

INVESTORS EXCHANGE DEEP+ SPECIFICATION

Version 1.06

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OVERVIEW

Participants of Investors Exchange ("IEX" or the "Exchange") may use DEEP+ to receive real-time, order-by-order depth of book quotations and last sale information direct from IEX. DEEP+ also supports several security-related administrative messages and provides event controls, such as start of day and end of day, to participants.

The depth of book quotations received via DEEP+ provide an order-by-order view of resting displayed orders a. Non-displayed orders and non-displayed portions of reserve orders are not represented in DEEP+. DEEP+ also provides last trade price and size information. Trades resulting from either displayed or non-displayed orders matching on IEX will be reported. Routed executions are not reported.

Subscribers with bandwidth concerns may consume depth of book aggregated market data via the IEX DEEP protocol, or top of book market data via the IEX TOPS protocol.

DEEP+ provides short sale restriction status, trading status, operational halt status, and security event information via security-related administrative messages. Lastly, DEEP+ provides event information about the market and data feed via administrative messages.

DEEP+ cannot be used to enter orders. For order entry, refer to the IEX FIX Specification.

IEX also offers a DEEP+ SNAP service, which is intended to augment the DEEP+ gap-fill service by adding a separate snapshot protocol. Please refer to IEX DEEP+ SNAP Specification.

For ordering information, contact IEX Market Operations at 646.343.2310 or marketops@iextrading.com or simply submit a completed IEX Data Subscriber Agreement and Forms. Please see the IEX Connectivity Manual for additional information.

TRANSPORT PROTOCOL OPTIONS

For direct data feed subscribers, IEX provides DEEP+ using the IEX Transport Protocol (IEX-TP) on UDP multicast for sequenced delivery. Additionally, IEX provides retransmission of DEEP+ data (i.e., gap fills) using IEX-TP on TCP or UDP unicast. See the IEX Transport Specification for details on sequenced delivery and requesting delivery of missed data.

Protocol Identification on IEX-TP

- Message Protocol ID: 0x8005

ARCHITECTURE

DEEP+ is made up of a series of sequenced messages. Each message is variable in length based on the message type. IEX reserves the right to add message types and grow the length of any messages without notice. Subscribers should develop their decoders to deal with unknown message types and messages that grow beyond the expected length. Messages will only be grown to add additional data to the end of a message or to add additional flag values at the end of a flags field. The messages that make up the data feed are delivered using a lower-level protocol that takes care of sequencing and delivery guarantees. Note that a Message Length field is provided with every message as part of framing defined in IEX-TP.

DATA TYPES

- String: Fixed-length ASCII byte sequence, left justified and space filled on the right
- Long: 8 bytes, signed integer
- Price: 8 bytes, signed integer containing a fixed-point number with 4 digits to the right of an implied decimal point
- Integer: 4 bytes, unsigned integer
- Byte: 1 byte, unsigned integer
- Timestamp: 8 bytes, signed integer containing a counter of nanoseconds since POSIX (Epoch) time UTC
- Event Time: 4 bytes, unsigned integer containing a counter of seconds since POSIX (Epoch) time UTC

All binary fields are in **little endian** format.

Note that each byte is represented by two hexadecimal digits in the examples within this specification.

Timestamp Relationships

Timestamps establish a total ordering of a *happened-before* relationship within the IEX Trading System. If Message A has a lower Timestamp than Message B, then the event causing Message A happened before (i.e., preceded) the event causing Message B. Messages with the same Timestamp (regardless of Message Type or Symbol) were caused by the same event and may be interpreted to have happened simultaneously and atomically within the IEX Trading System.

For a given <Message Type, Symbol> pairing, the subsequence of messages matching this <Message Type, Symbol> pairing on the data feed will have a progression of Timestamps which either remain equal (due to simultaneity) or increase (due to precedence) — within this subsequence Timestamps will never decrease.

No progression of Timestamps between messages having different Symbols may be expected. No progression of Timestamps between messages having the same Symbol but different Message Type may be expected, except in the following circumstance:

- The receipt of a Security Event Message for a given security implies that all preceding Price Level Update Messages for the same security have been transmitted.

NETWORK DETAILS

Multicast SOURCE IP SUBNET

SITE	XC Type	Source IP Subnet
IEX POP (Equinix NY5)	Primary (A)	23.226.155.128/28
	Secondary (B)	23.226.155.192/28
Disaster Recovery (Equinix CH4)	Tertiary (C)	23.226.155.176/28
IEX Testing Facility (“ITF”) (Equinix NY5)	ITF (I)	23.226.155.8/29

PIM RP Configuration Examples / Multicast Group Ranges by Connection Site

SITE	XC Type	PIM RP Statement Sample*
IEX POP (Equinix NY5)	Primary (A)	233.215.21.0/27
	Secondary (B)	233.215.21.128/27
Disaster Recovery (Equinix CH4)	Tertiary (C)	233.215.21.96/28
IEX Testing Facility (Equinix NY5)	ITF (I)	233.215.21.240/29

*IEX does not advertise PIM RP addresses. IEX statically subscribes to and floods the applicable individual market data multicast groups to direct data feed subscribers over the designated A, B, C, or I cross-connect. Subscribers should configure their network environment as appropriate for their own multicast design.

For Channelized DEEP+, the A-side groups span 233.215.21.10 through .25, and the B-side groups span 233.215.21.140 through .155. Channels 1–8 carry market data. Channels 9–16 are heartbeat-only at this time.

Users should direct the respective A, B, C, or I DR assignment to the directly connected circuit IEX side IP. I.E. If the circuit is 1.1.1.0/31, the RP configurations for IEX MC feeds should be configured as 1.1.1.0.

Network Prefixes Advertised

SITE	XC Type	Market Data Unicast Prefixes Advertised
IEX POP (Equinix NY5)	Primary (A)	23.226.155.128/28 (Multicast Sources) 23.226.155.160/28 (Gap Fill Servers)
	Secondary (B)	23.226.155.192/28 (Multicast Sources) 23.226.155.224/28 (Gap Fill Servers)
Disaster Recovery (Equinix CH4)	Tertiary (C)	23.226.155.176/28 (Multicast Sources) 23.226.155.208/28 (Gap Fill Servers)
IEX Testing Facility (Equinix NY5)	ITF (I)	23.226.155.8/29 (Multicast Source) 23.226.155.16/29 (Gap Fill Servers)

DEEP+ SINGLE CHANNEL

MULTICAST ADDRESSES

SITE	XC Type	Group	Port
IEX POP (Equinix NY5)	Primary (A)	233.215.21.8	10378
	Secondary (B)	233.215.21.138	10378
Disaster Recovery (Equinix CH4)	Tertiary (C)	233.215.21.74	10378
IEX Testing Facility (“ITF”) (Equinix NY5)	ITF (I)	233.215.21.242	32001

Unicast Gap Fill Details

Gap Fill Server Configuration

- Supported Retransmission Protocol(s): TCP and UDP
- Maximum UDP Retransmission Response: 1,000 messages per Retransmission Request
- Maximum TCP Retransmission Response: N/A (there is no limit to the retransmission response via TCP)
- Supported Request Type(s): Sequenced Messages

UDP Gap Fill Server Addresses

SITE	XC Type	Server	Port
IEX POP (Equinix NY5)	Primary (A)	23.226.155.170	11378
	Secondary (B)	23.226.155.234	11378
Disaster Recovery (Equinix CH4)	Tertiary (C)	23.226.155.251	11378
IEX Testing Facility (Equinix NY5)	ITF (I)	23.226.155.20	33001

TCP Gap Fill Server Addresses

SITE	XC Type	Server	Port
IEX POP (Equinix NY5)	Primary (A)	23.226.155.171	11378
	Secondary (B)	23.226.155.235	11378
Disaster Recovery (Equinix CH4)	Tertiary (C)	23.226.155.252	11378
IEX Testing Facility (Equinix NY5)	ITF (I)	23.226.155.21	33001

DEEP+ MULTI-CHANNEL

Multicast Addresses

DEEP+ Channelized Server Addresses

ChannelID	Symbol Start Range*	Port	POP Multicast A	POP Multicast B	Multicast DR	ITF
1	A	13337	233.215.21.10	233.215.21.140	233.215.21.96	233.215.21.245
2	C	13338	233.215.21.11	233.215.21.141	233.215.21.97	
3	E	13339	233.215.21.12	233.215.21.142	233.215.21.98	
4	H	13340	233.215.21.13	233.215.21.143	233.215.21.99	
5	K	13341	233.215.21.14	233.215.21.144	233.215.21.100	
6	O	13342	233.215.21.15	233.215.21.145	233.215.21.101	
7	S	13343	233.215.21.16	233.215.21.146	233.215.21.102	
8	U	13344	233.215.21.17	233.215.21.147	233.215.21.103	
9	-	13345	233.215.21.18	233.215.21.148	233.215.21.104	
10	-	13346	233.215.21.19	233.215.21.149	233.215.21.105	
11	-	13347	233.215.21.20	233.215.21.150	233.215.21.106	

12	-	13348	233.215.21.21	233.215.21.151	233.215.21.107	
13	-	13349	233.215.21.22	233.215.21.152	233.215.21.108	
14	-	13350	233.215.21.23	233.215.21.153	233.215.21.109	
15	-	13351	233.215.21.24	233.215.21.154	233.215.21.110	
16	-	13352	233.215.21.25	233.215.21.155	233.215.21.111	

*Unassigned symbol channels 9 through 16 will have heartbeat messages published over them.

Unicast Gap Fill Details

Gap Fill Server Configuration

- Supported Retransmission Protocol(s): TCP and UDP
- Maximum UDP Retransmission Response: 1,000 messages per Retransmission Request
- Maximum TCP Retransmission Response: N/A (there is no limit to the retransmission response via TCP)
- Supported Request Type(s): Sequenced Messages

UDP Gap Fill Server Addresses

ChannelID	Port	POP (A)	POP (B)	DR	ITF
1	23337	23.226.155.136	23.226.155.202		23.226.155.27
2	23338				
3	23339				
4	23340				

5	23341			23.226.155.216	
6	23342				
7	23343				
8	23344				
9	23345	23.226.155.141	23.226.155.206	23.226.155.217	
10	23346				
11	23347				
12	23348				
13	23349				
14	23350				
15	23351				
16	23352				

TCP Gap Fill Server Addresses

ChannelID	Port	POP (A)	POP (B)	DR	ITF
1	33337	23.226.155.139	23.226.155.198	23.226.155.220	23.226.155.26
2	33338				
3	33339				
4	33340				
5	33341				
6	33342				
7	33343				
8	33344				
9	33345	23.226.155.134	23.226.155.197	23.226.155.221	
10	33346				
11	33347				
12	33348				
13	33349				
14	33350				
15	33351				
16	33352				

ADMINISTRATIVE MESSAGE FORMATS

System Event Message – S (0x53)

The System Event Message is used to indicate events that apply to the market or the data feed.

There will be a single message disseminated per channel for each System Event type within a given trading session.

Field Name	Offset	Length	Type	Description/Notes
Message Type	0	1	Byte	'S' (0x53) – System Event
System Event	1	1	Byte	System event identifier • 'O' (0x4f): *Start of Messages* – Outside of heartbeat messages on the lower level protocol, the start of day message is the first message sent in any trading session. • 'S' (0x53): *Start of System Hours* – This message indicates that IEX is open and ready to start accepting orders. • 'R' (0x52): *Start of Regular Market Hours* – This message indicates that DAY and GTX orders, as well as market orders and pegged orders, are available for execution on IEX. • 'M' (0x4d): *End of Regular Market Hours* – This message indicates that DAY orders, market orders, and pegged orders are no longer accepted by IEX. • 'E' (0x45): *End of System Hours* – This message indicates that IEX is now closed and will not accept any new orders during this trading session. It is still possible to receive messages after the end of day. • 'C' (0x43): *End of Messages* – This is always the last message sent in any trading session.
Timestamp	2	8	Timestamp	Time stamp of the system event

Total Message Data length is 10 bytes. See Appendix B for the bitwise representation.

Example

```
Message Type            53                      // S = System Event
System Event            45                      // End of System Hours
Timestamp               00 a0 99 97 e9 3d b6 14 // 2017-04-17 17:00:00.000000000
```

Security Directory Message – D (0x44)

IEX disseminates a full pre-market spin of Security Directory Messages for all IEX-listed securities. After the pre-market spin, IEX will use the Security Directory Message to relay changes for an individual security.

Field Name	Offset	Length	Type	Description/Notes
Message Type	0	1	Byte	'D' (0x44) – Security Directory
Flags	1	1	Byte	See Appendix A for flag values
Timestamp	2	8	Timestamp	Time stamp of the security information
Symbol	10	8	String	Security identifier represented in Nasdaq Integrated symbology
Round Lot Size	18	4	Integer	Number of shares that represent a round lot
Adjusted POC Price	22	8	Price	Corporate action adjusted previous official closing price
LULD Tier	30	1	Byte	Indicates which Limit Up-Limit Down price band calculation parameter is to be used • 0 (0x0): Not applicable • 1 (0x1): Tier 1 NMS Stock • 2 (0x2): Tier 2 NMS Stock

Total Message Data length is 31 bytes. See Appendix B for the bitwise representation.

Example

```
Message Type                44                      // D = Security Directory
Flags                       80                      // Test security, not an ETP,
                                                       not a When Issued security
Timestamp                   00 20 89 7b 5a 1f b6 14 // 2017-04-17 07:40:00.000000000
Symbol                      5a 49 45 58 54 20 20 20 // ZIEXT
Round Lot Size              64 00 00 00             // 100 shares
Adjusted POC Price          24 1d 0f 00 00 00 00 00 // $99.05
LULD Tier                   01                      // Tier 1 NMS Stock
```

Trading Status Message – H (0x48)

The Trading Status Message is used to indicate the current trading status of a security. For securities eligible for trading, IEX abides by any regulatory trading halts and trading pauses instituted by the primary or listing market, as applicable.

IEX disseminates a full pre-market spin of Trading Status Messages indicating the trading status of all securities. In the spin, IEX will send out a Trading Status Message with "T" (Trading) for all securities that are eligible for trading at the start of the Pre-Market Session. If a security is absent from the dissemination, firms should assume that the security is being treated as operationally halted in the IEX Trading System.

After the pre-market spin, IEX will use the Trading Status Message to relay changes in trading status for an individual security. Messages will be sent when a security is:

- Halted
- Paused*
- Released into an Order Acceptance Period*
- Released for trading

* The paused and released into an Order Acceptance Period status will be disseminated for IEX-listed securities only. Trading pauses on non-IEX-listed securities will be treated simply as a halt.

Field Name	Offset	Length	Type	Description/Notes
Message Type	0	1	Byte	'H' (0x48) –Trading Status
Trading Status	1	1	Byte	Trading status identifier Trading Status will be set to "H" (Trading Halt) when a non-IEX-listed security is paused by the listing exchange. • 'H' (0x48): Trading halted across all US equity marketsr'O' (0x4f): Trading halt released into an Order Acceptance Period on IEX (IEX-listed securities only) • 'P' (0x50): Trading paused and Order Acceptance Period on IEX (IEX-listed securities only) • 'T' (0x54): Trading on IEX
Timestamp	2	8	Timestamp	Time stamp of the trading status
Symbol	10	8	String	Security identifier represented in Nasdaq Integrated symbology
Reason	18	4	String	Reason for the trading status change IEX populates the Reason field for IEX-listed securities when the Trading Status is "H" (Trading Halt) or "O" (Order Acceptance Period). For non-IEX-listed securities, the Reason field will be set to "NA" (Reason Not Available) when the Trading Status is "H" (Trading Halt). The Reason will be

				blank when the Trading Status is “P” (Trading Pause and Order Acceptance Period) or “T” (Trading).
				• Trading Halt Reasons
				  ○ T1: Halt News Pending
				  ○ IPO1: IPO Not Yet Trading
				  ○ IPOD: IPO Deferred
				  ○ MCB3: Market-Wide Circuit Breaker Level 3 – Breached
				  ○ NA: Reason Not Available
				• Order Acceptance Period Reasons
				  ○ T2: Halt News Dissemination
				  ○ IPO2: IPO Order Acceptance Period
				  ○ IPO3: IPO Pre-Launch Period
				  ○ MCB1: Market-Wide Circuit Breaker Level 1 – Breached
				  ○ MCB2: Market-Wide Circuit Breaker Level 2 – Breached

Total Message Data length is 22 bytes. See Appendix B for the bitwise representation.

Example

```
Message Type              48                      // H = Trading Status
Trading Status            48                      // H = Trading Halted
Timestamp                 ac 63 c0 20 96 86 6d 14 // 2016-08-23 15:30:32.572715948
Symbol                    5a 49 45 58 54 20 20 20 // ZIEXT
Reason                    54 31 20 20             // T1 = Halt News Pending
```

State Diagram

See Appendix C for a state diagram illustrating the potential Trading Status and Reason transitions.

Retail Liquidity Indicator Message – I (0x49)

DEEP+ broadcasts a real-time Retail Liquidity Indicator Message each time there is an update to IEX's eligible retail liquidity interest during the trading day. Prior to the start of trading, IEX publishes a "no interest indicator" (Retail Liquidity Indicator is set to '0x20') for all symbols in the IEX Trading System.

Field Name	Offset	Length	Type	Description/Notes
Message Type	0	1	Byte	'I' (0x49) - Retail Liquidity Indicator Message
Retail Liquidity Indicator	1	1	Byte	Retail Liquidity Indicator identifier • [space] (0x20) - Retail indicator not applicable • 'A' (0x41) - Buy interest for Retail • 'B' (0x42) - Sell interest for Retail • 'C' (0x43) - Buy and sell interest for Retail
Timestamp	2	8	Timestamp	Time stamp of the Retail Liquidity Indicator Message
Symbol	10	8	String	Security identifier represented in Nasdaq Integrated symbology

Total Message Data length is 18 bytes. See Appendix B for the bitwise representation.

Example

```
Message Type               49                      // I = Retail Liquidity Indicator Message
Retail Liquidity Indicator 41                      // A = Buy Interest for Retail
Timestamp                  ac 63 c0 20 96 86 6d 14 // 2016-08-23 15:30:32.572715948
Symbol                     5a 49 45 58 54 20 20 20 // ZIEXT
```

Operational Halt Status Message – O (0x4f)

The Exchange may suspend trading of one or more securities on IEX for operational reasons and indicates such operational halt using the Operational Halt Status Message.

IEX disseminates a full pre-market spin of Operational Halt Status Messages indicating the operational halt status of all securities. In the spin, IEX will send out an Operational Halt Message with "N" (Not operationally halted on IEX) for all securities that are eligible for trading at the start of the Pre-Market Session. If a security is absent from the dissemination, firms should assume that the security is being treated as operationally halted in the IEX Trading System at the start of the Pre-Market Session.

After the pre-market spin, IEX will use the Operational Halt Status Message to relay changes in operational halt status for an individual security.

Field Name	Offset	Length	Type	Description/Notes
Message Type	0	1	Byte	'O' (0x4f) – Operational Halt Status
Operational Halt Status	1	1	Byte	Operational halt status identifier • 'O' (0x4f): IEX specific operational trading halt • 'N' (0x4e): Not operationally halted on IEX
Timestamp	2	8	Timestamp	Time stamp of the operational halt status
Symbol	10	8	String	Security identifier represented in Nasdaq Integrated symbology

Total Message Data length is 18 bytes. See Appendix B for the bitwise representation.

Example

```
Message Type              4f                      // O = Operational Halt Status
Operational Halt Status   4f                      // O = Operationally halted on IEX
Timestamp                 ac 63 c0 20 96 86 6d 14 // 2016-08-23 15:30:32.572715948
Symbol                    5a 49 45 58 54 20 20 20 // ZIEXT
```

Short Sale Price Test Status Message – P (0x50)

In association with Rule 201 of Regulation SHO, the Short Sale Price Test Message is used to indicate when a short sale price test restriction is in effect for a security.

IEX disseminates a full pre-market spin of Short Sale Price Test Status Messages indicating the Rule 201 status of all securities. After the pre-market spin, IEX will use the Short Sale Price Test Status Message in the event of an intraday status change.

The IEX Trading System will process orders based on the latest short sale price test restriction status.

Field Name	Offset	Length	Type	Description/Notes
Message Type	0	1	Byte	'P' (0x50) – Short Sale Price Test Status
Short Sale Price Test Status	1	1	Byte	Reg. SHO short sale price test restriction status • 0 (0x0): Short Sale Price Test Not in Effect • 1 (0x1): Short Sale Price Test in Effect
Timestamp	2	8	Timestamp	Time stamp of the short sale price test status
Symbol	10	8	String	Security identifier represented in Nasdaq Integrated symbology
Detail	18	1	Byte	Detail of the Reg. SHO short sale price test restriction status IEX populates the Detail field for IEX-listed securities; this field will be set to "N" (Detail Not Available) for non-IEX-listed securities. • [space] (0x20): No price test in place • 'A' (0x41): Short sale price test restriction in effect due to an intraday price drop in the security (i.e., Activated) • 'C' (0x43): Short sale price test restriction remains in effect from prior day (i.e., Continued) • 'D' (0x44): Short sale price test restriction deactivated (i.e., Deactivated) • 'N' (0x4e): Detail Not Available

Total Message Data length is 19 bytes. See Appendix B for the bitwise representation.

Example

```
Message Type                    50                      // P = Short Sale Price Test Status
Short Sale Price Test Status    01                      // Short Sale Price Test in Effect
Timestamp                       ac 63 c0 20 96 86 6d 14 // 2016-08-23 15:30:32.572715948
Symbol                          5a 49 45 58 54 20 20 20 // ZIEXT
Detail                          41                      // A = Short Sale Price Test Activated
```

State Diagram

See Appendix C for a state diagram illustrating the potential Short Sale Price Test Status and Detail transitions.

Security Event Message – E (0x45)

The Security Event Message is used to indicate events that apply to a security. A Security Event Message will be sent whenever such event occurs for a security.

Field Name	Offset	Length	Type	Description/Notes
Message Type	0	1	Byte	'E' (0x45) – Security Event
Security Event	1	1	Byte	Security event identifier • 'O' (0x4f): *Opening Process Complete* – This message indicates that the Opening Process is complete in this security and any orders queued during the Pre-Market Session are now available for execution on the IEX Order Book for the subject security. • 'C' (0x43): *Closing Process Complete* – For non-IEX-listed securities, this message indicates that IEX has completed canceling orders from the IEX Order Book for the subject security that are not eligible for the Post-Market Session. For IEX-listed securities, this message indicates that the closing process (e.g., Closing Auction) has completed for this security and IEX has completed canceling orders from the IEX Order Book for the subject security that are not eligible for the Post-Market Session.
Timestamp	2	8	Timestamp	Time stamp of the security event
Symbol	10	8	String	Security identifier represented in Nasdaq Integrated symbology

Total Message Data length is 18 bytes. See Appendix B for the bitwise representation.

Example

```
Message Type          45                      // E = Security Event
Security Event        4f                      // O = Opening Process Complete
Timestamp             00 f0 30 2a 5b 25 b6 14 // 2017-04-17 09:30:00.000000000
Symbol                5a 49 45 58 54 20 20 20 // ZIEXT
```

TRADING MESSAGE FORMATS

Add Order Message – a (0x61)

A displayed order that has been added to the IEX Book.

The Order ID of this message is used as the identifier to calculate the order's state in subsequent messages.

Field Name	Offset	Length	Type	Description/Notes
Message Type	0	1	Byte	'a' (0x61) – Add Order
Side	1	1	Byte	Side of order: • '8' (0x38) – Buy • '5' (0x35) – Sell
Timestamp	2	8	Timestamp	Time stamp of the new order
Symbol	10	8	String	Security identifier represented in Nasdaq Integrated symbology
Order ID	18	8	Long	Order ID of new order
Size	26	4	Integer	Quoted size
Price	30	8	Price	Booking price on the IEX Order Book

Total Message Data length is 38 bytes. See Appendix B for the bitwise representation.

Example

```
Message Type        61                      // a = Add Order
Side                38                      // Buy Order
Timestamp           b2 8f a5 a0 ab 86 6d 14  // 2016-08-23 15:32:04.912754610
Symbol              5a 49 45 58 54 20 20 20  // ZIEXT
Order ID            96 8f 06 00 00 00 00 00  // 429974
Size                64 00 00 00              // 100 shares
Price               24 1d 0f 00 00 00 00 00  // $99.05
```

Order Modify Message – M (0x4D)

A displayed order that had its Price, Size, or Priority component changed as a result of user or system action.

The Order ID will reference the Order ID in the Add Order Message.

Field Name	Offset	Length	Type	Description/Notes
Message Type	0	1	Byte	'M' (0x4D) – Order Modify
Modify Flags	1	1	Byte	Bit 0 – Priority • 0 = Reset Priority • 1 = Maintain Priority Bits 1 – 7 Reserved
Timestamp	2	8	Timestamp	Time stamp of the modified order
Symbol	10	8	String	Security identifier represented in Nasdaq Integrated symbology
Order ID Reference	18	8	Long	Order ID of the referenced order
Size	26	4	Integer	New total quoted size
Price	30	8	Price	Booking price on the IEX Order Book

Total Message Data length is 38 bytes. See Appendix B for the bitwise representation.

Example

```
Message Type            4D                      // M = Order Modify
Modify Flags            00                      // Reset priority
Timestamp               b2 8f a5 a0 ab 86 6d 14  // 2016-08-23 15:32:04.912754610
Symbol                  5a 49 45 58 54 20 20 20  // ZIEXT
Order ID Reference      96 8f 06 00 00 00 00 00  // 429974
Size                    64 00 00 00              // 100 shares
Price                   24 1d 0f 00 00 00 00 00  // $99.05
```

Order Delete Message – R (0x52)

A displayed order that was removed from the IEX Book. This is caused by user request or due to an internal system action.

The Order ID will no longer be used in future messages to track state, unless a new Add Order Message contains the same Order ID.

Field Name	Offset	Length	Type	Description/Notes
Message Type	0	1	Byte	'R' (0x52) – Order Delete
Reserved	1	1	Byte	Reserved for future use
Timestamp	2	8	Timestamp	Time stamp of the deleted order
Symbol	10	8	String	Security identifier represented in Nasdaq Integrated symbology
Order ID Reference	18	8	Long	Order ID of the referenced order

Total Message Data length is 26 bytes. See Appendix B for the bitwise representation.

Example

```
Message Type            52                      // R = Order Delete
Reserved                00                      // Reserved for future use
Timestamp               b2 8f a5 a0 ab 86 6d 14  // 2016-08-23 15:32:04.912754610
Symbol                  5a 49 45 58 54 20 20 20  // ZIEXT
Order ID Reference      96 8f 06 00 00 00 00 00  // 429974
```

Order Executed Message – L (0x4C)

A displayed order that was executed against.

If the quantity executed reduces the remaining quantity of the order to 0, the order should be removed from the book. Otherwise, the remaining order quantity after the execution remains on the order book with the same time-priority.

The executed price given by this message may differ from the original displayed price of the order, due to system price improvement or price sliding.

Field Name	Offset	Length	Type	Description/Notes
Message Type	0	1	Byte	'L' (0x4C) – Order Executed
Sale Condition Flags	1	1	Byte	See Appendix A for flag values
Timestamp	2	8	Timestamp	Time stamp of the trade
Symbol	10	8	String	Security identifier represented in Nasdaq Integrated symbology
Order ID Reference	18	8	Long	Order ID of the referenced order
Size	26	4	Integer	Trade volume
Price	30	8	Price	Trade price
Trade ID	38	8	Long	IEX Generated Identifier

Total Message Data length is 46 bytes. See Appendix B for the bitwise representation.

Example

```
Message Type              4C                      // L = Order Executed
Sale Condition Flags      00                      // Non-ISO, Regular Market session, Round or
                                                     Mixed Lot, Trade is subject to Rule 611,
                                                     execution during continuous trading
Timestamp                 b2 8f a5 a0 ab 86 6d 14 // 2016-08-23 15:32:04.912754610
Symbol                    5a 49 45 58 54 20 20 20 // ZIEXT
Order ID Reference        96 8f 06 00 00 00 00 00 // 429974
Size                      64 00 00 00             // 100 shares
Price                     24 1d 0f 00 00 00 00 00 // $99.05
Trade ID                  96 8f 02 00 00 00 00 00 // 167830
```

Trade Message – T (0x54)

A non-displayed order on the book that executed against another non-displayed order on the book.

This message does not modify the quantity of a displayed order on the book but does impact the cumulative executed volume on IEX. For users interested in only knowing book state, this message can be ignored.

Field Name	Offset	Length	Type	Description/Notes
Message Type	0	1	Byte	'T' (0x54) – Trade
Sale Condition Flags	1	1	Byte	See Appendix A for flag values
Timestamp	2	8	Timestamp	Time stamp of the trade
Symbol	10	8	String	Security identifier represented in Nasdaq Integrated symbology
Size	18	4	Integer	Trade volume
Price	22	8	Price	Trade price
Trade ID	30	8	Long	IEX Generated Identifier

Total Message Data length is 38 bytes. See Appendix B for the bitwise representation.

Example

```
Message Type            54                      // T = Trade
Sale Condition Flags    00                      // Non-ISO, Regular Market session, Round or
                                                   Mixed Lot, Trade is subject to Rule 611,
                                                   execution during continuous trading
Timestamp               b2 8f a5 a0 ab 86 6d 14 // 2016-08-23 15:32:04.912754610
Symbol                  5a 49 45 58 54 20 20 20 // ZIEXT
Size                    64 00 00 00             // 100 shares
Price                   24 1d 0f 00 00 00 00 00 // $99.05
Trade ID                96 8f 02 00 00 00 00 00 // 167830
```

Trade Break Message – B (0x42)

Trade Break Messages are sent when an execution on IEX is broken on that same trading day. Trade breaks are rare and only affect applications that rely upon IEX execution based data.

Field Name	Offset	Length	Type	Description/Notes
Message Type	0	1	Byte	'B' (0x42) – Trade Break
Sale Condition Flags	1	1	Byte	See Appendix A for flag values
Timestamp	2	8	Timestamp	Time stamp of the trade break
Symbol	10	8	String	Security identifier represented in Nasdaq Integrated symbology
Size	18	4	Integer	Trade break volume
Price	22	8	Price	Trade break price
Trade ID	30	8	Long	IEX trade identifier of the trade that was broken. Trade ID refers to the previously sent Order Executed or Trade Message.

Total Message Data length is 38 bytes. See Appendix B for the bitwise representation.

Example

```
Message Type              42                      // B = Trade Break
Sale Condition Flags      00                      // Non-ISO, Regular Market Session, Round or
                                                     Mixed Lot, Trade is subject to Rule 611,
                                                     execution during continuous trading
Timestamp                 b2 8f a5 a0 ab 86 6d 14 // 2016-08-23 15:32:04.912754610
Symbol                    5a 49 45 58 54 20 20 20 // ZIEXT
Size                      64 00 00 00             // 100 shares
Price                     24 1d 0f 00 00 00 00 00 // $99.05
Trade ID                  96 8f 06 00 00 00 00 00 // 429974
```

Clear Book Message – C (0x43)

This message is used to indicate that the IEX Book for a symbol has been cleared of all orders.

Field Name	Offset	Length	Type	Description/Notes
Message Type	0	1	Byte	'C' (0x43) – Clear Book
Reserved	1	1	Byte	Reserved for future use
Timestamp	2	8	Timestamp	Time stamp of the clear book state
Symbol	10	8	String	Security identifier represented in Nasdaq Integrated symbology

Total Message Data length is 18 bytes. See Appendix B for the bitwise representation.

Example

```
Message Type        43                      // C = Clear Book
Reserved            00                      // Reserved for future use
Timestamp           b2 8f a5 a0 ab 86 6d 14 // 2016-08-23 15:32:04.912754610
Symbol              5a 49 45 58 54 20 20 20 // ZIEXT
```

APPENDIX A: FLAGS

Security Directory: Flags

Definition

Bit	Name	Description
7	T: Test Security Flag	0: Symbol is not a test security 1: Symbol is a test security
6	W: When Issued Flag	0: Symbol is not a when issued security 1: Symbol is a when issued security
5	E: ETP Flag	0: Symbol is not an ETP (i.e., Exchange Traded Product) 1: Symbol is an ETP

Usage

T	W	E	Mask	Meaning
X			Flags & 0x80	Test security
	X		Flags & 0x40	When issued security
		X	Flags & 0x20	ETP

Order Executed, Trade, & Trade Break: Sale Condition Flags

Definition

Bit	Name	Description
7	F: Intermarket Sweep Flag	0: Non-Intermarket Sweep Order 1: Intermarket Sweep Order ("ISO")
6	T: Extended Hours Flag	0: Regular Market Session Trade 1: Extended Hours Trade (i.e., Form T sale condition)
5	I: Odd Lot Flag	0: Round or Mixed Lot Trade 1: Odd Lot Trade
4	8: Trade Through Exempt Flag	0: Trade is subject to Rule 611 (Trade Through) of SEC Reg. NMS 1: Trade is not subject to Rule 611 (Trade Through) of SEC Reg. NMS*
3	X: Single-price Cross Trade Flag	0: Execution during continuous trading 1: Trade resulting from a single-price cross

* Applied when the taking order was an ISO that traded through a protected quotation, OR the NBBO was crossed at the time of the trade, OR the trade occurred through a self-helped venue's quotation, OR the trade was a single-price cross.

Usage

F	T	I	8	X	Mask	Meaning
X					Flags & 0x80	Trade resulted from an ISO
	X				Flags & 0x40	Trade occurred before or after the Regular Market Session (i.e., Form T)
		X			Flags & 0x20	Trade is less than one round lot
			X		Flags & 0x10	Trade is not subject to Trade Through Rule 611 of SEC Reg. NMS*
				X	Flags & 0x08	Trade resulted from a single-price cross

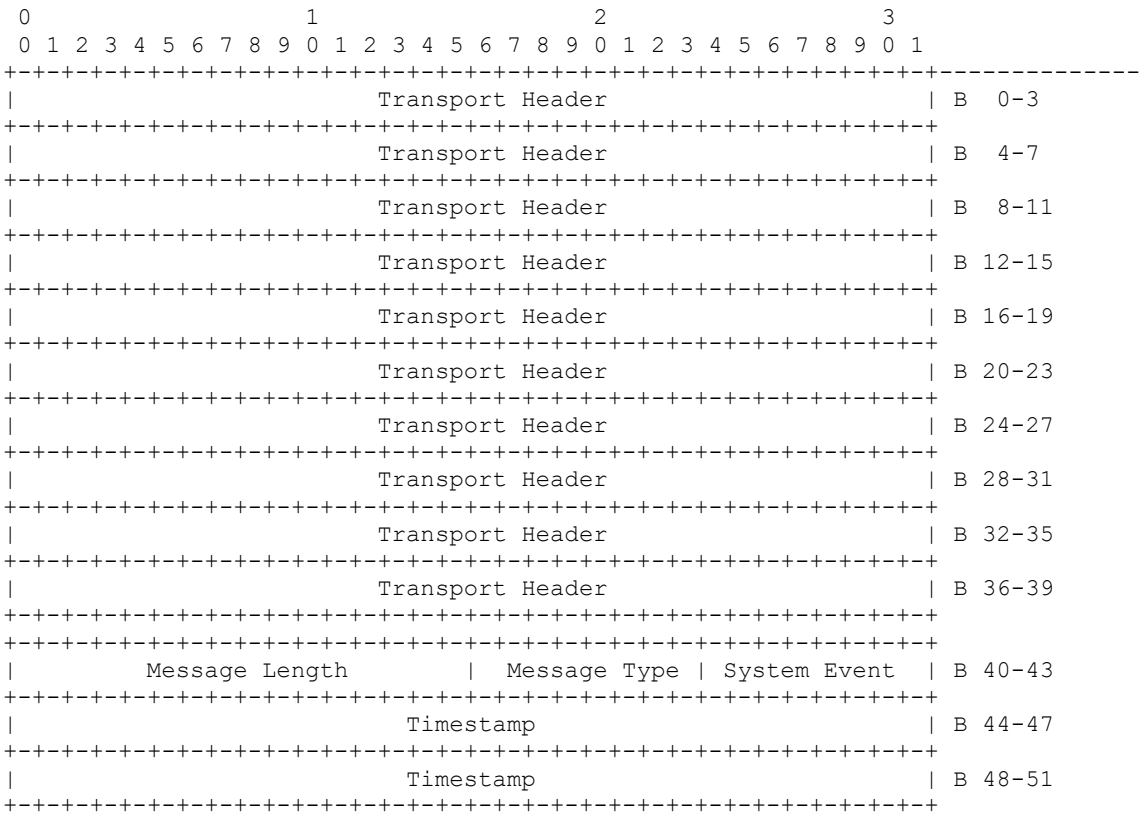
* Applied when the taking order was an ISO that traded through a protected quotation, OR the NBBO was crossed at the time of the trade, OR the trade occurred through a self-helped venue's quotation, OR the trade was a single-price cross.

Trade Eligibility Guidelines

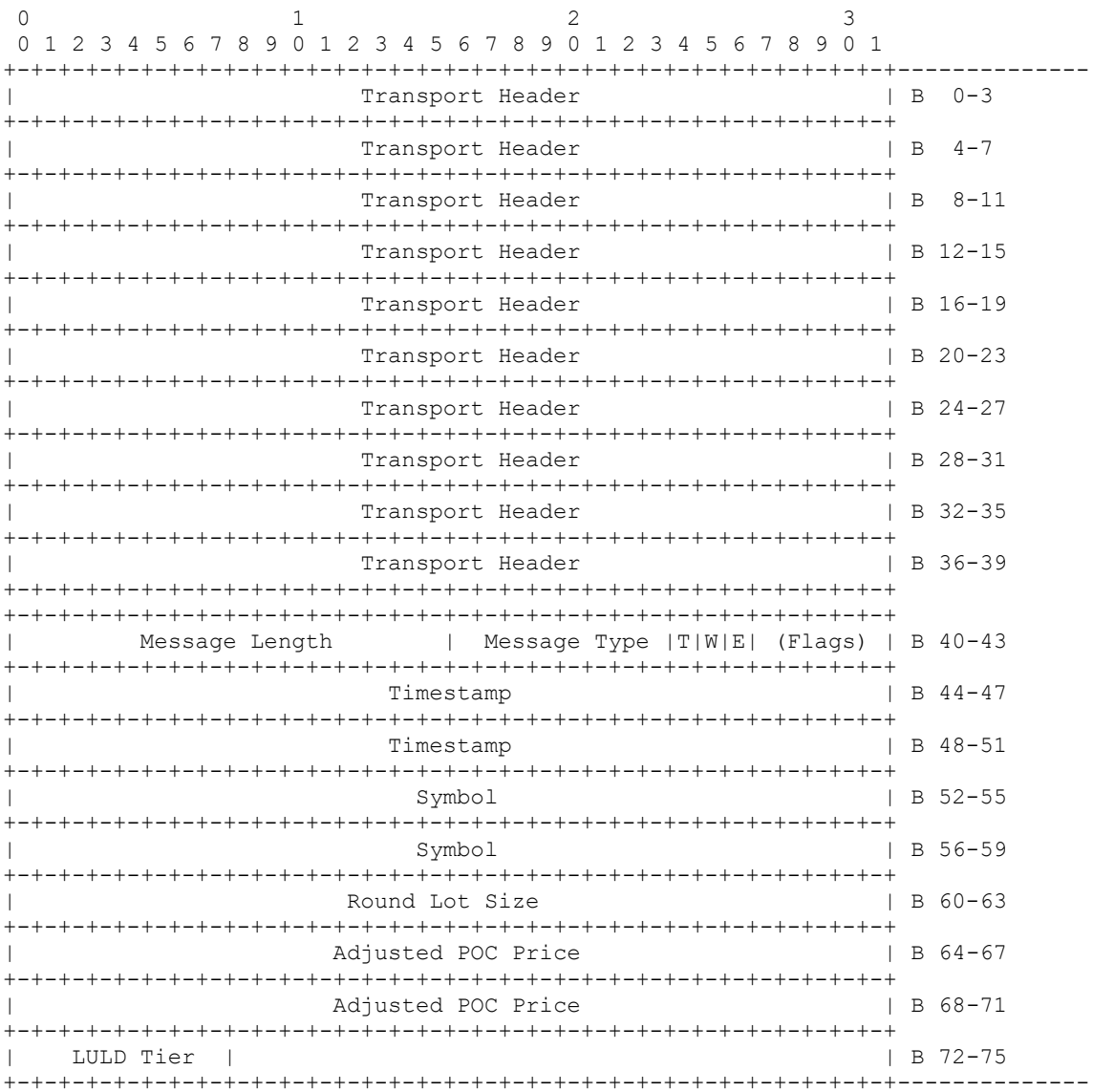
- Last Sale Eligible
  - Intermarket Sweep Flag: 0 or 1
  - Extended Hours Flag: 0
  - Odd Lot Flag: 0
  - Trade Through Exempt Flag: 0 or 1
  - Single-price Cross Trade Flag: 0 or 1
- High/Low Price Eligible
  - Intermarket Sweep Flag: 0 or 1
  - Extended Hours Flag: 0
  - Odd Lot Flag: 0
  - Trade Through Exempt Flag: 0 or 1
  - Single-price Cross Trade Flag: 0 or 1
- Volume Eligible
  - Intermarket Sweep Flag: 0 or 1
  - Extended Hours Flag: 0 or 1
  - Odd Lot Flag: 0 or 1
  - Trade Through Exempt Flag: 0 or 1
  - Single-price Cross Trade Flag: 0 or 1

APPENDIX B: BITWISE REPRESENTATION

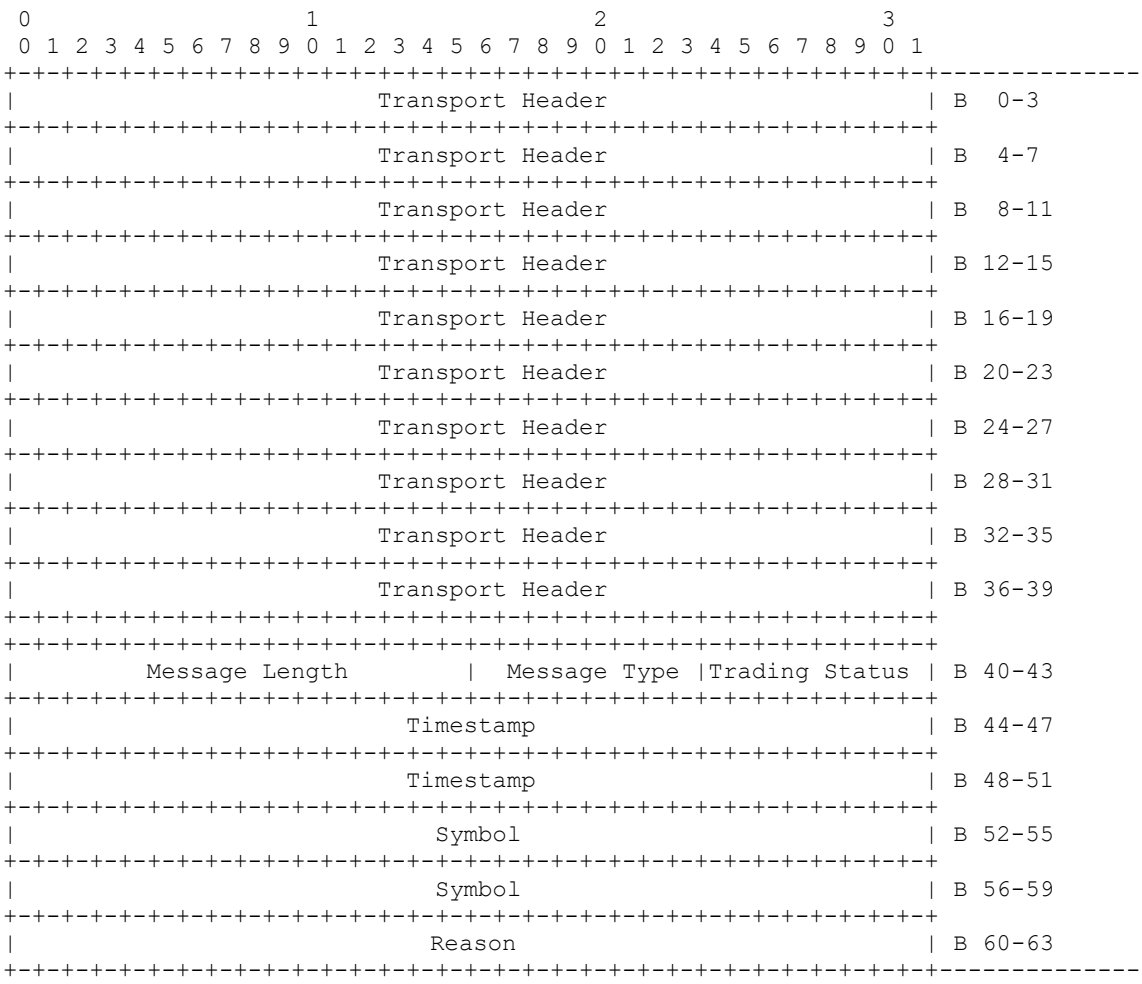
System Event Message in a Single Segment



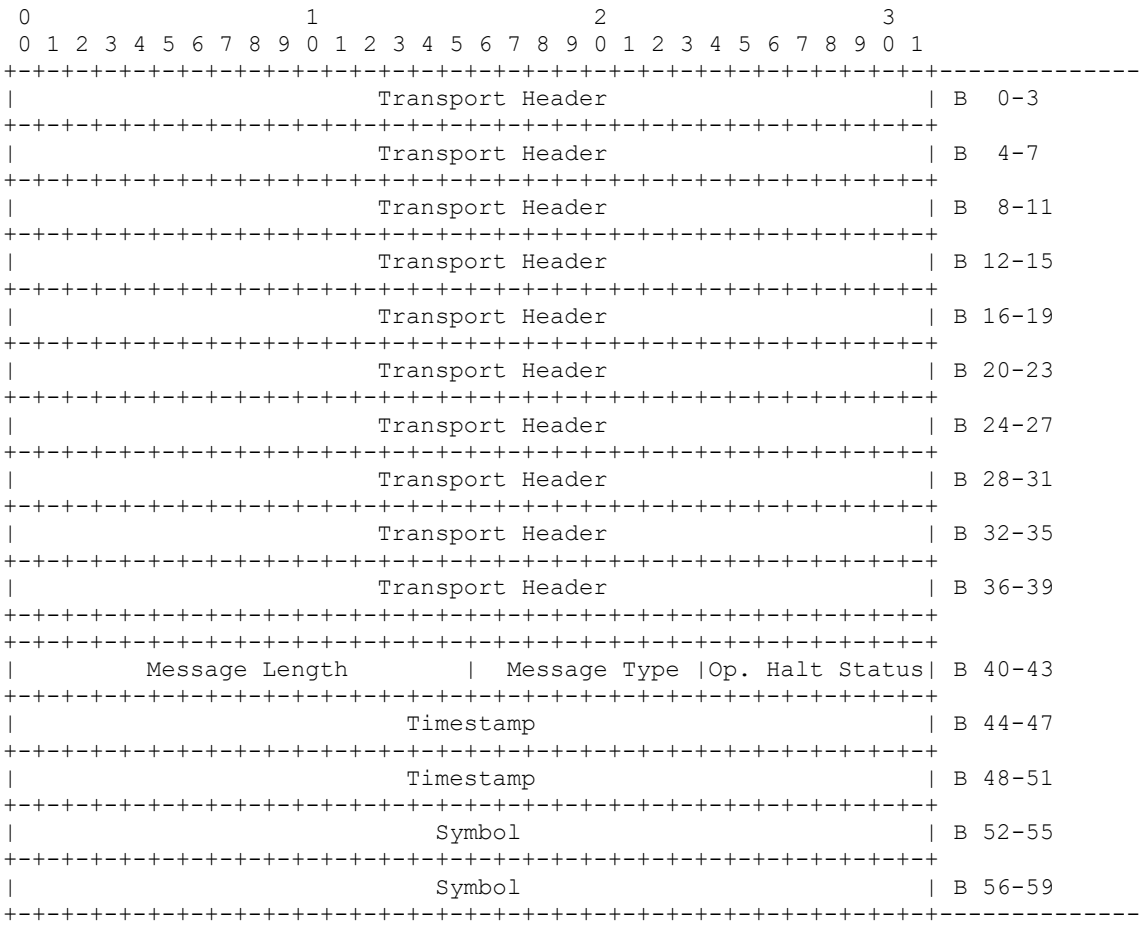
Security Directory Message in a Single Segment



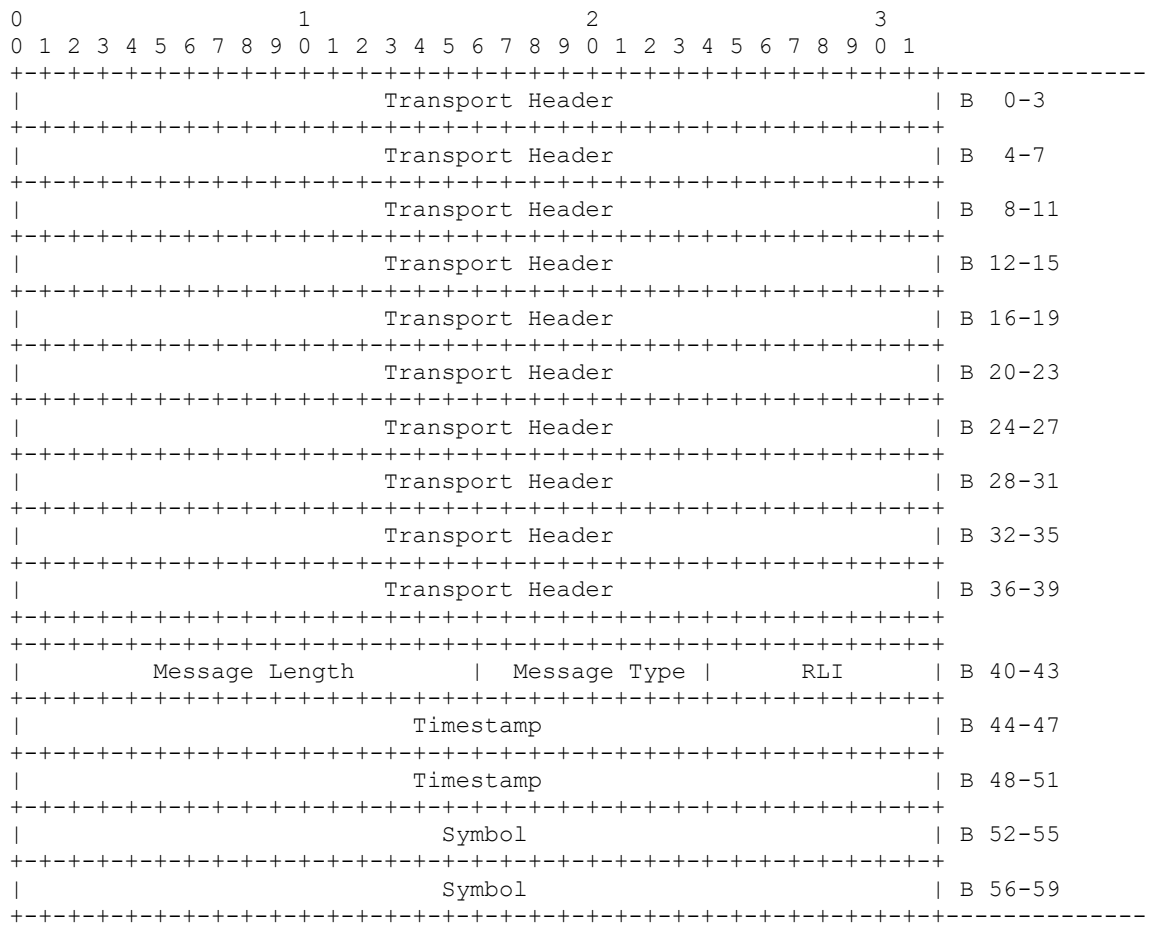
Trading Status Message in a Single Segment



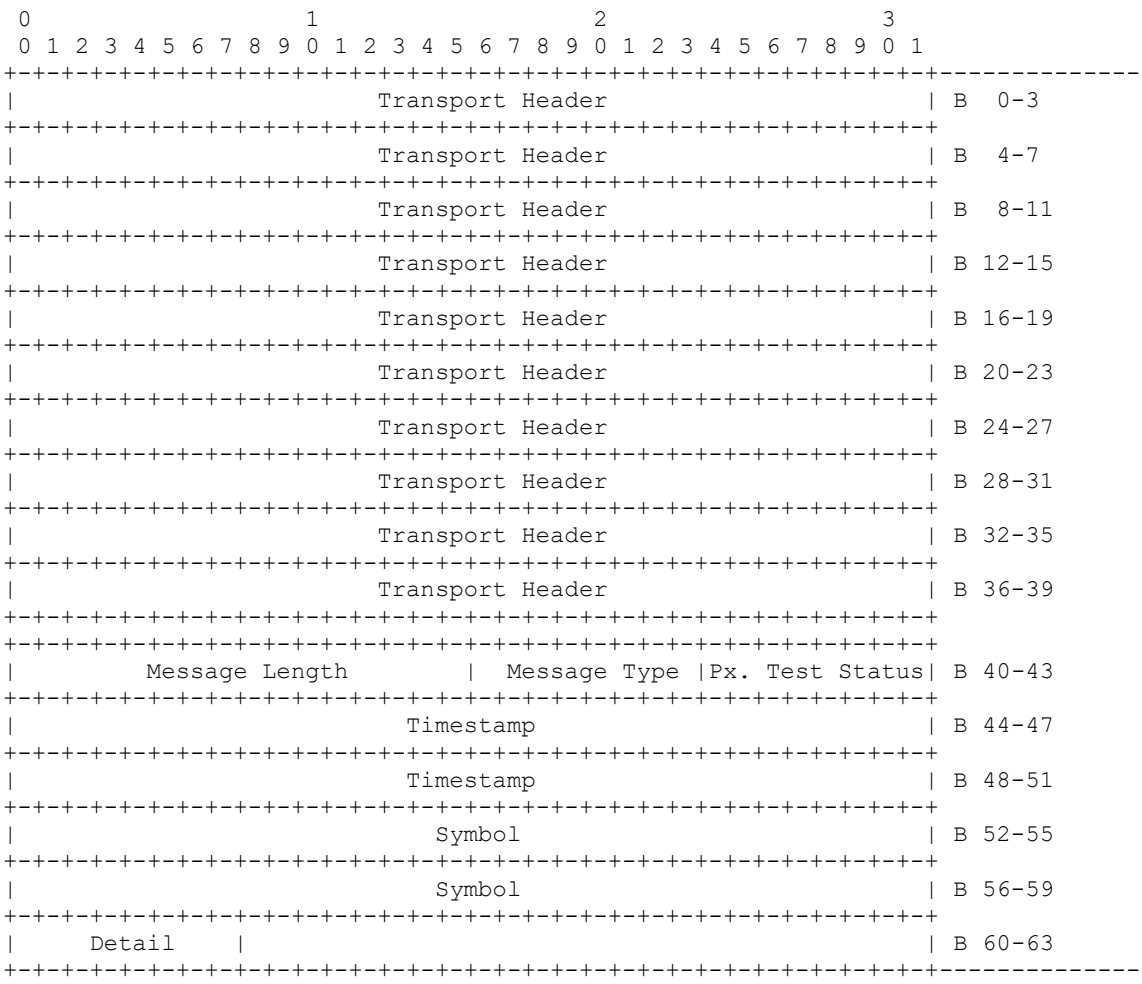
Operational Halt Status Message in a Single Segment



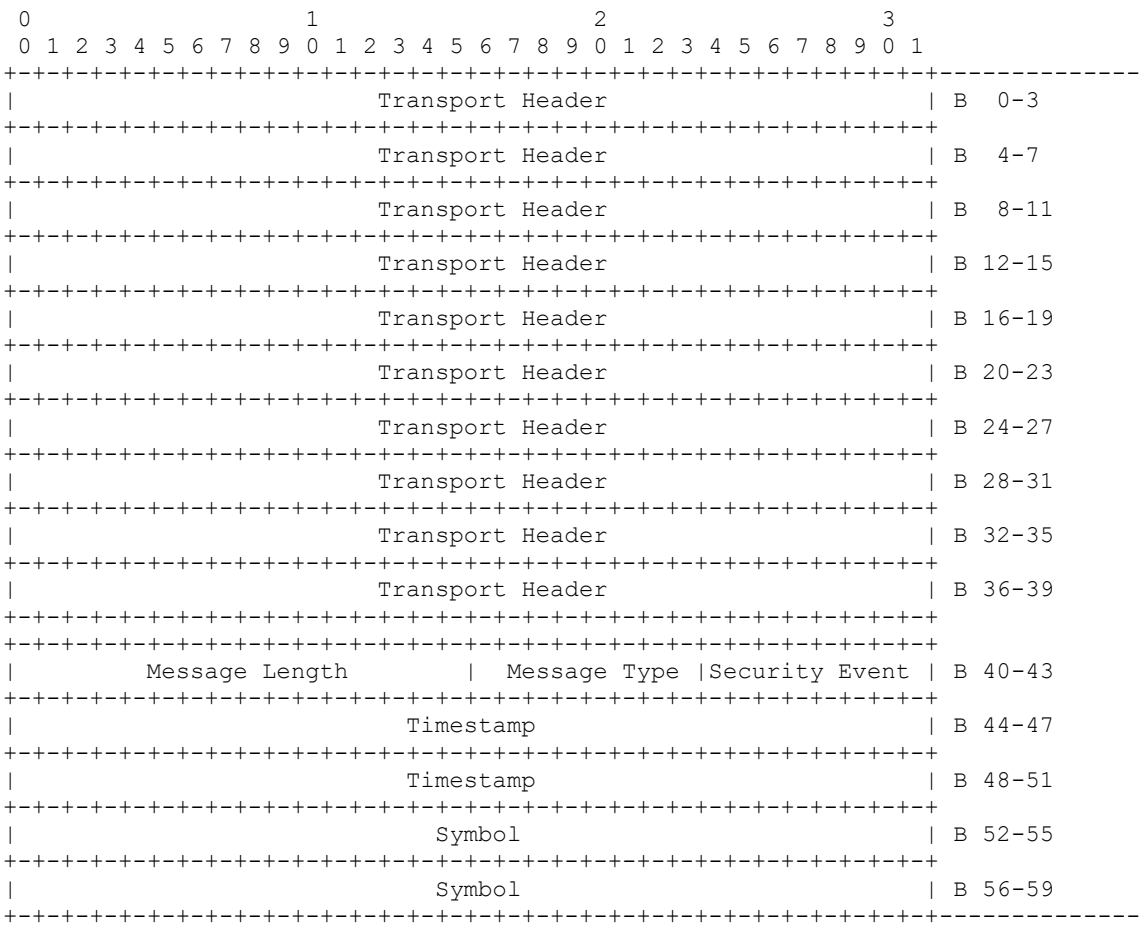
Retail Liquidity Indicator (“RLI”) Message in a Single Segment



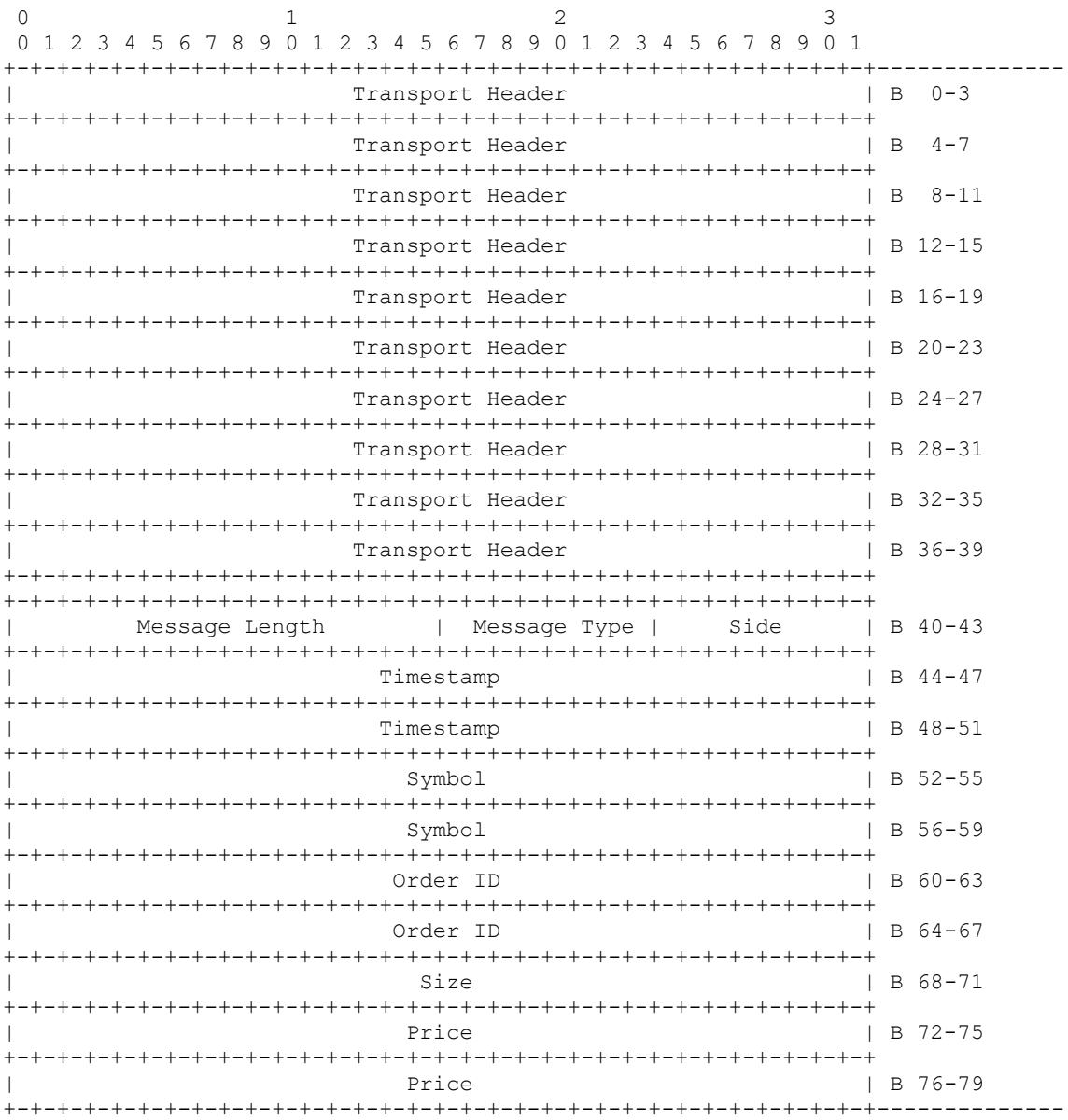
Short Sale Price Test Status Message in a Single Segment



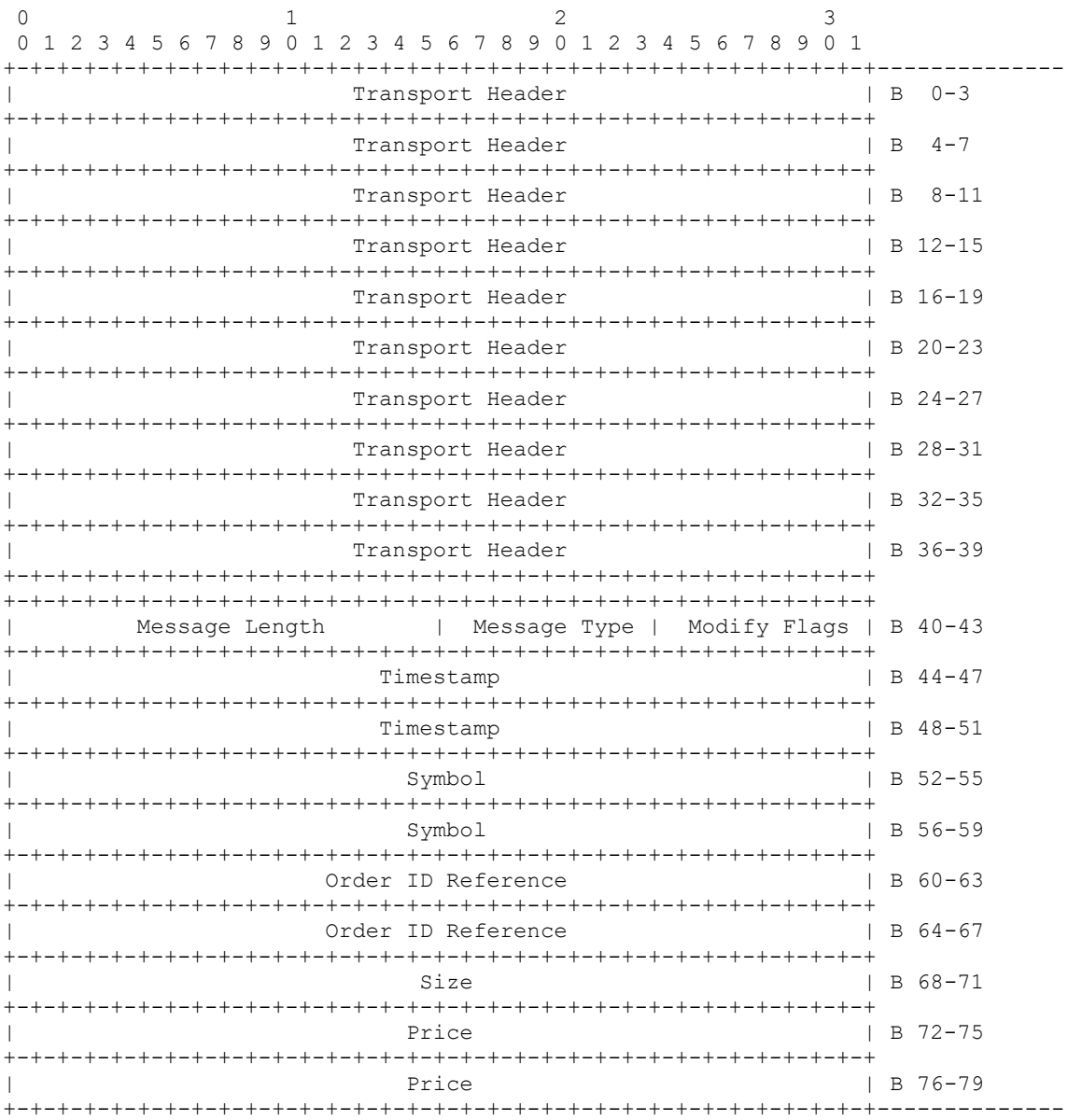
Security Event Message in a Single Segment



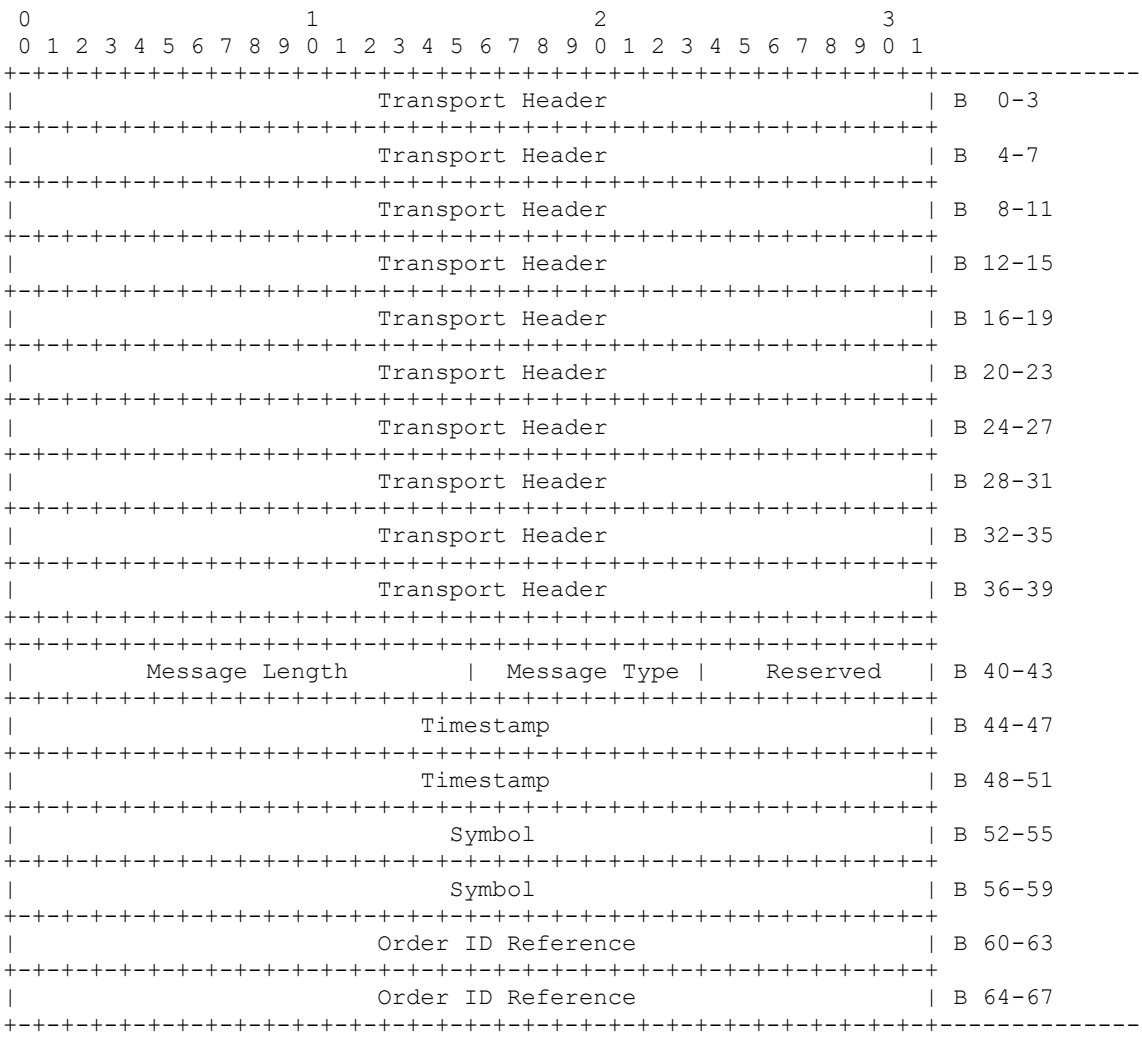
Add Order Message in a Single Segment



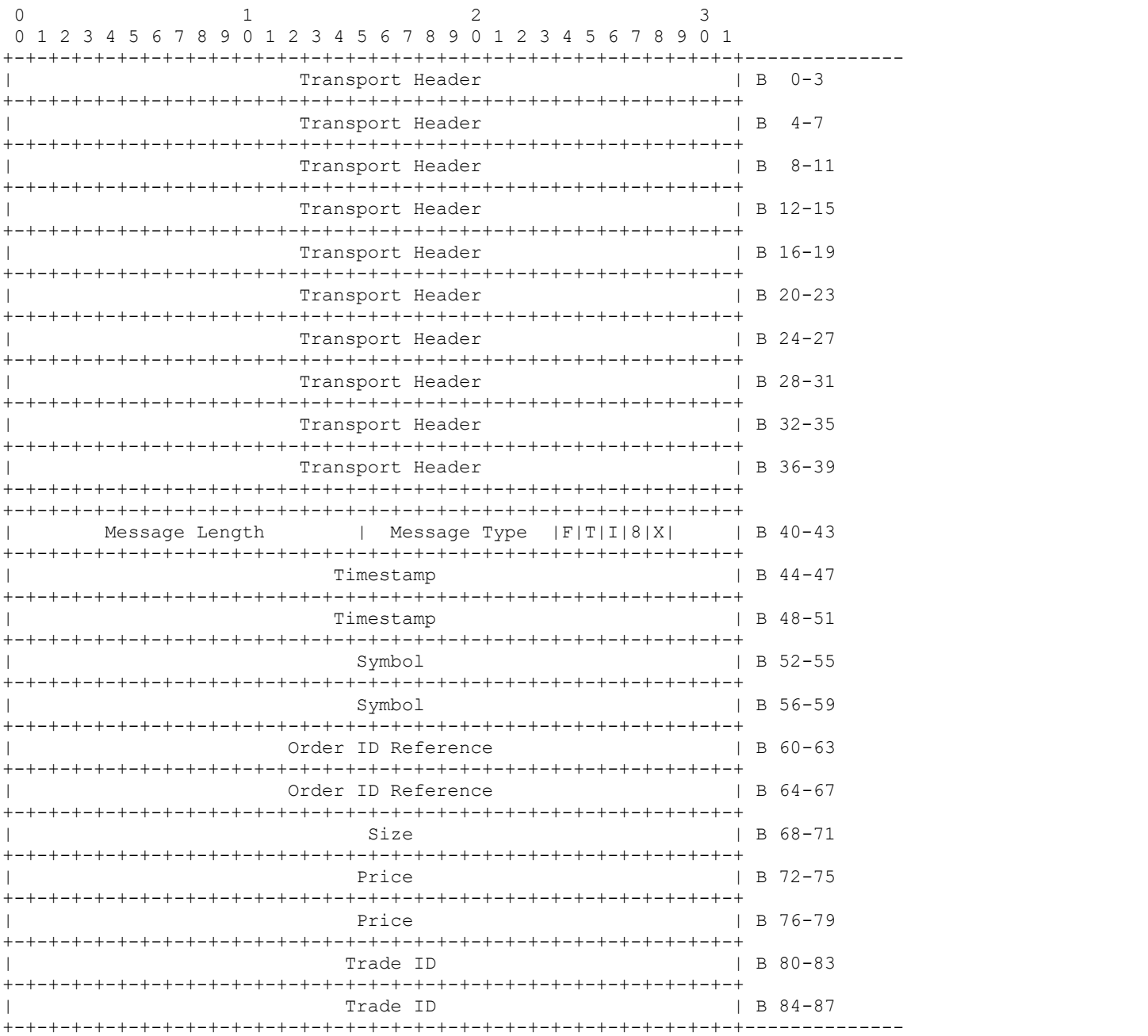
Order Modify Message in a Single Segment



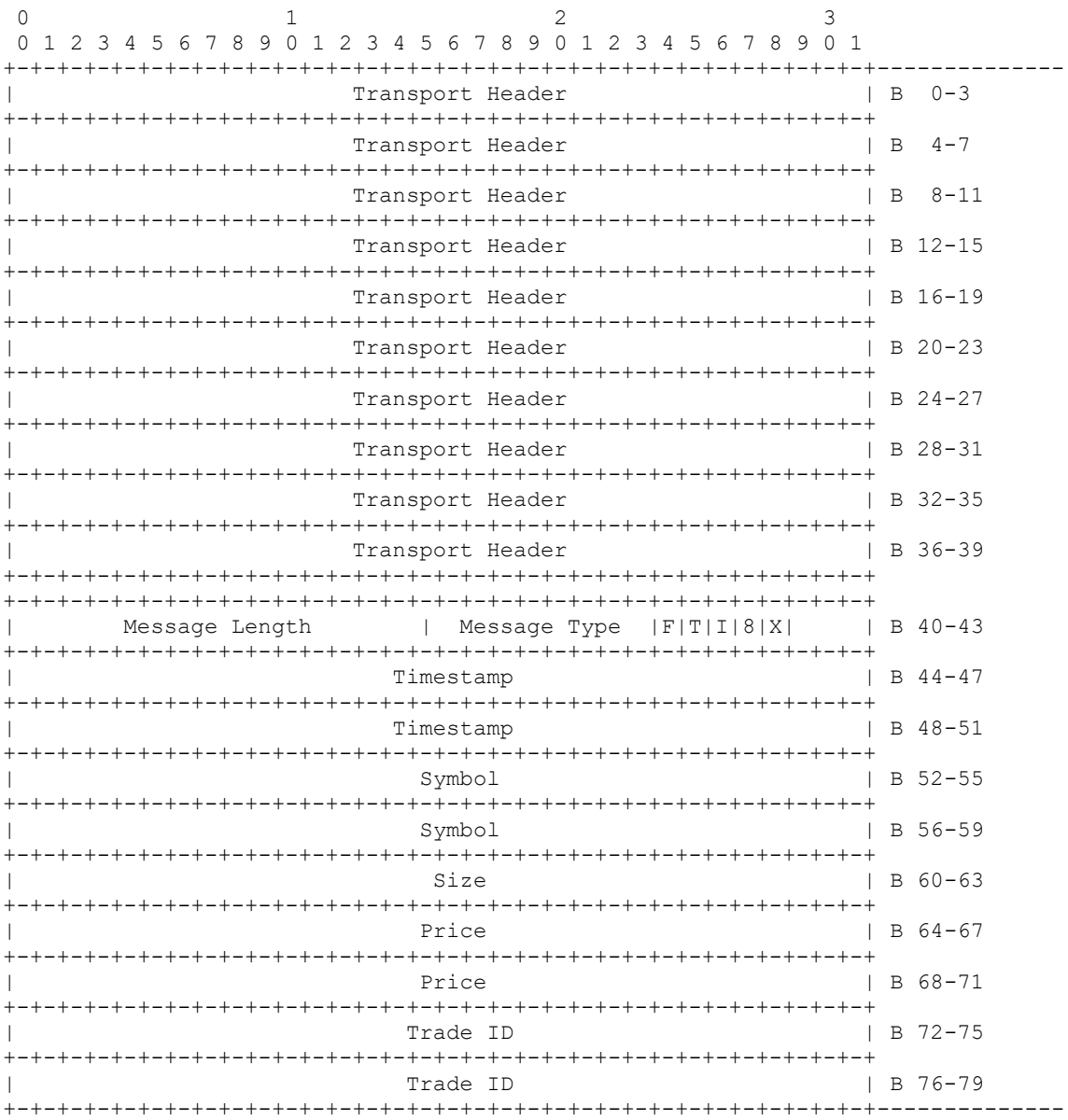
Order Delete Message in a Single Segment



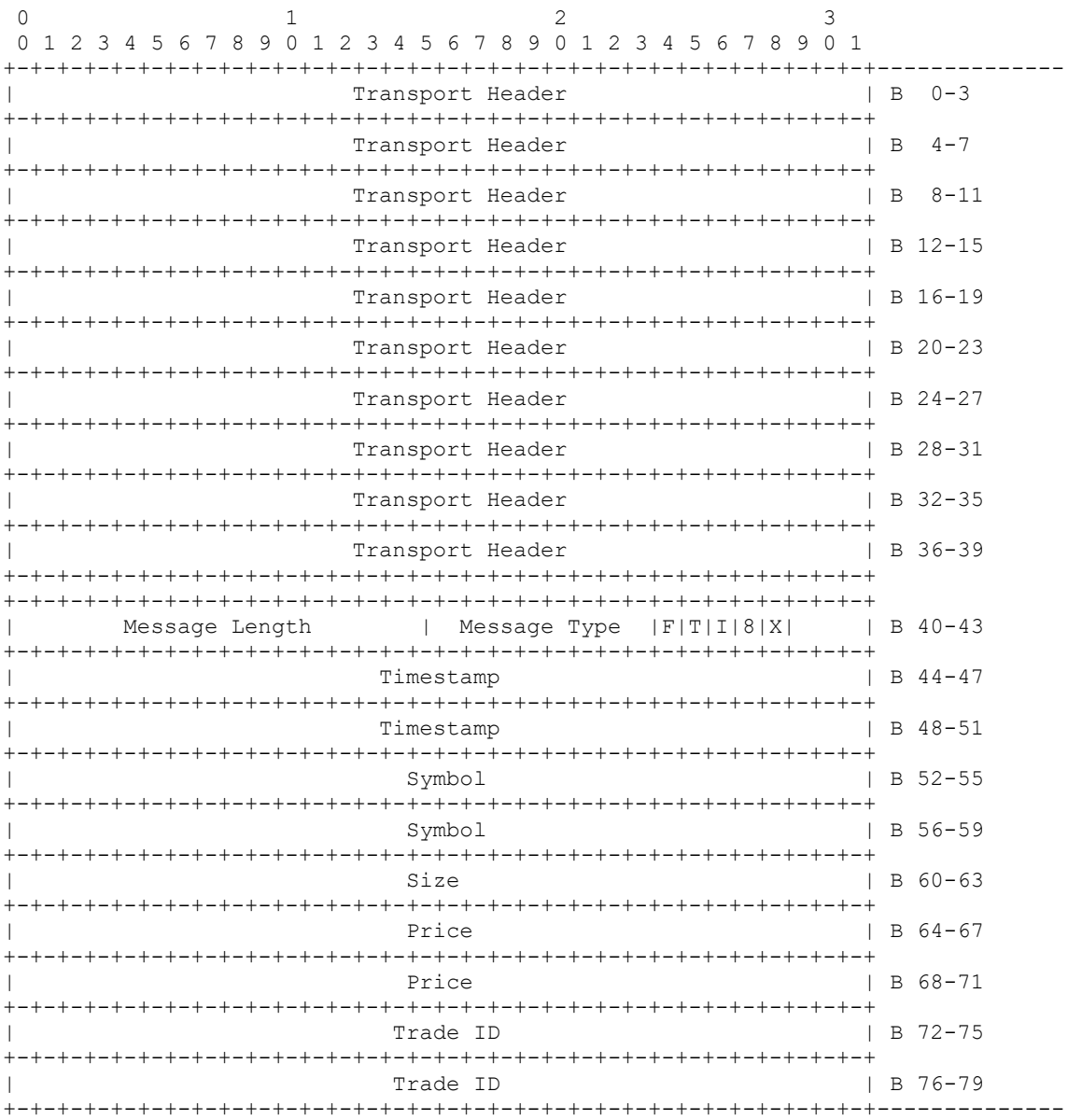
Order Executed Message in a Single Segment



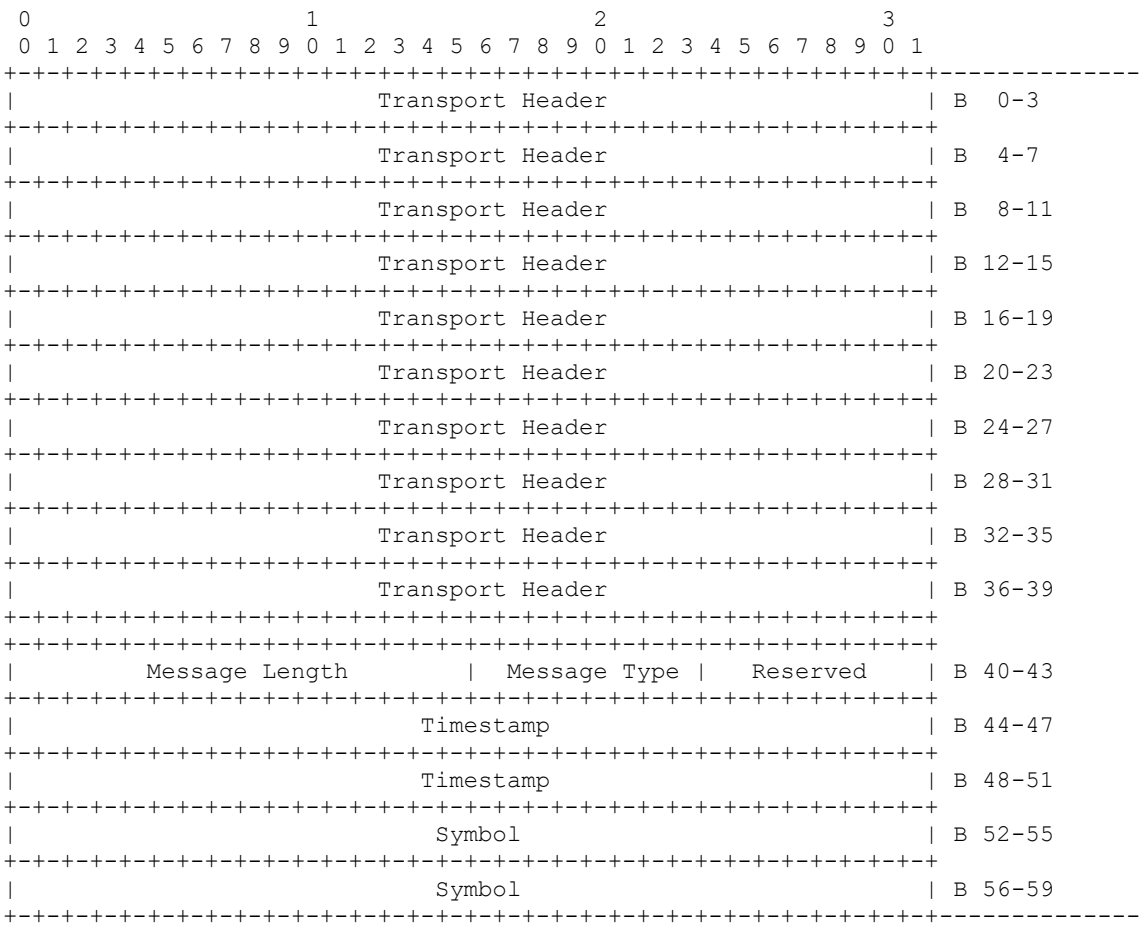
Trade Message in a Single Segment



Trade Break Message in a Single Segment

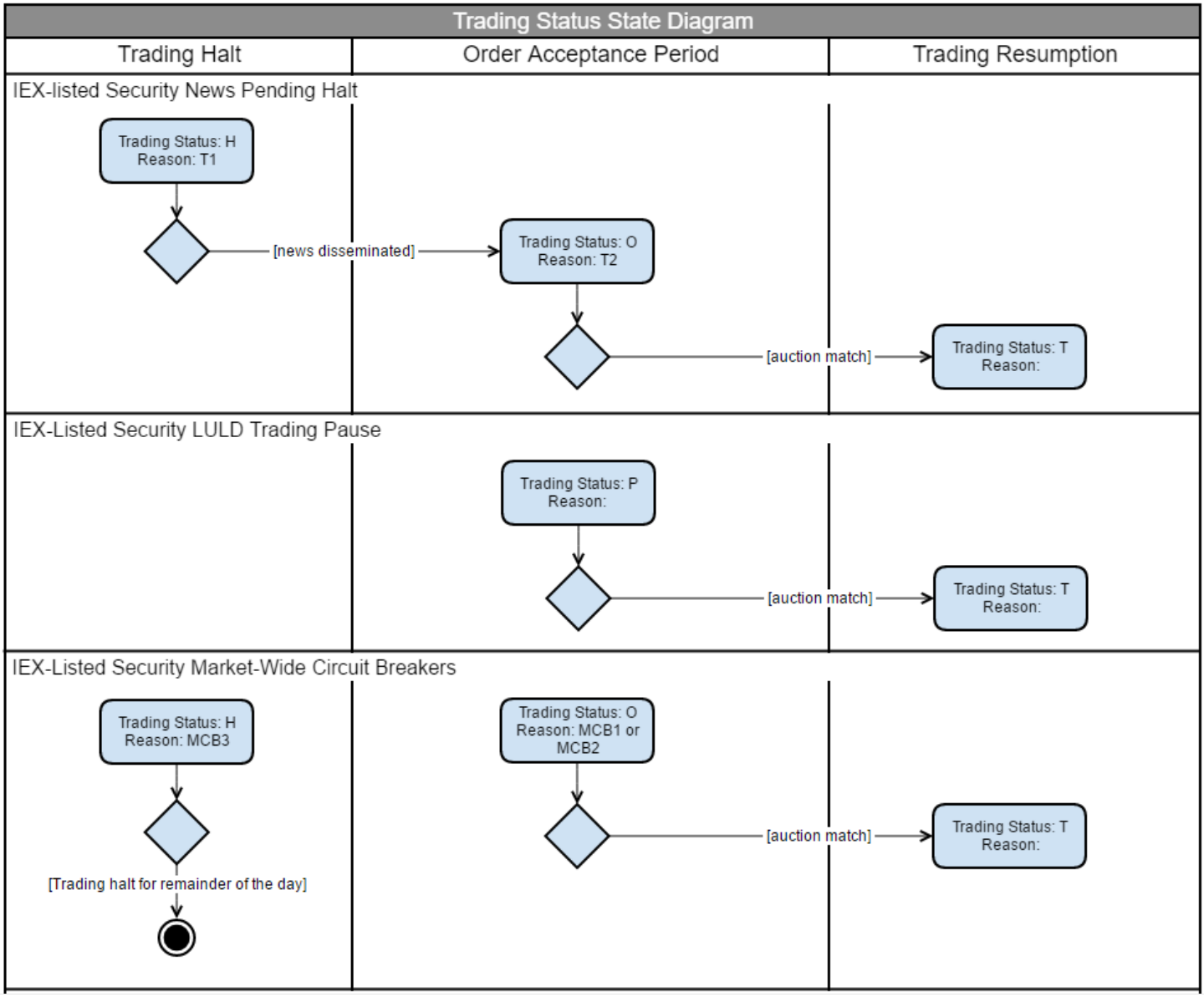


Clear Book Message in a Single Segment

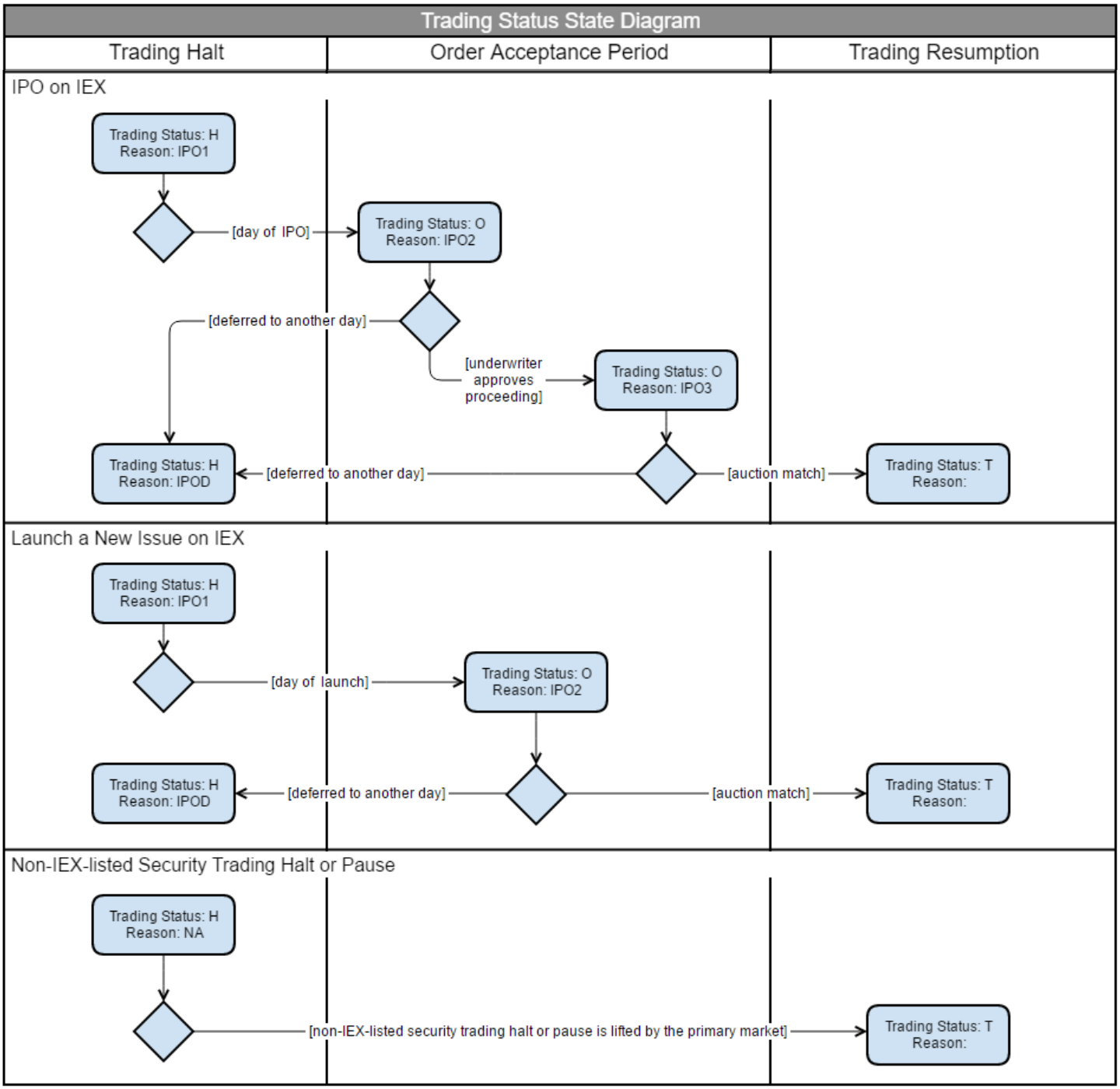


APPENDIX C: STATE DIAGRAMS

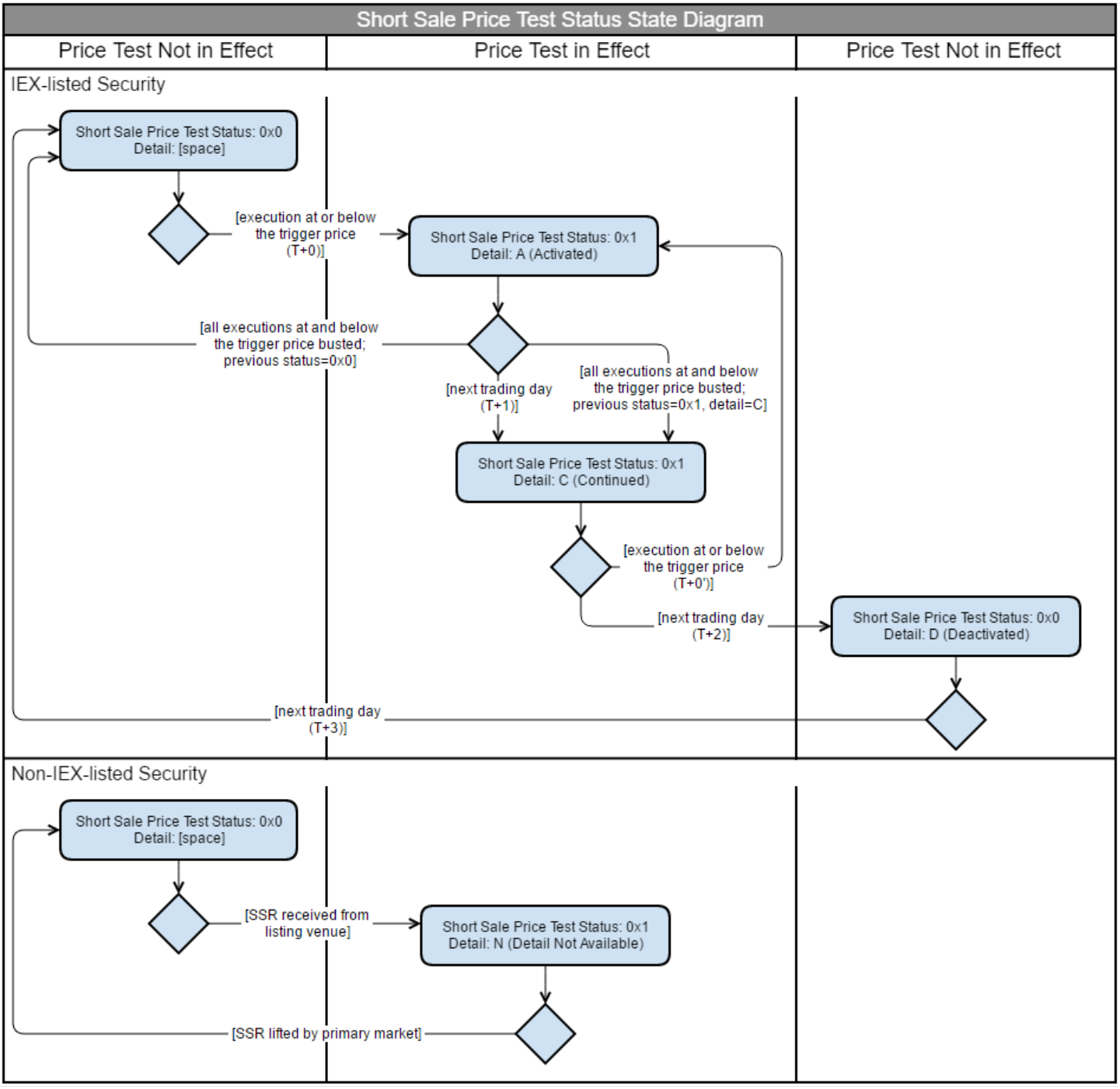
Trading Status Messages



Continues on next page.


Trading Status State Diagram
Trading Halt
Order Acceptance Period
Trading Resumption
IPO on IEX
Trading Status: H
Reason: IPO1
[day of IPO]
Trading Status: O
Reason: IPO2
[deferred to another day]
[underwriter approves proceeding]
Trading Status: O
Reason: IPO3
Trading Status: H
Reason: IPOD
[deferred to another day]
[auction match]
Trading Status: T
Reason:
Launch a New Issue on IEX
Trading Status: H
Reason: IPO1
[day of launch]
Trading Status: O
Reason: IPO2
Trading Status: H
Reason: IPOD
[deferred to another day]
[auction match]
Trading Status: T
Reason:
Non-IEX-listed Security Trading Halt or Pause
Trading Status: H
Reason: NA
[non-IEX-listed security trading halt or pause is lifted by the primary market]
Trading Status: T
Reason:

Short Sale Price Test Status Messages



REVISION HISTORY

Version	Date	Change
1.00	September 3, 2024	Initial document
1.01	September 30, 2024	Updated message type byte value for “Add Order” message
1.02	January 14, 2025	• Clarified description for “Size” field in “Modify Order” message. • Updated overview to reflect feed launch.
1.03	June 2, 2026	• Added DEEP+ Channelized IP, Ports and Channel Breakdown
1.04	June 4, 2026	• Updated DEEP+ Channelized IP Gap Fill Server Addresses for ITF
1.05	August 21, 2026	• Updated DEEP+ Channelized IP Gap Fill Server Addresses for DR
1.06	October 7, 2026	• Updated DEEP+ Channelized RP Configuration Examples and DR Addresses