Cboe US Equities Binary Order Entry Specification

Version 2.3.3

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Contents

1 Introduction

1.1 Overview

This document describes Bats Binary Order Entry (BOE), the Bats proprietary order entry protocol.

Where applicable, the terminology (e.g., time in force) used in this document is similar to that used by the FIX protocol to allow those familiar with FIX to more easily understand BOE. This document assumes the reader has basic knowledge of the FIX protocol.

BOE fulfills the following requirements:

- CPU and memory efficiency. Message encoding, decoding, and parsing are simpler to code and can be optimized to use less CPU and memory at runtime.
- Application level simplicity. State transitions are simple and unambiguous. They are easy to apply to a Member's representation of an order.
- Session level simplicity. The session level protocol (login, sequencing, replay of missed messages, logout) is simple to understand.

Whilst Bats has strived to preserve feature parity between FIX and BOE where possible, some features may only be available in one protocol or the other.

All binary values are in little Endian (used by Intel x86 processors), and not network byte order.

Each message is identified by a unique message type. Not all message types are used in all of Bats' trading environments globally. A listing of the supported message types is provided in **List of Message Types**.

All communication is via standard TCP/IP.

1.2 Data Types

The following data types are used by BOE. The size of some data types varies by message. All data types have default values of binary zero, in both Member to Cboe and Cboe to Member contexts.

- *Binary:* Little Endian byte order, unsigned binary value. The number of bytes used depends on the context.
  - One byte: `FE = 254`
  - Four bytes: `64 00 00 00 = 100`
- *Signed Binary:* Little Endian byte order, signed two's complement, binary value. The number of bytes used depends on the context.
  - One byte: `DF = -33`
  - Four bytes: `64 00 00 00 = +100`

- *Binary Price:* Little Endian byte order value, signed two's complement, eight bytes in size, with four implied decimal places. So, if the value is 123,400, the actual value taking into account implied decimal places is 12.34.
  - `08 E2 01 00 00 00 00 00` = 123,400/10,000 = 12.34
  - `F8 1D FE FF FF FF FF FF` = -123,400/10,000 = -12.34
- *Short Binary Price:* Little Endian byte order value, signed two's complement, four bytes in size, with four implied decimal places. So, if the value is 12,300, the actual value taking into account implied decimal places is 1:23.
  - `0C 30 00 00` = 12,300/10,000 = 1.34
- *Signed Binary Price:* Little Endian byte order value, signed two's complement, eight bytes in size, with four implied decimal places. So, the value is 123,400 is -12.34 after taking account for the four implied decimal places.
  - `08 E2 01 00 00 00 00 00` = 123,400/10,000 = 12.34
  - `F8 1D FE FF FF FF FF FF` = -123,400/10,000 = -12.34
- *Signed Binary Fee:* Little Endian byte order value, signed two's complement, eight bytes in size, with five implied decimal places. So, the value is 123,000 is -1.23 after taking account for the five implied decimal places.
  - `88 1F FE FF FF FF FF FF` = -123,000/100,000 = -1.23
- *Alpha:* Uppercase letters (A-Z) and lowercase letters (a-z) only. ASCII NUL (0x00) filled on the right, if necessary. The number of bytes used depends on the context.
- *Alphanumeric:* Uppercase letters (A-Z), lowercase letters (a-z) and numbers (0-9) only. ASCII NUL (0x00) filled on the right, if necessary.
- *Text:* Printable ASCII characters only. ASCII NUL (0x00) filled on the right, if necessary.
- *DateTime:* 8 bytes. The date and time, in UTC, represented as nanoseconds past the UNIX epoch (00:00:00 UTC on 1 January 1970). The nanoseconds portion is currently ignored and treated as 0 (i.e. the times are only accurate to microseconds) on input, and will always be set to 0 by Cboe in outgoing messages. However, Cboe may begin populating the nanoseconds portion at any time without warning.

  For example: 1,294,909,373,757,324,000 = 2011-01-13 09:02:53.757324 UTC.
- *Date:* Little Endian byte order, unsigned binary value, 4 bytes in size. The YYYYMMDD expressed as an integer.

1.3 Optional Fields and Bit fields

Some messages such as `New Order` and `Modify Order` have a number of optional fields. A count and number of bitfields in the message specify which optional fields will be present at the end of the message. If a bit is set, the field will be present. Fields are appended to the end of the message. There is no implicit framing between the optional fields. In order to decode the optional fields, they must be appended in a particular order to the end of the message. The fields of the first bitfield are appended first, lowest order bit first. Next, the fields of the next bitfield are appended, lowest order bit first. This continues for all bitfields. While certain reserved bits within a defined bitfield are used within another Cboe market and will be ignored, bits that are reserved for future expansion must be set to 0 when noted in the bitfield description.

The size, data type, and values for each field are described in 'Section 7 – List of Optional Fields'.

Note that the set of optional fields returned for each Cboe to Member message type is determined at session login (using the `Login Request` message); hence, the exact size and layout of each message received by the client application can be known in advance. Any requested optional field which is irrelevant in a particular context will still be present in the returned message, but with all bytes set to binary zero (0x00).

Each return message from Cboe to Member indicates the optional fields which are present, even though the Member indicated during login which optional fields are to be sent. The reason for the inclusion (and duplication) is so that each message can be interpreted on its own, without having to find the corresponding login request or response to know which optional fields are present. So, for example, in a log file, decoding a message requires only that single message.

Example messages are shown with each message type which should help to make this concept clear.

1.4 Hours of Operations

All times noted are Eastern Time zone (ET) based.

Refer to the web site for the Bats Holiday schedule.

BZX Exchange supports an opening and closing auction for BZX Exchange listed securities (refer to the 'Bats US Equities Auction Process specification' for more information).

Orders entered prior to the start of the Pre-Market or Regular Trading Session which are accepted will be queued for trading in the session designated by the order. Once trading begins, queued orders will be released to the respective book and crossing orders will be matched by time priority. Refer to the 'Bats Equities Opening Process' for more information.

Orders are rejected if they are received outside the hours Bats is available for trading or queuing. All orders remaining after the Post Market Session will be cancelled automatically (Execution Reports will be delivered).

1.4.1 Trading Sessions

Session	Start Time	End Time
Early Order Acceptance	**6:00 AM**	**7:00 AM**
Early Trading Session	**7:00 AM**	**8:00 AM**
Pre-Market Trading Session	**8:00 AM**	**9:30 AM**
Regular Trading Session	**9:30 AM**	**4:00 PM**
Post-Market Session	**4:00 PM**	**5:00 PM (BYX)** **8:00 PM (BZX, EDGA and EDGX)**

1.5 Protocol Features

1.5.1 Cboe Market Close (BZX Only) (Effective TBD)

Cboe Market Close on the BZX Exchange allows for Members to submit buy and sell Market-On-Close orders designated for participation in CMC in order to obtain the official closing price for any matched shares. Any remaining shares will be cancelled back to Members.

At 6:00 a.m. ET Members may enter new orders to participate in CMC. Members will populate the following BOE fields to send a CMC order.

Field Name	Comments
OrdType	1 = Market
TimeInForce	7 = At the Close
RoutingInst	B = Book Only

An `Order Restated` message will be sent for any fully or partially matched CMC order at

approximately 3:35 p.m. ET. A standard `Order Cancelled` message will be sent for any CMC order that does not have any matched quantity at this time. The restatement will contain the following fields:

Field Name	Description
RestatementReason	C = CMC Restatement
LastShares	Number of Shares Cancelled (if any)
LeavesQty	Matched Size

After the closing price is received one or more `Order Execution` messages, totaling the Matched Size, will be sent for each CMC order. The execution message will contain the following fields:

Field Name	Description
LastShares	Execution Size
LastPx	Execution Price (official close price)

If a closing price is not received from the primary listing exchange by 8:00 p.m. ET, then all CMC matched shares will be cancelled. In the event that a closing price is updated by the primary listing exchange after its initial publication, then a Trade Cancel or Correctmessage will be sent to update the execution price for each CMC execution impacted by the changed closing price. **As a result, all firms that wish to submit CMC orders must be certified for Trade Cancel or Correct messages on BOE before they will be allowed to submit CMC orders.**

2 Session

2.1 Message Headers

Each message has a ten byte header. The two initial *StartOfMessage* bytes are present to aid in message reassembly for network capture purposes. The *MatchingUnit* field is only populated on sequenced, non-session level messages sent from Cboe to the Member. Messages from Member to Cboe and all session level messages must always set this value to 0.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be `0xBA 0xBA`.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	Message type.
MatchingUnit	5	1	Binary	The matching unit which created this message. Matching units in BOE correspond to matching units on Multicast PITCH. **For session level traffic, the unit is set to 0.** **For messages from Member to Cboe, the unit must be 0.**
SequenceNumber	6	4	Binary	The sequence number for this message. Messages from Cboe to Member are sequenced distinctly per matching unit. Messages from Member to Cboe are sequenced across all matching units with a single sequence stream. Member can optionally send a 0 sequence number on all messages from Member to Cboe. Cboe highly recommends that Members send sequence number on all inbound messages.

2.2 Login, Replay and Sequencing

Session level messages, both inbound (Member to Cboe) and outbound (Cboe to Member) are unsequenced.

Inbound (Member to Cboe) application messages are sequenced. Upon reconnection, Cboe informs the Member of the last processed sequence number; the Member may choose to resend any messages with sequence numbers greater than this value. A gap forward in the Member's incoming sequence number is permitted at any time and is ignored by Cboe. Gaps backward in sequence number (including the same sequence number used twice) are never permitted and will always result in a `Logout` message being sent and the connection being dropped.

Most (but not all) outbound (Cboe to Member) application messages are monotonically sequenced per matching unit. Each message's documentation will indicate whether it is sequenced or unsequenced. While matching units on BOE correspond directly to matching units on Multicast PITCH, sequence numbers do not.

Upon reconnection, a Member sends the last received sequence number per matching unit in a `Login Request` message. Cboe will respond with any missed messages. However, when the `Login Request` *NoUnspeciedUnitReplay* flag is enabled, Cboe will exclude messages from unspecified matching units during replay. Cboe will send a `Replay Complete` message when replay is finished. If there are no messages to replay, a `Replay Complete` message will be sent immediately after a `Login Response` message. Cboe will reject all orders during replay.

Assuming a Member has requested replay messages using a properly formatted `Login Request` after a disconnect, any unacknowledged orders remaining with the Member after the `Replay Complete` message is received should be assumed to be unknown to Cboe.

Unsequenced messages will not be included during replay.

A session is identified by the username and session sub-identifier (both supplied by Cboe). Only one concurrent connection per username and session sub-identifier is permitted.

If a login is rejected, an appropriate `Login Response` message will be sent and the connection will be terminated.

2.3 Sequence Reset

A reset sequence operation is not available for Binary Order Entry. However, a Member can send a `Login Request` message with *NoUnspecifiedUnitReplay* field enabled, and *NumberOfUnits* field set to zero. Then, upon receiving a `Login Response` message from Cboe, the Member can use the field *LastReceivedSequenceNumber* as the sequence starting point for sending future messages.

2.4 Heartbeats

`Client Heartbeat` messages are sent from Member to Cboe and `Server Heartbeat` messages are sent from Cboe to Member if no other data has been sent in that direction for one second. Like other session level messages, heartbeats from Cboe to the Member do not increment the sequence number. If Cboe receives no inbound data or heartbeats for five seconds, a `Logout` message will be sent and the connection will be terminated. **Members are encouraged to have a one second heartbeat interval and to perform similar connection staleness logic.**

2.5 Logging Out

To gracefully log out of a session, a `Logout Request` message should be sent by the Member. Cboe will finish sending any queued data for that port and will then respond with its own `Logout` message and close the connection. After receipt of a `Logout Request` message, Cboe will ignore all other inbound (Member to Cboe) messages except for `Client Heartbeat`.

3 Session Messages

3.1 Member to Cboe

3.1.1 Login Request

A `Login Request` message must be sent as the first message upon connection.

A number of repeating parameter groups, some of which may be required, are sent at the end of the message. Ordering of parameter groups is not important. New parameter groups may be added in the future with no notice.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be `0xBA 0xBA`.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	`0x37`
MatchingUnit	5	1	Binary	Always 0 for inbound (Member to Cboe) messages.
SequenceNumber	6	4	Binary	Always 0 for session level messages.
SessionSubID	10	4	Alphanumeric	Session Sub ID supplied by Cboe.
Username	14	4	Alphanumeric	Username supplied by Cboe.
Password	18	10	Alphanumeric	Password supplied by Cboe.
NumberOfParam Groups	28	1	Binary	A number, n (possibly 0), of parameter groups to follow.
ParamGroup$_1$				First parameter group.
…				
ParamGroup$_n$				Last parameter group.

Unit Sequences Parameter Group

This parameter group includes the last consumed sequence number per matching unit received by the Member. Cboe uses these sequence numbers to determine what outbound (Cboe to Member) traffic, if any, was missed by the Member. If this parameter group is not sent, it's assumed the Member has not received any messages (e.g., start of day).

The Member does not need to include a sequence number for a unit if they have never received messages from it. For example, if the Member has received responses from units 1, 3, and 4, the `Login Request` message need not include unit 2. If the Member wishes to send a value for unit 2 anyway, 0 would be the only allowed value.

Only one instance of this parameter group may be included.

Field	Offset	Length	Data Type	Description

ParamGroupLength	0	2	Binary	Number of bytes for the parameter group, including this field.
ParamGroupType	2	1	Binary	`0x80`
NoUnspecified UnitReplay	3	1	Binary	Flag indicating whether to replay missed outgoing (Cboe to Member) messages for unspecified units. `0x00` = False (Replay Unspecified Units) `0x01` = True (Suppress Unspecified Units Replay)
NumberOfUnits	4	1	Binary	A number, n (possibly 0), of unit/sequence pairs to follow, one per unit from which the Member has received messages.
UnitNumber $_1$		1	Binary	A unit number.
UnitSequence$_1$		4	Binary	Last received sequence number for the unit.
…				
UnitNumber $_n$		1	Binary	A unit number.
UnitSequence$_n$		4	Binary	Last received sequence number for the unit.

Return Bitfields Parameter Group

This parameter group, which may be repeated, indicates which attributes of a message will be returned by Cboe for the remainder of the session. This allows Members to tailor the echoed results to the needs of their system without paying for bandwidth or processing they do not need.

Listing of the return bitfields which are permitted per message is contained in 'Section 7 – Return Bitfields per Message'.

Field	Offset	Length	Data Type	Description
ParamGroupLength	0	2	Binary	Number of bytes for the parameter group, including this field.
ParamGroupType	2	1	Binary	`0x81`
MessageType	3	1	Binary	Return message type for which the bitfields are being specified (e.g., `0x25` for an Order Acknowledgment message).
NumberOfReturn Bitfields	4	1	Binary	Number of bitfields to follow.
ReturnBitfield$_1$	5	1	Binary	Bitfield identifying fields to return.
…				
ReturnBitfield$_n$		1	Binary	Last bit field.

Example Login Request Message:

Note this example is for illustrative purposes only. Actual login messages will contain specification of return bitfields for a larger set messages and each return bitfield specification will be complete whereas

the example below is only an illustration for purposes of demonstrating the construction of the `Login Request` message.

Field Name	Hexadecimal	Notes
StartOfMessage	`BA BA`	Start of message bytes.
MessageLength	`43 00`	67 bytes
MessageType	`37`	`Login Request`
MatchingUnit	`00`	Always 0 for inbound messages
SequenceNumber	`00 00 00 00`	Always 0 for session level messages
SessionSubID	`30 30 30 31`	0001
Username	`54 45 53 54`	`TEST`
Password	`54 45 53 54 49 4E 47 00 00 00`	`TESTING`
NumberOfParamGroups	`03`	3 parameter groups
ParamGroupLength	`14 00`	20 bytes for this parameter group
ParamGroupType	`80`	`0x80` = Unit Sequences
NoUnspecifiedUnitReplay	`01`	True (replay only specified units)
NumberOfUnits	`03`	Two unit/sequence pairs to follow;
$UnitNumber_1$	`01`	Unit 1
$UnitSequence_1$	`4A BB 01 00`	Last received sequence of 113,482
$UnitNumber_2$	`02`	Unit 2
$UnitSequence_2$	`00 00 00 00`	Last received sequence of 0
$UnitNumber_3$	`04`	Unit 4
$UnitSequence_3$	`79 A1 00 00`	Last received sequence of 41,337
ParamGroupLength	`08 00`	8 bytes for this parameter group
ParamGroupType	`81`	`0x81` = Return Bitfields
MessageType	`25`	`0x25` = `Order Acknowledgment`
NumberOfReturnBitfields	`03`	3 bitfields to follow
$ReturnBitfield_1$	`00`	No bitfields from byte 1
$ReturnBitfield_2$	`41`	*Symbol, Capacity*
$ReturnBitfield_3$	`05`	*Account, ClearingAccount*
ParamGroupLength	`0C 00`	12 bytes for this parameter group
ParamGroupType	`81`	`0x81` = Return Bitfields
MessageType	`2C`	`0x2C` = `Order Execution`
NumberOfReturnBitfields	`07`	7 bitfields to follow
$ReturnBitfield_1$	`00`	No bitfields from byte 1
$ReturnBitfield_2$	`41`	*Symbol, Capacity*
$ReturnBitfield_3$	`07`	*Account, ClearingFirm, ClearingAccount*
$ReturnBitfield_4$	`00`	No bitfields from byte 4
$ReturnBitfield_5$	`40`	*BaseLiquidityIndicator*
$ReturnBitfield_6$	`00`	No bitfields from byte 6
$ReturnBitfield_7$	`01`	*SubLiquidityIndicator*

3.1.2 Logout Request

To end the session, the Member should send a `Logout Request` message. Cboe will finish sending any queued data and finally respond with a `Logout` message and close the connection.

A Member may simply close the connection without logging out, but may lose any queued messages by doing so.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be `0xBA 0xBA`.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	`0x02`
MatchingUnit	5	1	Binary	Always 0 for inbound (Member to Cboe) messages.
SequenceNumber	6	4	Binary	Always 0 for session level messages.

Example Logout Request Message:

Field Name	Hexadecimal	Notes
StartOfMessage	`BA BA`	Start of message bytes.
MessageLength	`08 00`	8 bytes
MessageType	`02`	`Logout Request`
MatchingUnit	`00`	Always 0 for inbound messages
SequenceNumber	`00 00 00 00`	Always 0 for session level messages

3.1.3 Client Heartbeat

See 'Section 2.4 – Heartbeats' for more information about heartbeats and the session level protocol.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be `0xBA 0xBA`.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	`0x03`
MatchingUnit	5	1	Binary	Always 0 for inbound (Member to Cboe) messages.
SequenceNumber	6	4	Binary	Always 0 for session level messages.

Example Client Heartbeat Message:

Field Name	Hexadecimal	Notes
StartOfMessage	`BA BA`	Start of message bytes.
MessageLength	`08 00`	8 bytes
MessageType	`03`	`Client Heartbeat`
MatchingUnit	`00`	Always 0 for inbound messages
SequenceNumber	`00 00 00 00`	Always 0 for session level messages

3.2 Cboe to Member

3.2.1 Login Response

A `Login Response` message is sent in response to a `Login Request` message. On a successful login, the *LoginResponseStatus* will be set to 'A'. On a failed login, *LoginResponseStatus* will be set to a value other than 'A', and *LoginResponseText* will be set to an appropriate failure description.

Cboe will verify Return Bitfields at login time. If the Return Bitfields in a Return Bitfields Parameter Group are invalid, *LoginResponseStatus* will be set to F, and *LoginResponseText* will include a description of which byte and bit are invalid. This is done to ensure that reserved fields are not used, and only options that apply to the local market are set. See 'Section 6 – Return Bitfields Per Message' for additional information.

Note that two sets of sequence numbers are available on the `Login Response`. The set of sequence numbers in the body are the actual Cboe to Member sequence numbers indicating the highest sequence numbers available per matching unit. If specified during login, the Unit Sequences Parameter Group will also be returned which is an echo of the sequence numbers the Member presented during login as the highest received. If these are different, it indicates a gap which will be filled by Cboe.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be `0xBA 0xBA`.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	`0x24`
MatchingUnit	5	1	Binary	Always 0 for session level messages.
SequenceNumber	6	4	Binary	Always 0 for session level messages.
LoginResponseStatus	10	1	Alphanumeric	Accepted, or the reason for the rejection. `A` = Login Accepted `N` = Not authorized (invalid username/password) `D` = Session is disabled `B` = Session in use `S` = Invalid session `Q` = Sequence ahead in Login message `I` = Invalid unit given in Login message `F` = Invalid return bit field in login message `M` = Invalid Login Request message structure
LoginResponseText	11	60	Text	Human-readable text with additional information about the reason for rejection. `ASCII NUL (0x00)` filled on the right, if necessary.
NoUnspecified UnitReplay	71	1	Binary	Echoed back from the original `Login Request message`.
LastReceived SequenceNumber	72	4	Binary	Last inbound (Member to Cboe) message sequence number processed by Cboe.
NumberOfUnits	76	1	Binary	A number, n, of unit/sequence pairs to follow, one per unit. A pair for every unit will be sent, even if no messages have been sent to this port today. For unsuccessful logins, this will be 0.

UnitNumber 1		1	Binary	A unit number.
UnitSequence1		4	Binary	Highest available Cboe to Member sequence number for the unit.
…				
UnitNumber n		1	Binary	A unit number.
UnitSequencen		4	Binary	Highest available Cboe to Member sequence number for the unit.
NumberOfParam Groups		1	Binary	Echoed back from the original `Login Request` message.
ParamGroup1				Echoed back from the original `Login Request` message.
…				
ParamGroupn				Echoed back from the original `Login Request` message.

Example Login Response Message:

Field Name	Hexadecimal	Notes
StartOfMessage	`BA BA`	Start of message bytes.
MessageLength	`88 00`	136 bytes
MessageType	`24`	`Login Response`
MatchingUnit	`00`	Always 0 for session messages
SequenceNumber	`00 00 00 00`	Always 0 for session level messages
LoginResponseStatus	`41`	A = Login Accepted
LoginResponseText	`41 63 63 65 70 74 65 64 00 00`	`Accepted`
	`00 00 00 00 00 00 00 00 00 00`	(padding)
	`00 00 00 00 00 00 00 00 00 00`	(padding)
	`00 00 00 00 00 00 00 00 00 00`	(padding)
	`00 00 00 00 00 00 00 00 00 00`	(padding)
	`00 00 00 00 00 00 00 00 00 00`	(padding)
NoUnspecified UnitReplay	`01`	True (replay only specified units)
Last Received Sequence Number	`54 4A 02 00`	Last sequence Cboe received of 150,100
NumberOfUnits	`04`	Four unit/sequence pairs to follow;
UnitNumber 1	`01`	Unit 1
UnitSequence1	`4A BB 01 00`	Actual last sequence of 113,482
UnitNumber 2	`02`	Unit 2
UnitSequence2	`00 00 00 00`	Actual last sequence of 0
UnitNumber 3	`02`	Unit 3
UnitSequence3	`00 00 00 00`	Actual last sequence of 0
UnitNumber 4	`02`	Unit 4
UnitSequence4	`79 A1 00 00`	Actual last sequence of 41,337
NumberOfParam Groups	`03`	3 parameter groups
ParamGroupLength	`14 00`	20 bytes for this parameter group
ParamGroupType	`80`	`0x80` = Unit Sequences
NoUnspecified UnitReplay	`01`	True (replay unspecified units)

NumberOfUnits	03	Three unit/sequence pairs to follow;
UnitNumber$_1$	01	Unit 1
UnitSequence$_1$	4A BB 01 00	Last received sequence of 113,482
UnitNumber$_2$	02	Unit 2
UnitSequence$_2$	00 00 00 00	Last received sequence of 0
UnitNumber$_3$	04	Unit 4
UnitSequence3	79 A1 00 00	Last received sequence of 41,337
ParamGroupLength	08 00	8 bytes for this parameter group
ParamGroupType	81	0x81 = Return Bitfields
MessageType	25	0x25 = Order Acknowledgment
NumberOfReturn Bitfields	03	3 bitfields to follow
ReturnBitfield$_1$	00	No bitfields from byte 1
ReturnBitfield$_2$	41	*Symbol, Capacity*
ReturnBitfield$_3$	05	*Account, ClearingAccount*
ParamGroupLength	0C 00	12 bytes for this parameter group
ParamGroupType	81	0x81 = Return Bitfields
MessageType	2C	0x2C = Order Execution
NumberOfReturn Bitfields	07	7 bitfields to follow
ReturnBitfield$_1$	00	No bitfields from byte 1
ReturnBitfield$_2$	41	*Symbol, Capacity*
ReturnBitfield$_3$	07	*Account, ClearingFirm, ClearingAccount*
ReturnBitfield$_4$	00	No bitfields from byte 4
ReturnBitfield$_5$	40	*BaseLiquidityIndicator*
ReturnBitfield$_6$	00	No bitfields from byte 6
ReturnBitfield$_7$	01	*SubLiquidityIndicator*

3.2.2 Logout

A Logout is usually sent in response to a Logout Request. Any queued data is transmitted, a Logout is sent, and Cboe will close the connection. However, a Logout may also be sent if the Member violates the protocol specification (e.g., by moving backwards in sequence number).

The Logout contains the last transmitted sequence number for each unit, allowing the Member to check that their last received sequence number matches.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x08
MatchingUnit	5	1	Binary	Always 0 for session level messages.
SequenceNumber	6	4	Binary	Always 0 for session level messages.

LogoutReason	10	1	Alphanumeric	The reason why the `Logout` message was sent. `U` = User Requested `E` = End of Day `A` = Administrative `!` = Protocol Violation
LogoutReasonText	11	60	Text	Human-readable text with additional information about the reason for logout. Particularly useful if *LogoutReason* = ! (Protocol Violation).
LastReceived SequenceNumber	71	4	Binary	Last inbound (Member to Cboe) message sequence number processed by Cboe.
NumberOfUnits	75	1	Binary	A number, *n* (possibly 0), of unit/sequence pairs to follow, one per unit from which the client has received messages.
UnitNumber $_1$		1	Binary	A unit number.
UnitSequence$_1$		4	Binary	Highest available sequence number for the unit.
…				
UnitNumber $_n$		1	Binary	A unit number.
UnitSequence$_n$		4	Binary	Highest available sequence number for the unit.

Example Logout Response Message:

Field Name	**Hexadecimal**	**Notes**
StartOfMessage	`BA BA`	Start of message bytes.
MessageLength	`55 00`	85 bytes
MessageType	`08`	Logout
MatchingUnit	`00`	Always 0 for session level messages
SequenceNumber	`00 00 00 00`	Always 0 for session level messages
LogoutReason	`55`	`U` = User Requested

LogoutReasonText	`55 73 65 72 00 00 00 00 00 00`
	`00 00 00 00 00 00 00 00 00 00`
	`00 00 00 00 00 00 00 00 00 00`
	`00 00 00 00 00 00 00 00 00 00`
	`00 00 00 00 00 00 00 00 00 00`
	`00 00 00 00 00 00 00 00 00 00`
		`User`

LastReceived SequenceNumber	`54 5A 02 00`	Last Cboe received sequence of 150,100
NumberOfUnits	`03`	Two unit/sequence pairs to follow;
UnitNumber$_1$	`01`	Unit 1
UnitSequence$_1$	`4A BB 01 00`	Last sent sequence of 113,482
UnitNumber$_2$	`02`	Unit 2
UnitSequence$_2$	`00 00 00 00`	Last sent sequence of 0
UnitNumber$_3$	`04`	Unit 2
UnitSequence$_3$	`79 A1 00 00`	Last sent sequence of 41,337

3.2.3 Server Heartbeat

See 'Section 2.4 – Heartbeats' for more information about heartbeats and the session level protocol.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be `0xBA 0xBA`.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	`0x09`
MatchingUnit	5	1	Binary	Always 0 for session level messages.
SequenceNumber	6	4	Binary	Always 0 for session level messages.

Example Server Heartbeat Message:

Field Name	Hexadecimal	Notes
StartOfMessage	`BA BA`	Start of message bytes.
MessageLength	`08 00`	8 bytes
MessageType	`09`	`Server Heartbeat`
MatchingUnit	`00`	Always 0 for inbound messages
SequenceNumber	`00 00 00 00`	Always 0 for session level messages

3.2.4 Replay Complete

See 'Section 2.2 – Login, Replay and Sequencing' for more information on Login, sequencing and replay.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be `0xBA 0xBA`.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	`0x13`
MatchingUnit	5	1	Binary	Always 0 for session level messages.
SequenceNumber	6	4	Binary	Always 0 for session level messages.

Example Replay Complete Message:

Field Name	Hexadecimal	Notes
StartOfMessage	`BA BA`	Start of message bytes.
MessageLength	`08 00`	8 bytes
MessageType	`13`	`Replay Complete`
MatchingUnit	`00`	Always 0 for inbound messages
SequenceNumber	`00 00 00 00`	Always 0 for session level messages

4 Application Messages

4.1 Member to Cboe

4.1.1 New Order

A `New Order` message consists of a number of required fields followed by a number of optional fields. The optional fields used are specified by setting bits in the *NewOrderBitfields*. Fields must be appended at the end of the message, starting with the lowest order enabled bit in the first bit field first.

Permitted input optional fields are described in 'Section 5.1 – New Order'.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be `0xBA 0xBA`.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	`0x38`
MatchingUnit	5	1	Binary	Always 0 for inbound (Member to Cboe) messages.
SequenceNumber	6	4	Binary	The sequence number for this message.
ClOrdID	10	20	Text	Corresponds to *ClOrdID* (11) in Cboe FIX. ID chosen by the client. Characters in the ASCII range 33-126 are allowed, except for comma, semicolon, and pipe. If the *ClOrdID* matches a live order, the order will be rejected as duplicate. Note: Cboe only enforces uniqueness of *ClOrdID* values among currently live orders. However, we strongly recommend that you keep your *ClOrdID* values unique.
Side	30	1	Alphanumeric	Corresponds to *Side* (54) in Cboe FIX. `1` = Buy `2` = Sell `5` = Sell Short (client affirms ability to borrow) `6` = Sell Short Exempt
OrderQty	31	4	Binary	Corresponds to *OrderQty* (38) in Cboe FIX. Order quantity. System limit is 999,999 shares.
NumberOf NewOrder Bitfields	35	1	Binary	Bitfield identifying which bitfields are set. Field values must be appended to the end of the message.
NewOrderBitfield[1]	36	1	Binary	Bitfield identifying fields to follow.
….				
NewOrderBitfield[n]		1	Binary	Last bitfield.
Optional fields. . .				

Required Order Attributes:

The following are required to be sent on new orders:

- Some form of symbology (see **Symbology** below);
- *Price* (limit orders) or *Price* and/or *OrdType* (limit order market orders); and,
- *Capacity*

All other values have defaults. See the table in **List of Optional Fields** for additional information about each optional field, including its default value.

Symbology:

For additional information, refer to the Cboe US Equity and Options Symbology Reference.

Example New Order Message:

Field Name	Hexadecimal	Notes
StartOfMessage	`BA BA`	Start of message bytes.
MessageLength	`4A 00`	73 bytes
MessageType	`38`	`New Order`
MatchingUnit	`00`	Always 0 for inbound messages
SequenceNumber	`64 00 00 00`	Sequence number 100
ClOrdID	`41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00`	ABC123
Side	`31`	Buy
OrderQty	`E8 03 00 00`	1,000 shares
NumberOfNewOrder Bitfields	`03`	3 bitfields to follow
NewOrderBitfield$_1$	`04`	*Price*
NewOrderBitfield$_2$	`C1`	*Symbol, Capacity, RoutingInst*
NewOrderBitfield$_3$	`01`	*Account*
Price	`44 D6 12 00 00 00 00 00`	$123.45
Symbol	`4D 53 46 54 00 00 00 00`	MSFT
Capacity	`50`	P = Principal
RoutingInst	`52 00 00 00`	R = Routable
Account	`44 45 46 47 00 00 00 00 00 00 00 00 00 00 00 00`	DEFG

4.1.2 Cancel Order

Request to cancel an order.

Permitted input optional fields are described in 'Section 5.4 – Cancel Order'.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be `0xBA 0xBA`.

MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x39
MatchingUnit	5	1	Binary	Always 0 for inbound (Member to Cboe) messages.
SequenceNumber	6	4	Binary	The sequence number for this message.
OrigClOrdID	10	20	Text	Corresponds to *OrigClOrdID* (41) in Cboe FIX. *ClOrdID* of the order to cancel.
NumberOf CancelOrder Bitfields	30	1	Binary	Bitfield identifying bitfields which are set. May be 0. Field values must be appended to the end of the message.
CancelOrder Bitfield[1]	31	1	Binary	Bitfield identifying fields to follow. Only present if *NumberOfCancelOrderBitfields* is non-zero.
…				
CancelOrder Bitfield[n]		1	Binary	Last bitfield.
Optional fields. . .				

Example Cancel Order Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	22 00	34 bytes
MessageType	39	Cancel Order
MatchingUnit	0	Always 0 for inbound messages
SequenceNumber	64 00 00 00	Sequence Number 100
OrigClOrdID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC123
NumberOfCancel OrderBitfields	01	1 bitfield to follow
CancelOrderBitfield$_1$	01	*ClearingFirm*
ClearingFirm	54 45 53 54	TEST

4.1.3 Modify Order

Request to modify an order. The order attributes to be modified are selected using *NumberOfModifyBitfields* and some number of bitfields to follow.

Only *Price*, *Side*, *OrderQty*, *StopPx*, *MaxFloor*, and *OrdType* may be adjusted. Modifies will result in a loss of time priority unless the modification involves a decrease in *OrderQty*, a change to *MaxFloor*, a change to *StopPx*, or a change in *Side* from sell long to sell short or vice-versa.

Other fields (including ExecInst will be ignored, and the value from the original order will be reused. In particular,note that when a Day ISO is modified, the ISO designation is applied to the new order.

A change in *MaxFloor* takes effect on the next reserve reload. A zero value for *MaxFloor* will be ignored. If *MaxFloor* is to be removed completely, then the order should be cancelled and a new order sent.

Changes in *OrderQty* result in an adjustment of the current order's *OrderQty*. The new *OrderQty* does not directly replace the current order's *LeavesQty*. Rather, a delta is computed from the current *OrderQty* and the replacement *OrderQty*. This delta is then applied to the current *LeavesQty*. If the resulting *LeavesQty* is less than or equal to zero, the order is cancelled. This results in safer behavior when the modification request overlaps partial fills for the current order, leaving the Member in total control of the share exposure of the order.

A `Modify Order` should not be issued until the `Order Acknowledgement` for the previous `New Order` or `Order Modified` message for the previous `Modify Order` has been received. The BOE handler will reject a new `Modify Order` if it has not been accepted or it has not seen the result of the prior modification from the Matching Engine. However, `Modify Order` requests that merely reduce *OrderQty* may be overlapped if the existing *ClOrdID* is reused, as long as the trading identifier has not been opted-in to daily limit trading risk controls. This is the only case where reuse of the *ClOrdID* is allowed.

***The OrderQty* and Price fields in the optional field block must be present on all `Modify Order` requests.** Messages sent without *OrderQty* or *Price* fields will be rejected.

Permitted input optional fields are described in 'Section 5.3 – Modify Order'.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be `0xBA 0xBA`.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	`0x3A`
MatchingUnit	5	1	Binary	Always 0 for inbound (Member to Cboe) messages.
SequenceNumber	6	4	Binary	The sequence number for this message.
ClOrdID	10	20	Text	New *ClOrdID* for this order.
OrigClOrdID	30	20	Text	Corresponds to *OrigClOrdID* (41) in Cboe FIX. *ClOrdID* of the order to replace. In the case of multiple changes to a single order, this will be the *ClOrdID* of the most recently accepted change.
NumberOfModifyOrder Bitfields	50	1	Binary	Bitfield identifying bitfields which are set. May be 0. Field values must be appended to the end of the message.

ModifyOrderBitfield1	51	1	Binary	Bitfield identifying fields to follow.
…				
ModifyOrderBitfieldn		1	Binary	Last bitfield.
Optional fields. . .				

Example Modify Order Message:

Field Name	Hexadecimal	Notes
StartOfMessage	`BA BA`	Start of message bytes
MessageLength	`3E 00`	62 bytes
MessageType	`3A`	`Modify Order`
MatchingUnit	`00`	Always 0 for inbound messages
SequenceNumber	`64 00 00 00`	Sequence Number 100
ClOrdID	`41 42 43 31 32 34 00 00 00 00 00 00 00 00 00 00 00 00 00 00`	ABC124
OrigClOrdID	`41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00`	ABC123
NumberOfModify OrderBitfields	`01`	1 bitfield to follow
ModifyOrderBitfield$_1$	`0C`	*OrderQty, Price*
OrderQty	`E0 2E 00 00`	12,000 shares
Price	`08 E2 01 00 00 00 00 00`	$12.34

4.1.4 Purge Orders (Effective 10/1/18)

Request to cancel a group of orders across all of the firm's sessions. `Purge Orders` messages are only accepted on dedicated BOE Purge Ports. The *MassCancelInst* optional field is required and must be selected and populated. In addition, a firm may choose to implement one or more filters:

- MPID Filter – optionally cancel based on MPID. This is required for any self-imposed lockouts or for service bureaus. Set using first character of *MassCancelInst* and sending *ClearingFirm*.
- Symbol Filter – optionally cancel based on symbol. Set by sending a valid symbol. Cannot be combined with *CustomGroupID* filter.
- *CustomGroupID* Filter – optionally cancel based on *CustomGroupID.* A maximum of 10 *CustomGroupID*s may be included on a single `Purge Orders` message. Set by populating *CustomGroupIDCnt* to a non-zero value. Cannot be combined with symbol filter.

A firm may use the second character of *MassCancelInst* to set the acknowledgement style. If a single `Mass Cancel Acknowledgement` is selected, then *MassCancelID* must be sent.

A firm may also impose a lockout using the third character of *MassCancelInst* (7700), which cancels any open orders and causes inbound orders received after the lockout to be rejected. A self-imposed lockout requires an MPID (*ClearingFirm*) to be sent. The firm may also choose to lockout by symbol or *CustomGroupID* but not by both.

The system limits the rate at which identical `Purge Orders` requests can be submitted to the system. Requests are restricted to twenty (20) messages per second per port.

An identical purge message is defined as a message having all of the same *CustomGroupID*, *Symbol*, *SymbolSfx, ClearingFirm*, and Lockout Instruction field values, as a previously received message.

Permitted input optional fields are described in 'Section 5.4 – Purge Orders'.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be `0xBA 0xBA`.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	`0x47`
MatchingUnit	5	1	Binary	Always 0 for inbound (Member to Cboe) messages.
SequenceNumber	6	4	Binary	The sequence number for this message.
ReservedInternal	10	1	Binary	Reserved for Cboe internal use.
NumberOfPurgeOrders Bitfields	11	1	Binary	Bitfield identifying bitfields which are set. May be 0. Field values must be appended to the end of the message.
PurgeOrdersBitfield1	12	1	Binary	Bitfield identifying fields to follow.
…				
PurgeOrdersBitfieldn		1	Binary	Last bitfield.
CustomGroupIDCnt		1	Binary	Number of repeating *CustomGroupID* values included in this message.
CustomGroupID1		2	Binary	First *CustomGroupID*. Only present if *CustomGroupIDCnt* is non-zero.
…				
CustomGroupIDn		2	Binary	Last *CustomGroupID*.
Optional fields. . .				

Example Purge Orders Message with CustomGroupID and Lockout:

Field Name	Hexadecimal	Notes
StartOfMessage	`BA BA`	Start of message bytes
MessageLength	`29 00`	58 bytes
MessageType	`47`	`Purge Orders`
MatchingUnit	`00`	Always 0 for inbound messages
SequenceNumber	`64 00 00 00`	Sequence number 100
ReservedInternal	`00`	Reserved
NumberOfPurgeOrders Bitfields	`01`	1 bitfield to follow

PurgeOrdersBitfield1	15	*ClearingFirm, MassCancelInst, MassCancelID*
CustomGroupIDCnt	02	Two *CustomGroupID* values to follow
CustomGroupID1	BF BE	48831
CustomGroupID2	C0 BE	48832
ClearingFirm	54 45 53 54	TEST
MassCancelInst	46 53 4C 00 00 00 00 00 00 00 00 00 00 00 00 00	F = Cancel orders matching *ClearingFirm* S = single ack L = Lockout both *CustomGroupIDs*
MassCancelID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC123

Example Purge Orders Message with Symbol and Lockout:

Field Name	**Hexadecimal**	**Notes**
StartOfMessage	BA BA	Start of message bytes
MessageLength	3F 00	63 bytes
MessageType	47	`Purge Orders`
MatchingUnit	00	Always 0 for inbound messages
SequenceNumber	64 00 00 00	Sequence number 100
ReservedInternal	00	Reserved
NumberOfPurgeOrders Bitfields	02	2 bitfields to follow
PurgeOrdersBitfield1	15	*ClearingFirm, MassCancelInst, MassCancelID*
PurgeOrdersBitfield2	01	*Symbol*
CustomGroupIDCnt	00	No *CustomGroupID* values to follow
ClearingFirm	54 45 53 54	TEST
MassCancelInst	46 53 4C 00 00 00 00 00 00 00 00 00 00 00 00 00	F = Cancel orders matching *ClearingFirm* S = single ack L = Lockout symbol
MassCancelID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC123
Symbol	41 42 43 44 45 00 00 00	ABCDE

4.2 Cboe to Member

4.2.1 Order Acknowledgment

`Order Acknowledgment` messages are sent in response to a `New Order` and message. The message corresponds to a FIX Execution Report with *ExecType* (150) = 0 (New).

Per the instructions given in a Return Bitfields Parameter Group on the `Login Request` ('Section 3.1.1 – Login Request'), optional fields may be appended to echo back information provided in the original `New Order` message. Fields which have been requested to be echoed back but which were not filled in will still be sent, but filled with binary zero (`0x00`).

Permitted return optional fields are described in 'Section 6.1 – Order Acknowledgement'.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be `0xBA 0xBA`.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	`0x25`
MatchingUnit	5	1	Binary	The matching unit which created this message. Matching units in BOE correspond to matching units on Multicast PITCH.
SequenceNumber	6	4	Binary	The sequence number for this message. Distinct per matching unit.
TransactionTime	10	8	DateTime	The time the event occurred in the Cboe Matching Engine (not the time the message was sent).
ClOrdID	18	20	Text	Echoed back from the original order.
OrderID	38	8	Binary	Corresponds to *OrderID* (37) in Cboe FIX. Order identifier supplied by Cboe. This identifier corresponds to the identifiers used in Cboe market data products.
ReservedInternal	46	1	Binary	Reserved for Cboe internal use.
NumberOfReturn Bitfields	47	1	Binary	Number of bitfields to follow.
ReturnBitfield[1]	48	1	Binary	Bitfield identifying fields to return.
…				
ReturnBitfield[n]		1	Binary	Last bitfield.
Optional fields. . .				

Example Order Acknowledgment Message:

Field Name	Hexadecimal	Notes
StartOfMessage	`BA BA`	Start of message bytes.
MessageLength	`4E 00`	78 bytes
MessageType	`25`	`Order Acknowledgment`
MatchingUnit	`03`	Matching Unit 3
SequenceNumber	`64 00 00 00`	Sequence number 100
TransactionTime	`E0 FA 20 F7 36 71 F8 11`	1,294,909,373,757,324,000
ClOrdID	`41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00`	ABC123

OrderID	05 10 1E B7 5E 39 2F 02	171WC1000005 (base 36)
ReservedInternal	00	Ignore
NumberOfReturn Bitfields	03	3 bitfields to follow
ReturnBitfield$_1$	00	No bitfields from byte 1
ReturnBitfield$_2$	41	*Symbol, Capacity*
ReturnBitfield$_3$	05	*Account, ClearingAccount*
Symbol	4D 53 46 54 00 00 00 00	MSFT
Capacity	50	P = Principal
Account	41 42 43 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC
ClearingAccount	00 00 00 00	(empty)

Example Minimal Order Acknowledgment Message:

Field Name	**Hexadecimal**	**Notes**
StartOfMessage	BA BA	Start of message bytes.
MessageLength	2E 00	46 bytes
MessageType	25	`Order Acknowledgment`
MatchingUnit	03	Matching Unit 3
SequenceNumber	64 00 00 00	Sequence number 100
TransactionTime	E0 FA 20 F7 36 71 F8 11	1,294,909,373,757,324,000
ClOrdID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC123
OrderID	05 10 1E B7 5E 39 2F 02	171WC1000005 (base 36)
ReservedInternal	00	Ignore
NumberOfReturn Bitfields	00	No bitfields to follow

4.2.2 Order Rejected

`Order Rejected` messages are sent in response to a `New Order` which must be rejected. This message corresponds to a FIX Execution Report with *ExecType* (150) = 8 (Rejected). `Order Rejected` messages are unsequenced.

Permitted return optional fields are described in 'Section 6.2 – Order Rejected'.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be `0xBA 0xBA`.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	`0x26`
MatchingUnit	5	1	Binary	Unsequenced application message. Matching unit will be set to 0.
SequenceNumber	6	4	Binary	Unsequenced application message. Sequence number will be set to 0.
TransactionTime	10	8	DateTime	The time the event occurred in the Cboe Matching Engine (not the time the message was sent).
ClOrdID	18	20	Text	Echoed back from the original order.
OrderRejectReason	38	1	Text	Reason for an order rejection. See **Reason Codes** for a list of possible reasons.
Text	39	60	Text	Human readable text with more information about the reject reason.
ReservedInternal	99	1	Binary	Reserved for Cboe internal use.
NumberOfReturn Bitfields	100	1	Binary	Number of bitfields to follow.
ReturnBitfield[1]	101	1	Binary	Bitfield identifying fields to return.
…				
ReturnBitfield[n]		1	Binary	Last bitfield.
Optional fields. . .				

Example Order Rejected Message:

Field Name	Hexadecimal	Notes
StartOfMessage	`BA BA`	Start of message bytes
MessageLength	`76 00`	118 bytes
MessageType	`26`	`Order Rejected`
MatchingUnit	`0`	Unsequenced message, unit = 0
SequenceNumber	`00 00 00 00`	Unsequenced message, sequence = 0
TransactionTime	`E0 FA 20 F7 36 71 F8 11`	1,294,909,373,757,324,000
ClOrdID	`41 42 43 31 32 33 00 00 00 00`	ABC123

	00 00 00 00 00 00 00 00 00 00	
OrderRejectReason	44	D
Text	44 75 70 6C 69 63 61 74 65 20	Duplicate ClOrdID
	43 6C 4F 72 64 49 44 00 00 00	
	00 00 00 00 00 00 00 00 00 00	
	00 00 00 00 00 00 00 00 00 00	
	00 00 00 00 00 00 00 00 00 00	
	00 00 00 00 00 00 00 00 00 00	
ReservedInternal	00	Ignore
NumberOfReturn Bitfields	03	3 bitfields to follow
$ReturnBitfield_1$	00	No bitfields from byte 1
$ReturnBitfield_2$	01	*Symbol*
$ReturnBitfield_3$	06	*ClearingFirm, ClearingAccount*
Symbol	4D 53 46 54 00 00 00 00	MSFT
ClearingFirm	54 45 53 54	TEST
ClearingAccount	00 00 00 00	(empty)

4.2.3 Order Modified

`Order Modified` messages are sent in response to a `Modify Request` to indicate that the order has been successfully modified.

Note: You must opt-in to receiving *LeavesQty* in `Order Modified` messages. In some cases, the last message to be received on an order's lifecycle will be an `Order Modified` message. The way to know the order is no longer live is to inspect *LeavesQty*. An example of this would be modification of an order whilst an execution is being generated, resulting in the order being reduced to zero outstanding quantity.

Permitted return optional fields are described in 'Section 6.3 – Order Modified'.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be `0xBA 0xBA`.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	`0x27`
MatchingUnit	5	1	Binary	The Matching Unit which created this message. Matching units in BOE correspond to Matching Units on Multicast PITCH.
SequenceNumber	6	4	Binary	The sequence number for this message. Distinct per Matching Unit.
TransactionTime	10	8	DateTime	The time the event occurred in the Cboe Matching Engine (not the time the message was sent).
ClOrdID	18	20	Text	Client order ID. This is the *ClOrdID* from the `Modify Order` message.

OrderID	38	8	Binary	Corresponds to *OrderID* (37) in Cboe FIX. The unique *OrderID*. Modifications do *not* change the *OrderID*.
ReservedInternal	46	1	Binary	Reserved for Cboe internal use.
NumberOfReturn Bitfields	47	1	Binary	Number of bitfields to follow.
ReturnBitfield[1]	48	1	Binary	Bitfield identifying fields to return.
…				
ReturnBitfield[n]		1	Binary	Last bitfield.
Optional fields. . .				

Example Order Modified Message:

Field Name	**Hexadecimal**	**Notes**
StartOfMessage	`BA BA`	Start of message bytes.
MessageLength	`35 00`	63 bytes
MessageType	`27`	`Order Modified`
MatchingUnit	`03`	Matching Unit 3
SequenceNumber	`64 00 00 00`	Sequence number 100
TransactionTime	`E0 FA 20 F7 36 71 F8 11`	1,294,909,373,757,324,000
ClOrdID	`41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00`	ABC123
OrderID	`05 10 1E B7 5E 39 2F 02`	171WC1000005 (base 36)
ReservedInternal	`00`	Ignore
NumberOfReturn Bitfields	`05`	5 bitfields to follow
ReturnBitfield$_1$	`04`	*Price*
ReturnBitfield$_2$	`00`	No fields from byte 2
ReturnBitfield$_3$	`00`	No fields from byte 3
ReturnBitfield$_4$	`00`	No fields from byte 4
ReturnBitfield$_5$	`02`	*LeavesQty*
Price	`08 E2 01 00 00 00 00 00`	$12.34
LeavesQty	`00 00 00 00`	0 (order done)

4.2.4 Order Restated

`Order Restated` messages are sent to inform the Member that an order has been asynchronously modified for some reason without an explicit `Modify Order` request having been sent. Some example (non-exhaustive) reasons for `Order Restated` messages being sent:

- A reserve (iceberg) order has been reloaded.
- An order's remaining quantity was decremented because of a prevented wash trade.
- A routed order has returned to rest on the book after matching liquidity on another market.

Members should be prepared to accept and apply `Order Restated` messages for any reason. The return bitfields indicate the characteristics of the order which have changed. Optional fields will be present at the end of the message with the new values.

Note: You must opt-in to receiving *LeavesQty* in `Order Restated` messages. In some cases, the last message to be received on an order's lifecycle will be an `Order Restated` message. The way to know the order is no longer live is to inspect *LeavesQty*. An example of this would be restatement of an order in some cases due to *PreventMatch* being set to d.

Permitted return optional fields are described in 'Section 6.4 – Order Restated'.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x28
MatchingUnit	5	1	Binary	The Matching Unit which created this message. Matching units in BOE correspond to Matching Units on Multicast PITCH.
SequenceNumber	6	4	Binary	The sequence number for this message. Distinct per Matching Unit.
TransactionTime	10	8	DateTime	The time the event occurred in the Cboe Matching Engine (not the time the message was sent).
ClOrdID	18	20	Text	The *ClOrdID* is the identifier from the open order.
OrderID	38	8	Binary	Corresponds to *OrderID* (37) in Cboe FIX. The unique *OrderID*. For informational purposes only. Restatements do *not* change the *OrderID*.
RestatementReason	46	1	Alphanumeric	The reason for this Order Restated message. `C` = Cboe Market Close (CMC) (**effective TBD**) `L` = Reload `P` = Peg or Price Sliding Reprice `Q` = Liquidity Updated `R` = Reroute `S` = Reduction of *OrderQty* due to SWP `W` = Wash Cboe reserves the right to add new values as necessary without prior notice.
ReservedInternal	47	1	Binary	Reserved for Cboe internal use.

NumberOfReturn Bitfields	48	1	Binary	Number of bitfields to follow.
ReturnBitfield[1]	49	1	Binary	Bitfield identifying fields to return.
…				
ReturnBitfield[n]		1	Binary	Last bitfield.
Optional fields. . .				

Example Order Restated Message for a reserve (iceberg) reload:

Field Name	**Hexadecimal**	**Notes**
StartOfMessage	`BA BA`	Start of message bytes.
MessageLength	`41 00`	65 bytes
MessageType	`27`	`Order Restated`
MatchingUnit	`03`	Matching Unit 3
SequenceNumber	`64 00 00 00`	Sequence number 100
TransactionTime	`E0 FA 20 F7 36 71 F8 11`	1,294,909,373,757,324,000
ClOrdID	`41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00`	ABC123
OrderID	`05 10 1E B7 5E 39 2F 02`	171WC1000005 (base 36)
RestatementReason	`4C`	L = Reload
ReservedInternal	`00`	Ignore
NumberOfReturn Bitfields	`06`	6 bitfields to follow
ReturnBitfield$_1$	`00`	No fields from byte 1
ReturnBitfield$_2$	`00`	No fields from byte 2
ReturnBitfield$_3$	`00`	No fields from byte 3
ReturnBitfield$_4$	`00`	No fields from byte 4
ReturnBitfield$_5$	`02`	*LeavesQty*
ReturnBitfield$_6$	`01`	*SecondaryOrderID*
LeavesQty	`64 00 00 00`	100 shares
SecondaryOrderID	`0A 10 1E B7 5E 39 2F 02`	171WC100000A (base 36)

4.2.5 User Modify Rejected

`User Modify Rejected` messages are sent in response to a `Modify Order` for an order which cannot be modified. `User Modify Rejected` messages are unsequenced.

This message corresponds to a FIX Execution Report with *MsgType* (35) = 9 (Order Cancel Reject) and *CxlRejResponseTo* (434) = 2 (Order Cancel/Replace Request).

Permitted return optional fields are described in 'Section 6.5 – User Modify Rejected'.

Field	**Offset**	**Length**	**Data Type**	**Description**
StartOfMessage	0	2	Binary	Must be `0xBA 0xBA`.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.

MessageType	4	1	Binary	0x29
MatchingUnit	5	1	Binary	Unsequenced application message. Matching unit will be set to 0.
SequenceNumber	6	4	Binary	Unsequenced application message. Sequence number will be set to 0.
TransactionTime	10	8	DateTime	The time the event occurred in the Cboe Matching Engine (not the time the message was sent).
ClOrdID	18	20	Text	The *ClOrdID* of the modify request which was rejected.
ModifyReject Reason	38	1	Text	Reason for a modify rejection. See **Reason Codes** for a list of possible reasons.
Text	39	60	Text	Human readable text with more information about the reject reason.
ReservedInternal	99	1	Binary	Reserved for Cboe internal use.
NumberOfReturn Bitfields	100	1	Binary	Number of bitfields to follow.
ReturnBitfield[1]	101	1	Binary	Bitfield identifying fields to return.
…				
ReturnBitfield[n]		1	Binary	Last bitfield.
Optional fields. . .				

Example User Modify Rejected Message:

Field Name	**Hexadecimal**	**Notes**
StartOfMessage	BA BA	Start of message bytes.
MessageLength	63 00	99 bytes
MessageType	29	User Modify Rejected
MatchingUnit	00	Unsequenced Message, unit = 0
SequenceNumber	00 00 00 00	Unsequenced Message, sequence = 0
TransactionTime	E0 FA 20 F7 36 71 F8 11	1,294,909,373,757,324,000
ClOrdID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC123
ModifyRejectReason	50	Pending Fill
Text	50 65 6E 64 69 6E 67 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	Pending
ReservedInternal	00	Ignore
NumberOfReturn Bitfields	00	No optional fields

4.2.6 Order Cancelled

An order has been cancelled.

Permitted return optional fields are described in 'Section 6.6 – Order Cancelled'.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x2A
MatchingUnit	5	1	Binary	The matching unit which created this message. Matching units in BOE correspond to matching units on Multicast PITCH.
SequenceNumber	6	4	Binary	The sequence number for this message. Distinct per matching unit.
TransactionTime	10	8	DateTime	The time the event occurred in the Cboe Matching Engine (not the time the message was sent).
ClOrdID	18	20	Text	The order which was cancelled.
CancelReason	38	1	Text	Reason for the order cancellation. See **Reason Codes** for a list of possible reasons.
ReservedInternal	39	1	Binary	Reserved for Cboe internal use.
NumberOfReturn Bitfields	40	1	Binary	Number of bitfields to follow.
ReturnBitfield[1]	41	1	Binary	Bitfield identifying fields to return.
…				
ReturnBitfield[n]		1	Binary	Last bitfield.
Optional fields. . .				

Example Order Cancelled Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes
MessageLength	48 00	72 bytes
MessageType	2A	Order Cancelled
MatchingUnit	03	Matching Unit 3
SequenceNumber	64 00 00 00	Sequence number 100
TransactionTime	E0 FA 20 F7 36 71 F8 11	1,294,909,373,757,324,000
ClOrdID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC123
CancelReason	55	U = User Requested
ReservedInternal	00	Ignore
NumberOfReturn Bitfields	05	5 bitfields to follow
ReturnBitfield$_1$	00	No fields from byte 1
ReturnBitfield$_2$	00	No fields from byte 2
ReturnBitfield$_3$	06	*ClearingFirm*, *ClearingAccount*

ReturnBitfield4	00	No fields from byte 4
ReturnBitfield5	01	*OrigClOrdID*
ClearingFirm	54 45 53 54	TEST
ClearingAccount	31 32 33 34	1234
OrigClOrdID	41 42 43 31 32 31 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC121

4.2.7 Cancel Rejected

A `Cancel Rejected` message is sent in response to a `Cancel Order` message to indicate that the cancellation cannot occur. `Cancel Rejected` messages are unsequenced.

Permitted return bitfields are described in 'Section 6.7 – Cancel Rejected'.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be `0xBA 0xBA`.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	`0x2B`
MatchingUnit	5	1	Binary	Unsequenced application message. Matching unit will be set to 0.
SequenceNumber	6	4	Binary	Unsequenced application message. Sequence number will be set to 0.
TransactionTime	10	8	DateTime	The time the event occurred in the Cboe Matching Engine (not the time the message was sent).
ClOrdID	18	20	Text	The order whose cancel was rejected.
CancelRejectReason	38	1	Text	Reason for the order cancellation. See **Reason Codes** for a list of possible reasons.
Text	39	60	Text	Human readable text with more information about the reject reason.
ReservedInternal	99	1	Binary	Reserved for Cboe internal use.
NumberOfReturn Bitfields	100	1	Binary	Number of bitfields to follow.
ReturnBitfield[1]	101	1	Binary	Bitfield identifying fields to return.
…				
ReturnBitfield[n]		1	Binary	Last bitfield.
Optional fields. . .				

Example Cancel Rejected Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes
MessageLength	63 00	99 bytes
MessageType	2B	`Cancel Rejected`
MatchingUnit	00	Unsequenced Message, unit = 0
SequenceNumber	00 00 00 00	Unsequenced Message, sequence = 0
TransactionTime	E0 FA 20 F7 36 71 F8 11	1,294,909,373,757,324,000

ClOrdID	41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ABC123
CancelRejectReason	4A	J
Text	54 4F 4F 20 4C 41 54 45 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	TOO LATE
ReservedInternal	00	Ignore
NumberOfReturn Bitfields	00	No optional fields

4.2.8 Order Execution

An `Order Execution` is sent for each fill on an order.

Rather than returning a monetary value indicating the rebate or charge for an execution, the *FeeCode* is an indication of a fee classification corresponding to an item on the venue's fee schedule.

Permitted return bitfields are described in 'Section 6.8 – Order Execution'.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be `0xBA 0xBA`.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	`0x2C`
MatchingUnit	5	1	Binary	The matching unit which created this message. Matching units in BOE correspond to matching units on Multicast PITCH.
SequenceNumber	6	4	Binary	The sequence number for this message. Distinct per matching unit.
TransactionTime	10	8	DateTime	The time the event occurred in the Cboe Matching Engine (not the time the message was sent).
ClOrdID	18	20	Text	Order receiving the execution.
ExecID	38	8	Binary	Corresponds to *ExecID* (17) in Cboe FIX. Execution ID. Unique across all matching units on a given day. Note: *ExecIDs* will be represented on ODROP and FIXDROP ports as nine character, base 36 ASCII. Leading zeros should be added if the converted base 36 value is shorter than nine characters. Example conversion:

Decimal	Base 36
28294005440239	A1234B567
76335905726621	R248BC23H
728557228187	09AP05V2Z

LastShares	46	4	Binary	Corresponds to *LastShares* (32) in Cboe FIX. Executed share quantity. Reports the amount of shares cancelled for Cboe Market Close restatements, which are sent at approximately 15:35 ET (**effective TBD**). Reports the size of Cboe Market Close fills, which are sent after the official closing price is received from the primary listing exchange (**effective TBD**).
LastPx	50	8	Binary Price	Corresponds to *LastPx* (31) in Cboe FIX. Price of this fill. Note the use of Binary Price type to represent positive and negative prices, which can occur with complex instruments. Reports the price of Cboe Market Close fills, which are sent after the official closing price is received from the primary listing exchange (**effective TBD**).
LeavesQty	58	4	Binary	Corresponds to *LeavesQty* (151) in Cboe FIX. Quantity still open for further execution. If zero, the order is complete.
BaseLiquidity Indicator	62	1	Alphanumeric	Indicates whether the trade added or removed liquidity. `A` = Added Liquidity `R` = Removed Liquidity `X` = Routed to Another Market `C` = Auction/Uncrossing
SubLiquidityIndicator	63	1	Alphanumeric	**Cboe may add additional values without notice. Members must gracefully ignore unknown values.** ASCII NUL (0x00) = No additional information `E` = Trade added RPI Liquidity (BYX Only) `H` = Trade added hidden liquidity `I` = Trade added hidden liquidity that was price improved `m` = Midpoint Peg Order `J` = Execution from first order to join the NBBO `S` = Execution from order that set the NBBO `V` = Visible liquidity add trade that was price improved

ContraBroker	64	4	Alphanumeric	Corresponds to *ContraBroker* (375) in Cboe FIX. All externally matched (routed) executions will identify the away exchange. `AMEX` = Routed to NYSE American `ARCA` = Routed to NYSE Arca `BEX` = Routed to Nasdaq BX `CHX` = Routed to CHX `IEX` = Routed to Investors Exchange `NYSE` = Routed to NYSE `PSX` = Routed to Nasdaq PSX `NSX` = Routed to NYSE National `DRT` = Routed to DRT Pool `BATS` = Routed to Cboe BZX Exchange* `BYXX` = Routed to Cboe BYX Exchange* `EDGA` = Routed to Cboe EDGA Exchange* `EDGX` = Routed to Cboe EDGX Exchange* * Internally matched if *ContraBroker* matches the identifier of the local trading platform's book.
ReservedInternal	68	1	Binary	Reserved for Cboe internal use.
NumberOfReturn Bitfields	69	1	Binary	Number of bitfields to follow.
ReturnBitfield[1]	70	1	Binary	Bitfield identifying fields to return.
…				
ReturnBitfield[n]		1	Binary	Last bitfield.
Optional fields…				

Example Order Execution Message:

Field Name	Hexadecimal	Notes
StartOfMessage	`BA BA`	Start of message bytes
MessageLength	`53 00`	83 bytes
MessageType	`2C`	`Order Execution`
MatchingUnit	`03`	Matching Unit 3
SequenceNumber	`64 00 00 00`	Sequence number 100
TransactionTime	`E0 FA 20 F7 36 71 F8 11`	1,294,909,373,757,324,000
ClOrdID	`41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00`	ABC123
ExecID	`01 F0 B7 D9 71 21 00 00`	D19800001 (base 36)
LastShares	`64 00 00 00`	100 shares
LastPx	`08 E2 01 00 00 00 00 00`	12.34
LeavesQty	`14 00 00 00`	20 contracts
BaseLiquidityIndicator	`41`	A = Added
SubLiquidityIndicator	`00`	(unset)
ContraBroker	`43 46 45 00`	BATS
ReservedInternal	`00`	Ignore
NumberOfReturn Bitfields	`03`	3 bitfields to follow
ReturnBitfield$_1$	`00`	No bitfields from byte 1

ReturnBitfield$_2$	00	No bitfields from byte 2
ReturnBitfield$_3$	46	*ClearingFirm, ClearingAccount, OrderQty*
ClearingFirm	54 45 53 54	TEST
ClearingAccount	31 32 33 43	1234
OrderQty	78 00 00 00	120 shares

4.2.9 Trade Cancel or Correct

Used to relay a trade which has been cancelled (busted) or corrected (price change only). The *CorrectedPrice* field will be set to 0 for cancelled trades and to the new trade price for corrected trades. `Trade Cancel or Correct` can be sent for same day as well as previous day trades.

Permitted return bitfields are described in 'Section 6.9 – Trade Cancel or Correct'.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be `0xBA 0xBA`.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	`0x2D`
MatchingUnit	5	1	Binary	The matching unit which created this message. Matching units in BOE correspond to matching units on Multicast PITCH.
SequenceNumber	6	4	Binary	The sequence number for this message. Distinct per matching unit.
TransactionTime	10	8	DateTime	The time the event occurred in the Cboe Matching Engine (not the time the message was sent).
ClOrdID	18	20	Text	*ClOrdID* of the order whose fill is being cancelled or corrected.
OrderID	38	8	Binary	Corresponds to *OrderID* (37) in Cboe FIX. Order whose fill is being cancelled or corrected.
ExecRefID	46	8	Binary	Corresponds to *ExecRefID* (19) in Cboe FIX. Refers to the *ExecID* of the fill being cancelled or corrected.
Side	54	1	Alphanumeric	Side of the order.
BaseLiquidity Indicator	55	1	Alphanumeric	Indicates whether the trade added or removed liquidity. `A` = Added Liquidity `R` = Removed Liquidity `X` = Routed to Another Market `C` = Auction/Uncrossing
ClearingFirm	56	4	Alpha	Echoed back from the original order.
ClearingAccount	60	4	Text	Echoed back from the original order.
LastShares	64	4	Binary	Number of shares of the trade being cancelled.
LastPx	68	8	Binary Price	Price of the trade being cancelled. Note the use of *Binary Price* type to represent positive and negative prices, which can occur with complex instruments.

CorrectedPrice	76	8	Binary Price	For trade corrections, this is the new trade price. For trade breaks, this is set to 0.
OrigTime	84	8	DateTime	Corresponds to *OrigTime* (42). The date and time of the original trade, in GMT.
ReservedInternal	92	1	Binary	Reserved for Cboe internal use.
NumberOfReturn Bitfields	93	1	Binary	Number of bitfields to follow.
ReturnBitfield[1]	94	1	Binary	Bitfield identifying fields to return.
…				
ReturnBitfield[n]		1	Binary	Last bitfield.
Optional fields. . .				

Example Trade Cancel or Correct Message:

Field Name	**Hexadecimal**	**Notes**
StartOfMessage	`BA BA`	Start of message bytes.
MessageLength	`66 00`	102 bytes
MessageType	`2D`	`Trade Cancel or Correct`
MatchingUnit	`03`	Matching Unit 3
SequenceNumber	`64 00 00 00`	Sequence number 100
TransactionTime	`E0 FA 20 F7 36 71 F8 11`	1,294,909,373,757,324,000
ClOrdID	`41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00`	ABC123
OrderID	`05 10 1E B7 5E 39 2F 02`	171WC1000005 (base 36)
ExecRefID	`01 F0 B7 D9 71 21 00 00`	D19800001 (base 36)
Side	`31`	Buy
BaseLiquidity Indicator	`41`	A = Added
ClearingFirm	`54 45 53 54`	TEST
ClearingAccount	`00 00 00 00`	(empty)
LastShares	`C4 09 00 00`	2,500 shares
LastPx	`5C 13 04 00 00 00 00 00`	$26.71
CorrectedPrice	`00 00 00 00 00 00 00 00`	0 (cancelled)
OrigTime	`E0 BA 75 95 15 4C EB 11`	1,291,209,373,757,324,000
ReservedInternal	`00`	Ignore
NumberOfReturn Bitfields	`02`	2 bitfields to follow
ReturnBitfield$_1$	`00`	No fields from byte 1
ReturnBitfield$_2$	`01`	*Symbol*
Symbol	`4D 53 46 54 00 00 00 00`	MSFT

4.2.10 Mass Cancel Acknowledgement

A `Mass Cancel Acknowledgement` is an unsequenced message sent when a `Purge Orders` message requesting a mass cancellation has completed canceling all individual orders. This message type only appears on dedicated BOE Purge Ports.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be `0xBA 0xBA`.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	`0x36`
MatchingUnit	5	1	Binary	Unsequenced application message. Matching unit will be set to 0.
SequenceNumber	6	4	Binary	Unsequenced application. Message. Sequence number will be set to 0.
TransactionTime	10	8	DateTime	The time in the order entry gateway when the final matching engine event was received to complete the mass cancel.
MassCancelID	18	20	Text	Copied from the *MassCancelID* passed on the original `Purge Orders` message. This field corresponds to *MassCancelID* (7695) in Cboe FIX.
CancelledOrderCount	38	4	Binary	Number of orders cancelled. This field corresponds to *CancelledOrderCount* (7696) in Cboe FIX.
ReservedInternal	42	1	Binary	Reserved for Cboe internal use.

Example Mass Cancel Acknowledgement Message:

Field Name	Hexadecimal	Notes
StartOfMessage	`BA`	Start of message bytes.
MessageLength	`29 00`	41 bytes
MessageType	`36`	`Mass Cancel Acknowledgment`
MatchingUnit	`00`	Unsequenced Message, unit = 0
SequenceNumber	`00 00 00 00`	Unsequenced Message, sequence = 0
TransactionTime	`E0 FA 20 F7 36 71 F8 11`	1,294,909,373,757,324,000
MassCancelID	`41 42 43 31 32 33 00 00 00 00 00 00 00 00 00 00 00 00 00 00`	ABC123
CancelledOrderCount	`63 00 00 00`	99 orders were cancelled
ReservedInternal	`00`	Ignore

4.2.11 Purge Rejected

A `Purge Rejected` message is sent in response to a `Purge Orders` message to indicate that the mass cancellation cannot occur. `Purge Rejected` messages are unsequenced. This message type only appears on dedicated BOE Purge Ports.

Permitted return bitfields are described in 'Section 6.10 – Purge Rejected'.

Field	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	Must be 0xBA 0xBA.
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes for the *StartOfMessage* field.
MessageType	4	1	Binary	0x48
MatchingUnit	5	1	Binary	Unsequenced application message. Matching unit will be set to 0.
SequenceNumber	6	4	Binary	Unsequenced application message. Sequence number will be set to 0.
TransactionTime	10	8	DateTime	The time the event occurred in the Cboe Matching Engine (not the time the message was sent).
PurgeRejectReason	18	1	Text	Reason for a purge rejection. See **Reason Codes** for a list of possible reasons.
Text	19	60	Text	Human readable text with more information about the reject reason.
ReservedInternal	79	1	Binary	Reserved for Cboe internal use.
NumberOfReturn Bitfields	80	1	Binary	Number of bitfields to follow.
ReturnBitfield$_1$	81	1	Binary	Bitfield identifying fields to return.
…				
ReturnBitfield$_n$		1	Binary	Last bitfield.
Optional fields. . .				

Example Purge Rejected Message:

Field Name	Hexadecimal	Notes
StartOfMessage	BA BA	Start of message bytes.
MessageLength	72 00	114 bytes
MessageType	48	Purge Rejected
MatchingUnit	00	Unsequenced Message, unit = 0
SequenceNumber	00 00 00 00	Unsequenced Message, sequence = 0
TransactionTime	E0 FA 20 F7 36 71 F8 11	1,294,909,373,757,324,000
PurgeRejectReason	41	A
Text	41 44 4D 49 4E 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	ADMIN
ReservedInternal	00	Ignore
NumberOfReturn Bitfields	0F	15 bitfields to follow
ReturnBitfield1	00	No fields from byte 1
ReturnBitfield2	00	No fields from byte 2
ReturnBitfield3	00	No fields from byte 3
ReturnBitfield4	00	No fields from byte 4
ReturnBitfield5	00	No fields from byte 5
ReturnBitfield6	00	No fields from byte 6
ReturnBitfield7	00	No fields from byte 7

ReturnBitfield8	`00`	No fields from byte 8
ReturnBitfield9	`00`	No fields from byte 9
ReturnBitfield10	`00`	No fields from byte 10
ReturnBitfield11	`00`	No fields from byte 11
ReturnBitfield12	`00`	No fields from byte 12
ReturnBitfield13	`00`	No fields from byte 13
ReturnBitfield14	`00`	No fields from byte 14
ReturnBitfield15	`08`	*MassCancelID*
MassCancelID	`54 45 53 54 00 00 00 00 00 00` `00 00 00 00 00 00 00 00 00 00`	TEST

5 Input Bitfields Per Message

Legend:

- **R** Indicates that the field must be specified for a message
- ● Indicates that the field can be specified for a message
- (Blank) Indicates that the field is not used by Cboe Equities and cannot be specified for a message

Input messages that containing invalid fields (i.e., Blank) will be rejected. In the case of rejected input messages, the associated Reject message sent back to the customer will contain a 'RejectReason' code non-optional field (See Section 8 – **Reason Codes**) and a 'Text' non-optional field containing descriptive text.

5.1 New Order

Byte	Bit	Field	
1	1	*ClearingFirm*	●
	2	*ClearingAccount*	●
	4	*Price*	●
	8	*ExecInst*	●
	16	*OrdType*	●
	32	*TimeInForce*	●
	64	*MinQty*	●
	128	*MaxFloor*	●
2	1	*Symbol*	**R**
	2	*SymbolSfx*	●
	4	*Currency*	
	8	*IdSource*	
	16	*SecurityId*	
	32	*SecurityExchange*	
	64	*Capacity*	**R**
	128	*RoutingInst*	●
3	1	*Account*	●
	2	*DisplayIndicator*	●
	4	*MaxRemovePct*	●
	8	*DiscretionAmount*	●
	16	*PegDifference*	●
	32	*PreventMatch*	●
	64	*LocateReqd*	●
	128	*ExpireTime*	●
4	1	*MaturityDate*	
	2	*StrikePrice*	
	4	*PutOrCall*	
	8	*RiskReset*	⬤
	16	*OpenClose*	
	32	*CMTANumber*	
	64	*TargetPartyID*	
	128	*(Reserved)*	

Byte	Bit	Field	
5	1	*(Reserved)*	
	2	*AttributedQuote*	●
	4	*BookingType*	
	8	*ExtExecInst*	●
	16	*ClientID*	
	32	*InvestorID*	
	64	*ExecutorID*	
	128	*OrderOrigination*	
6	1	*DisplayRange*	●
	2	*StopPx*	●
	4	*RoutStrategy*	●
	8	*RouteDeliveryMethod*	●
	16	*ExDestination*	●
	32	*EchoText*	●
	64	*AuctionId*	
	128	*RoutingFirmID*	
7	1	*AlgorithmicIndicator*	
	2	*CustomGroupID*	●
	4	*ClientQualifiedRole*	
	8	*InvestorQualifiedRole*	
	16	*ExecutorQualifiedRole*	
	32	*CtiCode*	
	64	*ManualOrderIndicator*	
	128	*OperatorId*	

5.2 Cancel Order

Byte	Bit	Field	
1	1	*ClearingFirm*	●
	2	*MassCancelLockout*	
	4	*MassCancel*	
	8	*RiskRoot*	
	16	*MassCancelID*	
	32	*RoutingFirmID*	
	64	*ManualOrderIndicator*	
	128	*OperatorId*	
2	1	*MassCancelInst*	
	2	*Symbol*	
	4	*SymbolSfx*	
	8	*(Reserved)*	
	16	*(Reserved)*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	

ClearingFirm is required for service bureau ports.

5.3 Modify Order

Byte	Bit	Field	
1	1	*ClearingFirm*	●
	2	*(Reserved)*	
	4	*OrderQty*	**R**
	8	*Price*	**R**
	16	*OrdType*	●
	32	*CancelOrigOnReject*	●
	64	*ExecInst*	●
	128	*Side*	●
2	1	*MaxFloor*	●
	2	*StopPx*	●
	4	*RoutingFirmID*	
	8	*ManualOrderIndicator*	
	16	*OperatorId*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	

(**R**) Both *OrderQty* and *Price* must be present on all Modify Order requests. Messages sent without both fields will be rejected.

ClearingFirm is required for service bureau ports.

5.4 Purge Orders

Byte	Bit	Field	
1	1	*ClearingFirm*	●
	2	*MassCancelLockout*	
	4	*MassCancelInst*	**R**
	8	*RiskRoot*	
	16	*MassCancelID*	●
	32	*RoutingFirmID*	
	64	*ManualOrderIndicator*	
	128	*OperatorId*	
2	1	*Symbol*	●
	2	*SymbolSfx*	●
	4	*(Reserved)*	
	8	*(Reserved)*	
	16	*(Reserved)*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	

6 Return Bitfields Per Message

Legend:

R	Indicates that the field must be specified for a message
●	Indicates that the field can be specified for a message
–	Indicates that the field cannot be specified for a message
(Blank)	Indicates that the field is not used by Cboe Options and cannot be specified for a message

Input messages that containing invalid fields (i.e., Blank) will be rejected. In the case of rejected input messages, the associated Reject message sent back to the customer will contain a 'RejectReason' code non-optional field (See Section 8 – **Reason Codes**) and a 'Text' non-optional field containing descriptive text.

6.1 Order Acknowledgment

Byte	Bit	Field	
1	1	*Side*	●
	2	*PegDifference*	●
	4	*Price*	●
	8	*ExecInst*	●
	16	*OrdType*	●
	32	*TimeInForce*	●
	64	*MinQty*	●
	128	*MaxRemovePct*	●
2	1	*Symbol*	●
	2	*SymbolSfx*	●
	4	*Currency*	
	8	*IdSource*	
	16	*SecurityId*	
	32	*SecurityExchange*	
	64	*Capacity*	●
	128	*ContraTrader*	
3	1	*Account*	●
	2	*ClearingFirm*	●
	4	*ClearingAccount*	●
	8	*DisplayIndicator*	●
	16	*MaxFloor*	●
	32	*DiscretionAmount*	●
	64	*OrderQty*	●
	128	*PreventMatch*	●
4	1	*MaturityDate*	
	2	*StrikePrice*	
	4	*PutOrCall*	
	8	*OpenClose*	
	16	*ClOrdIdBatch*	
	32	*CorrectedSize*	
	64	*PartyID*	
	128	*AccessFee*	
5	1	*OrigClOrdID*	●
	2	*LeavesQty*	●
	4	*LastShares*	●
	8	*LastPx*	●
	16	*DisplayPrice*	●
	32	*WorkingPrice*	●
	64	*BaseLiquidityIndicator*	●
	128	*ExpireTime*	●

Byte	Bit	Field	
6	1	*SecondaryOrderID*	●
	2	*CCP*	
	4	*ContraCapacity*	
	8	*AttributedQuote*	●
	16	*ExtExecInst*	●
	32	*BulkOrderIds*	
	64	*BulkRejectReasons*	
	128	*PartyRole*	
7	1	*SubLiquidityIndicator*	●
	2	*TradeReportTypeReturn*	
	4	*TradePublishIndReturn*	
	8	*Text*	
	16	*Bid*	
	32	*Offer*	
	64	*LargeSize*	
	128	*LastMkt*	
8	1	*FeeCode*	–
	2	*EchoText*	●
	4	*StopPx*	●
	8	*RoutingInst*	●
	16	*RoutStrategy*	●
	32	*RouteDeliveryMethod*	●
	64	*ExDestination*	●
	128	*TradeReportRefID*	
9	1	*MarketingFeeCode*	
	2	*TargetPartyID*	
	4	*AuctionId*	
	8	*OrderCategory*	
	16	*LiquidityProvision*	
	32	*CmtaNumber*	
	64	*CrossType*	
	128	*CrossPrioritization*	
10	1	*CrossId*	
	2	*AllocQty*	
	4	*GiveUpFirmID*	
	8	*RoutingFirmID*	
	16	*WaiverType*	
	32	*CrossExclusionIndicator*	
	64	*PriceFormation*	
	128	*ClientQualifiedRole*	

Byte	Bit	Field	
11	1	*ClientID*	
	2	*InvestorID*	
	4	*ExecutorID*	
	8	*OrderOrigination*	
	16	*Algo*	
	32	*DeferralReason*	
	64	*InvestorQualifiedRole*	
	128	*ExecutorQualifiedRole*	
12	1	*CtiCode*	
	2	*ManualOrderIndicator*	
	4	*OperatorId*	
	8	*TradeDate*	
	16	*ClearingPrice*	
	32	*ClearingSize*	
	64	*ClearingSymbol*	
	128	*(Reserved)*	
13	1	*CumQty*	
	2	*DayOrderQty*	
	4	*DayCumQty*	
	8	*AvgPx*	
	16	*DayAvgPx*	
	32	*PendingStatus*	
	64	*DrillThruProtection*	
	128	*MultilegReportingType*	
14	1	*LegCFICode*	
	2	*LegMaturityDate*	
	4	*LegStrikePrice*	
	8	*RoomId*	
	16	*SecondaryExecId*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	
15	1	*(Reserved)*	
	2	*EquityPartyId*	
	4	*EquityNBBOProtect*	
	8	*MassCancelId*	–
	16	*(Reserved)*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	

6.2 Order Rejected

Byte	Bit	Field	
1	1	*Side*	●
	2	*PegDifference*	●
	4	*Price*	●
	8	*ExecInst*	●
	16	*OrdType*	●
	32	*TimeInForce*	●
	64	*MinQty*	●
	128	*MaxRemovePct*	●
2	1	*Symbol*	●
	2	*SymbolSfx*	●
	4	*Currency*	
	8	*IdSource*	
	16	*SecurityId*	
	32	*SecurityExchange*	
	64	*Capacity*	●
	128	*ContraTrader*	
3	1	*Account*	●
	2	*ClearingFirm*	●
	4	*ClearingAccount*	●
	8	*DisplayIndicator*	●
	16	*MaxFloor*	●
	32	*DiscretionAmount*	●
	64	*OrderQty*	●
	128	*PreventMatch*	●
4	1	*MaturityDate*	
	2	*StrikePrice*	
	4	*PutOrCall*	
	8	*OpenClose*	
	16	*ClOrdIdBatch*	
	32	*CorrectedSize*	
	64	*PartyID*	
	128	*AccessFee*	
5	1	*OrigClOrdID*	–
	2	*LeavesQty*	–
	4	*LastShares*	–
	8	*LastPx*	–
	16	*DisplayPrice*	–
	32	*WorkingPrice*	–
	64	*BaseLiquidityIndicator*	–
	128	*ExpireTime*	–

Byte	Bit	Field	
6	1	*SecondaryOrderID*	●
	2	*CCP*	
	4	*ContraCapacity*	
	8	*AttributedQuote*	●
	16	*ExtExecInst*	●
	32	*BulkOrderIds*	
	64	*BulkRejectReasons*	
	128	*PartyRole*	
7	1	*SubLiquidityIndicator*	–
	2	*TradeReportTypeReturn*	
	4	*TradePublishIndReturn*	
	8	*Text*	
	16	*Bid*	
	32	*Offer*	
	64	*LargeSize*	
	128	*LastMkt*	
8	1	*FeeCode*	–
	2	*EchoText*	●
	4	*StopPx*	●
	8	*RoutingInst*	●
	16	*RoutStrategy*	●
	32	*RouteDeliveryMethod*	●
	64	*ExDestination*	●
	128	*TradeReportRefID*	
9	1	*MarketingFeeCode*	
	2	*TargetPartyID*	
	4	*AuctionId*	
	8	*OrderCategory*	
	16	*LiquidityProvision*	
	32	*CmtaNumber*	
	64	*CrossType*	
	128	*CrossPrioritization*	
10	1	*CrossId*	
	2	*AllocQty*	
	4	*GiveUpFirmID*	
	8	*RoutingFirmID*	
	16	*WaiverType*	
	32	*CrossExclusionIndicator*	
	64	*PriceFormation*	
	128	*ClientQualifiedRole*	

Byte	Bit	Field	
11	1	*ClientID*	
	2	*InvestorID*	
	4	*ExecutorID*	
	8	*OrderOrigination*	
	16	*Algo*	
	32	*DeferralReason*	
	64	*InvestorQualifiedRole*	
	128	*ExecutorQualifiedRole*	
12	1	*CtiCode*	
	2	*ManualOrderIndicator*	
	4	*OperatorId*	
	8	*TradeDate*	
	16	*ClearingPrice*	
	32	*ClearingSize*	
	64	*ClearingSymbol*	
	128	*(Reserved)*	
13	1	*CumQty*	
	2	*DayOrderQty*	
	4	*DayCumQty*	
	8	*AvgPx*	
	16	*DayAvgPx*	
	32	*PendingStatus*	
	64	*DrillThruProtection*	
	128	*MultilegReportingType*	
14	1	*LegCFICode*	
	2	*LegMaturityDate*	
	4	*LegStrikePrice*	
	8	*RoomId*	
	16	*SecondaryExecId*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	
15	1	*(Reserved)*	
	2	*EquityPartyId*	
	4	*EquityNBBOProtect*	
	8	*MassCancelId*	–
	16	*(Reserved)*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	

6.3 Order Modified

Byte	Bit	Field	
1	1	*Side*	●
	2	*PegDifference*	●
	4	*Price*	●
	8	*ExecInst*	●
	16	*OrdType*	●
	32	*TimeInForce*	●
	64	*MinQty*	●
	128	*MaxRemovePct*	●
2	1	*Symbol*	–
	2	*SymbolSfx*	–
	4	*Currency*	
	8	*IdSource*	
	16	*SecurityId*	
	32	*SecurityExchange*	
	64	*Capacity*	–
	128	*ContraTrader*	
3	1	*Account*	●
	2	*ClearingFirm*	●
	4	*ClearingAccount*	●
	8	*DisplayIndicator*	●
	16	*MaxFloor*	●
	32	*DiscretionAmount*	●
	64	*OrderQty*	●
	128	*PreventMatch*	●
4	1	*MaturityDate*	
	2	*StrikePrice*	
	4	*PutOrCall*	
	8	*OpenClose*	
	16	*ClOrdIdBatch*	
	32	*CorrectedSize*	
	64	*PartyID*	
	128	*AccessFee*	
5	1	*OrigClOrdID*	●
	2	*LeavesQty*	●
	4	*LastShares*	●
	8	*LastPx*	●
	16	*DisplayPrice*	●
	32	*WorkingPrice*	●
	64	*BaseLiquidityIndicator*	●
	128	*ExpireTime*	●

Byte	Bit	Field	
6	1	*SecondaryOrderID*	●
	2	*CCP*	
	4	*ContraCapacity*	
	8	*AttributedQuote*	●
	16	*ExtExecInst*	●
	32	*BulkOrderIds*	
	64	*BulkRejectReasons*	
	128	*PartyRole*	
7	1	*SubLiquidityIndicator*	–
	2	*TradeReportTypeReturn*	
	4	*TradePublishIndReturn*	
	8	*Text*	
	16	*Bid*	
	32	*Offer*	
	64	*LargeSize*	
	128	*LastMkt*	
8	1	*FeeCode*	–
	2	*EchoText*	●
	4	*StopPx*	●
	8	*RoutingInst*	●
	16	*RoutStrategy*	●
	32	*RouteDeliveryMethod*	●
	64	*ExDestination*	●
	128	*TradeReportRefID*	
9	1	*MarketingFeeCode*	
	2	*TargetPartyID*	
	4	*AuctionId*	
	8	*OrderCategory*	
	16	*LiquidityProvision*	
	32	*CmtaNumber*	
	64	*CrossType*	
	128	*CrossPrioritization*	
10	1	*CrossId*	
	2	*AllocQty*	
	4	*GiveUpFirmID*	
	8	*RoutingFirmID*	
	16	*WaiverType*	
	32	*CrossExclusionIndicator*	
	64	*PriceFormation*	
	128	*ClientQualifiedRole*	

Byte	Bit	Field	
11	1	*ClientID*	
	2	*InvestorID*	
	4	*ExecutorID*	
	8	*OrderOrigination*	
	16	*Algo*	
	32	*DeferralReason*	
	64	*InvestorQualifiedRole*	
	128	*ExecutorQualifiedRole*	
12	1	*CtiCode*	
	2	*ManualOrderIndicator*	
	4	*OperatorId*	
	8	*TradeDate*	
	16	*ClearingPrice*	
	32	*ClearingSize*	
	64	*ClearingSymbol*	
	128	*(Reserved)*	
13	1	*CumQty*	
	2	*DayOrderQty*	
	4	*DayCumQty*	
	8	*AvgPx*	
	16	*DayAvgPx*	
	32	*PendingStatus*	
	64	*DrillThruProtection*	
	128	*MultilegReportingType*	
14	1	*LegCFICode*	
	2	*LegMaturityDate*	
	4	*LegStrikePrice*	
	8	*RoomId*	
	16	*SecondaryExecId*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	
15	1	*(Reserved)*	
	2	*EquityPartyId*	
	4	*EquityNBBOProtect*	
	8	*MassCancelId*	–
	16	*(Reserved)*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	

6.4 Order Restated

Byte	Bit	Field	
1	1	*Side*	●
	2	*PegDifference*	●
	4	*Price*	●
	8	*ExecInst*	●
	16	*OrdType*	●
	32	*TimeInForce*	●
	64	*MinQty*	●
	128	*MaxRemovePct*	●
2	1	*Symbol*	●
	2	*SymbolSfx*	●
	4	*Currency*	
	8	*IdSource*	
	16	*SecurityId*	
	32	*SecurityExchange*	
	64	*Capacity*	●
	128	*ContraTrader*	
3	1	*Account*	●
	2	*ClearingFirm*	●
	4	*ClearingAccount*	●
	8	*DisplayIndicator*	●
	16	*MaxFloor*	●
	32	*DiscretionAmount*	●
	64	*OrderQty*	●
	128	*PreventMatch*	●
4	1	*MaturityDate*	
	2	*StrikePrice*	
	4	*PutOrCall*	
	8	*OpenClose*	
	16	*ClOrdIdBatch*	
	32	*CorrectedSize*	
	64	*PartyID*	
	128	*AccessFee*	
5	1	*OrigClOrdID*	●
	2	*LeavesQty*	●
	4	*LastShares*	●
	8	*LastPx*	●
	16	*DisplayPrice*	●
	32	*WorkingPrice*	●
	64	*BaseLiquidityIndicator*	●
	128	*ExpireTime*	●

Byte	Bit	Field	
6	1	*SecondaryOrderID*	●
	2	*CCP*	
	4	*ContraCapacity*	
	8	*AttributedQuote*	●
	16	*ExtExecInst*	●
	32	*BulkOrderIds*	
	64	*BulkRejectReasons*	
	128	*PartyRole*	
7	1	*SubLiquidityIndicator*	–
	2	*TradeReportTypeReturn*	
	4	*TradePublishIndReturn*	
	8	*Text*	
	16	*Bid*	
	32	*Offer*	
	64	*LargeSize*	
	128	*LastMkt*	
8	1	*FeeCode*	–
	2	*EchoText*	●
	4	*StopPx*	●
	8	*RoutingInst*	●
	16	*RoutStrategy*	●
	32	*RouteDeliveryMethod*	●
	64	*ExDestination*	●
	128	*TradeReportRefID*	
9	1	*MarketingFeeCode*	
	2	*TargetPartyID*	
	4	*AuctionId*	
	8	*OrderCategory*	
	16	*LiquidityProvision*	
	32	*CmtaNumber*	
	64	*CrossType*	
	128	*CrossPrioritization*	
10	1	*CrossId*	
	2	*AllocQty*	
	4	*GiveUpFirmID*	
	8	*RoutingFirmID*	
	16	*WaiverType*	
	32	*CrossExclusionIndicator*	
	64	*PriceFormation*	
	128	*ClientQualifiedRole*	

Byte	Bit	Field	
11	1	*ClientID*	
	2	*InvestorID*	
	4	*ExecutorID*	
	8	*OrderOrigination*	
	16	*Algo*	
	32	*DeferralReason*	
	64	*InvestorQualifiedRole*	
	128	*ExecutorQualifiedRole*	
12	1	*CtiCode*	
	2	*ManualOrderIndicator*	
	4	*OperatorId*	
	8	*TradeDate*	
	16	*ClearingPrice*	
	32	*ClearingSize*	
	64	*ClearingSymbol*	
	128	*(Reserved)*	
13	1	*CumQty*	
	2	*DayOrderQty*	
	4	*DayCumQty*	
	8	*AvgPx*	
	16	*DayAvgPx*	
	32	*PendingStatus*	
	64	*DrillThruProtection*	
	128	*MultilegReportingType*	
14	1	*LegCFICode*	
	2	*LegMaturityDate*	
	4	*LegStrikePrice*	
	8	*RoomId*	
	16	*SecondaryExecId*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	
15	1	*(Reserved)*	
	2	*EquityPartyId*	
	4	*EquityNBBOProtect*	
	8	*MassCancelId*	–
	16	*(Reserved)*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	

6.5 User Modify Rejected

Byte	Bit	Field	
1	1	*Side*	–
	2	*PegDifference*	–
	4	*Price*	–
	8	*ExecInst*	–
	16	*OrdType*	–
	32	*TimeInForce*	–
	64	*MinQty*	–
	128	*MaxRemovePct*	–
2	1	*Symbol*	–
	2	*SymbolSfx*	–
	4	*Currency*	
	8	*IdSource*	
	16	*SecurityId*	
	32	*SecurityExchange*	
	64	*Capacity*	–
	128	*ContraTrader*	
3	1	*Account*	–
	2	*ClearingFirm*	–
	4	*ClearingAccount*	–
	8	*DisplayIndicator*	–
	16	*MaxFloor*	–
	32	*DiscretionAmount*	–
	64	*OrderQty*	–
	128	*PreventMatch*	–
4	1	*MaturityDate*	
	2	*StrikePrice*	
	4	*PutOrCall*	
	8	*OpenClose*	
	16	*ClOrdIdBatch*	
	32	*CorrectedSize*	
	64	*PartyID*	
	128	*AccessFee*	
5	1	*OrigClOrdID*	–
	2	*LeavesQty*	–
	4	*LastShares*	–
	8	*LastPx*	–
	16	*DisplayPrice*	–
	32	*WorkingPrice*	–
	64	*BaseLiquidityIndicator*	–
	128	*ExpireTime*	–

Byte	Bit	Field	
6	1	*SecondaryOrderID*	–
	2	*CCP*	
	4	*ContraCapacity*	
	8	*AttributedQuote*	–
	16	*ExtExecInst*	–
	32	*BulkOrderIds*	
	64	*BulkRejectReasons*	
	128	*PartyRole*	
7	1	*SubLiquidityIndicator*	–
	2	*TradeReportTypeReturn*	
	4	*TradePublishIndReturn*	
	8	*Text*	
	16	*Bid*	
	32	*Offer*	
	64	*LargeSize*	
	128	*LastMkt*	
8	1	*FeeCode*	–
	2	*EchoText*	–
	4	*StopPx*	–
	8	*RoutingInst*	–
	16	*RoutStrategy*	–
	32	*RouteDeliveryMethod*	–
	64	*ExDestination*	–
	128	*TradeReportRefID*	
9	1	*MarketingFeeCode*	
	2	*TargetPartyID*	
	4	*AuctionId*	
	8	*OrderCategory*	
	16	*LiquidityProvision*	
	32	*CmtaNumber*	
	64	*CrossType*	
	128	*CrossPrioritization*	
10	1	*CrossId*	
	2	*AllocQty*	
	4	*GiveUpFirmID*	
	8	*RoutingFirmID*	
	16	*WaiverType*	
	32	*CrossExclusionIndicator*	
	64	*PriceFormation*	
	128	*ClientQualifiedRole*	

Byte	Bit	Field	
11	1	*ClientID*	
	2	*InvestorID*	
	4	*ExecutorID*	
	8	*OrderOrigination*	
	16	*Algo*	
	32	*DeferralReason*	
	64	*InvestorQualifiedRole*	
	128	*ExecutorQualifiedRole*	
12	1	*CtiCode*	
	2	*ManualOrderIndicator*	
	4	*OperatorId*	
	8	*TradeDate*	
	16	*ClearingPrice*	
	32	*ClearingSize*	
	64	*ClearingSymbol*	
	128	*(Reserved)*	
13	1	*CumQty*	
	2	*DayOrderQty*	
	4	*DayCumQty*	
	8	*AvgPx*	
	16	*DayAvgPx*	
	32	*PendingStatus*	
	64	*DrillThruProtection*	
	128	*MultilegReportingType*	
14	1	*LegCFICode*	
	2	*LegMaturityDate*	
	4	*LegStrikePrice*	
	8	*RoomId*	
	16	*SecondaryExecId*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	
15	1	*(Reserved)*	
	2	*EquityPartyId*	
	4	*EquityNBBOProtect*	
	8	*MassCancelId*	–
	16	*(Reserved)*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	

6.6 Order Cancelled

Byte	Bit	Field	
1	1	*Side*	●
	2	*PegDifference*	●
	4	*Price*	●
	8	*ExecInst*	●
	16	*OrdType*	●
	32	*TimeInForce*	●
	64	*MinQty*	●
	128	*MaxRemovePct*	●
2	1	*Symbol*	●
	2	*SymbolSfx*	●
	4	*Currency*	
	8	*IdSource*	
	16	*SecurityId*	
	32	*SecurityExchange*	
	64	*Capacity*	●
	128	*ContraTrader*	
3	1	*Account*	●
	2	*ClearingFirm*	●
	4	*ClearingAccount*	●
	8	*DisplayIndicator*	●
	16	*MaxFloor*	●
	32	*DiscretionAmount*	●
	64	*OrderQty*	●
	128	*PreventMatch*	●
4	1	*MaturityDate*	
	2	*StrikePrice*	
	4	*PutOrCall*	
	8	*OpenClose*	
	16	*ClOrdIdBatch*	
	32	*CorrectedSize*	
	64	*PartyID*	
	128	*AccessFee*	
5	1	*OrigClOrdID*	●
	2	*LeavesQty*	●
	4	*LastShares*	●
	8	*LastPx*	●
	16	*DisplayPrice*	●
	32	*WorkingPrice*	●
	64	*BaseLiquidityIndicator*	●
	128	*ExpireTime*	●

Byte	Bit	Field	
6	1	*SecondaryOrderID*	●
	2	*CCP*	
	4	*ContraCapacity*	
	8	*AttributedQuote*	●
	16	*ExtExecInst*	●
	32	*BulkOrderIds*	
	64	*BulkRejectReasons*	
	128	*PartyRole*	
7	1	*SubLiquidityIndicator*	–
	2	*TradeReportTypeReturn*	
	4	*TradePublishIndReturn*	
	8	*Text*	
	16	*Bid*	
	32	*Offer*	
	64	*LargeSize*	
	128	*LastMkt*	
8	1	*FeeCode*	–
	2	*EchoText*	●
	4	*StopPx*	●
	8	*RoutingInst*	●
	16	*RoutStrategy*	●
	32	*RouteDeliveryMethod*	●
	64	*ExDestination*	●
	128	*TradeReportRefID*	
9	1	*MarketingFeeCode*	
	2	*TargetPartyID*	
	4	*AuctionId*	
	8	*OrderCategory*	
	16	*LiquidityProvision*	
	32	*CmtaNumber*	
	64	*CrossType*	
	128	*CrossPrioritization*	
10	1	*CrossId*	
	2	*AllocQty*	
	4	*GiveUpFirmID*	
	8	*RoutingFirmID*	
	16	*WaiverType*	
	32	*CrossExclusionIndicator*	
	64	*PriceFormation*	
	128	*ClientQualifiedRole*	

Byte	Bit	Field	
11	1	*ClientID*	
	2	*InvestorID*	
	4	*ExecutorID*	
	8	*OrderOrigination*	
	16	*Algo*	
	32	*DeferralReason*	
	64	*InvestorQualifiedRole*	
	128	*ExecutorQualifiedRole*	
12	1	*CtiCode*	
	2	*ManualOrderIndicator*	
	4	*OperatorId*	
	8	*TradeDate*	
	16	*ClearingPrice*	
	32	*ClearingSize*	
	64	*ClearingSymbol*	
	128	*(Reserved)*	
13	1	*CumQty*	
	2	*DayOrderQty*	
	4	*DayCumQty*	
	8	*AvgPx*	
	16	*DayAvgPx*	
	32	*PendingStatus*	
	64	*DrillThruProtection*	
	128	*MultilegReportingType*	
14	1	*LegCFICode*	
	2	*LegMaturityDate*	
	4	*LegStrikePrice*	
	8	*RoomId*	
	16	*SecondaryExecId*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	
15	1	*(Reserved)*	
	2	*EquityPartyId*	
	4	*EquityNBBOProtect*	
	8	*MassCancelId*	–
	16	*(Reserved)*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	

6.7 Cancel Rejected

Byte	Bit	Field	
1	1	*Side*	●
	2	*PegDifference*	●
	4	*Price*	●
	8	*ExecInst*	●
	16	*OrdType*	●
	32	*TimeInForce*	●
	64	*MinQty*	●
	128	*MaxRemovePct*	●
2	1	*Symbol*	●
	2	*SymbolSfx*	●
	4	*Currency*	
	8	*IdSource*	
	16	*SecurityId*	
	32	*SecurityExchange*	
	64	*Capacity*	●
	128	*ContraTrader*	
3	1	*Account*	–
	2	*ClearingFirm*	–
	4	*ClearingAccount*	–
	8	*DisplayIndicator*	–
	16	*MaxFloor*	–
	32	*DiscretionAmount*	–
	64	*OrderQty*	–
	128	*PreventMatch*	–
4	1	*MaturityDate*	
	2	*StrikePrice*	
	4	*PutOrCall*	
	8	*OpenClose*	
	16	*ClOrdIdBatch*	
	32	*CorrectedSize*	
	64	*PartyID*	
	128	*AccessFee*	
5	1	*OrigClOrdID*	–
	2	*LeavesQty*	–
	4	*LastShares*	–
	8	*LastPx*	–
	16	*DisplayPrice*	–
	32	*WorkingPrice*	–
	64	*BaseLiquidityIndicator*	–
	128	*ExpireTime*	–

Byte	Bit	Field	
6	1	*SecondaryOrderID*	–
	2	*CCP*	
	4	*ContraCapacity*	
	8	*AttributedQuote*	–
	16	*ExtExecInst*	–
	32	*BulkOrderIds*	
	64	*BulkRejectReasons*	
	128	*PartyRole*	
7	1	*SubLiquidityIndicator*	–
	2	*TradeReportTypeReturn*	
	4	*TradePublishIndReturn*	
	8	*Text*	
	16	*Bid*	
	32	*Offer*	
	64	*LargeSize*	
	128	*LastMkt*	
8	1	*FeeCode*	–
	2	*EchoText*	●
	4	*StopPx*	●
	8	*RoutingInst*	–
	16	*RoutStrategy*	–
	32	*RouteDeliveryMethod*	–
	64	*ExDestination*	–
	128	*TradeReportRefID*	
9	1	*MarketingFeeCode*	
	2	*TargetPartyID*	
	4	*AuctionId*	
	8	*OrderCategory*	
	16	*LiquidityProvision*	
	32	*CmtaNumber*	
	64	*CrossType*	
	128	*CrossPrioritization*	
10	1	*CrossId*	
	2	*AllocQty*	
	4	*GiveUpFirmID*	
	8	*RoutingFirmID*	
	16	*WaiverType*	
	32	*CrossExclusionIndicator*	
	64	*PriceFormation*	
	128	*ClientQualifiedRole*	

Byte	Bit	Field	
11	1	*ClientID*	
	2	*InvestorID*	
	4	*ExecutorID*	
	8	*OrderOrigination*	
	16	*Algo*	
	32	*DeferralReason*	
	64	*InvestorQualifiedRole*	
	128	*ExecutorQualifiedRole*	
12	1	*CtiCode*	
	2	*ManualOrderIndicator*	
	4	*OperatorId*	
	8	*TradeDate*	
	16	*ClearingPrice*	
	32	*ClearingSize*	
	64	*ClearingSymbol*	
	128	*(Reserved)*	
13	1	*CumQty*	
	2	*DayOrderQty*	
	4	*DayCumQty*	
	8	*AvgPx*	
	16	*DayAvgPx*	
	32	*PendingStatus*	
	64	*DrillThruProtection*	
	128	*MultilegReportingType*	
14	1	*LegCFICode*	
	2	*LegMaturityDate*	
	4	*LegStrikePrice*	
	8	*RoomId*	
	16	*SecondaryExecId*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	
15	1	*(Reserved)*	
	2	*EquityPartyId*	
	4	*EquityNBBOProtect*	
	8	*MassCancelId*	–
	16	*(Reserved)*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	

6.8 Order Execution

Byte	Bit	Field	
1	1	*Side*	●
	2	*PegDifference*	●
	4	*Price*	●
	8	*ExecInst*	●
	16	*OrdType*	●
	32	*TimeInForce*	●
	64	*MinQty*	●
	128	*MaxRemovePct*	●
2	1	*Symbol*	●
	2	*SymbolSfx*	●
	4	*Currency*	
	8	*IdSource*	
	16	*SecurityId*	
	32	*SecurityExchange*	
	64	*Capacity*	●
	128	*ContraTrader*	
3	1	*Account*	●
	2	*ClearingFirm*	●
	4	*ClearingAccount*	●
	8	*DisplayIndicator*	●
	16	*MaxFloor*	●
	32	*DiscretionAmount*	●
	64	*OrderQty*	●
	128	*PreventMatch*	●
4	1	*MaturityDate*	
	2	*StrikePrice*	
	4	*PutOrCall*	
	8	*OpenClose*	
	16	*ClOrdIdBatch*	
	32	*CorrectedSize*	
	64	*PartyID*	
	128	*AccessFee*	
5	1	*OrigClOrdID*	–
	2	*LeavesQty*	–
	4	*LastShares*	–
	8	*LastPx*	–
	16	*DisplayPrice*	–
	32	*WorkingPrice*	–
	64	*BaseLiquidityIndicator*	–
	128	*ExpireTime*	–

Byte	Bit	Field	
6	1	*SecondaryOrderID*	–
	2	*CCP*	
	4	*ContraCapacity*	
	8	*AttributedQuote*	●
	16	*ExtExecInst*	●
	32	*BulkOrderIds*	
	64	*BulkRejectReasons*	
	128	*PartyRole*	
7	1	*SubLiquidityIndicator*	–
	2	*TradeReportTypeReturn*	
	4	*TradePublishIndReturn*	
	8	*Text*	
	16	*Bid*	
	32	*Offer*	
	64	*LargeSize*	
	128	*LastMkt*	
8	1	*FeeCode*	●
	2	*EchoText*	●
	4	*StopPx*	●
	8	*RoutingInst*	●
	16	*RoutStrategy*	●
	32	*RouteDeliveryMethod*	●
	64	*ExDestination*	●
	128	*TradeReportRefID*	
9	1	*MarketingFeeCode*	
	2	*TargetPartyID*	
	4	*AuctionId*	
	8	*OrderCategory*	
	16	*LiquidityProvision*	
	32	*CmtaNumber*	
	64	*CrossType*	
	128	*CrossPrioritization*	
10	1	*CrossId*	
	2	*AllocQty*	
	4	*GiveUpFirmID*	
	8	*RoutingFirmID*	
	16	*WaiverType*	
	32	*CrossExclusionIndicator*	
	64	*PriceFormation*	
	128	*ClientQualifiedRole*	

Byte	Bit	Field	
11	1	*ClientID*	
	2	*InvestorID*	
	4	*ExecutorID*	
	8	*OrderOrigination*	
	16	*Algo*	
	32	*DeferralReason*	
	64	*InvestorQualifiedRole*	
	128	*ExecutorQualifiedRole*	
12	1	*CtiCode*	
	2	*ManualOrderIndicator*	
	4	*OperatorId*	
	8	*TradeDate*	
	16	*ClearingPrice*	
	32	*ClearingSize*	
	64	*ClearingSymbol*	
	128	*(Reserved)*	
13	1	*CumQty*	
	2	*DayOrderQty*	
	4	*DayCumQty*	
	8	*AvgPx*	
	16	*DayAvgPx*	
	32	*PendingStatus*	
	64	*DrillThruProtection*	
	128	*MultilegReportingType*	
14	1	*LegCFICode*	
	2	*LegMaturityDate*	
	4	*LegStrikePrice*	
	8	*RoomId*	
	16	*SecondaryExecId*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	
15	1	*(Reserved)*	
	2	*EquityPartyId*	
	4	*EquityNBBOProtect*	
	8	*MassCancelId*	–
	16	*(Reserved)*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	

6.9 Trade Cancel or Correct

Byte	Bit	Field	
1	1	*Side*	–
	2	*PegDifference*	–
	4	*Price*	–
	8	*ExecInst*	–
	16	*OrdType*	–
	32	*TimeInForce*	–
	64	*MinQty*	–
	128	*MaxRemovePct*	–
2	1	*Symbol*	●
	2	*SymbolSfx*	●
	4	*Currency*	
	8	*IdSource*	
	16	*SecurityId*	
	32	*SecurityExchange*	
	64	*Capacity*	●
	128	*ContraTrader*	
3	1	*Account*	–
	2	*ClearingFirm*	–
	4	*ClearingAccount*	–
	8	*DisplayIndicator*	–
	16	*MaxFloor*	–
	32	*DiscretionAmount*	–
	64	*OrderQty*	–
	128	*PreventMatch*	–
4	1	*MaturityDate*	
	2	*StrikePrice*	
	4	*PutOrCall*	
	8	*OpenClose*	
	16	*ClOrdIdBatch*	
	32	*CorrectedSize*	
	64	*PartyID*	
	128	*AccessFee*	
5	1	*OrigClOrdID*	–
	2	*LeavesQty*	–
	4	*LastShares*	–
	8	*LastPx*	–
	16	*DisplayPrice*	–
	32	*WorkingPrice*	–
	64	*BaseLiquidityIndicator*	–
	128	*ExpireTime*	–

Byte	Bit	Field	
6	1	*SecondaryOrderID*	–
	2	*CCP*	
	4	*ContraCapacity*	
	8	*AttributedQuote*	–
	16	*ExtExecInst*	–
	32	*BulkOrderIds*	
	64	*BulkRejectReasons*	
	128	*PartyRole*	
7	1	*SubLiquidityIndicator*	●
	2	*TradeReportTypeReturn*	
	4	*TradePublishIndReturn*	
	8	*Text*	
	16	*Bid*	
	32	*Offer*	
	64	*LargeSize*	
	128	*LastMkt*	
8	1	*FeeCode*	–
	2	*EchoText*	–
	4	*StopPx*	–
	8	*RoutingInst*	–
	16	*RoutStrategy*	–
	32	*RouteDeliveryMethod*	–
	64	*ExDestination*	–
	128	*TradeReportRefID*	
9	1	*MarketingFeeCode*	
	2	*TargetPartyID*	
	4	*AuctionId*	
	8	*OrderCategory*	
	16	*LiquidityProvision*	
	32	*CmtaNumber*	
	64	*CrossType*	
	128	*CrossPrioritization*	
10	1	*CrossId*	
	2	*AllocQty*	
	4	*GiveUpFirmID*	
	8	*RoutingFirmID*	
	16	*WaiverType*	
	32	*CrossExclusionIndicator*	
	64	*PriceFormation*	
	128	*ClientQualifiedRole*	

Byte	Bit	Field	
11	1	*ClientID*	
	2	*InvestorID*	
	4	*ExecutorID*	
	8	*OrderOrigination*	
	16	*Algo*	
	32	*DeferralReason*	
	64	*InvestorQualifiedRole*	
	128	*ExecutorQualifiedRole*	
12	1	*CtiCode*	
	2	*ManualOrderIndicator*	
	4	*OperatorId*	
	8	*TradeDate*	
	16	*ClearingPrice*	
	32	*ClearingSize*	
	64	*ClearingSymbol*	
	128	*(Reserved)*	
13	1	*CumQty*	
	2	*DayOrderQty*	
	4	*DayCumQty*	
	8	*AvgPx*	
	16	*DayAvgPx*	
	32	*PendingStatus*	
	64	*DrillThruProtection*	
	128	*MultilegReportingType*	
14	1	*LegCFICode*	
	2	*LegMaturityDate*	
	4	*LegStrikePrice*	
	8	*RoomId*	
	16	*SecondaryExecId*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	
15	1	*(Reserved)*	
	2	*EquityPartyId*	
	4	*EquityNBBOProtect*	
	8	*MassCancelId*	–
	16	*(Reserved)*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	

6.10 Purge Rejected

Byte	Bit	Field	
1	1	*Side*	–
	2	*PegDifference*	–
	4	*Price*	–
	8	*ExecInst*	–
	16	*OrdType*	–
	32	*TimeInForce*	–
	64	*MinQty*	–
	128	*MaxRemovePct*	–
2	1	*Symbol*	–
	2	*SymbolSfx*	–
	4	*Currency*	
	8	*IdSource*	
	16	*SecurityId*	
	32	*SecurityExchange*	
	64	*Capacity*	–
	128	*ContraTrader*	
3	1	*Account*	–
	2	*ClearingFirm*	–
	4	*ClearingAccount*	–
	8	*DisplayIndicator*	–
	16	*MaxFloor*	–
	32	*DiscretionAmount*	–
	64	*OrderQty*	–
	128	*PreventMatch*	–
4	1	*MaturityDate*	
	2	*StrikePrice*	
	4	*PutOrCall*	
	8	*OpenClose*	
	16	*ClOrdIdBatch*	
	32	*CorrectedSize*	
	64	*PartyID*	
	128	*AccessFee*	
5	1	*OrigClOrdID*	–
	2	*LeavesQty*	–
	4	*LastShares*	–
	8	*LastPx*	–
	16	*DisplayPrice*	–
	32	*WorkingPrice*	–
	64	*BaseLiquidityIndicator*	–
	128	*ExpireTime*	–

Byte	Bit	Field	
6	1	*SecondaryOrderID*	–
	2	*CCP*	
	4	*ContraCapacity*	
	8	*AttributedQuote*	–
	16	*ExtExecInst*	–
	32	*BulkOrderIds*	
	64	*BulkRejectReasons*	
	128	*PartyRole*	
7	1	*SubLiquidityIndicator*	–
	2	*TradeReportTypeReturn*	
	4	*TradePublishIndReturn*	
	8	*Text*	
	16	*Bid*	
	32	*Offer*	
	64	*LargeSize*	
	128	*LastMkt*	
8	1	*FeeCode*	–
	2	*EchoText*	–
	4	*StopPx*	–
	8	*RoutingInst*	–
	16	*RoutStrategy*	–
	32	*RouteDeliveryMethod*	–
	64	*ExDestination*	–
	128	*TradeReportRefID*	
9	1	*MarketingFeeCode*	
	2	*TargetPartyID*	
	4	*AuctionId*	
	8	*OrderCategory*	
	16	*LiquidityProvision*	
	32	*CmtaNumber*	
	64	*CrossType*	
	128	*CrossPrioritization*	
10	1	*CrossId*	
	2	*AllocQty*	
	4	*GiveUpFirmID*	
	8	*RoutingFirmID*	
	16	*WaiverType*	
	32	*CrossExclusionIndicator*	
	64	*PriceFormation*	
	128	*ClientQualifiedRole*	

Byte	Bit	Field	
11	1	*ClientID*	
	2	*InvestorID*	
	4	*ExecutorID*	
	8	*OrderOrigination*	
	16	*Algo*	
	32	*DeferralReason*	
	64	*InvestorQualifiedRole*	
	128	*ExecutorQualifiedRole*	
12	1	*CtiCode*	
	2	*ManualOrderIndicator*	
	4	*OperatorId*	
	8	*TradeDate*	
	16	*ClearingPrice*	
	32	*ClearingSize*	
	64	*ClearingSymbol*	
	128	*(Reserved)*	
13	1	*CumQty*	
	2	*DayOrderQty*	
	4	*DayCumQty*	
	8	*AvgPx*	
	16	*DayAvgPx*	
	32	*PendingStatus*	
	64	*DrillThruProtection*	
	128	*MultilegReportingType*	
14	1	*LegCFICode*	
	2	*LegMaturityDate*	
	4	*LegStrikePrice*	
	8	*RoomId*	
	16	*SecondaryExecId*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	
15	1	*(Reserved)*	
	2	*EquityPartyId*	
	4	*EquityNBBOProtect*	
	8	*MassCancelId*	•
	16	*(Reserved)*	
	32	*(Reserved)*	
	64	*(Reserved)*	
	128	*(Reserved)*	

7 List of Optional Fields

The following are descriptions of optional fields which may be sent or received.

Field	Length	Data Type	Description
Account	16	Text	Corresponds to *Account* (1) in Cboe FIX. Reflected back on execution reports associated with this order. May be made available in the Member's clearing file. Allowed characters are alphanumeric and colon.
AttributedQuote	1	Alphanumeric	Optional. Allows for an order to be attributed to a firm's MPID or optionally RTAL (for retail firms) in Cboe's market data feeds. The order may also be included in attributed summary information displays related to quote/trade information on the Cboe website. Must opt-in to support through the Cboe Trade Desk. N = Do not attribute firm MPID to this order Y = Attribute firm MPID to this order R = Attribute RTAL to this order
BaseLiquidityIndicator	1	Alphanumeric	Indicates whether the trade added or removed liquidity. A = Added Liquidity R = Removed Liquidity X = Routed to Another Market C = Auction/Uncrossing
CancelOrigOnReject	1	Alpha	Corresponds to *CancelOrigOnReject* (9619) in Cboe FIX. Indicates handling of original order on failure to modify. N = Leave original order alone Y = Cancel original order if modification fails
Capacity	1	Alpha	Corresponds to *OrderCapacity* (47) in Cboe FIX. A = Agency P = Principal R = Riskless Principal
ClearingAccount	4	Text	Corresponds to *OnBehalfOfSubID* (116) and *ClearingAccount* (440) in Cboe FIX. Supplemental identifier. Recorded and made available in execution reports. Available via Drop feeds. For *RoutStrategy* = CLNK, value is passed through to SDP to further identify the end-client.
ClearingFirm	4	Alpha	Corresponds to *OnBehalfOfCompID* (115) and *ClearingFirm* (439) Cboe FIX. MPID that will clear the trade. Must be an allowed NSCC MPID. **Port attribute value of 'Default EFID' is used if not provided.**
CustomGroupID	2	Binary	Corresponds to *CustomGroupID* (7699) in Cboe FIX for `New Order` and `Purge Orders` messages. Used to group orders for use in `Purge Orders` where multiple orders can be cancelled by specifying a list of *CustomGroupIDs*.

DiscretionAmount	2	Binary	Corresponds to DiscretionAmount (9622) in Cboe FIX. • Two implied decimal places (e.g., 10 = $0.10) • Discretion is implicitly added to bid prices and subtracted from offer prices • Order will be diplayed at Price, but can be executed in the discretionary range. • A discretionary order will use the minimum amount of discretion necessary to achieve execution. • Maximum range is -9999 to 9999 (i.e., -99.99 to 99.99) May not be used with IOC orders. May not be used with Post Only orders.
DisplayIndicator	1	Alphanumeric	Corresponds to *DisplayIndicator* (9479) in Cboe FIX. **Re-pricing Options:** V = Default. As determined by port level seetting (defaults to S) P = Price Adjust m = Multiple Price Adjust R = Cancel back the order if it cannot be booked and displayed without adjustment r = Hidden; cancel back the order if it cannot be booked without adjustment S = Display Price Sliding (this is to override an opt-out of Display Price Siding at the port level) L = Display Price Sliding, but reject if order crosses the NBBO on entry M = Multiple Display Price Sliding **Other Options:** v = Visible (for visible peg orders only; others will be rejected) I = Invisible (implied for Midpoint Peg orders) N = No Rescrape at Limit. Applicable only to fully routable, IOC orders (*RoutingInst* = R and *TimeInForce* = 3). After walking the price to the limit, there will be no final scrape at Cboe and the cancel reason code will state X (Expired) rather than N (No Liquidity).
DisplayPrice	8	Binary Price	Only present when order is fully or partially booked. If the order has to be displayed at a less aggressive price for some reason, then that price will be reported here, otherwise equals *Price*. Present for hidden orders, indicating the price the order would have been displayed at.
DisplayRange	4	Binary	Corresponds to *DisplayRange* (8020) in Cboe FIX. Used for random replenishment of reserve orders. Random replenishment establishes a range of possible values for the order quantity that is to be displayed. For example, if MaxFloor = 2,000, and DisplayRange = 200, the displayed quantity will be selected from one of the following values: 1,800, 1,900, 2,000, 2,100, or 2,200. Must be specified in round lots.
EchoText	64	Text	Corresponds to *Text* (58) in Cboe FIX. Free format text string. May be echoed back on Cboe to Member messages.

ExDestination	1	Text	Corresponds to *ExDestination* (100) in Cboe FIX. Used to specify the designated away venue for *RoutStrategy* = DIRC or CLNK and for *RoutingInst* = A (Post to Away). A = NYSE American[1] B = NASDAQ BX[1] C = NYSE National h = HRT Execution Services (EDGA only)[3] I = Investors Exchange[1] J = EDGA[1] K = EDGX[1,2] M = CHX N = NYSE[1] P = NYSE Arca[1] Q = NASDAQ[1] X = NASDAQ PSX Y = BYX[1] Z = BZX[1] [1]Post to Away option available for ROUT, ROUX, and ROUE only. [2]Post to EDGX (for ROUT, ROUD, ROUE, ROUX, ROUZ, ROUQ, RDOT, RDOX, ROBB, ROCO, INET). [3]Specifies the designated away venue for *RoutStrategy* = CLNK. Not available for use with *RoutStrategy* = DIRC.
ExecInst	1	Text	Corresponds to *ExecInst* (18) in Cboe FIX. f = Intermarket Sweep (Directed or Cboe) P = Market Peg (peg Buy [Sell] to NBBO Offer [Bid]) Q = Market Maker Peg (see 'Market Maker Specification') R = Primary Peg (peg Buy [Sell] to NBB Bid [Offer]) U = Supplemental Peg Order M = Midpoint (peg to NBBO Midpoint) m = Midpoint (peg to NBBO Midpoint, but do not match when NBBO is locked) L = Alternate Midpoint (less aggressive of midpoint and 1 tick inside NBBO) **EDGA:** d = Midpoint Discretionary Order (added to EDGX **effective 10/3/18**) **BZX:** r = Late (for use with Auction Only orders); refer to the Cboe US Equities Auction Process specification for more information **BZX and EDGX:** o = Listing Market Opening (for ROOC strategy only) c = Listing Market Close (for ROOC strategy only) a = Both Listing Market Open and Close (for ROOC strategy only; also eligible for participation in halt auctions)
ExpireTime	8	DateTime	Corresponds to *ExpireTime* (126) in Cboe FIX. Required for *TimeInForce* = 6 orders, specifies the date-time (in UTC) that the order expires.

ExtExecInst	1	Text	Corresponds to *ExtExecInst* (9416) in Cboe FIX. N = None R = Retail Order **BYX:** P = Retail Order (Price Improvement Only) T = Retail Price Improving Order
FeeCode	2	Alphanumeric	Corresponds to *FeeCode* (9882) in Cboe FIX. Indicates fee associated with an execution. Fee codes are published in the pricing schedule. New fee codes may be sent with little or no notice. Members are encouraged to code their systems to accept unknown fee codes.
LastPx	8	Binary Price	Corresponds to *LastPx* (31) in Cboe FIX. Price of this fill.
LastShares	4	Binary	Corresponds to *LastShares* (32) in Cboe FIX. Executed share quantity.
LeavesQty	4	Binary	Corresponds to *LeavesQty* (151) in Cboe FIX. Quantity still open for further execution. If zero, the order is complete.
LocateReqd	1	Alpha	Corresponds to *LocateReqd* (114) in Cboe FIX. Optional, only processed for Sell Short and Sell Short Exempt orders. N = Client affirms ability to borrow (default) Y = Client does not affirm ability to borrow (results in reject)
MassCancelID	20	Text	Corresponds to *MassCancelID* (7695) in Cboe FIX. Copied from the *MassCancelID* passed on the original `Purge Orders` message.
MassCancelInst	16	Text	Corresponds to *MassCancelInst* (7700) in Cboe FIX. Used for specification of `Purge Orders` functionality. At least one character must be provided (MPID Filter). Contiguous characters must be specified up to total length. Truncated/unspecified characters will default to values indicated (D) below. ***1st Character: MPID Filter*** A = No filtering by MPID is performed. F = All orders that were sent under the MPID specified in *ClearingFirm* optional field. If "F" specified and *ClearingFirm* not provided, the `Purge Orders` will be rejected. ***2nd Character: Acknowledgement Style*** M = (D) `Order Cancelled` messages are sent for each cancelled order. If "M" is set and the *MassCancelID* optional field is specified, the *MassCancelID* value is ignored. S = A single `Mass Cancel Acknowledgement` message is sent once all cancels have been processed. The *MassCancelID* optional field must be specified or the `Mass Cancel` or `Purge Orders` will be rejected. B = Both individual `Order Cancelled` and `Mass Cancel Acknowledgement` messages will be sent. Also

			requires *MassCancelID* optional filed to be specified or the `Mass Cancel` or `Purge Orders` will be rejected. ***3rd Character: Lockout Instruction*** `N =` (D) No lockout `L =` Lockout until corresponding *RiskReset* received. Lockout can be used only with MPID Filter set to "F", otherwise the `Purge Orders` will be rejected. Lockout will apply to all `New Order` and `Modify Order` messages for the *ClearingFirm* (and symbol or *CustomGroupIDs*, if specified). A self-imposed lockout can be released using the *RiskReset* optional field in a `New Order` message.
MaxFloor	4	Binary	Corresponds to *MaxFloor* (111) in Cboe FIX. Portion of *OrderQty* to display. The balance is reserve. 0 displays the entire quantity. The displayed quantity of each order at a price level is decremented rirst. When displayed quantity is fully decremented, it is reloaded up to *MaxFloor* from reserve. Default = 0
MaxRemovePct	1	Binary	Corresponds to *MaxRemovePct* (9618) in Cboe FIX. For Post Only At Limit (RoutingInst = Q), what percentage of the order quantity which remains after price improvement may be removed at the limit. Must be 0 for non-Post Only At Limit orders. `0` = Don't Remove any shares at limit price `1-99` = Remove specified percentage of remainder at the limit `100` = Remove any amount at limit price If sent, must be 0 on EDGA and EDGX.
MinQty	4	Binary	Corresponds to *MinQty* (110) in Cboe FIX. Minimum fill quantity for non-routable hidden or non-routable IOC orders which only interact with liquidity on the target Cboe Exchange. **Ignored** if Enable True MinQty is set to "No" and the order is not a non-routable hidden or non-routable IOC. **Order is rejected** if Enable True MinQty is set to "Yes" and the order is not a non-routable hidden or non-routable IOC. **Default** is zero. Odd lot and mixed lot quantities allowed. When the remaining size on an order is less than the defined MinQty, then MinQty will be automatically set to the remaining size. When Enable True MinQty is set to "No" the minimum total fill size may be made up of several consecutive smaller fills. Setting this port attribute to "Yes" will require every fill to meet the defined MinQty. See 'Port Attributes' for details.
OrderQty	4	Binary	Corresponds to *OrderQty* (38) in Cboe FIX. Order quantity. System limit is 999,999 shares. On `Order Restated` messages the *OrderQty* may be updated (for example, for SWP or CMC restatements).

OrdType	1	Alphanumeric	Corresponds to *OrdType* (40) in Cboe FIX. 1 = Market 2 = Limit (default) 3 = Stop 4 = Stop Limit P = Pegged Pegged requires *ExecInst* be set to L, M, m, P, Q, or R. Market implies a *TimeInForce* of Day. Market day orders post in LULD straddle state or if a short sale during a Regulation SHO short sale circuit breaker. Stop/Stop Limit orders must have *TimeInForce* = R (Regular Hours Only) or 0 (Day). Pegged orders may not be routable except for midpoint peg orders on EDGA and BYX where *RoutStrategy* = RMPT or RMPL.
OrigClOrdID	20	Text	Corresponds to *OrigClOrdID* (41) in Cboe FIX.
PegDifference	8	Signed Binary Price	Corresponds to *PegDifference* (211) in Bats FIX. **Optional signed** value up to four decimal places*, when the peg difference is below $1.00, is **added** to the result of peg calculation. When the peg difference is above $1.00 a maximum of two decimal places can be specified. Previously was required to be only a non-aggressive offset. Must be zero for midpoint peg or non-pegged orders. Displayed Primary Peg orders with non-aggressive offset must have *TimeInForce* = R (Regular Hours Only) or 0 (Day). Day orders must be submitted after 9:30 a.m. ET. On **BYX**: If *ExtExecInst* = T (Retail Price Improving order): • May be priced in $0.001 increments • Must be ≥ 0 for Buy orders • Must be ≤ 0 for Sell orders **PegDifference* is rounded (down for buy, up for sell) to fit the tick size.

PreventMatch	3	Alpha	Corresponds to *PreventMatch* (7928) in Cboe FIX. Three characters: **1st character - MTP Modifier:** N = Cancel Newest O = Cancel Oldest B = Cancel Both S = Cancel Smallest D = Decrement larger / Cancel Smaller d = Same as D above, but only decrement LeavesQty. Do not restate OrderQty. **2nd character - Unique ID Level:** F = Prevent Match at Firm(Member) Level M = Prevent Match at MPID Level **3rd character - Trading Group ID (optional):** Member specified alphanumeric value 0-9, A-Z, or a-z. The Unique ID level (character 2) of both orders must match to prevent a trade. If specified on both orders, Trading Group ID (character 3) must match to prevent a trade. The MTP Modifier (character 1) of the inbound order will be honored, except that if the inbound order specifies Decrement and the resting order does not, and the resting order is larger, then both orders will be cancelled. This exception is to protect the order entry software for the resting order from receiving an unexpected restatement message. If order entry software is prepared to handle unexpected restatement messages, this exception may be override at the port level by requesting "Allow MTP Decrement Override" functionality. Uses of MTP Modifier D or d and users of "Allow MTP Decrement Override" functionality must be prepared to receive an `Order Restated` message that decrements *LeavesQty* (and, for method D, *OrderQty* as well).
Price	8	Binary Price	Corresponds to *Price* (44) in Cboe FIX. Limit price. Four implied decimal places Required for limit orders (*OrdType* = 2). If specified on market order (*OrdType* = 1), the order will be rejected. This field is also used to specify an optional cap price for pegged orders.

RiskReset	8	Text	Corresponds to *RiskReset* (7692) in Cboe FIX. For use by customers to release MPID, symbol or *CustomGroupID* level lockout conditions resulting from self-imposed lockouts issued via `Purge Orders` messages. **Single Character Values:** `S` = Symbol level lockout reset `F` = MPID level lockout reset `C` = *CustomGroupID* lockout reset Values may be combined together to allow for resets of multiple self-imposed lockouts in a single message. For example, "FS", "SC", "FC", and "SFC" are all acceptable values. If orders have been locked out any level, inbound orders for the locked symbol, MPID, or *CustomGroupID* will be rejected until this field is filled with the appropriate value on a `New Order` message.
RouteDeliveryMethod	3	Text	Corresponds to *RouteDeliveryMethod* (9350) in Cboe FIX. `RTI` = Route to improve (default if not specified). Ability to receive price improvement will take priority over speed of execution. `RTF` = Route to Fill. Speed of execution will take priority over potential price improvement. Only applicable to *RoutStrategy* = ROUT, ROUX, and ROUE.
RoutingInst	4	Text	Corresponds to *RoutingInst* (9303) in Cboe FIX. **1st character:** `B` = Book Only (not routable, will remove from local book) `P` = Post Only (not routable) `Q` = Post Only at Limit (removes liquidity that improves upon limit price and up to *MaxRemovePct* of remaining *OrderQty* at limit price) (BZX and BYX only) `R` = Routable `S` = Super Aggressive – Cross or Lock (order will be removed from the book and routed to any away quote that is locking or crossing the order). May remove liquidity after posting. `X` = Aggressive – Cross or Lock (order will be removed from the book and routed to any away quote that is locking or crossing the order) `K` = Super Aggressive When Odd Lot (routable order will be automatically assigned Super Aggressive status when it becomes an odd lot) `A` = Post to Away (a limit order that will post remainder to an away venue specified in *ExDestination* for applicable routing strategies) `N` = Non-Displayed Swap – Book only, Hidden order that may remove liquidity after posting. Requires *DisplayIndicator* = I. **2nd character (for use with *RoutStrategy* = DIRC, TRIM, TRIM-, TRIM2, TRIM2-, SLIM, SLIM+ only):** `D` = Eligible to route to DRT/CLC `L` = Route to displayed markets only
RoutStrategy	6	Text	Corresponds to *RoutStrategy* (9400) in Cboe FIX. **Please note:** `CLC` : Comprehensive Liquidity Check (EDGA/EDGX only) `DRT` : Dark Routing Technique (BZX/BYX only) `LCPMC` : Low Cost Protected Market Centers

			All exchanges: ALLB = Book + IOC Other Cboe Exchanges INET = Book + IOC/Day NASDAQ RDOT = Book + (CLC/DRT) + IOC/Day NYSE RDOX = Book + IOC/Day NYSE ROUT = Book + (CLC/DRT) + Street (**default if not specified**) ROUX = Book + Street ROUZ = Book + (CLC/DRT) SWPA = ISO Sweep of All Protected Markets SWPB = ISO Sweep of All Protected Markets (cancelled back if order quantity insufficient to clear all protected quotes) DIRC = Book + (CLC/DRT) + Directed IOC or Directed ISO if *ExecInst* = f. *ExDestination* must also be sent. **EDGA/EDGX:** ROUC = Book + (CLC/DRT) + LCPMC + All Other Protected Markets + Posts to EDGX ROUD = Book + Fast CLCs ROUE = Book + Fast CLCs + Street ROUQ = Book + Superfast CLCs **BYX/EDGA:** DIRC = Book + Midpoint IOC IEX (also requires *Ordtype* = P, *ExecInst* = M or m, and *ExDestination* = I) RMPT = Book + Midpoint IOC Select (CLC/DRT/Lit Venues) + Post to Local Book if non-IOC (must be used in conjunction with Midpoint Peg order type) RMPL = Book + Midpoint IOC RMPT Venues + Midpoint IOC RMPL Venues + Post to Local Book if non-IOC (must be used in conjunction with Midpoint Peg order type) **EDGA:** CLNK = Directed to Non-ATS Single Dealer Platform (SDP). Must be a limit IOC or Midpoint IOC order. ROBB = Book + IOC NASDAQ BX + IOC BYX ROCO = Book + IOC NASDAQ BX + IOC BYX + CLC **BYX:** TRIM = BYX + NASDAQ BX + EDGA + IEX + (DRT) + NYSE + BZX TRIM2 = BYX + (DRT) + NASDAQ BX + EDGA + IEX SLIM = BYX + LCPMC + (DRT) + LCPMC + All other protected markets **BZX:** TRIM = BZX + BYX + NASDAQ BX + EDGA + IEX + (DRT) + NYSE TRIM- = BYX[1] + NASDAQ BX + EDGA + IEX + (DRT) + NYSE TRIM2 = BZX + BYX + (DRT) + NASDAQ BX + EDGA + IEX TRIM2- = BYX[1] + (DRT) + NASDAQ BX + EDGA + IEX SLIM = BZX + BYX + LCPMC + (DRT) + LCPMC + All other protected markets SLIM+ = BYX[1] + BZX + LCPMC + (DRT) + LCPMC + All other protected markets **BZX/EDGX:** ROOC = Listing Market Open + Book + (CLC/DRT) + Street + Listing Market Close[2] [1]Route to BYX prior to scraping BZX unless price improvement is available. [2]Can be used with *ExecInst* = a, c, or o to specify listing market opening/closing eligibility.

SecondaryOrderID	8	Binary	Corresponds to *SecondaryOrderID* (198) in Cboe FIX. Denotes an alternative *OrderID* which is present on Cboe market data feeds (for example, to hide that a reserve (iceberg) order has reloaded). Or, *OrderID* of the contra side of a prevented match.
Side	1	Alphanumeric	Corresponds to *Side* (54) in Cboe FIX. `1` = Buy `2` = Sell `5` = Sell Short (client affirms ability to borrow) `6` = Sell Short Exempt
StopPx	8	Binary Price	Corresponds to *StopPx* (99) in Cboe FIX. Stop price. Required if *OrdType* = 3 (Stop) or 4 (Stop Limit). Stop and Stop Limit orders will only be triggered off Last Sale Eligible trades.
SubLiquidityIndicator	1	Alphanumeric	Additional information about an execution. Cboe **may add additional values without notice. Members must gracefully ignore unknown values.** `ASCII NUL (0x00)` = No Additional Information `E` = Trade added RPI liquidity (BYX only) `H` = Trade added hidden liquidity `I` = Trade added hidden liquidity that was price improved `J` = Execution from first order to join the NBBO `S` = Execution from order that set the NBBO `V` = Visible liquidity add trade that was price improved `m` = Midpoint peg order
Symbol	8	Alphanumeric	Corresponds to *Symbol* (55) in Cboe FIX. Entire Cboe format symbol or symbol root if using CQS or CMS format.
SymbolSfx	8	Alphanumeric	Corresponds to *SymbolSfx* (65) in Cboe FIX. CMS or CQS suffix. **Do not send *SymbolSfx* if using Bats format or if the symbol does not have a suffix.**
TimeInForce	1	Alphanumeric	Corresponds to *TimeInForce* (59) in Cboe FIX. `0` = Day (Early Trading Session until end of Regular Session) `1` = GTC (allowed, but treated as Day) `2` = At the Open (BZX only and Cboe listed securities only) `3` = IOC (Portion not filled immediately is cancelled) `4` = FOK (an IOC where the entire size must be filled, else the order will be cancelled back) `5` = GTX (Early Trading Session until end of Post-Market Session) `6` = GTD (Early Trading Session; expires at earlier of *ExpireTime* or end of Post-Market Session) `7` = At the Close (BZX only and applicable to Cboe Listed securities and Cboe Market Close symbols **effective TBD**) `E` = PRE (Pre-Market Trading Session until end of Regular Session) `R` = RHO (Regular Hours/Session Only) `T` = PTD (Pre-Market Trading Session; expires at earlier of specified *ExpireTime* or end of Post-Market Session) `X` = PTX (Pre-Market Trading Session until end of Post-Market Session)

WorkingPrice	8	Binary Price	Corresponds to *WorkingPrice* (9690) in Cboe FIX. If price had to be adjusted to a less aggressive value for some reason, then the adjusted price will be reported here, otherwise equals *Price*.

8 Reason Codes

The following is a list of all reason codes used by Cboe. These reason codes are used in a variety of contexts (order cancellations and order rejections). All reasons are not valid in all contexts. Cboe may add additional reason codes without notice. Members must gracefully ignore unknown values.

`A` = Admin
`C` = Capacity undefined
`D` = Duplicate identifier (e.g., ClOrdID)
`E` = Size reduction due to SWP restatement
`H` = Halted
`I` = Incorrect data center
`J` = Too late to cancel
`K` = Order rate threshold exceeded
`L` = Order would lock or cross NBBO
`M` = Order size exceeded
`N` = Ran out of liquidity to execute against
`O` = *ClOrdID* doesn't match a known order
`P` = Can't modify an order that is pending fill
`Q` = Waiting for first trade
`R` = Routing Unavailable
`S` = Short sale price violation
`T` = Fill would trade through the NBBO
`U` = User requested
`V` = Would wash
`W` = Add liquidity only order would remove
`X` = Order expired
`Y` = Symbol not supported
`Z` = Unforeseen reason
`f` = Risk management MPID or *CustomGroupID* level
`m` = Market access risk limit exceeded
`o` = Max open orders count exceeded
`r` = Reserve reload
`s` = Risk management symbol level
`u` = Limit Up Limit Down (LULD)
`w` = Would remove on unslide
`x` = Crossed market
`y` = Order received by Cboe during replay

9 List of Message Types

9.1 Member to Cboe

Message Name	Level	Type	Sequenced
Login Request	Session	0x37	No
Logout Request	Session	0x02	No
Client Heartbeat	Session	0x03	No
New Order	Application	0x38	Yes
Cancel Order	Application	0x39	Yes
Modify Order	Application	0x3A	Yes
Purge Orders	Application	0x47	Yes

9.2 Cboe to Member

Message Name	Level	Type	Sequenced
Login Response	Session	0x24	No
Logout	Session	0x08	No
Server Heartbeat	Session	0x09	No
Replay Complete	Session	0x13	No
Order Acknowledgment	Application	0x25	Yes
Order Rejected	Application	0x26	No
Order Modified	Application	0x27	Yes
Order Restated	Application	0x28	Yes
User Modify Rejected	Application	0x29	No
Order Cancelled	Application	0x2A	Yes
Cancel Rejected	Application	0x2B	No
Order Execution	Application	0x2C	Yes
Trade Cancel or Correct	Application	0x2D	Yes
Mass Cancel Acknowledgement	Application	0x36	No
Purge Rejected	Application	0x48	No

10 Port Attributes

The table below lists BOE port attributes that are configurable on the port or firm level. Changes to these attributes can be made by contacting the Cboe Trade Desk.

Attribute	Default	Description
Allowed Clearing MPIDs *	All MPIDs	MPID(s) allowed for trading on the port.
Default MPID	None	Default MPID to use if none is sent on a `New Order`.
Allow Pre-Market	Yes	Allow orders to be entered prior to Regular Session open.
Allow Post-Market	Yes	Allow orders to be entered after the Regular Session close.
Early Trading Session Opt-Out	No	Allow orders to be executable during the Early Trading Session. If set to Yes, then the following TimeInForce values will be translated: 0 (DAY) → E (PRE) 5 (GTX) → X (PTX) 6 (GTD) → T (PTD)
Allow Test Symbols Only	Disabled	Allow or disallow orders in non-test symbols
Allow ISO *	Yes	Allow or disallow ISO orders.
Allow Directed ISO *	Yes	Allow or disallow ISO orders directed to other market centers.
Default Routing Instruction +		Specifies a default value for routing. Fields can be overridden at the order level. The defaults are *RoutingInst* = R, *RouteDeliveryMethod* = RTI, and *RoutStrategy* = ROUT
Default Routing Instruction (Hidden Order Override) +		Specifies a default value for *RoutingInst* that is applied to hidden orders only.
Maximum Order Size *	25,000	Maximum order quantity
Maximum Order Dollar Value *	Unlimited	Maximum dollar value per order.
Default Price Sliding +	S	Default price sliding behavior. See *DisplayIndicator* for details.
Default Price Sliding (Hidden Order Override) +	S	Default price sliding behavior for hidden orders. See *DisplayIndicator* for details.
Cancel on Disconnect	Option 1	Cancels open orders upon order handler session disconnect; both graceful and ungraceful. If Cancel On Disconnect is set, open orders in Symbols that are not in Closed state at the time of the disconnect are cancelled. 1 = Cancel continuous book orders only (default) 2 = Cancel all open orders (continuous + auction*) 3 = Do not cancel any open orders *If disconnect occurs during the cut-off period for an auction, On-Open, On-Close and Late orders that are to participate in the auction will not be cancelled.
Cancel on ME Disconnect	Yes	When set to "No", this setting allows orders to remain open on a Matching Unit failover. When set to "Yes", all open orders associated with a session are immediately cancelled in the event of loss of connectivity to a Matching Unit. In any event, if a failover takes longer than five minutes, all orders are cancelled unconditionally.

Send Trade Breaks ^	No	Enables sending of `Trade Cancel or Correct` messages.
Default MTP Value *^+	None	Specifies default value for *PreventMatch*.
Allow MTP Decrement Override *^	No	Overrides the exception that requires both the resting and inbound order to be marked as "Decrement".
Allow Sponsored Participant MTP Control *^	No	Allow Sponsored Participant to override port default for match trade prevention by using *PreventMatch* on the order level.
Cancel on Reject +	No	Cancels an order upon a cancel or modify reject.
Cancel on Regulatory Halt	No	Cancels open orders upon receipt of a Regulatory Halt.
Fat Finger Protection *	None	Orders entered through the NBBO by a specified percentage or dollar based limit price tolerance will be rejected. Limits may be different for different price ranges and price ranges may vary across markets. Please see the 'Web Portal Port Controls Specification' for complete details.
Reject Orders on DROP Port Disconnect *	No	If all associated Standard FIX DROP ports associated with an order entry session experience disconnection, new orders will be rejected until at least one Standard FIX DROP port session has been reestablished. Note this parameter does not apply to Order-By-Order drop ports (ODROP).
Reject Orders on DROP Port Timeout (seconds) *	30 seconds	Only applicable if "Reject Orders on DROP Port Disconnect" has been enabled. When the last Standard FIX DROP port associated with an order entry session has disconnected, begin rejecting orders on the order entry session if a Standard FIX DROP session has not been reestablished within this timeout. Minimum value allowed is 0 seconds.
Cancel Open Orders on DROP Port Disconnect *	None	Only applicable if "Reject Orders on DROP Port Disconnect" has been enabled. When the last Standard FIX DROP port associated with an order handler session has disconnected, open orders, associated with the session are cancelled. All = Cancel Day and GTC orders Day = Cancel only Day orders (C2 only). None = Disabled Note this parameter applies to Standard FIX DROP ports and not Order-By-Order DROP ports (ODROP).

Notional Cutoff Aggregation Methods *	None	Gross exposure = CBB + CBO + CEB + CEO Net exposure = |(CEO + CBO) – (CEB + CBB)| On a given port, Cboe will calculate an track four values: `CBB` = Cumulative Notional Booked Bid Value *The sum of limit price x size for all booked sell limit orders.* `CBO` = Cumulative Notional Booked Offer Value *The sum of limit price x size for all booked sell limit orders.* `CEB` = Cumulative Notional Executed Bid Value *The sum of size x trade price for all executed buy orders* `CEO` = Cumulative Notional Executed Sell Value *The sum of size x trade price on all executed sell orders*
Gross Daily Risk Limit Order Notional Cutoff *	None	Results in rejects for **limit** orders when **gross** exposure of limit orders exceeds this value for this port. Maximum whole dollar value of $1 billion/port.
Gross Daily Risk Market Order Notional Cutoff *	None	Results in rejects for **market** orders when **gross** exposure of limit orders exceeds this value for this port. Maximum whole dollar value of $1 billion/port.
Net Daily Risk Limit Order Notional Cutoff *	None	Results in rejects for **limit** orders when **net** exposure of limit orders exceeds this value for this port. Maximum whole dollar value of $1 billion/port.
Net Daily Risk Market Order Notional Cutoff *	None	Results in rejects for **market** orders when **net**exposure of limit orders exceeds this value for this port. Maximum whole dollar value of $1 billion/port.
Default Attributed Quote *+	(see description)	Default value for *AttributedQuote* (9732). May override at order level. `Yes` = Attribute to MPID `RTAL` = Attribute as RTAL `No` = Don't Attribute (may override at order level) `Never*` = Never Attribute *May only change this setting to "Yes" or "No" after executing Attribution Addendum to Exchange User Agreement.
Crossed Market Cancel / Reject	No	Reject new orders when the NBBO in the security is crossed. Routable orders will have any remaining quantity cancelled back when the order returns to the book. Order modifications which cause a loss in priority will result in a cancel of the original order if the NBBO is crossed upon receipt of the modify request.
Send Peg Restatements	Option 1	Send restatements for Peg order movements. 1. No Peg restatements (default). 2. Market Maker Peg orders only. 3. All Peg orders except Market Maker Peg orders. 4. All Peg orders.
Default to Retail Order *^+	None	Default *ExtExecInst* = R or P.

Routing Retail Indicator (EDGX Only)	No	Mark orders as retail when routing to dark liquidity pools.
Single Order ADV Check	None	Reject orders when order size exceeds a specified percentage of the 20-day ADV. Members may also specify a 20-day ADV amount below which the check will not be applied.
All Routable to Halt Auction (BZX and EDGX Only)	No	Send all routable orders to the halt auction on the primary listing exchange. This applies to all routing strategies.
Duplicative Order Protection Time Threshold	None	Time window, in seconds, for Duplicative Order Protection Check
Duplicative Order Protection Order Count Threshold	None	Number of orders with the same *ClearingFirm*, *Price*, *OrderQty*, and *Symbol* that must be seen within the Duplicative Order Time Threshold to initiate Duplicative Order Protection Action.
Duplicative Order Protection Action	Option 1	Action taken when Duplicative Order Protection criteria is met: 1 = Not enabled. 2 = Reject new orders for the remainder of Duplicative Order Time Threshold. 3 = Disable port for *ClearingFirm*. Must call Cboe Trade Desk to reenable.
Post Order Rate Threshold	5,000 msgs/s	The maximum allowed message rate on the session. When the first non-session level message is received, a one second window begins. During the second no more than 4,999 additional non-session level messages will be allowed within that window. If the rate is exceeded, all new orders in the time window are rejected, modifies are treated as cancels, and cancels are processed. Maximum value is 5,000 msgs/sec.
Symbol Order Rate Threshold	5,000 msgs/s	Functions the same as the Port Order Rate Threshold, but is calculated at the symbol level. It is capped by the Port Order Rate Threshold. Maximum value is 5,000 msgs/sec.
Reject Market Orders Without NBBO	No	Reject Market Orders (including unpriced Peg Orders and Stop Orders) when there is no NBBO on the opposite side.
Default True *MinQty*	No	Do not aggregate multiple contra orders to meet the *MinQty* specified on an order.

* Sponsored Participants require written approval from Sponsors to update these settings on ports associated with a Sponsor's MPID.

+ Port attribute can be overridden on an order-by-order basis.

^ Requires certification.

11 Support

Please email questions or comments regarding this specification to tradedesk@cboe.com.

Revision History

Date	Description
April 4, 2014	*Version 2.0.0* First Version 2 release.
May 1, 2014	*Version 2.0.1* Retail attribution value changed from RTL to RETL.
June 4, 2014	*Version 2.0.2* Removed references to CBSX and NSX. Retail attribute value changes from RETL to RTAL. Corrected length of *NumberOfParamGroups* to be one byte (not two bytes). Fixed naming inconsistency of *AttributedQuote* sometimes being called *AttributedOrder*. Added send peg restatements and retail order default port attributes. Noted that *StopPx* may be modified.
July 1, 2014	*Version 2.0.3* Corrected *ExecInst* to note that Midpoint Discretionary Order will only be available on EDGA. Corrected Cancel on Disconnect options
July 3, 2014	*Version 2.0.4* Added field descriptions for *FeeCode* and *EchoText*.
July 7, 2014	*Version 2.0.5* Removed all return bits from `User Modify Rejected V2` messages. No optional return fields are allowed. Corrected a number of optional return bits. Added *RoutingInst*, *RoutStrategy*, *RouteDeliveryMethod*, and *ExDestination* as optional return bits (byte 8).
July 9, 2014	*Version 2.0.6* Corrected instances where *ContraCapacity* and *CorrectedSize* may be requested as optional return fields.
August 12, 2014	*Version 2.0.7* Added *RestatementReason* value of S (size reduced due to SWP). The “Default Price Sliding” value incorrectly indicated H for EDGX instead of the correct value of P. Corrected description of Market Peg.
August 15, 2014	*Version 2.0.8* Removed text which indicated version 2 was not yet available as it is now live.

August 22, 2014	*Version 2.0.9* Removed *ContraCapacity* which is not available in US Equities. Added Super Aggressive When Odd Lot RoutingInst value.
August 26, 2014	*Version 2.0.10* Added Reason Code of w (Would Remove on Unslide).
August 27, 2014	*Version 2.0.11* Corrected stages of RMPT route strategy.
September 8, 2014	*Version 2.0.12* Corrections in allowed return bitfields. Updated Options-specific fields to match latest version of Options specification. Removed *ContraCapacity* from allowed return bitfields. Removed *ContraBroker* from List of Optional fields.
September 9, 2014	*Version 2.0.13* Removed *AccessFee* from `Order Execution V2` allowed return bitfields. Removed Options-specific `Bulk Order Acknowledgment V2` message fromSection 6.
September 11, 2014	*Version 2.0.14* Correction: *ExtExecInst* wasn't marked as allowed for US Equities `New Order V2`.
September 29, 2014	*Version 2.0.15* Corrections: ROUC routing strategy will only be supported on EDGA/EDGX. Modified description of ROLF strategy to be Book + IOC LavaFlow.
October 10, 2014	*Version 2.0.16* Clarified ability to reuse *ClOrdId* with `Modify Orders` when daily limit trading risk controls are enabled.
November 13, 2014	*Version 2.0.17* Updated for EDGX Options. Added new fields *TargetPartyID* and *MarketingFeeCode*. Updated descriptions to note which fields are BZX Options or EDGX Options specific.
November 17, 2014	*Version 2.0.18* No functional changes. Clarified that LavaFlow's representation in *ExDestination* is l which is a lowercase L.
December 2, 2014	*Version 2.0.19* *MaxRemovePct* will now be allowed on EDGA and EDGX, but must always be 0.

December 19, 2014	*Version 2.0.20* Correction for *DiscretionAmount*. The documentation incorrectly indicated this is a Signed Binary field when it is actually a Binary field.
January 8, 2015	*Version 2.0.21* Corrected `Order Execution V2` return bitfields to note that *SubLiquidityIndicator* is not allowed—it's already available in the message body. Minor correction of *PreventMatch* text (no functional change). On *DisplayIndicator*, noted that I is implied on Midpoint Peg orders only
January 29, 2015	*Version 2.0.22* Removed references to ROLF and LavaFlow.
March 25, 2015	*Version 2.0.23* Corrected TRIM *RoutStrategy* descriptions.
May 19, 2015	*Version 2.1.0* Functionality modifications to EDGX to align with the other Bats equity exchanges: (effective 7/6/2015) EDGX Midpoint Match translated to Midpoint Peg No Lock, EDGX Hide Not Slide translated to Display Price Sliding, and EDGX price sliding default changes to Display Price Sliding.
June 10, 2015	*Version 2.1.1* Adjusted wording for *ExecInst* value of o. Added Reason Code value of T. Corrected message length of example `New Order V2` message.
July 6, 2015	*Version 2.1.2* Adjustments now that EDGX functionality changes are live.
July 27, 2015	*Version 2.1.3* Noted that *RoutStrategy* value of ROOC will only be available on BZX and EDGX effective 8/10/2015. Noted that ROOC orders with *ExecInst* set to c can route to halt auctions.
July 27, 2015	*Version 2.1.4* Added values to *ExDestination* and *ContraBroker* in anticipation of NSX reactivation on 8/31/2015. Added Routing Retail Indicator port attribute (EDGX only). Effective 9/10/2015. Added Single Order ADV Check port attribute. Effective 8/14/2015. Updated description of Fat Finger Protection port attribute.

August 10, 2015	*Version 2.1.5* Added *EffectiveTime* (effective 9/28/2015). Added Duplicative Order Protection port attributes.
October 26, 2015	*Version 2.1.6* Added port attribute "All Routable to Halt Auction". Updated *RoutStrategy* description of ROCO and ROBB. Updated effective date for *EffectiveTime*.
November 23, 2015	*Version 2.1.7* Added ALLB value to *RoutStrategy*. Updated effective date for "All Routable to Halt Auction."
February 17, 2016	*Version 2.1.8* Updated for new branding.
February 25, 2016	*Version 2.1.9* Added new *RestatementReason* value of P.
March 23, 2016	*Version 2.1.10* Updated description of *RoutStrategy* to state that routable ISOs must be sent using DIRC. Updated the minimum value of "Reject Orders on DROP Port Timeout" to be 0 seconds.
April 12, 2016	*Version 2.1.11* Added three new *TimeInForce* values to support addition of Early Trading Session. Added "Allow Early Trading Session" port attribute. Added Hours of Operation section. All effective 5/23/2016.
April 14, 2016	*Version 2.1.12* Removed some route strategies. Removal of IOCM and ICMT effective May 5, 2016 on BYX Exchange and May 6, 2016 on EDGA Exchange. Removal of TRIM3 and TRIM3- effective May 6, 2016 on BZX Exchange.
April 25, 2016	*Version 2.1.13* Clarified when "Fat Finger Protection" is applied. Clarified wording for "Early Trading Session Opt-Out."
July 13, 2016	*Version 2.1.14* Added new *ExecInst* value of y (Trade at ISO). Added new *ExDestination* value of I (IEX, effective 9/2/2016) and *ContraBroker* value of IEX (effective 8/1/2016).
August 8, 2016	*Version 2.1.15* Updated effective date for supporting *ExDestination* of IEX to 8/19/2016.
January 24, 2017	*Version 2.1.16* Added IEX Midpoint routing to RoutStrategy.

March 2, 2017	*Version 2.1.17* Add new field type *Date*.
March 14, 2017	*Version 2.1.18* Add descriptions of port attributes “Allow Test Symbols Only”, “Port Order Rate Threshold”, and “Symbol Order Rate Threshold”
March 23, 2017	*Version 2.1.19* Added RMPL Route Strategy to *RoutStrategy*.
May 17, 2017	*Version 2.1.20* Added description of port attribute “Cancel on ME Disconnect”
June 14, 2017	*Version 2.1.21* Added IEX to the TRIM, TRIM-, TRIM2 and TRIM2- *RoutStrategy* venues. Added new *RoutingInst* value of N (Non-Displayed Swap) (effective 7/21/2017).
August 10, 2017	*Version 2.1.22* Added description of port attribute “Default Routing Instruction (Hidden Order Override)”
October 17, 2017	*Version 2.1.23* Cboe rebranding/logo changes. Removed “X = Locked in cross” *RestatementReason* as this is specific to European markets and was previously deprecated.
October 25, 2017	*Version 2.1.24* Corrected various spelling errors, field name and case inconsistencies.
December 4, 2017	*Version 2.1.25* Updated *TimeInForce* requirements for Displayed Primary Peg with non-aggressive *PegDifference*. Effective 12/15/17.
January 24, 2018	*Version 2.1.26* Reworked the `Modify Order` message to clarify when an order loses time priority and to harmonize with FIX Post to Away orders must be limit orders.
February 2, 2018	*Version 2.1.27* Added port attribute “Reject Market Orders Without NBBO” (effective 2/16/18).
March 20, 2018	*Version 2.1.28* Updated the market centers that support Post to Away in *ExDestination.* Added port attribute “Default True MinQty” (effective 4/18/18).
March 27, 2018	*Version 2.2.0* Added Cboe Market Close (CMC) functionality (**effective TBD**). Clarified that a zero *MaxFloor* (111) on a `Modify Order` message will be ignored.

May 08, 2018	*Version 2.2.1* *LastShares* will be used to report the number of shares cancelled on Cboe Market Close restatements. *LeavesQty* will be used for matched shares on CMC restatements. Updated description of Aggressive and Super Aggressive *RoutingInst* values. Added 15th return byte to all messages from Cboe to Member.
May 11, 2018	*Version 2.2.2* Updated description on *MinQty* behavior and changes related to the release of Enable True *MinQty* port attribute.
June 08, 2018	*Version 2.2.3* Updated byte 15 Return Bitfields. None are applicable to US Equities. Defined Binary Signed Price data type, which is used for *PegDifference*. Added support for *RoutingInst*=N (NDS) on BYX, BZX, and EDGA (effective 6/14/18).
August 23, 2018	*Version 2.3.0* Added support for Equities Purge Ports (effective 10/1/18). Added `Purge Orders`, `Mass Cancel Acknowledgement`, and `Purge Rejected` message types and associated optional bitfields. Added definitions for *MassCancelID, MassCancelInst, CustomGroupID, CustomGroupIDCnt,* and *RiskReset* fields. Updated Trading Sessions to reflect that BZX is open until 8:00 p.m. ET. Added MDO *ExecInst* to EDGX **effective 10/3/18**.
August 27, 2018	*Version 2.3.1* Defined *CustomGroupID* Optional Field (effective 10/1/18).
September 13, 2018	*Version 2.3.2* Added CLNK as new value for *RoutStrategy* and h=HRT Execution Services LLC as new value for *ExDestination* . Effective 9/24/18 for EDGA only.
October 2, 2018	*Version 2.3.3* Removed Trade At ISO order due to Tick Pilot Sunset.