U.S. Options Auction Feed Specification

Version 1.1.29

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Contents

1 Introduction

The Cboe U.S. Options Auction Feed specification may be used to deliver Auction message information for the Cboe Options ("C1") and EDGX Options Exchanges.

Multicast Options Auction Feed Descriptions

Exchange	Shaping	Served From Data Center (Primary/Secondary)	Multicast Feed ID
C1 Options	Gig	Primary	CAA
C1 Options	Gig	Primary	CBA
C1 Options	Gig	Secondary	CEA
EDGX Options	Gig	Primary	EAA
EDGX Options	Gig	Primary	EBA
EDGX Options	Gig	Secondary	EEA

Cboe Members may also use Cboe Multicast PITCH to receive auction messages as well as real-time depth of book quotations and execution information. Refer to the US Equities/Options Multicast Depth of Book (PITCH) Specification for more information.

1.1 24x5 Feed Hours and System Restart (C1 Only)

For C1 Options operating in 24x5 mode, the Auction feed starts on Sunday at approximately 1:00 p.m. ET and shuts down on Friday at approximately 5:30 p.m. ET. A daily restart occurs between 5:30 and 7:00 p.m. ET each day at which time sequences will be reset. The daily restart is typically observed between 5:30 p.m. and 6:00 p.m. ET, but could occur later if needed for operational reasons. Feed startup and shutdown times may be adjusted without notice.

1.2 Feed Connectivity Requirements

Gig Shaped feeds are available to members with a minimum of 1 GB/s of connectivity to Cboe via cross connect or dedicated circuit.

Members with sufficient connectivity may choose to take both the Gig-Shaped feeds from one of Cboe datacenters and arbitrate the feeds to recover lost data. Alternatively, members may choose to arbitrate feeds from both datacenters. It should be noted that feeds from the secondary datacenter will have additional latency for those connected with Cboe in the primary data center due to proximity and business continuity processing.

Cboe Options Auction Feed real-time events are delivered using a published range of multicast addresses divided by symbol range units.

2 Protocol

C1 and EDGX Options users may receive the Cboe Options Auction Feed protocol over multicast only.

The Cboe Options Auction Feed cannot be used to enter orders. For Cboe Options Auction order entry, refer to the Cboe US Options FIX or BOE specifications.

2.1 Message Format

Cboe Options Auction Feed protocol messages are delivered un-sequenced and may not be retrieved if missed.

Cboe Members familiar with the Multicast Depth of Book protocol should find it very easy to reuse that code to process the Cboe Options Auction Feed. All multicast delivered events will be self-contained. Developers can assume that delivered data will not cross frame boundaries and a single Ethernet frame will contain only one Unit Header with associated data.

The Cboe Options Auction Feed is comprised of a series of dynamic length un-sequenced messages. Each message begins with *Length* and *Message Type* fields. Cboe reserves the right to add message types and grow the length of any message without notice. Members should develop their decoders to handle unknown message types and messages beyond the expected length. Messages will only be grown to add additional data to the end of a message.

2.2 Data Types

The following field types are used within the `Sequenced Unit Header` and PITCH 2.X.

- **Alphanumeric** fields are left justified ASCII fields and space padded on the right.
- **Binary** fields are unsigned and sized to "Length" bytes and ordered using Little Endian convention (least significant byte first).
- **Binary Long Price** fields are unsigned Little Endian encoded 8 byte binary fields with 4 implied decimal places (denominator = 10,000).
- **Multiplier** fields are unsigned Little Endian encoded 4 byte binary fields with 1 implied decimal place (denominator = 10).
- **Bit Field** fields are fixed width fields with each bit representing a Boolean flag (the 0 bit is the lowest significant bit; the 7 bit is the highest significant bit).
- **Printable ASCII** fields are left justified ASCII fields that are space padded on the right that may include ASCII values in the range of 0x20 – 0x7e.

- **Binary Date** fields are 4 byte unsigned Little Endian values where the base-10 representation is the YYYYMMDD representation of that date. For example, October 30, 2023 would be represented as 20,231,030 (20231030) .

2.3 Sequenced Unit Header

The `Sequenced Unit Header` is used for all Cboe Options Auction Feed messages.

Unsequenced data may be delivered using the `Sequenced Unit Header`. Sequenced headers will have a 0 value for the sequence field and potentially for the unit field.

Sequenced Unit Header				
Field	**Offset**	**Length**	**Value/Type**	**Description**
Hdr Length	0	2	Binary	Length of entire block of messages. Includes this header and *Hdr Count* messages to follow.
Hdr Count	2	1	Binary	Number of messages to follow this header.
Hdr Unit	3	1	Binary	Unit that applies to messages included in this header.
Hdr Sequence	4	4	Binary	Will be zero.
Total Length = 8 bytes				

2.4 Heartbeat Messages

The `Sequenced Unit Header` with a count field set to "0" will be used for heartbeat messages. During trading hours heartbeat messages will be sent if no data has been delivered within 1 second.

Outside of trading hours Cboe sends heartbeat messages on all real-time channels to help users validate multicast connectivity. Heartbeat messages may not be sent from 12:00 am – 1:00 am ET or during maintenance windows.

3 Cboe Options Auction Feed Messages

3.1 Time Reference (C1 Only)

The `Time Reference` message is used to provide a midnight reference point for recipients of the feed. It is sent whenever the system starts up and when the system crosses a midnight boundary. All subsequent `Time` messages for the same unit will the use the last *Midnight Reference* until another `Time Reference` message is received for that unit. The `Time Reference` message includes the *Trade Date*, so most other sequenced messages will not include that information.

`Time Reference` messages will be included in a spin response.

Time Reference				
Field Name	**Offset**	**Length**	**Type/(Value)**	**Description**
Length	0	1	Binary	*Length* of this message including this field.
Message Type	1	1	0xB1	`Time Reference` Message
Midnight Reference	2	4	Binary	Midnight Eastern Time reference time for subsequent `Time` messages, expressed as number of whole seconds since the Epoch (midnight January 1, 1970 UTC).
Time	6	4	Binary	Number of whole seconds from midnight Eastern Time.
Time Offset	10	4	Binary	Nanosecond offset from last unit timestamp.
Trade Date	14	4	Binary Date	Current Trade Date
Total Length = 18 bytes				

3.2 Time

A `Time` message is immediately generated and sent when there is an Auction event for a given clock second. If there is no Auction event for a given clock second, then no `Time` message is sent for that second. All subsequent time offset fields for the same unit will use the new `Time` value as the base until another `Time` message is received for the same unit.

Time				
Field Name	**Offset**	**Length**	**Type/(Value)**	**Description**
Length	0	1	Binary	*Length* of this message including this field
Message Type	1	1	0x20	`Time` Message
Time	2	4	Binary	Number of whole seconds from midnight Eastern Time

Epoch Time	6	4	Binary	*C1 Only* Number of whole seconds since the Epoch (midnight January 1, 1970 UTC).
Total Length = 6 bytes, 10 bytes on C1 Only				

3.3 Unit Clear

The `Unit Clear` message instructs feed recipients to clear all orders for the Cboe book in the unit specified in the `Sequenced Unit Header`. This message will be sent at startup each day. It would also be distributed in certain recovery events such as a data center fail-over.

Unit Clear				
Field Name	**Offset**	**Length**	**Type/(Value)**	**Description**
Length	0	1	Binary	*Length* of this message including this field
Message Type	1	1	0x97	`Unit Clear` Message
Time offset	2	4	Binary	Nanosecond offset from last unit timestamp
Total Length = 6 bytes				

3.4 Auction Notification

`Auction Notification` messages are used to disseminate order details of an auction. Auctions will be available for a defined period of time known as the exposure period.

Auction Notification				
Field Name	**Offset**	**Length**	**Type/(Value)**	**Description**
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0xAD	`Auction Notification` Message
Time offset	2	4	Binary	Nanosecond offset from last unit timestamp
Symbol	6	6	Printable ASCII	*Symbol* right padded with spaces.
Auction ID	12	8	Binary	Day specific identifier assigned to this auction.
Auction Type	20	1	Alphanumeric	B = AIM S = Solicitation Auction Mechanism (C1 and EDGX Only) T = Step Up Mechanism (SUM) A = SUM All or None
Side	21	1	Alphanumeric	"B" or "S"
Price	22	8	Binary Long Price	For SUM this will reflect the NBBO price of the opposite side of the auction at the time of entry. For AIM on EDGX, *Price* will be the auction start price. For SPX/SPXW AIM on C1, *Price* will be the auction start price, otherwise 0. For SAM, this will reflect the limit price specified on the order.

Contracts	30	4	Binary	Number of contracts available in the auction.
Customer Indicator	34	1	Alphanumeric	N = Non-Customer C = Customer
ParticipantID	35	4	Alphanumeric	Executing Broker (optional) of firm attributed to this quote
Auction End Offset	39	4	Binary	Nanosecond offset from last timestamp
Client ID	43	4	Alphanumeric	Optional user specified value attributed to this quote.
Total Length = 47 bytes				

3.5 Auction Cancel

`Auction Cancel` messages are used to disseminate the cancellation of an earlier `Auction Notification` message as a result of a user cancelation of the original order, a user modification request to change the price or increase the original order quantity, or a fading of the NBBO.

A user request to modify the order price or to increase the original order quantity will result in a cancelation of the auction followed by a new `Auction Notification` message. `Auction Cancel` messages will not be issued for order quantity decrements.

Auction Cancel				
Field Name	**Offset**	**Length**	**Type/(Value)**	**Description**
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0xAE	`Auction Cancel` Message
Time offset	2	4	Binary	Nanosecond offset from last unit timestamp
Auction ID	6	8	Binary	Day specific identifier assigned to this auction
Total Length = 14 bytes				

3.6 Auction Trade

`Auction Trade` messages are used to disseminate executions resulting from an options auction.

Auction Trade				
Field Name	**Offset**	**Length**	**Type/(Value)**	**Description**
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0xAF	`Auction Trade` Message
Time offset	2	4	Binary	Nanosecond offset from last unit timestamp
Auction ID	6	8	Binary	Day specific identifier assigned to this auction
Execution ID	14	8	Binary	Day specific identifier assigned to this execution
Price	22	8	Binary Long Price	Trade price
Contracts	30	4	Binary	Number of contracts traded

Total Length = 34 bytes

3.7 Options Auction Update

`Options Auction Update` messages are used to disseminate price and size information and Composite Market bid and offer prices during Opening and Re-Opening (halt) auctions on the Cboe Options Exchange. `Options Auction Update` messages are sent every five seconds during an opening period provided that one of the field values has changed. When no values have changed, a message is sent once every 60 seconds. Refer to the Cboe Options Opening Process specification for more information.

The `Options Auction Update` message has the following format:

Options Auction Update				
Field Name	**Offset**	**Length**	**Type/(Value)**	**Description**
Length	0	1	Binary	*Length* of this message including this field.
Message Type	1	1	0xD1	`Options Auction Update` Message
Time offset	2	4	Binary	Nanosecond offset from last unit timestamp.
Symbol	6	8	Printable ASCII	*Symbol* right padded with spaces.
Auction Type	14	1	Alphanumeric	G = GTH Opening (C1 only) O = RTH Opening (C1 Only) H = Halt Re-Opening V = Volatility Opening
Reference Price	15	8	Binary Long Price	Collared VMIM price computed on the queuing book only.
Buy Contracts	23	4	Binary	Cumulative Buy contracts at the *Reference Price* and above.
Sell Contracts	27	4	Binary	Cumulative Sell contracts at the *Reference Price* and below.
Indicative Price	31	8	Binary Long Price	Collared VMIM price computed on the combined queueing book and the continuous book. Equal to *Reference Price* for options that do not have a GTH trading session.
Auction Only Price	39	8	Binary Long Price	Uncollared VMIM price computed on the queuing book only.
Opening Condition	47	1	Alphanumeric	O = Would open Q = Need quote to open B = Need more buyers (C1 Only) S = Need more sellers (C1 Only) C = Crossed Composite Market
Composite Market Bid Price	48	8	Binary Long Price	Bid Price of the prevailing Composite Market
Composite Market Offer Price	56	8	Binary Long Price	Offer Price of the prevailing Composite Market.
Total Length = 64 bytes				

3.8 Auction Summary

`Auction Summary` messages are used to disseminate the results of the Opening and Re-Opening process. An Opening or Re-Opening `Auction Summary` message for each symbol is sent at the conclusion of the Opening or Re-Opening process and represents the Cboe opening price.

The `Auction Summary` message has the following format:

Auction Summary				
Field Name	**Offset**	**Length**	**Type/(Value)**	**Description**
Length	0	1	Binary	Length of this message including this field.
Message Type	1	1	0x96	`Auction Summary` Message
Time offset	2	4	Binary	Nanosecond offset from last unit timestamp.
Symbol	6	8	Printable ASCII	*Symbol* right padded with spaces.
Auction Type	14	1	Alphanumeric	G = GTH Opening (C1 Only) O = RTH Opening (C1 Only) H = Halt Re-Opening V = Volatility Opening
Price	15	8	Binary Long Price	Auction price.
Quantity	23	4	Binary	Cumulative number of contracts executed during the auction.
Total Length = 27 bytes				

3.9 Width Update

The `Width Update` message is used to communicate opening quote width multiplier. This message will be sent in the event that the exchange decides to change the quote width multiplier on a per underlying basis. For complete details on the opening collars see the Cboe Opening Process Specification.

Width Update				
Field Name	**Offset**	**Length**	**Type/(Value)**	**Description**
Length	0	1	Binary	*Length* of this message including this field.
Message Type	1	1	0xD2	`Width Update` Message
Time Offset	2	4	Binary	Nanosecond offset from last unit timestamp.
Underlying	6	8	Printable ASCII	Underlying right padded with spaces.
Width Type	14	1	Alphanumeric	R = Regular V = Volatility
Multiplier	15	4	Multiplier	Width multiplier.
Total Length = 19 bytes				

3.10 Symbol Mapping

A `Symbol Mapping` message is used to map the 6 character multicast feed symbol field to an OSI symbol. These messages are sent continuously through the day at variable rates as bandwidth allows. Members who consume the Options Auction feed will be able to receive the full list of symbols in approximately 30 minutes.

Symbol Mapping				
Field Name	**Offset**	**Length**	**Type/(Value)**	**Description**
Length	0	1	Binary	*Length* of this message including this field
Message Type	1	1	0x2E	`Symbol Mapping` Message
Feed Symbol	2	6	Printable ASCII	Symbol right padded with spaces
OSI Symbol	8	21	Printable ASCII	OSI Symbol
Symbol Condition	29	1	Alphanumeric	`N` = Normal `C` = Closing Only
Underlying	30	8	Alphanumeric	Symbol of underlying instrument right padded with spaces.
Total Length = 38 bytes				

3.11 End of Session

The `End of Session` message is sent for each unit when the unit shuts down. No more auction messages will be delivered for this unit, but heartbeats from the unit may be received.

End of Session				
Field Name	**Offset**	**Length**	**Type/(Value)**	**Description**
Length	0	1	Binary	*Length* of this message including this field
Message Type	1	1	0x2D	`End of Session` Message
Timestamp	2	4	Binary	Nanosecond offset from last unit timestamp.
Total Length = 6 bytes				

3.12 SOQ Strike Range Update (C1 Only)

The `SOQ Strike Range Update` message is only available on the C1 Exchange. This message disseminates the minimum and maximum strike prices of the strike price range used to calculate the Special Opening Quote ("SOQ") on a Volatility Settlement date. In the event that multiple distinct SOQ calculations occur on the same day, the applicable SOQ is differentiated by the *SOQ Identifier* field, which is set to the CSMi symbol on which the final settlement SOQ value is disseminated.

The `SOQ Strike Range Update` message has the following format:

SOQ Strike Range Update				
Field Name	**Offset**	**Length**	**Type/(Value)**	**Description**
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x9D	`SOQ Strike Range Update` Message

Time offset	2	4	Binary	Nanosecond offset from last unit timestamp
SOQ Identifier	6	20	Printable ASCII	Dissemination symbol of the final SOQ right padded with spaces.
Lower Strike Price	26	8	Binary Long Price	SOQ lower strike price
Upper Strike Price	34	8	Binary Long Price	SOQ upper strike price
Total Length = 42 bytes				

3.13 Constituent Symbol Mapping (C1 Only)

The `Constituent Symbol Mapping` message is only available on the C1 Exchange. This message is used to communicate which options series (if any) are Constituent Series in a Volatility Settlement Special Opening Quote ("SOQ"). The message is identical to the `Symbol Mapping` message with the addition of the *SOQ Identifier* field, which is set to the CSMi symbol on which the final settlement SOQ value is disseminated. The `Constituent Symbol Mapping` message is sent as an unsequenced message with one message sent for each Constituent Series in a continuous loop as bandwidth allows.

The `Constituent Symbol Mapping` message has the following format:

Constituent Symbol Mapping				
Field Name	**Offset**	**Length**	**Type/(Value)**	**Description**
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x9E	`Constituent Symbol Mapping` Message.
Feed Symbol	2	6	Printable ASCII	*Symbol* right padded with spaces
OSI Symbol	8	21	Printable ASCII	OSI Symbol
Symbol Condition	29	1	Alphanumeric	N = Normal C = Closing Only
Underlying	30	8	Alphanumeric	Symbol of underlying equity right padded with spaces.
SOQ Identifier	38	20	Printable ASCII	Dissemination symbol of the final SOQ right padded with spaces.
Total Length = 58 bytes				

4 Message Types

0xB1	Time Reference **(C1 Only)**
0x20	Time
0x97	Unit Clear
0xAD	Auction Notification
0xAE	Auction Cancel
0xAF	Auction Trade
0xD1	Options Auction Update
0x96	Auction Summary
0xD2	Width Update
0x2E	Symbol Mapping
0x2D	End of Session
0x9D	SOQ Strike Range Update
0x9E	Constituent Symbol Mapping

5 Example Messages

Each of the following message types must be wrapped by a sequenced unit header as described in Section 2.24. Note that in the following examples, each byte is represented by two hexadecimal digits.

5.1 Sequenced Unit Header

Hdr Length	31 00	49 bytes, including header
Hdr Count	02	2 messages to follow
Hdr Unit	01	Unit 1
Hdr Sequence	00 00 00 00	Always set to zero

5.2 Time Reference (C1 Only)

Length	12	18 bytes
Type	B1	Time Reference
Midnight Reference	D0 8B 34 60	2021-02-23 00:00:00 Eastern (1614056400 seconds since the Epoch)
Time	00 E1 00 00	16:00:00
Time Offset	00 00 00 00	Exactly 16:00:00
Trade Date	2F 62 34 01	20210223 February 23, 2021

5.3 Time Message

Length	06	6 bytes
Type	20	Time
Time	98 85 00 00	34,200 seconds = 09:30 AM Eastern

5.4 Time Message

Length	0A	10 bytes
Type	20	Time
Time	98 85 00 00	34,200 seconds = 09:30 AM Eastern
Epoch Time (C1 Only)	68 11 35 60	1,614,090,600 seconds since the Epoch

5.5 Unit Clear

Length	06	6 bytes
Type	97	Unit Clear
Time offset	18 D2 06 00	447,000 ns since last Time Message

5.6 Auction Notification Message

Length	2F	47 bytes
Type	AD	Auction Notification
Time offset	18 D2 06 00	447,000 ns since last Time Message
Symbol	30 30 6D 45 56 4F	00mEVO
Auction ID	05 40 5B 77 8F 56 1D 0B	631WC4000005
Auction Type	54	T = SUM
Side	42	B = Buy Side
Price	E8 A3 0F 00 00 00 00 00	$102.50
Contracts	64 00 00 00	100 contracts
Customer Indicator	43	C = Customer
ParticipantID	45 46 49 44	EFID
Auct. End Offset	38 73 0E 00	947,000 ns since last Time Message
Client ID	43 4C 49 44	CLID

5.7 Auction Cancel Message

Length	E	14 bytes
Type	AE	Auction Cancel
Time offset	18 D2 06 00	447,000 ns since last Time Message
Auction ID	05 40 5B 77 8F 56 1D 0B	631WC4000005

5.8 Auction Trade Message

Length	22	34 bytes
Type	AF	Auction Trade
Time offset	18 D2 06 00	447,000 ns since last Time Message
Auction ID	05 40 5B 77 8F 56 1D 0B	631WC4000005
Execution Id	34 2B 46 E0 BB 00 00 00	0AAP09VEC
Prc	E8 A3 0F 00 00 00 00 00	$102.50
Contracts	64 00 00 00	100 contracts

5.9 Options Auction Update

Length	40	64 bytes
Type	D1	Options Auction Update
Time offset	18 D2 06 00	447,000 ns since last Time Message
Symbol	30 30 6D 45 56 4F	00mEVO
Auction Type	56	Volatility Opening
Reference Price	E8 A3 0F 00 00 00 00 00	$102.50
Buy Contracts	64 00 00 00	100 Contracts
Sell Contracts	C8 00 00 00	200 Contracts
Indicative Price	E8 A3 0F 00 00 00 00 00	$102.50
Auction Only	E8 A3 0F 00 00 00 00 00	$102.50

Price		
Opening Condition	4F	O = Would Open
Composite Market	50 69 0F 00 00 00 00 00	$101.00
Bid Price		
Composite Market	70 B7 0F 00 00 00 00 00	$103.00

5.10 Offer Price Auction Summary

Length	1B	27 bytes
Type	96	Auction Summary
Time offset	18 D2 06 00	447,000 ns since last Time Message
Symbol	30 30 6D 45 56 5F 20 20	00mEVO
Auction Type	4F	O = Opening
Price	E8 A3 0F 00 00 00 00 00	$102.50
Quantity	4B 00 00 00	75

5.11 Width Update

Length	13	19 bytes
Type	D2	Width Update
Time Offset	18 D2 06 00	447,000 ns since last Time Message
Underlying	5A 56 5A 5A 54 20 20 20	ZVZZT
Width Type	52	R = Regular
Multiplier	0F 00 00 00	Multiplier of 1.5

5.12 Symbol Mapping Message

Length	26	38 bytes
Type	2E	Symbol Mapping Message
Feed Symbol	30 30 6D 45 56 4F	00mEVO
OSI Symbol	4D 53 46 54 20 20 31 39 30 39 32 30 43 30 30 31 35 30 30 30 30	MSFT 190920C00150000
Symbol Condition	4E	'N' – Closing Only
Underlying	4D 53 46 54 20 20 20 20	MSFT

5.13 End of Session

Length	06	6 bytes
Type	2D	End of Session
Time offset	18 D2 06 00	447,000 ns since last Time Message

5.14 SOQ Strike Range Update (C1 Only)

Length	2A	42 bytes
Type	9D	SOQ Strike Range Update

Time offset	18 D2 06 00	447,000 ns since last Time Message
SOQ Identifier	56 58 53 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20	VXS
Lower Strike Price	40 66 03 01 00 00 00 00	$1,700
Upper Strike Price	00 48 E8 01 00 00 00 00	$3,200

5.15 Constituent Symbol Mapping (C1 Only)

Length	3A	58 bytes
Type	9E	Constituent Symbol Mapping Message
Feed Symbol	30 30 6D 45 56 4F	00mEVO
OSI Symbol	53 50 58 57 20 20 31 39 30 39 32 37 43 30 32 33 39 30 30 30 30	SPXW 190927C02390000
Symbol Condition	4E	'N' – Normal
Underlying SOQ Identifier	53 50 58 20 20 20 20 20 56 58 53 20 20 20 20 20 20 20 20 20 20 20 20 20	SPX VXS

6 Multicast Configuration

6.1 US Options Production Environment Configuration

6.1.1 Limitations/Configurations

The following table defines Cboe current configuration for network and gap request limitations. These limitations are session based. Cboe reserves the right to adjust the gap request limitations to improve the effectiveness of the gap request infrastructure.

Period/Type	Limit/Setting	Notes
MTU	1500	Cboe will send UDP messages up to 1500 bytes. Members should ensure that their infrastructure is configured accordingly.
Gig-Shaped Throttle	1 Gb/s	The real-time and gap multicast head ends are configured to shape their output to this level to minimize packet loss.

6.1.2 Production Unit Distribution

The following table describes the Options symbol distribution across units.

Units 1-30

Unit	BZX/C1/C2/EDGX Symbol Range	Exceptions
1	A – ADBD~	
2	ADBE – ASMK~	Excludes AMZN
3	ASML – BBX~~	
4	BBY – BYND~	
5	BYNE – COUO~	
6	COUP – DH~~~	
7	DI – ENPG~	Excludes DJX
8	ENPH – FCXA~	
9	FCXB – GLDA~	
10	GLDB –INCX~	Excludes GOOG, GOOGL
11	INCY – IWMA~	
12	IWMB – LMS~~	
13	LMT – MELI~	
14	MELJ – NED~~	Excludes MRUT, MXEA, MXEF, NANOS
15	NEE – NSCA~	
16	NSCB – OKS~~	Excludes OEX
17	OKT – PTOM~	
18	PTON –ROKU~	Excludes QQQ, RLG, RLV
19	ROKV – SHOP~	Excludes RUI, RUT, RUTW
20	SHOQ – SQAA~	Excludes SIXB, SIXC, SIXE, SIXI, SIXR, SIXRE, SIXT, SIXU, SIXV, SIXY, SPESG, SPX/SPXW, SPY
21	SQAB – TQQP~	
22	TQQQ – ULTA~	Excludes TSLA, UKXM
23	ULTB – WAAA~	Excludes VIX, VIXW
24	WAAB – XLT~~	Excludes XEO
25	XLU – Z~~~~	Excludes XSP
26	GOOG, GOOGL	
27	TSLA	
28	QQQ	
29	AMZN	
30	SPY	

Units 31-35

Unit	BZX/C2 Symbol Range	C1 Symbol Range
31	DJX (C2 Only), RUT (BZX and C2 Only), RUTW (C2 Only)	DJX, MRUT, MXACW*, MXEA, MXEF, MXUSA*, MXWLD*, OEX, RLG, RLV, RUI, RUT, RUTW, SIXB, SIXC, SIXE, SIXI, SIXR, SIXRE, SIXT, SIXU, SIXV, SIXY, SPESG, XEO, UKXM, XSP
32	N/A	NANOS, VIX, VIXW, XSP
33	N/A	SPX
34	N/A	SPXW
35	N/A	SPX/SPXW, Cross Product Spreads

***Effective 03/18/24**

Note – Cboe reserves the right to add units and/or change symbol distribution with 48 hours of notice and no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to support mappings in these tables via software configuration.

6.1.3 C1 Options Production Multicast Routing Parameters

Data Center	Rendezvous Point
Primary Data Center A feed	74.115.128.183
Primary Data Center B feed	74.115.128.184
Secondary Data Center E feed	174.136.181.249

6.1.4 EDGX Options Production Multicast Routing Parameters

Data Center	Rendezvous Point
Primary Data Center A feed	74.115.128.160
Primary Data Center B feed	74.115.128.161
Secondary Data Center E feed	174.136.181.250

6.1.5 C1 Options Production Address/Unit Distribution

The following tables describe the unit distribution across the C1 Options Auction Feed.

Primary Datacenter		Gig Shaped [CAA] 170.137.114.80/28	Gig Shaped [CBA] 170.137.115.80/28
Unit	**IP Port**	**Real-time MC**	**Real-time MC**
1	30401	224.0.74.96	233.182.199.224
2	30402		
3	30403		
4	30404		
5	30405	224.0.74.97	233.182.199.225
6	30406		
7	30407		
8	30408		
9	30409	224.0.74.98	233.182.199.226
10	30410		
11	30411		
12	30412		
13	30413	224.0.74.99	233.182.199.227
14	30414		
15	30415		
16	30416		
17	30417	224.0.74.100	233.182.199.228
18	30418		
19	30419		
20	30420		
21	30421	224.0.74.101	233.182.199.229
22	30422		
23	30423		
24	30424		
25	30425	224.0.74.102	233.182.199.230
26	30426		
27	30427		
28	30428		
29	30429	224.0.74.103	233.182.199.231
30	30430		
31	30431		
32	30432		
33	30433	224.0.74.104	233.182.199.232
34	30434		
35	30435		

Secondary Datacenter		Gig Shaped [CEA] 170.137.124.224/28
Unit	**IP Port**	**Real-time MC**
1	31401	233.19.3.176
2	31402	
3	31403	
4	31404	
5	31405	233.19.3.177
6	31406	
7	31407	
8	31408	
9	31409	233.19.3.178
10	31410	
11	31411	
12	31412	
13	31413	233.19.3.179
14	31414	
15	31415	
16	31416	
17	31417	233.19.3.180
18	31418	
19	31419	
20	31420	
21	31421	233.19.3.181
22	31422	
23	31423	
24	31424	
25	31425	233.19.3.182
26	31426	
27	31427	
28	31428	
29	31429	233.19.3.183
30	31430	
31	31431	
32	31432	
33	31433	233.19.3.184
34	31434	
35	31435	

Note – Cboe reserves the right to add multicast addresses with prior notice, but no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to support mappings in these tables via software configuration. Addresses in the gray area are pre-assigned but not available. Members should not configure their networks or systems for these addresses.

6.1.6 EDGX Options Production Address/Unit Distribution

The following tables describe the unit distribution across the EDGX Options Auction Feed.

Primary Datacenter		Gig Shaped [EAA] 174.136.164.0/28	Gig Shaped [EBA] 174.136.164.16/28
Unit	IP Port	Real-time MC	Real-time MC
1	30601	224.0.131.144	233.130.124.144
2	30602		
3	30603		
4	30604		
5	30605	224.0.131.145	233.130.124.145
6	30606		
7	30607		
8	30608		
9	30609	224.0.131.146	223.130.124.146
10	30610		
11	30611		
12	30612		
13	30613	224.0.131.147	233.130.124.147
14	30614		
15	30615		
16	30616		
17	30617	224.0.131.148	233.130.124.148
18	30618		
19	30619		
20	30620		
21	30621	224.0.131.149	233.130.124.149
22	30622		
23	30623		
24	30624		
25	30625	224.0.131.150	233.130.124.150
26	30626		
27	30627		
28	30628		
29	30629	224.0.131.151	233.130.124.151
30	30630		
31	30631		
32	30632		
33	30633		

Secondary Datacenter		Gig Shaped [EEA] 174.136.176.128/28
Unit	**IP Port**	**Real-time MC**
1	31601	233.19.3.128
2	31602	
3	31603	
4	31604	
5	31605	233.19.3.129
6	31606	
7	31607	
8	31608	
9	31609	233.19.3.130
10	31610	
11	31611	
12	31612	
13	31613	233.19.3.131
14	31614	
15	31615	
16	31616	
17	31617	233.19.3.132
18	31618	
19	31619	
20	31620	
21	31621	233.19.3.133
22	31622	
23	31623	
24	31624	
25	31625	233.19.3.134
26	31626	
27	31627	
28	31628	
29	31629	233.19.3.135
30	31630	
31	31631	
32	31632	
33	31633	

Note – Cboe reserves the right to add multicast addresses with prior notice, but no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to support mappings in these tables via software configuration. Addresses in the gray area are pre-assigned but not available. Members should not configure their networks or systems for these addresses.

6.2 US Options Certification Environment Configuration

6.2.1 Certification Unit Distribution

The following table describes the Cboe Options symbol distribution across units.

Units 1-30

Unit	BZX/C1/C2/EDGX Symbol Range	Exceptions
1	A – ADBD~	
2	ADBE – ASMK~	Excludes AMZN
3	ASML – BBX~~	
4	BBY – BYND~	
5	BYNE – COUO~	
6	COUP – DH~~~	
7	DI – ENPG~	Excludes DJX
8	ENPH – FCXA~	
9	FCXB – GLDA~	
10	GLDB –INCX~	Excludes GOOG, GOOGL
11	INCY – IWMA~	
12	IWMB – LMS~~	
13	LMT – MELI~	
14	MELJ – NED~~	Excludes MRUT, MXEA, MXEF, NANOS
15	NEE – NSCA~	
16	NSCB – OKS~~	Excludes OEX
17	OKT – PTOM~	
18	PTON –ROKU~	Excludes QQQ, RLG, RLV
19	ROKV – SHOP~	Excludes RUI, RUT, RUTW
20	SHOQ – SQAA~	Excludes SIXB, SIXC, SIXE, SIXI, SIXR, SIXRE, SIXT, SIXU, SIXV, SIXY, SPESG, SPX/SPXW, SPY
21	SQAB – TQQP~	
22	TQQQ – ULTA~	Excludes TSLA, UKXM
23	ULTB – WAAA~	Excludes VIX, VIXW
24	WAAB – XLT~~	Excludes XEO
25	XLU – Z~~~~	Excludes XSP
26	GOOG, GOOGL	
27	TSLA	
28	QQQ	
29	AMZN	
30	SPY	

Units 31-35

Unit	BZX/C2 Symbol Range	C1 Symbol Range
31	DJX (C2 Only), RUT (BZX and C2 Only), RUTW (C2 Only)	DJX, MRUT, MXACW*, MXEA, MXEF, MXUSA*, MXWLD*, OEX, RLG, RLV, RUI, RUT, RUTW, SIXB, SIXC, SIXE, SIXI, SIXR, SIXRE, SIXT, SIXU, SIXV, SIXY, SPESG, XEO, UKXM
32	N/A	NANOS, VIX, VIXW, XSP
33	N/A	SPX
34	N/A	SPXW
35	N/A	SPX/SPXW, Cross Product Spreads

***Effective 03/18/24**

Note – Cboe reserves the right to add units and/or change symbol distribution with 48 hours of notice and no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to support mappings in these tables via software configuration.

6.2.2 Options Certification Multicast Routing Parameters

Primary Certification Data Center	Rendezvous Point
C1	74.115.128.131
EDGX	74.115.128.129

6.2.3 C1 Options Certification Address/Unit Distribution

The following tables describe the unit distribution across certification C1 Options Multicast Auction Feed out of the Primary datacenter.

Primary Datacenter		WAN-Shaped 170.137.126.16/28
Unit	**IP Port**	**Real-time MC**
1	32401	233.103.126.22
2	32402	
3	32403	
4	32404	
5	32405	
6	32406	
7	32407	
8	32408	
9	32409	
10	32410	
11	32411	
12	32412	
13	32413	
14	32414	
15	32415	
16	32416	
17	32417	233.103.126.23
18	32418	
19	32419	
20	32420	
21	32421	
22	32422	
23	32423	
24	32424	
25	32425	
26	32426	
27	32427	
28	32428	
29	32429	
30	32430	
31	32431	
32	32432	
33	32433	
34	32434	
35	32435	

Note – Cboe reserves the right to add multicast addresses with prior notice, but no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to support mappings in these tables via software configuration.

6.2.4 EDGX Options Certification Address/Unit Distribution

The following tables describe the unit distribution across certification EDGX Options Multicast Auction Feed out of the Primary datacenter.

Primary Datacenter		WAN-Shaped 174.136.174.176/28
Unit	**IP Port**	**Real-time MC**
1	32601	
2	32602	
3	32603	
4	32604	
5	32605	
6	32606	
7	32607	
8	32608	224.0.74.208
9	32609	
10	32610	
11	32611	
12	32612	
13	32613	
14	32614	
15	32615	
16	32616	
17	32617	
18	32618	
19	32619	
20	32620	
21	32621	
22	32622	
23	32623	
24	32624	
25	32625	224.0.74.210
26	32626	
27	32627	
28	32628	
29	32629	
30	32630	
31	32631	
32	32632	
33	32633	

Note – Cboe reserves the right to add multicast addresses with prior notice, but no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to support mappings in these tables via software configuration.

7 Connectivity

7.1 Supported Extranet Carriers

The Cboe Options Auction Feed will be made available to Members through extranet carriers that have completed their multicast implementation and certified with Cboe on a per-market basis. Cboe has certified a number of carriers for redistribution of Cboe Multicast data feeds as outlined in the Cboe US Equity/Options Connectivity Manual. For more information on receiving the Cboe Options Auction Feed through any of these providers, please refer to the vendor contact information noted in the Extranet Providers section of the Connectivity Manual.

8 References

For more information on Cboe Symbology, please refer to the Cboe Symbology Reference document.

9 Support

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

Revision History

Document Version	Date	Description
1.0.0	05/17/16	Initial version 1.0.0.
1.0.1	05/31/16	Added Ips and Port Numbers to the EDGX Options Certification Address/Unit Distribution table.
1.0.2	06/28/16	Added Ips and Port Numbers to the EDGX Options Production Address/Unit Distribution table. Updated the `Sequenced Unit Header` to 8 bytes. Removal of NBBO Price from `Auction Notification` message.
1.0.3	08/01/16	Added support for BAM Auctions.
1.0.4	01/06/17	Updated description of `Auction Trade` message.
1.0.5	10/17/17	Cboe branding/logo changes.
1.0.6	03/08/18	Updated Unit Distribution ranges.
1.0.7	03/23/18	Updated Unit Distribution ranges effective date updated to 4/14/18.
1.0.8	6/28/2018	Added Multicast Options Auction Feed Descriptions table. Added Feed Connectivity Requirements section. Added feed shaping information to source network headers.
1.1.0	11/16/18	Added support for C1 Options Feed.
1.1.1	12/06/18	Added notes indicating Feature Pack 4 updates.
1.1.2	03/07/19	Added matching engine unit 33 information in support of XSP trading on EDGX Options effective 04/08/19. Added C1 certification primary data center rendezvous point IP address, unit distribution, and C1 Certification symbol ranges.
1.1.3	04/05/19	Correction to EDGX Options Gig Shaped EAA, EBA and EEA Feeds for Unit 33
1.1.4	04/15/19	Added Production IP addresses for C1 Options.
1.1.5	05/01/19	Added notes indicating `Options Auction Update`, `Auction Summary`, and `Width Update` messages will be disseminated for EDGX options, effective with C1 Feature Pack 7.

1.1.6	05/14/19	Corrected description of `Width Update` message to indicate that message is only sent in the event that baseline MCW and OCW values are modified from their original state. Updated `Options Auction Update` message with *Opening Condition* = C (Crossed Composite Market), and addition Composite Market Bid and Offer price fields. Added `SOQ Strike Range Update` message. Update example for `Options Auction Update` and added example for `SOQ Strike Range` messages. Added additional proprietary products to matching unit 31 in C1.
1.1.7	05/20/19	Added `Constituent Symbol Mapping` message with example.
1.1.8	06/12/19	Corrected certification and production C1 symbol range for units 9 and 20.
1.1.9	07/12/19	Updated `Symbol Mapping` mapping description to indicate that full list of symbols should be received in approximately 30 minutes.
1.1.10	7/25/19	Added notes indicating `Options Auction Update` message *Opening Condition* values 'B' and 'S' are only applicable to the Cboe Options Exchange ("C1").
1.1.11	9/18/19	Corrected `Symbol Mapping Message` and `Constituent Symbol Mapping` examples.
1.1.12	1/31/20	Corrected UKXM and QQQ symbol entries in Unit Distribution table. Clarified description of `Time` message. Updated SAM effective date for EDGX to 2/3/20.
1.1.13	8/27/20	Added SPESG to the Unit Symbol Distribution tables for C1 unit 31 (effective 09/21/20).
1.1.14	10/06/20	Added SPESG to the Unit Symbol Distribution table Exclusion entries for C1.
1.1.15	10/20/20	Removed XSP from the Unit Symbol Distribution tables on EDGX (effective 11/2/20).
1.1.16	01/22/21	Updated *Price* field description on `Auction Notification` message to indicate that for SPX and SPXW AIM, this field will reflect the auction price (C1 Only) (effective 02/22/21).
1.1.17	02/01/21	Added MRUT to the Unit/Product Distribution tables for C1 unit 31 (effective 3/01/21). Added new updated Unit/Product Distribution tables with harmonized symbol ranges (effective 3/22/21).
1.1.18	03/25/21	Added Binary Date field type to Section 2.2 - Data Types (effective 10/10/21 ~~TBD 09/27/21~~ ~~Q3 2021~~). Added new `Time Reference` message (effective 10/10/21 ~~TBD 09/27/21~~ ~~Q3 2021~~). Added *EpochTime* field to `Time` message (effective 10/10/21 ~~TBD 09/27/21~~ ~~Q3 2021~~). Updated description of *Auction Type* field on `Options Auction Update` and `Auction Summary` messages (~~effective TBD 09/27/21~~ ~~Q3 2021~~).

1.1.19	05/13/21	Updated Curb session effective date to ~~TBD 09/27/21~~.
1.1.20	08/25/21	Updated Curb session effective date to ~~TBD~~.
1.1.21	09/09/21	Updated description of *Auction Type* field on `Options Auction Update` and `Auction Summary` messages (~~effective TBD~~).
1.1.22	09/30/21	Updated effective date for new `Time Reference` message (C1 Only), *EpochTime* field to `Time` message (C1 Only), and Binary Date field type to Section 2.2 - Data Types to 10/10/21. Added new section 1.1 - '24x5 Feed Hours and System Restart (C1 Only)' (effective 10/10/21).
1.1.23	11/04/21	Corrected example `Time` message values. Removed note indicating *Auction Type* = 'O' will be sent prior to Curb session. This value will only be sent for the RTH Opening.
1.1.24	02/02/22	Added NANOS to the C1 unit 32 Unit/Product Distribution tables (effective 03/14/22).
1.1.25	03/01/22	Removed XSP from the BZX unit 31 Unit/Product Distribution tables.
1.1.26	11/07/22	Moved XSP to the C1 unit 32 Unit/Production Distribution tables (effective 12/04/22).
1.1.27	03/30/23	Clarified RUT is on BZX and C2 Unit 31.
1.1.28	08/21/23	Updated *Price* in AIM `Auction Notification` messages.
1.1.29	01/29/24	Added MXACW, MXUSA, and MXWLD to the C1 unit 31 Unit/Product Distribution tables (**effective 03/18/24**).