MEMOIR Depth for US Options
V1.3
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1 Overview

MEMOIR Depth For US Options feed is a real-time depth of book feed exchange feed.

The MEMOIR Depth For US Options feed provides an event-based binary messaging protocol that supports the following:

- **Trading Session Information** - Provides the state of the trading session.
- **Order and Quote Data** - Provides exchange displayed order information.
- **Trade Information** - Provides exchange displayed trade information.
- **Instrument Mapping** - Supplies a mapping between symbology identifiers and options security identifiers, which are used for order entry, and market data.
- **Instrument Trading Information** - Supplies status messages to inform participants of market events for an instrument.

The MEMOIR Depth For US Options feed is unidirectional and is not used for order entry.

2 Architecture

The MEMOIR Depth for US Options feed is a sequenced message stream using fixed-width binary messages. Messages use a binary protocol based on [SBE (Simple Binary Encoding).](#)

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 gap fill replay service.

At the start of the trading session, a session ID will be provided, and messages begin at sequence number 1.

In order to support building an order book, all orders are sent keyed upon an OrderID. Events on the order (Add, Replace, Reduce, Executed) should be used to alter orders on the book. It is the responsibility of the client to organize their representation of the order book based upon time, side, size and price.

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 Depth for US Options messages use SchemaId=10.

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 type, message fields are listed, 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 Order Added Short Form

An order has been added to the book. This message is used for orders that where submitted with a capacity other than Customer.

The associated OrderID on this message is used as the key to track the order's lifecycle in subsequent messages.

In order to reduce bandwidth, if 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=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.
OrderID	22	8	UINT64	The trading session unique reference number assigned to the order. Note, the Memoir OrderID is the Memo messages ExecId.
Side	30	1	SideType	The side of the order being added.
Quantity	31	2	UINT16	The total quantity being added.
Price	33	2	ShortPriceType	The displayed price of the new order.

5.2 Order Added Long Form

An order has been added to the book. This message is used for orders that where submitted with a capacity other than Customer.

The associated OrderID on this message is used as the key to track the order's lifecycle in subsequent messages.

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
OrderID	22	8	UINT64	The trading session unique reference number assigned to the order. Note, the Memoir OrderID is the Memo messages ExecId.
Side	30	1	SideType	The side of the order being added.
Quantity	31	4	UINT32	The total quantity being added.
Price	35	8	PriceType	The displayed price of the new order.

5.3 Order Added Extended

An order has been added to the book. This message is used for orders that where submitted with a capacity other than Non-Customer.

The associated OrderID on this message is used as the key to track the order's lifecycle in subsequent messages.

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.
OrderCapacity	22	1	OrderCapacityType	The capacity of this order.
OrderID	23	8	UINT64	The trading session unique reference number assigned to the order. Note, the Memoir OrderID is the Memo messages ExecId.
Side	31	1	SideType	The side of the order being added.
Quantity	32	4	UINT32	The total quantity being added.
Price	36	8	PriceType	The displayed price of the new order.

5.4 Order Deleted

An order has been removed from the book. This may occur due to a cancellation request or an administrative operation.

This OrderID is no longer available, and should be removed from the book.

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.

Field	Offset	Length	Type	Meaning
OrderCapacity	22	1	OrderCapacityType	The capacity of this order.
OrderID	23	8	UINT64	The trading session unique reference number assigned to the order in the Order Added message. Note: the Memoir OrderID is the Memo messages ExecId.

5.5 Order Reduced

An order has been reduced in quantity while maintaining its matching priority in the book. This may occur when a replace or partial cancel request occurs.

The quantity field is used to reduce the existing order quantity, and the remainder should be kept on the book. If the value resulting from this subtraction reduces the order quantity to zero, then the order should be removed from the book.

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/Strike Price for the option security. This is specified in the InstrumentDirectory message.
OrderCapacity	22	1	OrderCapacityType	The capacity of the order being reduced.
OrderID	23	8	UINT64	The trading session unique reference number assigned to the order in the Order Added message. Note: the Memoir OrderID is the Memo messages ExecId.
Side	31	1	SideType	The side of the order being reduced.
Quantity	32	4	UINT32	The total quantity of the order AFTER being replaced/reduced. This is the size remaining on the order.
Price	36	8	PriceType	The displayed price of the order being reduced.
QuantityReduced	44	4	UINT32	The delta from the previous size, a positive number.

5.6 Order Executed

An order on the book has been executed.

If the quantity executed reduces the remaining quantity of the order to zero, then the order should be removed from the book. Otherwise, the remaining order quantity after the execution should remain on the order book with the same time-priority.

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	14	8	CHAR	A unique OptionsSecurityID identifying the OSIRoot/PutorCall/ExpirationDate/Strike Price for the option security. This is specified in the InstrumentDirectory message.
OrderCapacity	22	1	OrderCapacityType	The capacity of this order.
TradeConditions	23	1	TradeConditions	The details about the trade.
OrderID	24	8	UINT64	The trading session unique reference number assigned to the order in the Order Added message. Note: the Memoir OrderID is the Memo messages ExecId.
TradeID	32	8	UINT64	The globally unique execution identifier for the trade.
Quantity	40	4	UINT32	The total quantity executed.
Price	44	8	PriceType	The executed price of the order.

5.7 Clear Book

An operational action has resulted in the book state being reset.

Upon receipt of this message, all existing orders should be removed from the book for the Option Security ID specified.

Field	Offset	Length	Type	Meaning
SBE Header	0	6	SBE Header	SBE Header with TemplateId=18
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.