



Cboe Titanium U.S. Options Complex Book Process

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Cboe Titanium U.S. Options Complex Book Process

Overview

The Cboe Titanium U.S. Options Complex Book Process communicates the basic complex order functionality on the Exchange. The Complex Order Book is available on all Cboe-affiliated Options Exchanges.

Complex Order Basics

A complex order is an order for two or more different options series "legs" sent to the Exchange as a single order. The order, if filled, is guaranteed to execute within a net price and ratio, unlike sending two or more individual orders. Complex orders on C1 and EDGX may include an equity leg (see [Complex Orders with Stock Legs](#)). Complex orders must use the **New Order Multileg** message.

Ratios

The quantity of each leg of a complex order broken down to the lowest terms determines the ratio of the complex order. All legs must be reduced (i.e., 2:2 must be sent as 1:1) to be accepted by the system. The ratio allows the Exchange to partially execute the complex order in smaller pieces when possible while maintaining the proper proportions of each leg in the customer's strategy.

C1 only allows submission of complex options orders with any ratio to have a net price in a \$.01 increment, except for orders in SPX/SPXW which must have a net price in a \$.05 increment (other than SPX/SPXW boxes/rolls which may have a net price in a \$.01 increment). Further, for electronic and open outcry trades, leg execution prices for all complex orders in all classes, regardless of ratio, are permitted in \$.01 increments for all classes, including SPX/SPXW.

EDGX, C2, and BZX also allow submission of complex options orders with any ratio to have a net price in a \$.01 increment. Further, leg execution prices for all complex orders, regardless of ratio, are permitted in \$.01 increments.

For stock-option orders of any ratio, the net price is accepted with up to four decimal places. Options legs must print in \$.01 increments.; and stock legs may print in increments up to four decimal places.

On **C1 only**, box swaps submitted electronically or utilizing a PAR Tablet on the trading floor are permitted to trade in pennies in all symbols, including SPX/SPXW, during all trading sessions regardless of the minimum complex price increment applicable to the class.

Net Price

Complex orders are quoted in net price terms combining the cost of obtaining each leg of a complex order in its proper ratio. For example, assume a customer wanted to buy five contracts of Option 1 at a price of \$2.00 each and sell 15 contracts of option 2 at a price of \$0.50 each. The ratio for this order is 1:3 and the customer's limit price would be a net debit price of \$0.50 - that is, a debit of $\$2.00 \times 1 = \2.00 for option 1 and a credit of $(\$0.50) \times 3 = (\$1.50)$ for option 2, which would result in a net debit price of \$0.50. **Note:** For details on the Net price of a Complex order with a stock leg, please see [Complex Orders with Stock Legs](#).

Availability of Complex Order Functionality

Complex orders are available on the Exchange as further detailed below. This section contains information regarding certain parameters employed by the Exchange in offering complex order functionality on the Exchange. The information immediately following only applies to non-FLEX Complex order types. For Complex FLEX orders, please see [Complex FLEX Order Functionality](#).

Eligible Classes

Complex Book: The Exchange currently permits entry of complex orders in all classes traded on the Exchange. Similarly, the Exchange allows complex orders to rest on the complex book in all classes traded on the Exchange.

Eligible for Legging: The Exchange currently permits complex orders to leg in to the simple book in all classes traded on the Exchange.

Complex Order Auction (COA): The Exchange currently permits a COA to be initiated in all classes traded on the Exchange.

Number of Legs

Complex Book: The Exchange permits creation of complex instruments with a minimum of 2 legs and a maximum of up to 16 legs for all classes traded on the Exchange.

C1 only permits creation of complex instruments with a minimum of 2 legs and maximum of 100 legs on non-FLEX Floor-Routed orders.

Eligible for Legging: The Exchange currently limits complex orders from legging into the simple book to orders with four or fewer legs for all classes.

Order Capacities

Complex Book: On C2, EDGX, and BZX, orders entered with any capacity (e.g., Customer, non-BD Customer, Firm, etc.) are eligible for entry and may rest on the complex book. On C1, orders in SPX/SPXW and VIX/VIXW (except as otherwise permitted under Exchange Rule 5.33(b)) with a capacity of M (Market Maker) or N (Away Market Maker) cannot rest on the complex book during RTH.

Eligible for Legging: Orders of all capacities are eligible for legging into the simple book.

COA: EDGX, C2, and BZX complex orders of any capacity are permitted to initiate a COA. On C1, only Customer and Pro Customer are permitted to initiate a COA.

Ratios for Combo Orders

Non-FLEX Index combo orders are eligible for COA, COB, and AIM.

A combo is defined as any pair of legs buying a call and selling a put (or vice-versa) with the same strike and expiration in a 1:1 ratio. Orders with more than one option leg plus a combo will qualify for trading.

Automated handling for Index Combo orders includes orders with multiple combos. To determine the ratio, the System compares the smallest non-combo leg versus the quantity on the smallest combo.

Additionally, Index Combo orders executed in open outcry qualify as complex orders and will be afforded benefits applicable to other conforming complex orders.

Automated handling via COA, COB, AIM, QCC **(C1 and EDGX only)**, and C-SAM **(C1 and EDGX only)** is available for applicable non-conforming orders, except in SPX/SPXW **(C1 only)**. Automated handling of SPX/SPXW non-conforming spreads is enabled in GTH, including via COA, COB, and AIM.

All FLEX Option classes (including SPX/SPXW) also allow automated handling of non-conforming complex orders.

Synthetic BBO and Synthetic NBBO Calculations

The prices at which a complex instrument can be bought or sold based on the best prices available on the single leg book on the Exchange are referred to as the Synthetic BBO (SBBO). The prices at which a complex instrument can be bought or sold based on the best prices available single leg books at all markets are referred to as the Synthetic NBBO (SNBBO). For details on Synthetic BBO/NBBO calculations of a Complex order with a stock leg, please see [Complex Orders with Stock Legs \(C1 and EDGX only\)](#).

On BZX, SBBO and SNBBO calculations include the working price of a Display-Price sliding order if the working price is better than the displayed BZX BBO. For more information, please see [Display-Price Sliding](#).

Signed Values on SBBO and SNBBO

- Bids and offers for complex instruments can be positive values or negative values.
- The bid is always looked at from the buyer's perspective.
 - Since a buyer usually expects to pay in a transaction, a positive bid value means the buyer is paying (net debit) and the seller is being paid (net credit).
 - A negative bid value means the buyer is being paid and the seller is paying.

- The offer is always looked at from the seller's perspective.
 - Since a seller usually expects to be paid in a transaction, a positive offer value means the seller is being paid (net credit) and the buyer is paying (net debit).
 - A negative offer value means the seller is paying and the buyer is being paid.

Complex FLEX Order Functionality (C1 only)

Unless otherwise specified below, all features and functionality described in [Complex Order Basics](#) also apply to FLEX.

Leg Prices and Leg Products

Complex FLEX order legs must be for the same underlying product and the same exercise style (American or European). Complex FLEX order legs must be for the same settlement type if using Asian or Cliquet, however, A.M. or P.M. settlement types may be mixed. Complex FLEX order legs cannot be listed as a standard option.

Complex FLEX orders must contain a starting price for each leg in addition to the net package price for the order, except for orders routed to the floor, which may contain a price for some, all, or none of the legs. Responses will be in net price only. When an order is filled at the final net price, the system generates leg fill prices that are as close as possible to the submitted leg price.

Eligible Classes

FLEX can trade on any certified underlying product (Equity, ETF, or Index). The product does not have to be listed on any other options Exchange (standalone FLEX). FLEX products are defined by a set of attributes including the underlying instrument, the exercise style, and the settlement style. FLEX OSI Root names use a numeric value to identify Settlement/Exercise combinations along with underlying product symbol.

FLEX OSI Root names for Asian and Cliquet products use a numeric value to identify Settlement/Exercise combinations along with an abbreviated underlying product symbol. This is done to accommodate additional information in the FLEX product symbol. The Asian and Cliquet product symbol abbreviations are listed in the following sections.

FLEX OSI Root names can be pre-defined prior to the start of trading for everything other than Asian and Cliquet names. Asian and Cliquet OSI Roots will be added as needed based on incoming orders and trades of those FLEX products.

Number of Legs

Complex FLEX orders may have up to 100 legs, while FLEX DAC orders allow up to 99 legs. Equity legs are allowed on FLEX orders. Complex FLEX orders allow up to 99 options legs and one equity leg while FLEX DAC orders will allow up to 98 options legs and one equity leg.

There is no resting complex order book or legging for FLEX complex orders.

Order Capacities

The following order capacities are supported by FLEX:

Customer (C), Firm (F), Market Maker (M), Market Maker Away (N), Broker-Dealer (B), Non-TPH Affiliate (L), Joint Back Office (J), and Professional Customer (U).

Ratios for FLEX Combo Orders

There is no limitation on complex leg ratios for FLEX Index combo orders. A combo is defined as any pair of legs buying a call and selling a put (or vice-versa) with the same strike and expiration in a 1:1 ratio. Orders with more than one option leg with any ratio plus a combo will qualify for trading. This applies to all Cboe proprietary Index classes.

Complex Instruments

A complex instrument represents the specific leg and ratio details for a complex strategy.

For example, if a customer wanted to buy five contracts of June 150 IBM Calls and sell 15 contracts of June 175 IBM Calls, they would first be required to request the complex instrument be created using a two-step process. A customer using FIX can also enter an order using a one-step process (see [Instrument Creation](#)).

Once created, a complex order book would be opened for this strategy and the complex instrument would look similar to the below record in the system:

Table 1. Complex Instrument Record Example

Instrument ID	Legs	Symbol	Side	Ratio	Expiration	Strike	Class Type
CI0001	Leg 1	IBM	Buy	1	June	150	Call
	Leg 2	IBM	Sell	3	June	175	Call

A complex instrument only needs to be created once and will exist in the system for the remainder of the trading day unless tied to a working GTC order. Any customer can submit orders using the Instrument ID to trade this specific strategy without having to recreate the instrument.

If a customer wanted to buy five contracts of June 150 IBM Calls and sell 15 contracts of June 175 IBM Calls, they would submit a complex order that looks like the following: Buy 5 CI0001 @ Net Limit Price of \$0.50.

If a customer wanted to sell two contracts of June 150 IBM Calls and buy six contracts of June 175 IBM Calls, they would submit a complex order that looks like the following: Sell 2 CI0001 @ Net Limit Price of \$0.50.

Instrument Creation

The process customers use to request complex instruments is referred to as the Complex Instrument Creation (CIC) process.

FIX order entry supports two distinct styles of requests: short form and long form. The long form request requires the complete set of OSI symbol information for each leg to be specified on the FIX message. The short form requires two steps. First, the instrument must be created by submitting a security definition request, and then the resulting complex symbol id is used to submit the short form order message. BOE order entry only supports the short form. Refer to the US Options FIX and BOE Specifications for more details.

Any complex instrument created on the current trading day but not tied to a working GTC order will be purged at the end of that trading day. Any complex instrument previously associated with a GTC order but later results in no associated GTC orders will be purged at the end of the trading week (typically Friday evening).

Firms will be limited to creating 40,000 Complex instruments per trading day per underlying symbol on C1 and 25,000 per day per underlying symbol on BZX, C2, and EDGX. Once a firm has reached the CIC limit for a symbol they will begin receiving rejects for Security Definition Request messages; A: Exceeds firm CIC limit. This will only impact the creation of new complex instruments. An order on an existing complex symbol will not count towards the limit nor will firms who have breached the limit be rejected when entering new orders on existing complex instruments.

Exchange Designated Complex Instruments (C1 only)

In addition to customer creation of complex instruments, the Exchange may designate certain complex instruments to exist as needed by dependent Cboe products and services. The Exchange will ensure that such designated instruments exist, either from having been created by a customer request or by Exchange directed creation. In either case, standard Complex Instrument Definition (CID) messages for designated complex instruments will appear on the Complex PITCH and TOP feeds similar to all other complex instruments.

One or more supplementary **Exchange Designated Complex Instrument Definition** (EDCID) messages will be sent on the Complex PITCH and TOP feeds for each designated instrument that associates a complex instrument with a dependent service. The same Exchange Designated Complex Instrument symbol reference data will be made available

on the [Cboe US Options Reference Data](#) webpage for each dependent service.

Complex Instrument Structure

A complex instrument's structure, as created through the CIC request process, is the ultimate determining factor as to whether a complex order will be posted as a bid or as an offer. Complex instruments will always be defined from the buyer's perspective and will be communicated back to the requester on the **Security Definition** message following a **Security Definition Request** message. If a spread contract contains multiple OSI Roots and one contract from each root has the same side, class, strike, and expiration, then the legs will be ordered lexicographically by OSI Root (see [CIC Example 4](#)).

All CIC requests will be re-sorted according to the following method when defined and communicated back to the Exchange customers:

1. All buy legs
 - a. Calls
 - i. Lowest strike
2. Earliest expiration
 - a. Puts
 - i. Highest strike
3. Earliest expiration
4. All sell legs
 - a. Calls
 - i. Lowest strike
5. Earliest expiration
 - a. Puts
 - i. Highest strike
6. Earliest expiration

CIC Request Examples

Example 1: *Sorting Legs for New CICs*

- CIC request:
 - Sell 1 XYZ Aug \$5 Put
 - Buy 1 XYZ Jun \$15 Call
 - Sell 1 XYZ Aug \$10 Put
 - Buy 1 XYZ Jun \$10 Call
- Result:
 - Buy 1 XYZ Jun \$10 Call
 - Buy 1 XYZ Jun \$15 Call
 - Sell 1 XYZ Aug \$10 Put
 - Sell 1 XYZ Aug \$5 Put

Example 2: *Complex Instrument Already Exists*

- CIC request:
 - Buy 1 XYZ Jun \$10 Call
 - Buy 2 XYZ Jun \$15 Cal
- Result:
 - Acknowledgment indicates the requested complex instrument already exists and includes the Complex Instrument ID.

Example 3: ***Complex Instrument is Created from the Seller's Perspective***

- CIC request:
 - Sell 1 XYZ Jun \$10 Call
 - Sell 2 XYZ Jun \$15 Call
- Result:
 - If a complex instrument is sent to the Exchange from the seller's perspective, the Exchange will reverse all sides of the CIC request and define the instrument from the buyer's perspective.
 - Buy 1 XYZ Jun \$10 Call
 - Buy 2 XYZ Jun \$15 Call

Example 4: ***Sorting legs for CICs with Multiple OSI Roots***

- CIC request:
 - Sell 3 VXX2 Mar \$14 Put
 - Sell 1 VXX Mar \$14 Put
 - Buy 3 VXX2 Jan \$12 Call
 - Buy 1 VXX Jan \$12 Call
- Result:
 - Buy 1 VXX Jan \$12 Call
 - Buy 3 VXX2 Jan \$12 Call
 - Sell 1 VXX Mar \$14 Put
 - Sell 3 VXX2 Mar \$14 Put

Order Entry

Complex orders must use the order entry messages defined in the [Cboe Titanium U.S. Options FIX Specification](#) , [Cboe Titanium U.S. Options BOE Specification](#), and [Cboe Titanium U.S. Options BOEv3 Specification](#) .

Market-Makers may also submit complex orders for select Exchange Designated Complex Options to the Cboe Exchange using Complex Quoting over Bulk Quoting Ports. See the U.S. Options BOE specification for details on the use of **Complex Quote Update** and **Complex Quote Update (Short)** messages to efficiently manage complex orders on the Cboe Exchange.

Details regarding current and future order types are further described in the Exchange [rule books](#).

Order Book Matching

Complex orders are matched on the complex book in a similar manner to orders on the simple book. For example, a multi-legged complex buy order will only be represented as a single buy order on the complex book. However, there may be differences in order priority between the simple book and the complex book. Please see the Exchange Rules for further details.

Legging into Individual Series

Often, the best price available for a complex order can be obtained by legging the complex order into the individual series books that make up the complex instrument. For this to happen, the combination of the individual books must be able to fill at least part of the complex order quantity in the proper ratio.

All two-leg Complex Order Auction (COA) eligible Customer complex orders are allowed to leg in without restrictions. However, not all complex orders are eligible to leg into the individual series book.

The following complex orders cannot leg into the simple book:

- Non-Customer (COA eligible or not) and non-COA eligible Customer complex orders with two option legs where both legs are buying or both legs are selling AND both legs are calls or both legs are puts.
- Complex orders with three or four option legs where all legs are buying or all legs are selling.
- Complex orders with five or more option legs.
- AONs resting on the Simple Book will not trigger resting or inbound Complex Orders to leg into the Simple Book.
- Complex-to-Complex transactions will trade without regard to AONs resting on the Simple Book.
- A Complex Order that legs into the Simple Book based on displayed liquidity at the contra side SBBO will trade with better priced AONs if the size contingency on the AON can be met.
- Complex orders in Cross Product Spreads where the products do not operate on the same matching unit (i.e., SPX/SPXW, IWM/RUT, DIA/DJX, VIX/VXX, MNX/NDX). See [Cross Product Spread Symbol List \(C1 Only\)](#).
- Complex orders using **Complex Quote Update** messages on BOE Bulk Quoting ports.

Complex Order Auction (COA)

Complex Order Auction (COA) provides execution opportunity by exposing marketable complex orders prior to (1) canceling the order back or (2) booking the order to the complex order book. COAs are exposed for 100ms (the Response Time Interval) but this may be adjusted by the Exchange with appropriate notice.

New complex orders will initiate an auction upon entry if the Net Limit price of the buy (sell) complex order is equal to or greater (less) than the Synthetic Best Bid (Synthetic Best Offer) and better than any resting buy (sell) orders on the complex order book, regardless of the resting COB order's capacity.

If there are Priority Customer orders on the individual leg book at the SBB (SBO), the auction will only be initiated if the Net Limit price of the complex order is at least \$0.01 better than the SBB (SBO). If the Net Limit price on the buy (sell) order is greater (less) than the SBO (SBB), the order will still be auctioned at the complex order's Net Limit price but will be restricted to executing within the SBBO at the end of the auction period.

Other Exchange customers can interact with a COA by entering regular complex orders or Response Orders.

Priority Quoter algorithm is enabled on BZX only.

Complex Order Auction (COA) on Cboe Options Exchange (C1 only)

COA on C1 functions the same as it does on C2, EDGX, and BZX with the following differences:

- COA has separate priority configuration from the COB (i.e., COA can be P/T and COB can be Pro Rata for Class).
- Resting orders on the Complex Book arriving before the start of a COA auction will have the same priority as Complex orders and Response orders arriving after the start of the COA auction.
- COA auctions are allowed to start and execute through AON orders on the Simple Book.
- COA auction messages are displayed on both the Complex Auction Feed and Pitch Feed.

Initiating COA Orders

A customer may decide if their order is eligible to initiate an Auction. All Book Only, non-IOC complex orders are eligible for COA upon entry to the complex order book by default unless otherwise specified on the order. Book Only, IOC complex orders do not initiate a COA by default. Customers may opt-in or opt-out of initiating a COA by specifying one of the following 2nd character **RoutingInst** (9303) values:

- L = Do not expose order via COA (default for IOC)
- S = Expose order via COA (default for non-IOC)

Customers may override the default on an order-by-order basis using the appropriate **RoutingInst** (9303) values or configure alternative port level defaults by submitting a Modify Logical Port Request on the [Customer Web Portal](#).

Responding to COA Orders

Customers may interact with a COA with either a Response Order or a regular complex order resting on the book at the completion time of the COA. Response Orders must be priced equal to or more aggressive than the auction price and include a valid **AuctionID** (9370) of the targeted auction for the Response Order to interact with the COA. Response Orders priced less aggressive than the auction price will be held and canceled at the end of the auction period.

A customer may submit multiple responses to the same COA priced at increments of \$0.01.

Response orders priced equal to or more aggressive than the auction price will be held for the duration of the exposure period and continue to be eligible for execution until the COA either fully executes or terminates early. Response Orders may be cancelled or modified anytime.

Response orders not fully executed against the targeted COA order will be cancelled back following the conclusion of the auction.

At the conclusion of an auction response or exposure period, the Matching Engine will continue processing messages,

including auction responses, for up to an additional 100ms (900ms on **C1 only**) to include auction responses that arrived at the Matching Engine NIC prior to the scheduled auction end time. The Matching Engine will immediately conclude the auction either upon processing all events arriving at the Matching Engine prior to the scheduled auction end time or upon elapse of the additional timer.

For details on responding to COAs of a Complex order with a stock leg, please see [Complex Orders with Stock Legs](#) **(C1 and EDGX only)**.

Execution Priority of COA

The execution priority is set at the Class and/or Exchange level.

Any remaining quantity on a Non-IOC COA order following the end of the auction will be placed on the book if it cannot be executed in full.

COA responders on BZX Options Exchange will get allocation priority up to the size of their quote at the National Best Bid and Offer (NBBO) if they are on the contra NBBO on any legs of the complex instrument at the start of the auction. If on the NBBO on multiple legs at the start of the auction, the Priority Quoter allocation size will be based on the Market Maker's largest size on any NBBO leg, regardless of the ratios on each leg. At each price level, complex orders and COA responses from Priority Quoters will trade with the COA order first, and the balance of the COA order will be allocated to contra-side interest on the leg books in time priority, then in pro-rata priority against other complex orders and COA responses. If multiple Priority Quoter responders are on the NBBO and the combined size of the responses is greater than the COA order size, then the Priority Quoter responders will receive a pro-rata share based on their Priority Quoter allocation size.

Early Termination

A COA order will continue to be exposed and eligible for execution until the exposure period is over or the auction terminates early because of the following scenarios:

- Customer cancels the original order that initiated the COA.
- A new, non-COA eligible, complex order is entered on the same side with a better price than a COA in progress. The system will end the auction immediately and attempt to execute the COA order before handling the newly arrived non-COA eligible complex order.
- An order is received on an individual series leg that improves the SBBO on the same side as a COA in progress to a price better than the Auction Price. The system will end the auction immediately and attempt to execute the COA order.
- A Priority Customer order is received on an individual series that joins or improves the SBBO on the same side as a COA in progress to a price equal or better than the Auction Price. The system will end the auction immediately and attempt to execute the COA order **(C1 and EDGX only)**.
- A halt in the underlying security occurs while a COA is in progress. The COA will be terminated and no executions will be applied.
- A LULD Limit State or Straddle state goes into effect while a COA is in progress, if the COA order is a Market Order, the COA will be terminated and no executions will be applied. COAs for Limit Orders will not be affected by LULD.

Stop Complex Order Auction (Effective TBD)

Stop Complex Order Auctions (SCOA) can be used to expose electronic complex orders for potential price improvement and maximize execution quantity. Stop-limit complex orders will be accepted during all trading sessions, but will only be eligible for triggering and execution during Regular Trading Hours.

A stop-limit complex order is a conditional order that becomes a limit order when triggered by one of two configurable conditions. Only one trigger condition can be designated per order. The stop trigger conditions are as follows:

1. Net price of the complex strategy: an order will trigger when either the same side Market-Maker SBBO equals or betters the designated threshold price, or a trade in the same complex instrument occurs via COB, COA, AIM, SAM, or PAR at or better than the designated threshold price.
2. Underlying price: an order will trigger when a designated price threshold of the underlying security is either (i) at or above the underlying price or index level or (ii) at or below the underlying price or index level. For (i) the underlying price designated must be higher, and for (ii) the underlying price designated must be lower, than the current value of the equity same side NBBO or index level. If not, the order will be rejected.
 - a. Equity: triggers when the underlying security bid (ask) is equal to or higher (lower) than the designated stop price, or a trade occurs at a price equal to or higher (lower) than the stop price.
 - b. Index: triggers when the underlying index level is equal to or higher (lower) than the designated threshold price. This trigger does not include any bid/ask component.

Note stop-limit complex orders having both SPX and SPXW leg components and designating the net price trigger condition will only trigger if a trade occurs at or better than the designated threshold price.

Once triggered, the order(s) will initiate a new SCOA. If a single limit order is triggered, the SCOA starting auction price will be the less aggressive of the order's limit price or the opposite side SBBO. If multiple limit orders are triggered, the SCOA starting auction price will start the auction at the less aggressive of either the most aggressive limit price of the orders in the bundle or the opposite side SBBO.

At the start of the auction, an **Auction Notification** message will be sent and auction responses will be accepted. Orders will be allocated using a new proprietary volume-maximizing auction allocation methodology.

The SCOA auction message format is identical to a COA message. The **Auction Notification** message will be sent with **Auction Type** = C. If there is at least one priority customer (**OrderCapacity** = C) in the bundle of auctioned orders, the **Auction Notification** message will be sent with **Customer Indicator** = C, regardless of whether there are any professional orders in the bundle. Note the stop price can be modified before the order is activated, but not the stop price type (i.e., the trigger condition). Once a stop order has been activated, the stop price is no longer modifiable. If an order is already in an auction, an attempt to modify its stop price will be rejected.

Upon completion of the initial SCOA, any unfilled order(s) will iterate through additional SCOA's at incrementally more aggressive starting prices until all orders are filled, their limit price has been reached, or the current opposite side SBBO price has been used as the last auction start price. The starting price for each auction in the iteration process will be the least aggressive of:

- The previous auction price, plus the exchange default drill-through amount
- The most aggressive limit price on the remaining order(s)
- The opposite side SBBO

Any unfilled order(s) after the most aggressive price has already been used in a SCOA will be sent to the Complex Order Book (COB).

Firms can send stop-limit complex orders using **StopPx** (FIX Tag 99) and **StopPxType** (FIX Tag 25026).

SessionEligibility (FIX Tag 22017), if required, must be set to 'R' (Default) to indicate participation in Regular Trading Hours only for a complex stop-limit order to be accepted.

Complex Automated Improvement Mechanism (Complex AIM) (C1 and EDGX only)

The system will support an Automated Improvement Mechanism (Complex AIM) for two-sided complex auctions. Complex AIM auctions function in a similar manner to simple book AIM auctions, however, executions are allowed outside of the SNBBO for the Complex Instrument but must be within the SBBO.

The information below details the important differences for Complex AIM relative to AIM. Unless mentioned below, all other AIM behaviors (described in the [Cboe Titanium U.S. Options Auction Process Specification](#)) should be assumed to also apply to Complex AIM.

- Complex AIM orders may only be entered after all individual component legs have opened.
- The system enforces Customer Priority for both Simple Book orders and Complex Book orders for Complex AIM auctions even if Customer Priority is not enabled for the series.
- Drill Through protections are applied to both the Agency and contra sides of the Complex AIM order.
- All Complex Pricing Checks applying to standard COB orders (i.e., Minimum or Maximum Price, Strategy Specific Price Restrictions) also apply to Complex AIM orders.
- The Complex AIM auction message is published on the separate Complex Order Auction Feed and on the Complex Depth of Book Feed (Complex PITCH).
- Complex AIM orders cannot be canceled or modified.
- Complex AIM orders may specify a Preferred Market Maker (PMM) on the order that will receive the Marketing Fees but will not receive any priority benefits in the auction.
- Customer to Customer Complex AIM orders, regardless of size, are executed immediately and are not subjected to an exposure period if the auction price is in between the SBBO, or equal to or better than resting COB orders.

C-AIM Response Orders

Response orders to Complex AIM auctions must follow the same guidelines defined for AIM auctions. Responders need to include the Auction ID of the Complex AIM auction on their response for their order to be considered a Response Order. Responses for Complex AIM are capped by the SBBO instead of the NBBO.

At the conclusion of an auction response or exposure period, the Matching Engine will continue processing messages, including auction responses, for up to an additional 100ms (900ms on **C1 only**) to include auction responses that arrived at the Matching Engine NIC prior to the scheduled auction end time. The Matching Engine will immediately conclude the auction either upon processing all events arriving at the Matching Engine prior to the scheduled auction end time or upon elapse of the additional timer.

Early Termination

A Complex AIM auction will terminate naturally at the end of the exposure interval. Various scenarios may cause the auction to terminate early. Refer to the applicable Exchange Rule Book for a detailed list of early termination scenarios.

Complex Solicitation Auction Mechanism (Complex SAM) (C1 and EDGX Only)

The purpose of Complex SAM auctions is to facilitate the crossing of large size solicited orders. The information below will detail only the significant differences for Complex SAM relative to Complex AIM. Unless mentioned below, all other requirements for Complex AIM will also be applied Complex SAM.

- Complex SAM auctions must have 500 contracts or greater on the smallest leg of the complex order or it will be rejected.
- Customer Priority on the COB and Simple Book will always be enforced for Complex SAM allocations regardless of whether Customer Priority is enabled for the class.
- If better priced responses or a Non-Customer complex order is entered, the Agency side will be filled against the better priced responses and orders only if the entire quantity can be price improved.
- If an equal or better priced Priority Customer complex order is entered, the Agency side will be filled against the Priority Customer order only if it can fill the entire agency order by itself or when combined with equal or better priced responses and complex orders on the book.

Response Orders

Response orders to Complex SAM auctions follow the same guidelines described for Complex AIM.

Early Termination

A Complex AIM auction will terminate naturally at the end of the exposure interval. Various scenarios may cause the auction to terminate early. Refer to the applicable Exchange Rule Book for a detailed list of early termination scenarios.

Complex Qualified Contingent Cross (Complex QCC) (C1 and EDGX only)

This section will describe the Complex Qualified Contingent Cross (Complex QCC) functionality offered on the Cboe Options Exchange. Members must choose between trading the stock leg off exchange or sending the stock leg in the complex instrument definition for the Cboe Options Exchange to execute. For additional details relating to the Complex QCCs where the stock leg is included in the complex instrument definition, see [QCC for Complex Orders with Stock Legs](#).

The information below will detail the important differences for Complex QCC relative to QCC. Unless mentioned below, all other QCC behaviors (described in the [Cboe Titanium U.S. Options Auction Process Specification](#)) should be assumed to also apply to Complex QCC.

- The smallest component options leg must be at least 1,000 contracts
- Price protections, including Drill Through, will not apply to Complex QCCs.
- Complex QCCs will not be restricted by other auction types going on at the same time in the Complex or Simple Book.
- Trade messages resulting from Complex QCCs will not be displayed on the Auction Feed but will be displayed on the Depth, Top, and OPRA feeds.
- Complex QCCs will either be immediately executed or canceled on entry.
- Complex QCCs will never interact with resting liquidity on the complex or simple books.
- All component options legs must be executed at or inside the NBBO for each leg.

Complex QCC Examples

Table 1. Example 1 - Complex QCC Minimum Size Requirement

Order	Description
Complex QCC Minimum Size: Complex Instrument (CI0001):	1,000 Buy 3 : Sell 2
Complex QCC Order1: Complex QCC Order2:	Agency- Buy 499 @ 10.00 Contra - Sell 499 @ 10.00 Agency- Buy 500 @ 10.00 Contra - Sell 500 @ 10.00
Result:	Complex QCC Order1 does not meet minimum size requirement (smallest leg x quantity) and is rejected. Complex QCC Order2 meets minimum size requirement and is accepted.

Table 2. Example 2 - Complex QCCs Must be Executed at or Inside SNBBO

Order	Description
Complex Instrument (CI0001): SNBBO: SBBO:	Buy 1: Sell 1 1.00 x 1.50 .95 x 1.75
Complex QCC Order1: Complex QCC Order2: Complex QCC Order3: Complex QCC Order4:	Agency- Buy 1000 @ .99 Contra - Sell 1000 @ .99 Agency- Buy 1000 @ 1.51 Contra - Sell 1000 @ 1.51 Agency- Buy 1000 @ 1.00 Contra - Sell 1000 @ 1.00 Agency- Buy 1000 @ 1.50 Contra - Sell 1000 @ 1.50
Result:	Complex QCC Order1 and Complex QCC Order2 are both rejected since they are outside of the SNBBO. Complex QCC Order3 and QCC Order4 are accepted and trade at their respective prices.

Complex Orders with Stock Legs (C1 and EDGX only)

Cboe Options Exchange and Cboe EDGX Options Exchange support Complex instruments containing a stock leg. The stock portion is sent to an external execution venue according to the order instructions for execution. TD Securities (USA) LLC Execution Services (TD Securities (USA) LLC) serves as a possible execution venue for all orders. For QCC orders only, Penserra, FOG Equities, Libucki & Co., and SRT Securities, all via NYSE Chicago, serve as possible venues for execution.

Instrument Creation

The system supports instruments with up to 16 legs, one of which may be a stock leg. C1 only supports instruments with up to 100 legs, one of which may be a stock leg on non-FLEX Floor-Routed orders. Actual shares (reduced to lowest terms) is entered on the order for the stock leg (e.g., 100 equals 100 shares) and it is not entered in round lot quantities. The system will only accept a complex with stock strategy where the option legs all have the same deliverable amount. Customers can send Buy, Sell, Sell Short or Sell Short Exempt on the Stock Leg portion of the complex order.

Any complex instrument sent with a Buy stock leg will be considered a Debit strategy regardless of how many buy or sell options legs the instrument contains. Any complex instrument sent with a Sell stock leg will be considered a Credit strategy regardless of how many buy or sell options legs the instrument contains. The system will create the reverse of the instrument in order to store the instrument from the Buyer's perspective.

The system validates that all complex instruments with a stock leg have at least one option leg with an opposite delta position relative to the stock leg. Below are examples of instruments that would be accepted and instruments that would be rejected by the system:

Table 1. Accepted/Rejected Complex Instrument Examples

Stock Leg	Option Legs	Result
Buy	Sell Call	Accepted
Buy	Buy Put	Accepted
Sell	Buy Call	Accepted
Sell	Sell Put	Accepted
Buy	Buy Call	Rejected
Buy	Sell Put	Rejected
Sell	Sell Call	Rejected
Sell	Buy Put	Rejected
Buy	Buy Call Buy Call Sell Call	Accepted
Sell	Buy Put Buy Put Sell Call Buy Call	Accepted

COA for Complex Orders with Stock Legs

In general, COA auctions support instruments with stock legs and will follow the same rules specified for options only strategies. Stock legs always adhere to any trading restrictions in effect such as Reg SHO and LULD. Equity legs of stock-option orders are allowed to execute outside of the equity NBBO by no more than a buffer amount of \$0.25.

Rejects on Sell Short orders or system issues with TD Securities (USA) LLC could cause part or all of the agency side not to be entirely filled. If an issue occurs, the rejected stock quantity will result in a corresponding reduction of the total order quantity.

Early Termination

The auction may terminate early under various scenarios especially for those involving LULD and Reg SHO conditions on the stock leg. Refer to the applicable Exchange Rule Book for a detailed list of early termination scenarios.

AIM and SAM for Complex orders with Stock Legs

In general, Complex AIM/SAM auctions support instruments with stock legs and follow the same rules specified for options only Complex AIM/SAM strategies. Stock legs always adhere to any trading restrictions in effect such as Reg SHO and LULD. Equity legs of stock-option orders are allowed to execute outside of the equity NBBO by no more than a buffer amount of \$0.25.

Rejects on Sell Short orders or system issues with TD Securities (USA) LLC could cause part or all of the agency side not to be entirely filled. If an issue occurs, the rejected stock quantity will result in a corresponding reduction of the total order quantity.

QCC for Complex orders with Stock Legs

In general, Complex QCC auctions support instruments with stock legs and follow the same rules specified for options only Complex QCC auctions. Stock legs can be priced outside of the NBBO but will always adhere to any trading restrictions in effect such as Reg SHO and LULD.

Rejects on Sell Short orders or system issues with TD Securities (USA) LLC could cause part or all of the agency side not to be entirely filled. If an issue occurs, the rejected stock quantity will result in a corresponding reduction of the total order quantity.

Pricing

The Net Limit Price of the complex order package can be entered with up to 4 decimals. The equity component of the Net Price represents the cost of 1 share. Stock legs always adhere to any trading restrictions in effect such as Reg SHO and LULD. Equity legs of stock-option orders are allowed to execute outside of the equity NBBO by no more than a buffer amount of \$0.25 if necessary to achieve the net package price.

Stock legs as part of a QCC can be priced outside of the NBBO at any price.

Stock legs will be priced in 4 decimals on the tape print.

Printing and Clearing Stock Legs

Cboe Options uses TD Securities (USA) LLC Execution Services (TD Securities (USA) LLC) for printing and clearing stock legs. For QCC orders only, Penserra, FOG Equities, Libucki & Co., and SRT Securities, all via NYSE Chicago, serve as possible destinations for printing and clearing stock legs. A two-sided cross of the stock leg at a price determined by the ME is submitted to the appropriate venue (i.e., TD Securities (USA) LLC, Penserra, FOG Equities, Libucki & Co., or SRT Securities) according to order instructions. These venues can reject the cross if they deem it to be at an impermissible price based on their own view of the market data (i.e., Reg SHO violation). Options Members must have agreements in place with any broker included on the order instructions and will clear using one of two methods:

- Members must have a valid equity MPID for the broker specified on the order instruction. Cboe will send this MPID to the broker.
 - Member trades sent to TD Securities (USA) LLC will be reported for clearing to DTCC via ACT.
 - Member trades sent to any other venue will be reported for clearing to DTCC via NYSE Chicago.

The Cboe Options Trading Floor acts as a backup for TD Securities (USA) LLC in the event of system issues. The Trade Desk will have the ability to manually re-route all Complex with Stock orders to the Floor.

Complex Position Compression Cross (Complex PCC) (C1 only)

This section describes the Complex Positions Compression Cross (PCC) functionality offered on the Cboe Options Exchange. A PCC represents an order mechanism used for SPX/SPXW options electronic compression orders. PCC orders are used to reduce open positions in SPX/SPXW options series and can be executed as unexposed crosses.

Multi-leg positions include vertical call spreads, vertical put spreads, combos (i.e., purchase (sale) of a call and a sale (purchase) of a put with the same expiration date and strike price), and box spreads. The entry of SPX versus SPXW as a complex spread is not supported for PCC. If both SPX and SPXW legs are submitted in the same complex instrument, the order will be rejected. PCC orders submitted separately for SPX and SPXW legs are accepted.

The information below details important differences for Complex PCC relative to PCC. Unless mentioned below, all other PCC behaviors (described in the [Cboe Titanium U.S. Options Auction Process Specification](#)) should be assumed to also apply to Complex PCC.

- Complex PCCs support up to 16 legs and up to 10 contra orders.
- The execution price must be at or inside the SBBO or better than the SBBO if there is a priority customer on any leg of the SBBO, and better than the price of a priority customer complex order on the COB (if the order is multi-leg).
- All positions (both opening and closing positions) are permitted in compression orders and can be entered and executed in pennies. The legs of complex compression orders can be executed in \$0.01 increments.

Related Futures Cross (RFC) (C1 only)

This section describes the Related Futures Cross (RFC) functionality offered on the Cboe Options Exchange. An RFC represents an order mechanism used for VIX/VIXW options, enabling Trading Permit Holders (TPHs) to exchange futures contracts for related options positions in VIX/VIXW and is executed as an unexposed cross.

RFCs may only be used to execute complex orders comprised of an option combo order coupled with a contra-side order or orders totaling an equal number of option combos. An RFC order must be comprised of a two-legged order with one leg to purchase (sell) VIX/VIXW calls and another leg to sell (purchase) the same number of VIX/VIXW puts with the same expiration date and strike price.

Initiating RFC Orders

A Member may initiate an RFC by submitting a two-sided **New Order Cross Multileg** message using either FIX or BOE protocols and identifying the **CrossType** as RFC.

RFC Executions

RFC executions execute immediately upon entry if they satisfy the same pricing requirements as all other complex orders, with the additional requirement that no leg may trade outside the NBBO or at the same price as a resting Priority Customer order.

Market Data

RFC orders are not displayed on either the US Options Multicast PITCH feed, the US Options Auction Feed, or OPRA.

OPRA

Executions resulting from RFC orders are reported to OPRA as a Regular Trade.

Cboe Feeds

Executions resulting from RFC orders are reported to the US Options Multicast PITCH feed as a **Trade** Message.

Regulatory Impact and Member Reporting of Futures Positions

Members trading RFC are required to upload a spreadsheet into the [Cboe Customer Web Portal](#) conveying details of their futures positions by the end of the trading day during which the RFC orders were placed.

Floor Trading Support (C1 Only)

Complex orders can be routed to a PAR terminal on the Cboe Options Trading Floor.

Cash Spreads

PAR accepts complex orders with a total cash limit price based on the notional value of the order. C1 accepts cash limit prices up to \$999,999,999. Debit or Credit is indicated using the same methodology, positive (debit) or negative (credit) used for standard limit prices. The electronic book does not handle orders with cash limit prices. Trade prints and Clearing Records are converted to price and shares and are not reported using notional value.

Combo Trade Condition Code

Complex Orders may be marked as Combo Orders using **ComboOrder** (22005) in FIX or BOE. To qualify for the CMBO exemption, the complex order must meet the following criteria:

- Complex Order must be identified as Combo on the order message.
- Underlying symbol must be SPX or SPXW.
- Order must be directed to PAR and cannot be electronic.
- Complex Instrument can have any number of legs (up to max) but must have at least one Combo pair as defined below:
 - One Buy Call Leg and One Sell Put Leg (or opposite)
 - Both legs must have the same Strike and Expiration.
- An order marked CMBO but not meeting all of the above criteria will be rejected.

CumQty - Complex Floor Orders

When a complex floor order with out-of-ratio executions is modified, the exposure is trimmed in a way that rounds down to a complete package. This has the side effect of also rounding down the per-leg **CumQty** for executions that follow.

Opening Process

The Exchange's complex order book Opening Process offers customers the ability to queue orders or submit Complex Instrument Creation (CIC) requests during pre-market and during an intra-day halt period. Instruments with a stock leg will not open until all the individual option leg series have opened on the simple book, and the first trade and LULD bands have been published for the underlying equity leg by the primary listing market. Complex Orders with Stock legs will COA immediately following the Opening process if marketable.

Queuing Period

The pre-market queuing period for GTH eligible products begins at 8pm ET and the queuing period for RTH only products begins at 7:30am ET.

Complex instruments can also be halted intraday whenever the underlying product for a component leg is halted. Complex orders sent while a complex instrument is halted will also be queued up for a Re-Opening Auction.

During Queuing Periods, the Exchange disseminates expected opening price and size information using **Options Auction Update** messages over the U.S. Options Complex Multicast PITCH feed once every five seconds during the queuing period.

Complex Instrument Opening Process

Following the receipt of the opening trigger for opening Single Leg series of a class, the Exchange will wait for all component legs of the complex instrument to open before beginning the Opening Process. Additional details of the opening process for the individual component legs can be found in the [Cboe Titanium U.S. Options Opening Process](#). If there are no complex orders that can cross, the Exchange will open the order book for the complex instrument immediately. However, if there are complex orders that can cross, the system will determine the equilibrium price at which the greatest number of complex orders can trade and all such orders will be executed in standard priority (see [Price Calculation](#)).

If the equilibrium price is at or inside the SNBBO, the system will open the complex instrument at the equilibrium price. If the equilibrium price is outside the SNBBO, the system will continue to send out **Options Auction Update** messages. After an Exchange-determined period of time, the system will release the complex orders to the complex order book in time priority.

Matched Trade Prevention (MTP) is not in-effect during the matching phase of the complex series opening.

Complex books do not leg into component single leg books during the opening process. Instead, SNBBO collars ensure complex instrument opening prices are consistent with component single leg prices.

Opening Price Calculation

If there are complex orders on the book at the completion of the Queuing Period during an Opening or Re-Opening that can cross, the system will determine the Opening Price using a Volume Maximizing Imbalance Minimizing (VMIM) algorithm, which computes the greatest number of complex contracts can trade. Where multiple price levels would result in the same number of contracts traded, the price with the lowest resulting absolute imbalance is selected as the opening price. The following examples illustrate the VMIM algorithm application to opening of Complex Instruments.

Example 1: *Equilibrium Price Calculation*

Equilibrium price is \$1.96 since most contracts (400) can be done at this price.

CumBid	BidQty	Price	AskQty	CumAsk	Match	Imb
0	0	mkt (bid)				
0		2.00	100	8,500	0	(8,500)
0		1.99	1,000	8,400	0	(8,400)
100	100	1.98	3,000	7,400	100	(7,300)
200	100	1.97	4,000	4,400	200	(4,200)
700	500	1.96	100	400	400	300
1,700	1,000	1.95	100	300	300	1,400
2,200	500	1.94	100	200	200	2,000
3,300	1,100	1.93	100	100	100	3,200
4,500	1,200	1.92		0	0	4,500
5,000	500	1.91		0	0	5,000
5,100	100	1.90		0	0	5,100
		mkt (ask)	0	0		

Example 2: *Finding the Imbalance Minimizing Price*

If more than one price results in the same amount of contracts being executed, the price where the Buy or Sell Imbalance is the smallest will be chosen.

CumBid	BidQty	Price	AskQty	CumAsk	Match	Imb
0	0	mkt (bid)				
0		2.00	100	8,500	0	(8,500)
0		1.99	1,000	8,400	0	(8,400)
0		1.98	3,000	7,400	0	(7,400)
400	400	1.97	4,000	4,400	400	(4,000)
400		1.96	100	400	400	0
1,400	1,000	1.95	100	300	300	1,100
1,900	500	1.94	100	200	200	1,700
3,000	1,100	1.93	100	100	100	2,900
3,000		1.92		0	0	3,000
3,000		1.91		0	0	3,000
3,000		1.90		0	0	3,000
		mkt (ask)	0	0		

In the above example, both the \$1.97 and \$1.96 price levels result in 400 contracts being executed. Since there is a 4,000 contract Sell Imbalance at the \$1.97 price level and a zero imbalance at the \$1.96 price level, the system would choose \$1.96 as the opening price.

Example 3: *Volume Based Tie Breaker (VBTB)*

If more than one equilibrium price results in the same maximum number of contracts executed and have the same "smallest" imbalance, the system will choose the price closest to the Volume Based Tie Breaker (VBTB), where the VBTB would be the midpoint of the SNBBO for the given series.

For this example, assume the SNBBO is \$1.97 x \$1.98 Midpoint = \$1.975. The \$1.97, \$1.96, and \$1.95 price levels all result in 100 contracts being executed with a zero imbalance. Since \$1.97 is closest to the VBTB of \$1.975, the system would choose \$1.97 as the opening price.

CumBid	BidQty	Price	AskQty	CumAsk	Match	Imb
100	100	mkt (bid)				
100		2.00	100	4,200	100	(4,100)
100		1.99	1,000	4,100	100	(4,000)
100		1.98	3,000	3,100	100	(3,000)
100		1.97		100	100	0
100		1.96		100	100	0
100		1.95		100	100	0
600	500	1.94		100	100	500
1,700	1,100	1.93		100	100	1,600
2,900	1,200	1.92		100	100	2,800
3,400	500	1.91		100	100	3,300
3,500	100	1.90		100	100	3,400
		mkt (ask)	100	100		

Example 4: *Midpoint of Imbalance Minimizing Prices*

If more than one equilibrium price results in the same maximum number of contracts executed, have the same "smallest" imbalance, and there is no VBTB available, the system will choose the midpoint of the highest and lowest potential opening price levels.

If the potential opening price levels are \$1.97, \$1.96, and \$1.95 with all price levels resulting in 100 contracts being executed with a zero imbalance, and the midpoint of the highest and lowest potential opening prices of \$1.97 and \$1.95 would be \$1.96, the system would choose \$1.96 as the opening price.

If the midpoint of the potential opening prices results in an invalid price, the system will round down to the nearest permissible increment.

If the potential opening price levels are \$1.96 and \$1.95, and the midpoint of the \$1.96 and \$1.95 price levels is \$1.955, the system would round up and choose \$1.96 as the opening price.

Risk Controls

All existing risk management controls apply to all complex orders and executions for customers that have applicable symbol or firm-level limits set.

- For **Rate Based** and **Absolute Notional Value** Checks, the system counts the notional value of all individual trades executed as part of a complex order execution.
- For **Rate Based** and **Absolute Volume** Checks, the system counts the volume of all individual trades executed as part of a complex order execution.
- For **Rate Based** and **Absolute Count** Checks, the system counts each individual trade executed as part of a complex order execution separately.
- For **Rate Based** and **Absolute Percentage of Quote** Checks, the system counts the percentage executed on the complex order, not on each individual leg.

Price Validations

Minimum Price Checks

The Exchange rejects any limit orders that would result in individual leg prints being priced below \$0.01 if executed at that limit price. For example, a complex instrument with a 1:3 ratio containing all buys must have a net limit price of at least \$0.04.

For Diagonal Spreads on SPX, SPXW, and VIX, the buffer value is -\$50.00. This applies to orders selling a near month expiration call (put) in strike 1 and buying a far month expiration call (put) in strike 2, where strike 2 is lower (higher) than strike 1 **(C1 only)**.

The Exchange rejects any limit orders where the limit price of the order is less than an Exchange determined buffer value for Calendar, Vertical, Diagonal, Butterfly, and Box Spreads.

For Roll Spread orders in all product classes the buffer value is -\$999,999.99.

For Calendar Spreads on VIX, SPX, and SPXW the buffer value is -\$50.00.

The current default buffer value applied for all other spread types and products is zero.

Zero-priced SPX/SPXW vertical or butterfly complex buy orders are rejected unless **FloorRoutingInst** (22303) = D or **TimeInForce** (59) = 3 **(C1 only)**.

Maximum Price Checks

The Exchange rejects any limit orders where the limit price of the order is greater than the intrinsic value of a Call or Put Vertical, Butterfly, or Box spread plus an Exchange determined buffer value. The current buffer value is set to zero.

Fat Finger Protection

The Fat Finger Protection for complex orders is based on the net price of the entire order relative to the SNBBO. Fat Finger Protection is available for all complex orders. Fat Finger checks are not applicable for any Multi-Class Spread instruments that only trade on the floor. However, Fat Finger checks are applicable for Multi-Class complex instruments containing only SPX or SPXW legs as they are eligible for trading on the electronic book.

Complex orders will have the Exchange default Fat Finger settings applied if they are not set by the customer. The current Exchange default settings for EDGX, C2, and BZX are shown below as a function of limit price range (absolute value):

Table 1. Fat Finger Default Settings

Abs. Value Limit Price Range	Fat Finger % Default	Fat Finger Dollar-Based Limit Default
\$0.00 - \$1.99	(none)	\$0.50
\$2.00 - \$5.00	(none)	\$0.75
\$5.01 - \$10.00	(none)	\$1.00
\$10.01 - \$20.00	(none)	\$1.50
\$20.01 - \$50.00	(none)	\$2.00
\$50.01 - \$100.00	(none)	\$3.00
\$100.01 & Above	4%	Not Valid

Customers have the ability to set more or less restrictive settings than the Exchange's default settings.

Maximum Size Checks

The Exchange prevents complex orders from executing or being placed on the complex book if the size of the complex order exceeds the complex order size protection designated by the customer. If the maximum size of complex orders is not designated by the customer, the Exchange will reject orders with a size greater than 999,999. The size of a complex order is calculated as order quantity times largest ratio on a leg of a complex order. Maximum size protection is available for all complex orders.

Market Order/Limit Order Drill-Through

Default Drill-Through Protections are applied to all complex limit and market orders that will cap the price of the order relative to the SNBBO at the time of order entry.

For complex orders not specifying a drill through override with **DrillThruProtection** (FIX 6253), the drill-through mechanism will repeatedly post the order at a more aggressive price. If the order reaches its limit price at any time during the iterative drill-through process, the order will remain at its limit price and the drill-through protection mechanism will not continue. The preset duration is one second.

Eligible complex orders may initiate a COA throughout the iterative process.

Exchange defaults are 5% through the contra side of the SNBBO. The price cap level will be no larger than \$0.25 through the contra-side SNBBO and no smaller than \$0.02 through the contra-side SNBBO. For complex SPX/SPXW, the price cap level will be no larger than \$2.00 through the contra-side SNBBO **(C1 Only)**.

Customers can optionally set more or less restrictive Drill-Through Protections on individual orders using **DrillThruProtection** on the **New Order Multileg** message.

Match Trade Prevention (MTP)

MTP is supported for complex orders when interacting with orders on the complex book and when legging in to the individual series books.

The Exchange supports the following limited set of MTP Modifiers for Complex-to-Complex and Complex legging transactions MTP enforcement:

- Cancel Newest (N)
- Cancel Oldest (O)
- Cancel Both (B)

Complex-to-Complex orders are prevented from trading with each other only if the specified MTP Identifiers (Firm, EFID, Port Owner) are the same. For example, if one order specified Firm and one order specified EFID, the orders would be allowed to trade.

A Complex order that legs into the individual series books will always be cancelled (rather than the simple order) regardless of the MTP Modifier, if the MTP Identifier on any individual series book order matches the MTP Identifier on the Complex Order.

Market Data

OPRA

Trade prints are broken out into the individual leg components when reported to OPRA. Please refer to the Character Types and Descriptions table in the [OPRA Binary Data Recipient Interface Specification](#) to determine the specific Message Category/Type used for reporting complex order trades to OPRA.

Complex Multicast PITCH

The Complex Multicast PITCH feed is used to disseminate real-time depth of book complex quotation and execution information in addition to Complex Instrument Definition information directly from the Exchange.

Updated quotations are sent using the **Add Order** message which will display the net price of a complex order resting on the complex order book for each Complex Instrument ID.

When a complex order on the complex order book is executed in whole or in part, the **Order Executed** message will be sent. The **Trade** message provides information about executions of Complex Order Auctions on the complex order book. **Trade** messages do not alter the view of the complex order book.

Complex instruments are published using the **Complex Instrument Definition** message each time a new complex instrument is created.

Additional details can be found within the [Cboe Titanium U.S. Options Complex Multicast PITCH Specification](#).

Complex Multicast TOP

The Complex Multicast TOP feed is used to receive real-time top of book quotations, last trade price and size, and cumulative volume data in addition to complex instrument definition information, related to complex orders, direct from the Exchange.

The quotations received via the Complex Multicast TOP feed provide an aggregated size and do not indicate the size or number of individual complex orders at the best bid or ask.

Complex instruments are published using the **Complex Instrument Definition** message each time a new complex instrument is created.

Options Auction Update and **Auction Summary** messages are used to disseminate indicative prices prior to the Opening Auction as well as to report the size of any executions occurring in the Opening Auction.

Market Update messages reflect real-time events that update the current state of the market using **Single Side Update** or **Two Side Update** messages. **Single Side Update** messages provide an updated price and size for a single side of a Complex Instrument ID while **Two Side Update** messages provide an updated price and size for both sides of a Complex Instrument ID.

Top Trade messages provide information about executions of Complex Orders necessary to calculate execution-based data but do not alter the complex order book. A **Top Trade** message is sent for every execution. One or more **Single Side Update** or **Two Side Update** messages will follow a **TOP Trade** message to reflect the updated complex order book.

Trading Status messages indicate the current status of a complex instrument. A **Trading Status** message is sent whenever a complex instrument's status changes.

Additional details can be found within the [Cboe Titanium U.S. Options Complex Multicast TOP Specification](#).

Complex Auction Multicast PITCH

The Complex Auction Multicast PITCH feed is used to receive real-time auction updates, execution information, and complex instrument definition information related to Complex Order Auctions, direct from the Exchange. The Complex Auction Multicast PITCH feed does not include information about any Opening Auctions.

Complex instruments are published using the **Complex Instrument Definition** message each time a new complex instrument is created.

Auction Notification messages are used to disseminate order details of each COA. Auctions will end after a defined time period known as the exposure period.

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

Additional details can be found within the [Cboe Titanium U.S. Options Complex Auction Multicast PITCH Specification](#) .

Cross Product Spread Symbol List (C1 Only)

The following OSI root based cross product spreads are found on Matching Engine Unit 35. With the exception of SPX:SPXW spreads, these spreads are only eligible to route to the floor.

Table 1. C1 Cross Product Spread Symbol List

Product	Ratio	Price Increment
DIA:DJX	1:1	Penny
DIA:DJXW	1:1	Penny
IWB:RUI	10:1	Penny
IWD:RLV	10:1	Penny
IWF:RLG	10:1	Penny
IWM:MRUT	1:1	Penny
IWM:RUT	10:1	Penny
IWM:RUTW	10:1	Penny
MRUT:RUT	10:1	Penny
MRUT:RUTW	10:1	Penny
MRUT:SPX	10:1	Penny
MRUT:SPXW	10:1	Penny
MRUT:XSP	1:1	Penny
OEF:OEX	10:1	Penny
OEF:SPX	20:1	Nickel
OEF:SPXW	20:1	Nickel
OEF:XEO	10:1	Penny
OEF:XSP	2:1	Penny
OEX:SPX	2:1	Penny
OEX:SPXW	2:1	Penny
OEX:XEO	1:1	Penny
OEX:XSP	1:5	Penny
RSP:SPEQW	4:1	Penny
RSP:SPEQX	4:1	Penny
RUT:SPX	1:1	Nickel
RUT:SPXW	1:1	Nickel
RUTW:SPX	1:1	Nickel
RUTW:SPXW	1:1	Nickel
SPEQW:SPX	8:1	Nickel
SPEQW:SPXW	8:1	Nickel
SPEQW:SPY	1:1	Penny
SPEQW:XSP	1:1	Penny
SPEQX:SPX	8:1	Nickel
SPEQX:SPXW	8:1	Nickel
SPEQX:SPY	1:1	Penny
SPEQX:XSP	1:1	Penny
SPESG:SPX	12:1	Nickel

Product	Ratio	Price Increment
SPESG:SPXW	12:1	Nickel
SPX:SPXW	0:0 (No ratio requirements)	Nickel
SPX:SPY	1:10	Nickel
SPX:XEO	1:2	Penny
SPX:XSP	1:10	Nickel
SPXW:SPY	1:10	Nickel
SPXW:XEO	1:2	Penny
SPXW:XSP	1:10	Nickel
SPY:XSP	1:1	Penny
VIX:VXX	1:1	Penny
VIX:VXX1	1:1	Penny
VIX:VXZ	1:1	Penny
VIXW:VXX	1:1	Penny
VIXW:VXX1	1:1	Penny
VIXW:VXZ	1:1	Penny
VXX:VXZ	1:1	Penny
VXX1:VXZ	1:1	Penny
XEO:XSP	1:5	Penny

Support

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

Revision History

Document Version	Date	Description
1.0.0	08/21/17	Initial draft version.
1.1.0	09/01/17	Added support for C2.
1.1.1	10/18/17	Cboe branding/logo changes. Removed Fat Finger Max % limits.
1.1.2	01/20/18	Removed unnecessary language concerning number of legs to be eligible for COA. Renamed Origin Code to Order Capacity for consistency with other specifications.
1.1.3	03/22/18	Removed old EDGX Options Fat Finger defaults.
1.1.4	05/03/18	Removed reference to Post Only RoutingInst (9303) for C2 as this feature will not be offered on day 1. Various grammatical corrections, formatting updates, and wording clarifications.
1.1.5	07/09/18	Added additional CIC Request Example for a spread spanning multiple OSI Roots.
1.1.6	07/17/18	Clarified Non-Marketable COA Response order behavior.
1.2.0	11/16/18	Updated for C1 migration to Bats Tech.
1.2.1	11/30/18	Corrected "Complex Options Auction" to "Complex Order Auction".
1.2.2	06/14/19	Updated ineligible leg in scenarios cross product spreads. Removed references to Market Snapshot messages which were sunset 02/28/2019. Added notes indicating Complex AIM and QCC will be available on EDGX, effective with C1 Feature Pack 8.
1.2.3	06/28/19	Added note indicating EDGX will support Complex Auctions with support for underlying stock legs, effective with C1 Feature Pack 9.
1.2.4	07/01/19	Added details about types of instruments created with stock legs in Complex Orders with Stock Legs section.
1.2.5	07/10/19	Updated effective date for C-AIM on EDGX to TBD.
1.2.6	07/17/19	Added detail to Order Capacities section that on C1 orders in SPX and SPXW with a capacity of "M" (Market Maker) or "N" (Away Market Maker) may not rest on the complex book during RTH.
1.2.7	08/09/19	Added note indicating support for C-AIM on EDGX will be effective 08/22/19.
1.2.8	08/30/19	Added section listing Cross Product Spreads on Matching Engine 35 for C1.
1.2.9	10/03/19	Added ratios to Cross Product Spread Symbol List.
1.2.10	10/14/19	Updated Minimum Price Checks for Roll Spreads (all markets) and Calendar Spreads on C1.
1.2.11	10/21/19	COA timer updated from 50 ms to 100 ms.
1.2.12	02/3/20	Updated C-SAM section to indicate C-SAM is supported on EDGX (effective 2/3/20).
1.2.13	06/09/20	Added Ratios for Combo Orders section for FLEX Index Combos (effective 6/15/20).
1.2.14	06/10/20	For Diagonal Spreads on SPX, SPXW, and VIX the buffer value is -\$50.00. (effective 6/12/20).
1.2.15	07/28/20	Updated Drill-Through Protection values (effective 08/05/20).
1.2.16	08/11/20	Added SPX/RUT and SPXW/RUTW to the Cross Product Spread table (effective 08/21/20).
1.2.17	08/27/20	Added SPESG to the Cross Product Spread table (effective 09/21/20).
1.2.18	10/6/20	Added additional execution venue information for complex orders with stock legs. Added Position Compression Cross section (effective 10/28/20) C1 only .
1.2.19	10/14/20	Added note that Complex PCC orders will not support SPX and SPXW as legs within the same instrument and added SBBO information. Updated drill-through procedures to be iterative (effective 11/9/20 on EDGX and 11/10/20 on C1 and C2)
1.2.20	11/5/20	Updated iterative drill-through procedures effective date (effective 11/16/20 on EDGX and 11/17/20 on C1 and C2).

Document Version	Date	Description
1.2.21	12/17/20	Added Related Futures Cross section (effective 01/19/21) (C1 only).
1.2.22	02/01/21	Added MRUT to Cross Product Spread Symbol List (effective 03/01/21).
1.2.23	03/25/21	Added notes identifying new Curb session (C1 only) (effective 04/25/22 TBD 02/07/22 TBD 09/27/21 Q3 2021). Added note indicating complex instruments not tied to a working GTC will be purged at the end of the Curb session each day and will not carry over to the next day (effective 01/24/22 TBD 09/27/21 Q3 2021). Added notes identifying new GTH expanded hours (C1 only) (effective 11/21/21 Q4 2021). Removed mention of BZX Options Exchange in section 2.3.3, as Complex Orders do not trade on BZX.
1.2.24	04/05/21	Added note indicating Fat Finger Protection will not be applicable for multi-class spread limit orders (effective 04/20/21).
1.2.25	05/13/21	Added note related to CumQty rounding for Complex Floor Orders. Updated Curb session effective date to 04/25/22 TBD 02/07/22 TBD 09/27/21.
1.2.26	06/08/21	A maximum of 16 legs will be allowed on complex orders (effective 08/25/21 08/09/21).
1.2.27	07/07/21	Added section 2.3.4 detailing eligibility of non-FLEX combos for COA, COB, and AIM with a ratio of up to 8 options to 1 combo (effective 07/09/21).
1.2.28	08/02/21	Updated effective date for 16 legs allowed on complex orders to 08/25/21.
1.2.29	08/27/21	Updated Curb session effective date to 04/25/22 TBD 02/07/22 TBD.
1.2.30	11/04/21	Updated Curb session effective date to 04/25/22 TBD 02/07/22. Updated effective date for GTC behavior at end of Curb session to 01/24/22.
1.2.31	02/01/22	Updated Curb session effective date to 04/25/22 TBD.
1.2.32	03/07/22	Automated handling of Index Combo orders will be extended to include multiple combos (effective 03/20/22).
1.2.33	03/21/22	Complex orders of any ratio will be allowed with a net/package price in \$.01 increments, except for SPX/SPXW which must have a net/package price in \$.05 increments (C1 only) (effective 06/12/22 TBD 05/15/22 04/24/22).
1.2.34	04/04/22	Updated Curb session effective date to 04/25/22.
1.2.35	04/20/22	Clarified ratios for combo orders in section 2.3.4. Updated complex orders net price increments effective date to (06/12/22 TBD 05/15/22) (C1 only)
1.2.36	05/12/22	Updated effective date for new complex order net price increments and electronic handling behavior to 06/12/22 TBD (C1 only).
1.2.37	06/03/22	Updated effective date for new complex order net price increments and electronic handling behavior to 06/12/22 (C1 only).
1.2.38	07/01/22	Complex option orders with any ratio may be submitted with a net price in \$.01 increments. Automated handling via COA, COB, AIM, and QCC, as applicable, will be available for applicable non-conforming orders (C2 and EDGX only) (effective 07/18/22).
1.2.39	07/27/22	Automated handling via C-SAM will be available for applicable non-conforming orders (C1 and EDGX only) (effective 08/14/22).
1.2.40	10/17/22	Zero-priced SPX/SPXW vertical or butterfly complex buy orders will be rejected unless FloorRoutingInst (22303) = D or TimeInForce (59) = 3 (C1 only) (effective 11/20/22).
1.2.41	11/07/22	Added XSP to GTH and Curb sessions (effective 12/11/22).

Document Version	Date	Description
1.2.42	01/06/23	Updated order capacities for COA in section 2.3.3. Removed 8:1 and 3:1 ratio restrictions for non-FLEX Index combo orders in section 2.3.4. Updated starting leg price requirement in section 3.1. Added number of legs allowed for FLEX with price type DAC in section 3.1.2. Updated supported order capacities for FLEX in section 3.1.3. Removed 8:1 and 3:1 ratio restrictions for FLEX Index combo orders in section 3.1.4. Removed 8:100 ratio restriction for Options to Stock in section 11.1. Updated number of supported legs to 16 for complex PCCs in section 12. Updated section 16.2.5. to clarify complex orders do not initiate a SUM auction.
1.2.43	02/23/23	Updated section 11.6 to clarify that stock legs can be priced up to a buffer amount above (below) the NBBO.
1.2.44	06/29/23	Updated COA, C-AIM, and C-SAM auction responses with new behavior (effective 07/31/23 for C1 Unit 1, effective 08/07/23 for C1 all Units).
1.2.45	07/12/23	Box Swaps will be permitted to trade in pennies (C1 only) (effective 08/07/23).
1.2.46	08/29/23	Complex instruments will support a maximum of 100 legs on non-FLEX 'Floor-Routed' orders (C1 only) (effective 09/25/23).
1.2.47	10/16/23	Automated handling of SPX/SPXW non-conforming spreads will be enabled in GTH (C1 only) (effective 11/20/23).
1.2.48	11/03/23	For SPX/SPXW, the COA and C-AIM additional timer will be 100ms (C1 only) (effective 11/20/23).
1.2.49	01/10/24	Effective 04/29/24 03/11/24, equity legs will be allowed on FLEX orders. FLEX orders will allow up to 99 options legs and one equity leg while FLEX DAC orders will allow up to 98 options legs and one equity leg.
1.2.50	01/29/24	Added MXACW/ACWI and MXWLD/URTH to the Cross Product Spread table (effective 03/18/24).
1.2.51	02/13/24	Clarified that stock legs can be traded up to \$0.005 outside of the NBBO (not LULD bands) if necessary to avoid residual amounts.
1.2.52	03/08/24	Updated effective date for equity legs allowed on FLEX Orders to 04/29/24.
1.2.53	04/02/24	Added section on Exchange Designated Complex Instruments (C1 only) (effective 06/24/24).
1.2.54	04/12/24	Updated section 2.3.3 Order Capacities to indicate orders in VIX/VIXW with a capacity of "M" or "N" cannot rest on the complex book during RTH (C1 only) .
1.2.55	05/30/24	Noted in section 2.3.3 Order Capacities that on C1, orders in SPX/SPXW and VIX/VIXW with a capacity of "M" or "N" cannot rest on the complex book during RTH, except as otherwise permitted under Exchange Rule 5.33(b).
1.2.56	11/19/24	Effective 12/04/24 on C2 and 12/06/24 on EDGX, at the conclusion of an auction response or exposure period, the Matching Engine will continue processing messages, including auction responses, for up to an additional 100ms. Effective 12/09/24, all C1 Matching Units will increase the additional timer to 100ms.
1.2.57	12/03/24	Updated the Complex Orders with Stock Legs (C1 and EDGX only) section to indicate equity legs of stock-option orders will be allowed to execute outside of the equity NBBO by no more than a buffer amount of \$0.25 (effective 12/16/24).
1.2.58	02/11/25	Updated with Cboe Titanium branding.
1.2.59	03/25/25	Added SPEQX to Cross Product Spread Symbol List (C1 Only) (effective 04/14/25).
1.2.60	04/29/25	For SPX/SPXW, the COA and C-AIM additional timer will be 900ms (C1 only) (effective 05/12/25).
1.2.61	05/23/25	Effective 06/02/25, the price check buffer value will be set to zero.

Document Version	Date	Description
1.2.62	07/02/25	Updated Order Entry to indicate that Market-Makers may submit complex orders for select Exchange Designated Complex Options to the Cboe Exchange using Complex Quoting over Bulk Quoting Ports (effective 09/15/25 08/18/25). Updated Legging Into Individual Series to indicate that Complex orders introduced using Complex Quote Update messages on BOE Bulk Quoting ports cannot leg into the simple book (effective 09/15/25 08/18/25).
1.2.63	07/24/25	Specification updated to indicate complex functionality is available for all Cboe Options Exchanges, with BZX Options complex functionality effective on 10/13/25.
1.2.64	07/25/25	Added P.M.-settled S&P 500 Equal Weight Index Options symbols to Cross Product Spread Symbol List (C1 Only) (effective 08/25/25).
1.2.65	07/25/25	Updated Cowen to TD Securities (USA) LLC.
1.2.66	08/11/25	Updated complex orders functionality effective date to 09/15/25.
1.2.67	11/03/25	Updated Instrument Creation to indicate that firms will be limited to creating 40,000 Complex instruments per trading day per underlying symbol on C1 and 25,000 per day per underlying symbol on BZX, C2, and EDGX (effective 11/17/25).
1.2.68	11/19/25	Updated Opening Process Queuing Period to reflect 8pm ET pre-market queuing period for GTH eligible products and 7:30am ET queuing period for RTH only products.
1.2.69	01/13/26	Added new section for Stop Complex Order Auction (effective TBD 05/18/26 TBD).
1.2.70	03/27/26	Removed references to MXEA/MXEF/MXUSA/MXWLD.
1.2.71	04/06/26	Updated Stop Complex Order Auction effective date to TBD 05/18/26 .
1.2.72	05/14/26	Updated Stop Complex Order Auction effective date to TBD. Updated Cross Product Spread Symbol List (C1 Only) to include DJXW (effective 05/18/26).
1.2.73	07/06/26	Noted the maximum additional time spent reading auction responses for all C1 only Matching Units is 900ms (effective 07/20/26).