MIAX Futures Onyx

Top of Market Feed
ToM Interface Specification

Revision Date: 8/4/2025
Version 1.1

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1. Overview

MIAX Futures Onyx Top of Market Feed (**ToM**) is a data feed that allows subscribers to receive real-time updates of the following information from the MIAX Futures Onyx Exchange.

- MIAX Futures Exchange Best Bid and Offer (MBBO): Best Bid and Offer price with aggregated displayed size
- Simple Instrument Definition
- Complex Instrument Definition
- MIAX Futures Exchange Last Sale (trades)
- Trade Cancellations
- Trading Status of instruments traded on MIAX Futures Exchange
- MIAX Futures Exchange System Status

ToM Features:

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

- ToM uses binary message format, binary numeric fields and fixed length ASCII fields in messages in order to utilize bandwidth efficiently and assist in achieving **low latency**.
- Message formats are designed to use **less bandwidth**. For example: ToM messages use Instrument IDs in each message in place of a full canonical symbol.
- ToM 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.
- ToM real-time messages are disseminated over multicast to achieve a fair delivery mechanism. ToM 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 ToM retransmission service also provides a **Last Value Refresh Service** to facilitate fast intra-day recovery without a full day gap fill.
- ToM notifications provide current **system status** allowing the subscribers to take necessary actions immediately.

This specification is intended to be used by MIAX Futures Exchange ToM subscribers only.

1.1 Exchange related information

1.1.1 Hours of operation for MIAX Futures Onyx

Please visit the MIAX website for details about times for each of these periods.

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

5:40 pm ET	**End of Recycle Window**
	Firms will get the instrument data on multicast channels or can connect and download on retransmission channels.
5:45 pm ET	**Live Order Window (LOW)**
	Start of acceptance of messages (including Orders). Orders received at or after this time can be accepted by MIAX Futures Onyx.
5:05 pm ET	**Beginning of Recycle Window** (begins at 2:05 pm ET on early closing days)
	ToM has completed sending all messages.

Please refer to the MIAX website for details about times for each of these events/periods as well as Product-specific trading schedules.

MIAX Futures Onyx may send trade-related data following the end of trading session due to the issuance of manual trades, trade cancels or trade corrections for various operational reasons as needed.

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 MIAXFuturesTradingOperations@MIAXGlobal.com or by referring to the MIAX website.

1.2 Testing of ToM Subscription

MIAX Onyx can provide testing assistance on the MIAX Futures Onyx testing area for the ToM Feed and the ToM retransmission interface.

Please contact MIAX Trading Operations at MIAXFuturesTradingOperations@MIAXGlobal.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 ToM.

Instrument Definitions: Subscribers to the data feed will get a list of all Instruments that will be traded and sourced on that feed at the start of every Trading Day and upon creation of any Complex Instruments during the Trading Day. If firms cannot start listening to the feed in time for the normal Instrument broadcast, they can connect to the ToM Retransmission service and request for a Last Value Refresh Service (see section 3.2.2) or request all messages published and then subsequently process only the instrument messages to build their instrument list. The MIAX Futures Onyx assigned Instrument ID of each Instrument will be sent in every message so that firms can tie each message to an Instrument ID.

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, MIAX Futures Onyx offers the real-time ToM 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 ToM feed.

Business Trade Date: Business Trade Date refers to the calendar date on which a Trading Day ends, and is typically the calendar date after it begins. For example: A Business Trade Date of Monday 10/28/2024 begins on Sunday 10/27/2024 and ends on Monday 10/28/2024.

Trade ID: Simple Trade IDs and Complex Trade IDs are unique across Simple and Complex executions within a cloud.

1.4 Data Types

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

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

Data Type	Description
BinaryU	Unsigned, Intel x86 byte-ordered (**little-endian**), binary encoded numbers
BinaryS	Signed, Intel x86 byte-ordered (**little-endian**), binary encoded numbers
Price9S	BinaryS Field with the last 9 (right most) digit places being decimal places. $-1.00 is represented as -1,000,000,000
Flags	A special BinaryU type where a bit mask must be used to extract different values. The least significant bit is bit 0.
NanoTime	BinaryU field that contains the Matching Engine transaction time in nanoseconds since UNIX Epoch, 1970-01-01 00:00:00 +0000 (**UTC**).
Date	BinaryU field that contains number of days since the UNIX Epoch, 1970-01-01 00:00:00 +0000 (**UTC**). This field describes the Business Trade Date.
Alphanumeric	Each place can contain characters or numbers. Left justified and space-padded on the right
String	Characters in ASCII range 33-126 are allowed, except for pipe. If less than the maximum field size, must be null terminated for all the remaining bytes of the field

2. ToM Architecture

Top of Market Feed (ToM) Architecture
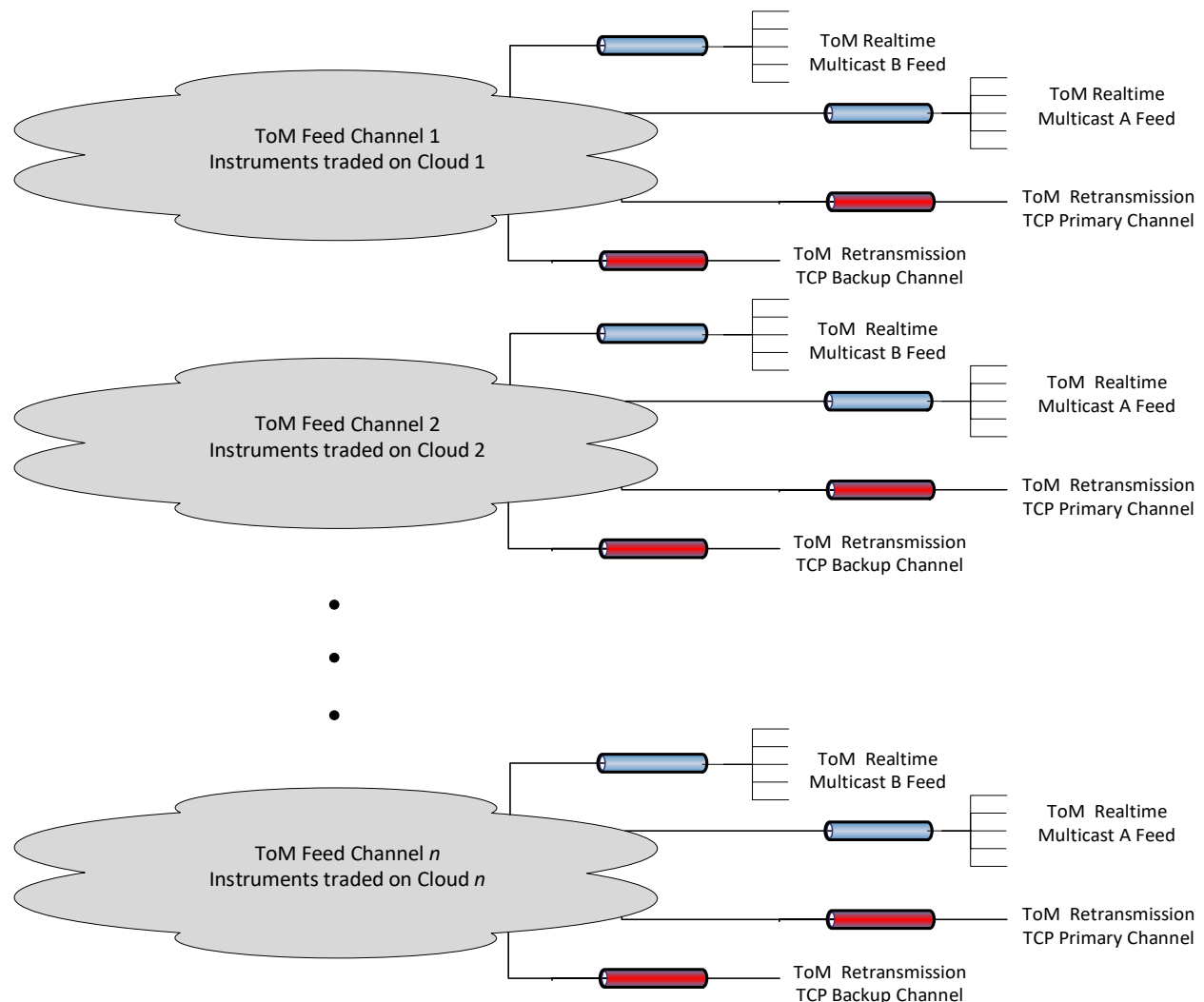
Highlights:

- Real-time dissemination is separated out on to *n* separate Feed channels.
- A Feed channel will contain sourced data for a discrete set of Instruments.
- A discrete set of Instruments 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
- Instruments may not be contiguously distributed according to instrument ranges in each Feed channel.

- Two separate TCP based retransmission channels for each Feed channel supply ToM retransmission via the ToM Retransmission interface.

3. Session Level Protocol

3.1 Real-time ToM Feed

ToM real-time feed uses MIAX's proprietary **MACH protocol**. Each ToM Packet may have multiple application messages and each application message is encapsulated in a MACH protocol packet. Hence a single ToM 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 ToM Retransmission Interface

ToM 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 SesM Gap Fill Service or 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 MIAX Futures Onyx

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
SesM Packet Length	2	Binary	
SesM Packet Type	1	Alphanumeric	*'U' – SesM Unsequenced Packet*
Request Type	1	Alphanumeric	'R' – Refresh
Refresh Message Type	1	Alphanumeric	'I' – Simple/Complex Instrument Definition Refresh 'T' – Instrument Trading Status Refresh 'S' – System State Refresh 'Q' – Top of Market Refresh

3.2.2.2 Response Message from MIAX Futures Onyx

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
SesM Packet Length	2	Binary	
SesM Packet Type	1	Alphanumeric	*'U' – SesM Unsequenced Packet*
Response Type	1	Alphanumeric	'r' –Refresh
Sequence Number	8	BinaryU	Original sequence number from live feed.
Application Message	varies	See section 4	Based on the message type requested.

The first SesM TCP packet to be received by the firms will be the System Time Message (See section 4.1). The timestamp (combined with the nanosecond part in the subsequent messages) represents the most recent MIAX Futures Onyx 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 (e.g. 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 MIAX Futures Onyx

When the refresh is complete MIAX Futures Onyx will send the following message.

Field Name	Length	Data Type	Notes
SesM Packet Length	2	Binary	
SesM Packet Type	1	Alphanumeric	*'U' – SesM Unsequenced Packet*
Response Type	1	Alphanumeric	'E' – End of Request.
Refresh Message Type	1	Alphanumeric	From Refresh Request.

3.2.3 Session Termination

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

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

4. Application Message Formats

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

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

4.1 Simple Instrument Definition

This is the message format that will be used to disseminate all Simple Instruments traded on MIAX Futures Onyx for the current trading session. The Instrument ID sent in this message will be disseminated in all Top of Market messages.

Field Name	Length	Data Type	Notes
MACH Protocol Data			*Refer to MACH Protocol Specification*
Message Type	1	BinaryU	1
Timestamp	8	NanoTime	Matching Engine time.
Instrument ID	4	BinaryU	Unique numeric ID assigned by MIAX Futures Onyx for a Simple instrument and is permanent for the life of a Simple instrument.
Underlying Asset Type	1	Alphanumeric	Underlying Asset Type of this instrument: 'E' = Equity Index 'A' = Commodity/Agriculture 'F' = Futures Contract
Underlying Asset	4	Alphanumeric	Underlying Asset Code. e.g.: MW for Hard Red Spring Wheat.
Product Group Code	6	Alphanumeric	Product Group Code: e.g.: MWE for Hard Red Spring Wheat Standard Deliverable (5000 Bushels)
Exchange	4	Alphanumeric	'XMGE' - MIAX Futures Exchange - Commodities 'XMFE' - MIAX Futures Exchange – Financials
Instrument ID Source	1	Alphanumeric	Indicates whether the Instrument ID has been assigned by the exchange or from an external industry source 'E' = Exchange
Instrument Type	1	Alphanumeric	'F' = Futures 'O' = Options on Futures
Reserved	4	BinaryU	Previously was Maturity Month-Year field; replaced by the Maturity Date field below. Currently reserved for future use. Always has a value of zero.
Currency	1	Alphanumeric	The currency in which all Futures Instruments of the Futures Product will trade 'U' = USD

Settlement Currency	1	Alphanumeric	The Currency in which the Product settles 'U' = USD
Match Algorithm	1	Alphanumeric	The allocation model used by the MIAX Futures Onyx Trading Platform for the Product 'P' = Price/Time
Minimum Size	4	BinaryU	Minimum Order Size
Maximum Size	4	BinaryU	Maximum Order Size
Tick	8	Price9S	Order Entry Price Tick of the Product
Unit of Measure	5	Alphanumeric	Individual unit of the Deliverable of the Underlying Asset associated with the Futures Contract 'BU' = Bushels 'USD' = USD 'FUT' = Futures Contract
Unit of Measure Quantity	4	BinaryU	The quantity of the Underlying Asset that is required for the Deliverable associated with the Futures Contract
Settlement Price	8	Price9S	The previous day's Settlement Price
Settlement Price Type – Calc Method	1	Alphanumeric	Actual or Theoretical Settlement Price Indicator 'A' = Actual 'T' = Theoretical
Total Volume	4	BinaryU	The aggregate amount of volume that has traded from the prior Trading Day
Open Interest Quantity	4	BinaryU	The amount of aggregate open contracts in a Simple Instrument
High Limit Price	8	Price9S	The Upper Band of the Daily Trading Limit of a Futures Product
Low Limit Price	8	Price9S	The Lower Band of the Daily Trading Limit of a Futures Product
Trading Collar Variation Type	1	Alphanumeric	'D' = Product Dollar Collar Value 'P' = Product Collar Percentage Value
Trading Collar Variation	8	Price9S	The Dollar Value or Percentage Value used in the calculation of the Trading Collar
Contract Date	4	BinaryU	The Contract Date will be assigned to each Simple Instrument. Format: YYYYMM
Maturity Date	2	Date	Maturity Date is the expiration date of a Simple Instrument.
Valuation Date	2	Date	The date that the Final Settlement Price will be calculated for purposes of Simple Instrument expiration
First Trade Date	2	Date	First Trade Date will be the Trading Date that the Simple Instrument is initially made available for Trading on MIAX Futures Onyx
Last Trade Date	2	Date	Last Trade Date will be the Maturity Date of the Simple Instrument

First Notice Date	2	Date	Last business date of the month preceding the month of the Maturity Date of the Simple Instrument. Applicable only to Underlying Asset = MW; will be zero for all other Underlying Assets
Last Notice Date	2	Date	Last Notice Date will be the business day preceding the Last Delivery Date of the Simple Instrument. Applicable only to Underlying Asset = MW; will be zero for all other Underlying Assets
First Delivery Date	2	Date	First Delivery Date will be the first business day of the month of the Maturity Date of the Simple Instrument. Applicable only to Underlying Asset = MW; will be zero for all other Underlying Assets
Last Delivery Date	2	Date	Last Delivery Date will be the seventh business day following the Last Trading Date of the Simple Instrument. Applicable only to Underlying Asset = MW; will be zero for all other Underlying Assets
Option Strike Price	8	Price9S	NULL when Instrument Type not equal to 'O'; see note below.
Option Strike Currency	1	Alphanumeric	'U' – US Dollar 'N' – N/A when Instrument Type not equal to 'O'
Option Type	1	Alphanumeric	'C' – Call Options 'P' – Put Options 'N' – N/A when Instrument Type not equal to 'O'
Option Expiration Type	1	Alphanumeric	'A' - American-Style Options 'E' - European-Style Options 'N' – N/A when Instrument Type not equal to 'O'
Underlying Future Instrument ID	4	BinaryU	The Instrument ID of the Futures Instrument that is the Underlying Asset of the Options on Futures Instrument Value of 0 when Instrument Type not equal to 'O'

Points to note:
- Entire Instrument list for the channel will be disseminated at the start of day.
- In each channel, firms will only receive the Instruments associated with the Matching 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 Instruments data from the ToM retransmission line.
- Open Interest Quantity provided in the Simple Instrument Definition will be T-2
- When Instrument Type is not equal to 'O', the Option Strike Price will be represented as 999,999,999.999999999.

4.2 Complex Instrument Definition

This is the message format that will be used to disseminate all Complex Instruments traded on MIAX Futures Onyx for the current trading session. The Strategy ID sent in this message will be disseminated in Top of Market messages.

Field Name	Length	Data Type	Notes
MACH Protocol Data			*Refer to MACH Protocol Specification*
Message Type	1	BinaryU	2
Timestamp	8	NanoTime	Matching Engine time.
Instrument ID (formerly known as Strategy Id)	4	BinaryU	Unique ID assigned by MIAX Futures Onyx for a Complex instrument and is permanent for the life of an instrument.
Underlying Asset Type	1	Alphanumeric	Underlying Asset Type of this instrument: 'E' = Equity Index 'A' = Commodity/Agriculture 'F' = Futures Contract
Underlying Asset	4	Alphanumeric	Underlying Asset Code. e.g.: MW for Red Spring Wheat.
Product Group Code	6	Alphanumeric	Product Group Code: e.g.: MWE for Hard Red Spring Wheat Standard Deliverable (5000 Bushels)
Spread Type	1	Alphanumeric	Spread Type 'S' = Standard Calendar Spread 'E' = Equity Calendar Spread 'B' = Butterfly Spread
Exchange	4	Alphanumeric	'XMGE' - MIAX Futures Exchange - Commodities 'XMFE' - MIAX Futures Exchange – Financials
Instrument ID Source	1	Alphanumeric	Indicates whether the Instrument ID has been assigned by the exchange or from an external industry source 'E' = Exchange
Instrument Type	1	Alphanumeric	'F' = Futures 'O' = Options on Futures
Currency	1	Alphanumeric	The currency in which all Futures Instruments of the Futures Product will trade 'U' = USD
Settlement Currency	1	Alphanumeric	The Currency in which the Product settles 'U' = USD
Match Algorithm	1	Alphanumeric	The allocation model used by the MIAX Futures Onyx Trading Platform for the Product 'P' = Price/Time
Minimum Size	4	BinaryU	Minimum Order Size
Maximum Size	4	BinaryU	Maximum Order Size
Tick	8	Price9S	Order Entry Price (Tick) of the Product

Unit of Measure	5	Alphanumeric	Individual unit of the Deliverable of the Underlying Asset associated with the Futures Contract 'BU' = Bushels 'USD' = USD 'FUT' = Futures Contract
Unit of Measure Quantity	4	BinaryU	The quantity of the Underlying Asset that is required for the Deliverable associated with the Futures Contract
Trading Collar Variation Type	1	Alphanumeric	'D' = Product Dollar Collar Value 'P' = Product Collar Percentage Value
Trading Collar Variation	8	Price9S	The Dollar Value or Percentage Value used in the calculation of the Trading Collar
Reserved	16	BinaryU	Reserved for future use
Number of Legs	1	BinaryU	Number of strategy legs. The fields below (marked with →) are repeated for each specified leg
→ Instrument ID	4	BinaryU	Instrument ID for the leg
→ Leg Ratio and Side	4	BinaryS	Leg ratio for the specified instrument Positive indicates Buy Negative indicates Sell
→ Reserved	4	BinaryU	Previously was Maturity Month-Year field; replaced by the Maturity Date field below. Currently reserved for future use. Always has a value of zero.
→ Maturity Date	2	Date	Maturity Date is the expiration date of a Simple Instrument
→ Reserved	6	BinaryU	Reserved for future use

Points to note:
- Entire Complex Instrument list for the channel will be disseminated at the start of day. Intra-day updates will also be published as they occur. In each channel, firms will only receive the Instruments associated with the Matching Engine that is servicing that channel.
- In case of an intra-day reconnection, users can request all Instruments data from the ToM retransmission line.
- The repeating Legs of the Complex Instrument Definition will be presented in the order in which they appear in the strategy, i.e. $leg_1..leg_n$

4.3 System State

This is the message format that will be used to notify firms of the state changes of the system. This is a notification that applies to all Instruments on the feed. Firms can use notifications as triggers in their system to ensure electronic synchronization of systems.

Field Name	Length	Data Type	Notes
MACH Protocol Data			*Refer to MACH Protocol Specification*
Message Type	1	BinaryU	3
Timestamp	8	NanoTime	Matching Engine time.
ToM Version	8	Alphanumeric	E.g. ToM1.0

Field Name	Length	Data Type	Notes
Session ID	1	BinaryU	Current trading session identifier.
System Status	1	Alphanumeric	'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 ToM 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 a restart at MACH sequence number 1 for all Instrument groups. 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 Instrument Trading Status Notification

This message is used to notify firms of changes to the trading status of a particular Simple or Complex Instrument.

Field Name	Length	Data Type	Notes
MACH Protocol Data			*Refer to MACH Protocol Specification*
Message Type	1	BinaryU	4
Timestamp	8	NanoTime	Matching Engine time.
Instrument ID	4	BinaryU	Instrument ID mapped to a given Simple or Complex Instrument.
Trading Status	1	BinaryU	1 - Pre-Open 2 - Opening Freeze 3 - Trading 4 - Halt 5 - Operational Halt 6 - Closed
Market State	1	BinaryU	1 - Pre-Opening 2 - Extended 1 Trading Session 3 - Regular Trading Session 4 - Extended 2 Trading Session

4.5 Top of Market (Best Bid and Offer) Message

This is the message format that will be used to publish MIAX Futures Onyx Best Bid and Offer (MBBO) of a Simple Instrument or Complex Instrument.

Field Name	Length	Data Type	Notes
MACH Protocol Data			*Refer to MACH Protocol Specification*
Message Type	1	BinaryU	15
Timestamp	8	NanoTime	Matching Engine time.

Field Name	Length	Data Type	Notes
Instrument ID	4	BinaryU	Instrument ID mapped to a given instrument. Will refer to Simple or Complex, based on value of Instrument Type field above
MBB Price	8	Price9S	Will be provided for updates as a result of any changes to the prices or sizes of the MBBO for an Simple Instrument or a Complex Instrument
MBB Size	4	BinaryU	Aggregate size in contracts at the displayed offer price. Will be provided for updates as a result of any changes to the prices or sizes of the MBBO for an Simple Instrument or a Complex Instrument
MBO Price	8	Price9S	Will be provided for updates as a result of any changes to the prices or sizes of the MBBO for an Simple Instrument or a Complex Instrument
MBO Size	4	BinaryU	Aggregate size in contracts at the displayed offer price. Will be provided for updates as a result of any changes to the prices or sizes of the MBBO for an Simple Instrument or a Complex Instrument

Points to note:
- Refresh: The sequence number in the refresh messages may be used to arbitrate with the sequenced packets from live feed (e.g. data with higher sequence number from either the refresh or the live feed represents latest information).
- No interest MBB updates will be represented with an MBB Price of -999,999,999.999999999 and an MBB Size of 0 for a Simple Instrument or Complex Instrument.
- No interest MBO updates will be represented with an MBO Price of 999,999,999.999999999 and an MBO Size of 0 for a Simple Instrument or Complex Instrument.

4.6 Last Sale (Trade) Message

This is the message format that will be used to disseminate trades that are resulting from executions on MIAX Futures Onyx during the current trading session. It includes a Trade ID that is unique to the trade across the exchange for the trading day. Trade corrections will also be disseminated for Simple Instruments only using the same message format.

Field Name	Length	Data Type	Notes
MACH Protocol Data			*Refer to MACH Protocol Specification*
Message Type	1	BinaryU	16
Timestamp	8	NanoTime	Matching Engine time.
Trade Date	2	Date	Business Trade Date
Instrument ID	4	BinaryU	Instrument ID mapped to a given Simple or Complex Instrument.
Trade ID	8	BinaryU	Unique ID assigned by the Matching Engine.

Field Name	Length	Data Type	Notes
			Note: Simple Trade IDs and Complex Trade IDs are not unique between Simple and Complex executions.
Correction Number	1	BinaryU	Trade correction number. Set to zero for new trades. Increments by 1 for each subsequent correction.
Price	8	Price9S	Execution price.
Size	4	BinaryU	Number of shares executed.
Trade Type	1	Alphanumeric	'O' – Outright Trade between two Simple Orders 'S' – Strategy Match: Net Level Trade 'M' – Strategy Match: Component Leg Trade 'C' – Complex Legging/Derived: Net Level Trade 'L' – Complex Legging/Derived: Component Leg Trade 'A' – Adjusted/Late Manual Trade
Complex Trade ID	8	BinaryU	For Trade Type 'L', or 'M', value of 'Trade ID' of the Complex Component. For Trade Types 'O', 'S', or 'C', the value is 0.
Instrument Type	1	Alphanumeric	'F' = Futures 'O' = Options on Futures

Points to Note:
- Trade ID assigned to a trade execution will be used in subsequent Trade Cancel message if the trade is canceled.
- If the execution is corrected, trade corrections are published with the same Trade ID as the original execution.
    - If a new or corrected trade was manually entered, the Aggressor Side will be set to 'N' and Trade Type will be 'A'.
- For clients maintaining an order book, the order size is reduced by the executed size. If a trade execution is reported by the Order Execution message, there will be no other message to indicate this order size reduction.
- Trade corrections will have the same Trade ID as the original trade; the Correction Number will be incremented for each subsequent correction.
- Trade Corrections will be sent for the individual components of Complex trades that have been adjusted.
- A complete view of all MIAX Futures Onyx executions can be built by using the Order Execution Messages and Trade Cancel Messages.
- Aggressor Side will be set to Not Applicable for trades that take place as part of the Opening Process.
- For Complex trades:
    - The Complex net level execution is reported before each leg.
    - The Complex net level execution is reported with its own Order Execution Message. (Trade Type equals 'C' or 'S', Complex Trade ID equals 0)

- o Each individual leg execution will be reported in ists own Order Execution message. (Trade Type equals 'L' or 'M', Complex Trade ID equals 'Trade ID' of the Complex net level execution.)
- o The repeating Legs of the Order Execution message (Trade Type = 'L' or 'M') will be presented in the order in which they appear in the Complex Instrument Definition, i.e. $leg_1..leg_n$

4.7 Trade Cancel Message

This message format is used to publish cancellation of a Simple Instrument trade which was previously published via a Last Sale (Trade) Message.

Field Name	Length	Data Type	Notes
MACH Protocol Data			*Refer to MACH Protocol Specification*
Message Type	1	BinaryU	14
Timestamp	8	NanoTime	Matching Engine time.
Trade Date	2	Date	Business Trade Date
Instrument ID	4	BinaryU	Instrument ID mapped to a given Simple Instrument.
Trade ID	8	BinaryU	Provided in the Last Sale (Trade) Message.
Correction Number	1	BinaryU	The latest correction number of the given Trade ID.
Price	8	Price9S	The latest price of the given Trade ID.
Size	4	BinaryU	The latest size of the given Trade ID.
Instrument Type	1	Alphanumeric	'F' = Futures 'O' = Options on Futures

Points to Note:

- Trade Cancels will be sent for the individual components of Complex trades that have been canceled.

Appendix A: ToM Subscription/ Connectivity Information

Please visit the MIAX Website 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 the MIAX Website for obtaining the most up-to-date contact list and other such information.

Appendix C: Revision History

Revision Date	Version	Description
10/31/2024	1.0	Initial release.
1/10/2025	1.0a	No changes to message structures Corrrected values for Unit of Measure. Added clarification to notes in section 4.3
3/25/2025	1.0b	Clarified notes in sections 4.6 and 4.7
8/4/2025	1.1	* Reporting of Complex trades now consist of the Complex trade followed by each legged trade * Trade IDs are now unique across both Simple and Complex trades * Modified 4.1/Simple Instrument Definition in size and fields appended; Maturity Month Year field changed to Maturity Date * Modified 4.2/Complex Instrument Definition – size unchanged but fields added in Reserved space, new Instrument Type value added, new Unit of Measure value added, and Maturity Month Year field changed to Maturity Date * Modified 4.6/Last Sale (Trade) Message in size and fields appended to aid in processing Options on Futures and the legged trades for Complex Instruments * Trade Type and Complex Trade ID appended

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