



Market Data Feed Specification Market Data Feed Specification

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System response times may vary for a number of reasons including market conditions, trading volumes and system performance.

VERSION HISTORY

VERSION	DESCRIPTION	DATE
1.0	First Release	13-04-2010
1.1	Key changes: <ul style="list-style-type: none"> • System Event Codes H = Halt and R = Resume added • Trade Message for hidden, iceberg and undisclosed order ref set to 0, indicator always set to B • Updated examples 6.7, 6.8, 6.11 • Amend section 5.6 for the description on when a Trade Message is sent. • Updated example 6.8 	09-08-2010
1.2	Key changes: Removed reference price suspend/resume status from Stock Status Message	22-11-2010
2.0	Key changes: <ul style="list-style-type: none"> • Updated Iceberg order example • Add off-exchange messages • Correct examples 6.7, 6.8, 6.11 • For off-exchange trade reporting <ul style="list-style-type: none"> ○ Add UTCTimestamp data type ○ Add trade report type and transaction time fields in Off-Exchange Trade message • For order book reset <ul style="list-style-type: none"> ○ Add 'Z' and 'N' system event code 	30-06-2011
2.1	Key changes <ul style="list-style-type: none"> • Removed section 6.3 	12-03-2012
2.2	Key changes <ul style="list-style-type: none"> • Removed obsolete behaviour indicating end of session in Section 4.8. 	30-10-2012
2.3	Key changes: <ul style="list-style-type: none"> • Removal of "t" and "p" flags in Section 5.8: Off Exchange Trade Message 	20-02-2013
2.4	Key changes <ul style="list-style-type: none"> • Update to Type S Trade Report description 	16-08-2013
2.5	Key changes <ul style="list-style-type: none"> • Support added to Trade Message for Market On Close (MOC) trades • New system event code for MOC trades • Support added to Trade Message for Broker Preferencing 	4-10-2013
3.0	Key changes <ul style="list-style-type: none"> • Support visible MOC order in Section 5.2 and 5.3 • Add Order Source and Trade Designation tags in Section 5.2: Add Order Message, Section 5.3: Order Execution Message and Section 5.7: Trade Message. • Removal of "M" and "m" in Section 5.6: Trade Message • Added the System Event Code for @Last Open • Updated to describe treatment of Visible MOC Orders 	01-07-2015
4.0	Key changes <ul style="list-style-type: none"> • Support Attributed Market – Section 5.2, 5.3, 5.7 and 5.8 • ETF Trade Reports 	01-07-2015
5.0	Key changes	01-12-2015

	<ul style="list-style-type: none"> • Introduction of Calculated Value Message 	
5.1	Key changes <ul style="list-style-type: none"> • Modify System Event Message type “S”, “E”, “V”, “M”, “H” and “R” to include field to define which markets are affected. Send multiple system event messages, one for each market that is affected • Long Form VIXEN Calculated Value Message 	28-06-2016
5.2	Key changes <ul style="list-style-type: none"> • Value Generation Time field added in Calculated Value Message, indicating when the Calculated Value is generated • QMF market support in Event Messages 	12-09-2016
6.2	Key changes <ul style="list-style-type: none"> • Remove Visible MOC Support (removal of System Event Code 'V' in section 5.1.2) 	09-05-2019
6.2	Cboe rebranding	01-02-2022

1 Introduction

Cboe Australia (“**Cboe**”) provides a high performance, low latency trading system. The information processed by the Cboe trading system is made available to market participants and data vendors through this Cboe Market Data Feed (“**Chi-X MD Feed**”).

This service provides clients with details concerning orders and trade information on a real time basis.

This document describes the technical specification for this data feed including the connection protocol, message types and message structures etc.

This specification should be read in conjunction with the *Order Type Overview*.

2 Data Types

This chapter described the available data types that are used in the Chi-XMD Feed.

2.1 Numeric

Numeric fields consist of digits which are ASCII coded. They are presented in right justification and are space-filled from the left. Data fields of numeric data type include Sequence, Order Reference, Trade Reference, number of Shares, etc.

2.2 Alphanumeric

Alphanumeric text fields consist of alphabetical letters or digits (or both). They are presented in left justification and are padded with spaces to the right. Data fields of alphanumeric data type include Stock (symbol).

2.3 Prices

Price data fields are presented in digits and decimal places are allowed.

Standard prices are presented in maximum six digits with four decimal places. Long form prices are presented in maximum 12 digits with 7 decimal places. Spaces are padded from the left in front of the digits and zeros are padded after the last decimal place to the right. Decimal points do not present in the price field. They are recognised by their positions in the price fields.

2.4 Timestamp

Timestamp data fields are presented in digits in milliseconds past midnight local time.

2.5 UTCTimestamp

String fields representing date and time combination represented in UTC in the YYYYMMDDHHMMSSsss format. Valid values: YYYY = 0000-9999, MM = 01-12, DD = 01-31, HH = 00-23, MM = 00-59, SS = 00-60 (60 only if UTC leap second), sss=000-999 (indicating milliseconds).

2.6 LocalTimestamp

String fields representing date and time combination represented in Local Time in the YYYYMMDDHHMMSSsss format. Valid values: YYYY = 0000-9999, MM = 01-12, DD = 01-31, HH = 00-23, MM = 00-59, SS = 00-60 (60 only if UTC leap second), sss=000-999 (indicating milliseconds).

3 Session

3.1 Session Protocol

Chi-X MD Feed is built on a session layer on top of TCP/IP sockets. Sessions include sequenced and non-sequenced messages in which sequenced messages are the actual market data, while the non-sequenced messages are the session level interfaces that are not part of the market data feed. Sequenced messages include buy and sell orders, order executions, order cancellation, etc. Login, logout and heartbeat messages are the examples of non-sequenced messages. Retrieving and recovering previous sequenced messages (actual market data feed) is possible.

3.2 Session Initialisation

A Chi-X MD Feed session is initialised when client establishes a TCP session and sends a login packet. If a login packet is not received within 30 seconds, the server will terminate the session. When the server receives the login packet, it responds with a login accepted packet and starts transferring sequenced data, or it rejects the login and terminates the session (if appropriate).

3.3 Sequential Messaging

Each message is not literally assigned with a sequence number. Since messages are transferred in sequence, clients should give the first sequenced message of the day the sequence number '1', and all subsequent sequenced messages should then be assigned the next sequence number.

3.4 Session Recovery

Recovering a session can be done by counting the number of sequenced messages which have already been received and providing the next expected sequence number of the message to be received when reconnecting to the server. The new session will start from the next expected sequenced message.

4 Session Message

4.1 Debug Message (to Client)

Debug Messages are used to provide information to assist developers with application development and troubleshooting. They are used during development processes only and should be discarded.

DEBUG MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Message Type	0	1	“+”	Debug Message
Text	1	Variable	Alphanumeric	Free form text
Terminator	Text Length + 1	1	ASCII 10, Hex 0x0A	Message Terminator

4.2 Login Request (to Cboe)

A Login Request Message is sent to the server immediately after the client tries to establish a connection to the server. It also allows session recovery by providing the sequence number when sending the Login Request Message.

Since data is sent in ASCII, it must be padded with spaces; for example, the field lengths of Username and Sequence are 6 and 10 alphanumeric characters respectively, if Username is “JOHN”, it should be sent as “JOHN_ _”, and if the expected sequence number is 1, it should be sent as “_ _ _ _ _ _ _ _ _ _1” (“_” represents a space).

LOGIN REQUEST MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Message Type	0	1	“L”	Login Request Message
Username	1	6	Alphanumeric	Username
Password	7	10	Alphanumeric	Password
Session	17	10	Alphanumeric	Login requested session ID. Leave this field blank for initial login; and provide Session ID for subsequent logins.
Sequence	27	10	Numeric	The next expected sequence number of the feed from which to start. “1” indicates starting from the beginning of the day. “0” indicates the last message generated by the system bypassing recovery.
Terminator	37	1	ASCII 10, Hex 0x0A	Message Terminator

4.3 Login Accepted (to Client)

Login Accepted Message is used for acknowledging a login request message sent by client upon successful login.

LOGIN ACCEPTED MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Message Type	0	1	"A"	Login Accepted Message
Session	1	10	Alphanumeric	The session ID currently logged into.
Sequence	11	10	Numeric	The next expected sequence number.
Comma	21	1	","	Separator
Messages Total	22	10	Numeric	This is the total number of messages that have gone through the data feed. This is different from the sequence number which is the next sequence number that the client will receive upon connection which is in accordance with the sequence the client submitted in the Login Request message
Terminator	32	1	ASCII 10, Hex 0x0A	Message Terminator

4.4 Login Rejected (to Client)

Login Rejected Message is used for acknowledging the failure of a login request packet sent by client.

LOGIN REJECTED MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Message Type	0	1	"J"	Login Rejected Message
Reject Reason	1	1	"A" or "S"	Reason of the login rejection: "A" – Invalid username/password "S" – Invalid session ID
Terminator	2	1	ASCII 10, Hex 0x0A	Message Terminator

4.5 Logout Request (to Cboe)

Logout Request Message is used for sending a session termination request to the server. The session will be closed immediately upon receipt of this message.

LOGOUT REQUEST MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Message Type	0	1	"O"	Logout Request Message
Terminator	1	1	ASCII 10, Hex 0x0A	Message Terminator

4.6 Server Heartbeat Message (to Client)

If a session is left idle for more than one second, the server will send a heartbeat message.

SERVER HEARTBEAT MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Message Type	0	1	"H"	Server Heartbeat Message
Terminator	1	1	ASCII 10, Hex 0x0A	Message Terminator

4.7 Client Heartbeat Message (to Cboe)

A Client Heartbeat Message must be sent to the server from the client side on a regular interval. The server assumes the client is no longer active if it does not receive a heartbeat message from the client for more than 15 seconds, in which case the session will be terminated.

CLIENT HEARTBEAT MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Message Type	0	1	"R"	Client Heartbeat Message
Terminator	1	1	ASCII 10, Hex 0x0A	Message Terminator

4.8 Sequenced Data Message (to Client)

The Sequenced Data Message contains the actual market data. Since messages are transferred in sequence, client should give the first sequenced data message of the current session the sequence number '1', and thereafter give each subsequent sequenced message the next sequence number. With the sequence number correctly assigned by the client to each message, session recovery is possible.

SEQUENCED DATA MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Message Type	0	1	"S"	Sequenced Data Message
Data	1	Variable	Alphanumeric	Sequenced data. Contains all messages of actual market data feed.
Terminator	Data Length + 1	1	ASCII 10, Hex 0x0A	Message Terminator

5 Market Data Feed Messages

The Chi-X MD Feed contains a series of messages informing clients of the orders added to and removed from the Cboe book and the execution of trades on Cboe's market. Market Data messages are included in Sequenced Data Messages and are inbound messages to the client side.

Long form messages are used when the display length of the price or the size of an order or execution is longer than the standard message permits. Long form messages are sent on a per order/execution basis.

5.1 System Event Message

The System Event Message is used for signalling an event which affects the Cboe system.

SYSTEM EVENT MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"S"	System Event Message
Event Code	9	1	Alphanumeric	Please see System Event Codes below
Market ID	10	4	Alphanumeric	Right-padded with spaces. If no market ID available (which means the Event Code applies to the whole system), then filled with space.

5.1.1 Market IDs

MARKET ID	DESCRIPTION	REMARKS
AUS	Australia Stock Market	Chi-X Continuous On-Market Trading
CXAW	Chi-X Australia - Warrants	Chi-X Warrants Trading
CXAE	Chi-X Australia - ETF	Chi-X ETF Trading
CXAR	Chi-X Australia - TraCR	Chi-X TraCR Trading
CXAQ	Chi-X Australia – QMF	Chi-X QMF Trading

5.1.2 System Event Codes

SYSTEM EVENT CODE	DESCRIPTION	REMARKS
O	Start of Messages	This is the first message of the day.
S	Chi-X Open	This message indicates that Chi-X is open for on-market continuous trading and accepting orders. Before the Chi-X Open message you may receive Off-Exchange Trade messages. Market ID field value is also provided in the event message which indicates which market this event belongs to.
E	Chi-X Close	This message indicates that Cboe's continuous trading session is closed. Cboe will not accept any more orders, except Market on Close ("MOC") orders, for the continuous trading session. Clients may still receive a Trade Message for MOC executions, Broken Trade, Order Cancel and Off-Exchange Trade messages after this session state.

		Market ID field value is also provided in the event message which indicates which market this event belongs to.
M	Chi-X MOC Close	<p>This message indicates that MOC orders can no longer execute. Clients may still receive MOC Executions after this session state closes.</p> <p>Market ID field value is also provided in the event message which indicates which market this event belongs to.</p>
H	Chi-X Halt	<p>This message indicates that Chi-X is halted. Chi-X will not accept any order or Off-exchange trade report during this period. Clients may still receive Broken Trade and Order Cancel messages during this period.</p> <p>Market ID field value is also provided in the event message which indicates which market this event belongs to.</p>
R	Chi-X Resume	<p>This message indicates that Cboe is resumed from halted state and accepting orders and Off-Exchange Trade Reports.</p> <p>Market ID field value is also provided in the event message which indicates which market this event belongs to.</p>
C	End of Messages	This is the last message of the day.
Z	Reset Orderbook	This message indicates that Cboe has explicitly reset its order book for all securities.
N	No Operation	This message is a system reserved message. Recipient should ignore this message, but increase the next expected sequence.

5.2 Add Order Message

Add Order Message is used for acknowledging the acceptance of a visible order into the Cboe book. The message contains an Order Reference which is a unique key of the day assigned to the order by Cboe.

Add Order Message may be sent for accepting a revised order after the original order is cancelled. Please refer to *Section 5.5 Modification of Existing Orders* for detail.

ADD ORDER MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"A"	Add Order Message
Order Reference	9	9	Numeric	Unique order reference number of the day.
Buy/Sell Indicator	18	1	"B" or "S"	"B" = Buy Order "S" = Sell Order
Shares	19	6	Numeric	Total number of shares being added to the book. For undisclosed order, number of shares is zero. (The number of shares added to the book may be less than the actual number of shares entered because part of the order may trade before being posted to the book).
Stock	25	6	Alphanumeric	Stock symbol (which is right-padded with spaces).
Price	31	10	Price	The displayprice of the order.
Display	41	1	"Y"	"Y" = displayed in quote
Order Source	42	1	"C"	"C" = Visible Limit order

LONG FORM ADD ORDER MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"a"	Long Form Add Order Message
Order Reference	9	9	Numeric	Unique order reference number of the day.
Buy/Sell Indicator	18	1	"B" or "S"	"B" = Buy Order "S" = Sell Order
Shares	19	10	Numeric	Total number of shares being added to the book. For undisclosed order, number of shares is zero. (The number of shares added to the book may be less than the actual number of shares entered because part of the order may trade before being posted to the book).
Stock	29	6	Alphanumeric	Stock symbol (which is right-padded with spaces).
Price	35	19	Price	The displayprice of the order.
Display	54	1	"Y"	"Y" = displayed in quote
Order Source	55	1	"C"	"C" = Visible Limit order

ADD ORDER MESSAGE (ATTRIBUTED MARKET)				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"F"	Add Order Message
Order Reference	9	9	Numeric	Unique order reference number of the day.
Buy/Sell Indicator	18	1	"B" or "S"	"B" = Buy Order "S" = Sell Order
Shares	19	6	Numeric	Total number of shares being added to the book. For undisclosed order, number of shares is zero. (The number of shares added to the book may be less than the actual number of shares entered because part of the order may trade before being posted to the book).
Stock	25	6	Alphanumeric	Stock symbol (which is right-padded with spaces).
Price	31	10	Price	The displayprice of the order.
Display	41	1	"Y"	"Y" = displayed in quote
Order Source	42	1	"C"	"C" = Visible Limit order
PID	43	5	Alphanumeric	Participant ID (which is right-padded with spaces)

LONG FORM ADD ORDER MESSAGE (ATTRIBUTED MARKET)				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"f"	Long Form Add Order Message
Order Reference	9	9	Numeric	Unique order reference number of the day.
Buy/Sell Indicator	18	1	"B" or "S"	"B" = Buy Order "S" = Sell Order
Shares	19	10	Numeric	Total number of shares being added to the book. For undisclosed order, number of shares is zero. (The number of shares added to the book may be less than the actual number of shares entered because part of the order may trade before being posted to the book).
Stock	29	6	Alphanumeric	Stock symbol (which is right-padded with spaces).
Price	35	19	Price	The displayprice of the order.
Display	54	1	"Y"	"Y" = displayed in quote
Order Source	55	1	"C"	"C" = Visible Limit order
PID	56	5	Alphanumeric	Participant ID (which is right-padded with spaces)

5.3 Order Execution Message

When a visible order on the book is executed, either in whole or in part, an Order Execution Message is sent.

Please note that this behaviour also occurs when the visible portion of an iceberg order is executed.

ORDER EXECUTION MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"E"	Order Execution Message
Order Reference	9	9	Numeric	The unique order reference number of the order which was executed.
Executed Shares	18	6	Numeric	The number of shares executed on the trade.
Trade Reference	24	9	Numeric	The unique trade reference number of the day.
Contra Order Reference	33	9	Numeric	The unique order reference number of the contra order that matched with this order.
Order Source	42	1	"C"	"C" = Visible Limit Order

LONG FORM ORDER EXECUTION MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"e"	Long Form Order Execution Message
Order Reference	9	9	Numeric	The unique order reference (if any) of the order which was executed. (Order Reference can be a reference of a previously sent Add Order Message, or of an order that was not previously displayed.)
Executed Shares	18	10	Numeric	The number of shares executed on this trade
Trade Reference	28	9	Numeric	The unique trade reference number of the day.
Contra Order Reference	37	9	Numeric	The unique order reference number of the contra order that matched with this order.
Order Source	46	1	"C"	"C" = Visible Limit Order

ORDER EXECUTION MESSAGE (ATTRIBUTED MARKET)				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"G"	Order Execution Message
Order Reference	9	9	Numeric	The unique order reference number of the order which was executed.
Executed Shares	18	6	Numeric	The number of shares executed on the trade.
Trade Reference	24	9	Numeric	The unique trade reference number of the day.
Contra Order Reference	33	9	Numeric	The unique order reference number of the contra order that matched with this order.
Order Source	42	1	"C"	"C" = Visible Limit Order
Contra PID	43	5	Alphanumeric	Contra Participant PID (which is right-padded with spaces)

LONG FORM ORDER EXECUTION MESSAGE (ATTRIBUTED MARKET)				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"g"	Long Form Order Execution Message
Order Reference	9	9	Numeric	The unique order reference (if any) of the order which was executed. (Order Reference can be a reference of a previously sent Add Order Message, or of an order that was not previously displayed.)
Executed Shares	18	10	Numeric	The number of shares executed on this trade
Trade Reference	28	9	Numeric	The unique trade reference number of the day.
Contra Order Reference	37	9	Numeric	The unique order reference number of the contra order that matched with this order.
Order Source	46	1	"C"	"C" = Visible Limit Order
Contra PID	47	5	Alphanumeric	Contra Participant PID (which is right-padded with spaces)

5.4 Order Cancel Message

When an order on the book is cancelled completely, the quantity of an order is reduced or the price of a pegged order is revised, an Order Cancel Message is sent out.

ORDER CANCEL MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"X"	Order Cancel Message
Order Reference	9	9	Numeric	The unique order reference number of the order which was cancelled. (Order Reference can be a reference of a previously sent Add Order Message.)
Cancelled Shares	18	6	Numeric	Number of shares cancelled. For cancel undisclosed order, number of shares is always zero.
LONG FORM ORDER CANCEL MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"x"	Long Form Order Cancel Message
Order Reference	9	9	Numeric	The unique order reference number of the order which was cancelled. (Order References can be a reference of a previously sent Add Order Message.)
Cancelled Shares	18	10	Numeric	Number of shares cancelled.

5.5 Modification of Existing Orders

5.5.1 Modification of Price

When the price on an existing order is modified, a Cancel Message for full quantity of the open order is sent out, followed by an Add Order Message which is assigned with the same Order Reference as the cancelled order.

5.5.2 Reduction of quantity

When there is a reduction of quantity on an existing order, a Cancel Message for the existing order is sent out which acknowledges the reduction of the number of shares pending in the referenced open order. If the number of currently pending shares for an order reaches zero, the order will be removed from the book.

5.6 Trade Message

When a trade occurs against order quantity not visible on the book (ie. a fully hidden Price Improvement order, the hidden portion of an iceberg order or an undisclosed order), or against a hidden MOC order, a Trade Message is sent out. Trade Messages fill in the gaps left when an order that is not visible on the book is executed.

Note: Order Execution Messages and Trade Messages together provide a complete picture of all executions that occur on Cboe. A Trade Message does not affect the book and can be ignored for book-building but can be used for time and sales and other execution based data aggregation.

Order Reference and Contra Order Reference are always set to 0 (zero) and the Buy/Sell Indicator to 'B'. This applies to the Long Form version as well.

TRADE MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"P"	Trade Message resulting from hidden liquidity
Order Reference	9	9	Numeric	The order reference number will always be set to 0
Buy/Sell Indicator	18	1	"B" or "S"	The indicator value is always set to B
Shares	19	6	Numeric	Number of shares executed.
Stock	25	6	Alphanumeric	Stock symbol (right-padded with spaces)
Price	31	10	Price	Match price of the order
Trade Reference	41	9	Numeric	Trade reference number generated for the trade.
Contra Order Reference	50	9	Numeric	The contra order reference number will always be set to 0.
Trade Type	59	1	Alphanumeric	"B" = Broker Preferred Trade "N" = Trade resulting from normal matching logic
Trade Designation	60	1	Alphanumeric	"C" = CXAC (Limit) "P" = CXAP (Mid-Point) "N" = CXAN (Near Point) "F" = CXAF (Far Point) "M" = CXAM (MOC)

LONG FORM TRADE MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp

Message Type	8	1	"p"	Trade Message resulting from hidden liquidity
Order Reference	9	9	Numeric	The order reference number will always be 0
Buy/Sell Indicator	18	1	"B" or "S"	The indicator value is always set to B
Shares	19	10	Numeric	Number of shares executed.
Stock	29	6	Alphanumeric	Stock symbol (right-padded with spaces).
Price	35	19	Price	Match price of the order
Trade Reference	54	9	Numeric	Trade reference number generated for the trade.
Contra Order Reference	63	9	Numeric	The contra order reference number will always be set to 0.
Trade Type	72	1	Alphanumeric	"B" = Broker Preferred Trade "N" = Trade resulting from normal matching logic
Trade Designation	73	1	Alphanumeric	"C" = CXAC (Limit) "P" = CXAP (Mid-Point) "N" = CXAN (Near Point) "F" = CXAF (Far Point) "M" = CXAM (MOC)

TRADE MESSAGE (ATTRIBUTED MARKET)				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"J"	Trade Message resulting from hidden liquidity
Order Reference	9	9	Numeric	The order reference number will always be set to 0
Buy/Sell Indicator	18	1	"B" or "S"	The indicator value is always set to B
Shares	19	6	Numeric	Number of shares executed.
Stock	25	6	Alphanumeric	Stock symbol (right-padded with spaces)
Price	31	10	Price	Match price of the order
Trade Reference	41	9	Numeric	Trade reference number generated for the trade.
Contra Order Reference	50	9	Numeric	The contra order reference number will always be set to 0.
Trade Type	59	1	Alphanumeric	"B" = Broker Preferred Trade "N" = Trade resulting from normal matching logic
Trade Designation	60	1	Alphanumeric	"C" = CXAC (Limit) "P" = CXAP (Mid-Point) "N" = CXAN (Near Point) "F" = CXAF (Far Point) "M" = CXAM (MOC)
PID	61	5	Alphanumeric	Participant ID (which is right-padded with spaces)
Contra PID	66	5	Alphanumeric	Contra Participant ID (which is right-padded with spaces)

LONG FORM TRADE MESSAGE (ATTRIBUTED MARKET)				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp

Message Type	8	1	"J"	Trade Message resulting from hidden liquidity
Order Reference	9	9	Numeric	The order reference number will always be 0
Buy/Sell Indicator	18	1	"B" or "S"	The indicator value is always set to B
Shares	19	10	Numeric	Number of shares executed.
Stock	29	6	Alphanumeric	Stock symbol (right-padded with spaces).
Price	35	19	Price	Match price of the order
Trade Reference	54	9	Numeric	Trade reference number generated for the trade.
Contra Order Reference	63	9	Numeric	The contra order reference number will always be set to 0.
Trade Type	72	1	Alphanumeric	"B" = Broker Preferred Trade "N" = Trade resulting from normal matching logic
Trade Designation	73	1	Alphanumeric	"C" = CXAC (Limit) "P" = CXAP (Mid-Point) "N" = CXAN (Near Point) "F" = CXAF (Far Point) "M" = CXAM (MOC)
PID	74	5	Alphanumeric	Participant ID (which is right-padded with spaces)
Contra PID	79	5	Alphanumeric	Contra Participant ID (which is right-padded with spaces)

5.7 Broken Trade Message

When an execution is broken on Cboe, a Broken Trade Message is sent out. If a trade is broken, it cannot be reinstated.

Note: A Broken Trade Message only affects applications which build on a time-and-sales database or maintain cumulative volumes or high/low calculations. A Broken Trade Message has no effect on the book and it can be ignored for book-building.

BROKEN TRADE MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"B"	Broken Trade Message
Trade Reference	9	9	Numeric	The trade reference number of the execution that was broken. (The Trade Reference is from a previously sent Order Execution Message or Trade Message.)

5.8 Off-Exchange Trade Message

Off-Exchange Trade Message is sent once participants report an off-exchange trade to Cboe.

OFF-EXCHANGE TRADE MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"Q"	Off-Exchange Trade Message

Shares	9	6	Numeric	Number of shares traded.
Stock	15	6	Alphanumeric	Stock symbol (right-padded with spaces)
Price	21	10	Price	Reported price of the trade
Trade Reference	31	9	Numeric	Trade reference number generated for the trade.
Trade Report Type	40	1	Alphanumeric	Trade report type of the Off-Exchange Trade message. Valid values: "B" – Block Trade "P" – Large Portfolio Trade "T" – Large Principal Transaction "S" – Trades With Price Improvement "L" – Permitted Trade During Post Trading Hours Period "M" – Permitted Trade During Pre Trading Hours Period "E" – Out Of Hours Trade "F" – ETF Trade Report for unit creations or redemptions
Transaction Time	41	17	UTCTimestamp	The date and time of the Off-Exchange Trade as specified in the Trade Report submitted by the trading participant

LONG FORM OFF-EXCHANGE TRADE MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"q"	Long Form Off-Exchange Trade Message
Shares	9	10	Numeric	Number of shares traded.
Stock	19	6	Alphanumeric	Stock symbol (right-padded with spaces)
Price	25	19	Price	Reported price of the trade
Trade Reference	44	9	Numeric	Trade reference number generated for the trade.
Trade Report Type	53	1	Alphanumeric	Trade report type of the Off-Exchange Trade message. Valid values: "B" – Block Trade "P" – Large Portfolio Trade "T" – Large Principal Transaction "S" – Trades With Price Improvement "L" – Permitted Trade During Post Trading Hours Period "M" – Permitted Trade During Pre Trading Hours Period "E" – Out Of Hours Trade "F" – ETF Trade Report for unit creations or redemptions
Transaction Time	54	17	UTCTimestamp	The date and time of the Off-Exchange Trade as specified in the Trade Report submitted by the trading participant

OFF-EXCHANGE TRADE MESSAGE (ATTRIBUTED MARKET)				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"K"	Off-Exchange Trade Message
Shares	9	6	Numeric	Number of shares traded.
Stock	15	6	Alphanumeric	Stock symbol (right-padded with spaces)

Price	21	10	Price	Reported price of the trade
Trade Reference	31	9	Numeric	Trade reference number generated for the trade.
Trade Report Type	40	1	Alphanumeric	Trade report type of the Off-Exchange Trade message. Valid values: "B" – Block Trade "P" – Large Portfolio Trade "T" – Large Principal Transaction "S" – Trades With Price Improvement "L" – Permitted Trade During Post Trading Hours Period "M" – Permitted Trade During Pre Trading Hours Period "E" – Out Of Hours Trade "F" – ETF Trade Reports for unit creations or redemptions
Transaction Time	41	17	UTCimestamp	The date and time of the Off-Exchange Trade as specified in the Trade Report submitted by the trading participant
PID	58	5	Alphanumeric	Participant ID (which is right-padded with spaces)
Contra PID	63	5	Alphanumeric	Contra Participant ID (which is right-padded with spaces)

LONG FORM OFF-EXCHANGE TRADE MESSAGE (ATTRIBUTED MARKET)

NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"k"	Long Form Off-Exchange Trade Message
Shares	9	10	Numeric	Number of shares traded.
Stock	19	6	Alphanumeric	Stock symbol (right-padded with spaces)
Price	25	19	Price	Reported price of the trade
Trade Reference	44	9	Numeric	Trade reference number generated for the trade.
Trade Report Type	53	1	Alphanumeric	Trade report type of the Off-Exchange Trade message. Valid values: "B" – Block Trade "P" – Large Portfolio Trade "T" – Large Principal Transaction "S" – Trades With Price Improvement "L" – Permitted Trade During Post Trading Hours Period "M" – Permitted Trade During Pre Trading Hours Period "E" – Out Of Hours Trade "F" – ETF Trade Report for unit creations or redemptions
Transaction Time	54	17	UTCimestamp	The date and time of the Off-Exchange Trade as specified in the Trade Report submitted by the trading participant
PID	71	5	Alphanumeric	Participant ID (which is right-padded with spaces)
Contra PID	76	5	Alphanumeric	Contra Participant ID (which is right-padded with spaces)

5.9 Broken Off-Exchange Trade Message

When an off-exchange trade is broken on Cboe, a Broken Off-Exchange Trade Message is sent out. If a trade is broken, it cannot be reinstated.

BROKEN OFF-EXCHANGE TRADE MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"C"	Broken Off-Exchange Trade Message
Trade Reference	9	9	Numeric	The trade reference number of the off-exchange trade that was broken. (The Trade Reference is from a previously sent Off-Exchange Trade Message.)

5.10 Stock Status Message

This message indicates the current trading status of a stock. At the start of day, the feed will send out a stock status message for each of the symbols trading on Cboe. Subsequently, stock status messages will be sent when a stock status changes or is released for trading.

STOCK STATUS MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"H"	Stock Trading Action Message
Stock	9	6	Alphanumeric	Stock Symbol
Security Status	15	1	Alphanumeric	"T"= Active "H" = Halted "S"=Suspend
Reserved	16	1	Alphanumeric	Reserved for future use

5.11 Calculated Value Message

Cboe calculated market values will be conveyed through this message. This message will be sent regularly for each symbol that has calculated market value available. The frequency of these updates will be determined in agreement with the Issuers.

CALCULATED VALUE MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"Y"	Calculated Value Message
Symbol	9	6	Alphanumeric	Symbol of the Calculated Value

Value Category	15	1	Alphanumeric	Category of the data conveyed in the "Value" field 1 – Closing Price 2 – iNAV values (ETF) 3 – Index values 4 – FX values 5 – EOD NAV from Issuer
Value	16	10	Price	Calculated Value
Value Generation Time	26	17	LocalTimestamp	Indicates when the Calculated Value is generated

LONG FORM CALCULATED VALUE MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"y"	Long Form Calculated Value Message
Symbol	9	6	Alphanumeric	Symbol of the Calculated Value
Value Category	15	1	Alphanumeric	Category of the data conveyed in the "Value" field 1 – Closing Price 2 – iNAV values (ETF) 3 – Index values 4 – FX values 5 – EOD NAV from Issuer
Value	16	19	Price	Calculated Value
Value Generation Time	35	17	LocalTimestamp	Indicates when the Calculated Value is generated

6 Sample Outputs

6.1 Order Added and Fully Traded

ACTION	MD FEED MESSAGE
Sell of 100 XXX shares entered at 85.89. Order Reference 638 assigned.	38743037A 638S 100XXX 858900YC
Matching buy order entered and order traded with Reference "355".	38754246E 638 100 355 640C

Note: There is no Add Order Message for the matching buy order because it does not display on the book.

Buyer needs to determine the execution price based on the limit price of the original order since the Order Execution Message has no price indicated.

6.2 Order Added, Fully Traded and Remaining Qty of Matching Order is Placed on Book

ACTION	MD FEED MESSAGE
Buy order of 111 XXX shares entered at 85.89. Order Reference "2" assigned.	46143332A 2B 111XXX 858900YC
Matching sell order entered for 112 shares of XXX. Order Execution Message is sent out with Order Reference "2" and Trade Reference "1".	46300560E 2 111 1 4C
Add the remaining share (1) of the sell order onto the book.	46300713A 4S 1XXX 858900YC

6.3 Price Revision

ACTION	MD FEED MESSAGE
Sell order of 1000 XXX shares entered. Order Reference "670" assigned. The displayprice is 85.88.	39465381A 670S 1000XXX 858800YC
Price is revised to 85.89. An Order Cancel Message is sent out.	39476527X 670 1000
An Add Order Message is sent after the Order Cancel Message. The Order Reference is the same. The displayprice changes to 85.89.	39476527A 670S 1000XXX 858900YC

6.4 Reduction of Order Quantity

ACTION	MD FEED MESSAGE
Sell order of 1000 XXX shares entered. Order Reference "671" assigned. The displayprice is 85.88.	39476527A 671S 1000XXX 858800YC
The order quantity is cut down by 100 shares. An Order Cancel Message is sent informing client about the change.	39483706X 671 100

Note: Cboe currently does not support increase of total order quantity so clients should calculate the remaining amount of the original order which is still open.

6.5 Order Revised and Executed

ACTION	MD FEED MESSAGE
A visible sell order of 1666 XXX shares is placed on the book with the displayprice of 85.89.	38821658A 642S 1666XXX 858900YC
A visible buy order of 1066 XXX shares is placed on the book with the displayprice of 85.88.	38841745A 644B 1066XXX 858800YC
The buy order is revised to the displayprice of 85.89. An Order Cancel Message is sent out.	38852664X 644 1066
The trade is executed. An Order Execution Message is sent out.	38852664E 642 1066 356 644C

6.6 Execution of Fully Hidden Order

ACTION	MD FEED MESSAGE
A hidden sell order of 777 XXX shares is placed on the book with the displayprice of 85.89.	[No message sent for hidden order.]
A visible buy order of 1000 shares is entered at 85.89. A Trade Message is sent out corresponding to the hidden order quantity. MIC Venue is Near Point	39067957P 0B 777XXX 858900 358 0NN
The remaining quantity of the buy order is added to the book.	39067957A 651B 223XXX 858900YC

6.7 Trades against Partially Hidden Order (Iceberg)

ACTION	MD FEED MESSAGE
A sell order of 10000 XXX shares is placed on the book with a visible quantity of 1000 shares. The displayprice is 85.89. An Add Order Message is sent out for the visible amount.	40792757A 2454S 1000XXX 858900YC
A buy order of 500 shares is entered and crosses against the visible quantity of 1000 shares. 500 shares remain on the book.	40812453E 2454 500 1953 2455C
A buy order for 4000 shares is entered and crosses against the iceberg. An Order Execution Message for the visible trade of 500 shares is sent out.	40825082E 2454 500 1954 2456C
A Trade Message is sent out for the hidden quantity of 3500 shares.	40825082P 0B 3500XXX 858900 1954 0NC
The peak is refreshed onto the book. An Add Order Message is sent out for 1000 shares.	40825082A 2457S 1000XXX 858900YC

6.8 Trade Cancellation (Bust)

ACTION	MD FEED MESSAGE
A sell order of 111 XXX shares is placed on the book. The display price is 85.89. An Add Order Message is sent out for the visible amount.	42119703A 4716S 111XXX 858900YC
An Order Execution Message is sent out on receiving a matching order. The Trade Reference is "4152".	42124752E 4716 111 4152 4717C
When the trade is cancelled by Cboe, a Broken Trade Message is sent.	42204572B 4152

6.9 Long Form Messages (Execution of Visible Order)

ACTION	MD FEED MESSAGE
A buy order of 1,000,000 YYYY shares entered at 80,000,000. Order Reference "109" is assigned.	36417412a 109B 1000000YYYY 8000000000YC
An Order Execution Message is sent out on receiving a matching order. The Trade Reference is "28".	36447020e 109 1000000 28 110C

6.10 Long Form Messages (Execution On Hidden Order)

ACTION	MD FEED MESSAGE
Trade Message is sent out on receiving an execution on the hidden quantity. MIC Venue is Near Point	36447020p 0B 200000YYYY 8000000000 29 ONN

6.11 Long Form Messages (Cancellation of Visible Order)

ACTION	MD FEED MESSAGE
A buy order of 1,000,000 YYYY shares entered at 80,000,000p. Order Reference "111" is assigned.	36417412a 111B 1000000YYYY 8000000000YC
The order is cancelled by Cboe and an Order Cancel Message is sent out.	36453536x 111 1000000

6.12 Undisclosed Order Added, Partially Traded, and then Fully Traded

ACTION	MD FEED MESSAGE
An undisclosed buy order of 10,000 XXX shares entered at 10.00. 0 share is displayed in the Add Order Message. Order Reference 8 assigned.	59709741A 8B 0XXX 100000YC

A visible sell order of 5000 XXX shares is entered at 10.00. A Trade Message is sent out for the traded quantity of 5000 shares.	59733491P 0B 5000XXX 100000140000005 0NC
Another visible sell order of 5000 XXX shares is entered at 10.00. A Trade Message is sent out for the traded quantity of 5000 shares.	59754241P 0B 5000XXX 100000140000006 0NC
The undisclosed order is then cancelled by Cboe and an Order Cancel Message with 0 shares is sent out	59754241X 8 0

6.13 Execution of Market On Close Order

ACTION	MD FEED MESSAGE
A Trade Message is sent out for MOC trade with quantity of 3500 shares and price of 85.89.	40825082P 0B 3500XXX 858900 1954 0NM

6.14 Long Form Messages (Execution of Market On Close Order)

ACTION	MD FEED MESSAGE
Trade Message is sent out for MOC trade with quantity of 200,000 and price of 800.	36447020p 0B 200000YYYY 8000000000 29 0NM

6.15 Execution of Broker Preferred Order

ACTION	MD FEED MESSAGE
A broker preferred sell order (hidden) of 1000 shares in XXX is placed on the book with a price of 85.89.	[No message sent for hidden order.]
A broker preferred buy order (hidden) of 3500 shares is entered at 85.89. A Trade Message is sent out for broker preferred trade with quantity of 1000 shares and price of 85.89. MIC Venue is Far Point	40825082P 0B 1000XXX 858900 1954 0BF
The remaining quantity of the buy order is added to the book.	[No message sent for hidden order.]

6.16 Long Form Messages (Execution of Broker Preferred Order)

ACTION	MD FEED MESSAGE
Trade Message is sent out for broker preferred trade with quantity of 200,000 and price of 800. MIC Venue is Far Point	36447020p 0B 200000YYYY 8000000000 29 0BF