Cboe Europe
PITCH Specification

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Contents

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1 Overview

This document describes the Cboe TCP PITCH protocol. The intended audience of this document is software developers of Cboe participants who would like to use the TCP PITCH protocol to receive real-time full depth of book quotations and execution information direct from Cboe, or those interested in receiving OTC trade reports from the Cboe Trade Reporting Facility.

1.1 Trading Platforms

The TCP PITCH protocol used by Cboe on its European Trading platforms (BXE, CXE and DXE) is very similar to the PITCH protocol used in the US markets, but with the addition of new *long form* message types which can accommodate larger order sizes, wider symbols and finer grained prices. For bandwidth efficiency, long form messages are only sent if required. The European platforms also add a Trade - Extended message, which details off-book trades reported to Cboe, such as privately negotiated trades brought 'on-exchange'.

PITCH cannot be used to enter orders. For order entry, refer to the Cboe Europe FIX Specification.

All visible orders and executions are reflected via the PITCH feed. Each PITCH message reflects the addition, deletion, or execution of an order in the system. All orders and executions are anonymous, and do not contain the participant identity.

The following TCP PITCH streams are available:

Covered Markets	Matching Units
Full Feed	All
XLON, XDUB	1–3
XPAR, XAMS, XBRU, XLIS	4–6
XETR/XFRA, XWBO	7–8
MTAA/MTAH/ETFP, XMCE, CHIX[1], XWAR, XBUD, XPRA, XSWX, XQMH	9–11
XCSE, XHEL, XSTO, XOSL	12

1.2 Trade Reporting Facility

The PITCH protocol is also used by the Cboe Trade Reporting Facility ("TRF") to disseminate OTC data.

Details of OTC or SI trades reported to the TRF system are published using the Trade - Extended message.

Order Executed and Trade messages are not applicable to the TRF PITCH feed.

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[1]In addition all the primary MICs of secondary listed symbols.

2 Protocol

2.1 Message Format

The PITCH data feed is comprised of a series of fixed-length sequenced messages. The length of each message is dependent upon the message type. Each message is made up of non-control ASCII bytes. ==Cboe reserves the right to add message types and grow the length== of any message without notice. Participants should develop their decoders to ignore unknown message types and messages that grow beyond the expected length. Messages will only be grown to add additional data to the end of the message.

2.2 Sequence Numbers

The messages that make up the PITCH protocol are delivered using SOUP 2.0 which handles sequencing and delivery integrity. The Cboe implementation of SOUP 2.0 is the same as other market centres.

2.3 Order and Execution IDs

Note that Order and Execution IDs are 12 characters, base 36.

2.4 Trade Amendments

Order-book or reported trades that are subsequently amended will result in two Trade - Extended Form messages to be sent. The first trade will be transmitted using all of the details of the original trade, including MMT flags, but with the Cancellation flag set. The second trade will be transmitted using the amended details, including MMT flags, but with the Modification flag set.

3 Sessions

The Cboe implementation of SOUP 2.0 is the same as other market centres. This includes the implementation of session events, such as login requests, client/server heartbeats, and logout requests.

4 Message Types

Each PITCH message type reflects the addition, deletion, or execution of an order in the system.

The fields within each message type have a corresponding data type. The various data types are defined in the following table.

Data Type	Description
Alpha	A string of ASCII letters (A–Z), left justified and space padded on the right.
Alphanumeric	A string of ASCII numbers and letters (A–Z, 0–9), left justified and space padded on the right.
Base 36 Numeric	A string of ASCII numbers and letters (A–Z, 0–9), representing base 36 digits, right justified and zero filled on the left. Typically used for Order IDs and Execution IDs.
Numeric	A string of ASCII numbers (0–9), right justified and zero filled on the left.
Price	A string of ASCII numbers (0–9) consisting of six whole digits followed by four decimal digits. The whole number portion is zero filled on the left; the decimal portion is zero filled on the right. The decimal point is implied by position and does not explicitly appear in the field.
Long Price	As with Prices above, but this field consists of 12 whole number digits followed by seven decimal digits.
TimestampUs	A string of ASCII numbers (0–9) representing the whole number of microseconds past midnight London time, right justified and zero padded on the left, with no decimal point. This will replace the existing 8-byte Timestamp field on all messages.

4.1 Modification of Orders

Messages which modify the state of an order (Order Executed and Order Executed — Long Form, Order Cancel and Order Cancel — Long Form) refer to an Order ID previously sent with an Add Order Message. Modifications are cumulative. Modification message reduce the remaining shares in the referenced open order by the number of shares indicated. When the remaining shares for an order reach zero, the order is dead and should be removed from the book.

4.2 System Event Message

Unlike other market centres, Cboe does not send System Event messages.

4.3 Symbol Clear

The `Symbol Clear` message instructs feed recipients to clear all orders for the Cboe book in the specified symbol. This message will be sent in certain recovery events such as a data center fail-over.

The `Symbol Clear` message has the following format:

Field Name	Offset	Length	Value	Description
Timestamp	0	11	TimestampUs	Timestamp in microseconds
Message Type	11	1	"h"	Symbol Clear Message
Symbol	12	8	Alphanumeric	Symbol right padded with spaces.

4.4 Add Order Message

An add order message represents a newly accepted visible order on the Cboe book. It includes a day-specific Order ID assigned by Cboe to the order.

Note: If an order is repriced within the Cboe matching engine, a Cancel Order Message will be immediately followed by an Add Order Message with the same Order ID as the original order.

Field Name	Offset	Length	Value	Description
Timestamp	0	11	TimestampUs	Timestamp in microseconds
Message Type	11	1	"K"	Add Order Message
OrderID	12	12	Base 36 Numeric	Day-specific identifier assigned to this order.
Side Indicator	24	1	Alpha	B = Buy S = Sell
Shares	25	6	Numeric	Number of shares being added to the book (may be less than the number of shares entered).
Symbol	31	6	Alphanumeric	Symbol, right added with spaces. Common Symbology Format.
Price	37	10	Price	Order price.
Display	47	1	"Y"	Always "Y". Maintained for compatibility reasons.

4.5 Add Order Message — Long Form

Only used on the Cboe European platform. As Add Order Message above, but with longer fields for Shares, Price and Symbol.

Field Name	Offset	Length	Value	Description
Timestamp	0	11	TimestampUs	Timestamp in microseconds
Message Type	11	1	"M"	Add Order Message — Long Form
OrderID	12	12	Base 36 Numeric	Day-specific identifier assigned to this order.
Side Indicator	24	1	Alpha	B = Buy S = Sell
Shares	25	10	Numeric	Number of shares being added to the book (may be less than the number of shares entered).
Symbol	35	8	Alphanumeric	Symbol, right added with spaces. Common Symbology Format.
Price	43	19	Long Price	Order price (long format).
Display	62	1	"Y"	Always "Y". Maintained for compatibility reasons.

4.6 Order Executed Messages

Order Executed Messages are sent when a visible order on the Cboe book is executed in whole or in part. The execution price equals the price found in the original Add Order Message.

4.6.1 Order Executed Message

Field Name	Offset	Length	Value	Description
Timestamp	0	11	TimestampUs	Timestamp in microseconds
Message Type	11	1	"N"	Order Executed Message
OrderID	12	12	Base 36 Numeric	Order ID of a previously sent Add Order Message.
Executed Shares	24	6	Numeric	Number of shares executed.
Execution ID	30	12	Base 36 Numeric	Cboe generated day-unique execution identifier of this execution. Execution ID is also reference in the Trade Break Message.
Execution Flag	42	4	Alphanumeric	Type flags based on MMT v3.04 standard (Soon to be upgraded to MMT v4.1)

4.7 Order Executed Message — Long Form

Only used on the Cboe European platform. As Order Executed Message above, but with a longer field for Executed Shares.

Field Name	Offset	Length	Value	Description
Timestamp	0	11	TimestampUs	Timestamp in microseconds
Message Type	11	1	"g"	Order Executed Message — Long Form
OrderID	12	12	Base 36 Numeric	Order ID of a previously sent Add Order Message.
Executed Shares	24	10	Numeric	Number of shares executed.
Execution ID	34	12	Base 36 Numeric	Cboe generated day-unique execution identifier of this execution. Execution ID is also reference in the Trade Break Message.
Execution Flags	46	4	Alphanumeric	Type flags based on MMT v3.04 standard (Soon to be upgraded to MMT v4.1

4.7.1 Execution Flags

The Order Executed message uses a 4-character flags field to provide detailed type information regarding the execution.

Each character in the flags field corresponds to a distinct MMT field, as described in the following table and § 4.14, p. 17:

Execution Flags			
Offset	MMT Level / Fieldname		Description
0	1	Market Mechanism	
1	2	Trading Mode	See § 4.14, p. 17 for possible values
2	3.6	Ex/Cum Dividend	
3	3.9	Algorithmic Trade	

Implied MMT flags for the Order Executed message are as follows:

- *Level 1* populated per Execution Flags offset 0
- *Level 2* populated per Execution Flags offset 1
- *Level 3.1* will always be '-' for a standard trade
- *Level 3.2* will always be '-' for not being a Negotiated Trade
- *Level 3.3* will always be '-' for not being a Crossing Trade
- *Level 3.4* will always be '-' for no Modification Indicator
- *Level 3.5* will always be '-' for no Benchmark or Reference Price Indicator
- *Level 3.6* populated per Execution Flags offset 2
- *Level 3.7* will always be '-' for unspecified (as not off book)
- *Level 3.8* will always be 'P' for a Plain-Vanilla Trade
- *Level 3.9* populated per Execution Flags offset 3
- *Level 4.1* will always be '-' for no deferral of publication
- *Level 4.2* will always be '-' for not being applicable
- *Level 5* will always be '-' for not being applicable

4.8 Order Cancel Message

Order Cancel Messages are sent when a visible order on the Cboe book is cancelled in whole or in part.

Field Name	Offset	Length	Value	Description

Timestamp	0	11	TimestampUs	Timestamp in microseconds
Message Type	11	1	"F"	Order Cancel Message
OrderID	12	12	Base 36 Numeric	Order ID of a previously sent Add Order Message.
Cancelled Shares	24	6	Numeric	Number of shares cancelled.

4.9 Order Cancel Message — Long Form

Only used on the Cboe European platform. As Order Cancel Message above, but with a longer field for Cancelled Shares.

Field Name	Offset	Length	Value	Description
Timestamp	0	11	TimestampUs	Timestamp in microseconds
Message Type	11	1	"G"	Order Cancel Message — Long Form
OrderID	12	12	Base 36 Numeric	Order ID of a previously sent Add Order Message.
Cancelled Shares	24	10	Numeric	Number of shares cancelled.

4.10 Trade Message

The Trade Message provides information about executions of non-displayed orders or shares on the Cboe book and negotiated trades. Trade Messages are necessary to calculate Cboe execution based data. Trade Messages do not alter the book and can be ignored if you are just building a book.

No Add Order Message is sent for invisible orders or negotiated trades, and thus, no modify order messages may be sent when these orders are executed. Instead, a Trade Message is sent whenever such an order is executed in whole or in part. As with visible orders, hidden orders may be executed in parts.

A complete view of all Cboe executions can be built by combining all Order Executed and Trade messages.

The Order ID of a non-displayed order is obfuscated by default in the Trade Message but may be optionally disseminated for a Participant's own orders upon request. As such, partial executions against the same hidden order will by default have different Order IDs.

4.10.1 Trade Message

Field Name	Offset	Length	Value	Description
Timestamp	0	11	TimestampUs	Timestamp in microseconds
Message Type	11	1	"V"	Trade Message
OrderID	12	12	Base 36 Numeric	Obfuscated Order ID or Order ID of the invisible order or negotiated trade.
Side Indicator	24	1	Alpha	Always "B".
Shares	25	6	Numeric	Incremental number of shares executed.
Symbol	31	6	Alpha	Symbol, right padded with spaces.
Price	37	10	Price	Execution price of the fill.
Execution ID	47	12	Base 36 Numeric	Cboe generated day-unique execution identifier of this trade. Execution ID is also referenced in the Trade Break Message.
Trade Flags	59	5	Alphanumeric	Type flags based on MMT v3.04 standard (Soon to be upgraded to MMT v4.1)

4.10.2 Trade Message — Long Form

Only used on the Cboe European platform. As Trade Message above, but with longer fields for Shares and Price.

Field Name	Offset	Length	Value	Description
Timestamp	0	11	TimestampUs	Timestamp in microseconds
Message Type	11	1	"W"	Trade Message — Long Form
OrderID	12	12	Base 36 Numeric	Obfuscated Order ID or Order ID of the invisible order or negotiated trade.
Side Indicator	24	1	Alpha	Always "B".
Shares	25	10	Numeric	Incremental number of shares executed.
Symbol	35	8	Alpha	Symbol, right padded with spaces.
Price	43	19	Long Price	Execution price (long format) of the fill.
Execution ID	62	12	Base 36 Numeric	Cboe generated day-unique execution identifier of this trade. Execution ID is also referenced in the Trade Break Message.
Trade Flags	74	5	Alphanumeric	Type flags based on MMT v3.04 standard (Soon to be upgraded to MMT v4.1)

4.10.3 Trade Flags

The non-Extended Trade messages use a 5-character flags field to provide detailed type information regarding the trade.

Each character in the flags field corresponds to a distinct MMT field, as described in the following table and § 4.14, p. 17:

Trade Flags			
Offset	MMT Level / Fieldname		Description
0	1	Market Mechanism	
1	2	Trading Mode	
2	3.1	Transaction Category	See § 4.14, p. 17 for possible values
3	3.5	Benchmark/Reference Price Indicator	
4	3.9	Algorithmic Trade	

Implied MMT flags for the non-Extended Trade messages are as follows:

- *Level 1* populated per Trade Flags offset 0
- *Level 2* populated per Trade Flags offset 1
- *Level 3.1* populated per Trade Flags offset 2
- *Level 3.2* will always be '-' for not being a Negotiated Trade
- *Level 3.3* will always be '-' for not being a Crossing Trade
- *Level 3.4* will always be '-' for no Modification Indicator
- *Level 3.5* populated per Trade Flags offset 3
- *Level 3.6* will always be '-' for no Special Dividend
- *Level 3.7* will always be '-' for unspecified (as not off book)
- *Level 3.8* will always be 'P' for a Plain-Vanilla Trade
- *Level 3.9* populated per Execution Flags offset 4
- *Level 4.1* will always be '-' for no deferral of publication
- *Level 4.2* will always be '-' for not being applicable
- *Level 5* will always be '-' for not being applicable

4.10.4 Trade Message — Extended Form

Only used on the Cboe European platform. This provides extended details of trades reported to or executed by Cboe. This includes, for example, privately negotiated trades brought 'on-exchange'. Like other Trade messages, these do not alter the book, and can be ignored if you are just building a book.

Field Name	Offset	Length	Value	Description
Timestamp	0	11	TimestampUs	Timestamp in microseconds
Message Type	11	1	"v"	Trade Message — Extended Form
Shares	12	12	Numeric	Number of shares executed.
Symbol	24	8	Alphanumeric	Symbol, right padded with spaces.
Price	32	19	Long Price	Execution price of the fill. This may be zero if the price is pending, as denoted by Level 3.8 of the Extended Trade Flags.
Trade ID	51	12	Base 36 Numeric	Cboe generated identifier of this trade. This identifier is guaranteed to be unique for at least 7 calendar days.
Trade Date	63	8	Alphanumeric	Date on which the trade occurred, in the form YYYYMMDD.
Trade Time	71	8	Timestamp	Time at which the trade occurred, encoded as the number of milliseconds since midnight, on the day represented by Trade date, London time.
Execution Venue	79	4	Alphanumeric	The venue on which the trade executed, when applicable. This will contain the MIC representing the venue on which the trade occurred, where applicable. Cboe UK LIS (CXE) trades have the value LISX and Cboe BIDS Europe (DXE) trades have the value LISZ. This will contain SINT if the trade occurred on a Systematic Internaliser or XOFF if OTC. Cboe will include third-country venue publication here when MMT v4.1 is introduced. See below for details.
Currency	83	3	Alphanumeric	Traded currency.
Cboe Trade Flags	86	1	Alphanumeric	See § 4.10.7, p. 13 for possible values.
Extended Trade Flags	87	14	Alphanumeric	Type flags based on the MMT v3.04 standard.(Soon to be upgraded to MMT v4.1)

From 1 Jan 2024, Cboe plans to include third-country venue publication in the Execution Venue field, together with the introduction of MMT v4.1.

Where a firm has executed a trade which is reportable via the EU APA and which has been executed on an organised trading platform outside of the EU which is not included in the Annex to the ESMA Transparency Opinion, this field will contain the 4-character MIC. Additionally, the Cboe Trade Flags field is extended with values indicating the non-recognised third-country status.

4.10.5 Trade Message — Unknown Symbol

Only used on the Cboe European Trade Reporting Facility. This provides details of trades reported to Cboe, but traded on a symbol not currently known to Cboe. These trades are identified by the ISIN and the reported currency. Like other Trade messages, these do not alter the book, and can be ignored if you are just building a book.

Field Name	Offset	Length	Value	Description
Timestamp	0	11	TimestampUs	Timestamp in microseconds
Message Type	11	1	"w"	Trade Message — Unknown Symbol
Shares	12	12	Numeric	Number of shares traded.
Symbol	24	12	Alphanumeric	Symbol in ISIN
Price	36	19	Long Price	Reported price of the trade. This may be zero if the price is pending, as denoted by Level 3.8 of the Extended Trade Flags.
Trade ID	55	12	Base 36 Numeric	Cboe generated identifier of this trade. This identifier is guaranteed to be unique for at least 7 calendar days.
Trade Date	67	8	Alphanumeric	Date on which the trade occurred, in the form YYYYMMDD.
Trade Time	75	8	Timestamp	Time at which the trade occurred, encoded as the number of milliseconds since midnight, on the day represented by Trade date, London time.
Execution Venue	83	4	Alphanumeric	The venue on which the trade executed, when applicable. This will contain the MIC representing the venue on which the trade occurred, where applicable. The field will contain SINT if the trade occurred on a Systematic Internaliser or XOFF if OTC. Cboe will include third-country venue publication here when MMT v4.1 is introduced. See below for details.
Currency	87	3	Alphanumeric	Reported currency.
Cboe Trade Flags	90	1	Alphanumeric	See § 4.10.7, p. 13 for possible values.
Extended Trade Flags	91	14	Alphanumeric	Type flags based on the MMT v3.04 standard. (Soon to be upgraded to MMT v4.1)

From 1 Jan 2024, Cboe plans to include third-country venue publication in the Execution Venue field, together with the introduction of MMT v4.1.

Where a firm has executed a trade which is reportable via the EU APA and which has been executed on an organised trading platform outside of the EU which is not included in the Annex to the ESMA Transparency Opinion, this field will contain the 4-character MIC. Additionally, the Cboe Trade Flags field is extended with values indicating the non-recognised third-country status.

4.10.6 Extended Trade Flags

The Cboe Extended Trade message uses a 14 character flags field to provide detailed type information regarding the trade.

The meaning of the flags field is different between different versions of MMT.

For MMT v3.04, the version currently supported, please consult § 4.14, p. 17.

For MMT v4, please consult § 4.15, p. 20.

4.10.7 Cboe Trade Flags

The Cboe Extended Trade message uses a 1 character field to provide detailed information about the trade such as timing, the regulated entity the trade was reported to, as well as whether the trade was reported to have been executed under an ESMA non-recognised third-country venue, as described in the following table:

| Regulated Entity | | Description |
UK	EU	
'-'	'4'	The trade was reported to Cboe on time and in the Main Session
'1'	'5'	The trade was reported to Cboe 'late'
'2'	'6'	The trade was reported to Cboe out of the Main Session
'3'	'7'	The trade was reported to Cboe late and out of the Main Session
N/A	'C'	Same as 4, and trade venue is an ESMA non-recognised 3rd Country venue
N/A	'D'	Same as 5, and trade venue is an ESMA non-recognised 3rd Country venue
N/A	'E'	Same as 6, and trade venue is an ESMA non-recognised 3rd Country venue
N/A	'F'	Same as 7, and trade venue is an ESMA non-recognised 3rd Country venue

Please note that values 'C' through 'F' (see bit 3 below), which highlight the trade was executed under an ESMA non-recognised third-country venue, will be introduced alongside the MMT v4 enhancements. Such trades should be considered 'XOFF', but will contain the MIC of the ESMA non-recognised third-country trading venue in the Execution Venue field.

Participants may choose to convert this field to a bitfield (mapping '-' to 0) and apply the following bitfield interpretations:

Bit 0: Set when the trade was reported to Cboe 'late'

Bit 1: Set when the trade was reported out of the Main Session

Bit 2: Set when the trade was reported to the ESMA (EU jurisdiction)

Bit 3: Set when the trade was reported to have been executed on an ESMA non-recognised third-country trading venue (XOFF)

4.11 Trading Status Message

The Trading Status Message is used to indicate the current trading status of a security. A Trading Status Message will be sent whenever a security's trading status changes. In addition, Cboe will send a Trading Status Message for all securities that are "Suspended" before the start of trading hours.

Field Name	Offset	Length	Value	Description
Timestamp	0	11	TimestampUs	Timestamp in microseconds
Message Type	11	1	"a"	Trading Status Message
Symbol	12	8	Alphanumeric	Symbol right padded with spaces.
Status	20	1	Alpha	"T" = Trading "R" = Off-Book Reporting "C" = Closed "S" = Suspended "N" = No Reference Price "V" = Volatility Interruption "O" = Opening Auction "E" = Closing Auction "H" = Halt[2] "M" = Market Order Imbalance "P" = Price Monitoring Extension "U" = Cboe Closing Cross
Reserved	21	3	Alpha	Reserved

See the Participant Manual for details on Trading Status phases.

4.12 Statistics Message

Only used on the Cboe European platform. The Statistics Message is used to disseminate the statistics prices: opening, closing, high, low. A Statistics Message will be sent whenever a value changes. At the start of each trading day a "Previous Closing Price" will be sent with the closing price of the previous trading day.

If a trade that generated the price is subsequently busted another Statistics Message will be sent.

The "Price Determination" will by default be "Normal". The value of "Manual" arises from prices being adjusted by market supervision. A lower "High Price" or higher "Low Price" could result from breaking a trade, these will be flagged with "Manual".

Cboe reserves the right to add additional values to the "Statistics Type" and "Price Determination" fields without notice. Participants should develop their decoders to ignore unknown values.

Field Name	Offset	Length	Value	Description
Timestamp	0	11	TimestampUs	Timestamp in microseconds
Message Type	11	1	"Y"	Statistics Message
Symbol	12	8	Alphanumeric	Symbol right padded with spaces.
Price	20	19	Long Price	Price.
Statistic Type	39	1	Alpha	"C" = Closing Price "H" = High Price "L" = Low Price "O" = Opening Price "P" = Previous Closing Price

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[2]Reserved for future use

Price Determination	40	1	Alphanumeric	"0" = Normal "1" = Manual (Price override by Market Supervision)

4.13 Auction Messages

4.13.1 Auction Update Message

Auction Update messages are used to disseminate indicative price and size information during auctions for Cboe auction eligible securities. For Opening and Closing auctions, Auction Update messages are published periodically during the call and extension phases of the auction process. For Periodic auctions, they are published when there is material change.

Field Name	Offset	Length	Value	Description
Timestamp	0	11	TimestampUs	Timestamp in microseconds
Message Type	11	1	"b"	Auction Update Message
Symbol	12	8	Alphanumeric	Symbol right padded with spaces.
Auction Type	20	1	Alpha	"O" = Opening Auction "C" = Closing Auction "H" = Halt Auction[3] "V" = Volatility Auction[3] "P" = Periodic Auction "U" = Cboe Closing Cross
Reference Price	21	19	Long Price	Reference price used in tie-breaker situations
Indicative Price	40	19	Long Price	Price at which the auction would match if executed at the time of the message
Indicative Shares	59	10	Numeric	Number of shares at the Indicative Price
Outside Tolerance	69	1	Alphanumeric	Indicates whether the price on this update is outside the Cboe EBBO collar: "O" = Outside tolerance "I" = Inside tolerance "-" = Not specified
Includes Primary	70	1	Alphanumeric	Indicates whether the Cboe EBBO used to collar this update includes the Primary Market quotes: "P" = Includes Primary "N" = Excludes Primary "-" = Not specified

4.13.2 Auction Summary

Auction Summary messages are used to disseminate the results of an auction in a Cboe auction eligible security.

Field Name	Offset	Length	Value	Description
Timestamp	0	11	TimestampUs	Timestamp in microseconds
Message Type	11	1	"f"	Auction Summary Message
Symbol	12	8	Alphanumeric	Symbol right padded with spaces.

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[3]Reserved for future use

Auction Type	20	1	Alpha	"O" = Opening Auction "C" = Closing Auction "H" = Halt Auction[4] "V" = Volatility Auction[4] "P" = Periodic Auction "U" = Cboe Closing Cross
Price	21	19	Long Price	Auction price
Shares	40	10	Numeric	Cumulative number of shares executed during the auction

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[4]Reserved for future use

4.14 MMT v3.04 Value Mappings

The following tables define type information as detailed by version 3.04 of the Market Model Typology standard ("MMT"). See `http://www.fixtradingcommunity.org/pg/group-types/mmt` for more details.

Each character in the flags field corresponds to a distinct MMT field, as described in the following table:

Trade Type Flags			
Offset	**MMT Level / Fieldname**		**Description**
0	1	Market Mechanism	See § 4.14, p. 17 for possible values.
1	2	Trading Mode	
2	3.1	Transaction Category	
3	3.2	Negotiated Trade	
4	3.3	Crossing Trade	
5	3.4	Modification Indicator	
6	3.5	Benchmark/Reference rice Indicator	
7	3.6	Special Dividend	
8	3.7	Off Book Automated Indicator	
9	3.8	Price Formation/Discovery Process	
10	3.9	Algorithmic Indicator	
11	4.1	Publication Mode/Deferral Reason	
12	4.2	Deferral or Enrichment Type	
13	5	Duplicative Indicator	

Special notes regarding Deferral or Enrichment Type

This is for RTS 2 only and currently unsupported in Cboe. A value of "-" should hence be expected for offset 12 (level 4.2).

Not all values are currently applicable to Cboe services. However, participants are advised to design their systems to cope with any of the listed MMT values.

1. Market Mechanism	
Value	**Meaning**
'1'	Central Limit Order Book
'2'	Quote Driven Market
'3'	Dark Order Book
'4'	Off Book
'5'	Periodic Auction
'6'	Request For Quotes
'7'	Any Other, Including Hybrid

2. Trading Mode	
Value	**Meaning**
'1'	Undefined Auction
'2'	Continuous Trading
'3'	At Market Close Trading
'4'	Out Of Main Session
'5'	Trade Reporting (On Exchange)
'6'	Trade Reporting (Off Exchange)
'7'	Trade Reporting (Systematic Internaliser)
'0'	Scheduled Opening Auction
'K'	Scheduled Closing Auction
'I'	Scheduled Intraday Auction
'U'	Unscheduled Auction

3.1 Transaction Category	
Value	**Meaning**
'D'	Dark Trade
'R'	Trade that has Received Price Improvement
'Z'	Packaged trade
'Y'	Exchange for Physicals Trade
'–'	None of the above apply

3.2 Negotiated Trade or Pre-Trade Transparency Waiver	
Value	**Meaning**
'1'	Negotiated Trade in Liquid Financial Instruments
'2'	Negotiated Trade in Illiquid Financial Instruments
'3'	Negotiated Trade Subject to Conditions Other than the Current Market Price
'N'	Negotiated Trade Where None of the Above Apply
'4'	Pre-Trade Transparency Waiver for Illiquid Instrument on an SI
'5'	Pre-Trade Transparency Waiver for Above Standard Market Size on an SI
'6'	Pre-Trade Transparency Waivers for Illiquid Instrument on an SI and Above Standard Market Size on an SI
'–'	Not specified

3.3 Crossing Trade	
Value	**Meaning**
'X'	Crossing Trade
'–'	Not specified

3.4 Modification Indicator	
Value	**Meaning**
'A'	Indicates a modification of a previously reported trade
'C'	Indicates a cancellation of a previously reported trade
'–'	Not specified

3.5 Benchmark or Reference Price Indicator	
Value	**Meaning**
'B'	Benchmark trade if (optionally) set by reporting party
'S'	Reference Price Trade
'–'	Not specified

3.6 Ex/Cum Dividend	
Value	**Meaning**
'E'	Ex/Cum/Special dividend if (optionally) set by reporting party
'–'	Not specified

3.7 Off Book Automated Indicator	
Value	**Meaning**
'Q'	Automated
'M'	Manual
'–'	Not specified

3.8 Contribution to Price Formation or the Price Discovery Process	
Value	Meaning
'P'	Standard trade for the specified Market Mechanism or Trading Mode
'T'	Non-Price Forming Trade (formerly known as Technical Trade)
'J'	Trade not Contributing to Price Discovery Process (formerly Technical Trade)
'N'	Price is currently not available but pending

3.9 Algorithmic Trade	
Value	Meaning
'H'	Algorithmic Trade
'–'	Non-algorithmic Trade

4.1 Publication Mode / Post-Trade Deferral Reason	
Value	Meaning
'1'	Trade report reported late without permitted deferral
'2'	Deferral Trade for "Large In Scale"
'3'	Deferral Trade for "Illiquid Instrument"
'4'	Deferral Trade for "Size Specific"
'5'	Deferral Trade for "Illiquid Instrument" and "Size Specific"
'6'	Deferral Trade for "Illiquid Instrument" and "Large In Scale"
'–'	Not specified (Immediate Publication)

4.2 Post-Trade Deferral or Enrichment Type	
Value	Meaning
'1'	Limited Details Trade
'2'	Daily Aggregated Trade
'3'	Volume Omission Trade
'4'	Four Weeks Aggregation Trade
'5'	Indefinite Aggregation Trade
'6'	Volume Omission Trade, Eligible For Subsequent Enrichment in Aggregated Form
'7'	Full Details of Earlier Limited Details Trade
'8'	Full Details of Earlier Daily Aggregated Trade
'9'	Full Details of Earlier Volume Omission Trade
'V'	Full Details of Four Weeks Aggregation Trade
'W'	Full Details of Earlier Volume Omission Trade, Eligible For Subsequent Enrichment in Aggregated Form
'–'	Not Applicable

5. Duplicative Indicator	
Value	Meaning
'1'	Duplicative Trade Report
'–'	Unique Trade Report

4.15 MMT v4.1 Value Mappings

From 1 Jan 2024, Cboe's market data will support the Market Model Typology (MMT) v4.1 standard.

The number of characters used to represent a trade remains unchanged in v4.1 - it will remain at 14 characters, just like v3.04.

However, effective from MMT v4.1 onwards, an "efficient encoding string" for MMT is used, which has been decoupled from the MMT v4.1 level structure. It will no longer be the case that each character of the MMT string represents a single level in the MMT, but instead there is an encoding algorithm which decides for each position, which one or more MMT levels are represented, and encoded accordingly.

However, it's important to note that MMT v4.1 is backwards compatible with the encoding for the preceding version v3.04. All values that are present in version 3.04 are still represented in version 4.1, but some encoding values are not applicable to earlier versions of MMT.

Offset 0 Represents MMT Level 1 Market Mechanism	
Value	**Meaning**
'1'	Central Limit Order Book
'2'	Quote Driven Market
'3'	Dark Order Book
'4'	Off Book
'5'	Periodic Auction
'6'	Request For Quotes
'7'	Any Other, Including Hybrid (Original ESMA definition)
'8'	Hybrid System (Revised ESMA definition)
'9'	Any Other, Excluding Hybrid (Revised ESMA definition)

Offset 1 Represents MMT Level 2 Trading Mode	
Value	**Meaning**
'1'	Undefined Auction
'2'	Continuous Trading
'3'	At Market Close Trading
'4'	Out Of Main Session
'5'	Trade Reporting (On Exchange)
'6'	Trade Reporting (Off Exchange)
'7'	Trade Reporting (Systematic Internaliser)
'0'	Scheduled Opening Auction
'K'	Scheduled Closing Auction
'I'	Scheduled Intraday Auction
'U'	Unscheduled Auction
'P'	On-Demand Auction

Note: As Cboe transitions to MMT v4, executions from Cboe's Periodic Auction books will be flagged as 'On-Demand Auction' ('P'), rather than ('I').

Offset 2 Encodes MMT Level 3.1 and Level 3.13		
Value	**Level 3.1 Transaction Category**	**Level 3.13 RFMD Give-up Trade**
'D'	Dark Trade	-
'R'	Trade that has Received Price Improvement	-
'Z'	Packaged Trade	-
'Y'	Exchange for Physicals Trade	-
'H'	Exchange for Physicals Trade	GIVE
'G'	None of the above apply	GIVE
'–'	None of the above apply	-

Offset 3 Encodes MMT Level 3.2 and Level 3.10		
Value	**Level 3.2 Negotiation Indicator or Pre-Trade Transparency Waiver**	**Level 3.10 Pre-Trade Transparency Waiver Related To Size/Scale**
'1'	NLIQ(Negotiated Trade in Liquid Financial Instruments)	-
'2'	OILQ(Negotiated Trade in Illiquid Financial Instruments)	-
'3'	PRIC(Negotiated Trade Subject to Conditions Other than the Current Market Price)	-
'4'	ILQD(Pre-Trade Transparency Waiver for Illiquid Instrument on an SI)	-
'5'	-	SIZE(Pre-Trade Transparency Waiver for Above Standard Market Size on an SI)
'6'	ILQD(Pre-Trade Transparency Waiver for Illiquid Instrument on an SI)	SIZE(Pre-Trade Transparency Waiver for Above Standard Market Size on an SI)
'7'	-	NTLS(Negotiated Trade Larger Than LIS Brought Onto A Venue)
'8'	NETW(Negotiated Trade With Pre-Trade Transparency Waiver)	
'9'	NLIQ(Negotiated Trade in Liquid Financial Instruments)	NTLS(Negotiated Trade Larger Than LIS Brought Onto A Venue)
'a'	OILQ(Negotiated Trade in Illiquid Financial Instruments)	NTLS(Negotiated Trade Larger Than LIS Brought Onto A Venue)
'b'	PRIC(Negotiated Trade Subject to Conditions Other than the Current Market Price)	NTLS(Negotiated Trade Larger Than LIS Brought Onto A Venue)
'c'	NETW(Negotiated Trade With Pre-Trade Transparency Waiver)	NTLS(Negotiated Trade Larger Than LIS Brought Onto A Venue)
'N'	N(Negotiated Trade Where None of the Above Apply)	-
'–'	Not a Negotiated Trade	

Note that, in MMT v3, the values of 5 and 6 were already representing

- *5*: SIZE (Pre-Trade Transparency Waiver For Above Standard Market Size on an SI)
- *6*: ILQD+SIZE (Pre-Trade Transparency Waivers for Illiquid Instrument on an SI and Above Standard Market Size on an SI)

While SIZE has now been separated out into its own Level 3.10, the possible values remain the same.

Offset 4 Represents MMT Level 3.3 Crossing Trade	
Value	Meaning
'X'	Crossing Trade
'–'	Not specified

Offset 5 Represents MMT Level 3.4 Modification Indicator	
Value	Meaning
'A'	Indicates a modification of a previously reported trade
'C'	Indicates a cancellation of a previously reported trade
'–'	Not specified

Offset 6 Encodes three MMT Level 3 Transaction Types - Levels 3.5, 3.11 and 3.12			
Value	Level 3.5 Benchmark (BENC), Benchmark Transactions Executed at Market Closing Price (CLSE), or Reference Price Indicator (RFPT)	Level 3.11 Portfolio Trade (PORT)	Level 3.12 Contingent Trade (CONT)
'B'	BENC	-	-
'C'	-	-	CONT
'M'	BENC	-	CONT
'N'	-	PORT	CONT
'O'	BENC	PORT	CONT
'P'	-	PORT	-
'S'	RFPT	-	-
'Y'	BENC	PORT	-
'1'	CLSE	-	-
'2'	CLSE	PORT	-
'3'	CLSE	-	CONT
'4'	CLSE	PORT	CONT
'–'	-	-	-

Offset 7 Represents MMT Level 3.6 Special Dividend Indicator	
Value	Meaning
'E'	Special dividend if (optionally) set by reporting party
'–'	Not specified

Offset 8 Represents MMT Level 3.7 Off Book Automated Indicator	
Value	Meaning
'Q'	Automated
'M'	Manual
'–'	Not specified

Offset 9 Represents MMT Level 3.8 Contribution to Price Formation or the Price Discovery Process	
Value	Meaning
'P'	Standard trade for the specified Market Mechanism or Trading Mode
'T'	(NPFT) Non-Price Forming Trade (formerly known as Technical Trade)
'J'	(TNCP) Trade not Contributing to Price Discovery Process (formerly Technical Trade)
'N'	(PNDG) Price is currently not available but pending
'Z'	(NOAP) Price is Not Applicable

Note: TNCP is due to be deprecated by ESMA on new trades from 2024.

Offset 10 Represents MMT Level 3.9 Algorithmic Trade	
Value	Meaning
'H'	Algorithmic Trade
'-'	Non-algorithmic Trade

Offset 11 Encodes three MMT Levels 4.1, 4.3, and 4.4			
Value	Level 4.1 - Publication Mode / Post-Trade Deferral Reason	Level 4.3 - Post-Trade Deferral Reason: Illiquid Instrument (ILQD)	Level 4.4 - Post-Trade Deferral Reason: Size Specific. (SIZE)
'1'	Trade report reported late without permitted deferral		
'2'	LRGS	-	-
'3'	-	ILQD	-
'4'	-	-	SIZE
'5'	-	ILQD	SIZE
'6'	LRGS	ILQD	-
'-'	Not specified (Immediate publication)		

Key:

- **LRGS**: Deferral Trade for Large In Scale
- **ILQD**: Deferral Trade for Illiquid Instrument
- **SIZE**: Deferral Trade for Size Specific

Since ILQD and SIZE were originally in Level 4.1 in MMT v3, the relocation of ILQD and SIZE to their own levels does not change the values possible in offset 12, and hence the encoding algorithm essentially keeps the same values.

Offset 12 Represents MMT Level 4.2 Post-Trade Deferral or Enrichment Type	
Value	Meaning
'1'	Limited Details Trade
'2'	Daily Aggregated Trade
'3'	Volume Omission Trade
'4'	Four Weeks Aggregation Trade
'5'	Indefinite Aggregation Trade
'6'	Volume Omission Trade, Eligible For Subsequent Enrichment in Aggregated Form
'7'	Full Details of Earlier Limited Details Trade
'8'	Full Details of Earlier Daily Aggregated Trade
'9'	Full Details of Earlier Volume Omission Trade
'V'	Full Details of Four Weeks Aggregation Trade
'W'	Full Details of Earlier Volume Omission Trade, Eligible For Subsequent Enrichment in Aggregated Form
'-'	Not Applicable

Offset 13 Encodes the three MMT Level 5 Reporting Circumstance flags - Levels 5.1, 5.2 and 5.3		
Value	**Level 5.1 Duplicative Within Jurisdiction (Duplicative Trade Report)**	**Level 5.2 Duplicative Across Jurisdictions (Cross Border Duplicative Trade Report)**	**Level 5.3 Intra-Group Trade**
'1'	DUPL	-	-
'2'	-	-	IGRP
'3'	DUPL	-	IGRP
'4'	-	XBDT	-
'5'	DUPL	XBDT	-
'6'	DUPL	XBDT	IGRP
'7'	-	XBDT	IGRP
'-'	-		

5 Support

Please email support questions or comments regarding this specification to tradedeskeurope@cboe.com.

Revision History

11 July 2008	Initial draft version.
16 July 2008	Updated contact information.
12 November 2008	Changed data type for symbol from Alpha to Alphanumeric.
	Updated front page text to note FSA authorisation.
2 December 2008	Noted that Trade Break Messages are not currently sent.
31 July 2009	Trade Message and Trade Message — Long Form will always have a Side Indicator of "B".
15 December 2009	Version 2.0.
	Added Order and Execution IDs subsection which notes how to infer different types of executions (e.g., Cboe Dark Pool).
17 March 2010	Version 2.1
	Corrected message type of Cancel Order — Long Form message.
20 April 2010	Version 2.2
	Clarified size of prices on long form messages by noting that their value is "Long Price" as opposed to "Numeric".
20 May 2010	Version 2.3
	Trade Message and Trade Message — Long Form will always have an Order ID of "000000000000" for dark book orders.
18 June 2010	Version 2.4
	Order IDs in Trade Messages are now obfuscated by default. This obsoletes the change made to Order IDs on 20 May 2010.
16 September 2010	Version 2.5
	Noted that two TCP PITCH streams (all instruments or just unit 12 instruments) are available in the Overview.
5 October 2010	Version 2.6
	Documentation incorrectly stated that dark book orders will have an OrderID consisting of all zeroes. In actuality, dark book OrderIDs are obfuscated just like any other hidden order.
	No functional changes.
11 July 2011	Version 2.7
	Noted that trade break messages *are* sent.
21 September 2011	Version 2.8
	Removed references to FAST.
13 December 2011	Version 2.9
	Removed references to MOC/TAL.
12 January 2012	Version 2.10
	Updated split feeds to reflect newly added streams.
22 February 2012	Version 2.11
	Added XFRA and ETFP MICs to Overview.
4 April 2012	Version 2.12
	Moved WBAH to the same stream as XETR/XFRA, units 8-9.
	Updated to reflect the availability of units 9-11 as a single stream (available from April 16th 2012).
17 April 2012	Version 2.13
	Added Chi-X Europe Integrated and Dark Pool Execution ids.
7 February 2013	Version 3.0
	New Off-Book Trade, Off-Book Trade Break and Symbol Clear messages.
21 March 2013	Version 3.1
	Off-Book Trade size will be 8 digits, Off-Book Trade price field will be 19 digits.
	Support for indicating an off-book trade was reported out of the Main Session.

9 April 2013	Version 3.2 Updated link to FESE website
20 June 2013	Version 3.3 The introduction has been re-worded, and section 1.2 added, introducing use of PITCH by the Trade Reporting Facility. Addition of Expanded Add Order message to support SI Quote publication. Addition of Trading Status and Statistics messages.
1 August 2013	Version 3.4 Addition of CHIX to MIC codes in the symbol ranges.
15 August 2013	Version 3.5 Additional information given on the new Trading Status and Statistics messages.
19 September 2013	Version 3.6 MIC update: WBAH to XWBO
6 December 2013	Version 4.0 Renamed Off-Book Trade Message to Trade Report Message. Removed the Off-Book Trade Break Message. Use a Modification Indicator of 'C' in the Trade Type Flags field to delete a Trade Report. Widened the Shares field from 8 to 12 bytes in the Trade Report (previously Off-Book Trade) message. Added a special value of 'BCS' to the Execution Venue field in the Trade Report (previously Off-Book Trade) message to indicate a 'Broker Crossing System' trade. Added a new Cboe specific Transaction Sub-Category flag to the end of the Trade Report Flags field in the Trade Report (previously Off-Book Trade) message. Widened the Symbol field from 6 to 8 bytes in the Add Order - Long and Trade - Long messages. Expanded the Status flag in the Trading Status message to include values for Regulatory Halts ('H'), Market Order Imbalance ('M') and Price Monitoring ('P') extensions. Additionally the Auction ('A') status has been removed and sub-divided into Opening Auction ('O') and Closing Auction ('E'). Added an Execution Flags field to the Order Executed and Order Executed – Long messages. Added a Trade Flags field to the Trade message. Section 4.13 added, introducing the Auction Update and Auction Summary messages.
24 December 2013	Version 4.1 Made Trade Report Message's Transaction Sub-Category field reserved for future use.
21 January 2014	Version 4.2 Renamed 'Regulatory Halt' trading status to 'Halt'. Clarified the trading statuses that are reserved for future use. Corrected the implied value for the level 3.1 MMT flag in the Execution Flags section. Changed the shares field width to 10 bytes in both the Auction Update and0 Auction Summary messages to bring them in line with the Multicast PITCH specification. Changed the Auction Update message type from 'i' to 'k'. Changed the Trade — Long Form message type from 'p' to 'q'. Changed the Add Order — Long Form message type from 'a' to 'c'. Changed VenueField value of BCS to AUT.

12 June 2014	Version 4.3 Deprecate usage of the fourth character of the Execution ID to help differentiate the nature of the trade in favour of MMT flags directly. Rename the Cboe Transaction Sub-Category Trade Report flag for the new MMT 3.7 trade flag. Added support for the new MMT 2 flag for an undefined auction.
23 September 2014	Version 4.3.1 Add XIST (Turkey) to the units 9–11 stream.
23 September 2014	Version 4.4 Removed 'effective from' labels.
4 February 2015	Version 4.4.1 Corrected timestamp data type from Numeric to Timestamp.
29 March 2015	Version 4.4.2 Clarify trade timing indicator.
8 June 2015	Version 4.5 Remove deprecated AUT flag. Rename Trade Report to Trade - Extended. New Auction Update message type. Extended the Auction Type flag in the Auction Update and Auction Summary messages to include Periodic Auctions ('P').
14 December 2015	Version 4.5.1 Add XQMH to the units 9–11 stream.
14 December 2015	Version 4.6 SINT and XOFF as possible values for the Execution Venue field of the Trade - Extended Form message. Details on semantic change for Trade Amendments. Removal of Trade Break messages.
19 February 2016	Version 4.7 Updated for new branding.
29 April 2016	Version 4.8 Removed 'Effective' content related to Q2 2016 Release.
17 June 2016	Version 4.9 Renamed a few dangling 'Trade Reporting message' to 'Trade - Extended message'.
8 July 2016	Version 4.10 Added MTAH market
1 February 2017	Version 4.11 MMT v3 support
23 May 2017	Version 4.12 Clarified MIC used in Execution Venue for Cboe BIDS trades.
19 July 2017	Version 4.13 MMT v3.04 support for Q4 2017 release.
2 August 2017	Version 4.14 Removed the XIST (Turkey) as a supported market.
26 January 2018	Version 4.15 Updated MIC used in Execution Venue for Cboe NT trades in BXE and CXE.
31 August 2018	Version 4.16 Add new markets (XWAR, XBUD & XPRA) to unit 12.
12 October 2018	Version 4.17 Renamed Cboe Trade Timing Indicator Field to Cboe Trade Flags
31 May 2019	Version 4.18 Add DXE environment. Add Cboe Closing Cross.
7 November 2019	Version 4.19 Clarified when Symbol Clear messages are sent.
6 February 2020	Version 4.20 Updated Order and Execution ID.

27 October 2020	Version 4.21
	Added LISZ as the Execution Venue for Cboe BIDS Europe (DXE) ETRs.
24 May 2022	Version 4.22
	Remove references to SI Quotes.
6 July 2023	Version 4.23
	Added MMT v4 support and new values in Execution Venue field.
17 July 2023	Version 4.24
	Removed NTLS from MMT v4 Level 3.2.
1 September 2023	Version 4.25
	Added new values supported in Cboe Trade Flags
16 October 2023	Version 4.26
	Added MMT v4.1 support.