



MIAx Emerald Options Exchange

User Manual

Modified November 2020

© 2020 Miami International Holdings, Inc. and its subsidiaries. All Rights Reserved.

Table of Contents

1. Introduction	5
2. How to Become a Member of MIAX Emerald	6
3. Types of Membership	7
Market Makers	7
Electronic Exchange Members (EEM)	7
4. Access by Non-Members	8
5. How Emerald Works	9
Architecture	9
Network Infrastructure	10
Data Center Services	10
Connectivity Choices	10
Trading System Features	11
Top of Market (ToM)	12
Complex Top of Market (cToM)	12
MIAX Order Feed	12
Administrative Information Subscribers (AIS)	14
MIAX Emerald Information and Performance Reports	14
Classes Listed on MIAX Emerald	15
Options Listed on MIAX Emerald	15
Simple Order Types	15
Routing to Other Exchanges	16
Simple Quote Types	17
Minimum Quote Size	17
Quoting Requirements	18
6. Trading on MIAX Emerald	19
Penny Pilot Program	19
Minimum Trading and Pricing Increments on MIAX Emerald	19
Allocation of Trades	19
Directed Order Enhanced Allocations	20

PLMM Enhanced Allocation.....	20
MIAX Emerald Opening Process	21
Emerald Price Improvement Mechanism (Emerald PRIME®) for Orders in the Simple Market.....	22
7. The MIAX Emerald Complex Order System.....	27
Complex Order Types.....	27
Complex Quote Types.....	28
Strategy Matching of Complex Orders.....	28
Legging of Complex Orders into the Simple Market.....	29
Complex Order Standard Auctions.....	29
Emerald Complex Order Price Improvement Mechanism (Emerald cPRIME).....	30
Stock-Tied Strategies.....	34
Derived Orders.....	34
Simple Market Auction Events / Wide Market Conditions.....	35
Trade Protection for Complex Orders	35
8. System Settings.....	37
9. Trading Halts and Trading Pauses	38
Limit Up / Limit Down (LULD).....	39
Market-Wide Circuit Breakers (MWCB)	39
10. MIAX Emerald Trade Protections	40
MIAX Variable Price Protection (MVP)	40
MIAX Order Monitor (MOM).....	41
Simple Order Protections Based on Price.....	41
Complex Order Protections Based on Price	41
Order Protections Based on Size and Quantity.....	41
MIAX Aggregate Risk Manager (ARM)	43
ARM ²	43
Market Maker Single Side Protection (SSP) for the Complex and Simple Order Markets.....	44
MIAX Risk Protection Monitor (RPM).....	44
Mass Cancellation of Trading Interest (MCTI)	47
Self-Trading Protection.....	48
Mass Quote Cancellation	48

ABBO Crossing Protection (Management of Non-Routable Liquidity).....	49
11. MIAX Member Firm Portal.....	50
12. MIAX Emerald Rules.....	51
13. MIAX Emerald Fees	52
MIAX Emerald Fee Schedule	52
14. Nullification and Adjustment of Options Transactions including Obvious Errors Policy.....	53
15. Hours of Operation and Calendar.....	54
Normal Trading Hours	54
Holiday Schedule and Altered Trading Hours.....	54
16. Contact MIAX Emerald	55

1. Introduction

The MIAX Emerald Exchange (MIAX Emerald, Emerald or the Exchange) created this User's Manual to assist Members and users of its Exchange in understanding the operation of the Exchange. The User's Manual discusses and, in some cases, summarizes various MIAX Emerald Rules. MIAX Emerald's complete and official Rulebook is available at www.miaxoptions.com/rulebook/emerald. In the event of a conflict between the User's Manual and the Rules set forth in the official Rulebook, the Rulebook shall prevail.

MIAX Emerald operates a fully automated electronic options trading platform for the purpose of buying and selling securities with a continuous, automated matching function. Liquidity is derived from quotes and orders to buy and sell. Quotes and orders are submitted to the Exchange electronically by Members from remote locations. MIAX Emerald does not maintain a physical trading floor. There are two categories of Members on MIAX Emerald – Market Makers, and all other Members which are known as Electronic Exchange Members (EEMs).

There are three types of Market Makers on MIAX Emerald: (i) Registered Market Makers, (ii) Lead Market Makers, and (iii) Primary Lead Market Makers, each of which is described in Section 3 below. Primary Lead Market Makers are Lead Market Makers, who meet certain additional criteria and obligations and are appointed as a Primary Lead Market Maker by the Exchange. There is just one Primary Lead Market Maker appointed by the Exchange in each option class. Primary Lead Market Makers, Lead Market Makers and Registered Market Makers (collectively, Market Makers) have affirmative market making obligations. Information on the quoting requirements for Market Makers can be found in the Quotes and Order Information section of this manual.

Access to the Exchange is maintained by way of Trading Permits issued to the Members. Trading Permits are not transferable except in the event of a change in control of a Member.

Members are subject to fees for executions and services on the Exchange as set forth in the Exchange's Fee Schedule.

2. How to Become a Member of MIAX Emerald

To become a member of MIAX Emerald, a Firm must be registered as a broker-dealer, must be a member of at least one other registered options exchange or FINRA, must be able to clear option trades or must clear through a clearing Firm and must meet certain additional criteria described by the Exchange and set forth in the Exchange's Rules. Non-members may also gain access to the Exchange through the use of a Sponsored User arrangement with a Sponsoring Member, in accordance with the Exchange's Rules.

Further information on membership at MIAX Emerald, is available on the Exchange's website:

www.miaxoptions.com/membership/emerald.

3. Types of Membership

Market Makers

- **Registered Market Maker**

Emerald as a Market Maker able to meet certain financial requirements and quoting obligations set forth in MIAX Emerald Rules. Further information regarding the obligations and requirements for RMMs and information regarding RMM trade allocations can be found in MIAX Emerald Rules, Chapters V and VI.

- **Lead Market Maker**

A Lead Market Maker (LMM) is a Market Maker that is held to, and maintains, additional financial requirements, and higher quoting obligations than a Registered Market Maker. Only LMMs (including those appointed as a Primary Lead Market Maker), may participate in the Exchange's Directed Order program and receive Marketing Fee payments for orders directed to them by an Electronic Exchange Member (Directed Orders). When appropriate, LMMs are also entitled to certain enhanced trade allocations in accordance with the Directed Order program. Further information regarding the obligations and requirements for LMMs and information regarding enhanced trade allocations and entitlements can be found in MIAX Emerald Rules, Chapters V and VI.

- **Primary Lead Market Maker**

A Primary Lead Market Maker (PLMM) is an LMM that is held to, and maintains, additional financial requirements, order flow commitments and additional quoting obligations in order to be appointed as the PLMM in an option class. There is only one PLMM appointed to each class of options traded on MIAX Emerald. A PLMM may receive certain enhanced trade allocations and entitlements when appropriate, including those associated with the Directed Order program. Further information regarding the obligations and requirements for a PLMM and information regarding enhanced trade allocations and other entitlements can be found in MIAX Emerald Rules, Chapters V and VI.

Electronic Exchange Members (EEM)

- An EEM is an Exchange Member that is permitted to submit either proprietary orders or orders it represents as agent to the MIAX Emerald System. An EEM is not permitted to act as a Market Maker.

4. Access by Non-Members

Non-Members may access the Exchange pursuant to Rules governing “sponsored access” to the Exchange. The Exchange permits access by entities (Sponsored Users) whose access is authorized in advance by entering into an arrangement with a Member (Sponsoring Member) in accordance with Exchange Rules.

Sponsored Users must agree to comply with all applicable Rules of the Exchange governing the entry, execution, reporting, clearing and settling of orders in securities eligible for trading on the Exchange. Further information about Sponsored Access can be found in MIAX Emerald Rules, Chapter II.

5. How Emerald Works

Architecture

Market Makers send quotes to the Exchange's systems through the MIAX Express Interface (MEI). Electronic Exchange Members send orders to the Exchange's systems through the FIX Order Interface (FOI) gateway. The MIAX Emerald Trading System is designed to be highly scalable, efficient, fast, reliable, robust and flexible.

The Exchange deploys multiple matching engines, each engine performing the trade match function for a defined set of option classes.

Market Makers connect to the System via the MIAX Express Interface (MEI), using a proprietary protocol for the transmission of quotes and other messages to and from the Exchange. Three types of MEI ports are available:

- **Full Service MEI Port**
 - All input message types are supported.
- **Limited Service MEI Port**
 - Supports all message types, except bulk quotes.
- **Priority Purge Port**
 - Supports only Quote Mass Cancel messages.

A Market Making Firm is allocated up to two full service, up to eight limited service and up to two Priority Purge MEI connections for each Exchange matching engine that performs the trade matching function for option classes in which the Member is assigned as a Market Maker.

EEMs connect to the System via the FOI gateway, using the industry standard FIX protocol with MIAX-specific extensions, for the transmission of orders and other messages to and from the Exchange. The FOI validates incoming orders and forwards them to the appropriate matching engine. Executions and cancelation notifications are provided through these same interfaces.

The matching engines of the Exchange each handle a defined set of option classes, which may be reallocated on a periodic basis in order to ensure that system load is balanced across the MIAX Emerald System. Each matching engine compares the limit price of all incoming quotes and orders with those quotes and orders already resting on the MIAX Emerald Book. The matching engine matches liquidity as available, calculates the MIAX Emerald Best Bid and Best Offer (the EBBO), monitors the other markets' displayed prices and determines when, and if, a trade can occur. If a newly arrived quote or order is marketable against the existing MIAX Emerald Book, and the EBBO is equal to or better than the best consolidated quote, an immediate match is made and allocations are communicated back to the trade participants.

If another market is disseminating a price superior to MIAX Emerald's displayed price, orders may be routed to the better priced market(s). Quotes and orders may be managed within the MIAX Emerald System so as not to lock or cross the NBBO price.

Network Infrastructure

- The MIAX network was designed to complement the MIAX Emerald Trading System and was built from the ground up to address the performance and security needs of a high speed trading platform. MIAX network infrastructure utilizes fully diverse and redundant 40Gbps backbones and 10 / 40Gbps switch technology for maximum throughput and minimal latency.

Data Center Services

- MIAX has partnered with Equinix, a world-class provider of data center services, to host the Trading System's data center infrastructure in its NY4 location.
- MIAX has implemented this approach to achieve redundancy in a single geographic locality for primary data center services.
- Customers with very low latency demands can cross-connect to the MIAX systems from elsewhere within the Equinix facility.
- **Notable Data Center Services**
 - SSAE16 compliant Data Centers
 - Redundant power feed sourced from district substations
 - Redundant power and cooling distribution paths within the facility
 - Concurrently maintainable (N+1 for greater resiliency)
 - On-site backup power generation
- **Enhanced Security Services**
 - State of the art security
 - Hand Scanners
 - Card Readers
 - Cameras
- Buildings designed to withstand fires, earthquakes, hurricanes and other environmental threats.
- Manned 24 / 7.
- An additional Data Center is operated in the Equinix CH4 location for Disaster Recovery.

Connectivity Choices

- MIAX Emerald's NY4 primary and secondary systems can be accessed via 1 Gigabit or 10 Gigabit ULL connections supporting direct attachment of customer / provider network equipment or directly attached host systems. Utilizing the MIAX Express Network Interconnect (MENI), 1 Gigabit connections are available and capable of accessing Emerald and any or all of the other MIAX Equity Options platforms. Dedicated 10 Gigabit ULL access to the MIAX Emerald platform is available but cannot be used to access other MIAX Equity Options platforms. Standard 10 Gigabit LL access will not be offered for Emerald. 1 Gigabit and 10 Gigabit LL connections are available and capable of accessing Emerald and any or all of the other MIAX Equity Options platforms in the CH4 disaster recovery center. MIAX supports the following connectivity options:
 - **Cross-Connect.** Users that are co-located in the Equinix NY4 or CH4 data centers may request an in-house cross-connect from the User's Point of Entry (POE) to MIAX Emerald.
 - **Point-to-Point.** Users may connect point-to-point using leased lines or other network methods (e.g., Ethernet, etc.). (Users are responsible for providing colocation space for independently owned equipment.)

- **Metro Ethernet / Dark Fiber.** Users may connect via Metro Ethernet or a dark fiber provider.

For additional details about connecting to the MIAX Express Network Interconnect (MENI), please see the [Connectivity Guide](#) on the Exchange's website.

Trading System Features

The MIAX Emerald Trading System was developed specifically for the unique functional and performance demands of derivatives trading. Our System provides the proper protections, low latency and throughput that is essential to the success of the trading community. The MIAX System provides extreme performance and scalability with best in class customer interface features and performance over the following interfaces:

- **FIX Order Interface (FOI) gateway for orders**
 - Each FOI is capable of processing more than 7,700 order messages per second.
- **FIX Drop (FXD)**
 - For clearing trade drops normally sent over FIX.
 - Available only to submitting EEMs
 - Echoes trade fills, trade adjustments, trade corrections and trade cancellations from orders submitted via FIX.
 - Does not include other FIX information such as order cancellations or order adjustments.
 - Multiple MPIDs can be configured to use a single FIX Drop Interface.
- MIAX Express Interface (MEI) offers direct connections to each matching engine for high-speed mass quoting:
 - Each full service MEI is capable of processing more than 200,000 quote messages per second.
- Top of Market (ToM) provides low latency access to Emerald market data:
 - The ToM data feed service produces market data across 12 multicast channels. Each channel is capable of transmitting more than 1,200,000 messages per second during peak periods.
- Administrative Information Subscriber (AIS) feed provides low latency access to Administrative Information and Liquidity Seeking Event information as-well-as certain product and System status information.
 - The AIS data feed service produces market data across 12 multicast channels.
- Clearing Trade Drop (CTD) is a low-latency, real-time feed providing clearing trade information to the parties of a trade, clearing Firms and / or other entitled designated recipients. Recipients connect to the CTD using a proprietary protocol and one or more CTD connections for each Exchange matching engine:
 - The CTD interface is capable of processing more than 20,000 clearing trade messages per second.
- **MIAX Order Feed (MOR)**
 - The MIAX Order Feed provides information about orders in the Emerald markets over 12 multicast channels.

The MIAX System uses a next-generation highly-automated Quality Assurance platform runs a full battery of tests against the System every night to ensure a high level of reliability and unprecedented confidence in System updates:

- State-of-the-art monitoring and systems security.
- A software and hardware architecture that results in minimizing the demands on power, space and cooling while allowing for rapid scalability, standard setting resiliency and superior fault isolation.

Further information on the Top of Market feed, Order feed and Administrative Information Subscribers feed is listed below. For additional details about connecting to the MIAX Express Network Interconnect (MENI), please see the [Connectivity Guide](#) and [Interface Specifications](#) on the Exchange's website.

Top of Market (ToM)

Top of Book and Trade Data is made available over the Top of Market data feed (ToM). ToM is available to all MIAX Emerald participants. ToM specific information:

- MIAX Emerald Best Bid and Offer information with sizes.
- Indications of Public and Priority Customer at the EBBO:
 - When present, the size of Priority Customer interest is also indicated
- Last sale information.
- Underlying Trading Status Notification.

ToM also includes information about other real-time Exchange System functions. Recipients connect to ToM using a proprietary protocol and for the purpose of redundancy may subscribe to two identical connections (ToM "A" and ToM "B") for each Exchange matching engine.

Complex Top of Market (cToM)

Complex Strategy Top of Book and Trade Data is made available over the Complex Top of Market data feed (cToM). cToM is available to all MIAX Emerald participants who choose to subscribe. cToM specific information:

- Complex Strategy Definition Notification.
- Complex Strategy Book Best Bid and Offer information with sizes:
 - Indication of Priority Customer size at the displayed Best Price on the Strategy Book (Phase II).
- Complex Strategy Last sale information.
- Underlying Trading Status Notification.

cToM also includes information about other real-time Exchange System functions. Recipients connect to cToM using a proprietary protocol and for the purpose of redundancy may subscribe to two identical connections (cToM "A" and cToM "B") for each Exchange matching engine.

Complex Order functionality may be enabled or disabled via Regulatory Circular.

MIAX Order Feed (MOR)

The MIAX Order Feed provides information about orders on the MIAX Emerald order book over a multicast feed. The following updates are transmitted over MOR when an order is received or when an order state changes:

- **Published Order information**
 - Time stamp
 - Action
 - Product ID

- Order ID
- Order Side
- Order Type
- Order Price
- Original Order Size
- Open Order Size
- Time in Force
- Origin
- Route Instruction
- Attributable ID if specified
- **For Complex Orders the following information will also be included**
 - Complex Strategy Definition Notification
 - Complex Order Notices
 - Priority Customer volume represented by a derived order
- **Order Close Message**
 - Used to disseminate Order Close (fill or cancel) for MIAX Emerald Simple and Complex Orders.
 - Contains only the following information:
 - Timestamp
 - Order ID
 - Simple or Complex Order
- The following will not be disseminated:
 - Order States:
 - Pending Replace
 - Rejected
 - Orders with time in Force of:
 - IOC
 - FOK
 - AOC (unless for Opening and Reopening)
 - Paired Orders:
 - PRIME
 - cPRIME
 - Customer Cross
 - Complex Customer Cross
 - Qualified Contingent Cross
 - Complex Qualified Contingent Cross
 - Child Orders related to routing are not published.
- Some elements of this data feed may be enabled or disabled via Regulatory Circular.

Administrative Information Subscribers (AIS)

Liquidity Seeking Event information is made available over the MIAX Administrative Information Subscriber data feed (AIS). AIS is available to all MIAX Emerald participants. AIS specific information:

- Opening Imbalance condition information.
- Opening Routing information.
- Expanded Quote Range Information.
- PRIME Auction notifications.
- Complex Auction notifications.
- cPRIME Auction notifications.

AIS also includes information about other real-time Exchange System functions and Complex Order strategy definition notifications. Recipients connect to AIS using a proprietary protocol and for the purpose of redundancy may subscribe to two identical connections (AIS “A” and AIS “B”) for each Exchange matching engine. Some elements of this data feed may be associated with functionality that can be enabled or disabled via Regulatory Circular.

MIAX Emerald Information and Performance Reports

Emerald Information and Performance Reports provide Member Firms with details of their trading and activities on the Exchange. The Reports include key information about transaction fees, directed orders, marketing fees, the NBBO and EBBO at the time of transaction, as well as volume, clearing and risk information. This information is intended to assist firms in monitoring and evaluating their trading activity on MIAX Emerald.

The reports are available on a T +1 basis via Firm specific secure FTP locations. This is the same location where end of day GTC and end of day clearing reports can be found. Further information on MIAX Emerald Information and Performance Report availability can be obtained by contacting MIAX Trading Operations at TradingOperations@MIAXOptions.com.

There are many types of Reports available, some of which are described below:

- **Traded Against Reports**
 - **Market Maker Report.** Includes all trades in which the Market Maker participated:
 - Executions resulting from orders directed to, and traded by, the Market Maker.
 - Executions resulting from orders directed to the Market Maker, but traded by others.
 - Executions resulting from orders directed to others and traded by the Market Maker.
 - Executions resulting from orders not directed and traded by the Market Maker.
 - Executions resulting from all other orders in a class to which the Member Firm is appointed as the PLMM.
 - **Electronic Exchange Member Report.** All executions resulting from orders sent by the EEM:
 - Executions resulting from orders directed by the EEM and traded by the Directed LMM.
 - Executions resulting from orders directed by the EEM and traded by parties other than the Directed LMM.
 - Executions resulting from orders not directed by the EEM.

Classes Listed on MIAX Emerald

A complete list of all Option Classes traded on MIAX Emerald is maintained in the Listings section of the Exchange's website at this address: <http://www.miaxoptions.com/listings/emerald>.

The "All Classes Listed on MIAX Emerald" file is updated daily and is available in CSV format. The file contains detailed information on each Class including:

- Underlying Symbol
- Underlying Security Name
- Option Symbol
- Primary Lead Market Maker (PLMM)
- Minimum Price Variation
- Minimum Quote Quantity
- Closing Time
- Information on Expiration Programs
- Information on Price Programs
- An indication if the Class is Closing Only
- MIAX Emerald Cloud Number

Options Listed on MIAX Emerald

A complete list of all Options traded on MIAX Emerald is maintained in the Listings section of the Exchange's website at this address: <http://www.miaxoptions.com/listings/emerald>.

The "All Options Listed on MIAX Emerald" file is updated daily and is available in CSV format. The file contains detailed information on each listed Option including:

- Underlying Symbol
- Option Symbol
- Expiration Date
- Strike Price
- Deliverable
- An indication if the Option is Closing Only

Simple Order Types

The following are the order types described in the MIAX Emerald Rules that, except as described below, are available for use on the Exchange as of the date of this User's Manual:

- **Market.** An order to buy or sell a stated number of options contracts at the best price available at the time of execution.
- **Limit.** An order to buy or sell a stated number of options contracts at or better than a specified price.
- **Marketable Limit.** A marketable limit order is a limit order to buy (sell) at or above (below) the best offer (bid) on the Exchange.

- **Fill-or-Kill (FOK).** A limit order to be executed in full upon receipt at a single price as soon as it is received or cancelled. A Fill-or-Kill order is not valid during the opening rotation process described in Rule 503.
- **Immediate-or-Cancel (IOC).** An order to be executed in whole or part upon receipt with any unexecuted portion cancelled. An immediate-or-cancel order is not valid during the opening rotation process described in Rule 503.
- **Auction-or-Cancel (AOC).** An order used to provide liquidity during a specific Exchange process such as an Opening Imbalance Timer or an auction as provided in the MIAX Emerald Rules.
- **Post-Only Order.** Post-Only Orders are orders that will not remove liquidity from the Book. Post-Only Orders are to be ranked and executed on the Exchange pursuant to Rule 514 (Priority on the Exchange), or handled pursuant to Rule 515, as appropriate, and will never route away to another trading center.
- **Intermarket Sweep Orders (ISO).** A limit order designated by the submitting member as an ISO trades without regard to MIAX Emerald price protections or protected quotations on other markets.
- **Do Not Route (DNR).** An order that will never be routed outside of MIAX Emerald regardless of the prices displayed by away markets. A DNR Order will never execute at a price inferior to the NBBO and when necessary, its display price will be managed so as not to lock or cross the NBBO.
- **Opening (OPG).** An order that is only valid during the Opening Process.
- **Day Limit.** An order to buy or sell which, if not executed, expires at the end of trading in the security on the day on which it was entered.
- **Good 'Til Cancelled (GTC).** An order to buy or sell, which if not executed, remains in effect until cancelled or until the underlying option expires.
- **Attributable.** An Attributable Order is a market or limit order which displays the entering Firm's Market Participant Identification (MPID). Use of Attributable Orders is voluntary.
- **Qualified Contingent Cross Order (QCC).** A QCC Order is an order that is comprised of an originating order to buy or sell at least 1,000 contracts (or 10,000 mini-option contracts) coupled with a contra side order for the same number of contracts and also paired with an NMS stock component. QCC Orders are not valid during the opening rotation process described in Rule 503.
- **Customer Cross Order.** A Customer Cross Order is comprised of a Priority Customer Order to buy and a Priority Customer Order to sell at the same price and for the same quantity. A Customer Cross Order is not valid during the opening rotation process described in Rule 503
- Certain order types are associated with functionality that may be enabled or disabled via Regulatory Circular.

Each of these types of orders is described in detail in MIAX Emerald Rule 516. The Exchange maintains a full audit trail of every order submitted to the Exchange's System. Members may receive status reports regarding orders submitted to the Exchange or change or cancel an order at any time before that order is executed on the Exchange.

Routing to Other Exchanges

Routing services are provided for routing to all Options Exchanges in the United States and are fully compliant with the Options Locked and Crossed Markets Plan (the Plan). The MIAX Emerald System routes Public Customer orders to away markets displaying liquidity at the NBBO when required to satisfy a protected quotation under the Plan.

A full description of MIAX Emerald routing functionality is available in MIAX Emerald Rule 529.

Simple Quote Types

The Emerald System accepts single-sided quotes. Market Makers may independently update bids and offers and are not required to send bid / ask pairs with every submission, provided they are compliant with their quoting obligations. Market Makers may submit a single standard quote and multiple eQuotes for each individual option, and may have multiple quotes (one standard quote and one or more eQuotes) active in a single option at any time. The following are the quote types described in the MIAX Emerald Rules that are available for use on the Exchange:

- **Standard.** A Standard quote cancels or replaces the Market Maker's previous quote, if any. For each Option, a Market Maker may only have a single Standard quote per side:
 - **Post-Only Standard Quotes.** The Post-Only instruction may be added to a Standard quote so that the quote will not remove liquidity from the Book. Post-Only quotes are to be ranked and executed on the Exchange pursuant to Rule 514 (Priority on the Exchange), or handled pursuant to Rule 515, as appropriate, and will never route away to another trading center.
 - Technical information on the submission of Post-Only Standard Quotes can be found in the MIAX Express Interface Specification on the Exchange's website.
- **eQuote.** An eQuote is a quote with a specific time in force that does not automatically cancel and replace a previous Standard quote or eQuote:
 - **Fill-or-Kill eQuote (FOK).** A quote to be executed in full upon receipt at a single price upon receipt or cancelled.
 - **Immediate-or-Cancel eQuote (IOC).** A quote to be executed in whole or part upon receipt with any unexecuted portion cancelled.
 - **Auction-or-Cancel eQuote (AOC).** A quote used to provide liquidity during a specific Exchange process such as an Opening Imbalance, Opening Route Timer or PRIME Auction.
 - **Intermarket Sweep eQuote.** A quote designated by the submitting member as an Intermarket Sweep eQuote trades without regard to MIAX Emerald price protections or protected quotations on other markets.
 - **Opening Only eQuote (OPG).** A quote that is only valid during the Opening Process.

Further information regarding quote types available on the MIAX Emerald can be found in MIAX Emerald Rule 517.

Minimum Quote Size

- **Standard Quotes.** The MIAX Emerald System accepts Standard quotes in a single-sided format. Standard quotes may be delivered in bulk with up to 50 single-sided quotes in an individual bulk quote message. Standard quotes must meet a minimum initial size when delivered to the Exchange. The Exchange-wide global default for Standard quote minimum size is ten (10) contracts. From time-to-time, the minimum Standard quote size may vary by class. Changes to the minimum Standard quote size will be announced via a Regulatory Circular and posted in the Regulatory section of the Exchange's website: www.miaxoptions.com/regulatory-circulars/emerald.
- **eQuotes.** The MIAX Emerald System accepts eQuotes in a single-sided, single quote format. eQuotes must meet a minimum initial size when delivered to the Exchange. The Exchange-wide global default for all eQuote types is one contract. From time-to-time the minimum eQuote size for certain types of eQuotes may vary. Changes to the minimum eQuote size will be announced via a Regulatory Circular and posted in the Regulatory section of the Exchange's website: www.miaxoptions.com/regulatory-circulars/emerald.

Further information regarding quoting requirements can be found in MIAX Emerald Rule 604 and further information on eQuotes can be found in MIAX Emerald Rule 517.

Quoting Requirements

PLMM, LMM and RMM Quoting Requirements are posted in the Regulatory section of the Exchange's website:

www.miaxoptions.com/market-maker-requirements/emerald.

6. Trading on MIAX Emerald

Penny Pilot Program

MIAX Emerald participates in the Penny Pilot program, which provides for the quoting and trading of certain option classes in penny increments. A list of the classes participating in the Penny Pilot Program is available along with other listing information on the Exchange's website at this address: www.miaxoptions.com/listings/emerald.

Minimum Trading and Pricing Increments on MIAX Emerald

Options in classes not in the Penny Pilot Program have a Minimum Price Variation (MPV) for EBBO display in \$0.05 increments if the affected options contract has a price of under \$3.00, and in \$0.10 increments if the affected options contract has a price of \$3.00 or higher.

Options in classes in the Penny Pilot Program have an MPV for EBBO display in \$0.01 increments under \$3.00 and \$0.05 increments for prices of \$3.00 or greater. Notwithstanding the above, options overlying certain ETFs and HOLDRs may be priced and disseminated in increments of \$0.01, regardless of the price of the option.

Allocation of Trades

MIAX Emerald supports both pro-rata and price-time trade allocation. As of the date of this User's Manual, only pro-rata trade allocation is available. If price-time trade allocation becomes available at a later date, notice will be provided via Regulatory Circular and on the Exchange's website.

Pro-rata trade allocation matches an initiating order against resting interest on the MIAX Emerald electronic book using a methodology that ensures that the best price has priority, but also allocates in a method that rewards Market Makers submitting continuous narrow and liquid two-sided quotes. As further defined in Rule 514(e), when multiple participants with interest at the same price exist, MIAX Emerald uses an allocation algorithm that groups the participants into three allocation tiers based on their participation type in the priority order defined below:

- Priority Customer Orders.
- Priority Quotes, after all Priority Customer Orders at the same price have been executed in full.
- All remaining Professional Orders and non-Priority Quotes, after all Priority Customer Orders and Priority Quotes have been executed in full.

A Market Maker quote that does not meet the defined Priority Width will be treated as Professional Interest for purposes of Enhanced Allocations and pro-rata trade allocation.

The priority quote width standard will be established by the Exchange and filed with the Commission. The priority quote width standard established by the Exchange can have bid / ask differentials as narrow as one MPV, as wide but never wider than the bid / ask differentials outlined in Rule 603(b)(4), or somewhere in between. Notwithstanding the foregoing, until such time as the Exchange has submitted and received approval of a rule change establishing

narrower bid / ask differentials, the priority quote width standard will be the bid / ask differentials outlined in Rule 603(b)(4).

Priority Quotes are required for Market Makers to be eligible for the Market Maker allocation tier (tier two). Priority Quotes are also required to be eligible to receive an Enhanced Allocation when the Primary Lead Market Maker or Directed Lead Market Maker overlays are in effect as described below.

Directed Order Enhanced Allocations

- **Directed Orders**
 - Directed Orders are orders that have identified a MIAX Emerald Market Maker (Directed Lead Market Maker, or DLMM) as the preferred contra party to the trade. If the Directed Lead Market Maker has a Priority Quote at the NBBO at the time the Directed Order is received, the Directed Lead Market Maker will receive the greater of:
 - An enhanced allocation of 60% if there is one other Market Maker with Priority Quotes at the NBBO or 40% if there are two or more other Market Makers with Priority Quotes at the NBBO; or
 - Their pro-rata share; or
 - One contract.
 - In all cases Market Maker allocations occur only after all Priority Customer interest at that price level has been satisfied.
- **Submitting a Directed Order**
 - Directed Orders may be submitted by any MIAX Emerald EEM on behalf of a Priority Customer.
 - Instructions to direct the order must be indicated in the FIX order message.
- **Receiving a Directed Order**
 - MIAX Emerald Market Makers that are approved as a Lead Market Maker may receive Directed Orders.

PLMM Enhanced Allocation

- **Orders Directed to the PLMM**
 - If the PLMM has a Priority Quote at the NBBO at the time the order is received and the PLMM is identified as the preferred contra party to the trade (the DLMM), the PLMM enhanced allocation described below will apply.
- Allocation of (i) orders directed to the PLMM and (ii) non-directed orders or (iii) orders directed to participant who is not quoting at the NBBO:
 - A PLMM with a Priority Quote at the NBBO at the time the order is received is entitled to receive the entire allocation of incoming orders with a size of 5 contracts or less (provided that the PLMM's disseminated quote is for a size of at least five contracts). A PLMM with a Priority Quote at the NBBO at the time an order of greater than five contracts are received will receive the greater of:
 - an enhanced allocation of 60% if there is one other Market Maker with Priority Quotes at the NBBO or 40% if there are two or more other Market Makers with Priority Quotes at the NBBO; or

- their pro-rata share; or
- one contract.
- In all cases Market Maker allocations occur only after all Priority Customer interest at that price level has been satisfied.

MIAX Emerald Opening Process

The MIAX Emerald Opening Process begins when the quoting requirements and other provisions of MIAX Emerald Rule 503 have been satisfied.

Once the Opening Process begins, if there are no quotes or orders that lock or cross each other, the System will open by disseminating the Exchange's best bid and offer among quotes and orders that exist in the System at that time. If there are quotes or orders that lock or cross each other, the System will calculate an opening price taking into consideration all valid Exchange quotes and all valid orders, together with other exchanges' markets for the option and identify the price at which the maximum number of contracts can trade. If that price is within the highest valid width quote bid and lowest valid width quote offer and leaves no imbalance, the Exchange will open at that price, executing marketable trading interest, as-long-as the opening price includes only Exchange interest. If the calculated opening price is outside of the NBBO, or equals the NBBO and requires interest from another exchange to satisfy all interest at that price, the System will broadcast a System Imbalance Message and initiate a Route Timer (not to exceed one second) to allow additional orders or quotes to be submitted. If no new interest is received during the Route Timer, the System will route to other markets disseminating prices better than the Exchange's opening price, execute marketable interest at the opening price on the Exchange, and route to other markets disseminating prices equal to the Exchange opening price if necessary. If new interest is received during the Route Timer, the System will recalculate the opening price taking such new interest into account. Then, if there is no longer an imbalance, the System will execute marketable interest at the opening price on the Exchange and route the remainder to other markets.

If the Opening Process results in an imbalance that cannot be satisfied within the Exchange's opening Quote Range, the System will begin an imbalance process by establishing an Expanded Quote Range (EQR), which will represent the limits of the range in which transactions may occur during the Opening Process. The EQR is established by subtracting the amount specified in the EQR table from the Quote Range bid and adding the amount specified in the table to the Quote Range offer. The EQR table can be found in the Regulatory Circulars section of the Regulatory tab on the Exchange's website: www.miaxoptions.com/regulatory-circulars/emerald.

If there is sufficient size on the Exchange on the opposite side of the market from the imbalance to execute all opening marketable interest at a price that is within the established EQR without leaving an imbalance, the System will open the affected option for trading at that price by executing opening marketable interest on the System, as long as the System does not trade through the ABBO. If all opening marketable size cannot be completely executed at or within the EQR without trading through the ABBO, the System will initiate an imbalance process. The System will broadcast a System Imbalance Message and initiate an Imbalance Timer (not to exceed three seconds) to allow additional orders or quotes to be submitted. At the end of the Imbalance Timer, if quotes and orders submitted during the Imbalance Timer, or other changes to the ABBO, would not allow the entire imbalance amount to trade at the Exchange at or within the EQR without trading through the ABBO, the System will send a new System Imbalance Message and initiate a Route Timer (not to exceed one second). If during the Route Timer, interest is received by the System which would allow all interest to trade on the System (i.e., there is no longer an imbalance) at the opening price without trading through other markets, the System will trade and the Route Timer will end early. If all of the marketable contracts on the Exchange can be executed, at the end of the Route Timer the System will execute as

many of the marketable contracts as possible by: (i) routing the number of contracts that will satisfy interest at other markets at prices better than the Exchange opening price; (ii) trading available contracts on the Exchange at the Exchange opening price; and/or (iii) routing a number of contracts that will satisfy interest at other markets at prices equal to the Exchange opening price. If not all of the marketable contracts on the Exchange can be executed, the System may repeat the imbalance process up to three times.

Order types and Instructions supported during the Opening Process:

- Opening Only (OPG)
- Settlement Auction Only (SAO)
- Auction-or-Cancel (AOC)
- Day Orders
- Good 'Til Cancelled (GTC)
- Do Not Route (DNR)
- **Post-Only**
 - The Post-Only instruction is ignored during the Opening Process

Quotes and eQuotes supported during the Opening Process:

- **Standard Quotes including Post-Only**
 - The Post-Only instruction is ignored during the Opening Process
- **eQuotes**
 - Opening Only (OPG)
 - Settlement Auction Only (SAO)
 - Auction-or-Cancel (AOC)

More information on acceptable bid / ask spreads for the Opening and other System parameters relating to the Opening Process can be found under System Settings on the Exchange's website:

<http://www.miaxoptions.com/system-configuration/emerald> and under Market Maker Requirements on the Exchange's website: <http://www.miaxoptions.com/market-maker-requirements/emerald>.

Emerald Price Improvement Mechanism (Emerald PRIME®) for Orders in the Simple Market

Emerald PRIME allows MIAX Emerald EEMs to enter orders they represent as agent (an Agency Order) into an auction to allow an opportunity for the Agency Order to receive price improvement. MIAX Emerald PRIME functionality may be enabled or disabled via Regulatory Circular.

A PRIME order consists of a simple paired order with sides of equal size, where the Contra side of the paired order guarantees the Agency side a complete fill at a price no worse than the auction start price (the stop price).

Participants

- All MIAX Emerald members may participate in PRIME Auctions.

PRIME Order

- A MIAX Emerald EEM submits an order it represents as agent (Agency Order) along with a contra side order (Contra Order) for the full size of the Agency Order:
 - The Contra Order guarantees the Agency Order a fill with either principal or solicited interest at the stop price:
 - An EEM may submit a PRIME Order with multiple contra participants provided the sum of the individual contra participants equals the total size of the Agency Order.
 - The Agency Order may be of any origin.
 - The Contra Order may be of any origin except MIAX Emerald Market Maker.

Responders

- All MIAX Emerald members, regardless of origin, may respond to a PRIME Auction.

PRIME Auction Start Price

- The Contra Order stops the Agency Order at a price that is equal to or better than the NBBO on the opposite side of the market from the Agency Order. The stop price also defines the auction's start price:
 - The EEM must stop the entire Agency Order at a price no worse than the NBBO:
 - If MIAX Emerald has an order resting on its book at the NBBO on the Agency Order side of the market, the auction start price must improve the NBBO by at least one penny.
 - Example:
 - If the NBBO and the MIAX Emerald BBO are 2.00 – 2.10 and MIAX Emerald has a limit order on the book to pay 2.00, the range of auction start prices is 2.01 through 2.10;
 - If MIAX Emerald only has quotes at 2.00, the range of auction start prices is 2.00 through 2.10.
- The PRIME Auction start price and auction responses may be in pennies irrespective of the option's MPV.
- Additional information about PRIME and Crossing Order acceptance and the auction start price can be found in MIAX Emerald Rule 515A.

PRIME Auction Initiation

- **Single-Price Submission**
 - Unless otherwise specified, PRIME Orders default to single-price submission. With single-price submission the Contra Party guarantees the Agency Order a complete fill at a price no worse than the auction start price.
 - When using single-price submission, the Contra Party may opt for last priority in the allocation. If elected, the Contra Party will only participate after all other tradable interest, if needed.

- **Auto-Match Limit and Auto-Match Market**
 - As an alternative to single-price submission, the Contra Party may participate in a PRIME Auction using auto-match as a limit or a market:
 - **Auto-Match Limit**
 - The Contra Party matches each auction response that improves the auction start-price up to and including the Auto-Match limit price specified by the Contra Order.
 - **Auto-Match Market**
 - The Contra Party matches all auction responses that provide price improvement until the PRIME Order is filled.

PRIME Auction Notification

- MIAX Emerald initiates a PRIME Auction upon receipt of a qualified PRIME Order and disseminates a request-for-response (RFR) message to all of its market data subscribers. The RFR message identifies the option, side, size, auction start price, and auction start-time.

PRIME Auction Process

- Responders may submit multiple responses on the opposite side of the market from the Agency Order that may be modified or canceled throughout the auction. Responses are held until the end of the auction when they may trade with unrelated liquidity.
- Auction responses shall be an Auction-or-Cancel (AOC) Order or AOC eQuote;
 - Auction responses are neither published nor visible to anyone.
 - Auction responses that do not equal or improve the auction start price and are therefore unable to join the auction will be rejected.
- If upon receipt of a PRIME Order MIAX Emerald has managed interest resting on its book on the opposite side of the market from the Agency Order, the Agency Order will immediately trade against the managed interest and any residual Agency Order quantity initiates the auction.

Auction Eligibility

- Only one PRIME auction may be in process for any given option at a time:
 - If MIAX Emerald receives a PRIME Order in an option that is already in a PRIME Auction, MIAX Emerald rejects the new PRIME Order.
- Managed Interest on the same side of the market as the Agency Order:
 - If upon receipt of a PRIME Order MIAX Emerald has managed interest resting on its book that is on the same side of the market as the Agency Order, MIAX Emerald rejects the PRIME Order.
- The PRIME Order will be rejected if there is a Post-Only quote or order on the Book for the option on the same side of the market as the Agency Order.
- If, at the time of receipt of a PRIME Order, the NBBO is locked or crossed, MIAX Emerald rejects the PRIME Order.
- For PRIME Orders of less than 50 contracts (or 500 Mini contracts):
 - If the option has an NBBO bid / ask spread of exactly one penny (\$0.01), MIAX Emerald rejects the PRIME Order.

Early Conclusion of an Auction

- MIAX Emerald terminates the auction timer early in the following scenarios:
 - **RFR Response**
 - If during a PRIME Auction MIAX Emerald receives an RFR response that is marketable against the NBBO, MIAX Emerald terminates the auction.
 - **Same Side Unrelated Liquidity**
 - If during a PRIME Auction MIAX Emerald receives an unrelated order in the same option on the same side of the market as the Agency Order that is marketable against the NBBO, the auction start price, or any auction response, MIAX Emerald terminates the auction.
 - **Opposite Side Unrelated Liquidity**
 - If during a PRIME Auction MIAX Emerald receives an unrelated order or quote in the same option on the opposite side of the market from the Agency Order that improves the price of any auction responses or is marketable against the NBBO, MIAX Emerald terminates the auction.
 - **Locked or Crossed Markets**
 - If the NBBO becomes locked or crossed, MIAX Emerald terminates the auction.
 - **Trading Halts**
 - A halt in the underlying security terminates the auction and the Agency Order only trades with the Contra Order and auction responses. The Agency Order does not trade with unrelated liquidity or resting interest.
- With the exception of a trading halt, an early conclusion of an auction follows the standard end of auction process - the Agency Order may trade with the Contra Order, auction responses, and unrelated liquidity. Once the Agency Order is filled, any remaining unrelated liquidity can trade with the remaining auction responses and liquidity on the MIAX Emerald book.
- Please note that engaging in a pattern and practice of disrupting the auction mechanism by intentionally causing auctions to end early will constitute a rule violation.

Best Price

- At the conclusion of the PRIME Auction the Agency Order trades with the best price(s) against all available interest that includes the Contra Order, auction responses, and unrelated interest.

Allocation

- MIAX Emerald caps oversized auction responses to the original size of the PRIME Order for allocation purposes.
- After any Priority Customer interest is satisfied, the Contra Order is entitled to its allocation as specified below and then MIAX Emerald applies its standard allocation algorithm to remaining interest at the conclusion of the auction.
- The allocation percentage for the Contra Order is determined by the number of remaining responders at the same price as the Contra Order:
 - **Single-Price Submission**
 - If only one other responder joins the Contra Order at the best price, the Contra Order receives a 50% allocation based on the original size of the order; otherwise the Contra Order receives a 40% allocation based on the original size of the order.

- If the Contra Order specifies the last-to-fill option, the Contra Order foregoes its guaranteed allocation.
- **Auto-Match**
 - If using auto match, the Contra Order is eligible to receive a 40% allocation of the remaining Agency Order size at the final price.
- Remaining contracts are allocated using the standard allocation algorithm.

Additional information concerning order allocation at the conclusion of PRIME Auctions can be found in MIAX Emerald Rule 515A.

Directed Orders in PRIME

- The Agency Order can be assigned a Directed Firm Code (DFC) by the submitting Member. The DFC will be used for the distribution of any related Marketing Fees, but will not be used for contract allocation resulting from a PRIME Auction.

PRIME Solicitation

- The PRIME Solicitation, a mechanism for trading institutional size orders (500 or greater) will be available in the future. As of the date of this User's Manual, PRIME Solicitation is not available. If PRIME Solicitation becomes available at a later date, notice will be provided via Regulatory Circular and on the Exchange's website.

Qualified Contingent Cross and Customer Cross Orders

- The PRIME mechanism is used for trading Qualified Contingent Cross and Customer Cross Orders. These crossing order transactions take place immediately (without an auction timer).

7. The MIAX Emerald Complex Order System

The MIAX Emerald Complex Order System is an execution platform providing for the execution of Complex Orders. A Complex Order is an order involving the simultaneous purchase and / or sale of two or more different options in the same underlying security (the “legs” or “components”) for the same account for the purpose of executing a particular investment strategy. A Complex Order may have up to eight components, all settling into the same underlying security and executed at a single net price. The Complex Order System has the capability to auction Complex Orders upon arrival (if so instructed), to match Complex Orders (and Complex Quotes) with other Complex Orders (and Complex Quotes) on the Strategy Book, to execute individual components of Complex Orders against orders held on the Simple Order Book in the Simple Market when available at the NBBO and in the proper ratio (so called, “legging”), and to continually evaluate for possible execution (through matching or auction) those Complex Orders and Complex Standard quotes that are resting on the Strategy Book.

MIAX Emerald Complex Order functionality may be enabled or disabled via Regulatory Circular. As of the date of this User’s Manual, Complex Standard quotes are not available. If Complex Standard quotes become available at a later date, notice will be provided via Regulatory Circular and on the Exchange’s website.

Complex Order Types

- **Market Orders**
 - An order to buy or sell a stated number of Strategies at the best price available at the time of execution.
- **Limit Orders**
 - An order to buy or sell a stated number of Strategies at or better than a specified price.
- **Day Limit Orders**
 - May be designated as Auction-on-Arrival (cAOA) specifying the submitter’s desire to be eligible to initiate a Complex Auction upon submission when received in free trading. Without a cAOA designation, Day Orders will be available for immediate Strategy Match, Legging or placement on the Strategy Book upon arrival, may join a Complex Auction that is in progress or participate in or initiate a Complex Auction resulting from a reevaluation.
- **GTC Orders**
 - May be designated as cAOA specifying the submitter’s desire to be eligible to initiate a Complex Auction upon submission when received in free trading. Without a cAOA designation, GTC Orders will be available for immediate Strategy Match, Legging or placement on the Strategy Book upon arrival, may join a Complex Auction that is in progress or participate in or initiate a Complex Auction resulting from a reevaluation.
- **Auction-or-Cancel Orders (cAOC)**
 - A cAOC order is a Complex Auction response order that lives only for the life of the event for which it was submitted and any unexecuted volume is cancelled by the System at the end of the event. cAOC Orders are not eligible to Leg into the Simple Market or initiate a Complex Auction.

- **Immediate or Cancel Orders (cIOC)**
 - A cIOC order immediately trades to the extent possible and is then cancelled by the System. cIOC Orders are not eligible to participate in, or initiate, a Complex Auction, but may Strategy Match or Leg into the Simple Market.
- **Post-Only Orders**
 - Post-Only Orders are not accepted by the Complex Order System and will be rejected.
- **Complex Qualified Contingent Cross Orders (cQCC)**
 - A cQCC Order is a Complex Order comprised of an originating Complex Order to buy or sell a Strategy consisting of at least 1,000 contracts of each option component coupled with a contra side order for the same Strategy which also consists of an NMS stock component. cQCC Orders are not valid during the opening rotation process described in Rule 503.
- **Complex Customer Cross Orders**
 - A Complex Customer Cross Order is comprised of a Priority Customer Complex Order to buy and a Priority Customer Complex Order to sell at the same price and for the same Strategy. A Complex Customer Cross Order is not valid during the opening rotation process described in Rule 503.

More information about Complex Order types can be found in MIAX Emerald Rule 518.

Complex Quote Types

- **Complex eQuotes**
 - **Auction-or-Cancel (cAOC)**
 - A cAOC eQuote is a Complex Auction or cPRIME Auction response that lives only for the life of the event for which it was submitted and any unexecuted volume is cancelled by the System at the end of the event. cAOC eQuotes are not eligible to Leg into the Simple Market or initiate a Complex Auction.
 - **Immediate or Cancel (cIOC)**
 - A cIOC eQuote immediately trades to the extent possible and is then cancelled by the System. cIOC eQuotes are not eligible to participate in, or initiate, a Complex Auction or Leg into the Simple Market.

More information about Complex eQuotes can be found in MIAX Emerald Rule 518.

Strategy Matching of Complex Orders

The Strategy Matching of Complex Orders and Complex Quotes may take place in free trading or within a Complex Auction. Strategy Match may not take place when the price of one component of the Strategy would equal the price of a Priority Customer Order resting on the Simple Order Book, unless the NBBO of at least one component of the Strategy is improved by at least one penny.

Complex Orders are automatically executed against bids and offers on the Strategy Book in price priority. Bids and offers at the same price will be executed according to the following priority rules: Priority Customer Complex Orders have first priority and are allocated on the basis of time of receipt; Market Maker Priority Interest has second priority, and is allocated on a pro-rata basis; Market Maker non-Priority Interest has third priority, and is allocated on a pro-rata basis; and Non-Market Maker Professional Interest has fourth priority, and is allocated on a pro-rata basis.

Complex Orders are not routed outside of the Exchange regardless of prices displayed by away markets. Complex Orders resting on the Strategy Book are managed and continually re-evaluated for execution by the System. More information on the circumstances under which Strategy Matching can take place can be found in MIAX Emerald Rule 518.

Legging of Complex Orders into the Simple Market

Legging is the act of executing a Complex Order against individual liquidity on the MIAX Emerald Simple Order Book in the Simple Market when each component is available at the NBBO and sized so that all sides of the Complex Order can execute (bids taking the Simple Order Book offer and offers hitting the Simple Order Book bid) in their proper ratio and within the Complex Order's price limit. Legging is not available for Complex Standard quotes, Complex eQuotes, Complex Orders that include the underlying security as a component, or certain Strategies that are restricted from Legging as defined in MIAX Emerald Rule 518.

Complex Order Standard Auctions

Complex Auctions may be initiated by the System in several different circumstances:

- **At the Opening or Reopening of a Strategy**
 - Once all of the components of a Strategy are open and in free trading the System will conduct an initial evaluation to see if any liquidity on the Strategy Book meets the requirements to initiate a Complex Auction.
- **Upon Entry of an Eligible Order Marked cAOA in Free Trading**
 - If certain marketability requirements are met, the System will initiate a Complex Auction on behalf of the incoming order.
- **Upon Reevaluation of the Strategy Book**
 - The System will continually reevaluate liquidity on the Strategy Book to determine if a Strategy Match is possible, if Legging of an order is possible, or if an eligible order meets the marketability and other requirements to initiate a Complex Auction.
- Any time liquidity would otherwise: i) auction, ii) trade or iii) post at a price more aggressive than its current MPC Price:
 - Information about MIAX Price Collars (MPC) for complex orders and eQuotes is available in the Trade Protections for Complex Orders section of this User's Manual

Upon receipt of a Complex Auction-eligible order or upon an evaluation by the System indicating that there is a Complex Auction-eligible order resting on the Strategy Book, the System will begin the Complex Auction process by sending a notification to all Exchange Members that subscribe to the Exchange's data feeds that deliver such notifications and initiating the Complex Auction timer.

The auction notification will include the following information:

- The limit price of the initiating order:
 - If the limit price is through the opposite side of the Strategy price as calculated using the displayed price of the components in the Simple Market on MIAX Emerald (the displayed Complex EBBO – dcEBBO), the System will send the dcEBBO in place of the order's limit price.
- The side of the market of the initiating order.

- The Matched Quantity and the Imbalance Quantity of all liquidity at the Complex Auction Price.

The length of the Complex Auction timer will be disseminated by Regulatory Circular and will not exceed 500 milliseconds.

Complex Auctions match liquidity at least one penny inside the best available market calculated using the best price for each component on the Simple Order Book and at the single price where the most volume can trade. The Complex Auction process will then continue trading via Strategy Match and Legging up to the dcEBBO. If all liquidity at the dcEBBO is exhausted and Complex Auction interest remains, the remaining interest, if eligible to rest on the Strategy Book, will be posted at the exhausted dcEBBO price and will be immediately reevaluated. Complex Auction interest not eligible to rest on the Strategy Book will be cancelled by the System.

More information about Complex Auctions, the requirements to initiate Complex Auctions and how Complex Auctions operate, can be found in MIAX Emerald Rule 518.

Emerald Complex Order Price Improvement Mechanism (Emerald cPRIME)

Emerald cPRIME allows MIAX Emerald EEMs to enter Complex Orders they represent as agent (a cPRIME Agency Order) into an auction to allow an opportunity for the cPRIME Agency Order to receive price improvement. MIAX Emerald cPRIME functionality may be enabled or disabled via Regulatory Circular.

A cPRIME Order consists of a paired Complex Order with sides of equal size, where the Contra side of the paired order guarantees the cPRIME Agency side a complete fill at a price no worse than the auction start price (the stop price).

Participants

- All MIAX Emerald members may participate in cPRIME Auctions.

cPRIME Order

- A MIAX Emerald EEM submits an order it represents as agent (cPRIME Agency Order) along with a Contra Order (cPRIME Contra Order) for the full size of the cPRIME Agency Order:
 - The cPRIME Contra Order guarantees the cPRIME Agency Order a fill with either principal or solicited interest at the stop price.
 - The cPRIME Agency Order may be of any origin.
 - The cPRIME Contra Order may be of any origin except MIAX Emerald Market Maker.

Responders

- All MIAX Emerald members, regardless of origin, may respond to a cPRIME Auction.

cPRIME Auction Start Price

- The cPRIME Contra Order stops the cPRIME Agency Order at a price that defines the auction's start price:
 - The EEM must stop the entire cPRIME Agency Order at a price that meets the following requirements:
 - The initiating price for a cPRIME Agency Order must be better than (inside) the icEBBO for the strategy and any other Complex Orders on the Strategy Book by at least \$0.01. The System will reject cPRIME Agency Orders submitted with an initiating price that is equal to or worse than (outside) the icEBBO or any other Complex Orders on the Strategy Book.

- The price must be at or inside of the MIAX Emerald Price Collar (MPC) on both sides of the market.
- The icEBBO is a calculation that uses the best price from the Simple Order Book for each component of a complex strategy including displayed and non-displayed trading interest:
 - If the order is for a protected Strategy (a Vertical or Calendar spread), the price must be within the protected price range as outlined in MIAX Emerald Rule 515A.
- The cPRIME Auction start price and auction responses may be in pennies irrespective of the MPV of any Strategy component.

Additional information about cPRIME and Complex Crossing Order acceptance and the auction start price can be found in MIAX Emerald Rule 515A.

cPRIME Auction Initiation

- **Single-Price Submission**
 - Unless otherwise specified, cPRIME Orders default to single-price submission. With single-price submission the Contra Party guarantees the cPRIME Agency Order a complete fill at a price no worse than the auction start price.
- **Auto-Match Limit and Auto-Match Market**
 - As an alternative to single-price submission, the Contra Party may participate in a cPRIME Auction using auto-match as a limit or a market:
 - **Auto-Match Limit**
 - The Contra Party matches each auction response that improves the auction start-price up to and including the Auto-Match limit price specified by the cPRIME Contra Order.
 - **Auto-Match Market**
 - The Contra Party matches all auction responses that provide price improvement until the cPRIME Order is filled.

cPRIME Auction Notification

- MIAX Emerald initiates a cPRIME Auction upon receipt of a qualified cPRIME.
- Order and disseminates a request-for-response (RFR) message to all of its market data subscribers. The RFR message identifies the Strategy, side, size, auction start price, and auction start-time.

cPRIME Auction Process

- Responders may submit multiple responses on the opposite side of the market from the cPRIME Agency Order that may be modified or canceled throughout the auction. Responses remain in the System until the end of the auction.
- Auction responses shall be a Complex Auction-or-Cancel (cAOC) Order or cAOC eQuote:
 - Auction responses are neither published nor visible to anyone.
 - Auction responses that do not equal or improve the auction start price and are therefore unable to join the auction will be rejected.

Auction Eligibility

- Only one complex auction whether a cPRIME or a Complex Auction may be in process for any given Strategy at a time:
 - If MIAX Emerald receives a cPRIME Order in a Strategy that is already in a cPRIME or Complex Auction, MIAX Emerald rejects the new cPRIME Order.
- The cPRIME Order will be rejected at the time of receipt if any component of the Strategy is subject to the Managed Interest Process.
- The cPRIME Order will be rejected at the time of receipt if any component of the Strategy is subject to a SMAT Event.
- A cPRIME Order will be rejected if upon receipt MIAX Emerald has managed interest for any component of the Strategy resting on its Simple book.

Early Conclusion of a cPRIME Auction

- MIAX Emerald terminates the auction timer early in the following scenarios:
 - Related liquidity (RFR response):
 - If a cAOC eQuote or cAOC Order on the opposite side of the market from the cPRIME Agency Order locks or crosses the Agency side icEBBO, or the best net price of a Complex Order in the same Strategy, whichever is more aggressive.
 - Unrelated liquidity:
 - If Unrelated interest on the same side of the market as the cPRIME Agency Order locks or crosses the best price on the opposite side of the market.
 - If Unrelated interest on the opposite side of the market from the cPRIME Agency Order:
 - locks or crosses the Agency side icEBBO, or the best net price of a Complex Order in the same Strategy, whichever is more aggressive; or
 - Improves the price of any RFR response.
 - A Simple Order or Quote in a component of the Strategy on the same side of the market as the cPRIME Agency Order locks or crosses the NBBO for that component.
 - A Simple Order or Quote in a component of the Strategy on the opposite side of the market from the cPRIME Agency Order:
 - Locks or crosses the NBBO for that component; or
 - Causes the icEBBO to be equal to or through the initiating price.
 - **Trading Halts**
 - A halt in the underlying security terminates the auction and the cPRIME Agency Order only trades with the cPRIME Contra Order and auction responses. The cPRIME Agency Order will not trade with unrelated liquidity or resting interest.
- With the exception of a trading halt, an early conclusion of an auction follows the standard end of auction process.
- Please note that engaging in a pattern and practice of disrupting the auction mechanism by intentionally causing auctions to end early will constitute a rule violation.

Best Price

- At the conclusion of the cPRIME Auction the cPRIME Agency Order trades with the best price(s) against all available interest including the cPRIME Contra Order, auction responses, unrelated interest and, if eligible for legging and interest remains, Simple Market interest that makes up the icEBBO.

Allocation

- MIAX Emerald caps oversized auction responses to the original size of the cPRIME Order for allocation purposes.
- The allocation percentage for the cPRIME Contra Order is determined by the number of remaining responders at the same price as the cPRIME Contra Order:
 - **Single-Price Submission**
 - If only one other responder joins the cPRIME Contra Order at the best price, the cPRIME Contra Order receives a 50% allocation based on the original size of the order; otherwise the cPRIME Contra Order receives a 40% allocation based on the original size of the order.
 - **Auto-Match**

If using auto match, the cPRIME Contra Order is eligible to receive a 40% allocation of the remaining cPRIME Agency Order size at the final price.
 - Remaining contracts are allocated using the standard allocation algorithm.

Additional information concerning order allocation at the conclusion of cPRIME Auctions can be found in MIAX Emerald Rule 515A.

Directed Orders in cPRIME

- The cPRIME Agency Order can be assigned a Directed Firm Code (DFC) by the submitting Member. The DFC will be used for the distribution of any related Marketing Fees, but will not be used for contract allocation resulting from a cPRIME Auction.

Complex Qualified Contingent Cross and Customer Cross Orders

- The cPRIME mechanism is used for trading Complex Qualified Contingent Cross and Customer Cross Orders. These crossing order transactions take place immediately (without an auction timer):
 - Information about the acceptance and execution of Complex Qualified Contingent Cross and Customer Cross Orders can be found in MIAX Emerald Rule 515A.

Stock-Tied Strategies

Complex Orders tied to underlying securities (generally referred to as “Stock-Tied” orders) are available through the Complex Order System:

- **Clearing Arrangements for EEMs and Market Makers**
 - Prior to submitting Stock-Tied orders or eQuotes to the Complex Order System, firms must first establish one of the two clearing arrangements outlined below. To complete this process, contact MIAX Member Services at: Membership@MIAXOptions.com:
 - **FINRA Transparency Services Uniform Executing Broker Agreement**
 - FINRA member firms that wish to participate in the Complex Order System for Stock-Tied orders are required to execute this agreement.
 - **QSR and Correspondent Clearing Relationships**
 - Firms that are not FINRA members and wish to participate in the Complex Order System should establish QSR and Correspondent Clearing relationships with MIAX’s Stock Routing Broker Dealer.
- Stock-Tied orders are eligible for Book Match, Complex Order Standard Auction Functionality, Complex Price Improvement Auctions (cPrime), QCC and Customer Cross orders.
- Stock-Tied orders are not eligible for legging.
- Stock-Tied orders are not eligible for the creation of Derived Orders.
- **Parity Price Protection.** A description of Parity Price Protection for Stock-Tied “Buy-Write” and “Married Put” Strategies consisting of a single Call or Put option component and an underlying security component consisting of exactly 100 shares is available in the Trade Protections for Complex Orders section below.

More information about Stock-Tied orders can be found in MIAX Emerald Rule 518.

Derived Orders

Derived Orders facilitate the execution of a Complex Order by placing a limit order for all or part of a component on the Simple Order Book. A Derived Order is an Exchange-generated limit order placed on the Simple Order Book that represents either a bid or offer for a component of a Complex Order resting on the Strategy Book.

Derived Orders are:

- Available only for Complex Orders that are eligible for Legging.
- Available only for those components with a ratio of one (1):
 - i.e., a Complex Order with components requiring a 1:2 ratio would only be eligible for generation of a Derived Order for the component with a ratio size of one (1).
- Represented in the EBBO.
- Not available for Routing.
- Subject to the Exchange’s order management procedures.

More information about Derived Orders can be found in MIAX Emerald Rule 518.

Simple Market Auction Events / Wide Market Conditions

During certain Auction Events (defined below), the Exchange uses special handling in the Complex Order Market to protect users and to prevent potential conflicts between the Complex Order Market and the Simple Order Market. With the exception of Complex Crossing Orders during Wide Market Conditions, trading in the Strategy will be suspended and the Strategy will remain in a pre-market state until the condition is resolved. Complex Crossing Orders (cPRIME, cQCC and Complex Customer Cross) will be accepted and may trade or initiate a cPRIME Auction during Wide Market Conditions:

- Wide Market Conditions exist when any component of a Strategy at the time of evaluation has a displayed EBBO quote width that is wider than the permissible Simple Market Valid Quote Width.
- PRIME Auction events for any component of the Strategy.

More information on System behavior during Auction Events and Wide Market Conditions can be found in MIAX Emerald Rule 518.

Trade Protection for Complex Orders

- **ABBO Price Protection (APP)**
 - The implied away best bid or offer (ixABBO) is the best complex bid from each single exchange and best complex offer from each single exchange, taking into account each exchange trading the components of the Strategy on their respective Simple Market Order books. Orders marked APP will never trade at a price outside of the opposing ixABBO as measured at the time of execution.
- **RPM for Complex Orders**
 - RPM Protection is extended to Complex Orders:
 - Complex Orders count as a single order for the delivering MPID regardless of the number of components that make up the Complex Order.
 - Contract sides executed as a result of Complex Orders will be counted for each component of the Strategy.
- **Complex MIAX Order Monitor (cMOM) Price Protection**
 - Rejects incoming limit orders that are priced through the opposite side of the cNBBO by an amount to be determined by the Exchange.
 - cMOM price protection does not apply to Complex Crossing Orders (cPRIME, cQCC and Complex Customer Cross).
 - A full description of cMOM order price and size protections is contained under the Complex Order Protections Based on Price heading in Section 10 of this Manual.
- **Order Protections Based on Size and Quantity**
 - Order Protections based on size and quantity for Complex Orders function as described under the Order Protections Based on Size and Quantity heading in Section 10 of this Manual.
- **MIAX Emerald Price Collars (MPC) for Complex Orders and eQuotes**
 - MPC is an Exchange-wide system that will prevent Complex Orders from executing at potentially erroneous prices by establishing temporary price limits (MPC Prices) beyond which the Complex Order or eQuote will not be displayed or executed. Complex orders or eQuotes are displayed and / or

executed according to normal complex order and eQuote handling procedures until reaching the first of, i) their limit price or, ii) their current MPC Price:

- The MPC value is calculated as a dollar amount and is expressed in pennies:
 - The MPC Value will be determined by the Exchange and communicated via Regulatory Circular.
 - The MPC Value will apply equally to all Classes listed on the Exchange in which complex orders are available.
 - The MPC value amount is added to the opposite side Complex National Best Bid or Offer (cNBBO) at the time the MPC Price is initially assigned, upon receipt or upon Strategy Opening, to establish the initial MPC.
 - If the MPC Price is less aggressive than the limit price of the Complex Order or eQuote (i.e., the MPC Price is lower than the Complex Order or eQuote's bid price for a buy, or the MPC Price is higher than the Complex Order or eQuote's offer price for a sell), or if the Complex Order is a market order, the Complex Order or eQuote will be displayed and / or executed according to normal complex order and eQuote handling procedures up to its MPC Price.
 - Any time liquidity would otherwise i) auction, ii) trade or iii) post at a price more aggressive than the current MPC Price, the System will initiate a Complex Liquidity Exposure Process (cLEP) Auction:
 - ◆ The cLEP Auction uses Standard Complex Auction methodology.
 - ◆ The cLEP Auction Start Price is the MPC Price.
 - After a complex order has been subjected to a cLEP Auction, its MPC Price will advance to a more aggressive level which will become its next MPC Price. The next MPC Price is determined by adding (for protected buy interest) or subtracting (for protected sell interest) the MPC Value to / from the then existing MPC Price.
 - MPC protection will continue until an order has been i) fully executed, ii) posted at its limit price, or iii) cancelled.
- More information about MPC behavior can be found in MIAX Emerald Rule 518.
- **Vertical Spread Price Protection**
 - A configurable Vertical Spread Variance (VSV) can be added to the maximum spread value (the difference between the two strikes) or subtracted from the minimum spread value of zero to create an allowable trading range for the Strategy. Orders priced through the allowable trading range will be managed at the limit of the allowable trading range.
 - The pre-set value of the VSV will be uniform for all option classes as determined by the Exchange and communicated to Members via Regulatory Circular.
- **Calendar Spread Price Protection**
 - A configurable Calendar Spread Variance (CSV) can be subtracted from the minimum spread value of zero (only one side is protected for a Calendar Spread). Orders priced through the minimum allowable trade value will be managed at the limit of the allowable trading range.
 - The pre-set value of the CSV will be uniform for all option classes as determined by the Exchange and communicated to Members via Regulatory Circular.

More information about all of the various Trade Protections for Complex Orders can be found in MIAX Emerald Rule 518.

8. System Settings

All current System settings are posted in the Regulatory Circulars located under the Regulatory tab on the Exchange's website: www.miaxoptions.com/regulatory-circulars/emerald and are also available under System Settings on the Exchange's website: <http://www.miaxoptions.com/system-configuration/emerald>.

Quoting information, including a table containing the following valid quote ranges is located under the Regulatory tab on the Exchange's website: www.miaxoptions.com/market-maker-requirements/emerald:

- Opening Valid Quote Width Table.
- Opening Priority Quote Width Table.
- Free Trading Valid Width Quote Table.
- Free Trading Priority Quote Table.

9. Trading Halts and Trading Pauses

The System automatically halts trading when the primary market for the underlying security disseminates a halted or paused condition. Under certain circumstances, in the interest of a fair and orderly market, the Exchange may elect to manually halt trading in an individual option class, a group of option classes or all option classes Exchange wide.

The Opening Process will not begin if the underlying security is halted or paused. If the Opening Process is in progress at the time of the halt, the System will interrupt the Opening Process prior to its completion, will halt trading in options already opened and will prevent unopened options from opening. After a trading halt on MIAX Emerald, the System will reopen following the same processes as the Opening Process, except that the Primary Listing Exchange for the underlying security will be used in place of the designated Exchange for Opening. The designated Exchange for Opening is disseminated via Regulatory Circular and is available on the Exchange's website.

Market Maker quotes are purged when is halt is initiated. Market Makers must send a re-entry flag prior to submitting quotes after the inception of a trading halt.

The following MIAX Emerald timers, if in progress at the time of a halt in the option, will be discontinued and will not result in an execution:

- Opening Imbalance Timer.
- Opening Route Timer.

If a PRIME or cPRIME Auction is in progress at the time of a halt in the option (or any option component of a Strategy), the Auction will be discontinued and the following end of Auction process will be followed:

- Quotes and eQuotes (other than AOC eQuotes in the auction) will be purged.
- The Auction Timer will be terminated and the standard End of Auction process will be performed using only the Agency Order, the Contra Order and any Auction Responses:
 - Unrelated Orders or interest resting on the NBBO will not be included
- After fully trading the Agency Order:
 - Any remaining contracts from the Contra Order will be cancelled.
 - Any remaining Auction Responses will be cancelled.

All Standard quotes and eQuotes existing at the time of the trading halt on MIAX Emerald will be purged by the System. Quotes sent prior to the conclusion of the purge will be rejected. A re-entry flag is required to resume submitting quotes after the purge is complete.

Notifications Prior to Reopening

- The Post Halt Notification period is the length of time prior to reopening after a manual trading halt prior to which a System notice is distributed over the Exchange's data feeds:
 - 20 Seconds.

- The Reopening Delay period is the length of time prior to reopening after an automatic trading halt (a System initiated interruption of trading resulting from a halt or pause in the underlying security on its primary listing exchange) prior to which a System notice is distributed over the Exchange's data feeds:
 - 5 Seconds.

Limit Up / Limit Down (LULD)

LULD functionality on MIAX Emerald is in effect when the underlying NMS Stock has entered into a Limit State or Straddle State. Once an NMS Stock has entered either a Straddle State or Limit State:

- The Exchange will not open an affected option.
- If an LULD state is entered after the opening, the Exchange will:
 - Reject all incoming market orders submitted into the Exchange System, and
 - Cancel all unexecuted market orders existing within the Exchange System, except that market orders to sell an option received when the national best bid is zero and the Exchange's disseminated offer is equal to or less than \$0.10 that have been converted to limit orders to sell pursuant to Rule 519(a) will not be cancelled by the Exchange's System.

In addition, once an NMS Stock has entered either a Limit or Straddle State, the Exchange shall relieve Exchange Market Makers from the following quotation obligations for options on the affected underlying NMS Stock:

- The bid / ask differential requirements set forth in MIAX Emerald Rule 603(b)(4).
- The minimum size requirement set forth in MIAX Emerald Rule 604(b)(2).
- The requirement to submit two-sided quotes set forth in MIAX Emerald Rule 604(c).
- The continuous quoting obligation set forth in MIAX Emerald Rule 604(e).

When an underlying NMS Stock is subject to a Trading Pause, the Exchange System will halt trading in options overlying the affected NMS Stock pursuant to MIAX Emerald Rule 504(c).

Market-Wide Circuit Breakers (MWCB)

MWCB halts are treated by the System in the same fashion as a Regulatory Trading Halt on the Primary Listing Market.

10. MIAX Emerald Trade Protections

MIAX Variable Price Protection (MVP)

The System applies a price protection process, as described in MIAX Emerald Rule 515, to all orders other than ISO Orders (as per MIAX Emerald Rule 515(c)(1)) and orders for the account of a MIAX Emerald Market Maker, limiting executions to no more than a specified number of MPVs through the NBBO as captured at time of order receipt. (If the Emerald best bid (offer) on the same side as the liquidity being evaluated is crossed by the National best offer (bid), the Emerald best bid (offer) will be used as the starting point for the MIAX Variable Price protection in place of the National best offer (bid).)

If size remains from a limit order priced through the NBBO (at the time of receipt) by more than the specified number of MPVs or a market order, and the order has exhausted its ability to execute on the NBBO within the MVP limit, the balance of the order will be cancelled back to the submitting member.

The number of MPVs through the NBBO at the time of order receipt that the order will be allowed to execute may be specified in the order at the time it is submitted to the Exchange through the Fix Order Interface. The acceptable value range for MVP is:

- **0 to 20**
 - A selection of 0 will indicate that the order will not be allowed to trade at a price inferior to the NBBO at the time the order was received.

To determine when an order will be converted to the max range or rejected, please refer to the FIX Order Interface Functional Specification on the MIAX website: www.miaxoptions.com/interface-specifications/emerald.

In the absence of a specified MVP value in the order at the time of submission, an Exchange default value for MVP will be applied. The MVP Exchange default value range is: 1 to 5. The effective value will be announced via Regulatory Circular and will be available under System Settings on the Exchange's website: <http://www.miaxoptions.com/system-configuration/emerald>.

Orders that participate in the MIAX Emerald Opening Process (including after a trading halt) will always use an MVP value of zero (0) regardless of whether another value has been specified in the order at the time of submission.

Orders with a price protection limit that is less aggressive than the order's effective limit price will be cancelled immediately following the commencement of a trading halt and at the end of each trading session.

MIAX Order Monitor (MOM)

Simple Order Protections Based on Price

In order to reduce the incidence of potential obvious or catastrophic errors on the Exchange, the MIAX Emerald System includes MOM, as described in Exchange Rule 519. MOM prevents certain orders that violate certain pre-defined price limits from executing or being placed on the MIAX Emerald Book. These price protections include:

- Rejection of market orders to sell when the national best bid is zero (0) and the national best offer is greater than \$0.10.
- Rejection of market orders to buy or sell when the NBBO is \$5.00 wide or greater.
- Rejection of limit orders priced through the opposite side NBBO by an amount greater than 50% of the NBBO or \$2.50, whichever is less, with the exception of:
 - When the NBO is less than or equal to \$0.50, the Exchange will only reject orders to buy with a price that is greater than the NBO by \$0.25 or more.
 - When the NBB is less than or equal to \$0.25, the Exchange will accept any properly submitted limit order to sell.

Protections under MOM do not apply to orders received prior to, or during the Opening Process, to Intermarket Sweep Orders (ISO), or to GTC orders resting from a prior session.

Complex Order Protections Based on Price

The MIAX Emerald Complex Order System also includes the Complex MIAX Order Monitor (cMOM), as described in Exchange Rule 518, Interpretations and Policies .06. cMOM prevents Complex Orders that violate certain pre-defined price limits from executing or being placed on the Emerald Strategy Book. MIAX Emerald Complex Order functionality may be enabled or disabled via Regulatory Circular. The cMOM price protection is as follows:

- Rejects incoming limit orders that are priced through the opposite side of the cNBBO by an amount to be determined by the Exchange and communicated to Members via Regulatory Circular, but which amount will not be greater than \$2.50.
- The cMOM price protection feature does not apply to Complex Crossing Orders (cPRIME, cQCC and Complex Customer Cross).

Order Protections Based on Size and Quantity

The MIAX Emerald System offers protections from potentially erroneous executions or obvious errors based on the size of orders, number of open orders and number of open contracts. Protections are available for both the Simple Order and Complex Order Markets.

Members are required to submit Exchange-wide global default settings for their Firm as a part of the MIAX Emerald Membership Application and System certification process. Firms provide settings by contacting the MIAX Trading Operations staff. The most recent settings will remain effective in the MIAX Emerald System until a subsequent update is received by the Exchange.

If triggered, the Simple Market Order protections referred to in this section will not affect the Firm's Complex Order Market functionality in any way, and if triggered, the Complex Market protections referred to in this section will not affect the Firm's Simple Market functionality in any way.

The following Exchange-wide Firm protections are available. These settings are not individually selectable by FOI connection, underlying security or MPID. Certain order protections are associated with functionality that may be enabled or disabled via Regulatory Circular.

Order Size

- Maximum size for a single Simple Market Order.
- Maximum size for a Simple Market Crossing Order (includes PRIME, Customer Cross and Qualified Contingent Cross).
- Maximum size for a single Complex Market Order.
- Maximum size for a Complex Market Crossing Order (includes cPRIME, Complex Customer Cross and Complex Qualified Contingent Cross).

Maximum Number of Open Orders

- Maximum number of Simple Market open orders.
- Maximum number of Complex Market open orders.
- These settings include partially filled orders.

Maximum Number of Open Contracts

- Maximum number of Simple Market open contracts.
- Maximum number of Complex Market open contracts.
- These settings include sum of any contracts remaining from unfilled and partially filled orders.

In addition to Firm-provided Exchange-wide settings that apply to all Classes, the following Firm / Class protections are available to provide Firm specific settings for individual Option Classes:

- Maximum size for a single Simple Market Order for a specific Class.
- Maximum size for a single Simple Market Crossing Order (includes PRIME, Customer Cross and Qualified Contingent Cross) for a specific Class.
- Maximum size for a single Complex Market order for a specific Class.
- Maximum size for a single Complex Market Crossing order (includes cPRIME, Complex Customer Cross and Complex Qualified Contingent Cross) for a specific Class.

For both Simple Market and Complex Crossing Orders, both the Agency side and Contra Order will each contribute to calculations for all Order Protections based on open orders and open contracts. For the Maximum size of a Crossing Order, only the Agency side (or the first side for Customer Cross and Qualified Contingent Cross Orders) will be counted.

For further information on the configuration of Order Protections Based on Size and Quantity, please contact MIAX Trading Operations: TradingOperations@MIAXOptions.com.

MIAX Aggregate Risk Manager (ARM)

The MIAX Aggregate Risk Manager (ARM) protects Market Makers by limiting the number of contracts they execute in a class on MIAX Emerald within a brief period of time as described in Exchange Rule 612.

The MIAX ARM tracks the number of contracts traded by a Market Maker (represented as a percentage of quote size) in an assigned option class within a specified time period. The Market Maker establishes a percentage of their quotations (Allowable Engagement Percentage) and the time period for each option class (“specified time period”). When an execution against a Market Maker’s Standard quote occurs, the System looks back over the specified time period to determine whether the execution is of sufficient size to trigger the Aggregate Risk Manager.

Market Makers can elect whether to have each new Standard quote sent reset their ARM count for that option side by selecting whether Reset on Quote (RoQ) is “on” or “off”. If Reset on Quote is “on”, and the Market Maker has requoted an option within the Counting Period, the Counting Period will only look back to the most recent requote. RoQ defaults to the “on” configuration. If Reset on Quote is “off”, all trades that occurred during the Counting Period are counted regardless of whether or not the Market Maker has requoted that side of that option. Participants desiring to have RoQ set to “off” must contact MIAX Trading Operations to request the new setting.

The System engages the Aggregate Risk Manager when it has determined that a Market Maker has traded a number of contracts equal to or above their Allowable Engagement Percentage during the time period. The Aggregate Risk Manager then automatically cancels and removes the Market Maker’s standard quotations from the Exchange’s disseminated quotation in all series of that particular option class until the Market Maker sends a re-entry flag and submits new quotations in the affected class. eQuotes present in the market are not cancelled by the Aggregate Risk Manager.

ARM²

ARM² is an enhancement to the existing ARM functionality. ARM² further protects MIAX Emerald Market Maker Firms with two ARM-derived counting programs, ARM² Class Protection and ARM² Firm Protection:

- **ARM² Class Protection.** ARM² Class Protection counts the number of ARM protections in a Class for that MPID over an ARM² Counting Period specified by the Firm. If the number of ARM protections in that Class meets the specified number, ARM² will initiate (Trigger) ARM² Class Protections in that Class for that MPID. Once Triggered, ARM² Class Protection requires a manual reset by MIAX Trading Operations to enable the Firm to send an ARM Quote Protection Reset Message and resume quoting in that Class.
- **ARM² Firm Protection.** ARM² Firm Protection counts the total number of unique Classes that Trigger ARM for a Firm over a Counting Period specified by the Firm. If the number of unique Classes that Trigger ARM protection meets or exceeds the designated threshold, ARM² will Trigger ARM protections for all Classes the Firm quotes. ARM² Firm Protection is an ARM protection for all Classes traded by the Firm and once Triggered requires manual reset by MIAX Trading Operations to enable the Firm to send an ARM Quote Protection Reset Message for each Class.
- **Configuration of ARM² Settings**
 - As with ARM settings, ARM² Class Protections are entered into the System via that MIAX Express Interface (MEI). Using MEI, the Firm can at any time create, edit or delete:
 - The settings for how many Primary ARM protections are required to Trigger ARM² for any Class / MPID combination.
 - The Counting Period settings for any Class / MPID combination.

- To create, edit or delete ARM2 Firm Protections, the Firm must submit a completed Protection Template to MIAX Trading Operations describing the ARM2 Firm Protection settings desired including the following:
 - The total number of unique Classes that must be protected by ARM across all MPIDs in the Firm required to Trigger ARM2 Firm Protection.
 - The Counting Period setting for ARM2 Firm Protection.

Market Maker Single Side Protection (SSP) for the Complex and Simple Order Markets

MIAX Emerald Single Side Protection removes the risk of a Market Maker trading multiple quotes on the same side of the market for an option or Complex Order Strategy. In order for the protection to be in effect, SSP must be enabled for an MPID by contacting MIAX Trading Operations. A single setting will enable (or disable) SSP for both the Simple Order Market and Complex Order Market, although the protections will operate separately (i.e., a Simple Order Market trigger will not affect Complex Order Market quotations or vice-versa.)

If enabled, SSP will be triggered when the full remaining size of a Simple or Complex Standard quote, IOC eQuote or FOK eQuote is exhausted by a trade.

Once Triggered in either the Simple or Complex Market, the Market Maker will be notified and the following actions affecting that Market Maker in that market will be taken:

- Any Simple Market or Complex Standard quote on that side of that option or Strategy for that Market Maker will be cancelled.
- All new Simple Market or Complex Standard quotes and IOC / FOK eQuotes on that side of that option or Strategy for that Market Maker will be Blocked.
- A reset message will be required before the Market Maker can reenter Standard quotes or IOC / FOK eQuotes on that (sell or buy) side of that option or Strategy.
- ISO, AOC and OPG eQuotes are unaffected (are not cancelled or blocked) and will never cause the protection to be triggered.

SSP Operates separately from any other MIAX Emerald trade protection and requires a separate reset to re-enable trading for that MPID for that side of the affected option or Strategy.

MIAX Risk Protection Monitor (RPM)

The MIAX Risk Protection Monitor (RPM) protects Member Firms, Clearing Firms and EEMs by providing a configurable and flexible safeguarding system that protects against Exchange-wide risk from the transmission and execution of orders as described in Exchange Rule 519A.

RPM enables the creation and simultaneous operation of multiple safeguarding measures (Metrics) allowing Members to establish Allowable Order Rates (rates of Order Acceptance by the Exchange) and Allowable Contract Execution Rates.

RPM is mandatory and all members who enter orders on the Exchange are required to establish basic risk protections as a prerequisite for trading on MIAX Emerald. Members must establish specified time periods for both an Allowable Order Rate and an Allowable Contract Execution Rate. The maximum duration of each specified time period will be established by the Exchange and announced via Regulatory Circular. The established multiplier may not exceed an

Exchange designated multiplier of the Member's historical peak order rate and peak contract execution rate over a specified number of trading days. The maximum Multiplier will also be established by the Exchange on an Exchange-wide basis and announced via Regulatory Circular. Certain order types are associated with functionality that may be enabled or disabled via Regulatory Circular.

When triggered the Risk Protection Monitor will prevent the System from accepting any new orders in all classes from the Member and, if designated by the Member's instructions, the System will also cancel all existing Day Orders in all classes from the Member.

When a Member's order is entered, or when an execution of a Member's order occurs, the System will look back over the specified time period to determine whether the order entered or the execution that occurred triggers the Risk Protection Monitor

- Members may establish whether the Risk Protection Monitor, when triggered, will:
 - Prevent the System from receiving any new orders in all series in all classes from the Member.
 - Prevent the System from receiving any new orders in all series in all classes from the Member and cancel all existing Day Orders in all series in all classes from the Member.
 - Send a notification that the Risk Protection Monitor has been triggered without any further preventative or cancellation action by the System.

Cancellation instructions for orders remaining on the book on behalf of protected MPIDs will continue to be accepted and acted upon. Cancel / Replace orders for affected MPIDs will cause only the Cancel portion of the order will be acted upon. The Replace instruction of the Cancel / Replace order will be rejected.

RPM Groups

- Members may also elect to group with other Members to enable the Risk Protection Monitor to apply collectively to the Group. The Members in the Group must designate a Group owner. Members may elect to group provided that either:
 - There is at least 75% common ownership between the firms as reflected on each firm's Form BD, Schedule A.
 - There is written authorization signed by all Members in the Group and the Group owner maintains exclusive control of all orders sent to the Exchange from each MPID within the Group.
- A clearing firm may also elect to group several Members to enable the Risk Protection Monitor to apply collectively to the group with the clearing firm designated as the group owner, provided that the clearing firm serves as the clearing firm for all the MPIDs of the Group and there is written authorization signed by the clearing firm and each Member of the Group. A clearing firm that has grouped several Members may only receive warning messages, unless one Member of the Group maintains exclusive control of all orders sent to the Exchange from each MPID within the Group.
- The Risk Protection Monitor for groups will operate in the same manner as described above, except that: (i) the counting program will count the number of orders entered and the number of contracts traded resulting from an order entered by all MPIDs in the Group collectively; (ii) the System will trigger the Risk Protection Monitor when the Group collectively exceeds either the Allowable Order Rate or Allowable Contract Execution Rate for the Group; (iii) once engaged, the Risk Protection Monitor will then either automatically prevent the System from receiving any new orders in all series in all classes from each MPID in the Group, and, if designated by the Group owner's instructions, cancel all existing Day Orders in all series in all classes from the Group or send a notification without any further preventative or cancellation action by the System; and;

- (iv) only the designated Group owner may request the Exchange to enable the acceptance of new orders for all the Members of the Group.
- Subject to the above, a Member may establish more than one Group.

PRIME and Complex Crossing Order Handling in RPM

- The System does include the following paired order types in the counting program. Each be counted as two orders for the purpose of calculating the Allowable Order Rate:
 - PRIME Orders
 - PRIME Solicitation Orders
 - cPRIME Orders
 - Simple and Complex QCC Orders
 - Simple and Complex Customer Crossing Orders
- Once engaged, the Risk Protection Monitor will block, but will not cancel any existing:
 - PRIME Orders
 - PRIME Solicitation Orders
 - Complex Crossing Orders (Stopped orders or immediately executed orders)
 - Simple or Complex AOC Orders
 - OPG Orders
 - Simple or Complex GTC Orders
 - QCC, cQCC, C2C and cC2C orders do not exist on the book and are therefore not subject to cancellation

Such orders will remain in the System available for trading and management when the Risk Protection Monitor is engaged.

RPM Warnings

- Members may also elect to receive warning notifications indicating that a specific percentage of an Allowable Order Rate or an Allowable Contract Execution Rate has been met for all metrics.

For further information on the configuration and operation of the Risk Protection Monitor, please contact MIAX Trading Operations: TradingOperations@MIAXOptions.com.

Mass Cancellation of Trading Interest (MCTI)

Cancel

- A Member may cancel all or a subset of its orders in the System, by firm name or by MPID, by requesting the Exchange staff to affect such cancellations.

Cancel and Block

- An EEM may request that the Exchange cancel all or a subset of its orders in the System and block all new inbound orders.
- A Market Maker may request that the Exchange remove all or a subset of its: (i) quotations in the System and block all or a subset of its new inbound quotations by firm name or MPID; or (ii) Standard quotations in the System and block all or a subset of its new inbound Standard quotations by MPID.
- The block will remain in effect until the Member requests that the Exchange remove the block.

Detection of Loss of Communication

- **MIAX Express Interface (“MEI”)**
 - When a Loss of Communication is detected on an MEI port during a certain time period (“xx” seconds), the System will close the session and automatically cancel quotes and eQuotes, as configured by the Member, provided that when a Loss of Communication is detected on the last connected MEI port during a certain time period (“xx” seconds), the System will close the session and automatically cancel quotes and eQuotes. The Exchange shall determine the appropriate period of (“xx” seconds) and shall notify Members of the value of “xx” seconds via Regulatory Circular. In no event shall “xx” be less than one second or greater than ten (10) seconds. Initially, the Exchange intends to set the value at one second.
- **Financial Information eXchange (“FIX”) Protocol**
 - When a Loss of Communication is detected on a FIX port the System will logoff the Member’s session and (i) cancel all eligible orders for the FIX Session if instructed by the Member upon login, or (ii) cancel all eligible orders identified by the Member. Following a disconnection, a reconnection will not be permitted for a certain period of time (“yy” seconds). The Exchange shall determine the appropriate period of (“yy” seconds) and shall notify Members of the value of “yy” seconds via Regulatory Circular. In no event shall “yy” be less than one second or greater than ten seconds. Initially, the Exchange intends to set the value at one second.

Loss of Communication

- A “Heartbeat” message is a communication which acts as a virtual pulse between the Exchange System and the Member’s system. The Heartbeat message sent by the Member and received by the Exchange allows the Exchange to continually monitor its connection with the Member:
 - Loss of communication is determined on an MEI port by (a) the lack of Heartbeats and/or Heartbeat responses as determined by the Exchange and communicated to Members via Regulatory Circular, or (b) the lack of data transmission from the Member, within a certain time period as determined by the Exchange and communicated to Members via Regulatory Circular. Initially, the Exchange intends to set this value at one second.
 - Loss of communication is determined on a FIX port by the lack of Heartbeats and / or Heartbeat responses as determined by the Exchange and communicated to Members via Regulatory Circular,

within a certain time period as specified by the Member upon login. Initially, the Exchange intends to set this value at one second.

Good 'Til Cancelled (“GTC”) Orders, as defined in Rule 516 and PRIME Orders, as defined in Rule 515A, are not eligible for automatic cancellation.

For more details on MCTI functionality, refer to MIAX Emerald Rule 519C. Additional information is also available in the MIAX FIX Order Interface Functional Specification or the MIAX Express Interface Functional Specification on the Exchange’s web site: www.miaxoptions.com/interface-specifications/emerald.

Self-Trading Protection

The MIAX Emerald System contains certain protections to prevent a Market Maker from interacting with their own quote or order. In the event that a Market Maker sends a quote or order priced at a limit that would allow it to interact with a quote or order from that same Market Maker MPID that is resting on the opposite side of the market, the resting quote or order from that Market Maker MPID will be cancelled by the System and the new quote or order will be accepted by the System.

Mass Quote Cancellation

- **Firm Initiated and Firm Requested Mass Cancellation**
 - Firms may initiate mass quote cancellation via MEI with a single request:
 - **Class Mass Quote Cancel.** Remove all Standard quotes and eQuotes in a class or classes associated with a specific underlying security for a given MPID:
 - Can apply to Simple Market quotes, Complex Market quotes or both.
 - A Reset Message is required to resume the submission of Standard quotes and eQuotes in that Class.
 - **Hybrid Mass Quote Cancel.** Remove all Standard quotes in a class with a specific underlying security for a given MPID. eQuotes are not affected:
 - Can apply to Simple Market Standard quotes, Complex Market Standard quotes (when available) or both.
 - A Reset Message is required to resume the submission of Standard quotes in that Class.
 - eQuotes are not blocked and continue to be accepted without the requirement of a Reset Message.
 - **MPID Wildcard Mass Quote Cancel.** Cancel all Standard quotes and all eQuotes for all classes on a specified matching engine for a given MPID:
 - Hybrid Wildcard Mass Cancellations are not supported.
 - MPID Wildcard Mass Cancellations can apply to Simple Market quotes, Complex Market quotes or both.
 - A Reset Message is required to resume the submission of Standard quotes and eQuotes in all classes after a Wildcard Mass Cancellation.

- MIAX Trading Operations has the ability to quickly cancel all quotes by Firm request for the following categories:
 - Underlying security and MPID.
 - Globally by MPID.
 - Globally by Firm.
- **MIAX Emerald Initiated and Automatic Purges**
 - **Port Disconnect Purges**
 - **Default Behavior.** If all ports for a given Firm on a specific matching engine disconnect, all Standard quotes and eQuotes for all of that Firm's MPIDs will be purged for that matching engine:
 - **Port Grouping.** Allows Firms to specify custom port groupings and regulate automatic purge behavior by group. Contact MIAX Trading Operations for details.
 - Port Disconnect Purges can be configured to apply to Simple Market quotes, Complex Market quotes or both.
 - **Loss of Heartbeat**
 - If all MEI applications on a specific matching engine fail for a given Firm, all quotes are purged for that entire Firm's MPIDs on that matching engine:
 - **Port Grouping.** Allows Firms to specify custom port groupings and regulate automatic purge behavior by group. Contact MIAX Trading Operations for details.
 - **Trading Halt**
 - In the case of a trading halt, all quotes in all classes associated with the underlying security(ies) that have halted are purged.
 - **Non-tradable Series**
 - When a series is made non-tradable, all quotes for the series are purged.

Additional information about quote Mass Cancellation and Purges can be found in the MIAX Express Interface Functional Specification on the MIAX website: www.miaxoptions.com/interface-specifications/emerald.

ABBO Crossing Protection (Management of Non-Routable Liquidity)

The Exchange System will not disseminate a locked or crossed market unless such dissemination is done in accordance with Exchange Rules or a National Market System plan (NMS) governing locked and crossed markets. When the System receives a quote or non-routable order that would lock or cross an away market, the System will display such quote or non-routable order at a price that is one MPV away from the current opposite side NBBO and book the quote or order at an undisplayed price that will lock the current opposite side NBBO. Should the NBBO price change to a price that is inferior to the price of the undisplayed booked quote or order, such quote or order's undisplayed price will continuously re-price to lock the new NBBO, and the quote or order's displayed price will continuously re-price one MPV away from the new NBBO until the quote or order reaches its original limit price, is fully executed, or is cancelled.

11. MIAX Member Firm Portal

The Member Firm Portal (MFP) is a member-facing application available via the internet. The MFP provides members with the tools needed to search for trade data, apply same-side clearing trade corrections and perform symbol self-assignments for LMMs and RMMs. This function is not available for PLMM assignment which is handled through the Exchange Listings Department.

The Member Firm Portal is available for search queries at all times. The trade information clearing correction function is available from 09:30 AM ET until System shutdown which occurs at approximately 5:15 PM ET.

LMM and RMM symbol self-assignments must be entered via the Member Firm Portal prior to 6:00 PM are effective for the following trading day. LMM and RMM symbol assignment changes via the Member Firm Portal are expected to become mandatory beginning in early 2018. Same day self-assignments are not available through the Member Firm Portal.

Additional information regarding the Member Firm Portal can be obtained by contacting MIAX Trading Operations at: TradingOperations@MIAXOptions.com.

12. MIAX Emerald Rules

A copy of the complete MIAX Emerald Rulebook is available in the Regulatory Section of the MIAX website:

www.miaxoptions.com/rulebook/emerald.

Throughout this User's Manual reference is made to MIAX Emerald Rules, in the event of any conflict between a description or discussion of a Rule in this User's Manual and the Rules set forth in the MIAX Emerald Rulebook, the Rulebook shall prevail.

13. MIAX Emerald Fees

MIAX Emerald Fee Schedule

MIAX Emerald operates under a maker-taker fee structure in which the Exchange generally pays its Members a rebate to provide liquidity and generally charges Members a fee to remove liquidity. MIAX Emerald may choose to apply volume discounts or other incentives to some of its transaction fees.

MIAX Emerald also charges membership fees, application fees, market data fees, connectivity fees, bandwidth fees and testing fees. A link to a copy of the complete MIAX Emerald Fee Schedule is available on the Exchange's website under the Fee Summary tab: www.miaxoptions.com/fees/emerald.

14. Nullification and Adjustment of Options Transactions including Obvious Errors Policy

The Exchange's policy towards Nullification and Adjustment of Options Transactions Including Obvious Errors is set forth in Exchange Rule 521 and 530(j). Participants who believe they may have been a party to an erroneous transaction or wish to request a voluntary nullification or adjustment are encouraged to fill out the Regulatory Form found on the MIAX website under Regulatory: www.mioxoptions.com/regulatory-forms/emerald and email it to Regulatory@mioxoptions.com. Once submitted, a MIAX Regulatory Official will review the transaction and take the appropriate action. The MIAX Regulatory Official will promptly notify all parties to the trade in question of any Voluntary or Obvious Error reviews. Once a review has been completed all parties will be notified and informed of any rulings or voluntary agreements. A member may appeal the decision from an Obvious Error review to the MIAX Chief Regulatory Officer (CRO).

15. Hours of Operation and Calendar

Normal Trading Hours

Normal hours of operation can be found on the Exchange's website: www.miaxoptions.com/trade-hours-calendar/emerald.

Holiday Schedule and Altered Trading Hours

The Holiday Schedule and any deviations from Normal Trading Hours can be found on the Exchange's website: www.miaxoptions.com/trade-hours-calendar/emerald.

16. Contact MIAX Emerald

Miami International Holdings, Inc.

Address: 7 Roszel Road, Suite 5-A
Princeton, NJ 08540

Phone: 609-897-7300

Area of Interest	Department	Email
Investor Inquiries	Investor Relations	Investor.Relations@Miami-Holdings.com
Business Development	Business Development	info@MIAXOptions.com
Regulatory	Regulatory	Regulatory@MIAXOptions.com Primary: 609-897-7309
Membership	Membership	Membership@MIAXOptions.com
Market Operations	Trading Operations	TradingOperations@MIAXOptions.com Primary: 609-897-7302
Connectivity	Trading Operations	TradingOperations@MIAXOptions.com Primary: 609-897-7302
Certification Testing	Trading Operations	TradingOperations@MIAXOptions.com Primary: 609-897-7302
Interface Development	Trading Operations	TradingOperations@MIAXOptions.com Primary: 609-897-7302
Market Data Requests	Market Data	MarketData@MIAXOptions.com
Market Data Usage Reporting	Market Data	MarketDataUsage@MIAXOptions.com
Listings	Listings	Listings@MIAXOptions.com Primary: 609-897-7308
Sales and marketing	Business Development	Sales@MIAXOptions.com Primary: 609-897-8177
Billing	Billing	Billing@MIAXOptions.com

miaxTM

miaxoptions.com