



SECURITIES INDUSTRY AUTOMATION CORPORATION

CQS

**CONSOLIDATED QUOTATION SYSTEM
PARTICIPANT INPUT BINARY SPECIFICATION**

**February 14, 2018
Version 1.6**

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

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VERSION HISTORY

| Version | Date | Description |
|---------|--------------------|---|
| 1.0 | July 1, 2016 | Initial Document |
| 1.1 | September 15, 2016 | <u>Added:</u> <ul style="list-style-type: none"> ▪ New Dedicated Test Symbols |
| 1.2 | February 21, 2017 | <u>Added:</u> <ul style="list-style-type: none"> ▪ ‘Message Length’ field in Message Header and field description ▪ New ‘Auction Status Category Q Type A’ message and field descriptions ▪ New ‘Auction Collar Price’ and ‘Number of Extension’ Error Codes <u>Eliminated:</u> <ul style="list-style-type: none"> ▪ Administrative Message ‘Text Length’ field (Length is identified in Message Header) <u>Modified:</u> <ul style="list-style-type: none"> ▪ ‘Block Pad Byte’ description to include binary representation ▪ Order of field appearances in Message Header ▪ ‘Reserved’ field length in Message Header ▪ Length of Short Quote format ▪ Minor edits/clarification throughout document/removed verbiage associated with eliminated functionality ▪ Binary and ASCII Protocol Differences and Notes |
| 1.3 | May 5, 2017 | <u>Added:</u> <ul style="list-style-type: none"> ▪ CBOE Stock Exchange, Inc. (CBSX) Participant ID ‘W’ |
| 1.4 | June 2, 2017 | <u>Added:</u> <ul style="list-style-type: none"> ▪ New Dedicated Test Symbols: ZIEXT, ZEXIT, ZXIET & 01V thru 12V |
| 1.5 | August 28, 2017 | <u>Modified:</u> <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 | <u>Modified:</u> <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 ▪ Security Status Indicator value ‘X’ From: Equipment Changeover / To: Operational ▪ Description of Auction Status message <u>Added:</u> Participant Reference Number requirements previously published in FAQ’S version 1.1, August 24, 2017 https://www.ctaplan.com/tech-specs for easy reference |

CONSOLIDATED QUOTATION SYSTEM (CQS) PARTICIPANT INPUT BINARY SPECIFICATION

1.0 INTRODUCTION

The Securities Industry Automation Corporation (SIAC) serves as the Processor for the Consolidated Quotation Plan from its inception on August 1, 1978. In fulfilling its role as the Processor, SIAC plans, develops, operates, and maintains the Consolidated Quotation System (CQS).

1.1 Background

CQS receives transactions generated by participating U.S. Stock Exchanges and the Financial Industry Regulatory Authority (FINRA). In addition, CQS calculates the National ‘Best Bid and Best Offer’ (NBBO) and identifies the FINRA ‘Best Bid and Best Offer’ (FBBO).

CQS 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.

Quote market data generated by each Participant and FINRA is assembled in prescribed message formats and transmitted to the appropriate TCP/IP Processor address via the Participant’s private communications facility. As each block is received, it is transmitted simultaneously to all data recipients via their private communications facilities. Approved data recipients of the CQS service can redistribute CQS 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 Quotation System (CQS) and the Consolidated Tape System (CTS) in order to receive complete listed equity market data. Reference the CQS and CTS Specifications for further details at: www.ctaplan.com.

1.2 Dual Site Redundancy

Computer systems that support the processing and dissemination of quote 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, CQS 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), all Participant input socket connections at the Primary Data Center will be **closed**. Participants should have an automated mechanism in place once a Participant’s Primary Data Center’s input sockets close, to ‘hunt’ for the Participant’s open input sockets at the Backup Data Center, and immediately establish input connectivity to either their primary or backup input connections (primary and backup connections are assigned the same port number however, the IP addresses are different) **within ten (10) minutes as per SEC requirement**.

1.3 Scope

This specification defines the interface specification and message format requirements for Participants inputting into CQS.

1.4 Data Feed Reference Material

Technical Specifications

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

- CQS Participant Input Specification
- CQS Multicast Output Specification
- CTS Participant Input 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 CQS:

- 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 CQS communications interface design utilizes the TCP/IP protocol.

2.1 TCP/IP Network Interface

The requirements for the TCP/IP Network Interface are in the addendum to this document, ‘TCP/IP for National Market System (NMS) Participant Input’. Participants may request to receive the CQS and TCP/IP Participant Input Specifications by sending an email message to CQS-CTS-OPRA@siac.com.

2.2 TCP/IP Dynamic Input Throttling

All Participants have pre-assigned input rate targets which are enforced through continuous input pacing by the CQS Processor. The input pacing rates are not fixed and can vary depending on changing traffic conditions. For example, if Participant “A” experiences a surge in traffic and requires more bandwidth than their present pacing rate allows, the CQS Processor will “borrow” bandwidth from excess system capacity if available.

3.0 CQS INTERFACE METHOD

Any Participant may input to CQS over one or more logical TCP/IP connections. Each logical connection is considered as a complete independent entity. Participants with multiple input connections should ensure that all transactions for any one symbol (e.g., ABC) are sent over the same line throughout the day. Should transactions for the same symbol be sent simultaneously over separate connections, CQS would not guarantee the order of processing.

Each Participant is supplied with Primary Data Center IP addresses/ports (primary and backup) and Disaster Recovery site (Backup Data Center) IP addresses/ports primary and backup). Primary and backup connections are assigned the same port number however the IP addresses (primary and backup) are different.

In the event a Participant detects a failure of the primary host connection at the Primary Data Center, Participants will be required to establish a connection to the backup host connection which is running in parallel to the primary host at the Primary Data Center. In the event the Primary Data Center is unavailable, each Participant will be required to connect to the Disaster Recovery site (Backup Data Center) IP addresses/ports.

Once a Participant establishes a connection, SIAC recommends that the Participant system, prior to transmitting data, generate a Sequence Information and Message Count Inquiry message to obtain the last Block Sequence Number obtained by CQS. If there is a discrepancy between the Block Sequence Number the Participant system is ready to send, and the Block Sequence Number CQS is ready to receive, the Participant system should re-send the messages in question, before generating any new messages. If a Participant is unable to utilize the Sequence Information and Message Count Inquiry method, SIAC recommends an alternative method. The Participant system, prior to sending data, should re-send a few blocks of data sent prior to disconnect. CQS will reject those messages it has already processed (due to a lower than expected Block Sequence Number) and process those it has not received.

If a Participant is establishing connections to the Disaster Recovery site (Backup Data Center) input lines, or in instances of a CQS cold-start, Participants will be required to re-quote.

3.1 General Design Considerations

CQS receives and transmits variable length blocks having maximum lengths of 1000 bytes. The length includes a Block Header, Block Data and an optional Block Pad Byte.

4.0 TRANSMISSION CHARACTERISTICS

4.1 Data Transmission

Data transmitted between the Participants and CQS is sent using TCP/IP. For a description of the TCP/IP segment, reference the addendum to this document, ‘TCP/IP for NMS Participant Input Interface Specification’. Participants may request to receive the TCP/IP Participant Input Interface Specifications by sending an email message to CQS-CTS-OPRA@siac.com.

The CQS data is sent as a CQS Binary Block, and becomes the TCP/IP payload. Since TCP/IP is byte-stream, a CQS Binary Block boundary may not match the TCP segment boundary; for example, a single TCP segment may contain more than one CQS Binary Block or a CQS Binary Block can be spread between two TCP segments.

A Participant is required to send a Block Separator which will be used to determine the start of the CQS Binary Block. It is the Participant’s responsibility to create the correct CQS Binary Block structure. Incorrect Block Structure information (e.g., Block Separator, Block Header, optional Block Pad, etc.) will result in lost messages or blocks being rejected back to a Participant. An invalid Block Separator will cause a drop of all data received up until a valid Block Separator is found.

In the case of an incorrectly formatted Block, the CQS system will search for the next Block Separator before it will resume processing. To ensure that the Block Separator bytes are not, in fact, actual data within the Block, CQS will additionally check for a valid Block structure and the next Block Separator at the correct position given by the Block Size before considering the Block valid.

4.2 Block Separator

Byte [2]. The Block Separator is a 2 byte sequence of Hex 0xA5 & 0x5A (offers better guarantees that the format will be identified correctly). The source of the Block Separator is both from a Participant to CQS and from CQS to a Participant. The Block Separator is not included in the block size it is independent of the Block. Every Block must be preceded by a Block Separator.

4.3 Binary Block Structure

A Block can have a maximum of 1,000 bytes inclusive of Block Separator, Block Header, Block Data and Block Pad Byte.

| Block Structure | Length |
|---------------------------|---------------|
| Block Header | 10 |
| Block Data | Variable |
| Block Pad Byte (optional) | 1 |

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4.4 Block Data

The Block Data consists of one or more CQS 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 |

4.5 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.

4.6 Data Type

The following data types are used by CQS:

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

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4.6.1 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

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)

4.6.2 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

4.7 Block Header

| Field | Length | Type |
|-----------------------|-----------|---------|
| Version | 1 | Byte |
| Block Size | 2 | Short |
| Block Sequence Number | 4 | Integer |
| Messages In Block | 1 | Byte |
| Block Checksum | 2 | Short |
| Total Length | 10 | |

4.7.1 Version

Byte. Indicates the CQS 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.

4.7.2 Block Size

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

4.7.3 Block Sequence Number

Integer. All transmission blocks are assigned a sequential Block Sequence Number. When the Block Sequence Number reaches 999,999,999, the next expected value is 0000000000 (a future enhancement will increase the number to 3,999,999,999).

On a per line basis, the Block Sequence Number on the lines are set to zero at the start of each day, and incremented by one each time a Block is transmitted, with the following conditions:

- **CQS expects a zero as first Block Sequence Number.**
- All Blocks containing Sequence Information and Message Count Inquiry message (Category C Type I) should have a Block Sequence Number set to zero.
- On every connection and reconnection, SIAC recommends a Participant input a Sequence Information and Message Count Inquiry message (Category C Type I) to synchronize with the expected sequence number.
- If a Participant inputs a Sequence Information and Message Count Inquiry message (Category C Type I), CQS will respond with a Sequence Information and Message Count Response (Category C Type N) message with the 'Current Block Sequence Number' field populated with the next expected Block Sequence Number from the Participant, the 'Last Participant Reference Number Received' field populated with the last Participant Reference Number from the Participant and the count of messages received on an individual line since startup. Message count does not include Line Integrity messages or Sequence Information and Message Count Inquiry messages.

4.7.4 Messages in Block

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

4.7.5 Block Checksum

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

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5.0 MESSAGE HEADER

The Message Header uniquely identifies the Message Category and Message 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 Name | 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 |
| Reserved | 4 | TBD |
| Participant Reference Number | 8 | Signed Long |
| Total Length | 26 | |

5.1 Message Length

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

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5.2 Message Category and Message Type Table

| Message Category | Message Type | Message Source* | Value |
|-----------------------|--------------|-----------------|---|
| Administrative | | | |
| A | H | Part. & CQS | Administrative Unformatted (free form text) |
| A | R | CQS | Rejection |
| A | W | CQS | Warning |
| Control | | | |
| C | A | CQS | Start of Day |
| C | C | Participant | FINRA Close |
| C | I | Participant | Sequence Information and Message Count Inquiry |
| C | N | CQS | Sequence Information and Message Count Response |
| C | O | Participant | FINRA Open |
| C | T | Part. & CQS | Line Integrity |
| C | Z | CQS | End of Day |
| C | 5 | Part. & CQS | Test |
| C | 7 | Part. & CQS | End of Participant Quoting |
| Quote | | | |
| Q | A | Participant | Auction Status |
| Q | L | Participant | Long Quote |
| Q | Q | Participant | Short Quote |
| Q | S | Participant | Special Long Quote (FINRA ADF) with BBO Information |

* The *source* of the message can originate from either a **Participant (Part.)** or from the **CQS** Processor.

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5.2.1 Message Category

Char. The Message Category represents the message classification. Refer to Message Category and Message Type Table *section 5.2*.

5.2.2 Message Type

Char. The Message Type together with the Message Category identifies the message. Refer to Message Category and Message Type Table *section 5.2*.

5.3 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 Quotation System |
| 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) |

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5.4 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 should be set to zero. For any messages generated by CQS, e.g., messages generated on behalf of a Participant, Administrative messages and Control messages, the Timestamp 1 field will be set to zero.

- **If from an Exchange: Timestamp 1** denotes the time where the quote bid price and/or the offer price for a security is designated with an Exchange's Matching Engine Publication timestamp. 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): Timestamp 1** denotes the time of the quote bid price and/or the offer price for a security that a FINRA member reports to the FINRA Alternative Display Facility. FINRA shall provide such times to the Processor in nanoseconds since Epoch.

5.5 Participant Reference Number

Signed Long. Set to Zero. Only zero and positive Participant Reference Numbers are allowed (negative Participant Reference Numbers will be rejected).

Note: As previously published in FAQ'S version 1.1, August 24, 2017 and posted at <https://www.ctaplan.com/tech-specs> under CQS-CTS Binary Specifications), SIAC requires Participants continue to use their ASCII Regional Reference Number (RRN) production population convention when populating the Binary Participant Reference Number (PRN) field. Participants should construct a 6 byte ASCII Regional Reference Number (RRN) and perform a byte-copy of those 6 characters to the lower-significant 6 bytes of the 8 byte PRN field and fill the upper-significant two bytes of the PRN to binary 0s.

RRN/PRN Input Example:

ASCII RRN:

| | | | | | |
|---|---|---|---|---|---|
| 1 | 2 | 3 | A | b | C |
|---|---|---|---|---|---|

New Binary PRN:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 | 0 | 1 | 2 | 3 | A | b | C |
|---|---|---|---|---|---|---|---|

PRN Validation:

- Participant Reference Numbers that do not conform to the ASCII 'Regional Reference Number' data format range requirements in the last six characters **will be rejected**.

5.6 Message ID

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

5.7 Reserved

Space filled. Field is **Reserved for Future Use to be determined (TBD)**.

6.0 MESSAGE FORMATS

The Message Category and Message Type identify the Message and determine the format of the body. Message formats are fixed field formats (with the exception of Administrative and some Control messages which have unformatted text).

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.

If the Participant input fails any of the Block Header, Message Category and Message Body validations, a reject message is returned to the Participant on the line from which the original message was sent.

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.

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6.1 Administrative Unformatted (free form text) Messages– Category A

The Administrative Unformatted (free form text) Category A message is designed to facilitate non-computerized miscellaneous information messages to CQS from a Participant or from CQS to a Participant. The text section of the Administrative message is transmitted in free format (printable ASCII characters only).

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

Varchar [maximum 900]. The Administrative Unformatted (free form text) message is used to provide administrative informational messages. The length of the free form text **cannot** exceed 900 characters. The Administrative messages are disseminated over the CQS 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 |
| Total Length | Maximum 900 | | |

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6.1.2 Rejection – Category A Type R

If CQS receives an invalid Block structure, the invalid Block structure will be rejected. If the Block Header contains invalid data, the Block will be rejected. After CQS receives a message, CQS validates the message and will process if valid and reject if invalid. All blocks or message types can elicit a Rejection response from CQS.

The Rejection message is used for all errors to notify a Participant that CQS has found an error either in the Block Header, Message Header or Message body (e.g., an invalid Price) in a Participant Input message.

| Field Name | Length | Type |
|------------------------------|---------------|-------------|
| Error Code | 1 | Byte |
| Block Sequence Number | 4 | Integer |
| Participant Reference Number | 8 | Signed Long |
| Message ID | 1 | Byte |
| Total Length | 14 | |

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6.1.3 Warning – Category A Type W

The Warning message is sent from CQS to a Participant in response to a Block Sequence Number Gap. The Block will still be processed by CQS.

| Field Name | Length | Type |
|---------------------------------------|-----------|-------------|
| Previous Block Sequence Number | 4 | Integer |
| Previous Participant Reference Number | 8 | Signed Long |
| Total Length | 12 | |

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6.2 Control Messages – Category C

Control messages are used to report specific system events. The source of a Control message can originate from either a Participant or from the CQS Processor. Control message formats fall into two categories:

- Those consisting of a Message Header only
- Those consisting of a Message Header and Message Body

Only one Control message is transmitted in a block and no other messages appear in that block.

A. Control Messages consisting of Message Header Only

| Message Category | Message Type | Value |
|------------------|--------------|--|
| C | A | Start Of Day |
| C | C | FINRA Close |
| C | I | Sequence Information and Message Count Inquiry |
| C | O | FINRA Open |
| C | T | Line Integrity |
| C | Z | End of Day |
| C | 7 | End of Participant Quoting |

B. Control Messages Consisting of Message Header and Message Body

| Message Category | Message Type | Value |
|------------------|--------------|---|
| C | N | Sequence Information and Message Count Response |
| C | 5 | Test |

6.2.1 Start of Day – Category C Type A

The Start of Day message consists of the **Message Header only** and is sent by CQS to a Participant to indicate CQS' readiness to accept data transmission from the Participant to which the message is transmitted. A Participant should not initiate data transfer with CQS until receipt of this message.

6.2.2 FINRA Close – Category C Type C

The FINRA Close message consists of the **Message Header only** and is transmitted by FINRA to CQS to indicate the Close state of FINRA Market Maker(s). All FINRA Market Maker quotes must be in either an Open or Close state where Open implies current and Close implies not current.

6.2.3 Sequence Information and Message Count Inquiry – Category C Type I

The Sequence Information and Message Count Inquiry message consists of the **Message Header only**. Participants' computers and the CQS processor use the Sequence Information and Message Count Inquiry message to synchronize message sequence numbers. Upon receipt of this message, CQS transmits back to the inquiry processor a Sequence Information and Message Count Response Category C Type N message containing the sequence number of the next expected message and the count of messages received on an individual line since startup. Multiple lines for a single Participant are treated as independent lines with their own block sequence numbers. The Sequence Information and Message Count Inquiry message is transmitted in a separate message block containing only the Sequence Information and Message Count Inquiry message.

6.2.4 Sequence Information and Message Count Response – Category C Type N

The Sequence Information and Message Count Response message is generated by CQS to a Participant in response to a Sequence Information and Message Count Inquiry message. It contains the block sequence number of the last message received prior to receipt of the Sequence Information and Message Count Inquiry message. The Sequence Information and Message Count Response message is transmitted in a separate message block containing only the Sequence Information and Message Count Response message.

| Field Name | Length | Type | Value |
|-----------------------------------|-----------|-------------|--|
| Current Block Sequence Number | 4 | Integer | Contains Next Expected Participant Block Sequence Number |
| Last Participant Reference Number | 8 | Signed Long | Contains Last Participant Reference Number Received |
| Message Count | 8 | Long | Contains the count of messages received on an individual line since startup. Message count does not include Line Integrity Messages or Sequence Information and Message Count Inquiry messages |
| Total Length | 20 | | |

Note:

- The Participant Reference Number that is returned is the Participant Reference Number received for the individual line on which the Sequence Information and Message Count Inquiry message was sent.

6.2.5 FINRA Open Category – C Type O

The FINRA Open message consists of the **Message Header only** and is transmitted by FINRA to CQS. This message indicates the Open state of FINRA Market Maker(s). All FINRA Market Maker quotes must be in either an Open or Close state, whereby Open implies 'current' and Close implies not current.

6.2.6 Line Integrity Participant to CQS / CQS to Participant – Category C Type T

Line Integrity Participant to CQS:

The **Participant to CQS** Category C Type T Line Integrity message consists of the **Message Header only** and is for optional use by a Participant. Line Integrity messages may be generated by a Participant to CQS at set intervals selected by a Participant (interval is configurable on a per exchange basis, e.g., Participant ‘A’ could be configured for 10 second wait intervals while Participant ‘B’ could be configured for 20 second wait intervals, etc.). The interval selected by a Participant will be used across all their input lines to provide verification of input line integrity either on a primary or backup input line. A Participant is required to input Category C Type T messages every 5 seconds regardless of the threshold interval utilized by the Participant once connection is established. If a Participant does not input Category C Type T messages or data to CQS within the Participants’ configured wait interval, CQS will assume an issue exists and will break the connection on the Participants’ connected input line. This will allow the Participant to reconnect to their primary or backup input line (e.g., connection should be made to the backup input line if the disconnect was made to the primary, conversely, connection should be made to the primary input line if the disconnect was made to the backup input line).

The Message Header field descriptions will be the same as in this CQS Participant Input Specification, with the exception of the Block Sequence Number field which will be populated as follows:

- The Block Sequence Number field is not incremented for Participant to CQS Category C Type T Line Integrity messages. The Block Sequence Number field will contain the Block Sequence Number of the last original message generated by the Participant.

Line Integrity CQS to Participant:

The **CQS to Participant** Category C Type T Line Integrity message consists of the **Message Header only** and is generated by CQS to each Participant at 1-minute intervals. A Participant can commence sending Line Integrity messages to CQS once the Participant lines have been started, the Participant has established connections and a Start of Day message has been sent to the Participant. Its primary function is to provide verification of line integrity during periods of inactivity. However, this message is also sent during periods of activity.

Line Integrity messages generated by CQS to a Participant will have the Message Header Timestamp 1 field populated with the Line Integrity time. 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).

Note:

- A Line Integrity message coming from a Participant to CQS is mutually exclusive from a Line Integrity message sent by CQS to a Participant (there is no correlation between the two Line Integrity message functionalities).

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

6.2.7 End of Day – Category C Type Z

The End of Day message consists of the **Message Header only** and is sent by CQS to a Participant to indicate that the Participant should not transmit any further messages to CQS. Messages received by CQS after the End of Day message has been transmitted will be rejected.

6.2.8 Test – Category C Type 5

CQS or a Participant may generate a Test message at any time during the day. Its function is to exercise the line to verify transmission integrity. A Test message is transmitted as the only message in a block.

| Field Name | Length | Type | Value |
|---------------------|------------|----------|--|
| Data | 256 | Byte [] | All ASCII characters starting with hex 0 and ending hex FF, in sequential order. |
| Total Length | 256 | | |

6.2.9 End of Participant Quoting (EOPQ) – Category C Type 7

The End of Participant Quoting (EOPQ) message consists of the **Message Header only** and is sent by CQS to a Participant or by a Participant to CQS. Once the EOPQ is processed, CQS will send closing quotes for that Participant. After the execution of an End of Participant Quoting message CQS processing will not accept any further messages from the Participant.

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

6.3 Quote Messages – Category Q

6.3.1 Auction Status – Category Q 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 |
| Reserved (for future use) | 62 | TBD |
| Total Length | 99 | |

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

6.3.2 Long Quote – Category Q Type L

The Long Quote message is used to report quote information for CTA eligible Equity, Local Issue or Bonds. This message can also be used to report trading suspensions in a security, price indications and trading range indications. The Long Quote message should be used by FINRA ADF only when either no FINRA BBO exists (FINRA BBO Indicator value ‘A’) or there is no FINRA BBO change FINRA BBO Indicator value ‘B’ and will not be used to remove FINRA ADF from the NBBO.

| Field Name | Length | Data Type |
|----------------------------------|-----------|-------------|
| Security Symbol | 11 | Char [] |
| Instrument Type | 1 | Char |
| Quote Condition | 1 | Char |
| Security Status Indicator | 1 | Char |
| Bid Price | 8 | Long |
| Bid Size | 4 | Integer |
| Offer Price | 8 | Long |
| Offer Size | 4 | Integer |
| Retail Interest Indicator | 1 | Char |
| Settlement Condition | 1 | Char |
| Market Condition | 1 | Char |
| FINRA Market Maker ID | 4 | Char [] |
| FINRA BBO Indicator | 1 | Char |
| Timestamp 2 | 8 | 2 x Integer |
| Short Sale Restriction Indicator | 1 | Char |
| Total Length | 55 | |

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

6.3.3 Short Quote – Category Q Type Q

The Short Quote message is used to report Bid and Offer quote information for **CTA eligible Equity only** (not used for Local Issues or Bonds) if the quote meets all the criteria and message format requirements otherwise Long Quote message is used.

| The Short Quote has the following criteria: | |
|---|---|
| 1. | Instrument Type is implied 'CTA Eligible Equity'. |
| 2. | Quote Condition is implied 'Regular' quote condition. |
| 3. | Settlement Condition is implied regular way settlement. |
| 4. | Market Condition is implied normal auction market. |
| 5. | Quote is <u>not</u> from FINRA ADF. |

| Field Name | Length | Type |
|---------------------|-----------|----------|
| Security Symbol | 5 | Char [] |
| Bid Price | 2 | Short |
| Bid Size | 2 | Short |
| Offer Price | 2 | Short |
| Offer Size | 2 | Short |
| Reserved | 2 | TBD |
| Total Length | 15 | |

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

6.3.4 Special Long Quote (FINRA ADF) with FBBO Information – Category Q Type S

The Special Long Quote (FINRA ADF) with BBO Information message should **only be used by FINRA ADF** for CTA eligible Equity, Local Issue or Bond information to identify the FINRA Best Bid and Best Offer at the Bid and/or Offer side for their Market Makers inclusive of changes to any existing FINRA BBO. The FINRA Best Bid and Best Offer information will be used in the National Best Bid and Best Offer (NBBO) calculation.

| Field Name | Length | Type |
|----------------------------------|-----------|-------------|
| Security Symbol | 11 | Char [] |
| Instrument Type | 1 | Char |
| Quote Condition | 1 | Char |
| Security Status Indicator | 1 | Char |
| Bid Price | 8 | Long |
| Bid Size | 4 | Integer |
| Offer Price | 8 | Long |
| Offer Size | 4 | Integer |
| Retail Interest Indicator | 1 | Char |
| Settlement Condition | 1 | Char |
| Market Condition | 1 | Char |
| FINRA Market Maker ID | 4 | Char [] |
| FINRA Best Bid Quote Condition | 1 | Char |
| FINRA Best Bid Price | 8 | Long |
| FINRA Best Bid Size | 4 | Integer |
| FINRA Best Bid Market Maker ID | 4 | Char [] |
| FINRA Best Offer Quote Condition | 1 | Char |
| FINRA Best Offer Price | 8 | Long |
| FINRA Best Offer Size | 4 | Integer |
| FINRA Best Offer Market Maker ID | 4 | Char [] |
| Timestamp 2 | 8 | 2 x Integer |
| Short Sale Restriction Indicator | 1 | Char |
| Total Length | 88 | |

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

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 QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

FIELD DESCRIPTIONS

| Field Name | Length | Description |
|------------|--------|---|
| Bid Price | 2 or 8 | <p>2 Short. Short have implied 2 decimal places and a maximum price of \$655.35.</p> <p>8 Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615.</p> <p>The Bid Price represents the highest price a prospective buyer is prepared to pay at a particular time for a security.</p> <p>When the Bid Price and the Bid Size fields are all zeroes, it represents a 'No Bid' quote, a 'No Quote' (i.e., neither a Bid nor an Offer, which zeroes out the quote), an Opening Delay or Trading Halt condition. If the Bid Size is set to zero and there is a Bid Price, it represents either a Trading Range Indication, or a Price Indication.</p> |
| Bid Size | 2 or 4 | <p>2 Short. Short have a maximum size of 65,535.</p> <p>4 Integer. Integer has a maximum size of 4,294,967,295.</p> <p>The Bid Size identifies the number of round-lots, for a security (e.g., 001 = one round-lot).</p> <p>Primarily, a unit of trade or round-lot consists of 100 shares or multiples thereof (e.g., 200, 1000, 5000, etc.). Certain securities trade in round-lot multiples other than 100 shares; other units of trade are 1, 10, 25 or 50 share round-lots.</p> <p>When the Bid Size field is all zeroes, it represents a 'No Bid' quote, a 'No Quote' (i.e., neither a Bid nor an Offer, which zeroes out the quote), a Trading Range Indication, or a Price Indication.</p> |

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | | | |
|--------------------------------|--|--|------|-------|-------|--|---|---------------------|---|---------------------|
| FINRA BBO Indicator | 1 | <p>Char.</p> <p>For FINRA, represents the FINRA BBO state of the FINRA quote.</p> <table><tr><th>Code</th><th>Value</th></tr><tr><td>Space</td><td>FINRA BBO Indicator Not Applicable (used by Participants other than FINRA)</td></tr><tr><td>A</td><td>No FINRA BBO Change</td></tr><tr><td>B</td><td>No FINRA BBO Exists</td></tr></table> | Code | Value | Space | FINRA BBO Indicator Not Applicable (used by Participants other than FINRA) | A | No FINRA BBO Change | B | No FINRA BBO Exists |
| Code | Value | | | | | | | | | |
| Space | FINRA BBO Indicator Not Applicable (used by Participants other than FINRA) | | | | | | | | | |
| A | No FINRA BBO Change | | | | | | | | | |
| B | No FINRA BBO Exists | | | | | | | | | |
| FINRA Best Bid Market Maker ID | 4 | <p>Char [4]. Left justified, space-filled.</p> <p>Represents the FINRA provided FINRA Best Bid Market Maker identifier of the Market Maker that had the FINRA Best Bid (FBBO).</p> | | | | | | | | |
| FINRA Best Bid Price | 8 | <p>8 Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615.</p> <p>Optional set to zero.</p> <p>Represents the FINRA provided FINRA Best Bid Price that is the FINRA Best Bid (FBBO).</p> | | | | | | | | |
| FINRA Best Bid Quote Condition | 1 | <p>Char. Space-filled.</p> <p>Represents the FINRA provided FINRA Best Bid Quote Condition associated with the FINRA Best Bid Price that had the FINRA Best Bid (FBBO).</p> | | | | | | | | |
| FINRA Best Bid Size | 4 | <p>4 Integer. Integer has a maximum size of 4,294,967,295.</p> <p>Optional set to zero.</p> <p>Represents the FINRA provided FINRA Best Bid Size associated with the FINRA Best Bid Price that had the FINRA Best Bid (FBBO).</p> <p>Primarily, a unit of trade or round-lot consists of 100 shares or multiples thereof (e.g., 200, 1000, 5000, etc.). Certain securities trade in round-lot multiples other than 100 shares; other units of trade are in 1, 10, 25 or 50 share round-lots.</p> | | | | | | | | |
| FINRA Best Offer Price | 8 | <p>8 Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615.</p> <p>Optional set to zero.</p> <p>Represents the FINRA provided Best FINRA Offer Price that is the FINRA Best Offer (FBBO).</p> | | | | | | | | |

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | | | | | |
|----------------------------------|---------------------|---|------|-------|---|---------------------|---|-------------|---|----------------|---|-----------------|
| FINRA Best Offer Size | 4 | <p>4 Integer. Integer has a maximum size of 4,294,967,295. Optional set to zero.</p> <p>Represents the FINRA provided FINRA Best Offer Size associated with the FINRA Best Offer Price that had the FINRA Best Offer (FBBO).</p> <p>Primarily, a unit of trade or round-lot consists of 100 shares or multiples thereof (e.g., 200, 1000, 5000, etc.). Certain securities trade in round-lot multiples other than 100 shares; other units of trade are in 1, 10, 25 or 50 share round-lots.</p> | | | | | | | | | | |
| FINRA Best Offer Market Maker ID | 4 | <p>Char [4]. Left justified, space-filled.</p> <p>Represents the FINRA provided FINRA Best Offer Market Maker identifier of the Market Maker that had the FINRA Best Offer (FBBO).</p> | | | | | | | | | | |
| FINRA Best Offer Quote Condition | 1 | <p>Char. Space-filled.</p> <p>Represents the FINRA provided FINRA Best Offer Quote Condition associated with the Best FINRA Offer Price that had the FINRA Best Offer (FBBO).</p> | | | | | | | | | | |
| FINRA Market Maker ID (MMID) | 4 | <p>Char [4]. Left justified, space-filled.</p> <p>Contains the FINRA Market Maker ID of the quoting participant on FINRA's Alternative Display Facility (ADF) or the FINRA ADF Identifier ‘FNRA’.</p> | | | | | | | | | | |
| Instrument Type | 1 | <p>Char.</p> <p>Identifies the instrument type relevant to the quote.</p> <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 | | | | | | | | | | | |

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | | | |
|----------------------|-----------------------|--|------|-------|-------|-----------------------|---|----------------|---|---------------|
| Market Condition | 1 | <p>Char.</p> <p>Identifies the market condition of a quote for a security. Crossed Market and Locked Market are only applicable to Government Bonds. In cases of a Normal Auction Market, the Bid Price must be less than the Offer Price. In cases of a Crossed Market, the Bid Price must be greater than the Offer Price. In cases of a Locked Market, the Bid Price must be equal to the Offer Price.</p> <table><tr><th>Code</th><th>Value</th></tr><tr><td>Space</td><td>Normal Auction Market</td></tr><tr><td>A</td><td>Crossed Market</td></tr><tr><td>B</td><td>Locked Market</td></tr></table> | Code | Value | Space | Normal Auction Market | A | Crossed Market | B | Locked Market |
| Code | Value | | | | | | | | | |
| Space | Normal Auction Market | | | | | | | | | |
| A | Crossed Market | | | | | | | | | |
| B | Locked Market | | | | | | | | | |
| Number of Extensions | 1 | <p>Byte.</p> <p>Optional set to zero.</p> <p>Identifies the number of manual or automatic extensions the applicable auction has received. 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.</p> | | | | | | | | |

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

FIELD DESCRIPTIONS

| Field Name | Length | Description |
|-------------|--------|---|
| Offer Price | 2 or 8 | <p>2 Short. Short have implied 2 decimal places and a maximum price of \$655.35.</p> <p>8 Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615.</p> <p>The Offer Price represents the lowest price acceptable to a prospective seller at a particular time for a security.</p> <p>When the Offer Price and the Offer Size fields are all zeroes, it represents a 'No Offer' quote, a 'No Quote' (i.e., neither a Bid nor an Offer; which zeroes out the quote), an Opening Delay or Trading Halt condition. If the Offer Size is zero and there is an offer price, it represents either a Trading Range Indication, or a Price Indication.</p> |
| Offer Size | 2 or 4 | <p>2 Short. Short have a maximum size of 65,535.</p> <p>4 Integer. Integer has a maximum size of 4,294,967,295.</p> <p>The Offer Short Size identifies the number of round-lots for a security.</p> <p>Primarily, a unit of trade or round-lot consists of 100 shares or multiples thereof (e.g., 200, 1000, 5000, etc.). Certain securities trade in round-lot multiples other than 100 shares; other units of trade are 1, 10, 25 or 50 shares.</p> <p>When the Offer Size field is all zeroes, it represents a 'No Offer' quote, a 'No Quote' (i.e., neither a Bid nor an Offer, which zeroes out the quote), a Trading Range Indication, or a Price Indication.</p> |

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|--|---|------|-------|-------|--|---|--|---|--|---|-----------------------------------|---|---|---|---|---|---|---|---|---|--|---|-------------------------------------|---|-------------------------------|---|--|---|--|---|---|
| Quote Condition | 1 | <div>Char.</div> <div>Denotes a particular condition applicable to the quote. The Quote Condition is used to determine whether a quote qualifies for the Best Bid and Best Offer calculation. When the Quote Condition field is not provided, the Security Status Indicator field must be provided.</div> <table><tr><th>Code</th><th>Value</th></tr><tr><td>Space</td><td>Quote Condition Not Applicable When Quote Condition is space filled, the Security Status Indicator field must contain a value other than space.</td></tr><tr><td>A</td><td>Slow Quote on Offer Side (Eligible for BBO)</td></tr><tr><td>B</td><td>Slow Quote on Bid Side (Eligible for BBO)</td></tr><tr><td>C</td><td>Closing (Not eligible for BBO)</td></tr><tr><td>E</td><td>Slow Quote Due to LRP or Gap Quote on the Bid Side (ONLY OFFER SIDE is eligible for BBO)</td></tr><tr><td>F</td><td>Slow Quote Due to LRP or Gap Quote on the Offer Side (ONLY BID SIDE is eligible for BBO)</td></tr><tr><td>H</td><td>Slow Quote on the Bid and Offer Sides (Eligible for BBO)</td></tr><tr><td>L</td><td>Closed Market Maker (FINRA) (Not eligible for BBO)</td></tr><tr><td>N</td><td>Non-Firm Quote (Not eligible for BBO)</td></tr><tr><td>O</td><td>Opening Quote (Eligible for BBO)</td></tr><tr><td>R</td><td>Regular (Eligible for BBO)</td></tr><tr><td>U</td><td>Slow Quote Due to Liquidity Replenishment Point (LRP), or Gap Quote on Both the Bid and Offer Sides (Not eligible for BBO)</td></tr><tr><td>W</td><td>Slow Quote Due to Set Slow List on Both the Bid and Offer Sides (Eligible for BBO)</td></tr><tr><td>4</td><td>On Demand Intra-Day Auction (Not eligible for BBO)</td></tr></table> | Code | Value | Space | Quote Condition Not Applicable When Quote Condition is space filled, the Security Status Indicator field must contain a value other than space. | A | Slow Quote on Offer Side (Eligible for BBO) | B | Slow Quote on Bid Side (Eligible for BBO) | C | Closing (Not eligible for BBO) | E | Slow Quote Due to LRP or Gap Quote on the Bid Side (ONLY OFFER SIDE is eligible for BBO) | F | Slow Quote Due to LRP or Gap Quote on the Offer Side (ONLY BID SIDE is eligible for BBO) | H | Slow Quote on the Bid and Offer Sides (Eligible for BBO) | L | Closed Market Maker (FINRA) (Not eligible for BBO) | N | Non-Firm Quote (Not eligible for BBO) | O | Opening Quote (Eligible for BBO) | R | Regular (Eligible for BBO) | U | Slow Quote Due to Liquidity Replenishment Point (LRP), or Gap Quote on Both the Bid and Offer Sides (Not eligible for BBO) | W | Slow Quote Due to Set Slow List on Both the Bid and Offer Sides (Eligible for BBO) | 4 | On Demand Intra-Day Auction (Not eligible for BBO) |
| Code | Value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Space | Quote Condition Not Applicable When Quote Condition is space filled, the Security Status Indicator field must contain a value other than space. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | Slow Quote on Offer Side (Eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B | Slow Quote on Bid Side (Eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C | Closing (Not eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E | Slow Quote Due to LRP or Gap Quote on the Bid Side (ONLY OFFER SIDE is eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| F | Slow Quote Due to LRP or Gap Quote on the Offer Side (ONLY BID SIDE is eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H | Slow Quote on the Bid and Offer Sides (Eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L | Closed Market Maker (FINRA) (Not eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N | Non-Firm Quote (Not eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| O | Opening Quote (Eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| R | Regular (Eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| U | Slow Quote Due to Liquidity Replenishment Point (LRP), or Gap Quote on Both the Bid and Offer Sides (Not eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| W | Slow Quote Due to Set Slow List on Both the Bid and Offer Sides (Eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | On Demand Intra-Day Auction (Not eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | | | | | |
|---------------------------|--|---|------|-------|-------|--------------------------------|---|------------------------------|---|--------------------------------|---|--|
| Reserved | Variable | Field is reserved for future use. | | | | | | | | | | |
| Retail Interest Indicator | 1 | <p>Char.</p> <p>When Retail Price Improvement (RPI) interest is priced better than the Protected Best Bid or Offer (PBBO) by a minimum of \$0.001, an indication of interest on the Bid, Offer, or both the Bid and Offer will identify that interest will be eligible to interact with incoming Retail Order interest.</p> <table><tr><th>Code</th><th>Value</th></tr><tr><td>Space</td><td>Retail Interest Not Applicable</td></tr><tr><td>A</td><td>Retail Interest on Bid Quote</td></tr><tr><td>B</td><td>Retail Interest on Offer Quote</td></tr><tr><td>C</td><td>Retail Interest on both the Bid and Offer Quotes</td></tr></table> | Code | Value | Space | Retail Interest Not Applicable | A | Retail Interest on Bid Quote | B | Retail Interest on Offer Quote | C | Retail Interest on both the Bid and Offer Quotes |
| Code | Value | | | | | | | | | | | |
| Space | Retail Interest Not Applicable | | | | | | | | | | | |
| A | Retail Interest on Bid Quote | | | | | | | | | | | |
| B | Retail Interest on Offer Quote | | | | | | | | | | | |
| C | Retail Interest on both the Bid and Offer Quotes | | | | | | | | | | | |

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------|--|---|----------------|--|------------|----------------|------|-------|--|--|-------|--|--|--|---|--------------------|---|--|---|--------------------------|--|--|---|-----------------|--|---|---|--|---|--|---|--------------|---|--|---|---------|--|--|---|-------------|--|---|---|-------------------|--|---|---|---------------------|--|--|---|--|---|--|---|--|---|--|---|--|---|--|
| Security Status Indicator | 1 | <p>Char.</p> <p>The Security Status Indicator field is used to report trading suspensions in a security, price indications, trading range indications, LULD Price Bands and Market Wide Circuit Breaker activity. When the Security Status Indicator is provided, the Quote Condition field must be space filled. If the Security Status Indicator is populated with either a regulatory or a non-regulatory status (other than Market Wide Circuit Breaker Levels), it will result in the BBO being recalculated excluding the Participant from the BBO if that Participant was part or all of the BBO.</p> <table><tr><th></th><th></th><th>Regulatory</th><th>Non Regulatory</th></tr><tr><th>Code</th><th>Value</th><th></th><th></th></tr><tr><td>Space</td><td>Security Status Indicator Not Applicable When Security Status Indicator is space filled, the Quote Condition field must contain a value other than space.</td><td></td><td></td></tr><tr><td>D</td><td>News Dissemination</td><td>X</td><td></td></tr><tr><td>G</td><td>Trading Range Indication</td><td></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>T</td><td>Resume*</td><td></td><td></td></tr><tr><td>X</td><td>Operational</td><td></td><td>X</td></tr><tr><td>Y</td><td>Sup-Penny Trading</td><td></td><td>X</td></tr><tr><td>Z</td><td>No Open-No Resume**</td><td></td><td></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> <p>* Used to indicate that trading for a Participant is no longer suspended in a security which had been Opening Delayed or Trading Halted.</p> <p>** Used to indicate that an Opening Delay or a Trading Halt is to be in effect for the rest of the trading day in a security for a Participant.</p> | | | Regulatory | Non Regulatory | Code | Value | | | Space | Security Status Indicator Not Applicable When Security Status Indicator is space filled, the Quote Condition field must contain a value other than space. | | | D | News Dissemination | X | | G | Trading Range Indication | | | I | Order Imbalance | | X | M | Limit-Up-Limit Down (LULD) Trading Pause | X | | P | News Pending | X | | T | Resume* | | | X | Operational | | X | Y | Sup-Penny Trading | | X | Z | No Open-No Resume** | | | 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 | |
| | | Regulatory | Non Regulatory | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Code | Value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Space | Security Status Indicator Not Applicable When Security Status Indicator is space filled, the Quote Condition field must contain a value other than space. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D | News Dissemination | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| G | Trading Range Indication | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I | Order Imbalance | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M | Limit-Up-Limit Down (LULD) Trading Pause | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P | News Pending | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| T | Resume* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X | Operational | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Y | Sup-Penny Trading | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Z | No Open-No Resume** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|--------------|--|------------------|-------------|------|-----|-----|-------|--------------|---------------|-----|-------|--------------|-----------|-----|-----|-----|-----|-------|--------------|----------|------|-------|------|--------------|-----|-------|-------|-------|--------------|
| Security Symbol | 5 or 11 | <p>Char [5] or [11]. Left justified, space-filled.</p> <p>Contains the security symbol. 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>Note: CQS 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.</p> <p>Identification of Test Data: The purpose of a Test Message is to have a mechanism whereby end-to-end connectivity and functionality between the CQS Participant and Data Recipient can be tested prior to the opening or during normal operational hours.</p> <p>Messages with any of the dedicated test symbols will be included in Participant statistics (e.g., National BBO calculations), but will be excluded in quote counts, etc.</p> <p>Alphanumeric Test Symbols are reserved for future use.</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 |
| 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

FIELD DESCRIPTIONS

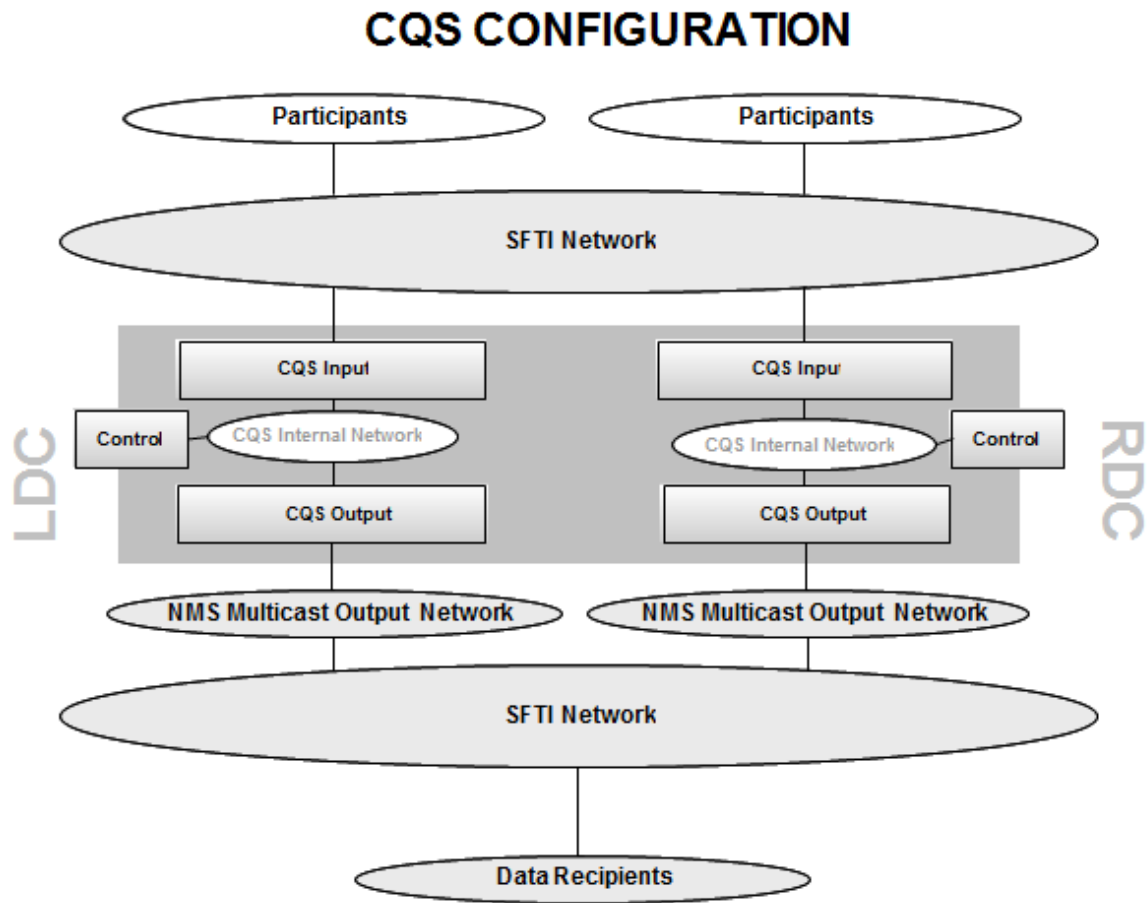
| Field Name | Length | Description | | | | | | | | | | |
|----------------------------------|---------------------------------------|--|------|-------|-------|---------------------------------------|---|----------------------------------|---|----------------------------------|---|------------------------------------|
| Settlement Condition | 1 | <p>Char.</p> <p>Identifies the settlement condition for a security.</p> <table><tr><th>Code</th><th>Value</th></tr><tr><td>Space</td><td>Regular Way Settlement</td></tr><tr><td>A</td><td>Cash (only) Settlement</td></tr><tr><td>B</td><td>Next Day (only) Settlement</td></tr></table> | Code | Value | Space | Regular Way Settlement | A | Cash (only) Settlement | B | Next Day (only) Settlement | | |
| Code | Value | | | | | | | | | | | |
| Space | Regular Way Settlement | | | | | | | | | | | |
| A | Cash (only) Settlement | | | | | | | | | | | |
| B | Next Day (only) Settlement | | | | | | | | | | | |
| Short Sale Restriction Indicator | 1 | <p>Char.</p> <p>Identifies whether or not a Short Sale Restriction is in effect. Populated by the Primary Listing Exchange for a security, with the previous quote price.</p> <p>Day 1: When a security’s price decreases by 10% or more from the previous day’s closing price, the primary listing market will generate a Quote message denoting ‘Short Sale Restriction Activated’.</p> <p>Day 2: As the short sale restriction will remain in effect the day after activation, the primary listing market will generate a Quote message denoting ‘Short Sale Restriction Continued’ (anticipated prior to the primary listing market open). In the event a security’s price decreases by an additional 10% or more from the previous day’s closing price, the primary listing market will generate a Quote message denoting ‘Short Sale Restriction Activated’ (reverts to Day 1).</p> <p>Day 3: As the short sale restriction is to be lifted at the end of Day 2, the primary listing market will generate a Trading Status message denoting ‘Short Sale Restriction Deactivated’ (anticipated prior to the primary listing market open).</p> <table><tr><th>Code</th><th>Value</th></tr><tr><td>Space</td><td>Short Sale Restriction Not Applicable</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></table> | Code | Value | Space | Short Sale Restriction Not Applicable | A | Short Sale Restriction Activated | C | Short Sale Restriction Continued | D | Short Sale Restriction Deactivated |
| Code | Value | | | | | | | | | | | |
| Space | Short Sale Restriction Not Applicable | | | | | | | | | | | |
| A | Short Sale Restriction Activated | | | | | | | | | | | |
| C | Short Sale Restriction Continued | | | | | | | | | | | |
| D | Short Sale Restriction Deactivated | | | | | | | | | | | |

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

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)-provided timestamp represented in terms 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 2 is not provided, this field should be set to zero. For any messages generated by CQS, e.g., messages generated on behalf of a Participant, Administrative messages and Control messages, the Timestamp 2 field will be set to zero.</p> <ul style="list-style-type: none">▪ If from an Exchange: Timestamp 2 field should be set to zero.▪ If from the FINRA Alternative Display Facility (ADF):<ul style="list-style-type: none">▪ If the FINRA ADF provides a proprietary feed of its quotation information, then FINRA will publish the time of the quotation as also published on the facility's proprietary feed. FINRA shall provide such times to the Processor in nanoseconds since Epoch.▪ If the FINRA ADF does not have a proprietary quotation feed then the Timestamp 2 field should be set to zero. |

APPENDIX A: CQS CONFIGURATION



**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

APPENDIX B: GLOSSARY

| Term | Description |
|---|---|
| Below Continuing Listing Standards | A financial status designation pertaining to Tape ‘A’ and Tape ‘B’ listed securities. The status identifies a company, whose issue is listed on the New York Stock Exchange, the NYSE American Stock Market or on one of the participating U.S. Stock Exchanges, and has failed to meet established listings standards. The listing exchange will subsequently review the appropriateness of continuing to list the issue, and may decide to commence the process of delisting the issue. |
| Cash (Only) Settlement | A security settling in cash all day on a participant or consolidated basis, such as a Common, Preferred or Right that is nearing expiration. Participants can elect to report different settlements in the same security during the day based on their own settlement requirements. For example, one participant can report quotes as cash (only) settlement while another participant can report quotes as regular or next day settlement. |
| Creations Suspended (For Exchange Traded Products) | A financial status designation used to denote the ability to create new shares of this Exchange Traded Product (ETP) has been temporarily suspended by the ETP Issuer. ETPs that are closed for Creations typically are allowed to continue trading on the listing market once the ETP Issuer publishes the press release. |
| Crossed Market | Indicates a Bid Price, which is greater than the Offer Price for a security for a quote. (Only applicable to Bonds.) |
| CTA Eligible Equity | Generally, any common stock, rights, long-term warrants 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 Stock Market for such securities. |
| Ex-Distribution | Securities without the right to receive the forthcoming distribution of securities, which has been recently declared. |
| Ex-Dividend | Securities without the right to receive the forthcoming dividend, which has been recently declared. |
| Ex-Interest | Debt related securities without the right to receive the forthcoming interest, which has been recently declared. |
| Ex-Rights | Securities without the right to buy a company's securities at a discount from the prevailing market price, which was distributed until a particular date. Typically, after that date, the rights trade separately from the security itself. |

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

GLOSSARY

| Term | Description |
|---|--|
| Late Filing | A financial status designation pertaining to Tape ‘A’ and Tape ‘B’ issues (i.e. issues listed on the NYSE, the NYSE American Stock Market or on one of the participating U.S. Stock Exchanges). The status identifies a company, which has failed to meet established listings standards for filing its annual reports. |
| Limit Up-Limit Down (LULD) Price Band | <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: http://www.sec.gov/news/press/2011/2011-84.htm</p> <p>Note1: There are no sizes associated with LULD Price Bands. Note2: ‘Limit Up-Limit Down’ Price Bands are republished every 30 seconds at clock time.</p> |
| 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. |
| 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. |
| Liquidation (For Exchange Traded Products) | A financial status designation used to denote that the ETP Issuer announced the ETP will be liquidated and NYSE ARCA announced the date the ETP will be suspended from trading. |
| Local Issue | A Local Issue is an issue that does not meet the NYSE American Stock Market or NYSE listing requirements (is not CTA eligible) but is traded at one or more participating U.S. Stock Exchanges. |
| Locked Market | Indicates an identical Bid and Offer Price for a security for a quote. (Only applicable to Bonds.) |

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

GLOSSARY

| Term | Description |
|--|--|
| Market-Wide Circuit Breaker Level 1 – 7% Decline | This Regulatory Trading Halt is used to denote that trading is suspended due to the S&P 500 Index reaching a 7% decline level below its closing value on the previous trading day. A Level 1 Market-Wide Circuit Breaker Regulatory Trading Halt would operate as follows: before 3:25 p.m. ET – duration 15 minutes; at or after 3:25 p.m. ET – trading shall continue, unless there is a Level 3 Market-Wide Circuit Breaker Regulatory Trading Halt. |
| Market-Wide Circuit Breaker Level 2 – 13% Decline | This Regulatory Trading Halt is used to denote that trading is suspended due to the S&P 500 Index reaching a 13% decline level below its closing value on the previous trading day. A Level 2 Market-Wide Circuit Breaker Regulatory Trading Halt would operate as follows: before 3:25 p.m. ET – duration 15 minutes; at or after 3:25 p.m. ET – trading shall continue, unless there is a Level 3 Market-Wide Circuit Breaker Regulatory Trading Halt. |
| Market-Wide Circuit Breaker Level 3 – 20% Decline | 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 <u>not</u> Resume for the remainder of the trading day. |
| Next Day (Only) Settlement | Same definition as cash (only) settlement except settlement is next day. |
| Non-Regulatory Opening Delay or Trading Halt | An operational Opening Delay or Trading Halt for a Participant due to Order Imbalance, Order Influx or Operational. |
| Normal Auction Market | Where the quote bid price is less than the offer price for a security for a Participant. |
| On Demand Intra-Day Auction | This quote condition is used to provide additional clarity to the CQS Participants and allow them to take part in an auction which will enhance liquidity in the marketplace. It is anticipated that this quote condition will be input into CQS by Participants with a zero bid price, zero bid size, zero offer price, and zero offer size and disseminated over the CQS multicast output lines. |
| Opening Delay | Postponement of the opening of trading in a security for a Participant. |

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

GLOSSARY

| Term | Description |
|---|---|
| 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. |
| Redemptions Suspended (For Exchange Traded Products) | A financial status designation used to denote the ability to redeem shares of this ETP has been suspended by the ETP Issuer. ETPs that are closed for redemption will remain halted on the listing market. |
| Regular Way Settlement | The settlement date is within three (3) business days following the date of the transaction. |
| Regulatory Opening Delay Or Trading Halt | An Opening Delay or Trading Halt in a particular security for a Participant in advance of a major news announcement and is noted with a News Dissemination or News Pending quote condition. In addition, Due To Related Security can be used in conjunction with a regulatory Delay/Halt Reason, i.e., News Dissemination or News Pending. |
| Republished Limit Up-Limit Down Price Band | Indicates that the Price Band being disseminated is a republication of the latest Price Band for a security. |
| Resume | This quote condition along with zero-filled bid, offer and size fields is used to indicate that trading for a Participant is no longer suspended in a security which had been Opening Delayed or Trading Halted. |
| 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. |
| Sub-Penny Trading | Indicates a non-regulatory Opening Delay or Trading Halt for a security whose price may fall below \$1.05, possibly leading to a sub-penny execution. |
| Trading Halt | Temporary halt in trading in a particular security for a Participant. |

APPENDIX C: FINRA OPEN / FINRA CLOSE

The FINRA Open (Category C Type O) and FINRA Close (Category C Type C) messages are specified for transmission by FINRA to CQS to indicate the Open or Close state of FINRA Market Maker quotes. All FINRA Market Maker quotes must be in either an Open or Close state where Open implies current and Close implies not current.

Upon detection of a FINRA Open (Category C Type O) message received from FINRA, CQS shall assemble and transmit a FINRA Open message to the output Multicast line data recipients. FINRA can send multiple FINRA Open messages in a trading day. Upon detection of a FINRA Closed (Category C Type C) message received from FINRA, CQS shall assemble and transmit a FINRA Closed message to the output Multicast line data recipients.

Prior to receipt of the FINRA Open (Category C Type O) message, all quotes are to be indicated as Closed by FINRA. Upon receipt of the FINRA Open message, all individual Market Maker quotes that have been transmitted during the current day prior to receipt of the FINRA Open message should be indicated as Open by FINRA.

Upon receipt of the FINRA Closed (Category C Type C) message, all individual Market Maker quotes should be indicated as closed. FINRA can send multiple FINRA Closed messages in a trading day. After receipt of the FINRA Closed (Category C Type C) message, individual Market Maker quotes in either the Open or Close state may be transmitted in the FINRA Open (Category C Type O) with the state of the quote indicated in the Quote Condition field of the message text as one of the following:

- | | | |
|----------|---|-----------------------------------|
| R | - | Regular (Open Market Maker Quote) |
| L | - | Closed Market Maker Quote |

CQS Multicast line data recipients shall mark these quotes accordingly within their systems.

APPENDIX D: QUOTE CONDITIONS

The Quote Condition determines whether a quote qualifies to be included in the calculation of the National BBO. The National BBO calculation is performed whenever a new qualifying quote with price and size filled Bid and/or Offer is received from a Participant. For quotes with BBO eligible quote conditions containing zero-filled price and size Bid and Offer information, the National BBO is recalculated excluding the Participant or FINRA Market Maker that transmitted the BBO eligible quote condition with zero-filled prices and sizes. In addition to the Quote Condition field determining whether a quote qualifies to be included in the calculation of the National BBO, the Security Status field is also considered in the calculation of the National BBO. If the Security Status Indicator is populated with either a regulatory or a non-regulatory status (other than Market Wide Circuit Breaker Levels), it will result in the BBO being recalculated excluding the Participant from the BBO if that Participant was part or all of the BBO.

The quote conditions may be viewed as belonging to two classes:

1. Those that qualify for inclusion in the National Best Bid & Offer (BBO) calculations.
2. Those that do not qualify for inclusion in the National Best Bid & Offer (BBO) calculations.

BBO Eligible Quotes

Quote Condition A – Slow Quote on the Offer Side

This condition indicates that the current offer is in ‘Slow’ quote mode. While in this mode, auto-execution is not eligible on the Offer side and can be traded through pursuant to anticipated Regulation NMS requirements.

Quote Condition B – Slow Quote on the Bid Side

This condition indicates that the current bid is in ‘Slow’ quote mode. While in this mode, auto-execution is not eligible on the Bid side and can be traded through pursuant to anticipated Regulation NMS requirements.

Quote Condition E – Slow Quote due to Liquidity Replenishment Point (LRP) or Gap Quote on the Bid Side - Only OFFER SIDE is eligible for BBO

This quote condition is used to indicate that the current Bid is in ‘Slow’ quote mode due to a Liquidity Replenishment Point (LRP) or Gap Quote. While in this mode, auto-execution is not eligible, the quote is then considered Slow on the Bid side and can be traded through, as per Regulation NMS.

APPENDIX D: QUOTE CONDITIONS

BBO Eligible Quotes

Quote Condition F - Slow Quote due to Liquidity Replenishment Point (LRP) or Gap Quote on the Offer Side - Only BID SIDE is eligible for BBO

This quote condition is used to indicate that the current Offer is in Slow quote mode due to a Liquidity Replenishment Point (LRP) or Gap Quote. While in this mode, auto-execution is not eligible, the quote is then considered Slow on the Offer side and can be traded through, as per Regulation NMS.

Quote Condition H - Slow Quote on the Bid and Offer Sides

This condition indicates that the quote is a 'Slow' quote on both the Bid and Offer sides. While in this mode, auto-execution is not eligible on the Bid and Offer sides, and either or both sides can be traded through pursuant to anticipated Regulation NMS requirements.

Quote Condition O - Opening Quote

This condition can be disseminated to indicate that this quote was the opening quote for a security for that Participant.

Quote Condition R - Regular (for FINRA - Market Maker Open)

This condition is used for the majority of quotes to indicate a normal trading environment. It is also used by the FINRA Market Makers in place of Quote Condition 'O' to indicate the first quote of the day for a particular security. The condition may also be used when a Market Maker re-opens a security during the day.

Quote Condition W – Slow Quote Due to Set Slow List on both Bid and Offer Sides

This quote condition is used to indicate that the quote is a Slow Quote on both the Bid and Offer sides due to a Set Slow List that includes High Price securities. While in this mode, auto-execution is not eligible, the quote is then considered Slow on the Bid and Offer sides and either or both sides can be traded through, as per Regulation NMS.

APPENDIX D: QUOTE CONDITIONS

BBO Ineligible Quotes

Quote Condition C - Closing Quote

This condition can be disseminated to indicate that this quote was the last quote for a security for that Participant.

Quote Condition L - Market Maker Quotes Closed (FINRA)

This condition is disseminated by each individual FINRA Market Maker to signify either the last quote of the day or the premature close of an individual Market Maker for the day. In the latter case, the Market Maker can re-open by transmitting a quote accompanied by the Quote Condition R.

Quote Condition N - Non-Firm Quote

This quote condition suspends a Participant's firm quote obligation for a quote for a security.

Quote Condition U - Slow Quote due to Liquidity Replenishment Point (LRP) or Gap Quote on both the Bid and Offer Sides

This quote condition is used to indicate that the quote is a Slow Quote on both the Bid and Offer sides due to a Liquidity Replenishment Point (LRP) or Gap Quote. While in this mode, auto-execution is not eligible, the quote is then considered Slow on the Bid and Offer sides, and either or both sides can be traded through, as per Regulation NMS.

Quote Condition 4 – On Demand Intra-Day Auction

This quote condition is used to provide additional clarity to the industry participants and to allow participants to take part in an auction which will enhance liquidity in the marketplace.

APPENDIX E: SECURITY STATUS INDICATORS

In addition to the Quote Condition field determining whether a quote qualifies to be included in the calculation of the National BBO, the Security Status field is also considered in the calculation of the National BBO. If the Security Status Indicator is populated with either a regulatory or a non-regulatory status (other than Market Wide Circuit Breaker Levels), it will result in the BBO being recalculated excluding the Participant from the BBO if that Participant was part or all of the BBO.

Security Status Indicator 1 – Market-Wide Circuit Breaker Level 1 – Breached

This security status indicator is used to indicate that trading is suspended due to the S&P 500 Index reaching a 7% decline level below its closing value on the previous trading day. A Level 1 Market-Wide Circuit Breaker Regulatory Trading Halt would operate as follows: before 3:25 p.m. ET – duration 15 minutes; at or after 3:25 p.m. ET – trading shall continue, unless there is a Level 3 Market-Wide Circuit Breaker Regulatory Trading Halt.

Security Status Indicator 2 – Market-Wide Circuit Breaker Level 2 – Breached

This security status indicator is used to indicate that trading is suspended due to the S&P 500 Index reaching a 13% decline level below its closing value on the previous trading day. A Level 2 Market-Wide Circuit Breaker Regulatory Trading Halt would operate as follows: before 3:25 p.m. ET – duration 15 minutes; at or after 3:25 p.m. ET – trading shall continue, unless there is a Level 3 Market-Wide Circuit Breaker Regulatory Trading Halt.

Security Status Indicator 3 – Market-Wide Circuit Breaker Level 3 – Breached

This security status indicator is used to indicate 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.

Security Status Indicator D - News Dissemination

This regulatory Opening Delay or Trading Halt is used 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.

Security Status Indicator G - Trading Range Indication

The trading range indication is used to denote the probable trading range (bid and offer prices, no sizes) of a security that is not Opening Delayed or Trading Halted. The Trading Range Indication is used prior to or after the opening of a security.

Security Status Indicator I - Order Imbalance

This non-regulatory Opening Delay or Trading Halt is used when there is a significant imbalance of buy or sell orders.

APPENDIX E: SECURITY STATUS INDICATORS

Security Status Indicator M – Limit Up-Limit Down (LULD) Trading Pause

This regulatory Opening Delay or Trading Halt is used to indicate conditions in which a stock experiences a 10% or more change in price over a five minute period.

Security Status Indicator P - News Pending

This security status indicator is used to indicate a regulatory Opening Delay or 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.

Security Status Indicator T - Resume

This security status indicator along with zero-filled bid, offer and size fields is used to indicate that trading for a Participant is no longer suspended in a security which has been Opening delayed or Trading Halted.

Security Status Indicator X - Operational

This non-regulatory Opening Delay or Trading Halt is used when the ability to trade a security by a Participant is temporarily inhibited due to technical reasons.

Security Status Indicator Y – Sub-Penny Trading

This non-regulatory Opening Delay or Trading Halt is used to indicate an Opening Delay or Trading Halt for a security whose price may fall below \$1.05, possibly leading to a sub-penny execution.

Security Status Indicator Z - No Open/No Resume

This security status indicator is used to indicate that an Opening Delay or a Trading Halt is to be in effect for the rest of the trading day in a security for a Participant.

APPENDIX F: NATIONAL BEST BID AND BEST OFFER OVERVIEW

National Best Bid and Best Offer calculations are performed for each Market Center whenever a new qualifying quote is received after a Participant Market Open. If it is determined that the new quote has caused a new National BBO, the appropriate National BBO information is appended to the new quote. Appendages are **not** added if it is determined that the current quote does **not** affect the National BBO.

A new quote can be the entire new National BBO quote (both Bid and Offer). In addition, the National BBO **can** indicate a Crossed Market where the Bid price is higher than the Offer price or a Locked Market where both the Bid and the Offer prices are the same.

CQS generates a National BBO based on the following criteria in this order:

- **Price** - Exchanges with highest Bid and lowest Offers have overall priority.
- **Size** - Largest size takes precedence when multiple Exchanges submit the same Bid and/or Offer price.
- **Time** - Earliest time takes precedence when multiple Exchanges submit the same Bid and/or Offer price with the same size(s).

APPENDIX G: CQS CLOSING ROUTINE

A Participant can individually close a security by sending in a closing quote to CQS. CQS disseminates this closing quote over the multicast line and appends a new BBO, excluding that Participant, if that Participant was part of the current BBO.

Participants in CQS are excluded from the BBO calculation at the Participant's designated closing time. A Participant can have multiple closing times, on a per security basis, thus allowing inclusion of quotes in the BBO calculation for those securities, which have not been closed. When a Participant is closed, CQS cycles through its database and disseminates a closing quote message using that Participant's last BBO eligible quote for only those securities for which that Participant was part or all of the current BBO. A Participant can continue to submit quotes for securities, which have been closed; however, the quotes will **not** be included in the BBO calculations.

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

APPENDIX H: SYMBOL SUFFIX EXAMPLES

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

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

APPENDIX H: SYMBOL SUFFIX EXAMPLES

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

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

APPENDIX I: INPUT ERROR CONDITIONS

| Code | Description | Rejection Reason |
|-------|---|---|
| 1 | Invalid Version | Unsupported Block Version number |
| 2 | Invalid Block Size | Block Size is less than minimum (1) or more than maximum allowable length |
| 3 | Invalid Block Sequence Number | Duplicate Message - the current Block Sequence Number is less than or equal to that of the last message processed. The expected message Block Sequence Number is not incremented and the message is not accepted |
| 4 | Invalid Messages in Block | Messages in Block is less than minimum (1) or more than maximum allowable length |
| 5 | Invalid Block Checksum | Block Checksum does not match |
| 6-10 | Reserved | N/A |
| 11 | Invalid text length | Text length is beyond acceptable bounds for the message |
| 12 | Message not acceptable before CQS market open or after CQS market close | Message sent outside acceptable timeframe, message sent before SOD disseminated or after Participant EOPQ sent |
| 13 | Invalid Message Category and Message Type | Unsupported Message Category and Message Type |
| 14 | Invalid Participant ID | Participant ID is not a supported value |
| 15 | Invalid Timestamp 1 | Timestamp is not within the appropriate range, invalid date and time |
| 16 | Invalid Participant Reference Number | Participant Reference Number is not within specified allowable ASCII character range |
| 17 | Duplicate Participant Reference Number | Participant Reference Number must be unique by Participant ID, by Trade Reporting Facility (TRF), by Security Symbol and by Participant Regional Reference Number |
| 18-21 | Reserved | N/A |
| 22 | Message Accepted From FINRA ADF Only | Message from Participant other than FINRA ADF |
| 23 | Invalid FINRA BBO Indicator | FINRA BBO Indicator is not a supported value |
| 24 | Invalid FINRA Best Bid Market Maker ID | FINRA MMID is not within ASCII valid character range 32-126 |

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

APPENDIX I: INPUT ERROR CONDITONS

| Code | Description | Rejection Reason |
|-------------|--|---|
| 25 | Invalid FINRA Best Offer Market Maker ID | FINRA MMID is not within ASCII valid character range 32-126 |
| 26 | Invalid FINRA Market Maker ID | FINRA MMID is not within ASCII valid character range 32-126 |
| 27 | Invalid FINRA Best Bid Quote Condition | Quote Condition is not a supported value |
| 28 | Invalid FINRA Best Offer Quote Condition | Quote Condition is not a supported value |
| 29 | Invalid Bid Price | Bid Price is zero, expecting non-zero |
| 30 | Invalid Bid Price | Bid Price is greater than Offer Price |
| 31 | Invalid Bid Size | Bid Size is zero vs. non-zero or Bid Size is non-zero vs. zero |
| 32 | Invalid Offer Price | Offer Price is zero, expecting non-zero |
| 33 | Invalid Offer Size | Offer Size is zero vs. non-zero or Offer Size is non-zero vs. zero |
| 34 | Invalid Instrument Type | Instrument Type value is not a supported value |
| 35 | Invalid Market Condition | Market Condition is not a supported value |
| 36 | Invalid Quote Condition | Quote Condition is not a supported value |
| 37 | Invalid Retail Interest Indicator | Retail Interest Indicator is not a supported value |
| 38 | Invalid Security Status Indicator | Security Status Indicator is not a supported value |
| 39 | Invalid Security Symbol | Unknown Security Symbol, either the security symbol and suffix are incorrect or no master record exists for the security symbol |
| 40 | Invalid Settlement Condition | Settlement Condition is not a supported value |
| 41 | Invalid Short Sale Restriction Indicator | Short Sale Restriction is not a supported value |
| 42 | Invalid Timestamp 2 | Timestamp is not within the appropriate range, invalid date and time |
| 43 | Unprintable ASCII Character | ASCII character not within 32-126 range |
| 44 | Unspecified Error | Unspecified Error |
| 45 | Invalid Auction Collar Price | Auction Price is zero, expecting non-zero |
| 46 | Invalid Number of Extensions | Number of Extensions is not a supported value |

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

APPENDIX J: 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 |
| | | |
| | | |
| | | |

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

CQS Participant Input Binary and ASCII Protocol Differences and Notes

General:

1. Transmission block SOH & ETX have been removed.
2. 'Block Separator' added to offer better guarantee that the format will be identified correctly.
3. 'Block Pad' byte added to ensure blocks are an even number of bytes. Updated 'Block Pad Byte' description to include binary representation.
4. 'Block Length Header' replaced by 'Block Size' included in Block Header.
5. Data Type (format) modified to support Big Endian (network byte order) and ASCII printable character codes 32-126 inclusive.
6. Message Category and Type Codes harmonized where applicable.
7. Administrative and Quote Categories have been separated.
8. Reorganization of fields within message formats for consistency purposes.
9. 'Instrument Type' in message formats will identify CTA Eligible Equity, Local Issue and Bonds.
10. All Times (e.g., Timestamps, Date and Time) will be represented in nanoseconds from Epoch 1/1/1970, 00:00:00 UTC.
11. Short Prices will have 2 decimal places implied and Long Prices will have 6 decimal places implied.
12. 'Due to Related Security' and 'In View of Common' processing has been removed.
13. The .TEST suffix support has been replaced by dedicated Test Symbols.
14. 'Reserved' fields removed from most message formats, future new fields will be accommodated using 'Version' updates.
15. 'Timestamp 2' has been moved from Message Header to applicable message formats.
16. 'CBSX' has withdrawn its status as a CTA Participant and has been removed.
17. Quote Condition 'Q' – Undefined previously removed in Binary Version 1.0 however omitted in differences and notes.
18. Signed Integer Data Type representation description has been added.
19. Minor clarification throughout document/removed verbiage associated with eliminated functionality.
20. Added CBOE Stock Exchange, Inc. (CBSX).

Revised 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; 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.

Differences and Notes, continued

Modified Message Header:

1. For input/output consistency, 'Participant ID' (previously 'Originating Participant ID') modified from 2 characters to 1 character.
2. 'Destination Participant ID' has been removed.
3. 'Message Sequence Number' renamed to 'Block Sequence Number' moved from Message Header to Block Header.
4. 'Status' removed; it is recommended that Participants utilize the Sequence Inquiry/Sequence Response messaging to determine expected sequence number.
5. 'Message Header Identifier' replaced by 'Version' in Block Header.
6. 'Regional Reference Number' renamed to 'Participant Reference Number'.
7. 'Timestamp 2' has been moved to applicable message formats.
8. 'Message Length' field has been added.
9. 'Reserved' field length revised.
10. Total length of Message Header increased.
11. Modified order of field appearances.

Administrative Messages:

1. 'Reject/Warning' message has been split into two separate message formats.
2. 'Reject' message modified to provide 'Block Sequence Number', 'Participant Reference Number' and 'Message ID'.
3. 'Warning message' modified to provide 'Previous Block Sequence Number' and 'Previous Participant Reference Number'.
4. Administrative message textual length increased to 900 characters.
5. '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.
6. Usage of YYY and ZZ begin announce and end announce characters removed.

Control Messages:

1. 'Sequence Information and Message Count Inquiry' replaces 'Sequence Inquiry'.
2. 'Sequence Information and Message Count Response' replaces 'Sequence Information' and will contain the count of messages received on an individual line since startup.
3. 'Line Integrity' time will be represented in nanoseconds from Epoch 1/1/1970, 00:00:00 UTC.
4. CQS to Participant 'Line Integrity' message modified to consist of Message Header only.
5. Introduced 'End of Day' for input/output consistency.
6. 'End of Participant Reporting' renamed to 'End of Participant Quoting'.
7. Activate 'Participant BBO Calculation' removed as activation of BBO is processed systemically by CQS.
8. 'End of Participant BBO Calculation' removed as deactivation of BBO is processed systemically by CQS.
9. 'Test' data textual length increased to 256.

**CONSOLIDATED QUOTATION SYSTEM (CQS)
PARTICIPANT INPUT BINARY SPECIFICATION**

Differences and Notes, continued

Quote Messages:

Short Quote Format:

1. 'Short Quote' format has an implied CTA eligible Equity only instrument type, 'Regular' Quote Condition, Regular Way Settlement and Normal Auction Market.
2. Increased the message length of Short Quote format for input/output length consistency.

Long Quote Format:

1. 'Quote Condition' split into two fields (Quote Condition - quote specific (e.g., regular) and Security Status – trading status specific (e.g., Trading Halts, Price Indications, etc.).
2. New 'FINRA BBO Indicator' to denote FINRA BBO status. FINRA will provide calculated FINRA Best Bid and Best Offer (FBBO).

New Special Quote Message Category/Type:

1. Introduced 'Special Long Quote (FINRA ADF) with FBBO Information message for FINRA only to identify the FINRA Best Bid and Best Offer at the Bid and/or Offer side for their Market Makers.

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.

Error Codes:

1. Obsolete error codes eliminated.
2. New error codes introduced.
3. Error codes re-ordered.
4. Added new Auction Collar Price/Number of Extension error codes.