

MEMOIR Depth For Crypto

MEMX Software Development

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1 Overview

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

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

- **Trading Session Information** - Provides the state of the trading session.
- **Order Data** - Provides exchange displayed order information.
- **Instrument Mapping** - Supplies a mapping between symbology identifiers and token 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 Crypto feed is unidirectional and is not used for order entry.

2 Architecture

The MEMOIR Depth for Crypto 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 and 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 Crypto feeds and are defined in the MEMOIR Common For Crypto Specification.

4 Message Field Types

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

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

4.1 RetailLiquidityIndicatorType

RetailLiquidityIndicatorType describes the retail disposition of an order when it is added to the displayed book.

Value	Name	Description
1	Normal	The order is a regular (non-retail) order
2	DesignatedRetail	The order is a retail-attested order
3	RetailLiquidityProvider	The order is a retail liquidity-providing order. Note: Retail liquidity-providing orders <i>may</i> lock or cross regular and retail-attested orders.

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.

Some Messages are common for some or all MEMOIR For Crypto feeds and are defined in the MEMOIR Common For Crypto specification.

5.1 Order Added

An order has been added to the book.

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

Field	Offset	Length	Type	Meaning
SBE Header	0	6	N/A	SBE Header with Schemald=6, TemplateId=10, BlockLength=50
Timestamp	6	8	UTCTimestampNanos	The timestamp when the event occurred.
TokenID	14	8	CHAR	A code uniquely identifying the instrument from the Instrument Directory.
OrderID	22	8	INT64	The trading session unique reference number assigned to the order.order.
CorrelationID	30	8	INT64	A reference number used for correlating orders between order entry and this feed. Values will be unique per token, per trading session.
Side	38	1	SideType	The side of the order being added.
Quantity	39	8	INT64	The total quantity being added.
Price	47	8	FixedPointDecimal	The displayed price of the new order.
RetailIndicator	55	1	RetailLiquidityIndicatorType	The retail disposition of the order.

5.2 Order Deleted

An order has been removed from the book. This may occur due to a cancellation requests or administrative operations.

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

Field	Offset	Length	Type	Meaning
SBE Header	0	6	N/A	SBE Header with Schemald=6, TemplateId=11, BlockLength=24
Timestamp	6	8	UTCTimestampNanos	The timestamp when the event occurred.

Field	Offset	Length	Type	Meaning
TokenID	14	8	CHAR	A code uniquely identifying the instrument from the Instrument Directory.
OrderID	22	8	INT64	The trading session unique reference number assigned to the order in the Order Added message.

5.3 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 order should be removed from the book.

Field	Offset	Length	Type	Meaning
SBE Header	0	6	N/A	SBE Header with Schemald=6, TemplateId=12, BlockLength=32
Timestamp	6	8	UTCTimestampNanos	The timestamp when the event occurred.
TokenID	14	8	CHAR	A code uniquely identifying the instrument from the Instrument Directory.
OrderID	22	8	INT64	The trading session unique reference number assigned to the order in the Order Added message.
Quantity	30	8	INT64	The total quantity being reduced. This value will always be greater than 0.

5.4 Order Executed

An order on the book has been executed.

If the quantity executed reduces the remaining quantity of the order to zero, then 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	N/A	SBE Header with Schemald=6, TemplateId=13, BlockLength=56
Timestamp	6	8	UTCTimestampNanos	The timestamp when the event occurred.
TokenID	14	8	CHAR	A code uniquely identifying the instrument from the Instrument Directory.
OrderID	22	8	INT64	The trading session unique reference number assigned to the order in the Order Added message.

Field	Offset	Length	Type	Meaning
TradeID	30	16	IDType	The globally unique execution identifier for the trade.
Quantity	46	8	INT64	The total quantity executed.
Price	54	8	FixedPointDecimal	The executed price of the order.

5.5 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 TokenID specified.

Field	Offset	Length	Type	Meaning
SBE Header	0	6	N/A	SBE Header with Schemald=6, TemplateId=14, BlockLength=16
Timestamp	6	8	UTCTimestampNanos	The timestamp when the event occurred.
TokenID	14	8	CHAR	A code uniquely identifying the instrument from the Instrument Directory.

6 Message/State Recovery Methods

All MEMOIR for Crypto feeds are disseminated primarily over the MEMX-UDP transport protocol. Consumers of the feeds may periodically miss messages due to the unreliable nature of the UDP protocol. Message and State recovery procedures are described in the MEMOIR Common For Crypto specification.