



SECURITIES INDUSTRY AUTOMATION CORPORATION

CTS

CONSOLIDATED TAPE SYSTEM

MULTICAST OUTPUT BINARY SPECIFICATION

**February 14, 2018
Version 1.6**

CONSOLIDATED TAPE SYSTEM (CTS)
MULTICAST OUTPUT BINARY SPECIFICATION

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VERSION HISTORY

Version	Date	Description
1.0	July 1, 2016	Initial Document
1.1	September 15, 2016	<ul style="list-style-type: none"> Added: New Dedicated Test Symbols.
1.2	February 21, 2017	<p><u>Added:</u></p> <ul style="list-style-type: none"> '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. <p><u>Corrected:</u></p> <ul style="list-style-type: none"> '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. <p><u>Eliminated:</u></p> <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> '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: <ul style="list-style-type: none"> '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). <p><u>Modified:</u></p> <ul style="list-style-type: none"> 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.

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VERSION HISTORY

Version	Date	Description
1.2	February 21, 2017 (continued)	<p><u>Modified:</u></p> <ul style="list-style-type: none"> ▪ Length of the ‘Number of Participant’ field. ▪ Index Message usable Data Type representation. ▪ MWCBC 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	<p><u>Added:</u></p> <ul style="list-style-type: none"> ▪ CBOE Stock Exchange, Inc. (CBSX) Participant ID ‘W’ <p><u>Corrected:</u></p> <ul style="list-style-type: none"> ▪ MWCBC Levels implied decimal typo to be implied 6 decimals
1.4	June 2, 2017	<p><u>Added:</u></p> <ul style="list-style-type: none"> ▪ New Dedicated Test Symbols ZIEXT, XEXIT, ZXIET & 01v thru 12V <p><u>Corrected:</u></p> <ul style="list-style-type: none"> ▪ From: Sequence Number / To: Participant Reference Number ▪ From: Reset Message Sequence Number / To: Reset Block Sequence Number
1.5	August 28, 2017	<p><u>Modified:</u></p> <ul style="list-style-type: none"> ▪ 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	<p><u>Modified:</u></p> <ul style="list-style-type: none"> ▪ 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

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 Financial Industry Regulatory Authority (FINRA). 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 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 FINRA 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 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.

1.4 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 Secure Financial Transaction Infrastructure (SFTI) connections to CTS:

- Submit a request at: <http://www.nyxdata.com/Connectivity>
- Contact SFTI Sales at: Sales-SFTI@theice.com
- For supporting SFTI® documentation including Customer and Technical guides visit: www.nyxdata.com/docs.

2.0 GENERAL DESIGN OF DATA DISTRIBUTION NETWORK

The NMS IP Multicast distribution network disseminates all market data and Time Beacon 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, but are not delivered via redundant data streams.

CTS After-Hours Playback Data

There are two sets of IP Multicast data feeds dedicated for after-hours playback test data. One set of IP Multicast data feeds supports the playback of production messages and the other set supports the playback of test messages. This playback data is made available via a single set of multicast data feeds.

Time Beacon

Selected nodes that source multicast data within the NMS IP Multicast distribution network generate a single Time Beacon packet every six seconds. Each node will issue a Time Beacon packet to the same multicast group.

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
<b>NUMERIC – Big-Endian (Network Byte Order)</b>	
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
<b>ALPHA/ALPHANUMERIC/SPECIAL/PRINTABLE</b>	
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 complement

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
<b>Total Length</b>	<b>20</b>	

#### 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 0 for first/initial version.

#### 3.5.2 Block Size

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

### 3.5.3 Block Sequence Number

**Integer.** All transmission blocks are assigned a sequential Block Sequence Number. Rollover occurs after 999,999,999 (a future enhancement will increase the number to 3,999,999,999). 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 by one each time a block is transmitted, with the following exceptions:

1. Retransmitted blocks contain the Block Sequence Number of the original block.
2. The Block Sequence Number field in the Block Header of a Category C Type L (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 numbers rolls over from 999,999,999 (a future enhancement will increase the number to 3,999,999,999) or a number greater than the highest number previously transmitted.
3. The block containing Category C Type A (Start of Day) message has a Block Sequence Number set to zero.
4. The block containing Category C Type T (Line Integrity) message contains the Block Sequence Number of the last block transmitted, which was not a retransmitted block.
5. The block containing Category C Type A (Start of Day) and Category C Type Z (End of Day) which is transmitted three times to ensure positive recognition, contain the same Block Sequence Number in each iteration of the message, one higher than the last non-retransmission message.
6. The block containing Category C Type M (Start of Test Cycle) and Category C Type N (End of Test Cycle) messages has a Block Sequence Number that repeat every cycle.
7. Should CTS experience a line failure and recovery, the Block Sequence Number for the recovered line(s) is reset to a number greater than the last number transmitted and 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 will contain the original time of the Block that was transmitted.

### 3.6 Retransmission Capability

CTS safe-stores all blocks transmitted to the Data Recipients for a single trading day. This safe-store provides a facility for block retransmissions.

If Data Recipients do not receive a block(s), a retransmission of a block(s) 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	M	Start of Test Cycle
C	N	End of Test Cycle
C	A	Start of Day
C	T	Line Integrity
Cycles of test messages are <u>not</u> available for retransmissions.		

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

The Automated Retransmission Facility works in conjunction with the Retransmission and Playback System (RAPS), a server associated with CTS, which supports CTS retransmissions. In addition, RAPS provides data playback capability facilitating test requirements.

A Data Recipient may request automated retransmission(s) by connecting directly through 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 sequence number information. The request will be forwarded to the Automated Retransmission Facility, then to a RAPS server associated with the CTS host, and out to the proper IP multicast groups. 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 block retransmitted contains the original Block Sequence Number.

Retransmissions requested by a Data Recipient will be retransmitted over dedicated retransmission multicast streams. Retransmissions generated by CTS will be retransmitted over the production multicast streams. Retransmissions are sent at a lower message rate in order not to delay transmission of current blocks. Retransmitted blocks are not combined with original messages in the same block.

**Note:**

- It is the responsibility of the Data Recipient to ignore retransmitted blocks 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
<b>Total Length</b>	<b>26</b>	

### 4.1 Message Length

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



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## 4.2 Message Category and Message Type Table

Message Category	Message Type	Value
<b>Administrative</b>		
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	H	Administrative Unformatted (free form text)
<b>Control</b>		
C	A	Start of Day
C	L	Reset Block Sequence Number
C	M	Start of Test Cycle
C	N	End of Test Cycle
C	P	Disaster Recovery Data Center Activation
C	T	Line Integrity
C	Z	End of Day
<b>Index</b>		
I	I	Index
I	Q	Bid and Offer Index
<b>Market Status</b>		
M	K	Market-Wide Circuit Breaker Decline Level Status
M	L	Market-Wide Circuit Breaker Status
M	N	Approximate Adjusted Volume Market Center
M	O	Approximate Trades and Total Dollar Value
M	P	Crossing Session Summary
<b>Prior Day</b>		
P	C	Prior Day Trade Correction
P	T	Prior Day Trade
P	X	Prior Day Trade Cancel/Error
<b>Summary</b>		
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
<b>Trade</b>		
T	A	Auction Status
T	C	Trade Correction
T	L	Long Trade
T	S	Trading Status
T	T	Short Trade
T	X	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	Financial Industry Regulatory Authority, Inc. (FINRA)
I	International Securities Exchange, LLC (ISE)
J	Cboe EDGA Exchange, Inc. (Cboe EDGA)
K	Cboe EDGX Exchange, Inc. (Cboe EDGX)
M	Chicago Stock Exchange, Inc. (CHX)
N	New York Stock Exchange, LLC (NYSE)
P	NYSE Arca, Inc. (NYSE Arca)
S	Consolidated Tape System (CTS)
T	NASDAQ Stock Market, LLC (NASDAQ)
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). If Timestamp 1 is not provided, this field is 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 1 field will be set to zero.

- **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):** Timestamp 1 denotes 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**) through Line 12 (**L12**) for Network 'B' (Cboe BZX, IEX, NYSE ARCA and NYSE American 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.

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

1. Administrative Unformatted (free form text) Category A Type H from NYSE are distributed over Network 'A' L1 only.
2. Administrative Unformatted (free form text) Category A Type H from Participants other than NYSE are distributed over Network 'B' L1 only.
3. Approximate Adjusted Volume Market Center Category M Type N and Approximate Trades and Total Dollar Value Category M Type O from NYSE are distributed over Network 'A' L1 only.
4. Approximate Adjusted Volume Market Center Category M Type N and Approximate Trades and Total Dollar Value Category M Type O from Participants other than NYSE are distributed over Network 'B' L1 only.
5. Bond transactions are distributed over Network 'B' L1-L12.
6. Local Issues transactions are distributed over Network 'B' L1-L12.
7. Control Category 'C' messages are distributed over all Network 'A' and Network 'B' inclusive of Index lines.

Index Messages are routed over two IP multicast lines according to the network and security symbol range distribution as follows:

1. Index Messages are over Network 'B' L1-L2.

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**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	KZZZZZ
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 and NYSE American 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 not occur intraday. Notification may not 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, except for Category A Type H Unformatted (free form text) messages, 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

Administrative Category A messages consist of either the standard Message Header only, or the standard Message Header immediately followed by Unformatted free form text. If the Administrative contains text (printable ASCII characters only), its format depends on the Message Type.

Administrative Category A messages that consist of the **Message Header only** is transmitted to signal the beginning and end of transmission of Summary messages.

### 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 Administrative Unformatted (free form text) Message – Category A Type H

**Varchar [maximum 900].** The Administrative Unformatted (free form text) Category A Type H message is used to provide administrative informational messages. The length of the free form text **cannot** exceed 900 characters. The Administrative Unformatted message is disseminated over the CTS Multicast feed in the same format as it is received from a Participant.

The Administrative Unformatted (free form text) message is also used to report Market Activity (e.g., Volume and Index related activity) to CTS. Administrative messages are disseminated over the CTS Multicast feed in the same format as it is received from a Participant.

Field Name	Length	Type	Value
Text	Maximum 900	Varchar [ ]	Free Form administrative informational message text
<b>Total Length</b>	<b>Maximum 900</b>		

## **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. The Start of Day message is sent three times with a quiescent period of one minute following each of the three transmissions.

The Block Sequence Number field in the Start of Day message always contains a Block Sequence Number set to zero. The Block Sequence Number counter is reset to zero, and is not incremented during the normal Start of Day message transmission.

### **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 Start of Test Cycle – Category C Type M**

The Start of Test Cycle message (transmitted before the Start of Day Category C Type A message is sent) is transmitted to signal the beginning of the transmission of test message cycles. Following the transmission of the Start of Test Cycle message, repeated test message cycles are transmitted.

### **6.2.4 End of Test Cycle – Category C Type N**

The End of Test Cycle message is transmitted to signal the end of the transmission of the repeated free form text test message cycles.

#### **Test Cycle Notes:**

- The purpose of test cycle messages is for Data Recipients to confirm systems and network connectivity.
- The test message cycles are repeated until shortly before transmission of the Start of Day Category C Type A message.
- Each repeated test message cycle contains repeated sequence numbers.



### **6.2.5 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 a Reset Block Sequence Number Category C Type L message.

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.

### **6.2.6 Line Integrity – Category C Type T**

The Line Integrity message is transmitted over the multicast lines at intervals of sixty (60) 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 Block Sequence Number of the last transmitted message.

### **6.2.7 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 of any type transmitted for the day. The message is transmitted three times, with a quiescent line interval of one minute following each transmission.

The Block Sequence Number field of the End of Day message contains a number one greater than the highest Block Sequence Number previously transmitted. The Block Sequence Number counter is not incremented and the Block Sequence Number does not change when the message is transmitted the second and third time in the normal message transmission sequence.

**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.

### 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
<b>Total Length</b>	<b>19</b>	

#### 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
<b>Total Length</b>	<b>27</b>	

## 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
<b>Total Length</b>	<b>25</b>	

#### 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
<b>Total Length</b>	<b>2</b>	

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### 6.4.3 Approximate Adjusted Volume Market Center – Category M Type N

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
<b>General Trade Information</b>		
Number of Participants	1	Byte
<b>Participant #1 through Total Number of Active Participants</b>		
Participant ID	1	Char
Trade Total Volume	8	Long
<b>Total Length</b>	<b>1+(9*# of Active Participants)</b>	

#### 6.4.4 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
<b>Total Length</b>	<b>12</b>	

#### 6.4.5 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
<b>Total Length</b>	<b>24</b>	

## 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.

### 6.5.1 Prior Day Trade Correction – Category P Type C

The Prior Day 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
<b>Total Length</b>	<b>69</b>	

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### 6.5.2 Prior Day Trade – Category P Type T

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
<b>Total Length</b>	<b>41</b>	



### 6.5.3 Prior Day Trade Cancel/Error – Category P Type X

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 using the Prior Day Long Trade message or Prior Day Trade Correction message formats. 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
<b>Total Length</b>	<b>42</b>	

## 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 textual 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
<b>Total Length</b>	<b>29</b>	

### 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 textual 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
<b>Total Length</b>	<b>25</b>	

### 6.6.3 Consolidated End of Day Summary – Category S Type C

The Consolidated End of Day Summary messages are transmitted shortly before the "Goodnight" messages. 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 textual 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
<b>Total Length</b>	<b>53</b>	

#### 6.6.4 Participant End of Day Summary – Category S Type D

The Participant End of Day Summary messages are transmitted shortly before the ‘Goodnight’ messages. 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 textual 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
<b>Total Length</b>	<b>58</b>	

## 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 Opening Delays, 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
<b>Reserved (for future use)</b>	<b>62</b>	<b>TBD</b>
<b>Total Length</b>	<b>102</b>	

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## 6.7.2 Trade Correction – Category T Type C

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 ( <i>of original transaction being corrected</i> )	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

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**Trade Correction – Category T Type C (continued)**

Field Name	Length	Type
<b>Consolidated Data</b>		
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
<b>Participant Data</b>		
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
<b>Total Length</b>	<b>146</b>	



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### 6.7.3 Long Trade – Category T Type L

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
<b>Total Length</b>	<b>46</b>	

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#### 6.7.4 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 an Opening Delay, 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
<b>Total Length</b>	<b>50</b>	

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### 6.7.5 Short Trade – Category T Type T

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
<b>Total Length</b>	<b>14</b>	

## 6.7.6 Trade Cancel/Error – Category T Type X

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 ( <i>of Original Transaction Being cancelled or errored</i> )	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

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

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

<b>Consolidated Data</b>		
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
<b>Participant Data</b>		
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
<b>Total Length</b>	<b>127</b>	

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

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## 7.0 FIELD DESCRIPTIONS

Field Name	Length	Description
Auction Collar Reference Price	8	<p>Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615. Optional set to zero.</p> <p>The Auction Collar Reference Price represents the price used by the exchange to establish the Auction Collar.</p>
Auction Collar Lower Threshold Price	8	<p>Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615. Optional set to zero.</p> <p>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.</p>
Auction Collar Upper Threshold Price	8	<p>Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615. Optional set to zero.</p> <p>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.</p>

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

**FIELD DESCRIPTIONS**

Field Name	Length	Description						
Bid Index Value	8	<p>Signed Long. Bid Index Value represents an <u>index value (i.e., not a price)</u> and has <u>implied 6 decimal places</u> and a maximum value of -9,223,372,036,854.775808 to +9,223,372,036,854.775807.</p> <p>The Bid Index Value represents the value of the index’s calculation formula using the current Bid values of the component securities.</p> <p><b>Note:</b> For Government Bonds, the Bid Index Value could reflect a value that is greater than the Offer Index Value.</p>						
Buy Volume	4	<p>Integer. Integer has a maximum volume of 4,294,967,295. Optional set to zero.</p> <p>The Buy Volume represents the reported imbalance of buy orders without matching sell orders for the security for a Participant.</p>						
Cancel/Error Action	1	<p>Char.</p> <p>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).</p> <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>	Code	Value	1	Cancel	2	Error
Code	Value							
1	Cancel							
2	Error							
Closing Bid Price	8	<p>Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615. Optional set to zero.</p> <p>The Closing Bid Price represents the last qualifying quote for a security by a Participant during the trading day.</p>						
Closing Offer Price	8	<p>Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615. Optional set to zero.</p> <p>The Closing Offer Price represents the last qualifying quote for a security by a Participant during the trading day.</p>						

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

**FIELD DESCRIPTIONS**

Field Name	Length	Description																		
Consolidated High/Low/Last Price Indicator	1	<p>Char.</p> <p>Identifies the Consolidated High/Low/Last Price applicable to the trade.</p> <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>High/Low/Last</td></tr><tr><td>H</td><td>High/Low</td></tr></table>	Code	Value	A	None	B	High	C	Low	D	Last	E	High/Last	F	Low/Last	G	High/Low/Last	H	High/Low
Code	Value																			
A	None																			
B	High																			
C	Low																			
D	Last																			
E	High/Last																			
F	Low/Last																			
G	High/Low/Last																			
H	High/Low																			
Corrected ( <i>followed by</i> ‘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	<p>Long. Long have a maximum volume of 184,467,440,737,095,516. Optional set to zero.</p> <p>Contains the number of shares traded at the Participant’s close price and taking place after the close of a Participant’s regular session.</p>																		
Crossing Session II Dollar Value	8	<p>Long. Long have implied 6 decimal places and a maximum value of \$18,446,744,073,709.551615. Optional set to zero.</p> <p>Contains the Dollar Value traded after the close of a Participant’s regular session.</p>																		
Crossing Session II Total Trades Volume	8	<p>Long. Long have a maximum volume of 184,467,440,737,095,516. Optional set to zero.</p> <p>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. Trades from the NYSE are executed at the aggregate price reported by member firms. Trades from the NYSE American exchange executed at the close price of the NYSE American exchange.</p>																		



CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

**FIELD DESCRIPTIONS**

Field Name	Length	Description																								
Dollar Value	8	<p>Long. Long have implied 6 decimal places and a maximum value of \$18,446,744,073,709.551615. Optional set to zero.</p> <p>The Dollar Value represents the total dollar worth of the daily trade transactions.</p>																								
Financial Status Indicator	1	<p>Char.</p> <p>Identifies the financial status of the security.</p> <table><tr><th>Code</th><th>Value</th></tr><tr><td>0</td><td>Financial Status Not Applicable</td></tr><tr><td>1</td><td>Bankrupt</td></tr><tr><td>2</td><td>Below Continuing Listing Standards</td></tr><tr><td>3</td><td>Bankrupt &amp; Below Continuing Listing Standards</td></tr><tr><td>4</td><td>Late Filing</td></tr><tr><td>5</td><td>Bankrupt &amp; Late Filing</td></tr><tr><td>6</td><td>Below Continuing Listing Standards &amp; Late Filing</td></tr><tr><td>7</td><td>Bankrupt, Below Continuing Listing Standards &amp; Late Filing</td></tr><tr><td>8</td><td>Creations Suspended (for Exchange Traded Products)</td></tr><tr><td>9</td><td>Redemptions Suspended (for Exchange Traded Products)</td></tr><tr><td>A</td><td>Liquidation (for Exchange Traded Products)</td></tr></table>	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)
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)																									

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

**FIELD DESCRIPTIONS**

Field Name	Length	Description																																												
Halt Reason	1	<div>Char.</div> <div>Denotes the reason for the Opening Delay or Trading Halt.</div> <table><tr><th>Code</th><th>Value</th><th>Regulatory</th><th>Non Regulatory</th></tr><tr><td>Space</td><td>Halt Reason Not Applicable</td><td></td><td></td></tr><tr><td>D</td><td>News Dissemination</td><td>X</td><td></td></tr><tr><td>I</td><td>Order Imbalance</td><td></td><td>X</td></tr><tr><td>M</td><td>Limit Up-Limit Down (LULD) Trading Pause</td><td>X</td><td></td></tr><tr><td>P</td><td>News Pending</td><td>X</td><td></td></tr><tr><td>X</td><td>Operational</td><td></td><td>X</td></tr><tr><td>Y</td><td>Sub-Penny Trading</td><td></td><td>X</td></tr><tr><td>1</td><td>Market-Wide Circuit Breaker Level 1 – Breached</td><td>X</td><td></td></tr><tr><td>2</td><td>Market-Wide Circuit Breaker Level 2 – Breached</td><td>X</td><td></td></tr><tr><td>3</td><td>Market-Wide Circuit Breaker Level 3 – Breached</td><td>X</td><td></td></tr></table>	Code	Value	Regulatory	Non Regulatory	Space	Halt Reason Not Applicable			D	News Dissemination	X		I	Order Imbalance		X	M	Limit Up-Limit Down (LULD) Trading Pause	X		P	News Pending	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	
Code	Value	Regulatory	Non Regulatory																																											
Space	Halt Reason Not Applicable																																													
D	News Dissemination	X																																												
I	Order Imbalance		X																																											
M	Limit Up-Limit Down (LULD) Trading Pause	X																																												
P	News Pending	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																																												

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

**FIELD DESCRIPTIONS**

Field Name	Length	Description										
Held Trade Indicator	1	<p>Char.</p> <p>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.</p> <table><tr><th>Code</th><th>Value</th></tr><tr><td>Space</td><td>Held Trade Indicator Not Applicable</td></tr><tr><td>A</td><td>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.</td></tr><tr><td>B</td><td>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 <u>not</u> on a Consolidated basis.</td></tr><tr><td>C</td><td>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.</td></tr></table> <p><b>Note:</b> For Corrections and Cancel/Error messages, the summary information details the Consolidated and Participant last information.</p>	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 <u>not</u> 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.
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 <u>not</u> 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.											

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

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**FIELD DESCRIPTIONS**

Field Name	Length	Description
High Indication Price/Upper Limit Price Band	8	<p>Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615. Optional set to zero.</p> <p>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 Opening Delayed or Trading Halted, i.e., Trading Range Indication or following an Opening Delay or a Trading Halt, i.e., Price Indication.</p> <p><b>Upper Limit Price Band:</b> represents the upper price band value for a security.</p> <p>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.</p> <p>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.</p> <p><b>Note:</b> 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).</p>
High Price	8	<p>Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615. Optional set to zero.</p> <p>The High Price represents the highest price paid for a security during the trading day.</p> <p><b>Note:</b> 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.</p>

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

## 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.  The Index Value 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. <table><tr><th>Code</th><th>Value</th></tr><tr><td>0</td><td>CTA Eligible Equity</td></tr><tr><td>1</td><td>Local Issue</td></tr><tr><td>2</td><td>Corporate Bond</td></tr><tr><td>3</td><td>Government Bond</td></tr></table>	Code	Value	0	CTA Eligible Equity	1	Local Issue	2	Corporate Bond	3	Government Bond
Code	Value											
0	CTA Eligible Equity											
1	Local Issue											
2	Corporate Bond											
3	Government Bond											
Last Participant ID	1	Char. Space-filled.  Refer to <b>Participant ID</b> 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.  The Last Price represents the last price for that security either on a Consolidated or an individual Participant basis at the time it is disseminated.  <b>Note 1:</b> For Trading Status Information, the Last Price is provided when the Security Status is: Opening Delay, Trading Halt, Price Indication or Trading Range Indication.  <b>Note 2:</b> In instances when <u>no trades qualify</u> to be included in the <b>Last Price</b> calculation, either on a Consolidated or an individual Participant basis, the <b>Last Price</b> 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.										

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

## FIELD DESCRIPTIONS

Field Name	Length	Description																								
Limit Up-Limit Down (LULD) Indicator	1	<p>Char.</p> <p>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.</p> <p>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.</p> <table><tr><th>Code</th><th>Value</th></tr><tr><td>Space</td><td>Limit Up-Limit Down Not Applicable</td></tr><tr><td>A</td><td>Limit Up-Limit Down Price Band</td></tr><tr><td>B</td><td>Republished Limit Up-Limit Down Price Band</td></tr><tr><td>C</td><td>National Best Bid Limit State Entered</td></tr><tr><td>D</td><td>National Best Bid Limit State Exited</td></tr><tr><td>E</td><td>National Best Offer Limit State Entered</td></tr><tr><td>F</td><td>National Best Offer Limit State Exited</td></tr><tr><td>G</td><td>National Best Bid and National Best Offer Limit State Entered</td></tr><tr><td>H</td><td>National Best Bid and National Best Offer Limit State Exited</td></tr><tr><td>I</td><td>National Best Bid Limit State Entered and National Best Offer Limit State Exited</td></tr><tr><td>J</td><td>National Best Bid Limit State Exited and National Best Offer Limit State Entered</td></tr></table> <p><b>Note 1:</b> Limit Up-Limit Down is not applicable to Local Issues or Bonds.</p> <p><b>Note 2:</b> All Limit State combination possibilities are reflected, though some may be a rare occurrence.</p> <p><b>Note 3:</b> When the ‘Limit Up-Limit Down Indicator’ codes are set to codes C through J, all price fields will be zero-filled.</p> <p><b>Note 4:</b> Indicators C through J <b>do not represent Price Bands</b>, they are used to identify that the symbol has entered/exited Limit State.</p>	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
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																									

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

## FIELD DESCRIPTIONS

Field Name	Length	Description										
Low Indication Price / Lower Limit Price Band	8	<p>Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615. Optional set to zero.</p> <p>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 Opening Delayed or Trading Halted, i.e., Trading Range Indication or following an Opening Delay or a Trading Halt, i.e., Price Indication.</p> <p><b>Lower Limit Price Band:</b> represents the lower price band value for a security.</p> <p>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.</p> <p>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.</p> <p><b>Note:</b> 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).</p>										
Low Price	8	<p>Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615. Optional set to zero.</p> <p>The Low Price represents the lowest price paid for a security during the trading day.</p> <p><b>Note:</b> 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.</p>										
Market-Wide Circuit Breaker (MWCB) Level Indicator	1	<p>Char.</p> <p>Identifies the threshold level that was breached.</p> <table><tr><th>Code</th><th>Value</th></tr><tr><td>Space</td><td>MWCB Not Applicable</td></tr><tr><td>1</td><td>Level 1 Breached</td></tr><tr><td>2</td><td>Level 2 Breached</td></tr><tr><td>3</td><td>Level 3 Breached</td></tr></table>	Code	Value	Space	MWCB Not Applicable	1	Level 1 Breached	2	Level 2 Breached	3	Level 3 Breached
Code	Value											
Space	MWCB Not Applicable											
1	Level 1 Breached											
2	Level 2 Breached											
3	Level 3 Breached											

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

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**FIELD DESCRIPTIONS**

Field Name	Length	Description
MWCB Level 1	8	<p>Signed Long. MWCB Level 1 value represents an <u>index value (i.e., not a price)</u> and has <u>implied 6 decimal places</u> and a maximum value of -9,223,372,036,854.775808 to +9,223,372,036,854.775807.</p> <p>Identifies the daily established drop level value (trigger value) associated with each Decline Level:</p> <ul style="list-style-type: none"><li>▪ Level 1 = 7% of Previous Close S&amp;P 500 Value</li></ul>
MWCB Level 2	8	<p>Signed Long. MWCB Level 2 value represents an <u>index value (i.e., not a price)</u> and has <u>implied 6 decimal places</u> and a maximum value of -9,223,372,036,854.775808 to +9,223,372,036,854.775807.</p> <p>Identifies the daily established drop level value (trigger value) associated with each Decline Level:</p> <ul style="list-style-type: none"><li>▪ Level 2 = 13% of Previous Close S&amp;P 500 Value</li></ul>
MWCB Level 3	8	<p>Signed Long. MWCB Level 3 value represents an <u>index value (i.e., not a price)</u> and has <u>implied 6 decimal places</u> and a maximum value of -9,223,372,036,854.775808 to +9,223,372,036,854.775807.</p> <p>Identifies the daily established drop level value (trigger value) associated with each Decline Level:</p> <ul style="list-style-type: none"><li>▪ Level 3 = 20% of Previous Close S&amp;P 500 Value</li></ul>



CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

**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 <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 calculation formula using the current offer values of the component securities.  <b>Note:</b> 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.  The Open Price represents the first qualifying price paid for a security during the trading day.  <b>Note:</b> 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.

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

**FIELD DESCRIPTIONS**

Field Name	Length	Description																																				
Participant Reference Number ( <i>of trade being corrected or cancelled or errored</i> )	8	<p>Signed Long. Set to Zero.</p> <p>Contains the Participant Reference Number of transaction to be corrected, cancelled or errored.</p> <p>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.</p>																																				
Participant ID	1	<p>Char.</p> <p>Identifies the Participant or Processor that initiated the message.</p> <table><tr><th>Code</th><th>Value</th></tr><tr><td>A</td><td>NYSE American</td></tr><tr><td>B</td><td>NASDAQ OMX BX</td></tr><tr><td>C</td><td>NYSE National</td></tr><tr><td>D</td><td>FINRA</td></tr><tr><td>I</td><td>ISE</td></tr><tr><td>J</td><td>Cboe EDGA</td></tr><tr><td>K</td><td>Cboe EDGX</td></tr><tr><td>M</td><td>CHX</td></tr><tr><td>N</td><td>NYSE</td></tr><tr><td>P</td><td>NYSE Arca</td></tr><tr><td>S</td><td>CTS</td></tr><tr><td>T</td><td>NASDAQ</td></tr><tr><td>V</td><td>IEX</td></tr><tr><td>W</td><td>CBSX</td></tr><tr><td>X</td><td>NASDAQ OMX PSX</td></tr><tr><td>Y</td><td>Cboe BYX</td></tr><tr><td>Z</td><td>Cboe BZX</td></tr></table>	Code	Value	A	NYSE American	B	NASDAQ OMX BX	C	NYSE National	D	FINRA	I	ISE	J	Cboe EDGA	K	Cboe EDGX	M	CHX	N	NYSE	P	NYSE Arca	S	CTS	T	NASDAQ	V	IEX	W	CBSX	X	NASDAQ OMX PSX	Y	Cboe BYX	Z	Cboe BZX
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CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

**FIELD DESCRIPTIONS**

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

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

## FIELD DESCRIPTIONS

Field Name	Length	Description																																				
Primary Listing Market Participant ID	1	<p>Char. .</p> <p>Identifies the Primary Listing Market of the security symbol.</p> <table><tr><th>Code</th><th>Value</th></tr><tr><td>Space</td><td>Primary Listing Market Participant ID Not Applicable</td></tr><tr><td>A</td><td>NYSE American</td></tr><tr><td>B</td><td>NASDAQ BX</td></tr><tr><td>C</td><td>NYSE National</td></tr><tr><td>D</td><td>FINRA</td></tr><tr><td>I</td><td>ISE</td></tr><tr><td>J</td><td>Cboe EDGA</td></tr><tr><td>K</td><td>Cboe EDGX</td></tr><tr><td>M</td><td>CHX</td></tr><tr><td>N</td><td>NYSE</td></tr><tr><td>P</td><td>NYSE Arca</td></tr><tr><td>T</td><td>NASDAQ</td></tr><tr><td>V</td><td>IEX</td></tr><tr><td>W</td><td>CBSX</td></tr><tr><td>X</td><td>NASDAQ OMX PSX</td></tr><tr><td>Y</td><td>Cboe BYX</td></tr><tr><td>Z</td><td>Cboe BZX</td></tr></table>	Code	Value	Space	Primary Listing Market Participant ID Not Applicable	A	NYSE American	B	NASDAQ BX	C	NYSE National	D	FINRA	I	ISE	J	Cboe EDGA	K	Cboe EDGX	M	CHX	N	NYSE	P	NYSE Arca	T	NASDAQ	V	IEX	W	CBSX	X	NASDAQ OMX PSX	Y	Cboe BYX	Z	Cboe BZX
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Prior Day Trade Date and Time	8	<p>2 x Integer (pair of Integers). Optional set to zero.</p> <p>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).</p> <p>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.</p>																																				
Reserved	1	Space-filled. Field is reserved for future use.																																				

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

## 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.				
CODE	SALE CONDITION	CONSOLIDATED Update		PARTICIPANT Update			VOLUME Update
		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) <i>or</i> 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	Next Day Trade (Next Day Clearing)	NO	NO	NO	NO	NO	YES
O	Market Center Opening Trade	#1	YES	YES	#2	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 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

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

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## 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 #1, #2, #3 and #4**) in the above calculation chart and are described below:

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

<b>Note 1</b>	<b>YES</b> , if it is the only qualifying last; <b>OR</b> If it is that Participant's first qualifying last; <b>OTHERWISE NO</b>
<b>Note 2</b>	<b>YES</b> , if it is the only qualifying last; <b>OTHERWISE NO</b>
<b>Note 3</b>	<b>YES</b> , if it is the only qualifying last; <b>OR</b> If it is from the same participant as the last; <b>OR</b> If it is from the LISTING MARKET for that Security; <b>OTHERWISE NO</b>
<b>Note 4</b>	<b>YES</b> , if it is the first qualifying or only qualifying trade of the day; <b>OTHERWISE <u>NO</u></b> .  (In instances of multiple Market Center Opening Trades, the latest trade takes precedence.)

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 #1, #2, #3 and #4**) the trade qualifies, the 'Note Criteria' takes precedence and the trade **will** be included in the calculations.

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

**FIELD DESCRIPTIONS**

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



CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

**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	<b>O</b> 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	<b>5</b> 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	<b>6</b> 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	<b>F</b> 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	<b>F</b> INTERMARKET SWEEP	N/A	TBD by each SRO

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

**SALE CONDITION, *continued***

**Rule 611- Trade Reporting Matrix, *continued***

			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
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	<b>4</b> 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	<b>4</b> DERIVATIVELY PRICED	N/A	TBD by each SRO

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

**FIELD DESCRIPTIONS**

Field Name	Length	Description																																		
Sale Condition Category	1	<p>Char.</p> <p>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.</p> <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>	Code	Value	Space	Sale Condition Category Not Applicable	1	Sale Condition Category 1	2	Sale Condition Category 2	3	Sale Condition Category 3	4	Sale Condition Category 4																						
Code	Value																																			
Space	Sale Condition Category Not Applicable																																			
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2	Sale Condition Category 2																																			
3	Sale Condition Category 3																																			
4	Sale Condition Category 4																																			
Security Status	1	<p>Char.</p> <p>Identifies the trading status applicable to the transaction.</p> <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>Opening Delay</td></tr><tr><td>2</td><td>Trading Halt</td></tr><tr><td>3</td><td>Resume</td></tr><tr><td>4</td><td>No Open/No Resume</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>Market On Close Imbalance Buy</td></tr><tr><td>A</td><td>Market On Close 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 Market On Close 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> <p><b>Note 1:</b> Last Price is provided when the Security Status is an Opening Delay, Trading Halt, Price Indication or Trading Range Indication. Market Imbalances and Market on Close Imbalances contain either buy or sell volumes. The remaining security status values are <u>not</u> accompanied by either price or volume data.</p> <p><b>Note 2:</b> ‘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.</p>	Code	Value	Space	Security Status Not Applicable	1	Opening Delay	2	Trading Halt	3	Resume	4	No Open/No Resume	5	Price Indication	6	Trading Range Indication	7	Market Imbalance Buy	8	Market Imbalance Sell	9	Market On Close Imbalance Buy	A	Market On Close Imbalance Sell	B	Reserved	C	No Market Imbalance	D	No Market On Close Imbalance	E	Short Sale Restriction	F	Limit Up-Limit Down
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CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

**FIELD DESCRIPTIONS**

Field Name	Length	Description																												
Security Symbol	5 or 11	<p>Char [5] or Char [11]. Left justified, space-filled.</p> <p>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.</p> <p><b><u>Identification of Test Data:</u></b></p> <p>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.</p> <p>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>.</p> <table><tr><th>Listing Exchange</th><th>Test Symbol</th></tr><tr><td rowspan="4">NYSE</td><td>CBO</td></tr><tr><td>CBX</td></tr><tr><td>NTEST</td></tr><tr><td>01N thru 12N</td></tr><tr><td rowspan="3">NYSE American</td><td>IBO</td></tr><tr><td>ATEST</td></tr><tr><td>01A thru 12A</td></tr><tr><td rowspan="6">NYSE Arca</td><td>IGZ</td></tr><tr><td>ZVV</td></tr><tr><td>ZZK</td></tr><tr><td>ZZZ</td></tr><tr><td>PTEST</td></tr><tr><td>01P thru 12P</td></tr><tr><td rowspan="4">Cboe BZX</td><td>ZBZX</td></tr><tr><td>ZTEST</td></tr><tr><td>ZTST</td></tr><tr><td>01Z thru 12Z</td></tr><tr><td rowspan="4">IEX</td><td>ZIEXT</td></tr><tr><td>ZEXIT</td></tr><tr><td>ZXIET</td></tr><tr><td>01V thru 12V</td></tr></table>	Listing Exchange	Test Symbol	NYSE	CBO	CBX	NTEST	01N thru 12N	NYSE American	IBO	ATEST	01A thru 12A	NYSE Arca	IGZ	ZVV	ZZK	ZZZ	PTEST	01P thru 12P	Cboe BZX	ZBZX	ZTEST	ZTST	01Z thru 12Z	IEX	ZIEXT	ZEXIT	ZXIET	01V thru 12V
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	ZZK																													
	ZZZ																													
	PTEST																													
	01P thru 12P																													
Cboe BZX	ZBZX																													
	ZTEST																													
	ZTST																													
	01Z thru 12Z																													
IEX	ZIEXT																													
	ZEXIT																													
	ZXIET																													
	01V thru 12V																													

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

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**FIELD DESCRIPTIONS**

Field Name	Length	Description												
Sell Volume	4	<p>Integer. Integer has a maximum volume of 4,294,967,295. Optional set to zero.</p> <p>Represents the reported imbalance of sell orders without matching buy orders for the security for a Participant.</p>												
Seller’s Sale Days	1	<p>Byte. Maximum number of Seller’s Sale Days is 60 days. Optional set to zero.</p> <p>Sale Condition must be ‘R’ and the Seller’s Sale Days is not less than two business days after trade date and not more than sixty days after trade date.</p> <p>Specifies the number of days that may elapse before delivery of the security.</p>												
Short Sale Restriction Indicator	1	<p>Char.</p> <p>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.</p> <table><tr><th>Code</th><th>Value</th></tr><tr><td>Space</td><td>Short Sale Restriction Not in Effect</td></tr><tr><td>A</td><td>Short Sale Restriction Activated</td></tr><tr><td>C</td><td>Short Sale Restriction Continued</td></tr><tr><td>D</td><td>Short Sale Restriction Deactivated</td></tr><tr><td>E</td><td>Short Sale Restriction in Effect</td></tr></table>	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
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													

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

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## FIELD DESCRIPTIONS

Field Name	Length	Description												
Stop Stock Indicator	1	<p>Char.</p> <p>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’).</p> <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>	Code	Value	0	Stop Stock Not Applicable	1	Stop Stock						
Code	Value													
0	Stop Stock Not Applicable													
1	Stop Stock													
Tick	1	<p>Char.</p> <p>Represents for a Participant the upward, downward or unchanged price movement in a security's trades:</p> <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> <p><b>Note 1:</b> For values 3 &amp; 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.</p> <p><b>Note 2:</b> 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.</p> <p><b>Note 3:</b> 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 (+).</p>	Code	Value	Space	Tick Not Applicable	1	+	2	-	3	0+	4	0-
Code	Value													
Space	Tick Not Applicable													
1	+													
2	-													
3	0+													
4	0-													

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

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**FIELD DESCRIPTIONS**

Field Name	Length	Description
Timestamp 2	8	<p>2 x Integer (pair of Integers). Optional set to zero.</p> <p>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.</p> <ul style="list-style-type: none"><li>▪ <b>If from an Exchange:</b> Timestamp 2 field will be set to zero.</li><li>▪ <b>If from the FINRA Alternative Display Facility (ADF) or a FINRA Trade Reporting Facility:</b><ul style="list-style-type: none"><li>▪ <b>If the FINRA ADF or a FINRA TRF</b> 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.</li><li>▪ <b>If the FINRA ADF or a FINRA TRF facility does not</b> have a proprietary trade feed then the Timestamp 2 field will be set to zero.</li></ul></li></ul>

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

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**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.  The Trade Price is the monetary value of an individual share of security at the time of the trade.



CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

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**FIELD DESCRIPTIONS**

Field Name	Length	Description																																				
Trade Reporting Facility ID	1	<p>Char. Space-filled.</p> <p>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.</p> <table><tr><th>Code</th><th>Value</th></tr><tr><td>Space</td><td>TRF Not Applicable</td></tr><tr><td>A</td><td>NYSE American</td></tr><tr><td>B</td><td>NASDAQ OMX BX</td></tr><tr><td>C</td><td>NYSE National</td></tr><tr><td>D</td><td>FINRA</td></tr><tr><td>I</td><td>ISE</td></tr><tr><td>J</td><td>Cboe EDGA</td></tr><tr><td>K</td><td>Cboe EDGX</td></tr><tr><td>M</td><td>CHX</td></tr><tr><td>N</td><td>NYSE</td></tr><tr><td>P</td><td>NYSE Arca</td></tr><tr><td>T</td><td>NASDAQ</td></tr><tr><td>V</td><td>IEX</td></tr><tr><td>W</td><td>CBSX</td></tr><tr><td>X</td><td>NASDAQ OMX PSX</td></tr><tr><td>Y</td><td>Cboe BYX</td></tr><tr><td>Z</td><td>Cboe BZX</td></tr></table>	Code	Value	Space	TRF Not Applicable	A	NYSE American	B	NASDAQ OMX BX	C	NYSE National	D	FINRA	I	ISE	J	Cboe EDGA	K	Cboe EDGX	M	CHX	N	NYSE	P	NYSE Arca	T	NASDAQ	V	IEX	W	CBSX	X	NASDAQ OMX PSX	Y	Cboe BYX	Z	Cboe BZX
Code	Value																																					
Space	TRF Not Applicable																																					
A	NYSE American																																					
B	NASDAQ OMX BX																																					
C	NYSE National																																					
D	FINRA																																					
I	ISE																																					
J	Cboe EDGA																																					
K	Cboe EDGX																																					
M	CHX																																					
N	NYSE																																					
P	NYSE Arca																																					
T	NASDAQ																																					
V	IEX																																					
W	CBSX																																					
X	NASDAQ OMX PSX																																					
Y	Cboe BYX																																					
Z	Cboe BZX																																					

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

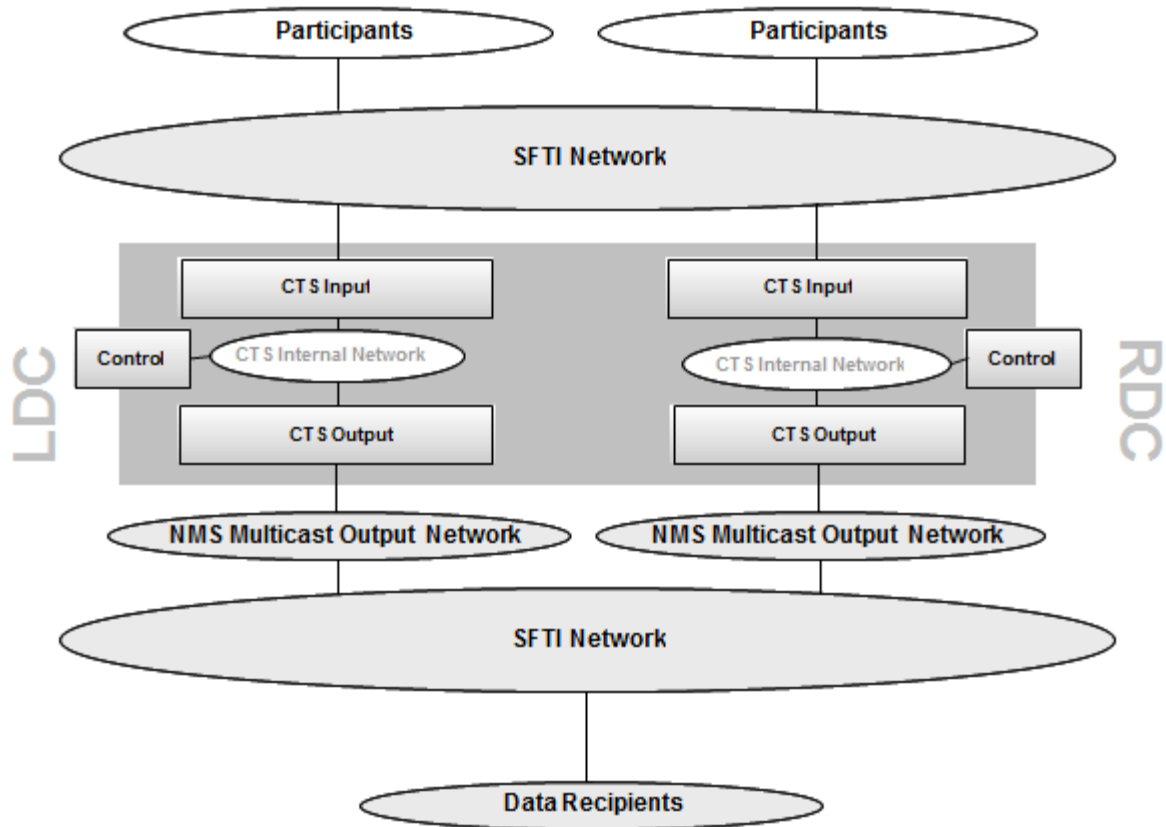
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**FIELD DESCRIPTIONS**

Field Name	Length	Description						
Trade Through Exempt Indicator	1	<p>Char.</p> <p>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.</p> <table><tr><th>Code</th><th>Value</th></tr><tr><td>0</td><td>Not a Trade Through Exemption</td></tr><tr><td>1</td><td>Trade Through Exemption</td></tr></table> <p><b>Note:</b> 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.</p>	Code	Value	0	Not a Trade Through Exemption	1	Trade Through Exemption
Code	Value							
0	Not a Trade Through Exemption							
1	Trade Through Exemption							
Trade Total Volume	8	<p>Long. Long have a maximum volume of 184,467,440,737,095,516. Optional set to zero.</p> <p>Contains the total number of shares traded for an individual security.</p>						
Trade Volume	2 or 4	<p>2 Short. Short have a maximum volume of 65,535.</p> <p>4 Integer. Integer has a maximum volume of 4,294,967,295. Short or Integer Optional set to zero.</p> <p>Contains the total number of shares traded in a single transaction for an individual security.</p>						

**APPENDIX A: CTS CONFIGURATION**

**CTS CONFIGURATION**



CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

**APPENDIX B: SYMBOL AND INDEX SUFFIX EXAMPLES**

	<b>Suffix</b>	<b>Description</b>
<b>A</b>	.A	Series (or Class) <b>A</b> - <i>Also</i> Series <b>B-T</b> & <b>V-Z</b>
	.A.CL	Series <b>A</b> Called - <i>Also</i> Series <b>B-T</b> & <b>V-Z</b>
	.A.CV	Series <b>A</b> Convertible - <i>Also</i> Series <b>B-T</b> & <b>V-Z</b>
	.Aw	Series <b>A</b> When Issued - <i>Also</i> Series <b>B-T</b> & <b>V-Z</b>
<b>C</b>	.CL	Called
	.CT	Certificates
	.CV	Convertible
	.CVR	Contingent Value Right
	.CV.CL	Convertible Called
<b>D</b>	.DP	Amount of most recent dividend to go 'ex- distribution'
	.DV	Accumulated dividend per share net expenses, through and including the previous
<b>E</b>	.EC	EMERGING COMPANY MARKETPLACE SM
	.EU	Estimated cash amount per creation unit
<b>F</b>	.FN	Foreign News
<b>I</b>	.ID	Index – differentiates an index from a stock with the same root symbol
	.IV	Intra-Day Net Asset Value per share
<b>M</b>	.MN	Mini
<b>N</b>	.NV	Net Asset Value per share as at the close on the previous day's close of trading
<b>P</b>	.PO	Percent Paid
	.PP	Partial Paid
	.PT.CL	Part Called
	p	Preferred
	pA	Preferred Series <b>A</b> - <i>Also</i> Series <b>B-T</b> & <b>V-Z</b>
	pA.CV	Preferred Series <b>A</b> Convertible - <i>Also</i> Series <b>B-T</b> & <b>V-Z</b>
	pA.CL	Preferred Series <b>A</b> Called - <i>Also</i> Series <b>B-T</b> & <b>V-Z</b>
	pAw	Preferred Series <b>A</b> When Issued - <i>Also</i> Series <b>B-T</b> & <b>V-Z</b>
	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 <b>A</b> of a Second Category of Preferred - <i>Also</i> Class <b>B-K</b> and <b>M-S</b>
<b>R</b>	r	Rights
	rw	Rights When Issued

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

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**APPENDIX B: SYMBOL AND INDEX SUFFIX EXAMPLES**

	<b>Suffix</b>	<b>Description</b>
<b>S</b>	.SC	Small Corporate - Offering Registration
	.SD	Stamped
	.SM	Mini Settlement
	.SO	Current shares outstanding in thousands
	.SP	Special
	.SV	Settlement
<b>T</b>	.TC	Total cash amount per creation unit
	.TT	Tier II Securities
<b>U</b>	.U	Units – (A combination of securities composed of two or more warrants, common stocks, preferred stocks and/or bonds.)
<b>V</b>	.VR	Variable Common Right
<b>W</b>	.WD	When Distributed
	w	When Issued
	.WS	Warrants
	.W.WS	With Warrants
	.WS.A	Warrants Series <b>A</b> - <i>Also</i> Series <b>B-T</b> & <b>V-Z</b>
	.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’.

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

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**APPENDIX C: GLOSSARY**

<b>Term</b>	<b>Description</b>
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.
Broken Lot	Indicates an irregular quantity or lot of securities, which is lower in terms of amount or quantity than the minimum lot quantity (for shares), or than the lot normally traded; less than 100 shares of a stock.
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 Trade	Indicates that the trade resulted from a Market Center's crossing session.
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.

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

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**APPENDIX C: GLOSSARY**

Term	Description
Crossing Session I (NYSE American)	Single-sided orders and coupled (both buy and sell side) orders may be entered into Crossing Session I (called "After Hours Trading" on the NYSE American) between 4:15 p.m. and 5:00 p.m. (EST). Systemized limit orders entered during the normal 9:30 to 4 p.m. trading session labeled good-till-executed (GTX) migrate to the Crossing Session I for possible execution. There is a single NYSE American Crossing Session I trade at 5:00 p.m. at the price of the NYSE American closing price determined during the Exchange's 9:30 a.m. to 4:00 p.m. trading session. This trade is printed on the Consolidated Tape (Tape B). All coupled orders are executed in the trade. GTX and single-sided orders are executed against each other (buys against sells) on a first-come-first-served basis. GTX orders, which are not executed, migrate back to the "book" for the next trading day. Single-sided orders, which are not executed, are cancelled. NYSE American Crossing Session I is exempt from "up-tick rule" for sell short orders. ETFs, which participate in NYSE American Crossing Session I, use the closing price at 4:15 p.m. See NYSE American Rules 1300 to 1306 for more details.
Crossing Session I (NYSE)	For the NYSE, Crossing Session I operates between 4:15 p.m. and 5:00 p.m. (EST). During this time, one-sided, two-sided, or good-till-executed (GTX) orders for a particular security can be entered for execution at 5:00 p.m. Matched orders are executed at the NYSE closing price determined during the Exchange's 9:30 a.m. to 4:00 p.m. trading session and are printed on the Consolidated Tape at approximately 6:40 p.m.
Crossing Session II (NYSE American)	NYSE American Crossing Session II (called "After Hours Trading Facility II" on the NYSE American) operates between 4:00 p.m. and 5:15 p.m. (EST). This session on the NYSE American accommodates the trading of NYSE American coupled orders in baskets, which are composed of at least 15 NYSE securities valued at \$1 million or more and also include NYSE American securities. Members, that have either facilitated a basket trade or have paired two customers' baskets, submit aggregate information on transactions in NYSE American securities included in the baskets to the NYSE American for execution. At 5:15 p.m., the aggregate information of all NYSE American securities included in baskets executed in this session prints to the Consolidated Tape (Tape B).
Crossing Session II (NYSE)	For the NYSE, Crossing Session II operates between 4:00 p.m. and 6:15 p.m. (EST). This session accommodates the trading of baskets of at least 15 NYSE securities valued at \$1 million or more. NYSE Members that have either facilitated a basket trade or have paired two customers' baskets can submit aggregate information to the Exchange for execution. At approximately 6:40 p.m., the aggregate information of all baskets executed in this session prints to the consolidated tape.

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

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**APPENDIX C: GLOSSARY**

<b>Term</b>	<b>Description</b>
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.
Held Trades	Trades received from a non-primary Participant during a primary market regulatory halt. These trades are held by the CTS Processor and are disseminated after the close of the primary market with an appropriate Held Trade Indicator code applicable to the trade.
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.



CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

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**APPENDIX C: GLOSSARY**

<b>Term</b>	<b>Description</b>
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	<p>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.</p> <p>For further details related to Limit Up-Limit Down, reference the following: <a href="http://www.sec.gov/rules/sro/nms/2012/34-67091.pdf">http://www.sec.gov/rules/sro/nms/2012/34-67091.pdf</a></p>
Limit Up-Limit Down (LULD) Quote Mid-Point	Indicates a listing exchange’s midpoint of a quote when the listing exchange opens (reopens) with a quote instead of opening (reopening) 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.

CONSOLIDATED TAPE SYSTEM (CTS)  
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**APPENDIX C: GLOSSARY**

<b>Term</b>	<b>Description</b>
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.
Market On Close (MOC) Imbalance Buy	An excess of 50,000 shares or more of MOC orders to buy over MOC orders to sell (including MOC sell plus and MOC sell short orders).
Market On Close (MOC) Imbalance Sell	An excess of 50,000 shares or more of MOC orders to sell (not including MOC sell short and MOC sell plus orders) over MOC orders to buy (including MOC orders to buy minus).
Market-Wide Circuit Breaker Level 1 – 7% Breached	<p>This regulatory Trading Halt is used to denote that trading is suspended due to the S&amp;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:</p> <ul style="list-style-type: none"><li>• Before 3:25 p.m. ET – duration 15 minutes</li><li>• At or after 3:25 p.m. ET – trading shall continue unless there is a Level 3 Market-Wide Circuit Breaker Regulatory Trading Halt.</li></ul>
Market-Wide Circuit Breaker Level 2 – 13% Breached	<p>This regulatory Trading Halt is used to denote that trading is suspended due to the S&amp;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:</p> <ul style="list-style-type: none"><li>• Before 3:25 p.m. ET – duration 15 minutes</li><li>• At or after 3:25 p.m. ET – trading shall continue unless there is a Level 3 Market-Wide Circuit Breaker Regulatory Trading Halt.</li></ul>

CONSOLIDATED TAPE SYSTEM (CTS)  
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**APPENDIX C: GLOSSARY**

<b>Term</b>	<b>Description</b>
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	An order for a number of shares greater than 100 (e.g., 142, 373, 1, 948 etc.), but not a multiple of 100. This type of order is also known as ‘PRL’ or ‘partial round lot’ order and is comprised of a round lot order and an odd lot order.
News Dissemination	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 publication or disclosure of information has occurred.
News Pending	Denotes a regulatory Trading Halt due to an expected news announcement, which may influence the security. An Opening Delay or Trading Halt may be continued once the news has been disseminated.
Next Day Trade	A transaction that requires the delivery of securities on the first business day following the trade date.
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 Market on Close (MOC) Imbalance	The difference between the number of shares to buy MOC and the number of shares to sell MOC is less than 50,000.
No Open/No Resume	Indicates an Opening Delay or Trading Halt is to be in effect for the rest of the trading day in a security for a Participant.
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.

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

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**APPENDIX C: GLOSSARY**

Term	Description
Odd Lot	An order amount for a security that is less than the normal unit of trading for that particular asset. Odd lots are considered to be anything <i>less than</i> the standard units of trade of 1, 10 or 100 shares.
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: <ul style="list-style-type: none"><li>• one point or more away from the last sale when the last sale is under \$20.00; <b>or</b></li><li>• two points or more away from the last sale when the last sale is \$20.00 or more</li></ul>
Opening Delay	Postponement of the opening of trading in a security for a Participant.
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 an Opening Delay or 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.

CONSOLIDATED TAPE SYSTEM (CTS)  
MULTICAST OUTPUT BINARY SPECIFICATION

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**APPENDIX C: GLOSSARY**

<b>Term</b>	<b>Description</b>
Regular Sale	A trade made without stated conditions is deemed regular way for settlement on the third business day following the transaction date.
Regulatory Halt or Delay	An Opening Delay or Trading Halt called due to news dissemination or news pending. In addition, Due To Related Security can be used in conjunction with a regulatory Halt Reason, i.e., News Dissemination or News Pending.
Resume	Indicates that trading for a Participant is no longer suspended in a security which had been Halted or had its Opening delayed.
Round Lot	Typically 100 shares of stock or any number of shares that is a multiple of 100 (i.e., 100, 600, 1,600, etc.).
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: <ol style="list-style-type: none"><li>1. has a volume of 10,000 shares or more <i>and/or</i></li><li>2. has a dollar value of \$200,000 or more.</li></ol>
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.

CONSOLIDATED TAPE SYSTEM (CTS)  
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**APPENDIX C: GLOSSARY**

<b>Term</b>	<b>Description</b>
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 Opening Delay or 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 <u>not</u> Opening Delayed or Trading Halted. The Trading Range Indication is used prior to or after the opening of a security.

CONSOLIDATED TAPE SYSTEM (CTS)  
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**APPENDIX D: SUMMARY OF DAILY CTS MULTICAST LINE MESSAGES**

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
01:40	Line Integrity Messages*
02:00	Start of Test Cycle Message
02:45	End of Test Cycle Message
03:30 – 03:32	Start of Day – Control Message (Sent three times at one minute intervals)
03:31 – 20:05	Administrative Messages Trading Halts, Pre-Opening Indication, Short Sale Restriction – Trading Status Messages Stock Indices
03:33 – 20:30	Reset Block Sequence Number – Control Message Retransmissions
04:00 - 20:05	Administrative & Announcement Messages Cancel/Error Messages Control Messages Correction Messages Index Messages Market Status Messages Prior Day Messages Test Messages Trade Messages Trading Status Messages Auction Status Messages
03:45 (Iteration 1) 07:45 (Iteration 2)	Consolidated Start of Day Summary Message Participant Start of Day Summary Message
04:00	<i>OFFICIAL MARKET OPEN: NASDAQ &amp; NYSE ARCA</i>
07:00 (Iteration 1) 08:00 (Iteration 2)	Market-Wide Circuit Breaker (MWCB) Decline Level – Market Status Message
07:00	<i>OFFICIAL MARKET OPEN: Cboe BYX, Cboe BZX, Cboe EDGA, Cboe EDGX, CHX, NASDAQ OMX BX, NYSE American &amp; NYSE National</i>
08:00	<i>OFFICIAL MARKET OPEN: FINRA, IEX, &amp; NASDAQ OMX PSX</i>
09:30	Market Open – Administrative Message
09:30	<i>OFFICIAL MARKET OPEN: NYSE</i>
09:30 – 16:00	LULD Price Band Messages

CONSOLIDATED TAPE SYSTEM (CTS)  
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*Line Integrity Messages are transmitted at intervals of approximately sixty (60) seconds throughout the day ending when the CTS multicast lines are brought down.

**APPENDIX D: SUMMARY OF DAILY CTS MULTICAST LINE MESSAGES**

Time (ET)	Transmission
10:00 - 16:46	Approximate NYSE Market Volume & Index (half-hourly) – Administrative Message
12:00	Noon Approximate NYSE Market Volume & Index – Administrative Message
16:00	MARKET CLOSED TRDS FROM MKTS STILL OPN WILL CONTINUE – Administrative Message
16:00	<i>OFFICIAL MARKET CLOSED: NYSE</i>
16:07 (Iteration 1) 16:36 (Iteration 2)	Network A/Network B Held Trades Released
16:11 (Iteration 1) 16:50 (Iteration 2)	Approximate Adjusted Volume Market Center – Market Status Message
16:13 (Iteration 1) 18:58 (Iteration 2)	Approximate Total Trades and Dollar Value – 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
16:15 - 16:45	<SYMBOL (S)> Not Available for NYSE Crossing Session Message (2 nd Iteration) Prior Day Correction Administrative Messages Administrative Messages (e.g., Market Volume & Index, Crossing Activity, Market Closed, Goodnight).
16:16	NYSE Closing Bid/Offer Prices – Market Status Message NYSE American Closing Bid/Offer Prices – Market Status Message
16:20 (Iteration 1) 16:50 (Iteration 2)	NYSE Start of Closing Trade Prices – Market Status Message NYSE American Start of Closing Trade Prices – Market Status Message
16:55	NYSE FINAL Market Volume, Index & Issues Traded, Up, Down and Unchanged – Administrative Message
17:00	<i>OFFICIAL MARKET CLOSED: Cboe BYX, Cboe BZX, CHX, IEX &amp; NASDAQ OMX PSX</i>
17:10	NYSE Closing Trade Prices – Market Status Message NYSE American Closing Trade Prices – Market Status Message



CONSOLIDATED TAPE SYSTEM (CTS)  
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**APPENDIX D: SUMMARY OF DAILY CTS MULTICAST LINE MESSAGES**

Time (ET)	Transmission
18:30	<i>OFFICIAL MARKET CLOSED: FINRA</i>
18:58	NYSE Crossing Session Summary – Market Status Message NYSE American Crossing Session Summary – Market Status Message
18:50	NYSE Crossing Session Summary Administrative Messages (III & IV)
18:55	Approximate Total Trades and Dollar Value – Market Status Message
19:00	<i>OFFICIAL MARKET CLOSED: NASDAQ OMX BX</i>
20:00	<i>OFFICIAL MARKET CLOSED: Cboe EDGA, Cboe EDGX, NASDAQ, NYSE ARCA, NYSE American &amp; NYSE National</i>
20:05	MARKET CLOSED - Administrative Message
20:15	GOOD NIGHT - Administrative Message
20:15 – 20:17	END OF DAY**

**Dependent on when the "Good Night" Message is sent (i.e., approximately 20:11 - 20:15 ET).

**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 **3:25 A.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 E: ADMINISTRATIVE MESSAGE TEXT SAMPLES**

The administrative message text examples provided are intended to be indicative of the kinds of Administrative messages, not necessarily limited to the number of examples shown, that can be transmitted.

### **Standard Message Sent Upon Detection of Delay:**

- ALERT ALERT ALERT THE CONSOLIDATED TAPE SYSTEM IS EXPERIENCING A PROCESSING PROBLEM AS OF <TIME>. FURTHER INFORMATION TO FOLLOW

### **Example of Update Message on Status of Delay:**

- ALERT ALERT ALERT THE CONSOLIDATED TAPE SYSTEM IS EXPERIENCING A REPORTING DELAY AFFECTING MULTICAST LINES <LINE NUMBER(S)>. FURTHER INFORMATION TO FOLLOW

### **Standard Message Sent Upon Return to Normal Reporting:**

- ALERT ALERT ALERT THE CONSOLIDATED TAPE SYSTEM PROCESSING PROBLEM IS RESOLVED AS OF <TIME>, CTS IS PROCESSING NORMALLY

### **End of Trading Day:**

- GOODNIGHT NETWORK A <MMDDYYYY>
- GOODNIGHT NETWORK B < MMDDYYYY>

CONSOLIDATED TAPE SYSTEM (CTS)  
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**APPENDIX F: ASCII PRINTABLE TABLE (Character Code 32-126)**

ASCII	DEC	Description
<space>	32	Space
!	33	Exclamation
"	34	Double quotes
#	35	Number
\$	36	Dollar
%	37	Percent
&	38	Ampersand
'	39	Single Quote
(	40	Open Parenthesis
)	41	Close Parenthesis
*	42	Asterisk
+	43	Plus
,	44	Comma
-	45	Hyphen
.	46	Period
/	47	Slash or Divide
0	48	Zero
1	49	One
2	50	Two
3	51	Three
4	52	Four
5	53	Five
6	54	Six
7	55	Seven
8	56	Eight
9	57	Nine
:	58	Colon
;	59	Semicolon
<	60	Less than
=	61	Equals
>	62	Greater than
?	63	Question mark
@	64	At symbol
A	65	Uppercase A
B	66	Uppercase B
C	67	Uppercase C
D	68	Uppercase D
E	69	Uppercase E
F	70	Uppercase F
G	71	Uppercase G
H	72	Uppercase H
I	73	Uppercase I
J	74	Uppercase J
K	75	Uppercase K
L	76	Uppercase L
M	77	Uppercase M
N	78	Uppercase N
O	79	Uppercase O
P	80	Uppercase P

ASCII	DEC	Description
Q	81	Uppercase Q
R	82	Uppercase R
S	83	Uppercase S
T	84	Uppercase T
U	85	Uppercase U
V	86	Uppercase V
W	87	Uppercase W
X	88	Uppercase X
Y	89	Uppercase Y
Z	90	Uppercase Z
[	91	Opening bracket
\	92	Backslash
]	93	Closing bracket
^	94	Caret
_	95	Underscore
`	96	Grave accent
a	97	Lowercase a
b	98	Lowercase b
c	99	Lowercase c
d	100	Lowercase d
e	101	Lowercase e
f	102	Lowercase f
g	103	Lowercase g
h	104	Lowercase h
i	105	Lowercase i
j	106	Lowercase j
k	107	Lowercase k
l	108	Lowercase l
m	109	Lowercase m
n	110	Lowercase n
o	111	Lowercase o
p	112	Lowercase p
q	113	Lowercase q
r	114	Lowercase r
s	115	Lowercase s
t	116	Lowercase t
u	117	Lowercase u
v	118	Lowercase v
w	119	Lowercase w
x	120	Lowercase x
y	121	Lowercase y
z	122	Lowercase z
{	123	Opening Brace
	124	Vertical Bar
}	125	Closing Brace
~	126	Equivalency Sign-Tilde

### CTS Multicast Output Binary and ASCII Protocol Differences and Notes

**General:**

1. Transmission block SOH & ETX have been removed.
2. 'Block Pad' byte has been added to ensure blocks are an even number of bytes. Updated 'Block Pad Byte' description to include binary representation.
3. Data Type (format) modified to support Big Endian (network byte order) and ASCII printable character codes 32-126 inclusive. Modified Data Type useable 'signed integer' values.
4. Message Category and Type Codes harmonized where applicable.
5. Reorganization of fields within message formats for consistency purposes.
6. 'Instrument Type' in message formats will identify CTA Eligible Equity, Local Issue and Bonds.
7. 'Primary Listing Market ID' will explicitly identify the Listing Market associated with their listed security.
8. All Times (e.g., Timestamps, Date and Time) will be represented in nanoseconds from Epoch 1/1/1970, 00:00:00 UTC.
9. Short Prices will have 2 decimal places implied and Long Prices will have 6 decimal places implied (Trade Denominator Indicator removed).
10. The Symbol Suffix delimiter has been modified from '/' to '.' for input/output consistency.
11. The .TEST Suffix support associated with the 'Test Message Indicator' has been replaced by dedicated Test Symbols.
12. Introduced alphanumeric dedicated Test Symbols consisting of two leading numeric associated with the multicast line routing followed by an alphabetic character designating the Primary Listing Market for the dedicated Test Symbol.
13. 'Due to Related Security' and 'In View of Common' processing has been removed.
14. 'Currency Indicator' removed as currency is continuously US Dollars.
15. 'Status Indicator' removed as Price Indications are updated vs. corrected/cancelled.
16. 'Reserved' fields removed from most message formats, future new fields will be accommodated using 'Version' updates.
17. 'Timestamp 2' has been moved from Message Header to applicable message formats.
18. 'CBSX' has withdrawn its status as a CTA Participant and has been removed.
19. Sale Condition Code '@' representing a 'Regular Sale' trade replaced with 'Space' to represent a 'Regular Sale' trade.
20. Added 'Sale Condition Category' field codes.
21. Modified the length of the 'Number of Participant' field from 2 to 1 Byte.
22. The 'Temporary Suffix' field has been removed.
23. Message routing reverted to current Production message routing.
24. Message Header and Message Body lengths decreased/increased to account for the elimination or addition of fields.
25. Modified Data Type representation in Index/MWCB messages.
26. Signed Long' Data Type representation added in CTS.
27. Minor clarification throughout document/removed verbiage associated with eliminated functionality/corrected typos.
28. Added CBOE Stock Exchange, Inc. (CBSX) Participant ID 'W' (inactive Participant).

## Differences and Notes, continued

### New Block Header:

1. 'Version' to facilitate support of current and future format changes.
2. 'Block Size' to indicate the size in bytes of the entire transmission block.
3. 'Block Sequence Number' to identify the block sequence number for each block with rollover occurring after 999,999,999 (a future enhancement will increase the number to 3,999,999,999; field was moved from Message Header to Block Header).
4. 'Messages in Block' to identify the number of messages contained in the transmission block.
5. 'Block Checksum' to identify sum of all the bytes in the block.
6. 'Data Feed Indicator' to identify CTS as the data feed.
7. 'Retransmission Indicator' reduced to 1 byte, moved from Message Header to Block Header and modified code from 'R' back to 'V' to indicate Retransmission.
8. 'SIP Block Timestamp' moved from Message Header to Block Header.
9. Modified order of field appearances in Block Header.

### Modified Message Header:

1. 'Message Network' (e.g., Network A/B) has been removed as network can be identified by the Multicast IP addresses.
2. 'Retransmission Indicator' moved from Message Header to Block Header.
3. 'Message Header Identifier' replaced by 'Version' in Block Header.
4. 'Transaction ID Part A and Part B' have been redefined as follows:
  - a. 'Transaction ID' (previously Transaction ID Part A) is for internal SIP use only.
  - b. 'Participant Reference Number' (previously Transaction ID Part B) replaces the use of 'Output Sequence Number' for correction and cancel/error processing.
5. 'Message Sequence Number' renamed to 'Block Sequence Number' moved from Message Header to Block Header.
6. 'SIP Block Timestamp' moved from Message Header to Block Header.
7. 'Timestamp 2' moved to applicable message formats.
8. 'Message ID' added to identify the message within the Block.
9. 'Message Length' field has been added.
10. 'Reserved' field has been removed.
11. 'Transaction ID' data type modified from Byte to Integer.
12. Message Header length increased.
13. Modified order of field appearances.

### Administrative Messages:

1. Category A Type H general 'Administrative Unformatted' replaces Category A Type S Market Volume and Index message which has been removed.
2. Administrative message textual length increased to 900 characters.
3. 'Text Length' originally added to identify the length of the text in the Administrative message has been eliminated as 'Message Length' field added to Message Header.
4. Usage of YYY and ZZ begin announce and end announce characters removed.
5. 'Eliminated: Administrative Text portion of the following Administrative Message Types:
  - 1) 'Category A Type A'
  - 2) 'Category A Type B'
  - 3) 'Category A Type C'

4) 'Category A Type D'

**Differences and Notes, continued**

**Control Messages:**

1. Renamed Category C Type Z from 'End of Transmission' to 'End of Day'.

**Index Messages:**

1. Category Y Type X Short Index message has been removed.
2. Category Y Type V Bid and Offer Index Short message has been removed.
3. Category Y renamed to Category I.
4. Grouping of Indices in a single message has been removed.
5. Revised usable data type representation (signed long).
6. Eliminated 'Index Sign' fields in Index Messages (sign is derived from Index value) and associated 'Index Sign' field descriptions.

**Market Status Messages:**

1. Category M Types B, C and D messages associated with 'Most Active Issues' have been removed.
2. Category M Types E, F and G messages associated with 'Closing Trade Prices' have been removed.
3. Category M Types H, I and J messages associated with 'Bid and Offer Closing Prices' have been removed.
4. MWCB Level 1, Level 2 & Level 3 data type modified from Long to Signed Long.

**Prior Day Messages:**

1. Prior Day Trade Date and Trade Time combined into one field and will be represented in nanoseconds from Epoch 1/1/1970, 00:00:00 UTC.
2. Prior Day Trade Correction 'Corrected Instrument Type' field to 'Instrument Type' and eliminated 'Original Instrument Type' field.

**Summary Messages:**

1. The 'Start of Day' Summary message has been split into two message types representing Consolidated Summary data and Participant Summary data separately.
2. Summary Messages length of the 'Number of Participant' field from 2 to 1 Byte.
3. Start/End of Day Summary Messages 'Previous Close Price Date and Time' field renamed to 'Previous Close Price Date'.

## Differences and Notes, continued

### Trade Messages:

1. 'Sale Condition Category' introduced in Short Trade format to identify category associated with Sale Condition.
2. Added ability to support the same codes in each Sale Condition category.
3. 'Participant Reference Number' replaces 'Output Sequence Number' in Correction and Cancel/Error message formats to identify the original transaction being corrected or cancelled/errored.
4. Added 'Primary Listing Market Participant ID' to Short Trade format.
5. Added new dedicated Test Symbols.
6. Added 'Short Sale Restriction Indicator' to Correction Message.
7. Eliminated Trade Correction Message 'Original Instrument Type' field.
8. Renamed Trade Correction Message 'Corrected Instrument Type' field to 'Instrument Type'.
9. Renamed Previous Close Price Date and Time field to Previous Close Price Date in Start/End of Day Summary Messages.
10. Trade Cancel/Error Message transposed appearance of 'Trade Reporting Facility ID' to be following 'Trade Through Exempt Indicator' field.

### New Auction Status Message Category/Type:

1. Introduced 'Auction Status' message to be transmitted when a Participant in a CTA eligible security, Local Issue or a Bond reports required Auction Information.
2. Added new Auction Status message field descriptions.