SIAC

SECURITIES INDUSTRY AUTOMATION CORPORATION

CTS

CONSOLIDATED TAPE SYSTEM

MULTICAST OUTPUT BINARY SPECIFICATION

June 6, 2025
Version 2.11a

CONTENTS

VERSION HISTORY

Version	Date	Description
1.0	July 1, 2016	Initial Document
1.1	September 15, 2016	<u>Added</u>: New Dedicated Test Symbols
1.2	February 21, 2017	<u>Added</u>: ▪ 'Message Length' field in Message Header and field description ▪ New 'Auction Status Category T Type A' message and field descriptions ▪ 'Short Sale Restriction Indicator' to Correction Message <u>Corrected</u>: ▪ 'Start of Day Category C Type A' message typo to reflect 'Category C Type **N'** End of Test Cycle in Block Sequence Number field description ▪ 'Start of Day Category C Type A' typo message typo to Category 'C' in Start of Test Cycle/End of Test Cycle field descriptions ▪ Description for the transmission at 20:15 – 20:17 typo to be identified as 'End of Day' ▪ The implied 2 decimal (Short) maximum trade price typo to $655.35 ▪ Trade Cancel/Error Message transposed appearance of 'Trade Reporting Facility ID' to be following 'Trade Through Exempt Indicator' field <u>Eliminated</u>: ▪ Message Header 'Reserved' field ▪ Administrative Message 'Text Length' field (Length is identified in Message Header) ▪ 'Temporary Suffix' field and description which are no longer supported ▪ Market Summary Messages/field descriptions which are no longer supported: • 'Category M Types B, C & D' • 'Category M Types E, F & G' • 'Category M Types H, I & J ▪ 'Sale Condition' code '@' representing a 'Regular Sale' trade (replaced with 'Space' representing a 'Regular Sale' trade) ▪ Administrative Text portion of the following Administrative Message Types: • 'Category A Type A' • 'Category A Type B' • 'Category A Type C' • 'Category A Type D' ▪ Trade Correction Message 'Original Instrument Type' field ▪ Administrative Message 'Category A Type S' which is no longer supported ▪ Index Messages 'Index Sign' fields/ field descriptions (sign is derived from Index value) <u>Modified</u>: ▪ Trade Correction Message 'Corrected Instrument Type' field to 'Instrument Type' ▪ Start/End of Day Summary Messages 'Previous Close Price Date and Time' field to 'Previous Close Price Date' ▪ Message Header 'Transaction ID' Data Type from Byte to Integer

VERSION HISTORY

Version	Date	Description
1.2	February 21, 2017 *(continued)*	Modified: ▪ Length of the 'Number of Participant' field ▪ Index Message usable Data Type representation ▪ MWCB Level 1, 2 and 3 Data Type representations ▪ 'Block Pad Byte' description to include binary representation ▪ Order of field appearances in Block Header and Message Header ▪ Message routing reverted to current Production routing ▪ Prior Day Trade Correction 'Corrected Instrument Type' field to 'Instrument Type' and eliminated 'Original Instrument Type' field ▪ 'Sale Condition Category' field codes representation ▪ Data Type useable 'signed integer' values ▪ Retransmission code from 'R' back to 'V' to indicate Retransmission ▪ Minor edits/clarification throughout document/removed verbiage associated with eliminated functionality ▪ Binary and ASCII Protocol Differences and Notes
1.3	May 5, 2017	Added: ▪ CBOE Stock Exchange, Inc. (CBSX) Participant ID 'W' Corrected: ▪ MWCB Levels implied decimal typo to be implied 6 decimals
1.4	June 2, 2017	Added: ▪ New Dedicated Test Symbols ZIEXT, XEXIT, ZXIET & 01v thru 12V Corrected: ▪ From: Sequence Number / To: Participant Reference Number ▪ From: Reset Message Sequence Number / To: Reset Block Sequence Number
1.5	August 28, 2017	Modified: ▪ Block Sequence Number rollover limited to occur after 999,999,999 (instead of 3,999,999,999) for a transitional period ▪ From: NYSE MKT / To: NYSE American
1.6	February 14, 2018	Modified: ▪ From: National Stock Exchange / To: NYSE National, Inc. ▪ From: Bats EDGA Exchange / To: Cboe EDGA Exchange ▪ From: Bats EDGX Exchange / To: Cboe EDGX Exchange ▪ From: Bats BYX Exchange / To: Cboe BYX Exchange ▪ From: Bats BZX Exchange / To: Cboe BZX Exchange ▪ IEX status to Primary Listing Exchange ▪ Halt Reason value 'X' From: Equipment Changeover / To: Operational ▪ Description of Auction Status message

VERSION HISTORY

Version	Date	Description
1.7	May 8, 2018	Modified: ▪ Trade Reporting Facility IDs ▪ From: Financial Industry Regulatory Authority, Inc. (FINRA) / To: FINRA Alternative Display Facility (ADF) Eliminated: ▪ Binary and ASCII Protocol Differences and Notes
1.8	July 17, 2019	Added: ▪ New Dedicated Test Symbols: CTEST and MTEST
1.9	October 25, 2019	Modified: ▪ From: Chicago Stock Exchange / To: NYSE Chicago, Inc. Update: ▪ NYSE Chicago included in 20:00 *OFFICIAL MARKET CLOSED*

VERSION HISTORY

Version	Date	Description
2.0	December 4, 2019	Modified: ■ Block Sequence Number limit to rollover occur after 4,294,967,295 ■ Block Sequence Number to contain the Message Sequence Number in the Output Block ■ SIP Block Timestamp for retransmitted block ■ Block Sequence number on retransmitted blocks ■ Message Routing for the distribution of Administrative Messages (Category A) and Market Status Messages (Category M) ■ Summary of Daily Multicast Line Messages (Appendix D) ■ Start of Day message publication from three times to one time Eliminated: ■ Security Status codes for Opening Delay and No Open/No Resume ■ Held Trade Indicator ■ Dedicated Test Cycles scheduled prior to SOD ■ 'Start of Test Cycle - Category C Type M' and 'End of Test Cycle - Category C Type N' messages ■ Time Beacon publication ■ Administrative Unformatted (Category A Type H) Message APPENDIX E: ADMINISTRATIVE MESSAGE TEXT SAMPLES
2.1	January 24, 2020	Modified: ■ Block version from 0 to 1 ■ Line Integrity publication interval from 60 seconds to 10 seconds ■ SIP Block Timestamp for retransmitted block
2.2	February 5, 2020	Modified: ■ Block version from 1 to 2 ■ 'Timestamp 1' for any SIP generated messages from 0 to current time
2.3	February 20, 2020	Modified: ■ Included redundant data stream for Retransmitted messages
2.4	February 25, 2020	Modified: ■ End of Day (Category C Type Z) description to highlight that Line Integrity messages are published even after End of Day
2.5	March 27, 2020	Modified: ■ Start of Day and End of Day Message transmission time
2.6	April 13, 2020	Modified: ■ Appendix D for Summary of Daily CTS Multicast Line Activity
2.7	May 15, 2020	Added: ■ MIAX Pearl Exchange, LLC (MIAX) Participant ID 'H' ■ Members Exchange, LLC (MEMX) Participant ID 'U'
2.7a	June 12, 2020	Clarification: ■ SIP Block Timestamp in retransmission block

VERSION HISTORY

Version	Date	Description
2.8	August 14, 2020	Added: ■ New Regulatory Halt Reason Codes (A, C, E, F, N, O and V) Modified: ■ Renamed Regulatory Halt Reason Code D from News Dissemination to News Released
2.9	October 2, 2020	Modified: ■ Block Sequence number on End of Day (Category C Type Z) message to be one higher than last transmitted block
2.9a	November 23, 2020	Modified: ■ Appendix D to update Cboe EDGX *OFFICIAL MARKET OPEN* time Corrected: ■ Multicast data feed setup for CTS after-hour playback data ■ Line Integrity Message publication schedule under Appendix D
2.9b	January 26, 2021	Modified: ■ Clarified that all Halt Reason Codes are currently active
2.9c	June 28, 2021	Modified: ■ Redefined Sale Condition 'X' from 'Cross Trade' to 'Cross/Periodic Auction Trade'
2.9d	Jan 10, 2022	Clarification: ■ Routing logic for Prior Day Messages for inactive symbols
2.9e	Oct 26. 2022	Modified: ■ Added section 1.3 to clarify system behavior during Failure Recovery
2.9f	Dec 16, 2022	Modified: ■ Corrected Symbol Suffix examples under Appendix B to include series U
2.9g	Jan 29, 2024	Modified: ■ Removed Test Symbol 'ZZZ' and 'IBO' and updated Listing Exchange for Test Symbol 'CTEST' under Security Symbol Field Description ■ Updated Appendix D to remove publication schedule for Crossing Session Summary messages
2.10	Mar 28, 2024	Modified: ■ Renamed 'Limit Up-Limit Down Quote Midpoint' to 'Limit Up-Limit Down Reference Price' throughout the document ■ Updated Last Eligibility for Market Center Opening Trade ('O') to be always Last eligible Added: ■ New Message Types for Fractional Share Trade Reporting (refer Message Category and Message Type Table)

VERSION HISTORY

Version	Date	Description
2.10a	May 2, 2024	Modified: ▪ Sale Condition 'N' (Next Day Trade) marked as Reserved as input Participants will transition to a shortened standard settlement cycle starting May 28, 2024
2.10b	June 12, 2024	Modified: ▪ Updated CTS Configuration diagram under Appendix A to remove reference to 'ICE Global Network'
2.10c	August 30, 2024	Modified: ▪ Updated Security Status Market on Close Imbalance to Closing Imbalance and changed its definition ▪ Updated Appendix D to clarify message publication start time
2.10d	January 14, 2025	Modified: ▪ Updated Appendix D for message publication times for MIAX Pearl
2.10e	March 7, 2025	Modified: ▪ Updated Line Integrity message publication interval to clarify that it can be published more frequently than every 10 seconds
2.11	May 2, 2025	Added: ▪ Symbol Reference Data (Category A Type S) message ▪ Round Lot Size field description to include round lot size 40 Modified: ▪ Message publication start time for Cboe BZX under Appendix D ▪ Renamed NYSE Chicago to NYSE Texas and updated Listing Exchange for test symbol MTEST to NYSE Texas
2.11a	June 6, 2025	Added: ▪ 24X National Exchange LLC (24X) Participant ID 'G'

1.0 INTRODUCTION

The Securities Industry Automation Corporation (SIAC) serves as the Processor for the Consolidated Tape Plan from its inception on August 30, 1976. In fulfilling its role as the Processor, SIAC plans, develops, operates, and maintains the Consolidated Tape System (CTS).

1.1 Background

CTS receives transactions generated by participating U.S. Stock Exchanges and the FINRA Alternative Display Facility (ADF). In addition, CTS calculates and identifies the Consolidated Last, High and Low, the Participant Open, Last, High and Low and the Limit Up-Limit Down Price Bands. CTS consolidates transactions that occurred on participating U.S. Stock Exchanges and FINRA Alternative Display Facility (ADF) and disseminates this information via computer-to-computer linkages to the financial community in the U.S. and abroad.

Essential in ensuring the timely reporting of trade information are the CTS IP Multicast data streams. CTS has a unique set of IP Multicast addresses assigned to each of its data "lines". Data generated by each participating Exchange and the FINRA Alternative Display Facility (ADF) is assembled in prescribed message formats and transmitted to the appropriate TCP/IP Processor address via the Participants' private communications facility. As each message is received, it is merged with messages received from all Participants, and the consolidated message stream is transmitted simultaneously to all Data Recipients via their private communications facilities. Approved Data Recipients of the CTS service can redistribute CTS data worldwide to their customers as part of their individual services or use the data for their own purposes.

Note:
- It is recommended that Data Recipients subscribe to both the Consolidated Tape System (CTS) and Consolidated Quotation System (CQS) in order to receive complete listed equity market data. Reference the CTS and CQS Multicast Interface Specification for further details at: www.ctaplan.com

1.2 Dual Site Redundancy

Computer systems that support the processing and dissemination of trade transactions are operational at primary and backup sites. The backup site provides recovery capability in the event of a disaster at the primary site. Through computerized communications equipment, CTS transaction data is disseminated from either the primary or backup site. The dual-site configuration provides system fold-over for a limited site disaster (system failure) or full site disaster (loss of facility).

In the event of a Primary Data Center failover to the Disaster Recovery site (Backup Data Center), data will be sourced via the Backup Data Center source addresses.

1.3   Failure Recovery

1.3.1 NMS Publication Process Failure Recovery

- In the event the Primary publication process encounters an unexpected state, data publication automatically switches to the Secondary publication process on the Primary Data Center
  - o Data Subscribers may observe gaps on the affected output multicast lines. Any such gaps can be requested for retransmission

- In the event where both the Primary and Secondary publication processes encounter an unexpected state at the same time on the Primary Data Center, Pillar CTA initiates an automatic restart for both the processes in a recovery mode
  - o There is no impact to the input Data Participants
  - o Data publication is paused for the affected output line(s) and any input messages received while the process is being restarted are queued and published once the processes recover
  - o Upon recovery, output block sequence for the affected line(s) is reset to a higher Block Sequence number. System transmits the Reset Block Sequence Number (Category C Type L) message and resumes data publication.
  - o Security symbol state including the LULD Price Bands is recovered. However, Trade Statistics (Open/High/Low/Last) are not persisted. Subsequent Trade Statistics are calculated based on any new Trades received after the process restart.
  - o Trades messages received prior to the process restart cannot be Cancelled/Corrected on the same day; but can be done on the next trading day via the Prior Day (Category P) Messages.
  - o All Messages for the day can be requested for retransmission, including those that were received prior to, or, while the processes were being restarted.

1.3.2 Input Gateway Failure and Recovery

- In the event the Primary input Gateway connection encounters an unexpected state, Input Participants can reconnect to the Secondary (backup) input connection

- In the event the Input Gateway encounters an unexpected state affecting both the Primary and Secondary Input Connections for all the Data Participants, a restart of the Input Gateway can be initiated on the Primary Data Center.
  - o Both Primary and Secondary Input connections are temporarily unavailable, affecting all Participants and Data Subscribers from inputting any data or requesting any retransmissions
  - o Upon recovery, Input Block Sequence Number and PRN are recovered for each input line. Data Participants can reestablish connection and start submitting data. Data publication resumes.
  - o There is no loss of data, all messages can be requested for retransmission.

1.3.3 Primary Data Center Failure Recovery

In the event that the Primary Data Center becomes unavailable, failover to the Disaster Recovery site (Backup Data Center) is initiated. However, if the DR site is also unavailable, then a Session Cold Restart on the Primary Data Center can be performed.

In case of a Session Cold Restart on the Primary Data Center:

- Both Primary and Secondary Input connections are temporarily unavailable, affecting all Participants and Data Subscribers from inputting any data or requesting any retransmissions
- Upon restart:
  - Output block sequence for all the lines is reset to a higher Block Sequence number and System transmits the Reset Block Sequence Number (Category C Type L) message
  - Security symbol state including the LULD Price Bands is recovered. However, Trade Statistics (Open/High/Low/Last) are not persisted. Subsequent Trade Statistics are calculated based on any new Trades received after the process restart.
  - Trades messages received prior to the process restart cannot be Cancelled/Corrected on the same day; but can be done on the next trading day via the Prior Day (Category P) Messages.
  - Input Lines are enabled and Data Publication Resumes
  - Messages prior to the Restart cannot be requested for Retransmission

1.4   Scope

This specification defines the interface and message format requirements for recipients of the CTS data feed via connectivity to the National Market System (NMS) IP Multicast distribution network.

1.5   Data Feed Reference Material

Technical Specifications

For Technical Specifications visit www.ctaplan.com - and select Tech Specs tab for the following:

- CQS Multicast Output Specification
- CTS Multicast Output Specification
- Common IP Multicast Distribution Network Specification
- Automated Retransmission Facility User Guide

Consolidated Tape Association (CTA) Announcements

CTA Announcements including feed enhancements, traffic rates, etc. visit www.ctaplan.com

Future Data Feed Enhancements

Future enhancements and/or modifications may require system changes for your firm. Please refer to the CTA Plan website www.ctaplan.com to obtain the latest CTA Notifications and Technical Specification documents. **To automatically receive these Notifications and System Alerts, subscribe at**: https://www.ctaplan.com/subscribe

Data Feed Related Resources

For customers selecting to initiate ICE Global Network (IGN), formerly known as the Secure Financial Transaction Infrastructure (SFTI), connections to CTS**:**

- Submit a request at: https://www.theice.com/contact-us/connectivity
- Contact IGN Sales at: clientnetworks@theice.com
- For more information on IGN, including documentation such as Customer and Technical guides reach out to an IGN representative at: iceglobalnetwork-info@theice.com

2.0   GENERAL DESIGN OF DATA DISTRIBUTION NETWORK

The NMS IP Multicast distribution network disseminates all market data information in the form of multicast addressed IP datagrams.

Data available via the NMS IP Multicast distribution network includes:

CTS Real-Time Production Data
A copy of each CTS real-time production message is available from SIAC's production/primary site. These redundant copies are delivered via two distinct multicast data streams.

CTS Real-Time Retransmission Data
The retransmission data streams are available from SIAC's production/primary site, and are delivered via two redundant retransmission multicast data streams.

CTS After-Hours Playback Data
There is a separate IP Multicast data feed dedicated for after-hours playback test data. The playback data is made available via a single set of multicast data feeds.

IP Multicast Network Interface
The requirements for the NMS IP Multicast distribution network interface are defined in the addendum to this document, "Common IP Multicast Distribution Network Recipient Interface Specification which can be accessed at website: http://www.ctaplan.com and select the Tech Specs tab.

3.0   TRANSMISSION CHARACTERISTICS

3.1   Transmission Block Structure

Encapsulated within each IP packet is a single transmission block. One type of transmission Block is used for all types of messages. A Block can have a maximum of 1,000 bytes inclusive of Block Header, Block Data, and Block Pad Byte.

Block Structure	Length
Block Header	20
Block Data	Variable
Block Pad Byte (optional)	1

3.2   Block Data

The Block Data consists of one or more CTS messages. A message consists of a Message Header, which is of fixed length and format, and Message Data (body), which is variable in length and format. Category C – Control messages are each sent in their own individual block.

The Block Data structure is as follows:

Block Data Structure
Message 1 Data
Message 2 Data
~~
Message N Data

3.3   Block Pad Byte

Byte. Unsigned integer contains binary zero (Hex 0x00). Only used when the size of a block consists of an odd number of bytes. In instances of odd number of bytes, the Block Pad Byte is added to the Block to ensure the Block is an even number of bytes.

3.4   Data Type

The following data types are used by CTS:

Type	Description
NUMERIC – Big-Endian (Network Byte Order)	
byte	Big-Endian Unsigned 1 Byte Integer
short	Big-Endian Unsigned 2 Byte Integer
integer	Big-Endian Unsigned 4 Byte Integer
long	Big-Endian Unsigned 8 Byte Integer
signed byte	Big-Endian Signed 1 Byte Integer
signed short	Big-Endian Signed 2 Byte Integer
signed integer	Big-Endian Signed 4 Byte Integer
signed long	Big-Endian Signed 8 Byte Integer
ALPHA/ALPHANUMERIC/SPECIAL/PRINTABLE	
char	Single printable ASCII character
char [ ]	Fixed length printable ASCII characters
varchar [ ]	Variable lengths printable ASCII characters

3.4.1   Numeric Types

1. All numeric fields will be in Big-Endian (Network Byte Order) format
2. Numeric types (byte, short, integer and long) represent sequence numbers, timestamps, prices and sizes
3. Prices represented by short fields have implied 2 decimal places
4. Prices represented by long fields have implied 6 decimal places
5. Any numeric value that is unused or does not apply to a given message type has a value set to 0
6. Signed integers are represented as 2's compliment

   The maximum range values for the numeric fields are as follows:

   1 byte unsigned integer: 0 – 255 (byte)
   2 byte unsigned integer: 0 – 65,535 (short)
   4 byte unsigned integer: 0 – 4,294,967,295 (integer)
   8 byte unsigned integer: 0 – 18,446,744,073,709,551,615 (long)

   Select values represented as 2's complement, will have signed integers with the following range:

   8 byte signed integer: -9,223,372,036,854,775,808 to +9,223,372,036,854,775,807 (signed long)

3.4.2 Alpha/Alphanumeric/Special/Printable Types

1. ASCII printable character codes 32 – 126
2. Left justified and padded on the right with spaces for fixed length fields

3.5   Block Header

Field	Length	Type
Version	1	Byte
Block Size	2	Short
Data Feed Indicator	1	Char
Retransmission Indicator	1	Char
Block Sequence Number	4	Integer
Messages In Block	1	Byte
SIP Block Timestamp	8	2 x Integer
Block Checksum	2	Short
Total Length	**20**	

3.5.1   Version

Byte. Indicates the CTS binary protocol version and allows for Block Header, Message Header and Message formats to be updated while still supporting previous versions of headers/message formats during transition. Version value is set to 2 for first/initial version for CTA Pillar SIP.

3.5.2   Block Size

Short. Indicate size in bytes of the entire transmission block.

3.5.3   Block Sequence Number

Integer. The Block Sequence Number denotes the sequence number of the first message in the block. If a Block contains more than one message, any messages following the first message are implicitly numbered sequentially. As such, the Block Sequence Number in the next Block is incremented by the number of messages published in the previous Block.

Block Sequence Number rollover occurs after 4,294,967,295. On a per multicast line basis, the Block Sequence Number on the multicast lines are set to zero at the start of each day, and incremented each time a block is transmitted, with the following exceptions:

1. The Block Sequence Number in retransmitted blocks contains the Message Sequence Number of the first message in the retransmitted Block

2. The Block Sequence Number field in the Block Header of a Category C Type L message (Reset Block Sequence Number) Block contains the number to which the Block Sequence Number counter is to be reset. This number is either one (1) in the event the sequence number rolls over from 4,294,967,295 or a number greater than the highest number previously transmitted.

3. The block containing a Category C Type A message (Start of Day) or Category C Type Z message (End of Day) contains the Block Sequence Number one higher than the last transmitted message block.

4. The block containing a Category C Type T (Line Integrity) message contains the message Sequence Number of the last block transmitted, which was not a retransmitted block.

5. Should CTS experience a line failure and recovery, the Block Sequence Number for the recovered line(s) can be reset to a number greater than the last message sequence number transmitted once message transmission is resumed.

3.5.4   Messages in Block

Byte. The number of messages contained in the transmission block.

3.5.5   Block Checksum

Short. Lower 2 bytes of the 4 byte sum of all the bytes in the block, excluding this Block Checksum field.

3.5.6   Data Feed Indicator

Char. Value is 'T' for Consolidated Tape System (CTS).

3.5.7   Retransmission Indicator

Char. Contains either a 'O' (indicating an original message) or 'V' (indicating a retransmitted block).

3.5.8   SIP Block Timestamp

2 x Integer (pair of integers). Contains the block timestamp and is the SIP time that processing a block of messages is completed. The first integer contains the number of seconds from epoch 1/1/1970, 00:00:00 UTC. The next integer contains the nanosecond portion of the time (e.g., 972402315)**.**

Precision Time Protocol (PTP) is utilized to provide a standard method to synchronize devices on a network with sub-microsecond precision. The protocol synchronizes slave clocks to a master clock ensuring that events and timestamps in all devices use the same time base.

SIAC recommends to represent this time in HH:MM:SS.mmmµµnnn format Eastern Time (ET) when communicating with SIAC.

For Retransmissions, the SIP Block Timestamp contains the timestamp representing when the first message in the retransmitted block was originally processed by SIP.

3.6   Retransmission Capability

CTS stores all data transmitted to the Data Recipients for a single trading day to facilitate data retransmission. If Data Recipients do not receive a block(s), a retransmission of the missed messages can be requested. Retransmission requests are accepted in the period following transmission of the Start of Day message and before the transmission of the End of Day message.

The following Message Category and Types are not included in retransmissions:

Message Category	Message Type	Description
C	A	Start of Day
C	T	Line Integrity

The Automated Retransmission Facility is utilized for automatically receiving and processing CTS block retransmission requests.

A Data Recipient may request automated retransmission(s) of missed messages by connecting directly through IGN, formerly known as SFTI, to the Automated Retransmission Facility via TCP/IP addresses and ports. A Data Recipient is required to enter their assigned user ID and password along with system, line, and message sequence number information.   The requested message(s) are re-published over the dedicated Retransmission multicast streams. An '**Automated Retransmission Facility User Guide'** for automated retransmission requests can be accessed at the following website: http://www.ctaplan.com and select the Technical Specs tab.

All retransmitted CTS blocks contain **only** 'V' in the Retransmission Indicator field of the Block Header. The Block Sequence Number field in the Block Header of each retransmitted block contains the Message Sequence Number of the first message in the retransmitted block.

Note:
- It is the responsibility of the Data Recipient to ignore retransmitted messages not requested by them.

4.0   MESSAGE HEADER

The Message Header uniquely identifies the Category and Type of each message within a Block. The Message Header can represent an entire message or appears before the Message Body segment in each message transmitted. The Message Header contains the following bytes and conforms in all cases to the following data fields:

Field	Length	Type
Message Length	2	Short
Message Category	1	Char
Message Type	1	Char
Participant ID	1	Char
Timestamp 1	8	2 x Integer
Message ID	1	Byte
Transaction ID	4	Integer
Participant Reference Number	8	Signed Long
Total Length	**26**	

4.1   Message Length

Short. The Message Length identifies the total message length inclusive of the Message Header and Message Body.

4.2 Message Category and Message Type Table

Note: New Message Types for Fractional Share Trade Reporting will replace existing Message Types. Both fractional and whole shares will be published by CTA via same message types (and include implied 6 decimal), tentatively scheduled for Q1 2026.

- Messages as per rows highlighted in Yellow in below table would be discontinued when Fractional Trade Volume publication is activated
- Messages as per rows highlighted in Green in below table would replace the to-be decommissioned messages and would be published once Fractional Trade Volume publication is activated

Message Category	Message Type	Value
Administrative		
A	A	Start of End of Day Summary
A	B	End of End of Day Summary
A	C	Start of Start of Day Summary
A	D	End of Start of Day Summary
A	S	Symbol Reference Data
Control		
C	A	Start of Day
C	L	Reset Block Sequence Number
C	P	Disaster Recovery Data Center Activation
C	T	Line Integrity
C	Z	End of Day
Index		
I	I	Index
I	Q	Bid and Offer Index
Market Status		
M	K	Market-Wide Circuit Breaker Decline Level Status
M	L	Market-Wide Circuit Breaker Status
M	N	Approximate Adjusted Volume Market Center
M	V	Fractional Approximate Adjusted Volume Market Center
M	O	Approximate Trades and Total Dollar Value
M	P	Crossing Session Summary
Prior Day		
P	C	Prior Day Trade Correction
P	T	Prior Day Trade
P	X	Prior Day Trade Cancel/Error
P	O	Fractional Prior Day Trade Correction
P	R	Fractional Prior Day Trade
P	E	Fractional Prior Day Trade Cancel/Error

Message Category and Message Type Table, *continued*

Message Category	Message Type	Value
Summary		
S	A	Consolidated Start of Day Summary
S	B	Participant Start of Day Summary
S	C	Consolidated End of Day Summary
S	D	Participant End of Day Summary
S	T	Fractional Consolidated End of Day Summary
S	P	Fractional Participant End of Day Summary
Trade		
T	A	Auction Status
T	S	Trading Status
T	C	Trade Correction
T	L	Long Trade
T	T	Short Trade
T	X	Trade Cancel/Error
T	O	Fractional Trade Correction
T	R	Fractional Long Trade
T	H	Fractional Short Trade
T	E	Fractional Trade Cancel/Error

4.2.1 Message Category

Char. The Message Category represents the message classification. Refer to Message Category and Message Type Table *section 4.2*.

4.2.2 Message Type

Char. The Message Type together with the Message Category identifies the message. Refer to Message Category and Message Type Table *section 4.2*.

4.3 Participant ID

Char. Participant ID identifies the Participant or Processor that generated the message.

Code	Value
A	NYSE American, LLC (NYSE American)
B	NASDAQ OMX BX, Inc. (NASDAQ OMX BX)
C	NYSE National, Inc. (NYSE National)
D	FINRA Alternative Display Facility (ADF)
G	24X National Exchange LLC (24X)
H	MIAX Pearl Exchange, LLC (MIAX)
I	International Securities Exchange, LLC (ISE)
J	Cboe EDGA Exchange, Inc. (Cboe EDGA)
K	Cboe EDGX Exchange, Inc. (Cboe EDGX)
L	Long-Term Stock Exchange, Inc. (LTSE)
M	NYSE Texas, Inc. (NYSE Texas)
N	New York Stock Exchange, LLC (NYSE)
P	NYSE Arca, Inc. (NYSE Arca)
S	Consolidated Tape System (CTS)
T	NASDAQ Stock Market, LLC (NASDAQ)
U	Members Exchange, LLC (MEMX)
V	Investors' Exchange, LLC. (IEX)
W	CBOE Stock Exchange, Inc. (CBSX)
X	NASDAQ OMX PSX, Inc. (NASDAQ OMX PSX)
Y	Cboe BYX Exchange, Inc. (Cboe BYX)
Z	Cboe BZX Exchange, Inc. (Cboe BZX)

4.4   Timestamp 1

2 x Integer (pair of integers). Timestamp 1 is a Participant-provided timestamp representing the number of nanoseconds since Epoch. The first integer contains the number of seconds from epoch 1/1/1970, 00:00:00 UTC. The next integer contains the nanosecond portion of the time (e.g., 972402315). For any messages generated by CTS, e.g., Messages generated on behalf of a Participant, Price Band messages, Control messages and Market Status messages, the Timestamp 1 field will be set to current SIP time.

- **If from an Exchange: Timestamp 1** denotes the Exchange Matching Engine Publication timestamp for a transaction. Exchanges use a clock sync methodology ensuring that timestamps are accurate within tolerances of 100 microseconds or less. Exchanges shall provide the timestamp in terms of nanoseconds since Epoch.

- **If from the FINRA Alternative Display Facility (ADF) or a FINRA Trade Reporting Facility (TRF):** Timestamp1denotes the time of execution that a FINRA member reports to the FINRA ADF or a FINRA TRF.   FINRA shall provide such times to the Processor in nanoseconds since Epoch.

4.5   Participant Reference Number

Signed Long. Set to Zero. The Participant Reference Number must be unique by Participant ID, by Trade Reporting Facility (TRF), and by Security Symbol for trade corrections, cancel and errors.   A Participant Reference Number must be increasing (not necessarily in sequential order, e.g., different symbols, ABC and XYZ may have the same Participant Reference Number over different lines, however symbol 'ABC' with Participant Reference Number '123456' on line 1 cannot be repeated over any other line. Zero, positive and negative Participant Reference Numbers will be sent.

4.6   Message ID

Byte.   The Message ID Identifies the individual message within the block beginning with number one (1).

4.7   Transaction ID

Integer. The Transaction ID will be populated by CTS and is **Reserved for Internal Use** only.

Note:
- Data Recipients should ignore/disregard this field to the extent that it does not impact their normal data processing.

5.0 MESSAGE ROUTING

In total, CTS messages are disseminated over **twenty-six (26)** IP multicast lines designated as:

1. Line 1 (**L1**) through Line 12 (**L12**) for Network 'A' (NYSE listed securities)
2. Line 1 (**L1**) though Line 12 (**L12**) for Network 'B' (Cboe BZX, NYSE ARCA, NYSE American and NYSE Texas listed securities) '.
3. Line 1 (**L1**) and Line 2 (**L2**) Network 'B' Index lines.

   Note: The 'Primary Listing Market Participant ID' field will explicitly identify the Listing Market associated with their listed security.

Index Messages are routed over Network 'B' L1-L2 IP multicast lines according to the network and security symbol range distribution

All other Messages are routed over the twenty-four IP multicast lines according to the network and security symbol range distribution except for the following:

1. Control Messages (Category C) are distributed over all Network 'A' and Network 'B' lines inclusive of Index lines
2. Market Status Messages - 'Market-Wide Circuit Breaker Decline Level Status (Category M Type K)' and 'Market-Wide Circuit Breaker Status (Category M Type L)' are distributed over all Network 'A' and Network 'B' lines inclusive of Index lines
3. Market Status Messages - 'Approximate Adjusted Volume Market Center (Category M Type N)', 'Approximate Trades and Total Dollar Value (Category M Type O)' and 'Crossing Session Summary (Category M Type P)' for Tape A are distributed over all Network 'A' lines
4. Market Status Messages - 'Approximate Adjusted Volume Market Center (Category M Type N)', 'Approximate Trades and Total Dollar Value (Category M Type O)' and 'Crossing Session Summary (Category M Type P)' for Tape B are distributed over all Network 'B' lines
5. Prior Day (Category P) messages for any inactive Security Symbols can be routed over either the Network A or B multicast lines, based on the Participant ID. Messages received from NYSE (Participant ID = N) are routed to Network A multicast lines while messages received from any other participant are routed to Network B multicast lines. Prior Day messages for active Security Symbols are disseminated on the respective network lines as per their Listing Markets.

MESSAGE ROUTING *(continued)*

Traffic for CTS Network 'A' and Network 'B' messages will be routed by network and security symbol to twenty-six (26) assigned multicast lines as follows:

CTS NETWORK 'A' Symbol Range Distribution			CTS NETWORK 'B' Symbol Range Distribution		
Multicast Lines	From	To	Multicast Lines	From	To
1	A	ANZZZZ	1	A	DZZZZZ
2	AO	BXZZZZ	2	E	EWZZZZ
3	BY	CRZZZZ	3	EX	GZZZZZ
4	CS	ELZZZZ	4	H	IWEZZZ
5	EM	GLZZZZ	5	IWF	KIZZZZ
6	GM	IQZZZZ	6	KJ	RMZZZZ
7	IR	LVZZZZ	7	RN	SKZZZZ
8	LW	NOZZZZ	8	SL	SPZZZZ
9	NP	PRZZZZ	9	SQ	UMZZZZ
10	PS	STZZZZ	10	UN	VNZZZZ
11	SU	USZZZZ	11	VO	XLEZZZ
12	UT	ZZZZZZ	12	XLF	ZZZZZZ

Index Messages		
Multicast Lines	From	To
1	A	MZZZZZ
2	N	ZZZZZZ

Test Messages:

- CTS messages containing dedicated 'Test Symbols' for Listing Exchange NYSE will route to multicast lines for Network 'A' according to the network and security symbol range distribution.

- CTS messages containing dedicated 'Test Symbols' for Listing Exchanges Cboe BZX, IEX, NYSE ARCA, NYSE American and NYSE Texas will route to multicast lines for Network 'B' according to the network and security symbol range distribution.

- Dedicated 'Test Symbols' are listed in the Field Descriptions section under the 'Security Symbol' field.

Note:
- Data Recipients are responsible for handling any symbol over any line. Redistribution of traffic may <u>not</u> occur intraday. Notification may <u>not</u> be sent to the Data Recipients regarding redistribution of traffic.

6.0   MESSAGE FORMATS

The Message Category and Message Type identify the Message and determine the format of the body. Each message transmitted by CTS consists of a Message Header and Message Body or Message Header only.

All messages formats have fixed field which is determined by reading the Message Header and Message Body.

A field description is provided as part of the Block Header format, Message Header format, Message Body or in the **Field Descriptions** section of this document.

6.1   Administrative Messages – Category A

6.1.1   Start of End of Day Summary – Category A Type A

The Start of End of Day Summary message consists of the **Message Header only** and is used to signal the start of Consolidated End of Day Summary and Participant End of Day Summary message iterations.

6.1.2   End of End of Day Summary – Category A Type B

The End of End of Day Summary message consists of the **Message Header only** and is used to signal the end of Consolidated End of Day Summary and Participant End of Day Summary message iterations.

6.1.3   Start of Start of Day Summary – Category A Type C

The Start of Start of Day Summary message consists of the **Message Header only** and is used to signal the start of Start of Day Summary message iterations.

6.1.4   End of Start of Day Summary – Category A Type D

The End of Start of Day Summary message consists of the **Message Header only** and is used to signal the end of Start of Day Summary message iterations.

6.1.5   Symbol Reference Data– Category A Type S

Note: Message will be available starting Nov 3 , 2025

Symbol Reference Data message contains symbol configuration as applicable at the start of each trading day. The Participant ID field of the Message Header is populated with 'S', signifying that the message is generated by Consolidated Tape System.

Message is published immediately following the Start of Day Message. A subsequent publication for any symbol(s) can occur in case there are any changes to symbol configuration intraday or in case of failure recovery.

Halt Reason is populated with the appropriate halt code if symbol was previously halted by Primary Listing Exchange and a Resume has not been received. Note - Message is not republished if Halt or Short Sale Restriction state of a symbol changes intraday, those updates are reported as Security Status updates via the Trading Status (Category T Type S) message.

Symbol Reference Data, *(continued)*

Field Name	Length	Type
Security Symbol	11	Char [ ]
Prior Security Symbol	11	Char [ ]
Primary Listing Market Participant ID	1	Char
Primary Listing Market Previous Closing Price	8	Long
Consolidated Closing Price	8	Long
Round Lot Size	2	Short
Reserved	1	TBD
LULD Tier	1	Char
LULD Leverage Ratio	4	Integer
Test	1	Char
IPO	1	Char
Financial Status Indicator	1	Char
Short Sale Restriction Indicator	1	Char
Halt Reason	1	Char
Instrument Type	1	Char
Reserved	1	TBD
Reserved	1	TBD
Reserved	128	TBD
Total Length	**183**	

6.2 Control Messages – Category C

Control messages consist of the standard **Message Header only**, and are **not** blocked with any other messages including Control messages.

When included in a retransmission sequence, the Retransmission Indicator field of a Control message contains code 'V'; otherwise this field contains the alphabetic upper case character 'O' (meaning original message).

6.2.1 Start of Day – Category C Type A

The Start of Day message signals the start of normal data dissemination over the multicast lines. A single Start of Day message is sent with the Block Sequence Number field set to zero.

6.2.2 Reset Block Sequence Number – Category C Type L

The Reset Block Sequence Number message is transmitted when the Block Sequence Number on an output multicast line requires resetting.

The Block Sequence Number field in the Reset Block Sequence Number message contains the number to which the Block Sequence Number counter is to be reset. This number is higher than the highest Block Sequence Number previously transmitted.

6.2.3 Disaster Recovery Data Center Activation – Category C Type P

The Disaster Recovery Data Center Activation message is transmitted to signify that the Consolidated Tape System (CTS) has switched processing from the Primary Data Center to the Disaster Recovery Data Center. The Disaster Recovery Data Center Activation message is preceded by the transmission of Reset Block Sequence Number Category C Type L messages.

The Block Sequence Number field of the Disaster Recovery Data Center Activation message contains a number greater than the highest Block Sequence Number previously transmitted.

6.2.4 Line Integrity – Category C Type T

The Line Integrity message is transmitted over the multicast lines at frequent intervals, with at least one message published no later than every ten (10) seconds to verify continued integrity of multicast transmission. The Line Integrity message transmission does not interrupt a transmission in progress.

The Block Sequence Number is not incremented for Line Integrity messages. The Block Sequence Number field will contain the Sequence Number of the last transmitted message**.**

6.2.5   End of Day – Category C Type Z

The End of Day message is transmitted over the multicast lines to advise all Data Recipients that there are no further messages to be transmitted for the day.

The Block Sequence Number field of the End of Day message contains a number one greater than the highest Block Sequence Number previously transmitted.

Note:
- Under normal conditions, upon receiving the End of Day Category C Type Z message, it is the Data Recipient's responsibility to terminate their production CTS output multicast line feeds from SIAC.
- System will continue to publish Line Integrity (Category C Type T) Messages until the CQS multicast lines are brought down.

6.3　Index Messages – Category I

Index messages are used to provide index value information of a security.

6.3.1　Index – Category I Type I

The Index message contains the index and the index value.

Field Name	Length	Type
Index Symbol	11	Char [ ]
Index Value	8	Signed Long
Total Length	19	

6.3.2　Category I Type Q – Bid and Offer Index

The Bid and Offer Index message contains the index Bid and Offer index values.

Field Name	Length	Type
Index Symbol	11	Char [ ]
Bid Index Value	8	Signed Long
Offer Index Value	8	Signed Long
Total Length	27	

6.4   Market Status Messages – Category M

Market Status messages are used to provide market data information.

Unless otherwise noted, detailed information on each field is contained in alphabetical order in the **Field Descriptions** section of this document.

6.4.1   Market-Wide Circuit Breaker Decline Level Status – Category M Type K

The Market-Wide Circuit Breaker Decline Level Status message is used to report the calculated Level 1, Level 2 and Level 3 threshold values for the current trading day necessary to trigger a circuit breaker. Levels are reset each trading day based on the closing value of the S&P 500 Index. If Levels are set as a result of inaccurate activity, Levels will be reset and disseminated. The most recently disseminated Levels will be in effect for that trading day.

Note:
- MWCB levels are index values (not prices) and have implied *6* decimal places.
- The Market-Wide Circuit Breaker Decline Level Status Message will be disseminated by CQS on a daily trading day basis at approximately 7:00 am and at 8:00 am ET; and additional occurrences if necessary, e.g., due to erroneously set Levels.

Field Name	Length	Type
MWCB Level 1	8	Signed Long
MWCB Level 2	8	Signed Long
MWCB Level 3	8	Signed Long
Reserved	1	TBD
Total Length	**25**	

6.4.2 Market-Wide Circuit Breaker Status – Category M Type L

The Market-Wide Circuit Breaker Status message is used to report the Market-Wide Circuit Breaker threshold Level that has been breached. Each Level will be disseminated only once during the trading day, unless a Level is breached as a result of erroneous activity. The most recently disseminated breached Level will be in effect.

The duration of Market-Wide Circuit Breaker Level 1 and Level 2 Regulatory Trading Halts is fifteen minutes. Following Level 3 Market-Wide Circuit Breaker Regulatory Trading Halts, trading will be halted for the remainder of the trading day and carried over to the following trading day in a Regulatory Trading Halted state.

Field Name	Length	Type
Market-Wide Circuit Breaker Level Indicator	1	Char
Reserved	1	TBD
Total Length	**2**	

6.4.3 Approximate Adjusted Volume Market Center – Category M Type N (to be descoped)

The Approximate Adjusted Volume Market Center message is a variable length record and can accommodate up to the total number of active Participants. This message is used to report the volume of adjusted trading activity for each Participant. As CTS calculates and generates these messages, the Message Header Participant ID field will be populated with "S" for CTS.

Field Name	Length	Type
General Trade Information		
Number of Participants	1	Byte
Participant #1 through Total Number of Active Participants		
Participant ID	1	Char
Trade Total Volume	8	Long
Total Length	**1+(9*# of Active Participants)**	

6.4.4 Fractional Approximate Adjusted Volume Market Center – Category M Type V (new)

The Approximate Adjusted Volume Market Center message is a variable length record and can accommodate up to the total number of active Participants. This message is used to report the volume of adjusted trading activity for each Participant. As CTS calculates and generates these messages, the Message Header Participant ID field will be populated with "S" for CTS. Volume is represented as a fractional value.

Field Name	Length	Type
General Trade Information		
Number of Participants	1	Byte
Participant #1 through Total Number of Active Participants		
Participant ID	1	Char
Fractional Trade Total Volume	8	Long
Total Length	**1+(9*# of Active Participants)**	

6.4.5   Approximate Trades and Total Dollar Value – Category M Type O

The Approximate Trades and Total Dollar Value message allows a Participant to report the total trades and total dollar value of trades at their respective market centers. A Participant is required to utilize all fields in the Approximate Total Trades and Dollar Value message.

Field Name	Length	Type
Total Trades	4	Integer
Dollar Value	8	Long
Total Length	**12**	

6.4.6   Crossing Session Summary – Category M Type P

The Crossing Session message is used to report the total volume and dollar value of trades transacted after the close of a Participant's regular session.

Field Name	Length	Type
Crossing Session I Total Trades Volume	8	Long
Crossing Session II Dollar Value	8	Long
Crossing Session II Total Trades Volume	8	Long
Total Length	**24**	

6.5   Prior Day Messages – Category P

Prior Day messages are used to report CTA eligible Equity, Local Issue or Bond trades, corrections, cancels or errors for transactions that occurred **earlier than the current trading day** and had not been reported. Trade Reporting Facility ID is restricted to CTA eligible Equity transactions.

Prior Day Messages can be reported for Security Symbols that have been delisted and no longer actively trading on the current trading day. Any Prior Day Messages for such Security Symbol can be routed over either the Network A or B multicast lines based on the Participant ID (refer Message Routing).

6.5.1   Prior Day Trade Correction – Category P Type C (to be descoped)

The Prior Day Trade Correction message is used to correct a transaction originally reported on a trading day earlier than the current trading day. Corrections to current day transactions are reported using the Trade Correction message Category 'T' Type 'C'.

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Corrected Sale Condition	4	Char [ ]
Corrected Trade Price	8	Long
Corrected Trade Volume	4	Integer
Corrected Seller's Sale Days	1	Byte
Corrected Stop Stock Indicator	1	Char
Corrected Trade Through Exempt Indicator	1	Char
Corrected Short Sale Restriction Indicator	1	Char
Corrected Prior Day Trade Date and Time	8	2 x Integer
Trade Reporting Facility ID	1	Char
Original Sale Condition	4	Char [ ]
Original Trade Price	8	Long
Original Trade Volume	4	Integer
Original Seller's Sale Days	1	Byte
Original Stop Stock Indicator	1	Char
Original Trade Through Exempt Indicator	1	Char
Original Short Sale Restriction Indicator	1	Char
Original Prior Day Trade Date and Time	8	2 x Integer
Total Length	**69**	

6.5.2   Fractional Prior Day Trade Correction – Category P Type O (new)

The Fractional Prior Day Trade Correction message is used to correct a transaction originally reported on a trading day earlier than the current trading day. Corrections to current day transactions are reported using the Trade Correction message Category 'T' Type 'C'. Volume is represented as a fractional value.

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Corrected Sale Condition	4	Char [ ]
Corrected Trade Price	8	Long
Corrected Fractional Trade Volume	8	Long
Corrected Seller's Sale Days	1	Byte
Corrected Stop Stock Indicator	1	Char
Corrected Trade Through Exempt Indicator	1	Char
Corrected Short Sale Restriction Indicator	1	Char
Corrected Prior Day Trade Date and Time	8	2 x Integer
Trade Reporting Facility ID	1	Char
Original Sale Condition	4	Char [ ]
Original Trade Price	8	Long
Original Fractional Trade Volume	8	Long
Original Seller's Sale Days	1	Byte
Original Stop Stock Indicator	1	Char
Original Trade Through Exempt Indicator	1	Char
Original Short Sale Restriction Indicator	1	Char
Original Prior Day Trade Date and Time	8	2 x Integer
Total Length	**77**	

6.5.3   Prior Day Trade – Category P Type T (to be descoped)

The Prior Day Trade message is used to report a CTA Equity, Local Issue or Bond transaction which occurred **earlier than the current trading day** and was not reported.

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Sale Condition	4	Char [ ]
Trade Price	8	Long
Trade Volume	4	Integer
Seller's Sale Days	1	Byte
Stop Stock Indicator	1	Char
Trade Through Exempt Indicator	1	Char
Short Sale Restriction Indicator	1	Char
Trade Reporting Facility ID	1	Char
Prior Day Trade Date and Time	8	2 x Integer
Total Length	**41**	

6.5.4 Fractional Prior Day Trade – Category P Type R (new)

The Fractional Prior Day Trade message is used to report a CTA Equity, Local Issue or Bond transaction which occurred earlier than the current trading day and was not reported. Volume is represented as a fractional value.

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Sale Condition	4	Char [ ]
Trade Price	8	Long
Fractional Trade Volume	8	Long
Seller's Sale Days	1	Byte
Stop Stock Indicator	1	Char
Trade Through Exempt Indicator	1	Char
Short Sale Restriction Indicator	1	Char
Trade Reporting Facility ID	1	Char
Prior Day Trade Date and Time	8	2 x Integer
Total Length	**45**	

6.5.5 Prior Day Trade Cancel/Error – Category P Type X (to be descoped)

The Prior Day Trade Cancel/Error message is used for CTA eligible Equity, Local Issue or Bond information to report the cancellation of a trade (buyer and seller agrees to cancel a trade) or error a trade that never took place but was reported. This message format is strictly used to cancel/error a trade or correction originally reported earlier than the current day. Cancel/Errors to current day transactions are reported using the Cancel/Error message, Category 'T' Type 'X'.

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Sale Condition	4	Char [ ]
Trade Price	8	Long
Trade Volume	4	Integer
Seller's Sale Days	1	Byte
Stop Stock Indicator	1	Char
Trade Through Exempt Indicator	1	Char
Short Sale Restriction Indicator	1	Char
Trade Reporting Facility ID	1	Char
Prior Day Trade Date and Time	8	2 x Integer
Cancel/Error Action	1	Char
Total Length	**42**	

6.5.6   Fractional Prior Day Trade Cancel/Error – Category P Type E (new)

The Fractional Prior Day Trade Cancel/Error message is used for CTA eligible Equity, Local Issue or Bond information to report the cancellation of a trade (buyer and seller agrees to cancel a trade) or error a trade that never took place but was reported. This message format is strictly used to cancel/error a trade or correction originally reported earlier than the current day. Cancel/Errors to current day transactions are reported using the Cancel/Error message, Category 'T' Type 'X'. Volume is represented as a fractional value.

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Sale Condition	4	Char [ ]
Trade Price	8	Long
Fractional Trade Volume	8	Long
Seller's Sale Days	1	Byte
Stop Stock Indicator	1	Char
Trade Through Exempt Indicator	1	Char
Short Sale Restriction Indicator	1	Char
Trade Reporting Facility ID	1	Char
Prior Day Trade Date and Time	8	2 x Integer
Cancel/Error Action	1	Char
Total Length	**46**	

6.6   Summary Messages – Category S

Summary messages are used to provide CTA eligible Equity, Local Issue and Bond summary information by security.

6.6.1   Consolidated Start of Day Summary – Category S Type A

The Consolidated Start of Day Summary messages are transmitted shortly after the Multicast Line 'Start of Day' message. The Participant ID field of the Message Header is populated with 'S', signifying that the message is generated by the Consolidated Tape System. It provides, by security, consolidated previous close price and previous close price date information for CTA eligible Equity, Local Issues and Bonds.

If there is no price associated with a security, e.g., an Initial Public Offering (IPO), no Consolidated Start of Day Summary message is generated for that security symbol. Other messages can be intermingled within this message transmission. This message transmission is preceded by a Category 'A' Type 'C' Start of Start of Day Summary and ended with a Category 'A' Type 'D' End of Start of Day Summary administrative messages.

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Participant ID	1	Char
Previous Close Price Date	4	Integer
Previous Close Price	8	Long
Short Sale Restriction Indicator	1	Char
Primary Listing Market Participant ID	1	Char
Financial Status Indicator	1	Char
Number of Participants	1	Byte
Total Length	**29**	

6.6.2   Participant Start of Day Summary – Category S Type B

The Participant Start of Day Summary messages are transmitted shortly after the Multicast Line 'Start of Day' message. The Participant ID field of the Message Header is populated with 'S', signifying that the message is generated by the Consolidated Tape System. It provides, by security, Participant previous close price and previous close price date information for CTA eligible Equity, Local Issues and Bonds.

If there is no price associated with a security, e.g., an Initial Public Offering (IPO), no Participant Start of Day Summary message is generated for that security symbol. Other messages can be intermingled within this message transmission. This message transmission is preceded by a Category 'A' Type 'C' Start of Start of Day Summary and ended with a Category 'A' Type 'D' End of Start of Day Summary administrative messages.

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Participant ID	1	Char
Previous Close Price Date	4	Integer
Previous Close Price	8	Long
Total Length	**25**	

6.6.3 Consolidated End of Day Summary – Category S Type C (to be descoped)

The Consolidated End of Day Summary messages are transmitted after the market close (refer publication schedule under Appendix D). The Participant ID field of the Message Header is populated with 'S', signifying that the message is generated by the Consolidated Tape System. The Consolidated End of Day Summary message provides by security, the Consolidated High, Low, Last and Volume for CTA eligible Equity, Local Issues and Bonds.

In cases where no trades qualify to update the **Last Price**, the previous close **Last Price** is provided and the **Previous Close Price Date** field is populated with the date associated with the **Last Price** value. If a trade qualifies to update the **Last Price**, the **Previous Price Close Date** field is set to zero. If there is no trading activity for a security for the day, a Consolidated End of Day Summary will not be generated for that security symbol. This message transmission is preceded by a Category 'A' Type 'A' Start of End of Day Summary and ended with a Category 'A' Type 'B' End of End of Day Summary administrative messages.

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Last Participant ID	1	Char
Previous Close Price Date	4	Integer
Last Price	8	Long
High Price	8	Long
Low Price	8	Long
Total Volume	8	Long
Short Sale Restriction Indicator	1	Char
Primary Listing Market Participant ID	1	Char
Financial Status Indicator	1	Char
Number of Participants	1	Byte
Total Length	**53**	

6.6.4 Fractional Consolidated End of Day Summary – Category S Type T (new)

The Consolidated End of Day Summary messages are transmitted after the market close (refer publication schedule under Appendix D). The Participant ID field of the Message Header is populated with 'S', signifying that the message is generated by the Consolidated Tape System. The Consolidated End of Day Summary message provides by security, the Consolidated High, Low, Last and Volume for CTA eligible Equity, Local Issues and Bonds. **Volume** is represented as a fractional value.

In cases where no trades qualify to update the Last Price, the previous close Last Price is provided and the Previous Close Price Date field is populated with the date associated with the Last Price value. If a trade qualifies to update the Last Price, the Previous Price Close Date field is set to zero. If there is no trading activity for a security for the day, a Consolidated End of Day Summary will not be generated for that security symbol. This message transmission is preceded by a Category 'A' Type 'A' Start of End of Day Summary and ended with a Category 'A' Type 'B' End of End of Day Summary administrative messages.

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Last Participant ID	1	Char
Previous Close Price Date	4	Integer
Last Price	8	Long
High Price	8	Long
Low Price	8	Long
Fractional Total Volume	8	Long
Short Sale Restriction Indicator	1	Char
Primary Listing Market Participant ID	1	Char
Financial Status Indicator	1	Char
Number of Participants	1	Byte
Total Length	**53**	

6.6.5   Participant End of Day Summary – Category S Type D (to be descoped)

The Participant End of Day Summary messages are transmitted after the market close (refer publication schedule under Appendix D). The Participant ID field of the Message Header is populated with 'S', signifying that the message is generated by the Consolidated Tape System. The Participant End of Day Summary message provides by security, the Participant Open, High, Low, Last, Volume and Tick information for CTA eligible securities, Local Issues and Bonds.

In cases where no trades qualify to update the **Last Price**, the previous close **Last Price** is provided and the **Previous Close Price Date** field is populated with the date associated with the **Last Price** value. If a trade qualifies to update the **Last Price**, the **Previous Price Close Date** field is set to zero. If there is no trading activity for a security for the day, a Participant End of Day Summary will not be generated for that security symbol. This message transmission is preceded by a Category 'A' Type 'A' Start of End of Day Summary and ended with a Category 'A' Type 'B' End of End of Day Summary administrative messages.

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Participant ID	1	Char
Previous Close Price Date	4	Integer
Last Price	8	Long
High Price	8	Long
Low Price	8	Long
Open Price	8	Long
Total Volume	8	Long
Tick	1	Char
Total Length	**58**	

6.6.6 Fractional Participant End of Day Summary – Category S Type P (new)

The Participant End of Day Summary messages are transmitted after the market close (refer publication schedule under Appendix D). The Participant ID field of the Message Header is populated with 'S', signifying that the message is generated by the Consolidated Tape System. The Participant End of Day Summary message provides by security, the Participant Open, High, Low, Last, Volume and Tick information for CTA eligible securities, Local Issues and Bonds. **Volume** is represented as a fractional value.

In cases where no trades qualify to update the Last Price, the previous close Last Price is provided and the Previous Close Price Date field is populated with the date associated with the Last Price value. If a trade qualifies to update the Last Price, the Previous Price Close Date field is set to zero. If there is no trading activity for a security for the day, a Participant End of Day Summary will not be generated for that security symbol. This message transmission is preceded by a Category 'A' Type 'A' Start of End of Day Summary and ended with a Category 'A' Type 'B' End of End of Day Summary administrative messages.

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Participant ID	1	Char
Previous Close Price Date	4	Integer
Last Price	8	Long
High Price	8	Long
Low Price	8	Long
Open Price	8	Long
Fractional Total Volume	8	Long
Tick	1	Char
Total Length	**58**	

6.7   Trade Messages – Category T

Trade messages are used to report CTA eligible Equity, Local Issue or Bond information. Trade messages allow for automated corrections, cancellations or errors of trade reports (originally reported using fixed message formats), reporting Trading Halts, Resumes, Indications and Imbalances. The Trade Reporting Facility ID is restricted to CTA eligible Equity transactions. 'Limit Up-Limit Down' is not applicable to Local Issues or Bonds. 'Limit Up-Limit Down' Price Bands are republished every 30 seconds at clock time.

6.7.1   Auction Status – Category T Type A

The Auction Status message is used when a Participant in a CTA eligible security, Local Issue or a Bond requires Auction Information. Primary Listing Markets using an automated reopening will calculate Auction Collars, in compliance with rules around prices for re-opening, when applicable and will publish the Auction Status message. The initial Auction Collar will be published after the LULD Trading Pause. The 'Number of Extensions' field will reflect when a new Auction Status message has been published. The first Auction Collar extension, at the time of the LULD Trading Pause, will be set to zero (0) indicating the first Auction Status message and will increment by one (1) for each new Auction Status message sent during the LULD Trading Pause event.

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Auction Collar Reference Price	8	Long
Auction Collar Upper Threshold Price	8	Long
Auction Collar Lower Threshold Price	8	Long
Number of Extensions	1	Byte
Short Sale Restriction Indicator	1	Char
Primary Listing Market Participant ID	1	Char
Financial Status Indicator	1	Char
Reserved (for future use)	**62**	**TBD**
Total Length	**102**	

6.7.2 Trade Correction – Category T Type C (to be descoped)

The Trade Correction message is used to correct CTA eligible Equity, Local Issue or Bond information. The Participant Reference Number of Original Transaction Being Adjusted will reflect the Participant Reference Number of either the original trade, or, if the original trade has already been corrected, of the most recent correction to the trade. Included in the Trade Correction message is the current status of the Consolidated Last, High, Low, Volume, and Previous Close Price Date and the Participant's Open, High, Low, Last, Previous Close Price Date, Volume, and Tick at the time of the correction for the affected security. In instances when an issue trades only on one exchange for the day, both the Consolidated and the Participant summary information are identical. In cases where no trades qualify to update the Last Price, both the Previous Close Date and Previous Close Price fields are provided.

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Corrected Sale Condition	4	Char [ ]
Corrected Trade Price	8	Long
Corrected Trade Volume	4	Integer
Corrected Seller's Sale Days	1	Byte
Corrected Stop Stock Indicator	1	Char
Corrected Trade Through Exempt Indicator	1	Char
Corrected Short Sale Restriction Indicator	1	Char
Trade Reporting Facility ID	1	Char
Timestamp 2	8	2 x Integer
Original Participant Reference Number (*of original transaction being corrected*)	8	Signed Long
Original Sale Condition	4	Char [ ]
Original Trade Price	8	Long
Original Trade Volume	4	Integer
Original Seller's Sale Days	1	Byte
Original Stop Stock Indicator	1	Char
Original Trade Through Exempt Indicator	1	Char
Original Short Sale Restriction Indicator	1	Char
Primary Listing Market Participant ID	1	Char
Financial Status Indicator	1	Char

Trade Correction – Category T Type C (continued)

Field Name	Length	Type
Consolidated Data		
Previous Close Price Date	4	Integer
Last Participant ID	1	Char
Last Price	8	Long
High Price	8	Long
Low Price	8	Long
Total Volume	4	Integer
Tick	1	Char
Participant Data		
Previous Close Price Date	4	Integer
Last Price	8	Long
High Price	8	Long
Low Price	8	Long
Open Price	8	Long
Total Volume	4	Integer
Tick	1	Char
Total Length	**146**	

6.7.3   Fractional Trade Correction – Category T Type O (new)

The Trade Correction message is used to correct CTA eligible Equity, Local Issue or Bond information. The Participant Reference Number of Original Transaction Being Adjusted will reflect the Participant Reference Number of either the original trade, or, if the original trade has already been corrected, of the most recent correction to the trade. Included in the Trade Correction message is the current status of the Consolidated Last, High, Low, Volume, and Previous Close Price Date and the Participant's Open, High, Low, Last, Previous Close Price Date, Volume, and Tick at the time of the correction for the affected security. In instances when an issue trades only on one exchange for the day, both the Consolidated and the Participant summary information are identical. In cases where no trades qualify to update the Last Price, both the Previous Close Date and Previous Close Price fields are provided. Volume is represented as a fractional value.

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Corrected Sale Condition	4	Char [ ]
Corrected Trade Price	8	Long
Corrected Fractional Trade Volume	8	Long
Corrected Seller's Sale Days	1	Byte
Corrected Stop Stock Indicator	1	Char
Corrected Trade Through Exempt Indicator	1	Char
Corrected Short Sale Restriction Indicator	1	Char
Trade Reporting Facility ID	1	Char
Timestamp 2	8	2 x Integer
Original Participant Reference Number (*of original transaction being corrected*)	8	Signed Long
Original Sale Condition	4	Char [ ]
Original Trade Price	8	Long
Original Fractional Trade Volume	8	Long
Original Seller's Sale Days	1	Byte
Original Stop Stock Indicator	1	Char
Original Trade Through Exempt Indicator	1	Char
Original Short Sale Restriction Indicator	1	Char
Primary Listing Market Participant ID	1	Char
Financial Status Indicator	1	Char

Trade Correction – Category T Type O (continued)

Field Name	Length	Type
Consolidated Data		
Previous Close Price Date	4	Integer
Last Participant ID	1	Char
Last Price	8	Long
High Price	8	Long
Low Price	8	Long
Fractional Total Volume	8	Long
Tick	1	Char
Participant Data		
Previous Close Price Date	4	Integer
Last Price	8	Long
High Price	8	Long
Low Price	8	Long
Open Price	8	Long
Fractional Total Volume	8	Long
Tick	1	Char
Total Length	**162**	

6.7.4 Long Trade – Category T Type L (to be descoped)

The Long Trade message is used to report trade information for CTA eligible Equity, Local Issue or Bonds.

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Sale Condition	4	Char [ ]
Trade Price	8	Long
Trade Volume	4	Integer
Seller's Sale Days	1	Byte
Stop Stock Indicator	1	Char
Trade Through Exempt Indicator	1	Char
Trade Reporting Facility ID	1	Char
Timestamp 2	8	2 x Integer
Short Sale Restriction Indicator	1	Char
Primary Listing Market Participant ID	1	Char
Financial Status Indicator	1	Char
Held Trade Indicator	1	Char
Consolidated High/Low/Last Indicator	1	Char
Participant Open/High/Low/Last Indicator	1	Char
Total Length	**46**	

6.7.5   Fractional Long Trade – Category T Type R (new)

The Long Trade message is used to report trade information for CTA eligible Equity, Local Issue or Bonds. Volume is represented as a fractional value.

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Sale Condition	4	Char [ ]
Trade Price	8	Long
Fractional Trade Volume	8	Long
Seller's Sale Days	1	Byte
Stop Stock Indicator	1	Char
Trade Through Exempt Indicator	1	Char
Trade Reporting Facility ID	1	Char
Timestamp 2	8	2 x Integer
Short Sale Restriction Indicator	1	Char
Primary Listing Market Participant ID	1	Char
Financial Status Indicator	1	Char
Held Trade Indicator	1	Char
Consolidated High/Low/Last Indicator	1	Char
Participant Open/High/Low/Last Indicator	1	Char
Total Length	**50**	

6.7.6   Trading Status – Category T Type S

The Trading Status message is transmitted when a Participant in a CTA eligible security, Local Issue or a Bond elects to notify CTS of a Trading Halt, a Trading Resume, a Price Indication or a Market Imbalance. The Trading Status message is also used to identify the Limit Up-Limit Down action associated with a security (e.g., Price Bands, Limit State Entered or Limit State Exited).

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Last Price	8	Long
High Indication Price / Upper Limit Price Band	8	Long
Low Indication Price / Lower Limit Price Band	8	Long
Buy Volume	4	Integer
Sell Volume	4	Integer
Security Status	1	Char
Halt Reason	1	Char
Short Sale Restriction Indicator	1	Char
Primary Listing Market Participant ID	1	Char
Financial Status Indicator	1	Char
Limit Up-Limit Down (LULD) Indicator	1	Char
Total Length	**50**	

6.7.7 Short Trade – Category T Type T (to be descoped)

The Short Trade message is used to report trade information for **CTA eligible Equity only** (not used for Local Issues or Bonds) if the trade meets message format requirements otherwise Long Trade message is used.

Field Name	Length	Type
Security Symbol	5	Char [ ]
Sale Condition	1	Char
Sale Condition Category	1	Char
Trade Price	2	Short
Trade Volume	2	Short
Primary Listing Market Participant ID	1	Char
Consolidated High/Low/Last Indicator	1	Char
Participant Open/High/Low/Last Indicator	1	Char
Total Length	**14**	

6.7.8 Fractional Short Trade – Category T Type H (new)

The Short Trade message is used to report trade information for CTA eligible Equity only (not used for Local Issues or Bonds) if the trade meets message format requirements otherwise Long Trade message is used. Volume is represented as a fractional value.

Field Name	Length	Type
Security Symbol	5	Char [ ]
Sale Condition	1	Char
Sale Condition Category	1	Char
Trade Price	2	Short
Fractional Trade Volume	4	Integer
Primary Listing Market Participant ID	1	Char
Consolidated High/Low/Last Indicator	1	Char
Participant Open/High/Low/Last Indicator	1	Char
Total Length	**16**	

Note - Short Trade messages are not published by CTS currently, message type is reserved for future use.

6.7.9 Trade Cancel/Error – Category T Type X (to be descoped)

The Trade Cancel/Error message is used cancel or error CTA eligible securities, Local Issues or Bond information (either to report the cancellation of a trade e.g., buyer and seller agrees to cancel a trade, or error a trade that never took place but was reported). The Participant Reference Number of Original Transaction Being Adjusted will reflect the Participant Reference Number of either the original trade, or, if the original trade has already been corrected, of the most recent correction to the trade. **Corrections are not applied to a cancelled or error trade. If a correction to a cancelled or error trade is required, the Participant will enter as a new trade.** Included in the Cancel/Error message is the current status of the Consolidated Last, High, Low, Volume, and Previous Close Price Date and the Participant's Open, High, Low, Last, Previous Close Price Date, Volume, and Tick at the time of the cancel/error. In instances when an issue trades only on one Exchange for the day, both the Consolidated and the Participant summary information are identical. In cases where no trades qualify to update the Last Price, the Previous Close Price is provided and the Previous Close Price Date field is populated.

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Sale Condition	4	Char [ ]
Trade Price	8	Long
Trade Volume	4	Integer
Seller's Sale Days	1	Byte
Stop Stock Indicator	1	Char
Trade Through Exempt Indicator	1	Char
Trade Reporting Facility ID	1	Char
Original Participant Reference Number (*of Original Transaction Being cancelled or errored*)	8	Signed Long
Timestamp 2	8	2 x Integer
Cancel/Error Action	1	Char
Short Sale Restriction Indicator	1	Char
Primary Listing Market Participant ID	1	Char
Financial Status Indicator	1	Char

Trade Cancel/Error – Category T Type X *(continued)*

Consolidated Data		
Previous Close Price Date	4	Integer
Last Participant ID	1	Char
Last Price	8	Long
High Price	8	Long
Low Price	8	Long
Total Volume	4	Integer
Tick	1	Char
Participant Data		
Previous Close Price Date	4	Integer
Last Price	8	Long
High Price	8	Long
Low Price	8	Long
Open Price	8	Long
Total Volume	4	Integer
Tick	1	Char
Total Length	**127**	

6.7.10 Fractional Trade Cancel/Error – Category T Type E (new)

The Trade Cancel/Error message is used cancel or error CTA eligible securities, Local Issues or Bond information (either to report the cancellation of a trade e.g., buyer and seller agrees to cancel a trade, or error a trade that never took place but was reported). The Participant Reference Number of Original Transaction Being Adjusted will reflect the Participant Reference Number of either the original trade, or, if the original trade has already been corrected, of the most recent correction to the trade. Corrections are not applied to a cancelled or error trade. If a correction to a cancelled or error trade is required, the Participant will enter as a new trade. Included in the Cancel/Error message is the current status of the Consolidated Last, High, Low, Volume, and Previous Close Price Date and the Participant's Open, High, Low, Last, Previous Close Price Date, Volume, and Tick at the time of the cancel/error. In instances when an issue trades only on one Exchange for the day, both the Consolidated and the Participant summary information are identical. In cases where no trades qualify to update the Last Price, the Previous Close Price is provided and the Previous Close Price Date field is populated. Volume is represented as a fractional value.

Field Name	Length	Type
Security Symbol	11	Char [ ]
Instrument Type	1	Char
Sale Condition	4	Char [ ]
Trade Price	8	Long
Fractional Trade Volume	8	Long
Seller's Sale Days	1	Byte
Stop Stock Indicator	1	Char
Trade Through Exempt Indicator	1	Char
Trade Reporting Facility ID	1	Char
Original Participant Reference Number (*of Original Transaction Being cancelled or errored*)	8	Signed Long
Timestamp 2	8	2 x Integer
Cancel/Error Action	1	Char
Short Sale Restriction Indicator	1	Char
Primary Listing Market Participant ID	1	Char
Financial Status Indicator	1	Char

Fractional Trade Cancel/Error – Category T Type E *(continued)*

Consolidated Data		
Previous Close Price Date	4	Integer
Last Participant ID	1	Char
Last Price	8	Long
High Price	8	Long
Low Price	8	Long
Fractional Total Volume	8	Long
Tick	1	Char
Participant Data		
Previous Close Price Date	4	Integer
Last Price	8	Long
High Price	8	Long
Low Price	8	Long
Open Price	8	Long
Fractional Total Volume	8	Long
Tick	1	Char
Total Length	**139**	

7.0   FIELD DESCRIPTIONS

Field Name	Length	Description
Auction Collar Reference Price	8	Long. Long have implied 6 decimal places and a maximum price of $18,446,744,073,709.551615. Optional set to zero. Represents the price used by the exchange to establish the Auction Collar.
Auction Collar Lower Threshold Price	8	Long. Long have implied 6 decimal places and a maximum price of $18,446,744,073,709.551615. Optional set to zero. Represents the latest lower threshold price of the Auction Collar. The lower threshold price of the Auction Collar is the lowest price of the auction collar, if any.
Auction Collar Upper Threshold Price	8	Long. Long have implied 6 decimal places and a maximum price of $18,446,744,073,709.551615. Optional set to zero. Represents the latest upper threshold price of the Auction Collar. The upper threshold price of the Auction Collar is the highest price of the auction collar, if any.

FIELD DESCRIPTIONS

Field Name	Length	Description
Bid Index Value	8	Signed Long. Bid Index Value represents an <u>index value (i.e., not a price) and has implied 6 decimal places</u> and a maximum value of -9,223,372,036,854.775808 to +9,223,372,036,854.775807. Represents the value of the index's calculation formula using the current Bid values of the component securities. **Note**: For Government Bonds, the Bid Index Value could reflect a value that is greater than the Offer Index Value.
Buy Volume	4	Integer. Integer has a maximum volume of 4,294,967,295. Optional set to zero. Represents the reported imbalance of buy orders without matching sell orders for the security for a Participant.
Cancel/Error Action	1	Char. Denotes whether the referenced transaction is to be cancelled (buyer and seller agrees to cancel a trade) or errored (error a trade that never took place but was reported). <table><tr><th>Code</th><th>Value</th></tr><tr><td>1</td><td>Cancel</td></tr><tr><td>2</td><td>Error</td></tr></table>
Closing Bid Price	8	Long. Long have implied 6 decimal places and a maximum price of $18,446,744,073,709.551615. Optional set to zero. Represents the last qualifying quote for a security by a Participant during the trading day.
Closing Offer Price	8	Long. Long have implied 6 decimal places and a maximum price of $18,446,744,073,709.551615. Optional set to zero. Represents the last qualifying quote for a security by a Participant during the trading day.

FIELD DESCRIPTIONS

Field Name	Length	Description
Consolidated High/Low/Last Price Indicator	1	Char. Identifies the Consolidated High/Low/Last Price applicable to the trade. | Code	Value | |---|---| | A | None | | B | High | | C | Low | | D | Last | | E | High/Last | | F | Low/Last | | G | High/Low/Last | | H | High/Low |
Corrected (*followed by* 'NAME OF FIELD')	Variable	Refer to the field name following the word 'Corrected' for field description. A field defined as 'Corrected' represents the specific field(s) possible new value for a trade that has been corrected.
Crossing Session I Total Trades Volume	8	Long. Long have a maximum volume of 184,467,440,737,095,516. Optional set to zero. Contains the number of shares traded at the Participant's close price and taking place after the close of a Participant's regular session.
Crossing Session II Dollar Value	8	Long. Long have implied 6 decimal places and a maximum value of $18,446,744,073,709.551615. Optional set to zero. Contains the Dollar Value traded after the close of a Participant's regular session.
Crossing Session II Total Trades Volume	8	Long. Long have a maximum volume of 184,467,440,737,095,516. Optional set to zero. Contains the number of shares traded after the close of a Participant's regular session. Crossing Session II is designed to facilitate trading between member firms.

FIELD DESCRIPTIONS

Field Name	Length	Description
Dollar Value	8	Long. Long have implied 6 decimal places and a maximum value of $18,446,744,073,709.551615. Optional set to zero. Represents the total dollar worth of the daily trade transactions.
Fractional Total Volume	8	Long. Field has implied 6 decimal places and a maximum volume of 18,446,744,073,709.551615 shares. Optional set to zero. Contains Total Volume of shares traded in a security either on a Consolidated or an individual Participant basis at the time it is disseminated.
Fractional Trade Total Volume	8	Long. Field has implied 6 decimal places and a maximum volume of 18,446,744,073,709.551615 shares. Optional set to zero. Contains the total number of shares traded for each Participant.
Fractional Trade Volume	4 or 8	4 Integer. Field has implied 6 decimal places for a maximum volume of 4294.967295 shares. 8 Long. Field has implied 6 decimal places and a maximum volume of 18,446,744,073,709.551615 shares. Optional set to zero. Contains the total number of shares (represented in fraction) which traded in a single transaction for an individual security.

FIELD DESCRIPTIONS

Field Name	Length	Description
Financial Status Indicator	1	Char. Identifies the financial status of the security. *see table below*

Code	Value
0	Financial Status Not Applicable
1	Bankrupt
2	Below Continuing Listing Standards
3	Bankrupt & Below Continuing Listing Standards
4	Late Filing
5	Bankrupt & Late Filing
6	Below Continuing Listing Standards & Late Filing
7	Bankrupt, Below Continuing Listing Standards & Late Filing
8	Creations Suspended (for Exchange Traded Products)
9	Redemptions Suspended (for Exchange Traded Products)
A	Liquidation (for Exchange Traded Products)

FIELD DESCRIPTIONS

Field Name	Length	Description
Halt Reason	1	Char. Denotes the reason for the Trading Halt.

Code	Value	Regulatory	Non Regulatory
Space	Halt Reason Not Applicable		
A	Additional Information Requested	X	
C	Regulatory Concern	X	
D	News Released (formerly News Dissemination)	X	
E	Merger Effective	X	
F	ETF Component Prices Not Available	X	
I	Order Imbalance		X
M	Limit Up-Limit Down (LULD) Trading Pause	X	
N	Corporate Action	X	
O	New Security Offering	X	
P	News Pending	X	
V	Intraday Indicative Value Not Available	X	
X	Operational		X
Y	Sub-Penny Trading		X
1	Market-Wide Circuit Breaker Level 1 – Breached	X	
2	Market-Wide Circuit Breaker Level 2 – Breached	X	
3	Market-Wide Circuit Breaker Level 3 – Breached	X	

FIELD DESCRIPTIONS

Field Name	Length	Description
Held Trade Indicator	1	Char. A 'held trade' is a trade reported by a non-primary market during a regulatory trading halt on the primary market, and it is held by CTS for dissemination until after the close of the primary market. The Held Trade Indicator reflects whether this trade qualifies for the Participant or Consolidated Last Price at the time it is disseminated.

Code	Value
Space	Held Trade Indicator Not Applicable
A*	This trade was held by the Processor during a primary market regulatory halt and should not be used as a last sale for the Participant in that security or on a Consolidated basis. Other trades were disseminated from this Participant for this security.
B*	This trade was held by the Processor during a primary market regulatory halt and can be used as a last sale for the reporting Participant but not on a Consolidated basis.
C*	This trade was held by the Processor during a primary market regulatory halt and can be used as a last sale both for the reporting Participant and on a Consolidated basis.

** Indicator Code currently not in use

FIELD DESCRIPTIONS

Field Name	Length	Description
High Indication Price/Upper Limit Price Band	8	Long. Long have implied 6 decimal places and a maximum price of $18,446,744,073,709.551615. Optional set to zero. The High Indication Price represents an approximation of what the high end 'Offer' price of a security's trading range may be. It is used for a security that is not Trading Halted, i.e., Trading Range Indication or following a Trading Halt, i.e., Price Indication. **Upper Limit Price Band:** represents the upper price band value for a security. When the 'Security Status' field code is 'Limit Up-Limit Down', and the 'Limit Up-Limit Down Indicator' field code is Limit Up-Limit Down' Price Bands, the Upper Limit Price Band value will be contained in the 'High Indication Price/Upper Limit Price Band' fields. When the Upper Limit Price Band field is zero, it identifies that the previous Price Bands have been removed and are no longer effective for a security. **Note**: For Government Bonds, the High Indication Price (i.e., Bid) could reflect a value that is greater than the Low Indication Price (i.e., Offer).
High Price	8	Long. Long have implied 6 decimal places and a maximum price of $18,446,744,073,709.551615. Optional set to zero. Represents the highest price paid for a security during the trading day. **Note**: In instances when no trades qualify to be included in the "High" calculation, either on a Consolidated or an individual Participant basis, this field is set to zero.

FIELD DESCRIPTIONS

Field Name	Length	Description
Index Symbol	11	Char [11]. Left justified, space-filled. Contains the Index symbol.
Index Value	8	Signed Long. Index Value represents an <u>index value (i.e., not a price) and has implied 6 decimal places</u> and a maximum value of -9,223,372,036,854.775808 to +9,223,372,036,854.775807. Represents a statistical composite that measures changes in the economy or in financial markets.
Instrument Type	1	Char. Identifies the instrument type relevant to the trade. | Code	Value
---	---
0	CTA Eligible Equity
1	Local Issue
2	Corporate Bond
3	Government Bond	
IPO	1	Char. Identifies whether the security symbol is an IPO | Code	Value
---	---
0	Not an IPO symbol
1	IPO symbol	

FIELD DESCRIPTIONS

Field Name	Length	Description
Last Participant ID	1	Char. Space-filled. Refer to **Participant ID** field description for Participant codes.
Last Price	8	Long. Long have implied 6 decimal places and a maximum price of $18,446,744,073,709.551615. Optional set to zero. Represents the last price for that security either on a Consolidated or an individual Participant basis at the time it is disseminated. **Note 1**: For Trading Status Information, the Last Price is provided when the Security Status is: Trading Halt, Price Indication or Trading Range Indication. **Note 2**: In instances when no trades qualify to be included in the **Last Price** calculation, either on a Consolidated or an individual Participant basis, the **Last Price** will reflect the most current Last Price, e.g., the previous close or if no previous close exists, the Last Price is set to zero.
LULD Tier	1	Char. Identifies the Limit Up Limit Down tier of the security symbol <table><tr><th>Code</th><th>Value</th></tr><tr><td>0</td><td>LULD not applicable</td></tr><tr><td>1</td><td>LULD Tier 1 Security</td></tr><tr><td>2</td><td>LULD Tier 2 Security</td></tr></table>
LULD Leverage Ratio	4	Integer. Fields has implied 6 decimal places and a maximum value of 4294.967295 Represents the Leverage ratio associated with the LULD Tier of the security symbol. Currently CTA symbols have LULD Leverage Ratio values of 1, 2, 3 or 4.

FIELD DESCRIPTIONS

Field Name	Length	Description
Limit Up-Limit Down (LULD) Indicator	1	Char. Identifies the Limit Up-Limit Down action (e.g., Price Bands, Consolidated Quotation system National Best Bid/Offer Limit State Entered/Exited) related to a security. When the 'Limit Up-Limit Down Indicator' code is set to either Limit Up-Limit Down Price Bands, the Price Band values will be contained in the 'High Indication Price/Upper Limit Price Band' and 'Low Indication Price/Lower Limit Price Band' fields.

Code	Value
Space	Limit Up-Limit Down Not Applicable
A	Limit Up-Limit Down Price Band
B	Republished Limit Up-Limit Down Price Band
C	National Best Bid Limit State Entered
D	National Best Bid Limit State Exited
E	National Best Offer Limit State Entered
F	National Best Offer Limit State Exited
G	National Best Bid and National Best Offer Limit State Entered
H	National Best Bid and National Best Offer Limit State Exited
I	National Best Bid Limit State Entered and National Best Offer Limit State Exited
J	National Best Bid Limit State Exited and National Best Offer Limit State Entered

Note 1: Limit Up-Limit Down is not applicable to Local Issues or Bonds.

Note 2: All Limit State combination possibilities are reflected, though some may be a rare occurrence.

Note 3: When the 'Limit Up-Limit Down Indicator' codes are set to codes C through J, all price fields will be zero-filled.

Note 4: Indicators C through J **do not represent Price Bands**, they are used to identify that the symbol has entered/exited Limit State**.**

FIELD DESCRIPTIONS

Field Name	Length	Description
Low Indication Price / Lower Limit Price Band	8	Long. Long have implied 6 decimal places and a maximum price of $18,446,744,073,709.551615. Optional set to zero. The Low Indication Price represents an approximation of what the low end "Bid" price of a security's trading range may be. It is used for a security that is not Trading Halted, i.e., Trading Range Indication or following a Trading Halt, i.e., Price Indication. **Lower Limit Price Band:** represents the lower price band value for a security. When the 'Security Status' field code is 'Limit Up-Limit Down', and the 'Limit Up-Limit Down Indicator' field code is Limit Up-Limit Down Price Bands, the Lower Limit Price Band values will be contained in the 'Low Indication Price/Lower Limit Price Band' fields. When the Lower Limit Price Band field is zero, it identifies that the previous Price Bands have been removed and are no longer effective for a security. **Note:** For Government Bonds, the High Indication Price (i.e., Bid) could reflect a value that is greater than the Low Indication Price (i.e., Offer).
Low Price	8	Long. Long have implied 6 decimal places and a maximum price of $18,446,744,073,709.551615. Optional set to zero. Represents the lowest price paid for a security during the trading day. **Note**: In instances when no trades qualify to be included in the "Low" calculation, either on a Consolidated or an individual Participant basis, this field is set to zero.
Market-Wide Circuit Breaker (MWCB) Level Indicator	1	Char. Identifies the threshold level that was breached. | Code	Value
---	---
Space	MWCB Not Applicable
1	Level 1 Breached
2	Level 2 Breached
3	Level 3 Breached	

FIELD DESCRIPTIONS

Field Name	Length	Description
MWCB Level 1	8	Signed Long. MWCB Level 1 value represents an <u>index value (i.e., not a price) and has implied 6 decimal places</u> and a maximum value of -9,223,372,036,854.775808 to +9,223,372,036,854.775807. Identifies the daily established drop level value (trigger value) associated with each Decline Level: ▪ Level 1 = 7% of Previous Close S&P 500 Value
MWCB Level 2	8	Signed Long. MWCB Level 2 value represents an <u>index value (i.e., not a price) and has implied 6 decimal places</u> and a maximum value of -9,223,372,036,854.775808 to +9,223,372,036,854.775807. Identifies the daily established drop level value (trigger value) associated with each Decline Level: ▪ Level 2 = 13% of Previous Close S&P 500 Value
MWCB Level 3	8	Signed Long. MWCB Level 3 value represents an <u>index value (i.e., not a price) and has implied 6 decimal places</u> and a maximum value of -9,223,372,036,854.775808 to +9,223,372,036,854.775807. Identifies the daily established drop level value (trigger value) associated with each Decline Level: ▪ Level 3 = 20% of Previous Close S&P 500 Value

FIELD DESCRIPTIONS

Field Name	Length	Description
Number of Extensions	1	Byte. Optional set to zero. Identifies the number of manual or automatic extensions the applicable auction has received.
Number of Participants	1	Byte. Represents the actual number of Participants for which an issue will be reported.
Offer Index Value	8	Signed Long. Offer Index Value represents an index value (i.e., not a price) and has implied 6 decimal places and a maximum value of -9,223,372,036,854.775808 to +9,223,372,036,854.775807. Represents the value of the index calculation formula using the current offer values of the component securities. **Note**: For Government Bonds, the Bid Index Value could reflect a value that is greater than the Offer Index Value.
Open Price	8	Long. Long have implied 6 decimal places and a maximum price of $18,446,744,073,709.551615. Optional set to zero. Represents the first qualifying price paid for a security during the trading day. **Note:** In instances when no trades qualify to be included in the 'Open Price' calculation, either on a Consolidated or an individual Participant basis, this field is set to zero.
Original (*followed by* 'NAME OF FIELD')	Variable	Refer to the field name following the word 'Original' for field description. In messages containing two sets of identical fields, one set of fields is used to denote the original trade detail when it was executed and the other set of fields is to denote the corrected field(s) originally reported incorrectly.

FIELD DESCRIPTIONS

Field Name	Length	Description
Participant Reference Number (*of trade being corrected or cancelled or errored*)	8	Signed Long. Set to Zero. Contains the Participant Reference Number of transaction to be corrected, cancelled or errored. The Participant Reference Number must correspond to the Participant Reference number in the Message Header of the transaction being corrected, cancelled or errored. If the trade has already been corrected, the Participant Reference Number of the most recent correction to the trade is required Corrections, Cancels or Errors entered for trades which have already been canceled or errored will be rejected back to the Participant.
Participant ID	1	Char. Identifies the Participant or Processor that initiated the message.

Code	Value
A	NYSE American
B	NASDAQ OMX BX
C	NYSE National
D	FINRA ADF
G	24X
H	MIAX Pearl
I	ISE
J	Cboe EDGA
K	Cboe EDGX
L	LTSE
M	NYSE Texas
N	NYSE
P	NYSE Arca
S	CTS
T	NASDAQ
U	Members Exchange
V	IEX
W	CBSX
X	NASDAQ OMX PSX
Y	Cboe BYX
Z	Cboe BZX

FIELD DESCRIPTIONS

Field Name	Length	Description
Participant Open/High/Low/Last Indicator	1	Char. Identifies the Participant Open/High/Low/Last applicable to the transaction. <table><tr><th>Code</th><th>Value</th></tr><tr><td>A</td><td>None</td></tr><tr><td>B</td><td>High</td></tr><tr><td>C</td><td>Low</td></tr><tr><td>D</td><td>Last</td></tr><tr><td>E</td><td>High/Last</td></tr><tr><td>F</td><td>Low/Last</td></tr><tr><td>G</td><td>Unused</td></tr><tr><td>H</td><td>Open</td></tr><tr><td>I</td><td>Open/High</td></tr><tr><td>J</td><td>Open/Low</td></tr><tr><td>K</td><td>Open/High/Low/Last</td></tr><tr><td>L</td><td>Open/Last</td></tr><tr><td>M</td><td>Open/High/Low</td></tr><tr><td>N</td><td>Open/High/Last</td></tr><tr><td>O</td><td>Open/Low/Last</td></tr><tr><td>P</td><td>High/Low</td></tr><tr><td>Q</td><td>High/Low/Last</td></tr></table>
Previous Close Price	8	Long. Long have implied 6 decimal places and a maximum price of $18,446,744,073,709.551615. Optional set to zero. Represents the last qualifying price paid for a security during the trading day.
Previous Close Price Date	4	Integer. Represented in seconds since Epoch. Optional set to zero. Represents the date the security last traded. **Note:** When a trade qualifies for the **Last Price**, the Previous Close Price Date field will be set to zero.

FIELD DESCRIPTIONS

Field Name	Length	Description
Primary Listing Market Participant ID	1	Char. Identifies the Primary Listing Market of the security symbol. | Code	Value
---	---
Space	Primary Listing Market Participant ID Not Applicable
A	NYSE American
B	NASDAQ BX
C	NYSE National
D	FINRA ADF
G	24X
H	MIAX Pearl
I	ISE
J	Cboe EDGA
K	Cboe EDGX
L	LTSE
M	NYSE Texas
N	NYSE
P	NYSE Arca
T	NASDAQ
U	Members Exchange
V	IEX
W	CBSX
X	NASDAQ OMX PSX
Y	Cboe BYX
Z	Cboe BZX	
Prior Day Trade Date and Time	8	2 x Integer (pair of Integers). Optional set to zero. The first integer contains the number of seconds from Epoch 1/1/1970, 00:00:00 UTC. The next integer contains the nanosecond portion of the time (e.g., 972402315). Represents the date and time the prior day trade was executed. In the Prior Day Correction messages, there are two Prior Day Trade Dates and Time, one to denote the date and time the original trade was executed as reported in a Prior Day Trade and one to denote the corrected date and time of trade execution. In the Prior Day Cancel/Error messages, the date and time denotes the reported execution date of the original trade being cancelled or reported in error.
Reserved	1	Space-filled. Field is reserved for future use.
Round Lot Size	2	Short. Round-lot size for a symbol can consist of 1, 10, 40 or 100 shares.

FIELD DESCRIPTIONS

Field Name	Length	Description
Sale Condition	1 or 4	Char. or Char [4]. Denotes the sale condition associated with a trade. Also noted is the impact of Sale Conditions on the Open, Last, High and Low calculations both on a Consolidated and Participant basis.

		CONSOLIDATED Update		PARTICIPANT Update			VOLUME Update
CODE	SALE CONDITION	LAST	HIGH / LOW	OPEN	LAST	HIGH / LOW	
Space	Regular Sale	YES	YES	#4	YES	YES	YES
B	Average Price Trade	NO	NO	NO	NO	NO	YES
C	Cash Trade (Same Day Clearing)	NO	NO	NO	NO	NO	YES
E	Automatic Execution	YES	YES	#4	YES	YES	YES
F	Inter-market Sweep Order	YES	YES	#4	YES	YES	YES
H	Price Variation Trade	NO	NO	NO	NO	NO	YES
I	Odd Lot Trade	NO	NO	NO	NO	NO	YES
K	Rule 127 (NYSE Only) *or* Rule 155 (NYSE American only)	YES	YES	#4	YES	YES	YES
L	Sold Last (Late Reporting)	#3	YES	#4	YES	YES	YES
M	Market Center Official Close	NO	NO	NO	YES	YES	NO
N	Reserved	NO	NO	NO	NO	NO	TBD
O	Market Center Opening Trade	YES	YES	YES	YES	YES	YES
P	Prior Reference Price	#2	YES	#4	#2	YES	YES
Q	Market Center Official Open	NO	NO	YES	NO	YES	NO
R	Seller	NO	NO	NO	NO	NO	YES
T	Extended Hours Trade	NO	NO	NO	NO	NO	YES
U	Extended Hours Sold (Out Of Sequence)	NO	NO	NO	NO	NO	YES
V	Contingent Trade	NO	NO	NO	NO	NO	YES
X	Cross/ Periodic Auction Trade	YES	YES	#4	YES	YES	YES
Z	Sold (Out Of Sequence)	#2	YES	#4	#2	YES	YES
4	Derivatively Priced	#2	YES	#4	#2	YES	YES
5	Market Center Reopening Trade	YES	YES	#4	YES	YES	YES
6	Market Center Closing Trade	YES	YES	#4	YES	YES	YES
7	Qualified Contingent Trade	NO	NO	NO	NO	NO	YES
8	Reserved	NO	NO	NO	NO	NO	TBD
9	Corrected Consolidated Close Price as per Listing Market	YES	YES	NO	NO	NO	NO

FIELD DESCRIPTIONS

SALE CONDITION, *continued*

Deviations from a trade's qualification for the Open, Last, High and Low calculations both on a Consolidated and individual Participant basis are denoted with a number (i.e., **Notes #2, #3 and #4)** in the above calculation chart and are described below:

'OPEN', 'LAST', 'HIGH', 'LOW' CALCULATIONS

Note 1 *(currently not in use for any sale condition)*	*YES***,** if it is the only qualifying last; *OR* If it is that Participant's first qualifying last; OTHERWISE *NO*
Note 2	*YES***,** if it is the only qualifying last; OTHERWISE *NO*
Note 3	*YES,* if it is the only qualifying last; *OR* If it is from the same participant as the last; *OR* If it is from the LISTING MARKET for that Security; OTHERWISE *NO*
Note 4	*YES,* if it is the first qualifying or only qualifying trade of the day; OTHERWISE *NO*.

In instances of multiple sale conditions, the following criteria will be used to determine the impact of the Sale Conditions on the Open, Last, High, and Low calculations both on a Consolidated and individual Participant basis:

MULTIPLE SALE CONDITION 'OPEN', 'LAST', 'HIGH', 'LOW' CALCULATIONS

- If all of the Sale Conditions indicate that the trade qualifies, it **will** be included in the calculations.

- If **any one or all** of the Sale Conditions indicate '**NO**', the trade **does not qualify**, the '**NO**' takes precedence and the trade **will not** be included in the calculations.

- If **all** of the Sale Conditions indicate that the trade qualifies, including a Sale Condition whose criteria deviates from a trade's qualification (i.e., above **Notes #2, #3 and #4**) the trade qualifies, the 'Note Criteria' takes precedence and the trade **will** be included in the calculations.

FIELD DESCRIPTIONS

Field Name	Length	Description
Sale Condition, *continued*	1 or 4	Char. or Char [4]. Denotes a particular condition applicable to the trade. The Short Trade format 'Sale Condition Category' field identifies the Category 1, 2, 3 or 4 level associated with a trade.

The Multicast Output four (4) Char Sale Condition field is **Char specific** whereby a Sale Condition from Category 1 should be in the first Char position, a Sale Condition from Category 2 should be in the second Char position, a Sale Condition from Category 3 should be in the third Char position and a Sale Condition from Category 4 should be in the fourth Char position. If a Sale Condition is not required from any one of the categories, the unused Sale Condition Char should be space-filled. The Category hierarchy in the 4 Char Sale Condition field is currently as follows:

Category 1 Settlement Type	Category 2 Reason for Trade-Through Exemption / Other Reason	Category 3 Extended Hours / Sequence Type	Category 4 SRO Trade Detail
Space (Regular Settlement)	**Space** (No Trade Through Exempt Reason)	**Space** (Not Extended Hours or Sold Out of Sequence)	**Space** (No SRO Required Trade Detail)
C Cash Trade (Same Day Clearing)	**F** Inter-market Sweep Order	**L** Sold Last (Late Reporting)	**B** Average Price Trade
N Reserved	**O** Market Center Opening Trade	**T** Extended Hours Trade	**E** Automatic Execution
R Seller	**4** Derivatively Priced	**U** Extended Hours Sold (Out of Sequence)	**H** Price Variation Trade
	5 Market Center Reopening Trade	**Z** Sold (Out of Sequence)	I Odd Lot Trade
	6 Market Center Closing Trade		**K** Rule 127 (NYSE only) or Rule 155 (NYSE American only)
	7 Qualified Contingent Trade		**M** Market Center Official Close
	8 Reserved		**P** Prior Reference Price
	9 Corrected Consolidated Close Price as per Listing Market		**Q** Market Center Official Open
			V Contingent Trade
			X Cross / Periodic Auction Trade

FIELD DESCRIPTIONS

SALE CONDITION, *continued*

Reference below for the impact of the above sale conditions on the Consolidated High/Low/Last and Participant Open/High/Low/Last price calculations.

Note 1:
- Sale Conditions within the same category are mutually exclusive (e.g., Sale Conditions C or R **cannot** be used in combination).

Note 2:
- Sale Condition U (Extended Hours Sold – Out of Sequence) cannot be used in combination with any of the Sale Conditions listed in Category 2 – Reason for Trade-Through Exemption (Rule 611).

Note 3:
- Sale Conditions L (Sold Last – Late Reporting), O (Market Center Opening Trade), P (Prior Reference Price), and Z (Sold – Out of Sequence), are mutually exclusive of each other (i.e., these sale conditions cannot be used in combination).

SALE CONDITION, *continued*

Rule 611- Trade Reporting Matrix

			TTE Field	Sales Condition Field			
Rule	Short Name	Description	611 Exemption	Settlement Type	Reason for 611 Exemption	Extended Hours/Sold	SRO Required Detail
			Level 1	Level 2	Level 3	Level 4	Level 5
611b1	Self Help	The transaction that constituted the trade-through was effected when the trading center displaying the protected quotation that was traded through was experiencing a failure, material delay, or malfunction of its systems or equipment.	YES	N/A	N/A	N/A	TBD by each SRO
611b2	Not Regular Way	The transaction that constituted the trade-through was not a "regular way" contract.	YES	YES	N/A	N/A	TBD by each SRO
611b3	Single Price Opening	The transaction that constituted the trade-through was a single-priced opening transaction by the trading center.	YES	N/A	**O** MARKET CENTER OPENING TRADE	N/A	TBD by each SRO
611b3	Single Price Reopening	The transaction that constituted the trade-through was a single-priced reopening transaction by the trading center.	YES	N/A	**5** MARKET CENTER REOPENING TRADE	N/A	TBD by each SRO
611b3	Single Price Closing	The transaction that constituted the trade-through was a single-priced closing transaction by the trading center.	YES	N/A	**6** MARKET CENTER CLOSING TRADE	N/A	TBD by each SRO
611b4	Crossed Market	The transaction that constituted the trade-through was executed at a time when a protected bid was priced higher than a protected offer in the NMS stock.	YES	N/A	N/A	N/A	TBD by each SRO
611b5	Inter-market Sweep	The transaction that constituted the trade-through was the execution of an order identified as an inter-market sweep order.	YES	N/A	**F** INTERMARKET SWEEP	N/A	TBD by each SRO
611b6	Inter-market Sweep	The transaction that constituted the trade-through was effected by a trading center that simultaneously routed an inter-market sweep order to execute against the full displayed size of any protected quotation in the NMS stock that was traded through.	YES	N/A	**F** INTERMARKET SWEEP	N/A	TBD by each SRO

SALE CONDITION, *continued*

Rule 611- Trade Reporting Matrix, *continued*

Rule	Short Name	Description	TTE Field	Sales Condition Field			
			611 Exemption	Settlement Type	Reason for 611 Exemption	Extended Hours/Sold	SRO Required Detail
			Level 1	Level 2	Level 3	Level 4	Level 5
611b7	Derivatively Priced	The transaction that constituted the trade-through was the execution of an order at a price that was not based, directly or indirectly, on the quoted price of the NMS stock at the time of execution and for which the material terms were not reasonably determinable at the time the commitment to execute the order was made.	YES	N/A	**4** DERIVATIVELY PRICED	N/A	TBD by each SRO
611b9	Stopped Stock	The transaction that constituted the trade-through was the execution by a trading center of an order for which, at the time of receipt of the order, the trading center had guaranteed an execution at no worse than a specified price (a "stopped order"), where: (i) The stopped order was for the account of a customer; (ii) The customer agreed to the specified price on an order-by-order basis; and (iii) The price of the trade-through transaction was, for a stopped buy order, lower than the national best bid in the NMS stock at the time of execution or, for a stopped sell order, higher than the national best offer in the NMS stock at the time of execution.	YES	N/A	**4** DERIVATIVELY PRICED	N/A	TBD by each SRO

FIELD DESCRIPTIONS

Field Name	Length	Description
Sale Condition Category	1	Char. In the Short Trade format, identifies the Sale Condition Category level associated with a trade. Sale Condition Categories are defined in the 'Sale Condition' field description. <table><tr><th>Code</th><th>Value</th></tr><tr><td>Space</td><td>Sale Condition Category Not Applicable</td></tr><tr><td>1</td><td>Sale Condition Category 1</td></tr><tr><td>2</td><td>Sale Condition Category 2</td></tr><tr><td>3</td><td>Sale Condition Category 3</td></tr><tr><td>4</td><td>Sale Condition Category 4</td></tr></table>
Security Status	1	Char. Identifies the trading status applicable to the transaction. <table><tr><th>Code</th><th>Value</th></tr><tr><td>Space</td><td>Security Status Not Applicable</td></tr><tr><td>1*</td><td>Reserved</td></tr><tr><td>2</td><td>Trading Halt</td></tr><tr><td>3</td><td>Resume</td></tr><tr><td>4*</td><td>Reserved</td></tr><tr><td>5</td><td>Price Indication</td></tr><tr><td>6</td><td>Trading Range Indication</td></tr><tr><td>7</td><td>Market Imbalance Buy</td></tr><tr><td>8</td><td>Market Imbalance Sell</td></tr><tr><td>9</td><td>Closing Imbalance Buy</td></tr><tr><td>A</td><td>Closing Imbalance Sell</td></tr><tr><td>B*</td><td>Reserved</td></tr><tr><td>C</td><td>No Market Imbalance</td></tr><tr><td>D</td><td>No Closing Imbalance</td></tr><tr><td>E</td><td>Short Sale Restriction</td></tr><tr><td>F</td><td>Limit Up-Limit Down</td></tr></table>* Reserved Codes are currently not in use **Note 1**: Last Price is provided when the Security Status is a Trading Halt, Price Indication or Trading Range Indication. Market Imbalances and Closing Imbalances contain either buy or sell volumes. The remaining security status values are <u>not</u> accompanied by either price or volume data. **Note 2**: 'Limit Up-Limit Down' (LULD) code will be used in conjunction with 'LULD Indicator' field, to further identify the LULD action (e.g., Price Bands, National Best Bid/Offer Limit State Entered/Exited) related to a security.

FIELD DESCRIPTIONS

Field Name	Length	Description
Security Symbol	5 or 11	Char [5] or Char [11]. Left justified, space-filled. Identifies the Security Symbol. CTS will allow for a base or root symbol to consist of from one (1) up to six (6) characters with the remaining characters in the security symbol field available for possible suffixes. Suffixes start with one of the following characters with no embedded spaces: (1) ASCII Period (.), (2) lower case p, (3) lower case r, or (4) lower case w. **Identification of Test Data:** The purpose of a Test Message is to have a mechanism whereby end-to-end connectivity and functionality between the CTS Participant and Data Recipient can be tested prior to the opening or during the trading day. Messages with any of the dedicated Test Symbols will be included in Participant statistics (e.g., Open/High/Low/Last calculations), but will be excluded in volume counts, trade counts, etc. Start and End of Day Summary messages will be generated for dedicated test symbols. Alphanumeric Test Symbols are <u>Reserved for future use</u>.

Listing Exchange	Test Symbol
NYSE	CBO
	CBX
	NTEST
	01N thru 12N
NYSE American	CTEST
	ATEST
	01A thru 12A
NYSE Arca	IGZ
	ZVV
	ZZK
	ZZZ
	PTEST
	01P thru 12P
NYSE Texas	MTEST
Cboe BZX	ZBZX
	ZTEST
	ZTST
	01Z thru 12Z
IEX	ZIEXT
	ZEXIT
	ZXIET
	01V thru 12V

FIELD DESCRIPTIONS

Field Name	Length	Description
Sell Volume	4	Integer. Integer has a maximum volume of 4,294,967,295. Optional set to zero. Represents the reported imbalance of sell orders without matching buy orders for the security for a Participant.
Seller's Sale Days	1	Byte. Allowed values of Seller's Sale Days is 2 through 60 days. Optional set to zero. Sale Condition must be 'R' when specifying the Seller's Sale Days on a trade. Seller's Sale Days is not less than two business days after trade date and not more than sixty days after trade date. Specifies the number of days that may elapse before delivery of the security.
Short Sale Restriction Indicator	1	Char. Identifies whether or not a Short Sale Restriction is in effect for a security. A Short Sale Restriction is to be in effect if a security's price decreases by 10% or more from the previous day's closing price. Once activated, the Short Sale Restriction will remain in effect for the remainder of the day as well as the following day, unless deactivated.

Code	Value
Space	Short Sale Restriction Not in Effect
A	Short Sale Restriction Activated
C	Short Sale Restriction Continued
D	Short Sale Restriction Deactivated
E	Short Sale Restriction in Effect

FIELD DESCRIPTIONS

Field Name	Length	Description
Stop Stock Indicator	1	Char. The transaction that constituted the trade-through was the execution by a trading center of an order for which, at the time of receipt of the order, the trading center had guaranteed an execution at no worse than a specified price (a 'stopped order'). <table><tr><th>Code</th><th>Value</th></tr><tr><td>0</td><td>Stop Stock Not Applicable</td></tr><tr><td>1</td><td>Stop Stock</td></tr></table>
Test	1	Char. Identifies whether the security symbol is a test symbol <table><tr><th>Code</th><th>Value</th></tr><tr><td>0</td><td>Not a test symbol</td></tr><tr><td>1</td><td>Test symbol</td></tr></table>
Tick	1	Char. Represents for a Participant the upward, downward or unchanged price movement in a security's trades: <table><tr><th>Code</th><th>Value</th></tr><tr><td>Space</td><td>Tick Not Applicable</td></tr><tr><td>1</td><td>+</td></tr><tr><td>2</td><td>-</td></tr><tr><td>3</td><td>0+</td></tr><tr><td>4</td><td>0-</td></tr></table> **Note 1**: For values 3 & 4, if the price of the last sale is unchanged from the previous last sale for that security, the tick reflects a zero in addition to the tick of the previous last sale that changed. **Note 2**: In instances when no trades qualify to be included in the tick calculation, the tick will reflect the most current calculated tick which may be the previous days' tick. **Note 3**: In instances when no trades qualify to be included in the tick calculation and <u>no</u> previous close exists, the tick will reflect a plus (+).

FIELD DESCRIPTIONS

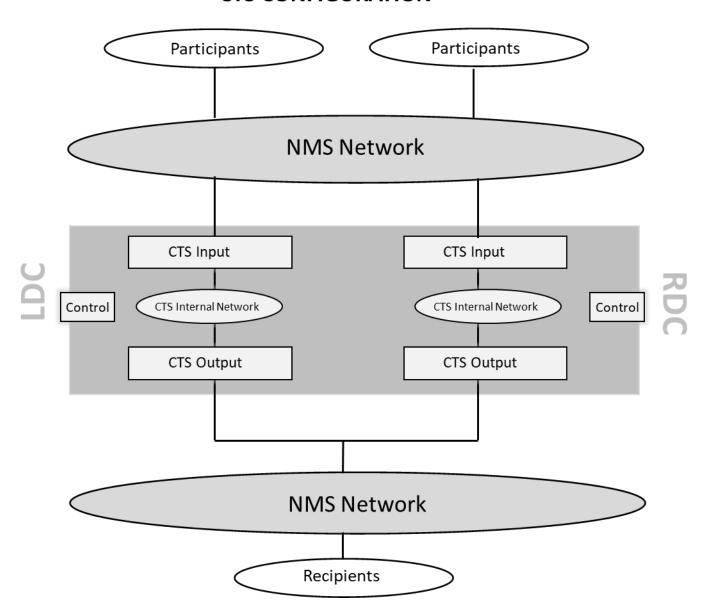| Field Name	Length	Description

Timestamp 2	8	2 x Integer (pair of Integers).
		Optional set to zero.
		
		Timestamp 2 is a FINRA Alternative Display Facility (ADF) or a FINRA Trade Reporting Facility-provided timestamp represented in nanoseconds since Epoch. The first integer contains the number of seconds from Epoch 1/1/1970, 00:00:00 UTC. The next integer contains the nanosecond portion of the time (e.g., 972402315). If Timestamp 2 is not provided, this field will be set to zero. For any messages generated by CTS, e.g., Messages generated on behalf of a Participant, Price Band messages, Administrative messages, Control messages and Market Status messages, the Timestamp 2 field will be set to zero.
		
		▪ **If from an Exchange: Timestamp 2** field will be set to zero.
		
		▪ **If from the FINRA Alternative Display Facility (ADF) or a FINRA Trade Reporting Facility:**
		
		    ▪ **If the FINRA ADF or a FINRA TRF** provides a proprietary feed of trades reported by the facility, then the FINRA facility will publish the time of the transmission as also published on the facility's proprietary trade feed. The ADF or TRF shall provide such times to the Processor in nanoseconds since Epoch.
		
		    ▪ **If the FINRA ADF or a FINRA TRF facility** does **not** have a proprietary trade feed then the Timestamp 2 field will be set to zero.

FIELD DESCRIPTIONS

Field Name	Length	Description
Total Trades	4	Integer. Integer has a maximum volume of 4,294,967,295. Optional set to zero. Contains the total number of trade transactions executed from a Market Center.
Total Volume	4 or 8	4 Integer. Integer has a maximum volume of 4,294,967,295. 8 Long. Long have a maximum volume of 184,467,440,737,095,516. Integer or Long Optional set to zero. Contains Total Volume of shares traded in a security either on a Consolidated or an individual Participant basis at the time it is disseminated.
Trade Price	2 or 8	2 Short. Short have implied 2 decimal places and a maximum price of $655.35. 8 Long. Long have implied 6 decimal places and a maximum price of $18,446,744,073,709.551615. Short or Long Optional set to zero. Represents the monetary value of an individual share of security at the time of the trade.

FIELD DESCRIPTIONS

Field Name	Length	Description
Trade Reporting Facility ID	1	Char. Space-filled. Identifies the Participant with whom a Trade Reporting Facility (TRF) has been formed. In cases of Bonds and Local Issues, which are <u>not</u> eligible for TRF transactions, the TRF Identifier field will be Space-filled.

Code	Value
Space	TRF Not Applicable
A	Not Currently Active
B	FINRA / NASDAQ TRF Chicago
C	Not Currently Active
D	Not Currently Active
I	Not Currently Active
J	Not Currently Active
K	Not Currently Active
M	Not Currently Active
N	FINRA / NYSE TRF
P	Not Currently Active
T	FINRA / NASDAQ TRF Carteret
V	Not Currently Active
W	Not Currently Active
X	Not Currently Active
Y	Not Currently Active
Z	Not Currently Active

FIELD DESCRIPTIONS

Field Name	Length	Description
Trade Through Exempt Indicator	1	Char. Denotes whether or not a trade is exempt (Rule 611) and when used jointly with certain Sale Conditions, will more fully describe the characteristics of a particular trade. **Note**: The Trade Through Exempt Indicator value will <u>not</u> have an effect on whether a trade qualifies for the Consolidated or Participant High, Low, Last and Open calculations. Only the Sale Condition determines if a trade qualifies.
Trade Total Volume	8	Long. Long have a maximum volume of 184,467,440,737,095,516. Optional set to zero. Contains the total number of shares traded for an individual security.
Trade Volume	2 or 4	2 Short. Short have a maximum volume of 65,535. 4 Integer. Integer has a maximum volume of 4,294,967,295. Short or Integer Optional set to zero. Contains the total number of shares traded in a single transaction for an individual security.

For the Trade Through Exempt Indicator, the following code table applies:

Code	Value
0	Not a Trade Through Exemption
1	Trade Through Exemption

APPENDIX A: CTS CONFIGURATION

CTS CONFIGURATION

APPENDIX B: SYMBOL AND INDEX SUFFIX EXAMPLES

	Suffix	Description
A	**.**A	Series (or Class) **A** - *Also* Series **B-Z**
	.A**.**CL	Series **A** Called - *Also* Series **B-Z**
	.A**.**CV	Series **A** Convertible - *Also* Series **B-Z**
	.Aw	Series **A** When Issued - *Also* Series **B-Z**
C	.CL	Called
	.CT	Certificates
	.CV	Convertible
	.CVR	Contingent Value Right
	.CV**.**CL	Convertible Called
D	**.**DP	Amount of most recent dividend to go 'ex- distribution'
	.DV	Accumulated dividend per share net expenses, through and including the previous
E	**.**EC	EMERGING COMPANY MARKETPLACE^{SM}
	.EU	Estimated cash amount per creation unit
F	**.**F**.**N	Foreign News
I	.ID	Index – differentiates an index from a stock with the same root symbol
	.IV	Intra-Day Net Asset Value per share
M	.MN	Mini
N	**.**NV	Net Asset Value per share as at the close on the previous day's close of trading
P	.PO	Percent Paid
	.PP	Partial Paid
	.PT**.**CL	Part Called
	p	Preferred
	pA	Preferred Series **A** - *Also* Series **B-Z**
	pA**.**CV	Preferred Series **A** Convertible - *Also* Series **B-Z**
	pA**.**CL	Preferred Series **A** Called - *Also* Series **B-Z**
	pAw	Preferred Series **A** When Issued - *Also* Series **B-Z**
	pw	Preferred When Issued
	p**.**CL	Preferred Called
	p**.**CV	Preferred Convertible
	p**.**CV**.**CL	Preferred Convertible Called
	p**.**WD	Preferred When Distributed
	pCA	Indicates Class **A** of a Second Category of Preferred - *Also* Class **B-K** and **M-S**
R	r	Rights
	rw	Rights When Issued

APPENDIX B: SYMBOL AND INDEX SUFFIX EXAMPLES

	Suffix	Description
S	**.**SC	Small Corporate - Offering Registration
	.SD	Stamped
	.SM	Mini Settlement
	.SO	Current shares outstanding in thousands
	.SP	Special
	.SV	Settlement
T	**.**TC	Total cash amount per creation unit
	.TT	Tier II Securities
U	**.**U	Units – (A combination of securities composed of two or more warrants, common stocks, preferred stocks and/or bonds.)
V	**.**VR	Variable Common Right
W	**.**WD	When Distributed
	w	When Issued
	.WS	Warrants
	.W**.**WS	With Warrants
	.WS**.**A	Warrants Series **A** - *Also* Series **B-Z**
	.WSw	Warrants When Issued

Note:
- Any combination of suffixes can be represented. Root Symbols for Government Bonds, e.g., TB, TN, US and ZC, and root symbols for Corporate Bonds, e.g., GMC are always followed by a three (3) upper case character suffix.
- Suffixes start with one of the following characters with no embedded spaces: a) ASCII Period ('**.**'); b) Lower case 'p'; c) Lower case 'r'; d) Lower case 'w'.

APPENDIX C: GLOSSARY

Term	Description
Automatic Execution	A sale condition code that identifies a NYSE trade that has been automatically executed without the potential benefit of price improvement.
Average Price Trade	A trade where the price reported is based upon an average of the prices for transactions in a security during all or any portion of the trading day.
Below Continuing Listing Standards	A financial status designation pertaining to Tape 'A' and Tape 'B' listed securities. The status identifies a company, whose issue has failed to meet established listings standards. The listing exchange will subsequently review the appropriateness of continuing to list the issue, and may decide to commence the process of delisting the issue.
Cash Trade	A transaction which requires delivery of securities and payment on the same day the trade takes place.
Closing Price	The Participant Closing Price represents the last qualifying trade paid for a security by a Participant during the trading day.
Contingent Trade	A Sale Condition code used to identify a transaction where the execution of the transaction is contingent upon some event.
Corrected Consolidated Close Price as per Listing Market	A transaction executed by the Listing Market to establish the official Consolidated Last Price as indicated by the Listing Exchange.
Cross/ Periodic Auction Trade	Indicates that the trade resulted from a Market Center's crossing session or auction trade.
Crossed Market	The transaction that constituted the trade-through was executed at a time when a protected Bid was priced higher than a protected offer in the security.

APPENDIX C: GLOSSARY

Term	Description
CTA Eligible Equity	Generally, any common stock, long-term warrant or preferred stock which becomes registered on any national securities exchange or is admitted to unlisted trading privileges thereon and which at the time of such registration or at the commencement of such trading substantially meets the original listing requirements of the NYSE or the NYSE American for such securities.
Derivatively Priced	The transaction that constituted the trade-through was the execution of an order at a price that was not based, directly or indirectly, on the quoted price of the security at the time of execution, and for which the material terms were not reasonably determinable at the time the commitment to execute the order was made (REG NMS 611b7).
Dollar Value	The whole and decimal portion, if any, of the total dollar worth of the total daily trade transactions.
Extended Hours Trade	Identifies a trade that was executed outside of regular primary market hours and is reported as an extended hours trade.
Extended Hours Sold (Out of Sequence)	Identifies a trade that takes place outside of regular market hours and is reported as an extended hours trade out of sequence and at a time different from the actual transaction time.
Indication	An approximation of what a security's opening or reopening price range (Bid and Offer prices, no sizes) will be when trading resumes after a delayed opening or after a trading halt.
Inter-Market Sweep Order	The transaction that constituted the trade-through was the execution of an order identified as an Inter-market Sweep Order.

APPENDIX C: GLOSSARY

Term	Description
Late Filing	A financial status designation pertaining to Tape 'A' and Tape 'B' issues (i.e. issues listed on the NYSE, the NYSE American or on one of the Regional exchanges). The status identifies a company, which has failed to meet established listings standards for filing its annual reports.
Limit State	Indicates that a National Best Bid is equal to the Upper Limit Price Band, or that a National Best Offer is equal to the Lower Limit Price Band.
Limit Up-Limit Down (LULD) Price Bands	The Limit Up-Limit Down Price Band represents a price range which is set at a percentage level above and below the average price of a security over the immediately preceding five (5) minute period. Price Bands prevail for a minimum of thirty (30) seconds. During a Limit State Price Bands will not be disseminated and will recommence when Limit State is terminated. For further details related to Limit Up-Limit Down, reference the following: http://www.sec.gov/rules/sro/nms/2012/34-67091.pdf
Limit Up-Limit Down (LULD) Reference Price	Indicates the Reference Price provided by the listing exchange for LULD Price Band calculation when the listing exchange opens (reopens) a security symbol either with a quote or with a trade.
Limit Up-Limit Down (LULD) Trading Pause	Denotes a five-minute regulatory trading halt (pause) for an individual security that does not exit a Limit State within 15 seconds.
Local Issue	A Local Issue is an issue that does not meet NYSE American Stock Market or NYSE listing requirements (is not CTA eligible) but is traded at one or more Regional Exchanges. Local Issues are included in the CTS database.
Market Center Closing Trade	The transaction that constituted the trade-through was a single priced closing transaction by the Market Center (REG NMS Rule 611b3).
Market Center Official Close	Indicates the 'Official' closing value as determined by a Market Center. This transaction report will contain the market center generated closing price.
Market Center Official Open	Indicates the 'Official' opening value as determined by a Market Center. This transaction report will contain the market center generated opening price.

APPENDIX C: GLOSSARY

Term	Description
Market Center Opening Trade	The trade that constituted the trade-through was a single priced opening transaction by the Market Center (REG NMS Rule 611b3).
Market Center Reopening Trade	The trade that constituted the trade-through was a single priced reopening transaction by the Market Center (REG NMS Rule 611b3).
Market Imbalance Buy	A 50,000 share or more excess of market orders to buy over market orders to sell as of 9:00 a.m. on expiration days.
Market Imbalance Sell	A 50,000 share or more, excess of market orders to sell over market orders to buy as of 9:00 a.m. on expiration days.
Closing Imbalance Buy	Excess closing auction interest to buy, above a pre-defined threshold as determined by the primary listing market.
Closing Imbalance Sell	Excess closing auction interest to sell, above a pre-defined threshold as determined by the primary listing market.
Market-Wide Circuit Breaker Level 1 – 7% Breached	This regulatory Trading Halt is used to denote that trading is suspended due to the S&P 500 Index reaching a 7% decline level below its closing value on the previous trading day. A Level 1 Market-Wide Circuit Breaker Regulatory Trading Halt would operate as follows: - Before 3:25 p.m. ET – duration 15 minutes - At or after 3:25 p.m. ET – trading shall continue unless there is a Level 3 Market-Wide Circuit Breaker Regulatory Trading Halt.
Market-Wide Circuit Breaker Level 2 – 13% Breached	This regulatory Trading Halt is used to denote that trading is suspended due to the S&P 500 Index reaching a 13% decline level below its closing value on the previous trading day. A Level 2 Market-Wide Circuit Breaker Regulatory Trading Halt would operate as follows: - Before 3:25 p.m. ET – duration 15 minutes - At or after 3:25 p.m. ET – trading shall continue unless there is a Level 3 Market-Wide Circuit Breaker Regulatory Trading Halt.

APPENDIX C: GLOSSARY

Term	Description
Market-Wide Circuit Breaker Level 3 – 20% Breached	This regulatory Trading Halt is used to denote that trading is suspended due to the S&P 500 Index reaching a 20% decline level below its closing value on the previous trading day. A Level 3 Market-Wide Circuit Breaker Regulatory Trading Halt would operate as follows: At any time during regular trading hours, trading shall Halt and not Resume for the remainder of the trading day.
Mixed Lot	Number of shares greater than the symbol lot size, but not an exact multiple of the lot size. Mixed Lot is also known as 'PRL' or 'partial round lot' order and is comprised of a round lot order and an odd lot order. As an example, for a symbol with round-lot size of 40, Mixed Lot size can be 41-79, 81-119 and so on.
No Market Imbalance	Indicates that the imbalance of market orders for a security is less than 50,000 shares as of 9:00 a.m. on expiration day.
No Closing Imbalance	Excess closing auction interest to sell, above a pre-defined threshold as determined by the primary listing market.
Non-Regulatory Halt or Delay	An operational Trading Halt for a Participant due to Order Imbalance or Operational.
Not-Regular Way	The transaction that constituted the trade-through was not a 'regular way' contract.

APPENDIX C: GLOSSARY

Term	Description
Odd Lot	Odd lot size for a symbol is considered to be any number of shares _less than_ the symbol round lot size. As an example, for a symbol with round-lot size of 40, Odd Lot size can be 1-39.
One or Two Point Rule	A trade must receive Floor Official approval and be published on the tape as 'opened' or 'sold last' if it is: • one point or more away from the last sale when the last sale is under $20.00; **or** • two points or more away from the last sale when the last sale is $20.00 or more
Opening/Reopening Trade Detail	An Opening/Reopening Trade Detail report indicates the trade was included as part of an opening or reopening transaction previously reported by a Participant on an aggregate basis.
Operational	Denotes a non-regulatory Trading Halt. The ability to trade a security by a Participant is temporarily inhibited due to technical reasons.
Order Imbalance	Denotes a non-regulatory halt condition where there is a significant imbalance of buy or sell orders.
Price Indication	Reflects an approximate price range of what a security's trading range (Bid and Offer prices) will be when trading resumes after a Trading Halt.
Price Variation Trade	Indicates a regular market session trade transaction that carries a price that is significantly away from the prevailing consolidated or primary market value at the time of the transaction.
Prior Reference Price	A sale condition that identifies a trade based on a price at a prior point in time, i.e., more than 90 seconds prior to the time of the trade report. The execution time of the trade will be the time of the prior reference price.
Qualified Contingent Trade	A transaction consisting of two or more component orders executed as agent or principal where the execution of one component is contingent upon the execution of all other components at or near the same time and the price is determined by the relationship between the component orders and not the current market price for the security.
Regular Sale	A trade made without stated conditions is deemed regular way for settlement on the third business day following the transaction date.

APPENDIX C: GLOSSARY

Term	Description
Regulatory Halt - Additional Information Requested	Denotes a regulatory trading halt when the primary market has requested additional information from the issuer of the security. Trading is suspended until the primary market has received and reviewed the requested information.
Regulatory Halt - Corporate Action	Denotes a regulatory trading halt when the primary market determines a halt is necessary pending the outcome of a Corporate Action event. Trading is suspended until the results of the Corporate Action are confirmed and the security if suitable for trading.
Regulatory Halt - ETF Component Prices Not Available	Denotes a regulatory trading halt when a significant percentage of an ETF's weight is invested in components in which pricing is not available. Trading is suspended until the primary market determines that such condition no longer exists.
Regulatory Halt - Intraday Indicative Value Not Available	Denotes a regulatory trading halt when the Intraday Indicative Value of an ETF is not being disseminated or is being disseminated incorrectly. Trading is suspended until the primary market determines that such condition no longer exists.
Regulatory Halt - Merger Effective	Denotes a regulatory trading halt in connection with a security being suspended in connection with a merger. Trading is suspended indefinitely.
Regulatory Halt - New Security Offering	Denotes a regulatory trading halt in connection with a new security offering. Trading is suspended until the new security is admitted to trading on the primary listing exchange during the primary trading session.
Regulatory Halt - News Pending	Denotes a regulatory Trading Halt due to an expected news announcement, which may influence the security. A Trading Halt may be continued once the news has been disseminated.
Regulatory Halt - News Released	Denotes a regulatory trading halt when relevant news influencing the security is being disseminated. Trading is suspended until the primary market determines that an adequate time has passed to allow for full dissemination of the news into the market.
Regulatory Halt - Regulatory Concern	Denotes a regulatory trading halt due to an ongoing regulatory concern regarding the suitability of trading in a security. Trading is suspended until the primary market determines the security is suitable for trading

APPENDIX C: GLOSSARY

Term	Description
Resume	Indicates that trading for a Participant is no longer suspended in a security which had been Halted.
Round Lot	Number of shares that is equal to or an exact multiple of the symbol Round Lot Size.
Rule 127 Trade (NYSE)	To qualify as a NYSE Rule 127 the trade is executed outside the present quote and meets one or both of the following conditions: 1. has a volume of 10,000 shares or more *and/or* 2. has a dollar value of $200,000 or more.
Rule 155 Trade (NYSE American)	To qualify as a NYSE American Rule 155, from time to time, a specialist may arrange for the sale, or purchase, of a block of security, or other large number of shares of securities, at a single "clean-up" price. Generally such a sale or purchase is outside of the current market. Such sale or trade is designated as a Rule 155 trade.
Self Help	The transaction that constituted the trade-through was effected when the market center displaying the protected quotation that was traded through was experiencing a failure, material delay or malfunction of its systems or equipment.
Seller	A Seller's Option transaction gives the seller the right to deliver the security at any time within a specific period, ranging from not less than two calendar days, to not more than sixty calendar days. A security offered "Seller's Option" may command a lesser price than if offered "Regular Way".
Short Sale Restriction	A restriction designed to control short selling from further driving down the price of a security any day in which the price declines by 10% or more from the previous day's closing price. Once the Short Sale Restriction is activated, a Short Sale Restriction would be in effect in that security for the remainder of the day as well as the following day, unless deactivated.

APPENDIX C: GLOSSARY

Term	Description
Single-Priced Opening	The transaction that constituted the trade-through was a single-priced opening transaction by the market center.
Single-Priced Reopening	The transaction that constituted the trade-through was a single-priced reopening transaction by the market center.
Single-Priced Closing	The transaction that constituted the trade-through was a single-priced closing transaction by the market center.
Sold	Sold is used when a trade is printed (reported) out of sequence and at a time different from the actual transaction time.
Sold Last	Sold Last is used when a trade prints in sequence but is reported late or printed in conformance to the One or Two Point Rule.
Stock-Option Trade	Stock-Option Trade is used to identify cash equity transactions which are related to options transactions and therefore potentially subject to cancellation if market conditions of the options leg(s) prevent the execution of the stock-option order at the price agreed upon.
Stopped Stock	The transaction that constituted the trade-through was the execution by a trading center of an order for which, at the time of receipt of the order, the trading center had guaranteed an execution at no worse than a specified price (a "stopped order"), where: (i) The stopped order was for the account of a customer;(ii) The customer agreed to the specified price on an order-by-order basis; and (iii) The price of the trade-through transaction was for a stopped buy order lower than the National Best Bid in the security at the time of execution, or for a stopped sell order higher than the National Best Offer in the security at the time of execution.
Sub-Penny Trading	Indicates a non-regulatory Trading Halt for an NYSE security whose price may fall below $1.05, possibly leading to a sub-penny execution.
Trading Halt	A temporary halt in the trading of a particular security by a Participant.
Trading Range Indication	Denotes the probable trading range (Bid and Offer prices, no sizes) of a security that is not Trading Halted. The Trading Range Indication is used prior to or after the opening of a security.

APPENDIX D: SUMMARY OF DAILY CTS MULTICAST LINE ACTIVITY

Time Ranges shown have approximate end times indicated, are dependent on daily traffic volume and are subject to change based on a Participant's hours of operation. Times are represented in *Eastern Time* (ET).

Time (ET)	Transmission / Events
00:20	Line Integrity Messages*
01:30	Start of Day – Control Message
01:30 – 20:05	Symbol Reference Data Trading Status Messages (Trading Halt, Trading Range Indication, Price Indication, Short Sale Restriction, Resume) Administrative messages Control Messages Index Messages Market Status Messages Auction Status Messages Trade Messages Cancel/Error Messages Correction Messages Prior Day Messages Retransmission Messages Test Data**
03:45 (Iteration 1) 07:45 (Iteration 2)	Consolidated Start of Day Summary Message Participant Start of Day Summary Message
04:00	*OFFICIAL MARKET OPEN: NASDAQ, NYSE ARCA, Cboe EDGX, Cboe BZX, MIAX Pearl & 24X*
07:00 (Iteration 1) 08:00 (Iteration 2)	Market-Wide Circuit Breaker (MWCB) Decline Level – Market Status Message
07:00	*OFFICIAL MARKET OPEN: Cboe BYX, Cboe EDGA, NYSE Texas, NASDAQ OMX BX, NYSE American, NYSE National & MEMX*
08:00	*OFFICIAL MARKET OPEN: FINRA ADF, IEX, NASDAQ OMX PSX & LTSE*
09:30	Market Open
09:30	*OFFICIAL MARKET OPEN: NYSE*
09:30 – 16:00	LULD Price Band Messages
16:00	*OFFICIAL MARKET CLOSED: NYSE*

*   Line Integrity Messages are transmitted at frequent intervals, with at least one message published no later than ten (10) seconds throughout the day, starting when the CTS multicast lines are brought up and ending when the CTS multicast lines are brought down.

**   Test Data for Test Symbols is disseminated after the Start of Day message and continues throughout the day up till End of Day message.

APPENDIX D: SUMMARY OF DAILY CTS MULTICAST LINE ACTIVITY, *continued*

Time (ET)	Transmission / Events
16:11 (Iteration 1) 16:50 (Iteration 2) 17:40 (Iteration 3) 18:40 (Iteration 4) 20:02 (Iteration 5)	Approximate Adjusted Volume Market Center – Market Status Message
16:15 (Iteration 1) 17:05 (Iteration 2) 18:40 (Iteration 3) 20:04 (Iteration 4)	Consolidated End of Day Summary Messages Participant End of Day Summary Messages
17:00	*OFFICIAL MARKET CLOSED: IEX, NASDAQ OMX PSX & LTSE*
18:30	*OFFICIAL MARKET CLOSED: FINRA ADF*
19:00	*OFFICIAL MARKET CLOSED: NASDAQ OMX BX*
20:00	*OFFICIAL MARKET CLOSED: Cboe BYX, Cboe BZX, Cboe EDGA, Cboe EDGX, NASDAQ, NYSE ARCA, NYSE American, NYSE National, NYSE Texas, MEMX, MIAX Pearl & 24X*
20:05	MARKET CLOSED
20:05	End of Day – Control Message

Afterhours Test Data Dissemination:

Note:
- CTS Multicast Data Recipients are reminded that test data dissemination over CTS multicast data feeds can commence as early as **8:30 P.M. ET** and terminate as late as **11:00 P.M**. **ET** during business weekdays and any time during Saturdays, Sundays and Market holidays. This test period is accommodated to allow testing opportunities for Participants and Data Recipients, as well as to provide test time to rectify any production problems that may have occurred the prior business day. Multicast data feed recipients should take the necessary precautions to protect their systems against any adverse impact (e.g., database corruption) if processing data throughout the test dissemination period. During the test period, note that test data can be disseminated over all CTS multicast channels (e.g., Production, Retransmission or Playback Test Group IP addresses).

APPENDIX F: ASCII PRINTABLE TABLE (Character Code 32-126)

ASCII	DEC	Description	ASCII	DEC	Description
<space>	32	Space	Q	81	Uppercase Q
!	33	Exclamation	R	82	Uppercase R
"	34	Double quotes	S	83	Uppercase S
#	35	Number	T	84	Uppercase T
$	36	Dollar	U	85	Uppercase U
%	37	Percent	V	86	Uppercase V
&	38	Ampersand	W	87	Uppercase W
'	39	Single Quote	X	88	Uppercase X
(	40	Open Parenthesis	Y	89	Uppercase Y
)	41	Close Parenthesis	Z	90	Uppercase Z
*	42	Asterisk	[	91	Opening bracket
+	43	Plus	\	92	Backslash
,	44	Comma	]	93	Closing bracket
-	45	Hyphen	^	94	Caret
.	46	Period	_	95	Underscore
/	47	Slash or Divide	`	96	Grave accent
0	48	Zero	a	97	Lowercase a
1	49	One	b	98	Lowercase b
2	50	Two	c	99	Lowercase c
3	51	Three	d	100	Lowercase d
4	52	Four	e	101	Lowercase e
5	53	Five	f	102	Lowercase f
6	54	Six	g	103	Lowercase g
7	55	Seven	h	104	Lowercase h
8	56	Eight	i	105	Lowercase i
9	57	Nine	j	106	Lowercase j
:	58	Colon	k	107	Lowercase k
;	59	Semicolon	l	108	Lowercase l
<	60	Less than	m	109	Lowercase m
=	61	Equals	n	110	Lowercase n
>	62	Greater than	o	111	Lowercase o
?	63	Question mark	p	112	Lowercase p
@	64	At symbol	q	113	Lowercase q
A	65	Uppercase A	r	114	Lowercase r
B	66	Uppercase B	s	115	Lowercase s
C	67	Uppercase C	t	116	Lowercase t
D	68	Uppercase D	u	117	Lowercase u
E	69	Uppercase E	v	118	Lowercase v
F	70	Uppercase F	w	119	Lowercase w
G	71	Uppercase G	x	120	Lowercase x
H	72	Uppercase H	y	121	Lowercase y
I	73	Uppercase I	z	122	Lowercase z
J	74	Uppercase J	{	123	Opening Brace
K	75	Uppercase K	|	124	Vertical Bar
L	76	Uppercase L	}	125	Closing Brace
M	77	Uppercase M	~	126	Equivalency Sign-Tilde
N	78	Uppercase N			
O	79	Uppercase O			
P	80	Uppercase P			