

**MIAx Emerald Options Exchange**

# **MIAX Order Feed (MOR)**

## ***Interface Specification***

**Revision Date: 07/26/2020**  
**Version 1.0a**

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# 1. Overview

Emerald - MIAX Order Feed (**MOR**) is a data feed that allows subscribers to receive real-time updates of the following information from the MIAX Emerald Options Market

- Options orders (Please refer to the rules as to the types of orders published)
- Products traded on MIAX Emerald
- MIAX Emerald Options System status
- MIAX Emerald Options Underlying trading status

MIAX Emerald is referred to as Emerald in the rest of the document.

MOR Features:

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

- MOR uses binary message format, binary numeric fields and fixed-length ASCII fields messages in order to utilize bandwidth efficiently and assist in achieving **low latency**. MOR messages use Product IDs in each message in place of a full canonical symbol.
- MOR is offered with redundant multicast feeds (A Feed & B Feed) to provide single point of failure hardware and network fault tolerance and to provide an opportunity for recipients to arbitrate the two feeds to auto-fill gaps.
- MOR real-time messages are disseminated over multicast to achieve a fair delivery mechanism. MOR requires the use of MIAX proprietary SesM over TCP/IP protocol for retransmission lines in order to provide a **guaranteed delivery** mechanism for gap fills.
- The MOR retransmission service also provides a 3.2.2 Last Value Refresh **Service** to facilitate fast intra-day recovery without a full day gap fill.
- MOR notifications provide current **electronic system status** allowing the subscribers to take necessary actions immediately.

This specification is intended to be used by Emerald MOR subscribers only.

## 1.1 Exchange related information

### 1.1.1 Hours of Operation for Emerald Options Exchange

Please refer to MIAX website at <http://www.MIAXOptions.com> for details about times for each of these events.

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

- Start of Session: Start of dissemination of messages. After 5:00 a.m.

- Trading Session for Equity Options: 9:30 a.m. to 4:00 p.m. (ends at 1:00 p.m. on early closing days).
- Trading Session for ETF and Index Options: 9:30 a.m. to 4:15 p.m. (ends at 1:15 p.m. on early closing days).
- End of Order Cancel Acceptance: 4:25 p.m. (1:25 p.m. on early closing days). However, Emerald may send order messages following the end of order cancel acceptance due to manual actions of the trade desk for various operational reasons.

### 1.1.2 Obtaining more information

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

## 1.2 Testing of MOR Subscription

Emerald can provide testing assistance on the Emerald testing area for the MOR Feed and the MOR retransmission interface.

Please contact MIAX Trading Operations at [TradingOperations@MIAXOptions.com](mailto:TradingOperations@MIAXOptions.com) or (609) 897-7302 to obtain more information about the aforementioned.

## 1.3 Answers to FAQs

Subscription: Please contact Trading Operations for details about subscribing to MOR.

Symbol and Strategy management: Subscribers to the data feed will get a list of all option symbols and strategies that will be traded and sourced on that feed at the start of every session. If firms cannot start listening to the feed in time for the normal symbol and complex strategy broadcast, they can connect to the MOR Retransmission service and request for a Last Value Refresh Service (see section 3.2.2 Last Value Refresh Service) or request all messages published and then subsequently process only the symbol and strategy messages to build their symbol and/or strategy list. The Emerald assigned Product ID or Strategy ID of each option/strategy will be sent in every message so that firms can tie each message to an option symbol or strategy.

Retransmission: Gap-fill packets generated as a response to retransmission requests are only disseminated on the retransmission TCP channels and not on the real-time multicast feeds.

Redundant Feeds: In order to achieve higher availability, Emerald offers the real-time MOR feed in two separate redundant and identical feeds named “A Feed” and “B Feed”. Firms are advised to arbitrate between the two feeds in order to mitigate gaps and achieve higher availability. “A Feed” is the primary feed from the primary data center and “B Feed” is the secondary feed from the secondary data center.

Refresh Service: Refresh service is provided only on the retransmission TCP channels and does not affect the real-time MOR feed.

## 1.4 Data Types

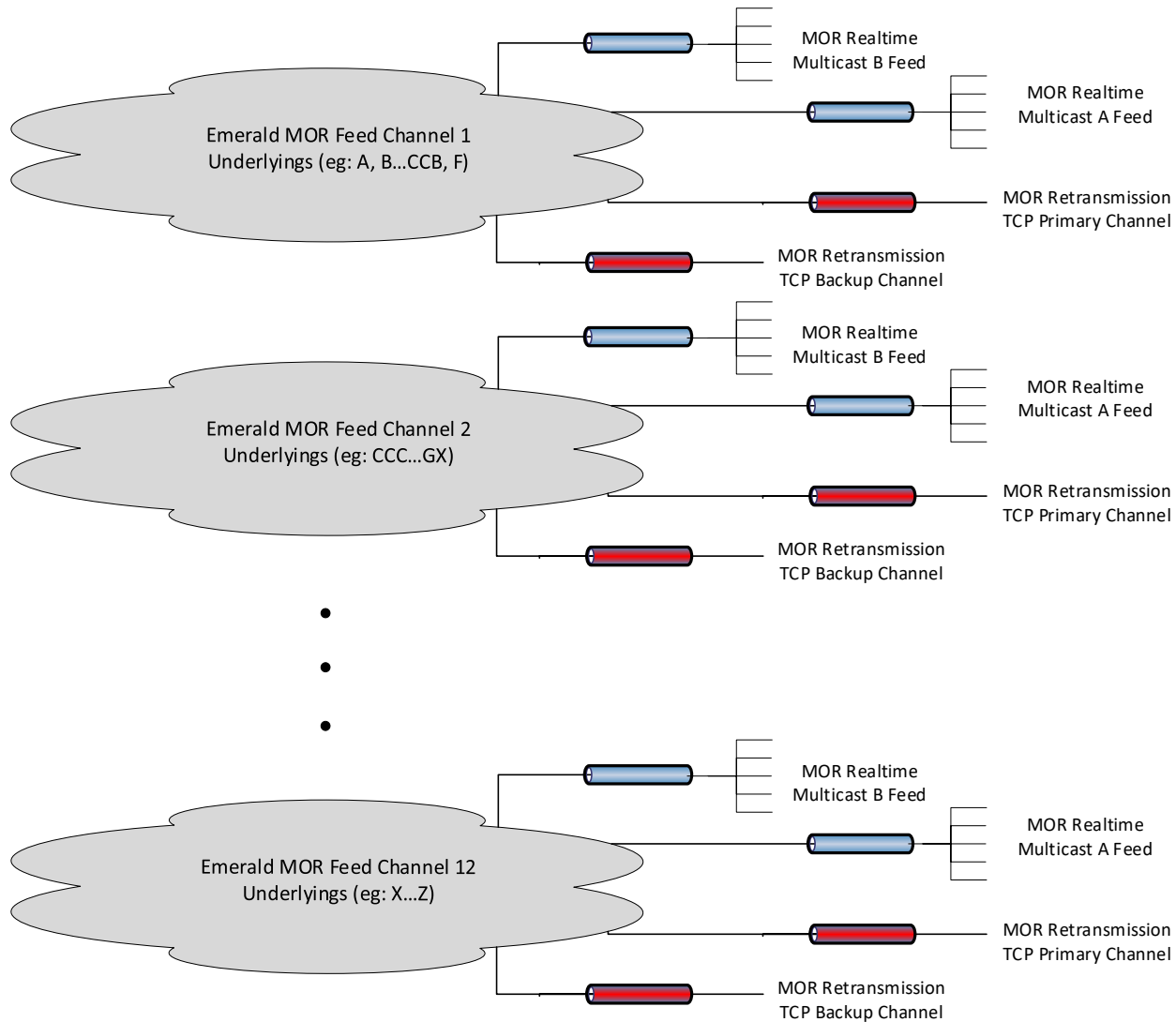
The following table describes the data types used in MOR messaging:

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

Data Type	Description
<b>BinaryU</b>	Unsigned, Intel x86 byte-ordered ( <b>little-endian</b> ), binary encoded numbers
<b>BinaryS</b>	Signed, Intel x86 byte-ordered ( <b>little-endian</b> ), binary encoded numbers
<b>BinaryPrc4U</b>	BinaryU Field with the last 4 (right most) digit places being decimal places
<b>BinaryPrc4S</b>	BinaryS Field with the last 4 (right most) digit places being decimal places
<b>SecTime</b>	BinaryU field that contain transaction time in seconds since Epoch (January 1, 1970, 00:00:00 <b>UTC</b> )
<b>NanoTime</b>	BinaryU field that contain transaction time in nanoseconds since past second
<b>Alphanumeric</b>	Each place can contain characters or numbers. Left justified and space-padded on the right

## 2. MOR Architecture

### Emerald - MIAX Order Feed (MOR) Architecture



#### Highlights:

- Real-time dissemination is separated out on to 12 separate Feed channels.
- A Feed channel will contain sourced data for all options for a single underlying.
- Any options for any given underlying will only be sourced by a single feed channel on any given day.
- Each Feed channel sources independently from the other groups and hence has independent sequence numbers.
- All the messages on each feed channel will be published in FIFO sequence.
- High availability is achieved by disseminating identical data on an “A Feed” and “B Feed” for each Feed channel

- Underlyings may not be contiguously distributed according to symbol ranges in each Feed channel.
- Two separate TCP based retransmission channels for each Feed channel supply MOR retransmission via the MOR Retransmission interface.

## 3. Session Level Protocol

### 3.1 Real-time MOR Feed

MOR real-time feed uses MIAX’s proprietary **MACH protocol**. Each MOR Packet may have multiple application messages and each application message is encapsulated in a MACH protocol packet. Hence a single MOR packet may contain 1 or more sequenced MACH protocol packets.

Please refer to MACH document (available at the [MIAX website](#)) for details about MACH protocol. This protocol layer offers low latency application messaging over multicast, sequencing of messages and heartbeats.

### 3.2 MOR Retransmission Interface

MOR Retransmission Interface uses MIAX’s proprietary **SesM – TCP Session Management Protocol**. Please refer to the latest SesM TCP Session Management document (available at the [MIAX website](#)) for details about SesM session management protocol. This protocol layer offers session management capabilities such as authentication, application messaging over TCP/IP, sequencing of messages, heartbeats and gap fills.

Firms must first use the `Login Request` with a requested sequence number of zero to login to the Interface. After receiving a successful `Login Response`, the firm can choose either the 3.2.1 SesM Gap Fill Service or 3.2.2 Last Value Refresh Service.

#### 3.2.1 SesM Gap Fill Service

Firms can use the **Retransmission Request** session management message, available in the SesM protocol, to request retransmission of a specific range of packets, identified by sequence numbers.

#### 3.2.2 Last Value Refresh Service

##### 3.2.2.1 Request Message to Emerald

Firms can use the **Unsequenced Data Packet**, available in the SesM protocol, to request a last value refresh of various market data and status information. The Refresh Request has the following format:

Field Name	Length	Data Type	Notes
<b>SesM Packet Length</b>	2	Binary	
<b>SesM Packet Type</b>	1	Alphanumeric	‘U’ – SesM Unsequenced Packet
<b>Request Type</b>	1	Alphanumeric	‘R’ – Refresh
<b>Refresh Message Type</b>	1	Alphanumeric	‘P’ - Series Update Refresh ‘U’ – Underlying Trading Status Refresh ‘S’ – System State Refresh ‘C’ – Complex Strategy Definition Refresh



### 3.2.2.2 Response Message from Emerald

The Retransmission feed will respond to the Refresh request with a series of SesM-TCP **Unsequenced Data Packets** based on the Refresh Message Type. Each response message will have the following format:

Field Name	Length	Data Type	Notes
<b>SesM Packet Length</b>	2	Binary	
<b>SesM Packet Type</b>	1	Alphanumeric	'U' – SesM Unsequenced Packet
<b>Response Type</b>	1	Alphanumeric	"R" –Refresh
<b>Sequence Number</b>	8	BinaryU	Original sequence number from live feed.
<b>Application Message</b>	varies	See section 4. Application Message Formats	Based on the message type requested.

The first SesM TCP packet to be received by the firms will be the 4.1 Emerald System Time Message (See section 4.1 Emerald System Time Message). The timestamp (combined with the nanosecond part in the subsequent messages) represents the most recent Matching Engine transaction time. It is **not** the original timestamp from the MACH sequenced messages in the live feed. *The sequence number in the refresh messages may be used to arbitrate with the sequenced packets from live feed (eg: data with higher sequence number from either the refresh or the live feed represents latest information).*

### 3.2.2.3 End of Refresh Notification from Emerald

When the refresh is complete Emerald will send the following message.

Field Name	Length	Data Type	Notes
<b>SesM Packet Length</b>	2	Binary	
<b>SesM Packet Type</b>	1	Alphanumeric	'U' – SesM Unsequenced Packet
<b>Response Type</b>	1	Alphanumeric	"E" – End of Request.
<b>Refresh Message Type</b>	1	Alphanumeric	from Refresh Request

### 3.2.3 Session Termination

After satisfying the retransmission request, MOR Retransmission Interface will send a Goodbye Packet and disconnect the TCP connection.

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

## 4. Application Message Formats

This section consists of format of messages sent over the MOR feed.

The time specified in the *Timestamp* field in all the messages below is the time at which the Matching Engine associated with that underlying group published the message. This is the same timestamp that will get included in the messages transmitted on the retransmission interface.

### 4.1 Emerald System Time Message

This is the message format that will be used to disseminate the “seconds” part of the timestamp that is applicable to all messages that are sent in the current second.

Field Name	Length	Data Type	Notes
<i>MACH Protocol Data</i>			<i>Refer to MACH Protocol Specification</i>
<b>Message Type</b>	1	Alphanumeric	“1”
<b>Time Stamp</b>	4	SecTime	Seconds part of the time that applies to all messages that gets disseminated until this message gets sent again.

Points to note:

- Note that this message is only sent when there are any application messages that are going to be sent during any second. Firms are advised to not assume that there will be a message for every second of the day.

### 4.2 Simple Series Update

This is the message format that will be used to disseminate all Option series traded on Emerald for the current session.

Field Name	Length	Data Type	Notes
<i>MACH Protocol Data</i>			<i>Refer to MACH Protocol Specification</i>
<b>Message Type</b>	1	Alphanumeric	“P”
<b>Product Add/Update Time</b>	4	NanoTime	Time at which this product is added/updated on Emerald system today.
<b>Product ID</b>	4	BinaryU	Emerald Product ID mapped to a given option. It is assigned per trading session and is valid for that session.
<b>Underlying Symbol</b>	11	Alphanumeric	Stock Symbol for the option.
<b>Security Symbol</b>	6	Alphanumeric	Option Security Symbol
<b>Expiration Date</b>	8	Alphanumeric	Expiration date of the option in YYYYMMDD format
<b>Strike Price</b>	4	BinaryPrc4U	Explicit strike price of the option. Refer to data types for field processing notes
<b>Call or Put</b>	1	Alphanumeric	Option Type

Field Name	Length	Data Type	Notes														
			"C" = Call "P" = Put														
<b>Opening Time</b>	8	Alphanumeric	Expressed in HH:MM:SS format. Eg: 09:30:00														
<b>Closing Time</b>	8	Alphanumeric	Expressed in HH:MM:SS format. Eg: 16:15:00														
<b>Restricted Option</b>	1	Alphanumeric	"Y" = Emerald will accept position closing orders only "N" = Emerald will accept open and close positions														
<b>Long Term Option</b>	1	Alphanumeric	"Y" = Far month expiration (as defined by Emerald rules) "N" = Near month expiration (as defined by Emerald rules)														
<b>Active on Emerald</b>	1	Alphanumeric	Indicates if this symbol is tradable on Emerald in the current session: "A" = Active (tradable) on Emerald "I" = Inactive (not tradable) on Emerald														
<b>Emerald BBO Posting Increment Indicator</b>	1	Alphanumeric	This is the Minimum Price Variation as agreed to by the Options industry (penny pilot program) and as published by Emerald <table border="1" data-bbox="748 932 1312 1125"> <thead> <tr> <th rowspan="2">Indicator</th> <th colspan="2">BBO Increments</th> </tr> <tr> <th>Price &lt;= \$3</th> <th>Price &gt; \$3</th> </tr> </thead> <tbody> <tr> <td>"P"</td> <td>Penny (0.01)</td> <td>Penny (0.01)</td> </tr> <tr> <td>"N"</td> <td>Penny (0.01)</td> <td>Nickel (0.05)</td> </tr> <tr> <td>"D"</td> <td>Nickel (0.05)</td> <td>Dime (0.10)</td> </tr> </tbody> </table>	Indicator	BBO Increments		Price <= \$3	Price > \$3	"P"	Penny (0.01)	Penny (0.01)	"N"	Penny (0.01)	Nickel (0.05)	"D"	Nickel (0.05)	Dime (0.10)
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<b>Liquidity Acceptance Increment Indicator</b>	1	Alphanumeric	This is the Minimum Price Variation for Quote/Order acceptance as per Emerald rules <table border="1" data-bbox="748 1205 1312 1398"> <thead> <tr> <th rowspan="2">Indicator</th> <th colspan="2">Quoting Increments</th> </tr> <tr> <th>Price &lt;= \$3</th> <th>Price &gt; \$3</th> </tr> </thead> <tbody> <tr> <td>"P"</td> <td>Penny (0.01)</td> <td>Penny (0.01)</td> </tr> <tr> <td>"N"</td> <td>Penny (0.01)</td> <td>Nickel (0.05)</td> </tr> <tr> <td>"D"</td> <td>Nickel (0.05)</td> <td>Dime (0.10)</td> </tr> </tbody> </table>	Indicator	Quoting Increments		Price <= \$3	Price > \$3	"P"	Penny (0.01)	Penny (0.01)	"N"	Penny (0.01)	Nickel (0.05)	"D"	Nickel (0.05)	Dime (0.10)
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"N"	Penny (0.01)	Nickel (0.05)															
"D"	Nickel (0.05)	Dime (0.10)															

Field Name	Length	Data Type	Notes	
<b>Opening Underlying Market Code</b>	1	Alphanumeric	Options opening will be triggered on receipt of Opening quote/trade from this Underlying market:	
			<b>Market Code</b>	<b>Description</b>
			A	NYSE Amex
			B	NASDAQ OMX BX
			C	National Stock Exchange
			D	FINRA ADF
			E	Market Independent (Any market that opens first)
			H	MIAX PEARL Equities
			I	International Securities Exchange
			J	EDGA Exchange, Inc
			K	EDGX Exchange, Inc
			L	LTSE
			M	Chicago Stock Exchange
			N	NYSE Euronext
			P	NYSE Arca Exchange
Q	NASDAQ OMX (via UTP Feed)			
T	NASDAQ OMX (via CTA Feed)			
U	MEMX			
V	IEX			
W	CBOE Stock Exchange (CBSX)			
X	NASDAQ OMX PHLX			
Y	BATS Y-Exchange, Inc			
Z	BATS Exchange Inc			
<b>Priority Quote Width</b>	4	BinaryPrc4U	Maximum allowable width for a quote for this Option during regular trading in order to be considered as Priority Quote. 0 when Priority Quote Width is not applicable.	
<b>Reserved</b>	8	BinaryU	** Reserved for future use **	

Points to note:

- Entire Options list will be disseminated at the start of day.
- In each channel, firms will only receive the series associated with the Engine that is servicing that channel.
- Intra-day updates will also be published as they occur.
- In case of an intra-day reconnection, users can request all Options series data from the MOR retransmission line.
- The Priority quote width specified in this message is not applicable to Opening. Please refer to Emerald rules and circulars for details about priority quote width applicable during Opening.

## 4.3 System State

This message format is used to notify the firms of the state changes of the system. This is a notification that applies to each Underlying group. Firms can use notifications as triggers in their system to ensure electronic synchronization of systems.

Field Name	Length	Data Type	Notes
<i>MACH Protocol Data</i>			<i>Refer to MACH Protocol Specification</i>
<b>Message Type</b>	1	Alphanumeric	"S"
<b>Notification Time</b>	4	NanoTime	Time at which this was generated by Emerald system.
<b>MOR Version</b>	8	Alphanumeric	Eg: MOR1.0
<b>Session ID</b>	4	BinaryU	Emerald assigned ID for the current trading session
<b>System Status</b>	1	Alphanumeric	Current system status: "S" = Start of System hours "C" = End of System hours "1" = Start of Test Session (sent before tests). "2" = End of Test Session.

Points to note:

- Firms must ensure that messages sent on the MOR Feed from the beginning of "start of test session" to the end of "end of test session" will not affect their production session while allowing the firms to still be involved in production tests and dry runs.
- A change in Session ID will mean that restarting at MACH sequence number 1 for that Underlying group. Refer to MACH protocol specification for details about this. Firms must be able to handle more than one trading session in a single trading day.

## 4.4 Underlying Trading Status Notification

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

Field Name	Length	Data Type	Notes
<i>MACH Protocol Data</i>			<i>Refer to MACH Protocol Specification</i>
<b>Message Type</b>	1	Alphanumeric	"H"
<b>Timestamp</b>	4	NanoTime	Time at which this was generated by Emerald system.
<b>Underlying Symbol</b>	11	Alphanumeric	Underlying Symbol
<b>Trading Status</b>	1	Alphanumeric	"H" = Emerald has halted trading for this Underlying Symbol "R" = Emerald will resume trading (reopen) for this Underlying Symbol "O" = Emerald will open trading for this Underlying Symbol

Field Name	Length	Data Type	Notes
Event Reason	1	Alphanumeric	“A” = This event resulted from automatic/market driven event “M” = Emerald manually initiated this event
Expected Event Time: Seconds Part	4	SecTime	Seconds portion of the expected time of the event. Always use in conjunction with the Nano-seconds part field.
Expected Event Time: Nano-Seconds Part	4	BinaryU	Nano-seconds portion of the expected time of the event. Specifies number of nano-seconds since the seconds specified in “Expected Event Time Seconds” field.

Points to note:

- When underlying trading status = “H”, Expected Event Time Seconds/Nano-Seconds will be set to 0 (zero).
- When underlying trading status = “R” or “O”, Expected Event Time (Seconds/Nano-Seconds Parts) will be set to the time at which the opening/reopening process will start for this Underlying Symbol.

## 4.5 Simple Order Message

This is the message format that will be used to disseminate Emerald Options Simple Orders.

Field Name	Length	Data Type	Notes
<i>MACH Protocol Data</i>			<i>Refer to MACH Protocol Specification</i>
Message Type	1	Alphanumeric	“F”
Timestamp	4	NanoTime	Time at which this was generated by Emerald system.
Action	1	Alphanumeric	Order Status. Valid Values: O = Open
Product ID	4	BinaryU	Emerald Product ID mapped to a given option. It is assigned per trading session and is valid for that session.
Order ID	8	BinaryU	Emerald assigned Order ID
Order Side	1	Alphanumeric	Side of order. Valid values: B = Buy S = Sell
Order Type	1	Alphanumeric	Order price type. Valid values: M = Market L = Limit
Order Price	4	BinaryPrc4U	Limit price of the order. Zero for market orders.
Order Original Volume	4	BinaryU	Number of contracts specified on the order.

Field Name	Length	Data Type	Notes
<b>Remaining Volume Open</b>	4	BinaryU	Number of contracts that are still open for trading at Emerald.
<b>Time In Force (TIF)</b>	1	Alphanumeric	Specifies how long the order remains in effect. Valid values: A = AOC (Auction or Cancel) G = GTC (Good Till Canceled) O = OPG (Opening transaction only or Cancel) D = DAY S = SAO (Settlement Auction Only) – future use
<b>Origin</b>	1	Alphanumeric	Specifies the order origin type. Valid values:  0 = Priority Customer 1 = Firm 2 = Broker/Dealer 4 = Market Maker (MM) 5 = Non-Member Market Maker 8 = Non-Priority Customer “ “ = Not Applicable (used for Derived Order)
<b>Open/close indicator</b>	1	Alphanumeric	Specifies if this order opens a position or closes a position. N/A when Origin is set to 4 = Market Maker or 5 = Non-Member Market Maker Valid values: O = Open C = Close “ “ = Not Applicable
<b>Route instruction</b>	1	Alphanumeric	Route instruction that came with the order. Valid values: R = Routable D = Do Not Route (DNR) P = Post-Only
<b>Attributed ID</b>	4	Alphanumeric	Emerald assigned Attributable ID (Executing Broker MPID) of an Order. Otherwise, it is space filled.
<b>Priority Customer Volume</b>	4	BinaryU	Number of Priority Customer contracts when Origin = “ “ (Derived Order)
<b>Reserved</b>	28	BinaryU	** Reserved for future use **





Points to note:

- Order open size can increase, decrease, or increase after going down to zero due to routing and reintroduction activities. It is also possible that such activities can result in identical messages being published occasionally.
- It is possible that an order may be closed and then reopened. Subscribers must be able to handle this.
- Only Open Simple Orders are disseminated using this message. A Simple Order Close state is disseminated using Order Close Message (Message Type = “X”).

- Quotes and eQuotes will not be disseminated.
- Orders executed, rejected or canceled immediately upon receipt are not disseminated.
- Auction orders (eg: PRIME) and Immediate orders (eg: IOC, FOK, ISO) are not disseminated.
- AOC orders are only disseminated when they are targeted for Opening or Re-Opening.

## 4.6 Complex Strategy Definition Update

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

Field Name	Length	Data Type	Notes
<b>MACH Protocol Data</b>			<i>Refer to MACH Protocol Specification</i>
<b>Message Type</b>	1	Alphanumeric	"C"
<b>Strategy Add Time</b>	4	NanoTime	Time at which this Strategy is added/updated on Emerald system today.
<b>Strategy ID</b>	4	BinaryU	Emerald Strategy ID is assigned per trading day and is valid only for that day.
<b>Underlying Symbol</b>	11	Alphanumeric	Underlying Symbol for this strategy
<b>Active on Emerald</b>	1	Alphanumeric	Indicates if this strategy is tradable on Emerald in the current session: "A" = Active (tradable) on Emerald "I" = Inactive (not tradable) on Emerald
<b>Reserved</b>	1	BinaryU	** Reserved for future use **
<b>Update Reason</b>	1	Alphanumeric	"N" – New strategy created "U" - Strategy definition Updated
<b>Reserved</b>	10	BinaryU	** Reserved for future use **
<b>Number of Legs</b>	1	BinaryU	Number of Legs. Variable from 2 to 8
 <b>Product ID</b>	4	BinaryU	<i>Option leg:</i> Emerald Defined Series. See Simple Series Update Message. <i>Stock leg:</i> 0 (zero)
 <b>Leg Ratio Qty</b>	2	BinaryU	The ratio of this individual leg. Number of option contracts or Number of stock shares for this leg is: LegRatioQty * OrderQty
 <b>Leg Side</b>	1	Alphanumeric	The side of this individual leg Valid values are: "B" = Bid "A" = Ask
 <b>Reserved</b>	8	BinaryU	** Reserved for future use **



Points to note:

- Strategies may be created intra-day as orders are placed at the Emerald Exchange or pre-defined before the market open.
- In each channel, firms will only receive the Strategies associated with the Engine that is servicing that channel.
- In case of an intra-day reconnection, users can request all Strategies definitions from the AIS of MOR retransmission lines.
- The length of this message is **variable** based on the number of legs.
- When underlying halts, all strategies for that underlying are in a halted state. Firms should process Underlying Trading Status notification to determine current state of the strategies.
- This message might be published more than once per day. When Update Reason is “U”, the only field that can change is “Active on Emerald”.
- The tradability of a strategy can be tracked with the status of the underlying (message type “H”) or the individual series. (message type “P”)
- The Strategy ID and Product ID fields are separate and distinct fields with assigned ID’s per trading day and valid only for the current day. Their scope is limited to each field.

## 4.7 Complex Order Message

This is the message format that will be used to disseminate Emerald Options Complex Orders.

Field Name	Length	Data Type	Notes
<i>MACH Protocol Data</i>			<i>Refer to MACH Protocol Specification</i>
<b>Message Type</b>	1	Alphanumeric	“R”
<b>Timestamp</b>	4	NanoTime	Time at which this was generated by Emerald system.
<b>Action</b>	1	Alphanumeric	Order Status. Valid Values: O = Open
<b>Strategy ID</b>	4	BinaryU	Emerald Strategy ID as specified in Strategy Update message. ID is assigned per trading session and is valid for that session.
<b>Order ID</b>	8	BinaryU	Emerald assigned Order ID
<b>Order Side</b>	1	Alphanumeric	Side of order. Valid values: B = Buy S = Sell
<b>Order Type</b>	1	Alphanumeric	Order price type. Valid values: M = Market L = Limit

Field Name	Length	Data Type	Notes
<b>Order Price</b>	8	BinaryPrc4S	Limit price of the order. Not applicable for Market Orders. If Side is "B": <ul style="list-style-type: none"> <li>• Positive number represents net debit</li> <li>• Negative number represents net credit</li> </ul> If Side is "S": <ul style="list-style-type: none"> <li>• Positive number represents net credit</li> <li>• Negative number represents net debit</li> </ul> Price of Zero is net neutral for either side
<b>Order Original Volume</b>	4	BinaryU	Number of strategies specified on the order.
<b>Remaining Volume Open</b>	4	BinaryU	Number of strategies that are still open for trading at Emerald.
<b>Time In Force (TIF)</b>	1	Alphanumeric	Specifies how long the order remains in effect. Valid values: G = GTC (Good Till Canceled) D = DAY
<b>Origin</b>	1	Alphanumeric	Specifies the order origin type. Valid values: 0 = Priority Customer 1 = Firm 2 = Broker/Dealer 4 = Market Maker (MM) 5 = Non-Member Market Maker 8 = Non-Priority Customer
<b>Reserved</b>	32	BinaryU	** Reserved for future use **

Points to note:

- Order open size can increase, decrease, or increase after going down to zero.
- It is possible that an order may be closed and then reopened. Subscribers must be able to handle this.
- Only Open Complex Orders are disseminated using this message. A Complex Order Close state is disseminated using Order Close Message (Message Type = "x").
- Orders fully executed, rejected, or canceled immediately upon receipt are not disseminated.
- Auction or Cancel (AOC) orders and Immediate orders (eg: IOC) are not disseminated.
- Complex crossing orders (cPRIME, cC2C, cQCC) are not disseminated

## 4.8 Order Close Message

This is the message format that will be used to disseminate Order Close for Emerald Options Simple and Complex Orders.

Field Name	Length	Data Type	Notes
<b>MACH Protocol Data</b>			Refer to MACH Protocol Specification

Field Name	Length	Data Type	Notes
Message Type	1	Alphanumeric	"X"
Timestamp	4	NanoTime	Time at which this was generated by Emerald system.
Simple or Complex Order	1	Alphanumeric	"F" – Simple Order "R" – Complex Order
Order ID	8	BinaryU	Emerald assigned Order ID

Points to note:

- Order Close Message is disseminated for a fill or a cancel.
- Order ID is unique across all Emerald Options Orders and can be used to uniquely identify a Simple or a Complex Order.

# Appendix A: Emerald MOR Subscription/Connectivity Information

Please visit MIAX website at <http://www.MIAXOptions.com> to obtain the most up-to-date information about the following:

- Real-time Feed multicast groups, ports for A feed and B Feed
- Retransmission IP addresses and ports for primary and backup channels.

## Appendix B: Contact List

Please visit MIAX website at <http://www.MIAXOptions.com> to obtain the most up-to-date contact list and other such information.

## Appendix C: Revision History

Revision Date	Version	Author	Description
May 8, 2018	1.0	Vinay S. Rao	First release.
Jul 26, 2020	1.0a	Vinay S. Rao	Added new Equities exchanges.

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