Options Clearing Trade Interface (CTI)

Specification. Version 3.0

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1. Overview

The Options Clearing Trade Interface (CTI) is a direct data product offered by Nasdaq for the following option exchanges:

- Nasdaq ISE (ISE)
- Nasdaq GEMX (GEMX)
- Nasdaq MRX (MRX)
- Nasdaq BX Options (BX)
- Nasdaq PHLX (PHLX)

CTI sends the following messages:

- Clearing trades, trade corrections and trade cancels on a low latency, real-time basis. – Routed to a given firm's connection based on:
- Clearing Member Trade Agreement (CMTA) or Options Clearing Corp. (OCC) Number and/or
- Exchange Badge or House Number and/or
- Exchange Internal Firm Identifier (IFI)
- Optional administrative messages:
  - Options directory messages to relay option symbol and contract information for those options traded on the exchange.
  - Complex Order Strategy Messages to relay information for those strategies traded on the exchange (available for PHLX/ISE/MRX). The Strategy Message lists the legs which compose the Strategy and the leg ratios which uniquely define this Strategy for an underlying.
  - Trading action messages to inform market participants when a specific option or strategy is halted or released for trading on the exchange.

2. Architecture

2.1. Network protocol

Messages are transported using SoupBinTCP v3.00 on top of TCP/IP.

2.2. Connection

Due to scaled nature of the exchange system and need to minimize latency, connecting firms need to support at least one direct connection to each exchange subsystem where trades can come from.

Connection type	Number of instances	Description
Matching system	One	Matching system is scaled into multiple independent "rings" with each ring generating trades for a specified range of options. Option directory and complex strategy messages can be used to determine what options and complex strategies are served by a given subsystem.

All venues will have one connection to the match ring. There will no longer be a need to connect to Route ring since the routing information will be available in the match ring connection.

2.3. Failover

Message gaps due to short connection losses are easily recovered by reconnecting to the exchange with the last sequence number processed by the firm before disconnect. SoupBinTCP supports a store on the exchange side where it keeps all messages for a trading session sorted by sequence numbers regardless of the client's connection state. SoupBinTCP will send all sequenced messages starting with the sequence number requested by the firm upon login.

Upon certain failures CTI may be restarted. None of the trades are going to be lost. All messages in the CTI message store will be recreated. Trades, trade corrections and cancels will be marked as "possible duplicates". After recovery if firms reconnect with sequence number 1, they should be ready to process "possible duplicates" accordingly.

In the event of catastrophic issues, the whole exchange system may be restarted in the middle of the trading day (intraday session roll-over). In this case, a new SoupBinTCP session will be started. The CTI message store will be empty and not have trades/etc. from the previous session. Firms have to login with sequence number 1. Trade ids are guaranteed to be unique across sessions for the same trading day.

2.4. Backup

For each connection block, the exchange provides a backup with connections that have the same subscription and port as the primary connection block but different IP addresses.

If there is a physical problem with one of the primary connections, firms can switch to the corresponding backup connection immediately. There is one backup connection for each primary connection. For smooth transition, it is recommended to login to the backup connection with the last sequence number received on the primary connection before it went down.

If there is a physical problem with the whole datacenter which affects all connections and the problem is not going to be fixed until next day, firms have to be ready to connect to the disaster recovery site on the next day.

3. Subscription

Firms can configure their connections (each connection block separately) to route trade related messages based on the following match criteria (entitlements):

OCC clearing number(s), and/or CMTA and/or

Exchange badge(s) (house number + suffix,), and/or

Exchange house number(s) (used by PHLX specialists and order providers) and/or

IFI (exchange internal firm identifier which describes a group of exchange badges or/and houses)

"Excluding" logic is not supported. For example, "send all trades for OCC number 123 to a given connection block" is a valid configuration while "...except trades for badge 789-A" is not. Trade routing by firm names is not supported at this time either.

If an order provider supplies a CMTA number, CMTA number will be used for routing decisions instead of the order provider's default OCC clearing number. Firms can now optionally elect thru subscriber services to route trades based on the order provider's original OCC clearing number (give-up) when a CMTA is supplied.

By default, all non-trade related messages (events, options, strategies, and trading actions) are routed to the firms unconditionally. It is possible to request configuring firms' connections for sending only trade related messages without any events, options, strategies, and trading actions.

4. Exchange Specific Messages

Firms connecting to PHLX, ISE and MRX options market will see all message types and field values described in the document related to the following functionality:

- Block Auctions
- Facilitation Auctions
- Complex Facilitation Auctions
- Solicitation Auctions
- Complex Solicitation Auctions
- Complex Exposure Auctions
- PIM/PIXL Auctions (Price improvement auction)
- Complex PIM/PIXL Auctions
- QCC orders (Qualified Contingent Cross)
- Customer to Customer Cross
- Flex Auctions (PHLX and ISE only)
- Complex Flex Auctions (PHLX and ISE only)

Firms connecting to GEMX and BX Options Exchanges will see all message types and field values described in the document related to the following functionality:

- Block Auctions
- Facilitation Auctions
- Solicitation Auctions
- PIM Auctions (Price improvement auction)
- QCC orders (Qualified Contingent Cross)
- Customer to Customer Cross

5. Messages

CTI will support three basic types of messages:

- System Events
- Administrative Data
- Trade related information

A firm can request configuring its lines to send only trade related information. All integer fields are unsigned big-endian (network byte order) binary numbers. All alphanumeric fields are left justified and padded on the right with spaces.

Trade Prices are long fields. When converted to a decimal format, prices are in fixed point format with 13 whole number places followed by 6 decimal digits. So price 1.3 will be a long number with value of 1300000.

All other price fields are integer. When converted to a decimal format, prices are in fixed point format with 13 whole number places followed by 4 decimal digits. So price 1.3 will be a long number with value of 13000.

Each message has a time located at offset 1 (Seconds, Nanoseconds). This time reflects the time when the message was created by the system not sent out. If firms connecting to CTI request to resend the message on reconnect, the message time will not change. “Seconds” is the number of whole seconds after midnight of the day and “Nanoseconds” is the remaining sub-second portion of the time. The “Seconds” field will have a range of 0 to 86400 (i.e. 12:00:00am to 11:59:60pm (Leap second)) and “Nanoseconds” will have a range of 0 to 999999999. All times in this protocol are U.S. Eastern Time zone.

Each message has a 1byte version number at offset 9 indicating current CTI message version. Version number is decoded as Mn, where M is major version and n is minor version. For example, CTI version 2.0 will be sent as 20, 1.3 will be sent as 13.

5.1. System Event

The system event message is used to signal a ring wide event.

Name	Offset	Size	Value	Notes
Message type	0	1	“S”	System event message
Seconds	1	4	Integer	Seconds portion of timestamp
Nanoseconds	5	4	Integer	Nanoseconds portion of timestamp
Version	9	1	Integer	CTI version (currently set to 30)
Event code	10	1	Alpha	Refer to System Event Codes below

Event Code	Explanation	When (typically)
“O”	Start of Messages. This is always the first message sent in any trading day.	After ~4:00am
“S”	Start of System Hours. This message indicates that the exchange is ready to start accepting orders.	7:00am
“Q”	Start of Opening Process. This message is intended to indicate that the exchange has started its	9:30:00am opening process.
“N”	End of Normal Hours Processing. This message is intended to indicate that the exchange will no longer accept any new orders or changes to existing orders for options that trade during normal hours.	4:00:00pm
"L"	End of Late Hours Processing. This message is intended to indicate that the exchange will no longer accept any new orders or changes to existing orders for options that trade during extended hours.	4:15:00pm
“E”	End of System Hours. This message indicates that the system is now closed.	~5:30pm
“C”	End of Messages. This is always the last message sent in any trading day.	~5:35pm
“W”	End of WCO Early closing. (PHLX only) This message is intended to indicate that the exchange will no longer accept any new orders or changes to existing Orders on last trading date of WCO options.	12:00 Noon

5.2. Options Directory

At the start of each trading day, the exchange disseminates directory messages for all symbols trading on a given ring.

Name	Offset	Size	Value	Notes
Message type	0	1	“D”	Options directory message
Seconds	1	4	Integer	Seconds portion of timestamp
Nanoseconds	5	4	Integer	Nanoseconds portion of timestamp
Version	9	1	Integer	CTI version (currently set to 30)
Option id	10	4	Integer	Option id assigned by exchange daily
Security symbol	14	8	Alpha Numeric	Option “root” symbol
Expiration year, month and day	22	2	Integer	Expiration date of the option: Bits 0-6 = Year (0-99) Bits 7-10 = Month (1-12) Bits 11-15 = Day (1-31) Bit 15 is least significant bit
Strike price	24	4	Integer	Strike price of the option (see Messages section for field processing)

Name	Offset	Size	Value	Notes
Option kind	28	1	Alpha	"C" = Call "P" = Put
Underlying Symbol	29	13	Integer	Underlying stock symbol (left justified, space filled)
Option closing type	42	1	Alpha	"N" = Normal hours "L" = Late hours "W" = WCO Early Closing at 12:00 Noon (PHLX Only)
Tradable	43	1	Alpha	Y = Tradable N = Non-Tradable
MPV	44	1	Alpha	Minimum Price Variation for this option. See Notes below for further explanation: "E" = penny Everywhere "S" = Scaled "P" = penny Pilot
Closing Only	45	1	Alpha	"Y" = Option is Closing Position Only. Only MM origin orders can have open position in the series. "N" = Option is not Closing Position Only.
Contract Size	46	4	Integer	Underlying Deliverable size
(Reserved)	50	16	Alpha	Reserved for future use

NOTE: The options directory messages are sent once per symbol, typically before the "Start of System Hours" System Event. Should it be necessary, intra-day updates to this message will be sent as they occur.

The Minimum Price Variation (MPV) has the following values:

a. "E" – All prices are in penny increments
b. "S" – Prices below $3.00 are in increments of $0.05, prices above $3.00 are in increments of $0.10
c. "P" – Prices below $3.00 are in increments of $0.01, prices above $3.00 are in increments of $0.05

5.3. Complex Order Strategy (Specific to PHLX/ISE/MRX only)

This is the strategy associated to a complex order. The Strategy ID assigned for a new complex strategy is unique for a particular complex instrument for a trading session however Strategy IDs are independent of session Option IDs and uniqueness of the IDs across both complex and simple options is not guaranteed.

Name	Offset	Size	Value	Notes
Message type	0	1	"R"	Complex order strategy message
Seconds	1	4	Integer	Seconds portion of timestamp
Nanoseconds	5	4	Integer	Nanoseconds portion of timestamp
Version	9	1	Integer	CTI version (currently set to 30)
Strategy id	10	4	Integer	Strategy id assigned daily
Underlying Symbol	14	13	Integer	Underlying stock symbol (left justified, space filled)
Action	27	1	Alpha	State of the strategy: "A" = Add "D" = Delete
Reserved	28	16	N/A	Reserved for future use
Number of legs	44	1	Integer	Number of legs in the strategy NOTE: Leg field offsets below are an equation, where "n" is the zero based leg number (0, 1, ...)

Name		Offset	Size	Value	Notes
Leg information, legs repeated. n = 0, 1,...	Option id	32n + 45	4	Integer	Option id for this leg (matches with id in the options directory message). Zero for stock leg
	Security symbol	32n + 49	8	Alpha Numeric	Option “root” symbol. Blank for a stock leg (use underlying symbol instead)
	Expiration year, month and day	32n + 57	2	Integer	Expiration date of the option: Bits 0-6 = Year (0-99) Bits 7-10 = Month (1-12) Bits 11-15 = Day (1-31) Bit 15 is least significant bit Zero for stock leg.
	Strike price	32n + 59	4	Integer	Strike price of the option (see Messages section for field processing). Zero for stock leg.
	Option kind	32n + 63	1	Alpha	“C” = Call “P” = Put “ “(space) = Stock leg
	Side	32n + 64	1	Alpha	“B” = Leg is on buy side “S” = Leg is on sell side
	Leg ratio	32n + 65	4	Integer	Strategy leg ratio
	Reserved	32n + 69	8	N/A	Reserved for future use

5.4. Security Trading Action

This administrative message indicates the current trading status of an option within the exchange.

The exchange will send out a Trading Action message with the “T” (Trading resumed) for all options that are eligible for trading at the start of the Options Market system hours. If a security is absent from the pre-opening Trading Action spin, firms should assume that the security is being treated as halted at the start of the system hours.

Name	Offset	Size	Value	Notes
Message type	0	1	“H”	Trading action message
Seconds	1	4	Integer	Seconds portion of timestamp
Nanoseconds	5	4	Integer	Nanoseconds portion of timestamp
Version	9	1	Integer	CTI version (currently set to 30)
Option id	10	4	Integer	Option id assigned by exchange daily
Security symbol	14	8	Alpha Numeric	Option “root” symbol
Expiration year, month and day	22	2	Integer	Expiration date of the option: Bits 0-6 = Year (0-99) Bits 7-10 = Month (1-12) Bits 11-15 = Day (1-31) Bit 15 is least significant bit
Strike price	24	4	Integer	Strike price of the option (see Messages section for field processing)
Option kind	28	1	Alpha	“C” = Call "P” = Put
Current trading state	29	1	Alpha	Current trading state for the option on the exchange: “H” = Halt in effect “T” = Trading resumed

5.5. Complex Trading Action (Specific to PHLX/ISE/MRX only)

This administrative message indicates the current trading status of a strategy within the exchange.

The exchange will send out a Strategy Trading Action message with the "T" (Trading Resumed) for all strategies that are eligible for trading at the start of the Options Market system hours. If a strategy is absent from the pre-opening Trading Action spin, firms should assume that the strategy is being treated as halted at the start of the system hours.

Name	Offset	Size	Value	Notes
Message type	0	1	"I"	Strategy trading action message
Seconds	1	4	Integer	Seconds portion of timestamp
Nanoseconds	5	4	Integer	Nanoseconds portion of timestamp
Version	9	1	Integer	CTI version (currently set to 30)
Strategy id	10	4	Integer	Strategy id assigned daily
Current trading state	14	1	Alpha	Current trading state for the strategy on the exchange: "H" = Halt in effect "T" = Trading resumed

5.6. Trade

The exchange sends trades and corrections using this message. Trade cancels can be delivered using this message too if configured on the firm's request but by default CTI sends cancels using different message type (see Trade Cancels section below). Note that CTI trades differ from executions sent on FIX, SQF, or OTTO interface. Executions concern only with price and total volume traded while clearing trades have to provide information about contra sides. FIX, SQF and OTTO users will get execution information about their side only whereas CTI users will get the execution along with contra side information.

Each field has an indicator on the right side specifying if the field is populated for a specific exchange. Following code is used to denote each of the exchanges where CTI is available.

Exchange	Code
PHLX	X
NOM	Q
BX	T
ISE	I
GEMX	H
MRX	J

Name	Offset	Size	Value	Notes
Message type	0	1	"T"	Trade message
Seconds	1	4	Integer	Seconds portion of trade time
Nanoseconds	5	4	Integer	Nanoseconds portion of trade time
Version	9	1	Integer	Currently set to 30
Send type	10	1	Alpha	"S" = Send (original transmission) "P" = Possible duplicate (unsolicited retransmission)
Symbol Information				
Option id	11	4	Integer	Option id assigned by exchange daily. Zero for stock leg.
Underlying symbol	15	13	Alpha	Underlying stock symbol (left justified, space filled)
Security symbol	28	8	Alpha numeric	Option "root" symbol. Blank for stock leg.

Name	Offset	Size	Value	Notes
Expiration year, month and day	36	2	Integer	Expiration date of the option: Bits 0-6 = Year (0-99) Bits 0-6 = Year (0-99) Bits 7-10 = Month (1-12) Bits 11-15 = Day (1-31) Bit 15 is least significant bit. Zero for stock leg.
Strike price	38	4	Integer	Strike price of the option (see Messages section for field processing). Zero for stock leg.
Option kind	42	1	Alpha	“C” = Call “P” = Put “ “(space) = Stock leg
Flags	43	2	Integer	Bit 0: Symbol in Penny Pilot (0=no, 1=yes) Bit 1: Symbol In Make/Take Program (0=no, 1=yes) Bit 2: Single Listed (0=no, 1=yes) (Will be available at a future date) Bit 3: Weekly Expiration (0=no, 1=yes) (Will be available at a future date) Bit 4: Monthly Expiration (0=no, 1=yes) (Will be available at a future date) Bit 5: Quarterly Expiration ((0=no, 1=yes) (Will be available at a future date) Bit 6-15: Not Used Bit 15 is least significant bit. When available, only one of Bits 3, 4 and 5 will be set to 1 for an option.
(Reserved)	45	4	N/A	Reserved for future use
			Trade Information	
Transaction Type	49	1	Alpha	“X” = new trade “Y” = trade correction “Z” = trade cancels (if trade cancel messages are to be sent using this message. See Trade Cancels description below)
Liquidity	50	1	Integer	See Liquidity Codes Table below.
Trade id	51	4	Integer	Clearing trade Id. Coupled with correction number and trade side uniquely identifies a clearing trade for a given day.
Correction number	55	2	Integer	Trade correction number. 0 for new trades. Used to identify version of the trade being corrected.
Cross id	57	4	Integer	Trade Group Id. Ties together all clearing trades of a given atomic transaction in the matching engine. 0 if cross id is not available.
Match ID	61	4	Integer	Execution Id of the trade being cancelled
Auction id	65	4	Integer	Auction id for trades resulting from an auction. E.g. Complex Order Live Auction (Exposure/COLA),PIXL/ PRISM/PIM Auction, etc.... or 0 if none.

Name	Offset	Size	Value	Notes
Auction Type	69	1	Alpha	Auction Type for trades resulting from an auction. Values: 'P' = Simple Order PIXL/PRISM/PIM 'Q' = Complex Order PIXL/PIM 'O' = Opening 'C' = Complex Order Live Auction (COLA)/ISE Exposure Auction (CAO) 'Z'= Complex Opening Auction (PHLX ONLY) 'S' = Simple Order Solicitation 'R' = Complex Order Solicitation F = Simple Facilitation G = Complex Facilitation B = Block 'X' = Flex Auction (PHLX and ISE only) 'Y' = Complex Flex Auction (PHLX and ISE only) ' ' = No Auction Note: This field will be blank for Manual Trades
Ref trade id	70	4	Integer	For corrected trades, trade id of prior trade. 0 if never corrected. See examples for details.
Ref correction number	74	2	Integer	For corrected trades, correction number of prior trade. 0 if never corrected. See examples for details.
Ref Match Id	76	4	Integer	For corrected trades, Execution Id of the prior trade.
Execution Type[1]	80	1	Alpha	"A" = automatic "M" = manual
Execution market	81	1	Integer	For stock trades on PHLX/ISE/MRX " "(space) = Stock Legs For Options Away execution market id: "A" = AMEX "B" = BOX "C" = CBOE "D" = MIAX Emerald "I" = ISE "N" = NYSE "Q" = NASDAQ "W" = C2 "Z" = BATS "X" = PHLX "T" = BX Options "M" = MIAX "P" = MIAX Pearl "H" = GEMX "E" = BATS EDGX "J" = MRX "U" = MEMX "S" = MIAX Sapphire " " (space) = Not away trade
Trade side	82	1	Alpha	"B" = Buy "S" = Sell
Trade price	83	8	Long	Trade price (see Messages section for field processing)
Trade contracts	91	4	Integer	Trade contracts

Name	Offset	Size	Value	Notes
Side changed	95	1	Alpha	"Y" = for new trades and corrections that affected this side of the trade "N" = for corrections that affected only contra side (see examples for details)
Strategy id	96	4	Integer	Complex order strategy id which this trade is associated with. If either side of the trade involves a Complex Order, this field will be populated. Otherwise 0.
Strategy leg	100	2	Integer	Leg reference if the trade involves a complex order or sweep. If either side of Integer the trade involves a Complex Order, this field will be populated. The reference is a leg index (starting from 0) in Complex order strategy message.
(Reserved)	102	8	N/A	Reserved for future use
Same Side Clearing Information				
OCC clearing number	110	4	Integer	OCC clearing number or CMTA provided by firm
Give-up OCC clearing number	114	4	Integer	OCC clearing number of the giving-up firm if OCC clearing number above is CMTA. Otherwise 0.
Exchange clearing number	118	4	Integer	Exchange assigned clearing number
Exchange house	122	4	Integer	Exchange assigned house number
Exchange suffix	126	1	Alpha	Exchange assigned house suffix for market makers (badge suffix)
Capacity[3]	127	1	Alpha	"C" = Customer "P" = Professional Customer "B" = Broker Dealer Customer "M" = Exchange Registered Market Maker "O" = Other Exchange Registered Market Maker (FARMM/ AWAYMM) " " = Not Applicable (In Case of stock leg execution or routed away execution) "J" = Joint BackOffice (JBO) "F" = Firm
Multi Account[4]	128	5	Alpha numeric	Sub or multi account
Broker	133	4	Alpha	Floor broker number/Executing Broker
2nd broker	137	4	Integer	2nd floor broker number

Name	Offset	Size	Value	Notes
Origin Market	141	1	Alpha	Originating market of the order for market makers (FIX tag 207 “Security Exchange”): “A” = AMEX B” = BOX “C” = CBOE “I” = ISE “N” = NYSE “Q” = NASDAQ “W” = C2 “X” = PHLX “T” = BX Options “M” = MIAX “H” = GEMX “E” = BATS EDGX “J” = MRX “U” = MEMX "D" = MIAX Emerald "S" = MIAX Sapphire “ “ = Not Applicable (In case the capacity of this side of trade is not ‘O’).
Account	142	32	Alpha numeric	Account as specified in the order (FIX tag 1 “Account”)
NSCC	174	4	Integer	NSCC clearing number for a stock leg
MPID	178	5	Alpha numeric	MPID for the Stock Leg
Clearing Flags	183	2	Integer	Bit 0: Priority Market Maker (0=no, 1=yes
Executing Broker	185	4	Alpha	Executing Broker
Reserved[2]	189	6	N/A	Reserved for future extension
Contra Side Clearing Information				
OCC clearing number	195	4	Integer	OCC clearing number or CMTA provided by firm
Give-up OCC a clearing number	199	4	Integer	OCC clearing number of the giving-up firm if OCC clearing number above is CMTA. Otherwise 0.
Exchange clearing	203	4	Integer	Exchange assigned clearing number
Exchange house	207	4	Integer	Exchange assigned house number
Capacity[3]	211	1	Alpha	“C” = Customer “E” = Proprietary Customer “R” = Retail Customer “P” = Professional Customer “B” = Broker Dealer Customer “M” = Exchange Registered Market Maker “O” = Other Exchange Registered Market Maker (FARMM/AWAYMM) “ “ = Not Applicable (In Case of stock leg execution or routed away execution) “J” = Joint BackOffice (JBO) “F” = Firm “f” = Proprietary Firm “K” = Broker Dealer – Firm
Broker	212	4	Integer	Floor broker number
2nd broker	216	4	Integer	2nd floor broker number
NSCC	220	4	Integer	NSCC clearing number for a stock leg
MPID	224	5	Alpha Numeric	For PHLX, NASDAQ assigned MPID number for a stock leg. For ISE/MRX, MPID of the firm at the stock executing venue.

Name	Offset	Size	Value	Notes
Reserved[2]	229	8	N/A	Reserved for future extension
Same Side Origin Information				
Firm	237	4	Alpha numeric	Firm Identifier for the order or Quote
Order date	241	2	Integer	Date when a FIX order is Bits 0-6 = Year (0-99) Bits 7-10 = Month (1-12) Bits 11-15 = Day (1-31) Bit 15 is least significant bit 0 if the order is not a GTC or GTD order.
Order id	243	30	Alpha numeric	Right padded FIX/OTTO order id or spaces. Will be populated with CLOrderID
Quote id	273	8	Binary	Quote id for quotes with ids (from SQF feed v6 and higher). Right padded "1" for quotes without ids. Spaces if this side of the trade is a not a quote.
SQF Sweep id	281	8	Binary	Sweep id for order sweeps with ids (from SQF feed v6 and higher). Right Binary padded "1" for sweeps without ids. Spaces if this side of the trade is a not a sweep.
Open/Close indicator	289	1	Alpha numeric	Open/Close indicator from FIX/OTTO orders. " "(space) for stock leg
Customer strategy leg	290	10	Alpha numeric	Leg reference id of a complex order as sent by the customer or spaces
Short sell	300	1	Alpha	Short sell for a stock leg: "Y" = Short Sale "N" = Not a Short Sale "E" = Short Sale Exempt " " = Not Applicable (Not a Stock Leg)
Principal agent	301	1	Alpha	Capacity for a stock leg: A" = Agency Order "P" = Principle "R" = Riskless Principle " "(space) = Not a stock leg
Supplementary Id	302	15	Alpha numeric	§Supplementary Id from FIX orders (FIX tag 58 "Text")
Order Indicators	317	2	Integer	Bit 0 = FBMS order (0-no, 1-yes) Bit 1 = Directed/Preferenced (0-no, 1-yes) Bit 2 = Post Only /ALO (0-no, 1-yes) Bit 3 = MKT Order (0-no, 1-yes) Bit 4 = ISE Directed Order Bits 5-15 = not used Bit 15 is least significant bit. Note: Directed/Preferenced, Post Only, ISE Directed and MKT Order indicators will not be available for Manual Trades, Trade Correction and Cancels

Name	Offset	Size	Value	Notes
Origin Type	319	1	Alpha numeric	“O” = FIX Order “C” = FIX Complex Order "T” = OTTO Order “Z” = OTTO Complex Order “E” = OTTO Sweep (NOM only) "Q” = SQF Quote “W” = SQF Sweep “S” = SQF Complex Sweep "P” = Block Order “X” = Block Response “G” = PIXL/PRISM/PIM Primary Order "H” = PIXL/PRISM/PIM Contra Order "I” = PIXL/PRISM/PIM Response Order “J” = PIXL/PRISM/PIM Response SQF Sweep "g” = PIXL/PIM Primary Complex Order “h” = PIXL/PIM Contra Complex Order "i” = PIXL/PIM Response Complex Order “j” = PIXL/PIM Response SQF Complex Sweep “B” = FBMS Floor Trade “K” = QCC Primary “L” = QCC Contra “M” = Solicitation Primary Order “N” = Solicitation Contra Order “U” = Solicitation Response Order “V” = Solicitation Response SQF Sweep “m” = Solicitation Primary Complex Order “n” = Solicitation Contra Complex Order “u” = Solicitation Response Complex Order “v” = Solicitation Response SQF Complex Sweep “F” = Facilitation Primary Order “A” = Facilitation Contra Order “D” = Facilitation Response Order “Y” = Facilitation Response SQF Sweep “f” = Facilitation Primary Complex Order “a” = Facilitation Contra Complex Order “d” = Facilitation Response Complex Order “y” = Facilitation Response SQF Complex Sweep “"(space) = Others 0 = Simple Flex Initiator 1 = Simple Flex Response Order 2 = Simple Flex Response SQF Sweep 3 = Complex Flex Initiator 4 = Complex Flex Response Order 5 = Complex Flex Response SQF Sweep
Order Size	320	4	Integer	Size of the order/quote/sweep or 0 for manual trades.
Order Price	324	4	Integer	Price of the order/quote/sweep. 0 for MKT Orders (Indicated by MKT bit in OrderIndicators above). 0 for manual trades.

Name	Offset	Size	Value	Notes
Tif	328	1	Alpha	Time In Force for the order/quote/sweep 'I' = IOC or FOK 'D' = DAY 'G' = GTC 'O' = OPG 'T' = GTD ' ' = Not Applicable (For quotes, manual trades).
Reserved[2]	329	8	N/A	Reserved for future extension

Notes:

1. A trade (buy or sell) is considered automatic when it is assigned by the electronic matching engine else it is a manual trade. Examples: a quote matches with a resting order – both sides are automatic, an order sent from FBMS to the matching engine trades with a resting quote – both sides are automatic, two orders matched inside of FBMS outside of the matching engine – both sides are manual.
2. Assumptions about the contents of reserved fields are not recommended. They can be zero, spaces, or any other values.
3. XL has alternative names for capacity:
4. Registered Market Maker = On-Floor Market Maker,
5. Away Market Maker = On-Floor Market Maker Off-Floor, and Non-registered Market Maker = Off-Floor Market Maker.
6. Multi Account in XL will store Market Maker badge (house+suffix) for On-Floor Market Maker orders with CMTA.
7. FOK orders will be returned with TIF = IOC
8. Order ID will not be populated when Origin Source is FBMS Fix.
9. Order Bookings and QCCs originating from the floor will be marked as 'Automatic' for the Execution Type. The other trades will be marked as 'Manual'.

5.7. Cancel Trade

By default CTI sends trade cancels using this message. The alternative is to request configuring CTI for a given firm and connection block to send "extended" cancels with all the trade information using Trade message (described above) with transactionType set to Z.

Name	Offset	Length	Value	Notes
Message Type	0	1	"V"	Cancel trade message
Seconds	1	4	Integer	Seconds portion of cancel time
Nanoseconds	5	4	Integer	Nanoseconds portion of cancel time
Version	9	1	Integer	CTI version (currently set to 30)
Send type	10	1	Alpha	"S" = Send (original transmission) "P" = Possible duplicate (unsolicited retransmission)
Option id	11	4	Integer	Option id assigned by exchange daily. Zero for stock leg.
Underlying symbol	15	13	Alpha	Underlying stock symbol (left justified, space filled)
Security symbol	28	8	Alphanumeric	Option "root" symbol. Blank for stock leg.
Expiration year, month and day	36	2	Integer	Expiration date of the option: Bits 0-6 = Year (0-99) Bits 7-10 = Month (1-12) Bits 11-15 = Day (1-31) Bit 15 is least significant bit. Zero for stock leg.
Strike price	38	4	Integer	Strike price of the option (see Data Types for field processing). Zero for stock leg.

Name	Offset	Length	Value	Notes
Option Kind	42	1	Alpha	"C" = Call "P" = Put " " (Space) = Stock Leg
Trade id	43	4	Integer	Clearing trade Id
Correction Number	47	2	Integer	Trade Correction Number. 0 for new trade.
Cross id	49	4	Integer	Trade Group Id. Ties together all clearing trades of a given atomic transaction in the matching engine.
Trade side	53	1	Alpha	"B" = Buy "S" = Sell
Match ID	54	4	Integer	Execution Id of the trade being cancelled
(Reserved)	58	8	N/A	Reserved for future use

6. Liquidity Codes

Code	Description
1	Add/Maker
2	Remove/Taker
4	Response
5	Hidden
6	Opening Trade
7	Cross
8	Flashed Order
9	Flash Response
10	Routed Out
11	Trade Report
12	Combo Maker Against Combo
13	Combo Taker Against Comb
14	Combo Response Against Combo
15	Combo Hidden Against Comb
16	Combo Opening Rotation
17	Combo Cross
18	Combo Taker Against Regular
19	Regular Maker Against Combo
20	Combo Taker Against I
21	Regular Taker Against IO (incl. PIM)
23	IO Maker Against Regular
24	Regular Maker Against IO Participant
25	IO Participant Taker Against Regular
26	Broken Price Improvement
27	Broken Facilitation
28	Broken Solicitation
29	Combo Broken Price Improvement
30	Combo Broken Facilitation

Code	Description
31	Combo Broken Solicitation
32	Block
33	Block Response
34	Directed Response
35	Facilitation
36	Facilitation Response
37	Price Improvement
38	Price improvement Response
39	Solicitation
40	Solicitation Response
41	Qualified Contingent Cross
42	Customer to Customer
43	Combo Facilitation
44	Combo Facilitation Response
45	Combo Price Improvement
46	Combo Price Improvement Response
47	Combo Solicitation
48	Combo Solicitation Response
49	Combo Qualified Contingent Cross
50	Combo Customer to Customer
51	Sweep Routed Out
52	Sweep Trade Report
53	Combo Taker Against Regular – Thru NBB
55	Simple Exposure Order – Upon Receipt
57	Simple Exposure Order – Responder
58	Flex Auction
59	Flex Auction Responder
60	Flex Price Improvement
61	Flex Price Improvement Responder
62	Flex Broken Price Improvement
63	Flex Solicitation
64	Flex Solicitation Responder
65	Flex Broken Solicitation
66	Combo Flex Auction
67	Combo Flex Auction Responder
68	Combo Flex Price Improvement
69	Combo Flex Price Improvement Responder
70	Combo Flex Broken Price Improvement
71	Combo Flex Solicitation
72	Combo Flex Solicitation Responder
73	Combo Flex Broken Solicitation

7. Examples

7.1. Ref Trade Id and Correction Number in Trade message

As part of a transaction in the trading system, participant B buys 100 contracts from participant S:

CTI sends a clearing trade to both participants with a new tradeId (let's say 5) and correctionNumber 0. Since this completely new trade (#5/0) doesn't refer to any prior trades, refTradeId and refCorrectionNumber in trade messages for buyer and seller are both set to 0.

Later back office changes the trade #5/0 taking 70 contracts from seller S and assigning them to another seller (let's say participant S2). The buyer stays the same:

CTI sends a corrected trade (transactionType field is set to Y "Trade Correction") to buyer B and seller S for 30 contracts with unchanged tradeId (5) and correctionNumber incremented by 1 (0+1=1). refTradeId and refCorrectionNumber in messages for this trade #5/1 are set to refer to prior trade #5/0.

Also as part of the change to the trade #5/0, CTI sends a new trade (transactionType X "new trade") to buyer B and seller S2 for 70 contracts with new tradeId (let's say 6) and correctionNumber 0. refTradeId and refCorrectionNumber in messages for this trade #6/0 are set to refer to prior trade #5/0.

If back office changes the trade #5/1 further taking 10 more contracts from seller S and assigning them to another seller (let's say participant S3 this time) with the same buyer:

CTI will send a corrected trade (transactionType field is set to Y "Trade Correction") to buyer B and seller S for 20 contracts with unchanged tradeId (5) and correctionNumber incremented by 1 (1+1=2). refTradeId and refCorrectionNumber in messages for this trade #5/2 are set to refer to prior trade #5/1.

Also as part of the change to the trade #5/1, CTI will send a new trade (transactionType X "new trade") to buyer B and seller S3 for 10 contracts with new tradeId (let's say 7) and correctionNumber 0. refTradeId and refCorrectionNumber in messages for this trade #7/0 are set to refer to trade #5/1.

7.2. sideChanged in Trade message

After participant B buys 100 contracts from participant S:

CTI sends a clearing trade to both participants with sideChanged set to Y(es).

If later back office changes price of the trade:

CTI will send a corrected trade (transactionType field set to Y "Trade Correction") to both participants with sideChanged set to Y(es)

Later back office changes the trade re-assigning all contracts on the sell side from participant S to participant S2 and keeping the same buyer:

CTI sends a corrected trade (transactionType = "Trade Correction") to buyer B with sideChanged set to N(o) because all that changed for the buyer is a contra side. Participant S gets a trade cancel, and participant S2 gets a new trade with sideChanged set to Y(es).

If later back office splits the sell side between existing seller S2 and 5 more sellers keeping the same buyer:

CTI will send 6 corrected trades to buyer B with sideChanged set to N(o) because total contracts didn't change (only contra side). Participant S2 gets a trade correction too but his sideChanged will be Y(es) because the seller's contracts got reduced. All other new sellers will get new trades with sideChanged set to Y(es).

8. Support

Department	Phone	Email
Market Operations	215-496-1571	optionshelpdesk@nasdaq.com
Subscriber Services	215-496-5473	subscriber@nasdaq.com

9. Appendix A – Revision Control Log

May 7th, 2025: PHLX Replatform

- Clarifying the Execution Type for orders and trades originating from the Phlx floor.

April 1st, 2025: PHLX Replatform

- Clarifying Trade Message in case of FBMS FIX Orders

March 16th, 2025: PHLX Replatform

- PHLX to adopt CTI v2.2 during the replatform scheduled to complete in December 2025

February 18, 2025: Flex Options

- Removing source from Options Directory message and adding tradable.

January 21, 2025: Flex Options

- Clarifying Cancel Trade Message

September 5, 2024: Flex Options

- Removing Auction Duration from draft specifications for Flex.

July 2, 2024: Flex Options

- Adding support for Flex options on ISE
  - Increased size of Security symbol from 5 to 8 characters in the Directory message.
  - Removing source field from Options Directory message and Complex Option Strategy message.
  - New Auction Types "X" for Simple Flex Auction and "Y" for Complex Flex Auction.

March 12, 2024: ISE Replatform

- ISE to adopt CTI v2.2 during the Replatform scheduled to complete on September 23, 2024

January 23, 2024: Clearing Trade Interface 2.2

- Adding MIAX Sapphire enumeration as “S” to Origin and Execution market

June 14, 2023: GEMX Replatform

- Adding MEMX spec updates to Security Exchange, Last Mkt, Liquidity Flag, Execution Mkt and Origin Mkt.

March 31, 2023: GEMX Replatform

- November 2023 GEMX to adopt CTI version 2.2 during the Replatform that is scheduled to complete November 13, 2023

November 7, 2022 Clearing Trade Interface 2.2

- Introducing new liquidity codes to MRX only upon replatform, backward compatible with 2.1
- Clarifying the version field in all messages (Added: 11/3/2022)

July 13, 2017 Clearing Trade Interface (CTI) 2.1

- Adjusting Origin Type enumeration for "OTTO Complex" to "Z" and "OTTO Sweep" to "E" (as it exists on NOM currently) in Trade Message (Section 5.6)

April 19, 2017 Clearing Trade Interface (CTI) 2.1

- Adjusting Origin Type enumeration for "Block Response" to "X" in Trade Message (Section 5.6)

March 8, 2017 Clearing Trade Interface (CTI) 2.1

Changes:

- Adjusting Origin Type enumeration for "Block Response" to "W" in Trade Message (Section 5.6)
- Adjusting Origin Type description for Enumeration "E" to "OTTO Complex Order"
- Adjust Version in System Event Message to "21" representing 2.1
- Clarifying SoupBin TCP version 3.0
- Correcting Trade Message Offsets
- Clarifying Trade prices are long fields and other prices are integer

January 13, 2017 Clearing Trade Interface (CTI) 2.1

Changes:

- Adjusting enumeration to "F" for System Event Start of Currency Opening Process
- Adding MIAX Pearl enumeration as "P" to Execution market

Dec 16, 2016 Clearing Trade Interface (CTI) 2.1

Changes:

- Adjusting enumeration to "E" for Proprietary Customer, "B" for Broker Dealer – Customer, "R" for retail and "K" for Broker Dealer – Firm in Trade Message

Nov 18, 2016: Clearing Trade Interface (CTI) – Version 2.1

Changes:

- Adding System Event code for "Start of Currency Opening Process"
- Fill or Kill orders will have TimeInForce = IOC
- Changing liquidity codes from Alpha to Numeric data type
- OrderID will be BranchSequence Number if provided for FIX Orders
- Adding Block/Facilitation to OriginType

Sep 13, 2016: Clearing Trade Interface (CTI) – Version 2.0

Changes:

- New Messaging with support for NASDAQ ISE, GEMX and MRX exchanges.

Feb 24, 2016: Clearing Trade Interface (CTI) – Version 1.3

Changes:

- Changed Start Of Messages Event time from 6:00am to 4:00am.

Feb 01, 2016: Clearing Trade Interface (CTI) – Version 1.3
Changes:

- Added ISE MERCURY Exchange Code (J) to Execution Market and Origin Market.

Sep 30, 2015: Clearing Trade Interface (CTI) – Version 1.3
Changes:

- Added BATS EDGX Exchange Code (E) to Execution Market and Origin Market.

Aug 10, 2015: Clearing Trade Interface (CTI) – Version 1.3
Changes:

- Added WCO Early Close Time 'W' for option directory message.
- Added WCO Early Close Time 'W' for System Event message.

May 27, 2015: Clearing Trade Interface (CTI) - Version 1.3
Changes:

- Added Auction Type, Auction ID and ClearingFlags to BX Options Market for PRISM Cross.

Mar 02, 2015: Clearing Trade Interface (CTI) - Version 1.3
Changes:

- Added explanation about strategy ID in section 5.3 (Complex Order Strategy).

Mar 19, 2014: Clearing Trade Interface (CTI) - Version 1.3
Changes:

- Added Capacity 'J' for Joint Back Office (JBO) Orders.
- Added Executing and Origin Market Code 'H' for ISE Gemini exchange.

Jan 29, 2013: Clearing Trade Interface (CTI) - Version 1.3
Changes:

- Added Liquidity Codes for Order Exposure Alert (Flash Trade).
- Explained that new Alpha-Numeric liquidity codes may be added in future without any notice.

Nov 9, 2012: Clearing Trade Interface (CTI) - Version 1.3
Changes:

- Added Executing Market Code ("M") for Miami Stock Exchange (MIAX).

July 20, 2012: Clearing Trade Interface (CTI) - Version 1.3
Changes:

- Added Auction Type and Origin Type values for
  - Simple Order Solicitation
  - Complex Order PIXL
  - Complex Order Solicitation

May 21, 2012: Clearing Trade Interface (CTI) - Version 1.3
Changes:

- Added Contra Capacity To NOM.

- Explained when the following fields can be blank or 0
  - Origin market
  - Order Date
  - Short Sell Indicator.

March 23, 2012: Clearing Trade Interface (CTI) - Version 1.3

Changes:

- Added NASDAQ OMX BX Options Market.
- Reversed Revision Control Log (this Appendix) to have the latest change at the top.

October 19, 2011: Clearing Trade Interface (CTI) - Version 1.3

Changes:

- New version with support for Real Time Billing.

April 4, 2011 Clearing Trade Interface (CTI) - Version 1.2

Changes in Trade Message:

- Added "QCC Primary" and "QCC Contra" as possible values in "Origin Type" field

December 8, 2010: Clearing Trade Interface (CTI) - Version 1.2

Changes:

- Made one document for NASDAQ Options Market (NOM) and NASDAQ PHLX Options Market (XL).
- Trade messages changes:
  - Increased Account from 10 bytes to 32
  - Added "Opening Trade" to Liquidity field
  - Added "Opening Trade Customer to Customer" to Liquidity field
  - Added "Away Market Maker" and "Non-Registered Market Maker" to "Capacity" field
  - Added "OTTO Order" and "OTTO Sweep" to "Origin Type" field

October 18, 2010: Clearing Trade Interface (CTI) - Version 1.1

Changes:

- Added explanation for Give-Up CMTA and MM-Acronym fields for new On-Floor Market Maker order with CMTA (Fix tag 204=9).
- Populate contents of Match ID in the Trade message for corrections. Updated the notes content of the Match ID field in the trade message to denote that the field will now be populated for corrections.

September 17, 2010: Clearing Trade Interface (CTI) - Version 1.1

Changes:

- Added Origin Type to Trade Messages
- Added a comment to the 'Strategy id' and 'Strategy Leg' Field Notes Changes:
- Added an option of sending trade cancels using trade messages

May 13, 2010: Clearing Trade Interface (CTI) - Version 1.1
Changes:

- Changed Architecture section
  - Away trade corrections and cancels are not sent on “Away Trades” line. They come down on one of the trade lines based on the underlying assignment.
  - In Overview mentioned that administrative and market event messages are optional
  - Added failover section
- Added Subscription section
- Changed Version field in System Event message to 11
- Added MatchId field to Trade Message
- Added reserved fields to Trade Message
- Added Supplementary Id field to Trade Message (order info section)
- Added Order Indicators to Trade Message (with FBMS order indicator)
- Changed many notes for trade message fields
- Added notes after Trade message
- Added example section

April 21, 2010: Clearing Trade Interface (CTI) - Version 1.0
Initial Release.