Cboe Titanium U.S. Equities Last Sale Specification

Version 1.2.5

June 30, 2026

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Introduction

The Cboe Titanium U.S. Equities Last Sale Feed is a direct data feed product that is the source for real-time, intraday trade data which includes price, volume and time while specifically excluding order information. Routed executions are not reported on the Last Sale Feed.

*The highlighted sections indicate differences between Last Sale and similar protocols used by other Market Centers. Note that and Execution Ids are 12 characters base 36 instead of 9 characters base 10.

Data Types

- Numeric fields are a string of ASCII digits, right justified and zero filled on the left.
- *Base 36 Numeric (Execution Id) fields are base 36 (0-9A-Z) numbers, right justified and Zero filled on the left.
- Alpha fields are left justified and space padded on the right.
- Prices are decimal with 6 whole number digits followed by 4 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 does explicitly appear in the field.
- Long Prices are decimal with 8 whole number digits followed by 6 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 does explicitly appear in the field.
- Timestamp fields are whole number milliseconds past midnight Eastern Time, right justified and zero filled on the left, with no decimal point. Negative offsets are possible and will have a minus sign '-' in the left most location. Negative values represent time before midnight Eastern Time.

Protocol

Message Format

The Last Sale 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.

Sequence Numbers

The messages that make up the Last Sale protocol are delivered using SOUP 2.0, which handles sequencing and delivery integrity. Cboe implementation of SOUP 2.0 is the same as other Market Centers.

Sessions

Cboe’s implementation of SOUP 2.0 is the same as other Market Centers. This includes the implementation of session events such as login requests, client/server heartbeats, and logout requests.

Message Types

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

Table 1. Message Types

Data Type	Description
Alpha	A string of ASCII letters (A-Z) left justified and space padded on the right.
Base 36 Numeric	A string of ASCII numbers and letters (0-9A-Z), representing base 36 digits, right justified and zero filled on the left. Typically used for ***Order IDs*** and ***Execution IDs***. Note that these fields are longer than on some other Market Centers.
Numeric	A string of ASCII numbers (0-9), right justified and zero filled on the left.
Prices	A string of ASCII numbers (0-9) consisting of 6 whole number digits followed by 4 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 does explicitly appear in the field.
Long Prices	A string of ASCII numbers (0-9) consisting of 8 whole number digits followed by 6 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 does explicitly appear in the field.
Timestamps	A string of numbers (0-9) representing whole number milliseconds past midnight Eastern Time, right justified and zero filled on the left, with no decimal point.

System Event Message

Cboe does not send System Event messages.

Last Sale Message

Last Sale messages are sent when an order on the Cboe book is executed in whole or in part.

Table 1. Last Sale Message

Field Name	Offset	Length	Value	Description
Timestamp	0	8	Numeric	Timestamp
Message Type	8	1	"L"	Last Sale
Executed Shares	9	8	Numeric	Number of shares executed
Stock Symbol	17	8	Alpha	Stock symbol right padded with spaces
Price	25	10	Numeric	The execution price of the order
* ***Execution Id***	35	12	Base 36 Numeric	Cboe generated day-unique execution identifier of this execution. ***Execution Id*** is also referenced in the **Trade Break** message.

The extended version of the **Last Sale** message accommodates larger prices and has the following format:

Table 2. Last Sale Extended Message

Field Name	Offset	Length	Value	Description
Timestamp	0	8	Numeric	Timestamp
Message Type	8	1	"5"	Extended Last Sale
Executed Shares	9	8	Numeric	Number of shares executed
Stock Symbol	17	8	Alpha	Stock symbol right padded with spaces

Field Name	Offset	Length	Value	Description
Price	25	14	Long Price	The execution price of the order
* ***Execution Id***	39	12	Base 36 Numeric	Cboe generated day-unique execution identifier of this execution. ***Execution Id*** is also referenced in the **Trade Break** message.

Trade Break Message

The **Trade Break** message is sent whenever an execution on Cboe is broken. Trade breaks are rare and only affect applications that rely upon Cboe execution-based data.

The **Trade Break** Message has the following format:

Table 1. Trade Break Message

Field Name	Offset	Length	Data Type	Description
Timestamp	0	8	Numeric	Timestamp
Message Type	8	1	"B"	**Trade Break** message
* ***Execution ID***	9	12	Base 36 Numeric	Cboe execution identifier of the execution that was broken. ***Execution ID*** refers to previously sent **Order Execution** or **Trade** messages.

Time Reference Message Fields (Effective 11/02/26 on BZX and EDGX)

The **Time Reference** message is used to provide a midnight reference point for recipients of the feed. It is sent whenever the system starts up and when the system crosses a midnight boundary. All subsequent ***Timestamp*** values will use the last ***Midnight Reference*** until another **Time Reference** message is received. The **Time Reference** message includes the ***Trade Date***, so most other sequenced messages will not include that information.

The **Time Reference** message will be sent when the system first detects a message that crosses a midnight boundary. In the event a message from another internal data source has not yet passed midnight and needs to be sent, a negative ***Timestamp*** will be used to reflect that the time for that message is prior to midnight.

The ***Timestamp*** field will contain the offset from the ***Trade Date*** of the **Time Reference** message.

Time Reference messages will be included in a spin response.

Table 1. Time Reference

Field Name	Offset	Length	Data Type	Description
Timestamp	0	8	Timestamp	Timestamp
Message Type	8	1	T	**Time Reference** message
Midnight Reference	9	10	Numeric	Midnight Eastern Time reference time for subsequent ***Timestamp*** values, expressed as number of whole seconds since the Epoch (Midnight January 1, 1970 UTC).

Field Name	Offset	Length	Data Type	Description
Time	19	10	Numeric	Number of whole seconds elapsed since the start of the current Eastern Time calendar day, derived by converting the current Eastern wall clock time (HH:MM:SS) to seconds. On Daylight Saving Time transition days, ***Time*** reflects wall clock seconds and does not adjust for the UTC offset change. On a DST spring-forward day, the maximum value will be 82,799 (23 hours). On a DST fall-back day, values between 3,600 and 7,199 will appear twice. Recipients requiring unambiguous absolute timestamps should use ***Midnight Reference*** in the **Time Reference** message.
Trade Date	29	8	Numeric	Current Trade Date as represented by YYYYMMDD

References

For more information on Cboe Symbology, please refer to the Cboe Titanium U.S. Symbology Reference.

Support

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

Revision History

Document Version	Date	Description
1.0.0	04/06/10	Initial Version 1.0.
1.1.0	09/03/10	Added Trade Break message type.
1.2.0	02/19/16	Bats branding/logo changes.
1.2.1	10/17/17	Cboe branding/logo changes.
1.2.2	07/26/21	Updated formatting, Trade Desk email, and Cboe Symbology Reference link.
1.2.3	03/15/24	Added extended version of **Last Sale** message (effective 06/17/24).
1.2.4	01/15/25	Updated with Cboe Titanium branding.
1.2.5	06/30/26	Updated Timestamp data type to indicate that negative offsets are possible and will have a minus sign '-' in the left most location. Added Time Reference Message Fields, effective 11/02/26 on BZX and EDGX.