



Cboe Titanium U.S. Options Complex Multicast Futures Options Order Type PITCH Specification

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Cboe Titanium U.S. Options Complex Multicast Futures Options Order Type PITCH Specification

Introduction

Note that this specification is the standard specification to be used for complex options with futures legs on the Cboe Options (C1) Exchange platform.

Cboe customers may use Complex Options/Futures Multicast PITCH to receive real-time depth of book quotations and execution information direct from Cboe. This feed only includes quotations and executions related to orders for complex options with futures legs.

Complex Options/Futures Multicast PITCH cannot be used to enter orders. For order entry, refer to the appropriate U.S. Options FIX or BOE Specifications.

A Gig-Shaped version of the Complex Options/Futures Multicast PITCH feed is available from both of Cboe's data centers. Customers may choose to take one or more of the following Complex Options/Futures Multicast PITCH feed options depending on their location and connectivity to Cboe.

This feed is also available to CFE market data subscribers at no additional charge through the distribution of CFE market data. There is a small latency difference between direct receipt of that feed and receipt of that feed through CFE market data distribution. CFE market data subscribers may also choose to obtain this feed directly at no additional charge.

Complex Options/Futures Multicast PITCH Feed Descriptions

Table 1. Complex Options/Futures Multicast PITCH Feed Descriptions

Exchange	Shaping (Gig)	Served From Data Center (Primary/Secondary)	Multicast Feed ID
C1 Options	Gig	Primary	CAI
C1 Options	Gig	Primary	CBI
C1 Options	Gig	Secondary	CEI

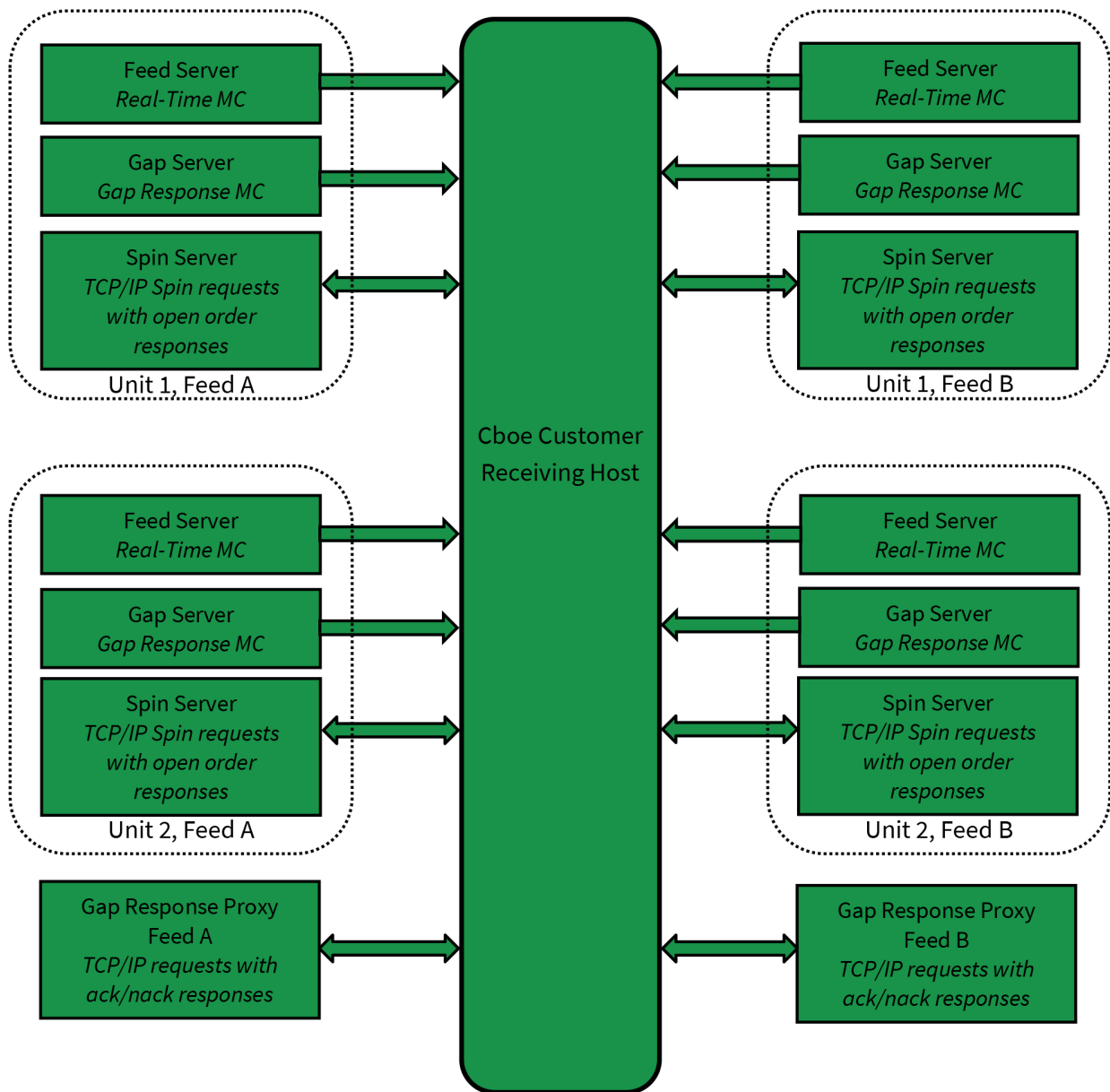
Feed Connectivity Requirements

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

Customers with sufficient connectivity may choose to take more than one Gig-Shaped feed from the Cboe datacenters and arbitrate the feeds to recover lost data. It should be noted that feeds from the secondary datacenter will have additional latency for those co-located with Cboe in the primary datacenter due to proximity.

Cboe Options/Futures Complex Multicast PITCH real-time events are delivered using a published range of multicast addresses divided by symbol range units. Dropped messages can be requested using a TCP/IP connection to one of Cboe's Gap Request Proxy (GRP) servers with replayed messages being delivered on a separate set of multicast ranges reserved for packet retransmission. Intraday, a spin of all open orders may be requested from a Spin Server. This allows a client to become current without requesting a gap for all messages up to that point in the day.

The following diagram is a logical representation Complex Options/Futures Multicast PITCH feed message flow between Cboe and a customer feed handler that is listening to the "A" and "B" instances of two units:



Symbol Ranges, Units, and Sequence Numbers

Symbols will be separated by underlyer into units by a published distribution. Symbol distribution will not change intra-day. Cboe does, however, reserve the right to add multicast addresses or change the symbol distribution with prior notice to customers. Care should be taken to ensure that address changes, address additions, and symbol distribution changes can be supported easily.

Message sequence numbers are incremented by one for every sequenced message within a particular symbol unit. It is important to understand that one or more units will be delivered on a single multicast address. As with symbol ranges, unit distribution across multicast addresses will not change intra-day, but may change after notice has been given.

Symbol distribution across units as well as unit distribution across multicast addresses are identical for real-time and gap response multicast addresses.

Complex Options Specific Symbol Processing

Cboe has implemented a Complex Instrument Creation (CIC) process due to the seemingly infinite number of combinations that can make up a complex instrument. This allows the Complex Options/Futures Multicast PITCH specification to be consistent with the equities, standard and auction options Multicast

PITCH specifications. This CIC process significantly reduces the size of the Complex Options/Futures Multicast PITCH feed and allows customers to use the same feed handler for Cboe equity, options, and futures exchanges.

Real-time CIC messages are available on each unit's multicast feed. **Complex Options Futures Instrument Definition** messages are used to map the 6 character feed Complex Instrument ID (CID) to the complex instrument definition. A complex instrument definition consists of one or more option legs plus a futures leg. The complex instrument is valid only for the current trading date on which it was created. Once a complex instrument is created, it cannot be deleted or modified for the remainder of the trading day.

Complex instruments can be created from pre-market through the end of trading. When a complex instrument is created, a sequenced **Complex Options Futures Instrument Definition** message is disseminated at the time of creation and is sent in a background loop as an unsequenced message for the remainder of the trading day as bandwidth allows.

Gap Request Proxy and Message Retransmission

Requesting delivery of missed data is achieved by connecting to the Cboe Gap Request Proxy (GRP) for the complex options data feed. Customers who do not wish to request missed messages do not need to connect to a GRP for any reason or listen to the multicast addresses reserved for message retransmission. Customers choosing to request missed data will need to connect to their assigned GRP, log in, and request gap ranges as necessary. All gap requests will be responded to with a **Gap Response** message. A **Gap Response Status** code of Accepted signals that the replayed messages will be delivered via the appropriate gap response multicast address. Any other **Gap Response Status** code will indicate the reason that the request cannot be serviced.

Gap requests are limited in message count, frequency, and age by the GRP. Gap requests will only be serviced if they are within a defined sequence range of the current multicast sequence number for the requested unit. Customers will receive a total daily allowance of gap requested messages. In addition, each customer is given renewable one second and one minute gap request limits.

If more than one gap request is received for a particular unit/sequence/count combination within a short timeframe, all requests will receive a successful **Gap Response** message from the GRP, but only a single replayed message will be sent on the gap response multicast address.

If overlapping gap requests are received within a short period of time, the gap server will only send the union of the sequence ranges across grouped gap requests. Customers will receive gap responses for their requested unit/sequence/count, but receivers should be prepared for the gap responses to be delivered via multicast in non-contiguous blocks.

Gap acknowledgments or rejects will be delivered to users for every gap request received by the GRP. Users should be prepared to see replayed multicast data before or after the receipt of the gap response acknowledgment from the GRP.

Spin Servers

A Spin Server is available for each unit. The server allows customers to connect via TCP and receive a spin of all complex instrument definitions and currently open orders with limited trading conditions on that unit. By using the spin, a customer can get the current complex book quickly in the middle of the trading session without worry of gap request limits. The Spin Server for each unit listens on its own address and/or TCP port.

Upon successful login and periodically thereafter, a **Spin Image Available** message is sent which contains a sequence number indicating the most recent message applied to the complex book. Using a **Spin Request** message, a customer may request a spin for the orders up to a sequence number noted within one of the last ten **Spin Image Available** messages distributed. If the **Spin Request** submitted

does not present a sequence number that matches one of the last ten **Spin Image Available** messages distributed, the spin will return orders up to the next closest sequence number reported through a **Spin Image Available** message that is greater than the sequence number requested.

In the case a customer sends a sequence number in a **Spin Request** that is higher than the sequence number reported by the most recent **Spin Image Available** message, the next spin image to be generated will be returned when it is available. If the requested sequence number is still higher at that time, an O (Out of Range) error will be generated.

A spin consists only of **Complex Options Futures Instrument Definition Expanded , Add Order (long and/or short)**, **Trading Status** and **Time** messages. **Trading Status** messages will be sent in spins for all complex instruments that are not S=Suspended, which results in at least two messages for every complex instrument that has not been Suspended since system startup. A **Time** message will be sent as the last message in a spin if the last **Time** message sent on a spin is older than the last received time from the internal market data producers.

Spins will not contain any message for an order which is no longer on the book. While receiving the spin, the customer must buffer multicast messages received. If the **Spin Image Available** message sequence number is the customer's reference point, multicast messages with larger sequence numbers should be buffered. If a non- **Spin Image Available** sequence number is the customer's reference point from which they send in their **Spin Request**, they should buffer from that point on, but note that the spin they will receive will contain sequence numbers beyond that point which may be disregarded. When a **Spin Finished** message is received, the buffered messages must be applied to spun copy of the book to bring it current.

Customers can also use the Spin Server to request a spin of all **Symbol Mapping** and **Complex Options Futures Instrument Definition** messages by sending an **Instrument Definition Request**. The Spin Server can only process one spin at a time. Customers will need to wait for a **Spin Finished** or **Instrument Definition Finished** message before submitting another request.

[Spin Messages](#) shows an example flow of messages between a customer and Cboe's Multicast PITCH feed and Spin Server.

Protocol

Cboe users may use the PITCH 2.X protocol over multicast to receive real-time full depth of complex book quotations and execution information direct from Cboe.

Message Format

The messages that make up the PITCH 2.X protocol are delivered using **Sequenced Unit Header** which handles sequencing and delivery integrity. All messages delivered via multicast as well as to/from the Gap Request Proxy (GRP) will use the **Sequenced Unit Header** for handling message integrity.

All UDP delivered events will be self-contained. Developers can assume that UDP delivered data will not cross frame boundaries and a single Ethernet frame will contain only one **Sequenced Unit Header** with associated data.

TCP/IP delivered events from the GRP may cross frames as the data will be delivered as a stream of data with the TCP/IP stack controlling Ethernet framing.

The PITCH data feed is comprised of a series of dynamic length 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. Customers should develop their decoders to deal with unknown message types and messages that grow beyond the expected length. Messages will only be grown to add additional data to the end of a message.

Data Types

The following field types are used within the **Sequenced Unit Header**, GRP messages, 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).
- Signed Binary fields are signed and sized to Length bytes and ordered using Little Endian convention (least significant byte first).
- Binary Signed Short Price fields are signed Little Endian encoded 2 byte binary fields with 2 implied decimal places (denominator = 100). The short price range is -327.68 to +327.67. Prices outside of this range will use the long price.
- Binary Unsigned Price fields are signed Little Endian encoded 4 byte binary fields with 4 implied decimal places (denominator = 10,000).
- Binary Signed Long Price fields are signed Little Endian encoded 8 byte binary fields with 4 implied decimal places (denominator = 10,000).
- 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).
- Time Offset fields are 4 byte unsigned Little Endian values that represent the number of nanoseconds since the last **Time** message. **Effective 09/08/25**, these fields will be populated to nanosecond precision. For example, a nano time of 1,737,580,407,123,456,789 ("Wednesday, January 22, 2025 9:13:27.123456789") would return value = 123456789.

Message Framing

Depth of book update messages will be combined into single UDP frame where possible to decrease message overhead and total bandwidth. The count of messages in a UDP frame will be communicated using the **Sequenced Unit Header**. Framing will be determined by the server for each unit and site. The content of the multicast across feeds (e.g. A/B & Gig-Shaped) will be identical, but framing will not be consistent across feeds. Receiving processes that receive and arbitrate multiple feeds cannot use frame level arbitration to fill gaps.

Sequenced Unit Header

The **Sequenced Unit Header** is used for all Cboe Complex Options/Futures Multicast PITCH messages as well as messages to and from the Gap Request Proxy (GRP) and Spin Servers.

Sequenced and un-sequenced data may be delivered using the **Sequenced Unit Header**. Un-sequenced headers will have a 0 value for the sequence field and potentially for the unit field. All messages sent to and from the GRP and Spin Server are un-sequenced while multicast may contain sequenced and un-sequenced messages.

Sequenced messages have implied sequences with the first message having the sequence number contained in the header. Each subsequent message will have an implied sequence one greater than the previous message up to a maximum of count messages. Multiple messages can follow a **Sequenced Unit Header**, but a combination of sequenced and un-sequenced messages cannot be sent with one header.

The sequence number for the first message in the next frame can be calculated by adding the **Hdr Count** field to the **Hdr Sequence**. This technique will work for sequenced messages and heartbeats.

Table 1. 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	Sequence of first message to follow this header.
Total Length = 8 bytes				

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 from the GRP and all multicast addresses if no data has been delivered within 1 second. **Heartbeat** messages never increment the sequence number for a unit, but can be used to detect gaps on the real-time multicast channels during low update rate periods.

Heartbeat messages on the real-time multicast addresses during trading hours will have a **Hdr Sequence** value equal to the sequence of the next sequenced message to be sent for the unit. Heartbeats on gap multicast addresses will always have the **Hdr Sequence** field set to 0. All **Heartbeat** messages sent to and from the GRP are considered un-sequenced and should have sequence and unit fields set to 0.

Outside of trading hours Cboe sends **Heartbeat** messages on all real-time and gap channels with a sequence of 0 to help users validate multicast connectivity. **Heartbeat** messages may not be sent from 12:00 a.m. - 1:00 a.m. ET or during maintenance windows.

Cboe expects **Heartbeat** messages to be sent to the GRP and Spin Servers on live connections no less than every 5 seconds. Failure to receive 2 consecutive **Heartbeat** messages will result in the GRP or Spin Servers terminating the client connection.

PITCH 2.X Messages

With the exception of **Time Reference** and **Time** messages, each PITCH message reflects the order addition, order deletion, order modification or execution of an order in the system.

Time Message Fields

A **Time** message is immediately generated and sent when there is a PITCH event for a given clock second. If there is no PITCH event for a given clock second, then no **Time** message is sent for that second. The **Time** field is the number of seconds relative to midnight Eastern Time. 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. The **Time** message will also include the **Epoch Time** field, which is the current time represented as the number of whole seconds since the Epoch (midnight January 1, 1970).

A given trading day may span multiple calendar days. Market data recipients must prepare for a crossing of the midnight ET boundary. At such time, a new **Time Reference** message will be sent and the **Time** field in subsequent **Time** messages will reset to reflect the number of seconds from the most recent midnight ET time.

Table 1. 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	Number of whole seconds since the Epoch (midnight January 1, 1970 UTC).
Total Length = 6 bytes, 10 bytes				

Unit Clear Message Fields

The **Unit Clear** message instructs feed recipients to clear all orders for the Cboe complex book in the unit specified in the **Sequenced Unit Header**.

Table 1. 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	Time Offset	Nanosecond offset from last unit timestamp
Total Length = 6 bytes				

Transaction Begin Message Fields

The **Transaction Begin** message indicates any subsequent messages, up to the accompanying **Transaction End** message, are all part of the same transaction block. All PITCH messages corresponding to such an event would be included between a **Transaction Begin** and **Transaction End**. It is important to note that any PITCH Message Type may be included in a transaction block and there is no guarantee that the messages apply to the same price level or even the same Symbol. **Transaction Begin** messages do not alter the book and can be ignored if messages are being used solely to build a book.

Feed processors can use a transaction block as a trigger to postpone publishing a quote update until the end of the transaction block.

Table 1. Transaction Begin

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field.
Message Type	1	1	0xBC	Transaction Begin Message
Time Offset	2	4	Time Offset	Nanosecond offset from last unit timestamp.
Total Length = 6 bytes				

Transaction End Message Fields

The **Transaction End** message indicates that a transaction indicated by a previous **Transaction Begin** message has completed. **Transaction End** messages do not alter the book and can be ignored if messages are being used solely to build a book.

Table 1. Transaction End

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

Complex Options Futures Instrument Definition Message Fields

A **Complex Options Futures Instrument Definition** message represents a complex instrument that is available to place orders. It is sent as a sequenced message the first time a **Complex Options Futures Instrument Definition** message is sent for a symbol. These messages will also be sent continuously through the day as an unsequenced message (sequence = 0) at variable rates as bandwidth allows. The **Time offset** field should be ignored on an unsequenced **Complex Options Futures Instrument Definition** message.

The **Complex Options Futures Instrument Definition** message will contain two or more repeating groups of leg definitions. There is a limit of 16 leg definitions, one of which is a futures leg.

Table 1. Complex Options Futures Instrument Definition

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field.
Message Type	1	1	0xFC	Complex Options Futures Instrument Definition message
Time Offset	2	4	Time Offset	Nanosecond offset from last unit timestamp.
Complex Instrument Id	6	6	Printable ASCII	Complex Instrument Id right padded with spaces.
Complex Instrument Underlying	12	8	Printable ASCII	Complex Instrument Underlying right padded with spaces.
Complex Instrument Type	20	1	Alphanumeric	Complex Option Type F = One leg is a futures leg
Reserved	21	3	Reserved	Reserved

Field Name	Offset	Length	Type/(Value)	Description
Leg Count	24	1	Binary	The number of legs in the complex instrument. The maximum number of legs is 16.
Futures Price Leg Count	25	1	Binary	The number of futures leg prices. This must match the number of futures legs.
The following fields repeat Leg Count times for multi-leg strategies. Leg Index is zero-based.				
Leg Symbol	26 + Leg Index * 11	6	Printable ASCII	Option or Futures Symbol of leg, right padded with spaces.
Leg Ratio	32 + Leg Index * 11	4	Signed Binary	Leg ratio (positive for buy-side, negative for sell-side). This is the number of contracts.
Leg Security Type	36 + Leg Index * 11	1	Alphanumeric	O=Leg is an Option instrument F=Leg is an Futures instrument
The following fields repeat Futures Leg Price Count times. Futures Price Leg Index is zero-based.				
Leg Index	26 + (Leg Count * 11) + (Futures Price Leg Index * 9)	1	Binary	The Leg Index the future price corresponds to. Leg Index is zero-based.
Futures Leg Price	27 + (Leg Count * 11) + (Futures Price Leg Index * 9)	8	Binary Unsigned Price	Futures leg price
Total Length = 26 + (Leg Count * 11) + (Futures Price Leg Count * 9) bytes				

Symbol Mapping Message Fields

A **Symbol Mapping** message is used to map the 6 character multicast feed symbol field to an OSI symbol and Underlying. These messages are not sequenced (sequence = 0) and are sent continuously through the day at variable rates as bandwidth allows.

Table 1. 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 equity right padded with spaces. All spaces if not available or not applicable.
Total Length = 38 bytes				

Add Order Message Fields

An **Add Order** message represents a newly accepted visible order on the Cboe complex book. It includes a day-specific Order Id assigned by Cboe to the complex order.

Table 1. Add Order (long)

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x21	Add Order Message (long)

Field Name	Offset	Length	Type/(Value)	Description
Time Offset	2	4	Time Offset	Nanosecond offset from last unit timestamp
Order Id	6	8	Binary	Day-specific identifier assigned to this order
Side Indicator	14	1	Alphanumeric	B = Buy Order S = Sell Order
Quantity	15	4	Binary	Instrument quantity added to the complex book (may be less than the number entered).
Complex Instrument Id	19	6	Printable ASCII	Complex Instrument Id right padded with spaces.
Price	25	8	Binary Signed Long Price	The limit order price. This is the price of the option legs only and does not include the futures leg price.
Reserved	33	1	Reserved	Reserved
Total Length = 34 bytes				

Table 2. Add Order (short)

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x22	Add Order Message (short)
Time Offset	2	4	Time Offset	Nanosecond offset from last unit timestamp
Order Id	6	8	Binary	Day-specific identifier assigned to this order
Side Indicator	14	1	Alphanumeric	B = Buy Order S = Sell Order
Quantity	15	2	Binary	Instrument quantity being added to the complex book (may be less than the number entered).
Complex Instrument Id	17	6	Printable ASCII	Complex Instrument Id right padded with spaces.
Price	23	2	Binary Signed Short Price	The limit order price. This is the price of the option legs only and does not include the futures leg price.
Reserved	25	1	Reserved	Reserved
Total Length = 26 bytes				

Table 3. Add Order (expanded)

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x2F	Add Order Message (expanded)
Time Offset	2	4	Time Offset	Nanosecond offset from last unit timestamp
Order Id	6	8	Binary	Day-specific identifier assigned to this order
Side Indicator	14	1	Alphanumeric	B = Buy Order S = Sell Order
Quantity	15	4	Binary	Instrument quantity being added to the complex book (may be less than the number entered).
Complex Instrument Id	19	8	Printable ASCII	Complex Instrument Id right padded with spaces.
Price	27	8	Binary Signed Long Price	The limit order price. This is the price of the option legs only and does not include the futures leg price.

Field Name	Offset	Length	Type/(Value)	Description
Reserved	35	1	Reserved	Reserved
Participant ID	36	4	Alphanumeric	Optionally specified. If specified the Executing Broker of firm attributed to this quote. Space filled otherwise.
Customer Indicator	40	1	Alphanumeric	N = Non-Customer C = Customer
Client ID	41	4	Alphanumeric	Optional user specified value attributed to this quote. Space filled otherwise.
Reserved	45	5	Reserved	Reserved
Total Length = 50 bytes				

Order Modification Messages Message Fields

Order Modification messages refer to an Order ID previously sent with an **Add Order** message. Multiple Order Modification messages may modify a single complex order and the effects are cumulative. Modify messages may update the size and/or the price of a complex order on the book. When the remaining size of a complex order reaches zero, the complex order is dead and should be removed from the book.

Order Executed

Order Executed messages are sent when a visible complex order on the Cboe complex book is executed in whole or in part. The execution price equals the limit order price found in the original **Add Order** message or the limit order price in the latest **Modify Order** message referencing the **Order Id**.

Note even if there are single leg to complex order executions, this feed will only contain the order execution for the complex order. Any single leg execution information is available on the standard PITCH feed.

Table 1. Order Executed

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x23	Order Executed Message
Time Offset	2	4	Time Offset	Nanosecond offset from last unit timestamp
Order Id	6	8	Binary	Order Id of a previously sent Add Order message that was executed
Executed Quantity	14	4	Binary	Instrument quantity executed
Execution Id	18	8	Binary	Cboe generated day-unique execution identifier of this execution.
Trade Condition	26	1	Alphanumeric	N = Future Options auto electronic trade - Electronic execution of a multi leg future/options order traded on the complex book M = Future Options auction trade - Electronic execution of a multi leg future/options order traded in a two sided auction P = Future Options cross - Electronic execution of a multi leg future/options order traded in a two sided crossing mechanism that does not go through an exposure period
Total Length = 27 bytes				

Order Executed at Price/Size

Order Execution at Price/Size messages are sent when a complex order on the Cboe complex book is executed in whole or in part at a different price than the limit price on the original **Add Order** message or the limit order price in the latest **Modify Order** message referencing the **Order Id**. If the **Remaining Quantity** field contains a 0 the complex order should be completely removed from the complex book.

Order Execution at Price/Size messages may also be sent in the event the existing size for Order Id is not equal to **Executed Quantity** + **Remaining Quantity**. In this case the complex order should be prioritized the same as a new complex order.

Table 1. Order Executed at Price/Size

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x24	Order Executed at Price/Size Message
Time Offset	2	4	Time Offset	Nanosecond offset from last unit timestamp
Order Id	6	8	Binary	Order Id of a previously sent Add Order message that was executed
Executed Quantity	14	4	Binary	Instrument quantity executed
Remaining Quantity	18	4	Binary	Number of contracts remaining after the execution
Execution Id	22	8	Binary	Cboe generated day-unique execution identifier of this execution.
Price	30	8	Binary Signed Long Price	The execution price of the order. This is the price of the option legs only and does not include the futures leg price.
Trade Condition	38	1	Alphanumeric	N = Future Options auto electronic trade - Electronic execution of a multi leg future/options order traded on the complex book M = Future Options auction trade - Electronic execution of a multi leg future/options order traded in a two sided auction P = Future Options cross - Electronic execution of a multi leg future/options order traded in a two sided crossing mechanism that does not go through an exposure period See Options Trade Condition Codes for details about new codes.
Total Length = 39 bytes				

Reduce Size

Reduce Size messages are sent when a complex order on the Cboe complex book is partially reduced.

Table 1. Reduce Size (long)

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x25	Reduce Size Message (long)
Time Offset	2	4	Time Offset	Nanosecond offset from last unit timestamp
Order Id	6	8	Binary	Order Id of a previously sent Add Order message that has been reduced

Field Name	Offset	Length	Type/(Value)	Description
Canceled Quantity	14	4	Binary	Instrument quantity canceled
Total Length = 18 bytes				

Table 2. Reduce Size (short)

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x26	Reduce Size Message (short)
Time Offset	2	4	Time Offset	Nanosecond offset from last unit timestamp
Order Id	6	8	Binary	Order Id of a previously sent Add Order message that has been reduced
Canceled Quantity	14	2	Binary	Instrument quantity canceled
Total Length = 16 bytes				

Modify Order

The **Modify Order** message is sent whenever an open complex order is visibly modified. The **Order Id** refers to the **Order Id** of the original **Add Order** message.

Note that **Modify Order** messages that appear to be "no ops" (i.e. they do not appear to modify any relevant fields) will still lose priority.

Table 1. Modify (long)

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x27	Modify Order message (long)
Time Offset	2	4	Time Offset	Nanosecond offset from last unit timestamp
Order Id	6	8	Binary	Order Id of a previously sent Add Order message that has been modified
Quantity	14	4	Binary	Instrument quantity associated with this complex order after this modify (may be less than the number entered)
Price	18	8	Binary Signed Long Price	The limit order price after this modify. This is the price of the option legs only and does not include the futures leg price.
Reserved	26	1	Bit Field	Reserved
Total Length = 27 bytes				

Table 2. Modify (short)

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x28	Modify Order message (short)
Time Offset	2	4	Time Offset	Nanosecond offset from last unit timestamp
Order Id	6	8	Binary	Order Id of a previously sent Add Order message that has been modified

Field Name	Offset	Length	Type/(Value)	Description
Quantity	14	2	Binary	Instrument quantity associated with this complex order after this modify (may be less than the number entered)
Price	16	2	Binary Signed Short Price	The limit order price after this modify. This is the price of the option legs only and does not include the futures leg price.
Reserved	18	1	Bit Field	Reserved
Total Length = 19 bytes				

Delete Order

The **Delete Order** message is sent whenever a booked order is cancelled or leaves the order book. The **Order Id** refers to the **Order Id** of the original **Add Order** message. An order that is deleted from the book may return to the book later under certain circumstances. Therefore, a **Delete Order** message does not indicate that a given **Order Id** will not be sent again on a subsequent **Add Order** message.

Table 1. Delete

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x29	Delete Order Message
Time Offset	2	4	Time Offset	Nanosecond offset from last unit timestamp
Order Id	6	8	Binary	Order Id of a previously sent Add Order message that has been removed from order book.
Total Length = 14 bytes				

Trade Message Fields

The **Trade** message provides information about executions of complex order auctions on the Cboe complex book. A **Trade** message can also be sent when an auction executes against a non-displayed order, such as a contra response. **Trade** messages are necessary to calculate Cboe execution-based data. **Trade** messages do not alter the complex book and can be ignored if messages are being used solely to build a complex book.

No **Add Order** message is sent for complex auction orders, and thus, no order modification messages may be sent when complex auctions are executed. Instead, a **Trade** message is sent whenever a complex auction is executed in whole or in part. A complete view of all Cboe complex executions can be built by combining all **Order Executed** messages and **Trade** messages.

Table 1. Trade (long)

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x2A	Trade Message (long)
Time Offset	2	4	Time Offset	Nanosecond offset from last unit timestamp
Order Id	6	8	Binary	Order Id of the executed order.
Side Indicator	14	1	Alphanumeric	Always B=Buy Order regardless of resting side
Quantity	15	4	Binary	Instrument quantity traded
Complex Instrument Id	19	6	Printable ASCII	Complex Instrument Id right padded with spaces.

Field Name	Offset	Length	Type/(Value)	Description
Price	25	8	Binary Signed Long Price	The execution price of the order. This is the price of the option legs only and does not include the futures leg price.
Execution Id	33	8	Binary	Cboe generated day-unique execution identifier of this trade.
Trade Condition	41	1	Alphanumeric	N = Future Options auto electronic trade - Electronic execution of a multi leg future/options order traded on the complex book M = Future Options auction trade - Electronic execution of a multi leg future/options order traded in a two sided auction P = Future Options cross - Electronic execution of a multi leg future/options order traded in a two sided crossing mechanism that does not go through an exposure period
Total Length = 42 bytes				

Table 2. Trade (short)

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x2B	Trade Message (short)
Time Offset	2	4	Time Offset	Nanosecond offset from last unit timestamp
Order Id	6	8	Binary	Order Id of the executed order.
Side Indicator	14	1	Alphanumeric	Always B=Buy Order regardless of resting side
Quantity	15	2	Binary	Instrument quantity traded
Complex Instrument Id	17	6	Printable ASCII	Complex Instrument Id right padded with spaces.
Price	23	2	Binary Signed Short Price	The execution price of the order. This is the price of the option legs only and does not include the futures leg price.
Execution Id	25	8	Binary	Cboe generated day-unique execution identifier of this trade.
Trade Condition	33	1	Alphanumeric	N = Future Options auto electronic trade - Electronic execution of a multi leg future/options order traded on the complex book M = Future Options auction trade - Electronic execution of a multi leg future/options order traded in a two sided auction P = Future Options cross - Electronic execution of a multi leg future/options order traded in a two sided crossing mechanism that does not go through an exposure period
Total Length = 34 bytes				

Table 3. Trade (Futures Options)

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0xFD	Trade Message (Futures Options)
Time Offset	2	4	Time Offset	Nanosecond offset from last unit timestamp
Order Id	6	8	Binary	Order Id of the executed order.

Field Name	Offset	Length	Type/(Value)	Description
Side Indicator	14	1	Alphanumeric	Always B =Buy Order regardless of resting side
Quantity	15	4	Binary	Instrument quantity traded
Complex Instrument Id	19	6	Printable ASCII	Complex Instrument Id right padded with spaces.
Total Price	25	8	Binary Signed Long Price	The total execution price of the order. This is the total execution price of the order including all the option legs and the futures leg.
Execution Id	33	8	Binary	Cboe generated day-unique execution identifier of this trade.
Trade Condition	41	1	Alphanumeric	N = Future Options auto electronic trade - Electronic execution of a multi leg future/options order traded on the complex book M = Future Options auction trade - Electronic execution of a multi leg future/options order traded in a two sided auction P = Future Options cross - Electronic execution of a multi leg future/options order traded in a two sided crossing mechanism that does not go through an exposure period
Total Length = 42 bytes				

Order Execution, Order Execution At Price/Size, Auction Trade, Trade (long), and Trade (short) messages carry the execution price of the order as calculated without the futures leg price. Any of these messages will be immediately followed by a **Trade (futures options)** message for the same execution id and will carry the execution price of the order as calculated including the futures leg price.

Auction Notification Message Fields

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

Table 1. 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	Time Offset	Nanosecond offset from last unit timestamp.
Complex Instrument Id	6	6	Printable ASCII	Complex Instrument Id right padded with spaces.
Auction ID	12	8	Binary	Day specific identifier assigned to this auction.
Auction Type	20	1	Alphanumeric	C=Complex Auction (COA) B=Complex AIM
Side	21	1	Alphanumeric	B=Buy S=Sell
Price	22	8	Binary Signed Long Price	Auction price. This is the auction price of the option legs only and does not include the futures leg price.
Quantity	30	4	Binary	Instrument quantity.

Field Name	Offset	Length	Type/(Value)	Description
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. Space filled otherwise.
Total Length = 47 bytes				

Auction Cancel Message Fields

Auction Cancel messages are used to disseminate the cancellation of an earlier **Auction Notification** message as a result of a user cancellation of the original complex auction, a user modification request to change the complex auction price or increase the original complex auction quantity, a fading of the NBBO or to cancel any remaining complex auction quantity from the original **Auction Notification** following the complex auction termination.

A user request to modify the complex auction price or to increase the original complex auction quantity will result in a cancellation of the complex auction followed by a new **Auction Notification** message.

Auction Cancel messages will not be issued for complex auction quantity decrements.

Table 1. 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	Time Offset	Nanosecond offset from last unit timestamp
Auction ID	6	8	Binary	Day specific identifier assigned to this auction
Total Length = 14 bytes				

Auction Trade Message Fields

Auction Trade messages are used to disseminate executions resulting from a complex auction.

Table 1. 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	Time Offset	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 Signed Long Price	Trade price. This is the trade price of the option legs only and does not include the futures leg price.
Quantity	30	4	Binary	Instrument quantity traded

Field Name	Offset	Length	Type/(Value)	Description
Total Length = 34 bytes				

Trading Status Message Fields

The **Trading Status** message is used to indicate the current trading status of a complex instrument. A **Trading Status** message will be sent whenever a complex instrument trading status changes.

A **Trading Status** message will be sent for all complex instruments as they transition through various trading states.

Starting at 7:30 a.m. ET, Cboe will send a **Trading Status** of Q once orders can be accepted for queuing in preparation for the RTH open. At or after 9:30 a.m. ET, Cboe will send a **Trading Status** of T as series are open for trading. Cboe will send a **Trading Status** of L as SPX or VIX series transition from RTH trading to Curb trading.

A **Trading Status** message will also be sent:

- for a Regulatory Halt Q=Quotingperiod in any series where the underlying has experienced a Regulatory Halt as well as the T=Trading resumption for the same series.
- for instruments that are in a Q=Quoting period for auctions.

The **Trading Status** field will be used to represent the status of the RTH (9:30 a.m. ET - 4:15 p.m. ET) and Curb sessions. The **GTH Trading Status** field will be used to represent the status of series that trade during the GTH session. The GTH session runs from 8:15 p.m. to 9:25 a.m. ET for SPX and VIX series.

Table 1. Trading Status

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x31	Trading Status message
Time Offset	2	4	Time Offset	Nanosecond offset from last unit timestamp
Complex Symbol ID	6	6	Printable ASCII	Complex Symbol right padded with spaces.
Reserved	12	2	Reserved	Reserved
Trading Status	14	1	Alpha	H=Halted L=Curb Trading Q=Quote-Only T=RTH Trading
Reserved	15	1	Reserved	Reserved
GTH Trading Status	16	1	Alpha	H=Halted Q=Quote-Only T=Trading
Reserved2	17	1	Alpha	Reserved
Total Length = 18 bytes				

Options Auction Update Message Fields

Options Auction Update messages are used to disseminate price and size information during the Opening and Re-Opening (halt) process for complex instruments. The **Options Auction Update** messages are sent every 5 seconds during an opening period. Refer to the [Cboe Options Complex Book Process](#) specification for more information.

Table 1. 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	Time Offset	Nanosecond offset from last unit timestamp.
Complex Instrument ID	6	8	Printable ASCII	Complex Instrument right padded with spaces.
Auction Type	14	1	Alphanumeric	G=GTH Opening O=RTH Opening H=Halt Re-Opening
Reference Price	15	8	Binary Long Price	Not used for complex series. Will contain zero value.
Buy Contracts	23	4	Binary	Cumulative Buy interest at the Indicative Price.
Sell Contracts	27	4	Binary	Cumulative Sell interest at the Indicative Price.
Indicative Price	31	8	Binary Signed Long Price	SNBBO Collared Volume Maximizing Imbalance Minimizing Price computed on combined Auction-Only and Continuous Book (if any). This is the price of the option legs only and does not include the futures leg price.
Auction Only Price	39	8	Binary Signed Long Price	Not used for complex series. Will contain zero value.
Opening Condition	47	1	Alphanumeric	Not used for Complex series. Will contain zero value.
Composite Market Bid Price	48	8	Binary Signed Long Price	Not used for Complex series. Will contain zero value.
Composite Market Offer Price	56	8	Binary Signed Long Price	Not used for complex series. Will contain zero value.
Total Length = 64 bytes				

Auction Summary Message Fields

Auction Summary messages are used to disseminate the results of an auction of a complex instrument. An Opening or Re-Opening **Auction Summary** message for each complex instrument is sent at the conclusion of its Opening or Re-Opening auction and represents Cboe opening price. Refer to the [Cboe Options Complex Book Process](#) specification for more information.

The **Auction Summary** message has the following format:

Table 1. 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	Time Offset	Nanosecond offset from last unit timestamp.
Complex Instrument Id	6	8	Printable ASCII	Complex Instrument Id right padded with spaces.
Auction Type	14	1	Alphanumeric	G=GTH Opening O=RTH Opening H=Halt Re-Opening
Price	15	8	Binary Signed Long Price	Auction price. This is the price of the option legs only and does not include the futures leg price.

Field Name	Offset	Length	Type/(Value)	Description
Quantity	23	4	Binary	Cumulative instrument quantity executed during the auction
Total Length = 27 bytes				

End of Session Message Fields

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

Table 1. 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				

Gap Request Proxy Messages

The following messages are used for initializing a TCP/IP connection to the Gap Request Proxy (GRP) and to request message retransmissions. Customers only need to implement the following messages if gap requests will be made. The following messages will not be delivered using multicast.

Login Message Fields

The **Login** message is the first message sent to the GRP by a user's process after the connection to the GRP is established. Failure to login before sending any other message type will result in the connection being dropped by the GRP.

Table 1. Login

Field	Offset	Length	Value/Type	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x01	Login message
SessionSubId	2	4	Alphanumeric	SessionSubId supplied by Cboe
Username	6	4	Alphanumeric	Username supplied by Cboe
Filler	10	2	Alphanumeric	(space filled)
Password	12	10	Alphanumeric	Password supplied by Cboe
Total Length = 22 bytes				

Login Response Message Fields

The **Login Response** message is sent by the GRP to a user's process in response to a **Login** message. The status field is used to reflect an accepted login or the reason the session was not accepted. If login fails, the connection will be dropped after the **Login Response** message is sent.

Table 1. Login Response

Field	Offset	Length	Value/Type	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x02	Login Response Message
Status	2	1	Alphanumeric	Accepted or reason for reject
Total Length = 3 bytes				
Login Response - Status Codes				
'A'	Login Accepted			
'N'	Not authorized (Invalid Username/Password)			
'B'	Session in use			
'S'	Invalid Session			

Gap Request Message Fields

The **Gap Request** message is used by a user's process to request retransmission of a sequenced message (or messages) by one of Cboe's gap servers.

Table 1. Gap Request

Field	Offset	Length	Value/Type	Description
Length	0	1	Binary	Length of this message including this field

Field	Offset	Length	Value/Type	Description
Message Type	1	1	0x03	Gap Request message
Unit	2	1	Binary	Unit that the gap is requested for
Sequence	3	4	Binary	Sequence of first message (lowest sequence in range)
Count	7	2	Binary	Count of messages requested
Total Length = 9 bytes				

Gap Response Message Fields

The **Gap Response** message is sent by the GRP in response to a **Gap Request** message. The **Unit** and **Sequence** fields will match the values supplied in the **Gap Request** message. A **Gap Response** message, with a Status of Accepted or reason for failure, will be sent for each **Gap Request** message received by the GRP.

Table 1. Gap Response

Field	Offset	Length	Value/Type	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x04	Gap Response message
Unit	2	1	Binary	Unit the gap was requested for
Sequence	3	4	Binary	Sequence of first message in request
Count	7	2	Binary	Count of messages requested
Status	9	1	Alphanumeric	Accepted or reason for reject
Total Length = 10 bytes				
Gap Response - Status Codes				
'A'	Accepted			
'O'	Out of range (ahead of sequence or too far behind)			
'D'	Daily gap request allocation exhausted			
'M'	Minute gap request allocation exhausted			
'S'	Second gap request allocation exhausted			
'C'	Count request limit for one gap request exceeded			
'I'	Invalid Unit specified in request			
'U'	Unit is currently unavailable			

* All non-'A' status codes should be interpreted as a reject.

Spin Messages

Login Message Fields

The **Login** message is the first message sent to the Spin Server by a user's process after the connection to the Spin Server is established. Failure to login before sending any other message type will result in the connection being dropped by the Spin Server.

The format of the **Login** message for the Spin Server is identical to that of the GRP described in [Login Message Fields](#).

Login Response Message Fields

The **Login Response** message is sent by the Spin Server to a user's process in response to a **Login** message. The status field is used to reflect an accepted login or the reason the session was not accepted. If login fails, the connection will be dropped after the **Login Response** message is sent.

The format of the **Login Response** message for the Spin Server is identical to that of the GRP described in [Login Response Message Fields](#).

Spin Image Available Message Fields

The **Spin Image Available** message is sent once per second and indicates through what sequence number a spin is available.

Table 1. Spin Image Available

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x80	Spin Image Available message
Sequence	2	4	Binary	Spin is available which is current through this sequence number
Total Length = 6 bytes				

Spin Request Message Fields

The **Spin Request** message is used by a user's process to request transmission of a spin of the unit's order book. Refer to [Spin Servers](#) for more complete details regarding **Sequence** specification as well as buffering requirements.

Table 1. Spin Request

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x81	Spin Request message
Sequence	2	4	Binary	Sequence number from a Spin Image Available message received by the customer
Total Length = 6 bytes				

Spin Response Message Fields

The **Spin Response** message is sent in response to a user's **Spin Request** message indicating whether a spin will be sent.

Table 1. Spin Response

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x82	Spin Response message
Sequence	2	4	Binary	Sequence number from a Spin Image Available message received by the customer
Order Count	6	4	Binary	Number of Add Order messages which will be contained in this spin
Status	10	1	Alphanumeric	Accepted or reason for reject
Total Length = 11 bytes				
Spin Response - Status Codes				
'A'	Accepted			
'O'	Out of Range (Sequence requested is greater than Sequence available by the next spin)			
'S'	Spin already in progress (only one spin can be running at a time)			

* All non-'A' status codes should be interpreted as a reject.

Spin Finished Message Fields

The **Spin Finished** message is sent to indicate that all messages for the spin requested have been sent. A **Spin Finished** message is only sent if a **Spin Request** was not rejected. Upon receipt of a **Spin Finished** message, any buffered multicast messages should be applied to the customer's copy of the book to make it current.

Table 1. Spin Finished

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x83	Spin Finished message
Sequence	2	4	Binary	Sequence number from the Spin Request message
Total Length = 6 bytes				

Instrument Definition Request Message Fields

The **Instrument Definition Request** message is used by a user's process to request transmission of this unit's Symbol Mappings and Complex Instrument Definitions. All **Symbol Mapping** messages will be sent before **Complex Options Futures Instrument Definition** messages. Refer to Section 1.6 for more complete details regarding **Sequence** specification as well as buffering requirements.

Table 1. Instrument Definition Request

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x84	Instrument Definition Request message
Sequence	2	4	Binary	Must be 0. Only the current Symbol Mappings and Complex Instrument Definitions are available.
Total Length = 6 bytes				

Instrument Definition Response Message Fields

The **Instrument Definition Response** message is sent in response to a user's **Instrument Definition Request** message indicating whether a spin will be sent.

Table 1. Instrument Definition Response

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x85	Instrument Definition Response message
Sequence	2	4	Binary	Will always be 0.
Instrument Count	6	4	Binary	Number of Symbol Mapping and Complex Instrument Definition (if applicable) messages which will be contained in this spin
Status	10	1	Alphanumeric	Accepted or reason for reject
Total Length = 11 bytes				
Instrument Definition Response - Status Codes				
'A'	Accepted			
'O'	Out of Range (Sequence must be 0)			
'S'	Spin already in progress (only one spin can be running at a time)			

* All non-'A' status codes should be interpreted as a reject.

Instrument Definition Finished Message Fields

The **Instrument Definition Finished** message is sent to indicate that all **Symbol Mapping** and **Complex Options Futures Instrument Definition** messages for this unit have been sent. An **Instrument Definition Finished** message is only sent if an **Instrument Definition Request** was not rejected.

Table 1. Instrument Definition Finished

Field Name	Offset	Length	Type/(Value)	Description
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x86	Instrument Definition Finished Message
Total Length = 2 bytes				

Spin Server Usage Example

The following diagram shows the exchange of messages over time between a customer and Cboe's Multicast PITCH feed and spin server. Note that while the example may seem to imply only **Complex Options Futures Instrument Definition, Time** and **Add Order** messages would be sent on a spin, this is not the case. **Trading Status and Auction Update** messages may also be sent.

At time 1, the customer has no state of the book and desires to become current. The customer caches the received Multicast PITCH messages (sequences 310172 and 310173) for later use. Since the customer has no book, they cannot yet be applied.

At time 5, the customer has successfully logged into the Spin Server and has cached another message, sequence 310174.

At time 7, the customer receives a **Spin Image Available** message which indicates that the spin server is capable of giving them a spin of all open orders as of sequence 310169. The customer does not have all messages cached after 310169 (they are missing 310170 and 310171), so this spin is not useful to the customer.

At time 10, the customer receives a **Spin Image Available** message which is useful since it would be a spin of all orders up to and including sequence 310175 and the customer has all messages after 310175 cached.

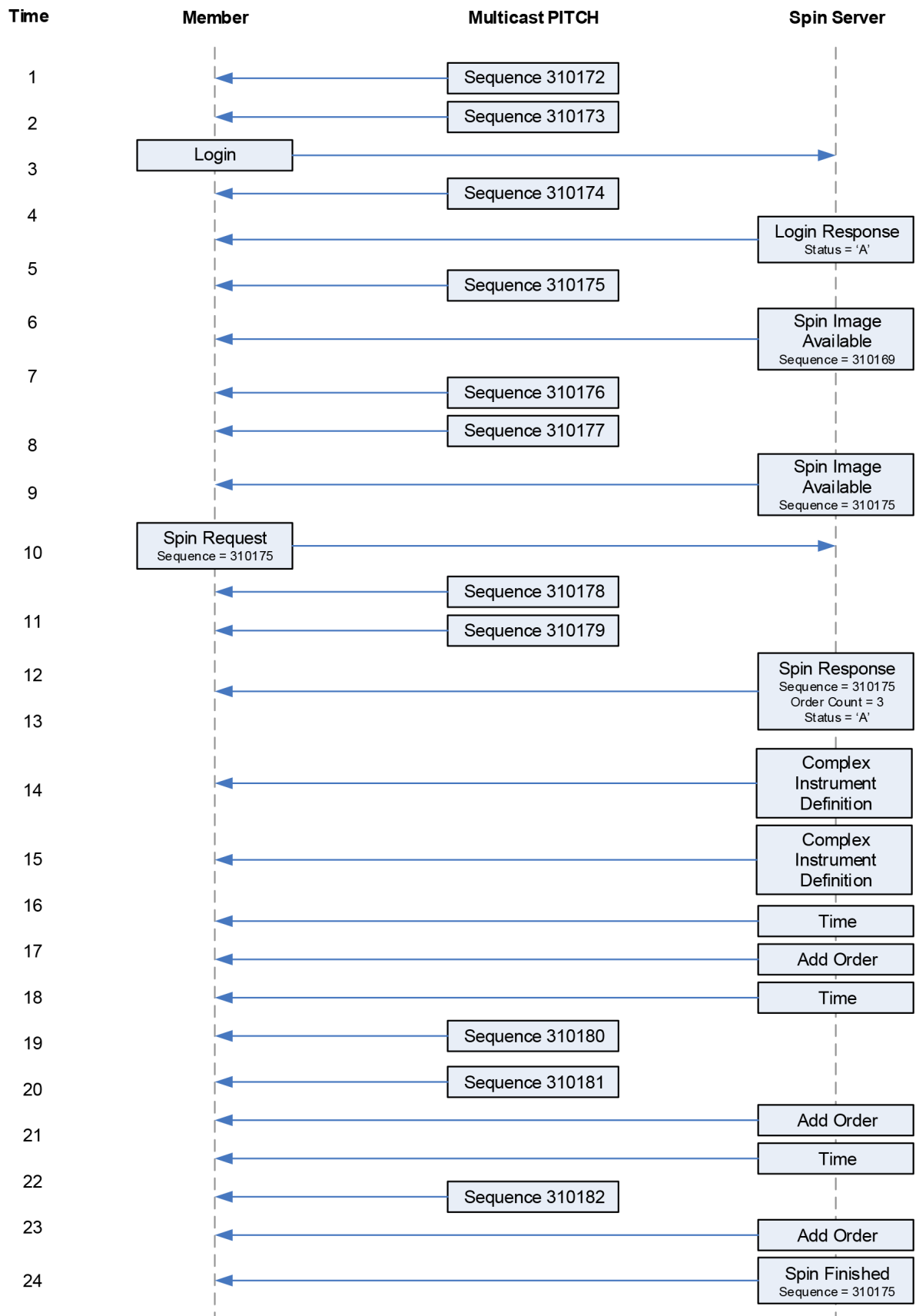
At time 11, the customer sends a **Spin Request** for all messages up to and including 310175 and continues to cache Multicast PITCH messages received.

At time 14, the spin server acknowledges the spin request and indicates that five messages will be sent (complex instrument definition and open orders).

At time 24, the spin server indicates that it has finished sending all messages. The customer must then apply the cached messages from sequence number 310176 through current.

Notes:

- Spin Servers are available for each unit. Customers may need to employ multiple Spin Servers depending upon their architecture.
- As a rule of thumb, in its Options markets, Cboe typically has ~300,000 complex instruments defined and ~3.2 million open orders across all units, or an average of about 9,375 complex instruments and 100,000 open orders per unit. The actual number per unit varies depending upon activity in individual symbols. Expect this number to increase and plan accordingly.



Message Types

Gap Request Proxy Messages

0x01	Login
0x02	Login Response
0x03	Gap Request
0x04	Gap Response

Spin Server Messages

0x01	Login
0x02	Login Response
0x80	Spin Image Available
0x81	Spin Request
0x82	Spin Response
0x83	Spin Finished
0x84	Instrument Definition Request
0x85	Instrument Definition Response
0x86	Instrument Definition Finished

PITCH 2.X Messages

0xB1	Time Reference
0x20	Time
0x97	Unit Clear
0xBC	Transaction Begin
0xBD	Transaction End
0xFC	Complex Options Futures Instrument Definition
0x2F	Symbol Mapping
0x21	Add Order - Long
0x22	Add Order - Short
0x2F	Add Order - Expanded
0x23	Order Executed
0x24	Order Executed at Price/Size
0x25	Reduce Size - Long
0x26	Reduce Size - Short
0x27	Modify Order - Long
0x28	Modify Order - Short
0x29	Delete Order
0x2A	Trade - Long
0x2B	Trade - Short
0xFD	Trade (Futures Options)
0xAD	Auction Notification
0xAE	Auction Cancel
0xAF	Auction Trade
0x31	Trading Status
0xD1	Options Auction Update
0x96	Auction Summary
0x2D	End of Session

Example Messages

Each of the following message types must be wrapped by a sequenced or unsequenced unit header as described in [Sequenced Unit Header](#). Note that in the following examples, each byte is represented by two hexadecimal digits.

Login Message Example

Table 1. Login Message Example

Length	16	22 bytes
Type	01	Login
SessionSubId	30 30 30 31	"0001"
Username	46 49 52 4D	"FIRM"
Filler	20 20	" "
Password	41 42 43 44 30 30 20 20 20 20	"ABCD00"

Login Response Message Example

Table 1. Login Response Message Example

Length	03	3 bytes
Type	02	Login Response
Status	41	Login accepted

Gap Request Message Example

Table 1. Gap Request Message Example

Length	09	9 bytes
Type	03	Gap Request
Unit	01	Unit 1
Sequence	3B 10 00 00	First message: 4155
Count	32 00	50 messages

Gap Response Message Example

Table 1. Gap Response Message Example

Length	10	10 bytes
Type	04	Gap Response
Unit	01	Unit 1
Sequence	3B 10 00 00	First message: 4155
Count	32 00	50 messages
Status	41	Accepted

Spin Image Available Message Example

Table 1. Spin Image Available Message Example

Length	06	6 bytes
--------	----	---------

Type	80	Spin Image Available
Sequence	3B 10 00 00	Sequence: 4155

Spin Request Message Example

Table 1. Spin Request Message Example

Length	06	6 bytes
Type	81	Spin Request
Sequence	3B 10 00 00	Sequence: 4155

Spin Response Message Example

Table 1. Spin Response Message Example

Length	0B	11 bytes
Type	82	Spin Request
Sequence	3B 10 00 00	Sequence: 4155
Order Count	42 00 00 00	66 orders
Status	41	Accepted

Spin Finished Message Example

Table 1. Spin Finished Message Example

Length	06	6 bytes
Type	83	Spin Finished
Sequence	3B 10 00 00	Sequence: 4155

Instrument Definition Request Message Example

Table 1. Instrument Definition Request Message Example

Length	06	6 bytes
Type	84	Instrument Definition Request
Sequence	00 00 00 00	Sequence: 0

Instrument Definition Response Message Example

Length	0B	11 bytes
Type	85	Instrument Definition Response
Sequence	00 00 00 00	Sequence: 0
Instrument Count	B8 0B 00 00	3000 Instruments
Status	41	Accepted

Instrument Definition Finished Message Example

Table 1. Instrument Definition Finished Message Example

Length	02	2 bytes
Type	86	Instrument Definition Finished

Time Reference Message Example (C1 Only)

Table 1. Time Reference Message Example (C1 Only)

Length	12	18 bytes
Type	B1	Time Reference
Midnight	D0 8B 34 60	2021-02-23 00:00:00
Reference		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	2021-02-23 February 23, 2021

Time Message Example

Table 1. Time Message Example

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

Unit Clear Message Example

Table 1. Unit Clear Message Example

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

Add Order - Long Message Example

Table 1. Add Order - Long Message Example

Length	22	34 bytes
Type	21	Add Order - Long
Time Offset	18 D2 06 00	447,000 ns since last Time Message
Order Id	05 40 5B 77 8F 56 1D 0B	631WC4000005
Side Indicator	42	Buy
Quantity	32 00 00 00	50
CID	43 30 30 30 31 32	C00012
Price	28 23 00 00 00 00 00 00	\$0.9000
Reserved	00	Reserved

Add Order - Short Message Example

Table 1. Add Order - Short Message Example

Length	1A	26 bytes
Type	22	Add Order - Short

Time Offset	18 D2 06 00	447,000 ns since last Time Message
Order Id	05 40 5B 77 8F 56 1D 0B	631WC4000005
Side Indicator	42	Buy
Quantity	32 00	50
CID	43 30 30 30 31 32	C00012
Price	0A 28	\$102.50
Reserved	00	Reserved

Add Order - Expanded Message Example

Table 1. Add Order - Expanded Message Example

Length	2D	45 bytes
Type	2F	Add Order - Expanded
Time Offset	18 D2 06 00	447,000 ns since last Time Message
Order Id	05 40 5B 77 8F 56 1D 0B	631WC4000005
Side Indicator	42	Buy
Quantity	32 00	50
CID	43 30 30 30 31 32 20 20	C00012
Price	28 23 00 00 00 00 00 00	\$0.9000
Reserved	00	Reserved
Participant ID	41 42 43 44	ABCD
Customer Indicator	4E	Non-Customer
Client ID	43 4C 49 44	CLID

Order Executed Message Example

Table 1. Order Executed Message Example

Length	1A	26 bytes
Type	23	Order Executed
Time Offset	18 D2 06 00	447,000 ns since last Time Message
Order Id	05 40 5B 77 8F 56 1D 0B	631WC4000005
Executed Quantity	64 00 00 00	100
Execution Id	34 2B 46 E0 BB 00 00 00	0AAP09VEC

Order Executed at Price/Size Message Example

Table 1. Order Executed at Price/Size Message Example

Length	26	38 bytes
Type	24	Order Executed at Price/Size
Time Offset	18 D2 06 00	447,000 ns since last Time Message
Order Id	05 40 5B 77 8F 56 1D 0B	631WC4000005
Executed Quantity	64 00 00 00	100
Remaining	32 00 00 00	50
Execution Id	34 2B 46 E0 BB 00 00 00	0AAP09VEC

Price	E8 A3 0F 00 00 00 00 00	\$102.50
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Reduce Size - Long Message Example

Table 1. Reduce Size - Long Message Example

Length	12	18 bytes
Type	25	Reduce Size - Long
Time Offset	18 D2 06 00	447,000 ns since last Time Message
Order Id	05 40 5B 77 8F 56 1D 0B	631WC4000005
Canceled Quantity	64 00 00 00	100

Reduce Size - Short Message Example

Table 1. Reduce Size - Short Message Example

Length	10	16 bytes
Type	26	Reduce Size - Short
Time Offset	18 D2 06 00	447,000 ns since last Time Message
Order Id	05 40 5B 77 8F 56 1D 0B	631WC4000005
Canceled Quantity	64 00	100

Modify Order - Long Message Example

Table 1. Modify Order - Long Message Example

Length	1B	27 bytes
Type	27	Modify Order - Long
Time Offset	18 D2 06 00	447,000 ns since last Time Message
Order Id	05 40 5B 77 8F 56 1D 0B	631WC4000005
Quantity	4B 00 00 00	75
Price	E8 A3 0F 00 00 00 00 00	\$102.50
Reserved	00	Reserved

Modify Order - Short Message Example

Table 1. Modify Order - Short Message Example

Length	13	19 bytes
Type	28	Modify Order - Short
Time Offset	18 D2 06 00	447,000 ns since last Time Message
Order Id	05 40 5B 77 8F 56 1D 0B	631WC4000005
Quantity	4B 00	75
Price	0A 28	\$102.50
Reserved	00	Reserved

Delete Order Message Example

Table 1. Delete Order Message Example

Length	0E	14 bytes
Type	29	Delete Order
Time Offset	18 D2 06 00	447,000 ns since last Time Message
Order Id	05 40 5B 77 8F 56 1D 0B	

Trade - Long Message Example

Table 1. Trade - Long Message Example

Length	29	41 bytes
Type	2A	Trade - Long
Time Offset	18 D2 06 00	447,000 ns since last Time Message
Order Id	05 40 5B 77 8F 56 1D 0B	631WC4000005
Side	42	Buy
Quantity	4B 00 00 00	75
CID	43 30 30 30 31 32	C00012
Price	E8 A3 0F 00 00 00 00 00	\$102.50
Execution Id	34 2B 46 E0 BB 00 00 00	0AAP09VEC

Trade - Short Message Example

Table 1. Trade - Short Message Example

Length	21	33 bytes
Type	FD	Trade - Short
Time Offset	18 D2 06 00	447,000 ns since last Time Message
Order Id	05 40 5B 77 8F 56 1D 0B	631WC4000005
Side	42	Buy
Quantity	64 00	100
CID	43 30 30 30 31 32	C00012
Price	0A 28	\$102.50
Execution Id	34 2B 46 E0 BB 00 00 00	0AAP09VEC

Trade - Futures Options Message Example

Table 1. Trade - Futures Options Message Example

Length	29	41 bytes
Type	2A	Trade - Futures Options
Time Offset	18 D2 06 00	447,000 ns since last Time Message
Order Id	05 40 5B 77 8F 56 1D 0B	631WC4000005
Side	42	Buy
Quantity	4B 00 00 00	75
CID	43 30 30 30 31 32	C00012
Price	E8 A3 0F 00 00 00 00 00	\$102.50
Execution Id	34 2B 46 E0 BB 00 00 00	0AAP09VEC

Auction Notification Message Example

Table 1. Auction Notification Message Example

Length	2F	47 bytes
Type	AD	Auction Notification
Time Offset	18 D2 06 00	447,000 ns since last Time Message
CID	43 30 30 30 31 32	C00012
Auction ID	05 40 5B 77 8F 56 1D 0B	631WC4000005
Auction Type	4F	O = COA AON
Side	42	B = Buy Side
Price	00 00 00 00 00 00 00 00	Price not displayed
Quantity	64 00 00 00	100
Customer Indicator	43	C = Customer
Participant ID	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

Auction Cancel Message Example

Table 1. Auction Cancel Message Example

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

Auction Trade Message Example

Table 1. Auction Trade Message Example

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
Price	E8 A3 0F 00 00 00 00 00	\$102.50
Quantity	64 00 00 00	100

End of Session Message Example

Table 1. End of Session Message Example

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

Trading Status Message Example

Table 1. Trading Status Message Example

Length	12	18 bytes
Type	31	Trading Status
Time Offset	18 D2 06 00	447,000 ns since last Time Message
CID	39 39 38 38 37 37	998877
Reserved	20 20	Reserved
Trading Status	54	T = Trading
Reserved	20	Reserved
Global Trading	48	H = Halted
Hours Status	Reserved	20
Reserved	20	Reserved

Sequenced Unit Header with 2 Messages Example

Table 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	01 00 00 00	First message has sequence number 1

Table 2. Message 1: Add Order (Short)

Length	1A	26 bytes
Message format	22	Add Order - Short
Time Offset	18 D2 06 00	447,000 ns since last Time Message
Order Id	05 40 5B 77 8F 56 1D 0B	631WC4000005
Side Indicator	42	Buy
Quantity	E1 02	737
CID	43 30 30 30 31 32	C00012
Price	01 00	0.01
Reserved	00	Reserved

Table 3. Message 2: Reduce Size (Short)

Length	10	16 bytes
Message format	26	Reduce Size - Short
Time Offset	E8 D9 06 00	449,000 ns since last Time Message
Order Id	05 40 5B 77 8F 56 1D 0B	631WC4000005
Canceled Quantity	E1 02	737

Options Auction Update Message Example

Table 1. Options Auction Update Message Example

Length	40	64 bytes
Type	D1	Options Auction Update
Time Offset	18 D2 06 00	447,000 ns since last Time Message

CID	43 30 30 30 31 32 20 20	C00012
Auction Type	4F	RTH Opening
Reference Price	00 00 00 00 00 00 00 00	always zero
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 Price	00 00 00 00 00 00 00 00	always zero
Opening Condition	00	always zero
Composite Market Bid Price	00 00 00 00 00 00 00 00	always zero
Composite Market Offer Price	00 00 00 00 00 00 00 00	always zero

Auction Summary Message Example

Table 1. Auction Summary Message Example

Length	1B	27 bytes
Type	96	Auction Summary
Time Offset	18 D2 06 00	447,000 ns since last Time Message
CID	43 30 30 30 31 32 20 20	C00012
Auction Type	4F	RTH Opening
Price	E8 A3 0F 00 00 00 00 00	\$102.50
Quantity	4B 00 00 00	75

Complex Options Futures Instrument Definition Message Example

Table 1. Complex Options Futures Instrument Definition Message Example

Length	16	22 bytes
Type	01	Login
SessionSubId	30 30 30 31	"0001"
Username	46 49 52 4D	"FIRM"
Filler	20 20	" "
Password	41 42 43 44 30 30 20 20 20 20	"ABCD00"

Symbol Mapping Message Example

Table 1. Symbol Mapping Message Example

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	43	'C' - Closing OnlyCondition
Underlying	4D 53 46 54 20 20 20 20	MSFT

Multicast Configuration

Production Environment Configuration

Production Environment Configuration contains Limitations/Configurations, C1 Unit/Product Distribution, C1 Options Multicast Routing Parameters, and C1 Options Address/Unit Distribution.

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.

Table 1. Limitations/Configurations

Period/Type	Limit/Setting	Notes
MTU	1500	Cboe will send UDP messages up to 1500 bytes. Customers 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.
Gap Response Delay	2 ms	The Gap Server will delay resending sequenced messages via multicast for the specified limit in order to satisfy multiple GRP gap requests with one multicast response.
Count	100	Any single gap request may not be for more than this number of dropped messages.
1 Second	320 Requests	This is the maximum number of retransmission requests allowed per second for each session. This is renewed every clock second.
1 Minute	1500 Requests	This is the maximum number of retransmission requests allowed per minute for each session. This is renewed every clock minute.
Day	100,000 Requests	This is the maximum number of retransmission requests allowed per day for each session.
Within Range	1,000,000 Messages	Users' retransmission requests must be within this many messages of the most recent sequence sent by the real-time feed.

C1 Unit/Product Distribution

Unit	C1 Symbol Range	C1 Exceptions
1	A - AIPA~	
2	AIPB - AO~	
3	AP - AVGO~	
4	AVGP - BOIL~	
5	BOIM - CMPR~	Excludes CBTX, CBTXW
6	CMPS - CSIQ~	
7	CSIR - DJTA~	
8	DJTB - FARO~	Excludes DJX, DJXW
9	FARP - GLC~	

Unit	C1 Symbol Range	C1 Exceptions
10	GLD - HAYW~	
11	HAYX - IYWA~	Excludes IWM
12	IYWB - LMTA~	
13	LMTB - MES~	Excludes MBTX, MBTXW
14	MET - MRM~	Excludes MGTN, MGTNW
15	MRN - MSTR~	Excludes MRUT
16	MSTS - NKEA~	Excludes NANOS
17	NKEB - PDC~	Excludes NVDA, OEX
18	PDD - RDDS~	Excludes QQQ
19	RDDT - SEAA~	Excludes RLG, RLV, RUI, RUT/RUTW
20	SEAB - SMHA~	Excludes SIXB, SIXC, SIXE, SIXI, SIXM, SIXR, SIXRE, SIXT, SIXU, SIXV, SIXY
21	SMHB - TEQ~	Excludes SPEQX, SPESG, SPX, SPXO*, SPXW, SPY
22	TER - TTC~	Excludes TSLA
23	TTD - VB~	Excludes UKXM
24	VC - WYNN~	Excludes VIX, VIXW
25	WYNO - Z~	Excludes XEO, XSP, XSPBW
26	NVDA	
27	TSLA	
28	QQQ	
29	IWM	
30	SPY	
31	CBTX, CBTXW, DJX, DJXW, MBTX, MBTXW, MGTN, MGTNW, MRUT, NDX, OEX, RLG, RLV, RUI, RUT, RUTW, SIXB, SIXC, SIXE, SIXI, SIXM, SIXR, SIXRE, SIXT, SIXU, SIXV, SIXY, SPEQX, SPESG, UKXM, XEO, XND	
32	NANOS, VIX, VIXW, XSP, XSPBW	
33	SPX, SPXO*	
34	SPXW	
35	SPX/SPXW, Cross Product Spreads	

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.

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C1 Options Multicast Routing Parameters

Table 1. C1 Options Multicast Routing Parameters - Production

Data Center	Rendezvous Point
Primary Data Center A feed	74.115.128.189
Primary Data Center B feed	74.115.128.190
Secondary Data Center E feed	174.136.181.249

C1 Options Address/Unit Distribution

The following tables describe the unit distribution across the C1 Complex Multicast PITCH feeds.

Table 1. C1 Options Primary Data Center - Production

Primary Datacenter		Gig-Shaped [CAI] 170.137.114.80/28		Gig-Shaped [CBI] 170.137.115.80/28	
Unit	IP Port	Real-time MC	Gap Resp. MC	Real-time MC	Gap Resp. MC
1	30351	224.0.74.126	224.0.74.127	233.182.199.254	233.182.199.255
2	30352				
3	30353				
4	30354				
5	30355				
6	30356				
7	30357				
8	30358				
9	30359				
10	30360				
11	30361				
12	30362				
13	30363				
14	30364				
15	30365				
16	30366				
17	30367				
18	30368				
19	30369				
20	30370				
21	30371				
22	30372				
23	30373				
24	30374				
25	30375				
26	30376				
27	30377				
28	30378				
29	30379				
30	30380				
31	30381				
32	30382				
33	30383				
34	30384				
35	30385				

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. Customers should not configure their networks or systems for these addresses.

Table 2. C1 Options Secondary Datacenter - Production

Secondary Datacenter		Gig-Shaped [CEI] 170.137.124.224/28	
Unit	IP Port	Real-time MC	Gap Response MC
1	30601	233.19.3.250	233.19.3.251
2	30602		
3	30603		
4	30604		
5	30605		
6	30606		
7	30607		
8	30608		
9	30609		
10	30610		
11	30611		
12	30612		
13	30613		
14	30614		
15	30615		
16	30616		
17	30617		
18	30618		
19	30619		
20	30620		
21	30621		
22	30622		
23	30623		
24	30624		
25	30625		
26	30626		
27	30627		
28	30628		
29	30629		
30	30630		
31	30631		
32	30632		
33	30633		
34	30634		
35	30635		

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.

Certification Environment Configuration

Certification Environment Configuration contains C1 Unit/Product Distribution, Multicast Routing Parameters, and C1 Options Address/Unit Distribution

C1 Unit/Product Distribution

Unit	C1 Symbol Range	C1 Exceptions
1	A - AIPA~	
2	AIPB - AO~	
3	AP - AVGO~	
4	AVGP - BOIL~	
5	BOIM - CMPR~	Excludes CBTX, CBTXW
6	CMPS - CSIQ~	
7	CSIR - DJTA~	
8	DJTB - FARO~	Excludes DJX, DJXW
9	FARP - GLC~	
10	GLD - HAYW~	
11	HAYX - IYWA~	Excludes IWM
12	IYWB - LMTA~	
13	LMTB - MES~	Excludes MBTX, MBTXW
14	MET - MRM~	Excludes MGTN, MGTNW
15	MRN - MSTR~	Excludes MRUT
16	MSTS - NKEA~	Excludes NANOS
17	NKEB - PDC~	Excludes NVDA, OEX
18	PDD - RDDS~	Excludes QQQ
19	RDDT - SEAA~	Excludes RLG, RLV, RUI, RUT/RUTW
20	SEAB - SMHA~	Excludes SIXB, SIXC, SIXE, SIXI, SIXM, SIXR, SIXRE, SIXT, SIXU, SIXV, SIXY
21	SMHB - TEQ~	Excludes SPEQX, SPESG, SPX, SPXO*, SPXW, SPY
22	TER - TTC~	Excludes TSLA
23	TTD - VB~	Excludes UKXM
24	VC - WYNN~	Excludes VIX, VIXW
25	WYNO - Z~	Excludes XEO, XSP, XSPBW
26	NVDA	
27	TSLA	
28	QQQ	
29	IWM	
30	SPY	

Unit	C1 Symbol Range	C1 Exceptions
31	CBTX, CBTXW, DJX, DJXW, MBTX, MBTXW, MGTN, MGTNW, MRUT, NDX, OEX, RLG, RLV, RUI, RUT, RUTW, SIXB, SIXC, SIXE, SIXI, SIXM, SIXR, SIXRE, SIXT, SIXU, SIXV, SIXY, SPEQX, SPESG, UKXM, XEO, XND	
32	NANOS, VIX, VIXW, XSP, XSPBW	
33	SPX, SPXO*	
34	SPXW	
35	SPX/SPXW, Cross Product Spreads	

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.

*Effective 11/09/26

Multicast Routing Parameters

Primary Certification Data Center	Rendezvous Point
C1	74.115.128.131

C1 Options Address/Unit Distribution

The following table describes the unit distribution across certification C1 Complex Multicast PITCH feeds out of the Primary datacenter.

Table 1. C1 Options Address/Unit Distribution - Certification

Primary Datacenter		Certification 170.137.126.16/28	
Unit	IP Port	Real-time MC	Gap Resp. MC
1	30601	233.103.126.24	233.103.126.25
2	30602		
3	30603		
4	30604		
5	30605		
6	30606		
7	30607		
8	30608		
9	30609		
10	30610		
11	30611		
12	30612		
13	30613		
14	30614		
15	30615		
16	30616		

Primary Datacenter		Certification 170.137.126.16/28	
Unit	IP Port	Real-time MC	Gap Resp. MC
17	30617		
18	30618		
19	30619		
20	30620		
21	30621		
22	30622		
23	30623		
24	30624		
25	30625		
26	30626		
27	30627		
28	30628		
29	30629		
30	30630		
31	30631		
32	30632		
33	30633		
34	30634		
35	30635		

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.

Options Trade Condition Codes

The following table defines valid values for the **Trade Condition** field. TODO: Do we need a new trade condition for options with futures?

Table 1. Options Trade Condition Codes

Type	Field Value
f	Complex to Complex Electronic Trade. Cboe auction type is COA
g	Complex Auction Trade. Cboe order types include C-AIM, C-SAM
h	Complex Cross. Cboe auction types include Cust to Cust C-AIM, C-QCC
j	Complex Electronic Trade Against Single Leg(s)
k	Complex with Stock Options Auction Trade. Cboe auction types include C-AIM w/ Stock, C-SAM w/ Stock
m	Complex Floor Trade Against Single Leg(s). All complex floor executions are reported as condition 'm'.
n	Complex with Stock Electronic Trade. Includes COA auctions done electronically
o	Complex with Stock Cross. Cboe auction types include C-QCC w/ Stock
p	Complex with Stock Floor Trade
t	Complex Floor Trade of Proprietary Products Marked as "Combo Order"
v	Extended Hours Trade. Transaction represents a trade executed during the Curb session.
I	Electronic Trade
M	Future Options auction trade. Electronic execution of a multi leg future/options order traded in a two sided auction.
N	Future Options auto electronic trade. Electronic execution of a multi leg future/options order traded on the complex book.
O*	Opening Trade
P	Future Options cross. Electronic execution of a multi leg future/options order traded in a two sided crossing mechanism that does not go through an exposure period.

*The **Trade Condition** value of O=Opening Trade will be disseminated on the options PITCH and TOP feeds but will not be sent to OPRA.

Connectivity

Supported Extranet Carriers

Cboe has certified a number of carriers defined in the [Cboe US Equity/Options Connectivity Manual](#) with respect to redistribution of Cboe Multicast data feeds. For more information on receiving Multicast PITCH through any of these providers, reach out to the vendor contact noted in the [Cboe US Equity/Options Connectivity Manual](#) under Extranet Providers.

Bandwidth Recommendation

The Gig-shaped feeds require 1Gbps of bandwidth. Cboe will use 90% of these respective bandwidths for Multicast PITCH to allow customers to use the same physical connection for FIX order entry if desired.

Multicast Test Program

The ZIP file located at https://cdn.cboe.com/resources/membership/mcast_pitch.zip contains a sample program that may be used to test Multicast PITCH feed connections and to troubleshoot Multicast issues. Refer to the included README file for build and usage information.

References

For more information on Cboe Symbology, please see [Cboe Symbology Reference](#).

Support

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

Revision History

Document Version	Date	Description
1.0.0	09/16/26	Initial version.