MEMOIR Top for US Options
V1.6A
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1 Overview

MEMOIR Top of Book Feed is a real-time top of book feed offered directly from MEMX.

MEMOIR Top of Book Feed will provide an event based binary messaging protocol that will support the following types of messages:

- **Trading Session Information** - Provides the state of the MEMX trading session.

- **Top of Book** - Provides the best bid and best offer on the MEMX exchange in efficient formats.

- **Instrument Directory** - Provides a mapping of all supported MEMX security IDs to their basic attributes.

- **Trading Actions** - Supplies trading status messages, which inform participants of events for an instrument.

MEMOIR Top of Book Feed is unidirectional. It cannot be used to enter orders.

Application messages are implemented using a binary protocol based on SBE (Simple Binary Encoding).

2 Architecture

The MEMOIR Top of Book Feed is a sequenced message stream using fixed width binary messages.

The business level messaging is transported via the following protocols for framing and recovery:

- MEMX-UDP protocol - UDP Multicast-based session transport for the real-time delivery of messages.

- MEMX-TCP protocol - TCP-based transport used for gap fill and snapshot recovery of state (see Message/State Recovery modes later in this document for more info)

At the start of the day a session ID will be provided via the MEMX-UDP channel, and messages will begin at sequence number 1. An Instrument Directory message spin will be sent out to map all the traded symbols to a symbol locate code that will be used throughout the session. The locate code will not change during the course of the session, however intraday there may be subsequent updates to the same or new instruments.

3 Encoding

The Data Type and Header Encoding are common for all MEMOIR For US Options feeds and are defined in the MEMOIR Common For US Options Specification. All MEMOIR Top for US Options messages use SchemaId=11.

4 Message Field Types

All messages are composed of fields. Each field has a type.

Some Message Field Types and messages are common for all MEMOIR For US Options feeds and are defined in the MEMOIR Common For US Options Specification.

5 Messages

This section defines the messages that make up the protocol. For each message, it lists the fields in the message, as well as each field's position and length in the message, its underlying type, and a description of its purpose. Note common messages (in both Top and Depth feeds) are documented in the MEMOIR Common For US Options Specification.

5.1 Best Bid Offer

Provides an entire top of book update for a particular security during the snapshot procedure. Note this message is only sent from the exchange snapshot server during a snapshot procedure. (See https://memx.atlassian.net/wiki/spaces/MD/pages/2543353872/MEMOIR+Common+for+US+Option s#Snapshot)This message is not sent from the exchange when processing an incremental feed. In the incremental feed, all bid and ask updates are one sided i.e. Best Bid, Best Offer, Best Bid Short, Best Offer Short.

Field	Offset	Length	Type	Meaning
SBE Header	0	6	SBE Header	SBE Header with TemplateId=10
Timestamp	6	8	UTC Timestamp Nanos	The timestamp when the event occurred.
Symbol	14	8	CHAR	A unique OptionsSecurityID identifying the OSIRoot/PutorCall/ExpirationDate/StrikePrice for the option security. This is specified in the InstrumentDirectory message.
TotalBidSize	22	4	UINT32	The total best bid size (customer + non-customer).
CustBidSize	26	4	UINT32	The amount of the TotalBidSize that is customer liquidity.
BidPrice	30	8	PriceType	The best bid price.
TotalOfferSize	38	4	UINT32	The total best offer size (customer + non-customer).
CustOfferSize	42	4	UINT32	The amount of the TotalOfferSize that is customer liquidity.
OfferPrice	46	8	PriceType	The best offer price.

5.2 Best Bid

In order to reduce bandwidth, if only the bid (buy) side has changed for a particular security, this message will be sent.

Field	Offset	Length	Type	Meaning
SBE Header	0	6	SBE Header	SBE Header with TemplateId=11
Timestamp	6	8	UTC Timestamp Nanos	The timestamp when the event occurred.
Symbol	14	8	CHAR	A unique OptionsSecurityID identifying the OSIRoot/PutorCall/ExpirationDate/StrikePrice for the option security. This is specified in the InstrumentDirectory message.

Field	Offset	Length	Type	Meaning
TotalBidSize	22	4	UINT32	The total best bid size (customer + non-customer).
CustBidSize	26	4	UINT32	The amount of the TotalBidSize that is customer liquidity.
BidPrice	30	8	PriceType	The best bid price.

5.3 Best Offer

In order to reduce bandwidth, if only the offer (sell) side has changed for a particular security, this message will be sent.

Field	Offset	Length	Type	Meaning
SBE Header	0	6	SBE Header	SBE Header with TemplateId=12
Timestamp	6	8	UTC Timestamp Nanos	The timestamp when the event occurred.
Symbol	14	8	CHAR	A unique OptionsSecurityID identifying the OSIRoot/PutorCall/ExpirationDate/StrikePrice for the option security. This is specified in the InstrumentDirectory message.
TotalOfferSize	22	4	UINT32	The total best offer size (customer + non-customer).
CustOfferSize	26	4	UINT32	The amount of the TotalOfferSize that is customer liquidity.
OfferPrice	30	8	PriceType	The best offer price.

5.4 Best Bid Short

In order to reduce bandwidth, if only the bid (buy) side has changed for a particular security and the price <= $327.67 and size < 65535 this message will be sent.

Field	Offset	Length	Type	Meaning
SBE Header	0	6	SBE Header	SBE Header with TemplateId=13
Timestamp	6	8	UTC Timestamp Nanos	The timestamp when the event occurred.
Symbol	14	8	CHAR	A unique OptionsSecurityID identifying the OSIRoot/PutorCall/ExpirationDate/StrikePrice for the option security. This is specified in the InstrumentDirectory message.
TotalBidSize	22	2	UINT16	The total best bid size (customer + non-customer).
CustBidSize	24	2	UINT16	The amount of the TotalBidSize that is customer liquidity.
BidPrice	26	2	ShortPriceType	The best bid price.

5.5 Best Offer Short

In order to reduce bandwidth, if only the offer (sell) side has changed for a particular security and the price <= $327.67 and size < 65535 this message will be sent.

Field	Offset	Length	Type	Meaning
SBE Header	0	6	SBE Header	SBE Header with TemplateId=14
Timestamp	6	8	UTC Timestamp Nanos	The timestamp when the event occurred.
Symbol	14	8	CHAR	A unique OptionsSecurityID identifying the OSIRoot/PutorCall/ExpirationDate/StrikePrice for the option security. This is specified in the InstrumentDirectory message.
TotalOfferSize	22	2	UINT16	The total best offer size (customer + non-customer).
CustOfferSize	24	2	UINT16	The amount of the TotalOfferSize that is customer liquidity.
OfferPrice	26	2	ShortPriceType	The best offer price.

5.6 Trade

A trade occurred on the exchange.

Field	Offset	Length	Type	Meaning
SBE Header	0	6	SBE Header	SBE Header with TemplateId=15
Timestamp	6	8	UTC Timestamp Nanos	The timestamp when the event occurred.
Symbol (the MEMX OptionsSecurityID)	14	8	CHAR	A unique OptionsSecurityID identifying the OSIRoot/PutorCall/ExpirationDate/StrikePrice for the option security. This is specified in the InstrumentDirectory message.
TradeID	22	8	UINT64	The globally unique execution identifier for the trade.
TradeConditions	30	1	TradeConditions	The details about the trade.
Side	31	1	SideType	The side of the aggressing order.
Quantity	32	4	UINT32	The total quantity executed.
Price	36	8	PriceType	The executed price of the order.
CustQuantity	44	4	UINT32	The amount of the trade that was Customer Order Capacity. This can be the full Quantity, or a portion of the full Quantity.
Capacity	48	1	OrderCapacity	The order capacity of the passive order.

5.7 Clear Book

A MEMX operational or regulatory action has resulted in the book being cleared.

Field	Offset	Length	Type	Meaning
SBE Header	0	6	SBE Header	SBE Header with TemplateId=16
Timestamp	6	8	UTC Timestamp Nanos	The timestamp when the event occurred.
Symbol	14	8	CHAR	A unique OptionsSecurityID identifying the OSIRoot/PutorCall/ExpirationDate/StrikePrice for the option security. This is specified in the InstrumentDirectory message.

6 Message/State Recovery Methods

The details of MEMOIR for US Options feed message/state recovery are common for all MEMOIR For US Options feeds. They are defined in the MEMOIR Common For US Options Specification.