INVESTORS EXCHANGE TOPS SPECIFICATION

Version 1.56

Updated: May 9, 2017

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OVERVIEW

Participants of Investors Exchange ("IEX" or the "Exchange") may use TOPS to receive real-time top of book quotations direct from IEX. The quotations received via TOPS provide an aggregated size and do not indicate the size or number of individual orders at the best bid or ask. Non-displayed orders and non-displayed portions of reserve orders are not represented in TOPS.

TOPS 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 will not be reported.

TOPS cannot be used to enter orders. For order entry, refer to the FIX Specification.

For ordering information, contact IEX Market Operations at 646.343.2300 or marketops@iextrading.com or simply submit completed Data Agreements and Forms.

TRANSPORT PROTOCOL OPTIONS

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

Protocol Identification on IEX-TP

- Message Protocol ID: 0x8002
- Channel ID: 1

ARCHITECTURE

TOPS is made up of a series of sequenced messages. The messages that make up the TOPS feed are delivered using a lower level protocol that takes care of sequencing and delivery guarantees.

DATA TYPES

- String: variable 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

All binary fields are in little endian format.

NETWORK DETAILS

Multicast Addresses

SITE	XC Type	Group	Port	Source IP Subnet
IEX POP (Equinix NY5)	Primary (A)	233.215.21.2	10376	23.226.155.128/28
	Secondary (B)	233.215.21.130	10376	23.226.155.192/28
Disaster Recovery (Equinix CH4)	Tertiary (C)	233.215.21.66	10376	23.226.155.176/28
IEX Testing Facility ("ITF") (Equinix NY5)	ITF (I)	233.215.21.240	32000	23.226.155.8/29

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
- Supported Request Type(s):   Sequenced Messages

UDP Gap Fill Server Addresses

SITE	XC Type	Server	Port
IEX POP (Equinix NY5)	Primary (A)	23.226.155.164	11376
	Secondary (B)	23.226.155.228	11376
Disaster Recovery (Equinix CH4)	Tertiary (C)	23.226.155.244	11376
IEX Testing Facility (Equinix NY5)	ITF (I)	23.226.155.18	33000

TCP Gap Fill Server Addresses

SITE	XC Type	Server	Port
IEX POP (Equinix NY5)	Primary (A)	23.226.155.165	11376
	Secondary (B)	23.226.155.229	11376
Disaster Recovery (Equinix CH4)	Tertiary (C)	23.226.155.245	11376
IEX Testing Facility (Equinix NY5)	ITF (I)	23.226.155.19	33000

PIM RP Configuration Examples

SITE	XC Type	PIM RP Statement Sample*
IEX POP (Equinix NY5)	Primary (A)	ip pim rp-address x.x.x.x 233.215.21.0/28
	Secondary (B)	ip pim rp-address y.y.y.y 233.215.21.128/28
Disaster Recovery (Equinix CH4)	Tertiary (C)	ip pim rp-address z.z.z.z 233.215.21.64/28
IEX Testing Facility (Equinix NY5)	ITF (I)	ip pim rp-address i.i.i.i 233.215.21.240/29

* x.x.x.x, y.y.y.y, z.z.z.z, and i.i.i.i in above samples refer to respective IEX-side BGP Peer IPs.

Please note that this is only one of several ways to configure multicast. Additionally, RP IPs are not advertised at this time.

IEX statically subscribes and floods individual data feed multicast groups to applicable direct data feed subscribers on cross-connects designated A, B, C, or I.

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) 23.226.155.240/28 (Gap Fill Servers)
IEX Testing Facility (Equinix NY5)	ITF (I)	23.226.155.8/29 (Multicast Source) 23.226.155.0.16/29 (Gap Fill Servers)

MESSAGE FORMATS

Quote Update Message

TOPS broadcasts a real-time Quote Update Message each time IEX's best bid or offer quote is updated during the trading day. Prior to the start of trading, IEX publishes a "zero quote" (Bid Price, Bid Size, Ask Price, and Ask Size are zero) for all symbols in the IEX Trading System.

Field Name	Offset	Length	Type	Description/Notes
Message Type	0	1	Byte	'Q' (0x51) – Quote Update
Flags	1	1	Byte	See Appendix A for flag values
Timestamp	2	8	Long	Time stamp
Symbol	10	8	String	Quoted symbol
Bid Size	18	4	Integer	Aggregate quoted best bid size
Bid Price	22	8	Price	Best quoted bid price
Ask Price	30	8	Price	Best quoted ask price
Ask Size	38	4	Integer	Aggregate quoted best ask size

Total Message Data length is 42 bytes. See Appendix B for the bitwise representation.

Timestamp

The time an event triggered the top of book update as set by the IEX Trading System logic. The format of the timestamp is a counter of nanoseconds since POSIX (Epoch) time UTC. When an execution on the Order Book causes a quote update, the Trade Report Message(s) will publish on TOPS first, followed by a single resulting Quote Update Message. All messages triggered by the same event (e.g., taking order) will have the same timestamp. For a given symbol, timestamps monotonically increase in time unless an out-of-band event occurs (e.g., trade bust or IEX manually disables a symbol); however, there is no guarantee that timestamps across symbols are monotonically increasing.

Symbol

Quoted symbol represented in Nasdaq Integrated symbology.

Price

Price of the quote, where the decimal portion is zero filled on the right. The decimal point is implied by position and does not explicitly appear in the field. For example, 123400 = $12.34.

Size

Size of the quote represented in number of shares.

Trade Report Message

Trade Report Messages are sent when an order on the IEX Order Book is executed in whole or in part. TOPS sends a Trade Report Message for every individual fill.

Field Name	Offset	Length	Type	Description/Notes
Message Type	0	1	Byte	'T' (0x54) – Trade Report
Sale Condition Flags	1	1	Byte	See Appendix A for flag values
Timestamp	2	8	Long	Time stamp
Symbol	10	8	String	Security identifier
Size	18	4	Integer	Trade volume
Price	22	8	Price	Trade price
Trade ID	30	8	Long	IEX Generated Identifier. Trade ID is also referenced in the Trade Break Message.
(Reserved)	38	4		Reserved bytes

Total Message Data length is 42 bytes. See Appendix B for the bitwise representation.

Timestamp

The time an event triggered the trade (i.e., execution) as set by the IEX Trading System logic. The format of the timestamp is a counter of nanoseconds since POSIX (Epoch) time UTC. When an execution on the Order Book causes a quote update, the Trade Report Message(s) will publish on TOPS first, followed by a single resulting Quote Update Message. All messages triggered by the same event (e.g., taking order) will have the same timestamp. For a given symbol, timestamps monotonically increase in time unless an out-of-band event occurs (e.g., trade bust or IEX manually disables a symbol); however, there is no guarantee that timestamps across symbols are monotonically increasing.

Symbol

Traded symbol represented in Nasdaq Integrated symbology.

Size

Size of the trade represented in number of shares.

Price

Execution price, where the decimal portion is zero filled on the right. The decimal point is an implied by position (always 4 decimal places) and does not explicitly appear in the field. For example, 123400 = $12.34.

Trade ID

IEX generated trade identifier. A given trade is uniquely identified within a day by its Trade ID.

Trade Break Message

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	Long	Time stamp
Symbol	10	8	String	Security identifier
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 Trade Report Message.
(Reserved)	38	4		Reserved bytes

Total Message Data length is 42 bytes. See Appendix B for the bitwise representation.

Timestamp

The time an event triggered the trade break as set by the IEX Trading System logic. The format of the timestamp is a counter of nanoseconds since POSIX (Epoch) time UTC. For a given symbol, timestamps monotonically increase in time unless an out-of-band event occurs (e.g., trade bust or IEX manually disables a symbol); however, however, there is no guarantee that timestamps across symbols are monotonically increasing.

Symbol

Traded symbol represented in Nasdaq Integrated symbology.

Price

Execution price, where the decimal portion is zero filled on the right. The decimal point is an implied by position (always 4 decimal places) and does not explicitly appear in the field. For example, 123400 = $12.34.

Size

Size of the trade represented in number of shares.

Trade ID

IEX generated trade identifier of the broken trade. A given trade is uniquely identified within a day by its Trade ID.

EXAMPLE MESSAGES

Note that in the following examples, each byte is represented by two hexadecimal digits.

Quote Update Message

Message Type	51	//	Q = Quote Update
Flags	00	//	Active and Regular Market Session
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
Bid Size	e4 25 00 00	//	9,700 shares
Bid Price	24 1d 0f 00 00 00 00 00	//	$99.05
Ask Price	ec 1d 0f 00 00 00 00 00	//	$99.07
Ask Size	e8 03 00 00	//	1,000 shares

Trade Report Message

Message Type	54	//	T = Trade Report
Sale Condition Flags	00	//	Non-ISO, Regular Market Session, Round or Mixed Lot, Trade is subject to Rule 611
Timestamp	c3 df f7 05 a2 86 6d 14	//	2016-08-23 15:31:23.662974915
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
(Reserved)	00 00 00 00	//	

Trade Break Message

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
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
(Reserved)	00 00 00 00	//	

APPENDIX A: FLAGS

Quote Update: Flags

Definition

Bit	Name	Description
0	H: Symbol Halt Flag	0: Symbol is active (available for trading) 1: Symbol is halted
1	P: Market Session Flag	0: Regular Market Session 1: Pre/Post-Market Session

Usage

H	P	Mask	Meaning
X		Flags & 0x80	Symbol is halted
	X	Flags & 0x40	Pre/Post-Market Session

Trade Report & Trade Break: Sale Condition Flags

Definition

Bit	Name	Description
0	F: Intermarket Sweep Flag	0: Non-Intermarket Sweep Order 1: Intermarket Sweep Order ("ISO")
1	T: Extended Hours Flag	0: Regular Market Session Trade 1: Extended Hours Trade (i.e., Form T sale condition)
2	I: Odd Lot Flag	0: Round or Mixed Lot Trade 1: Odd Lot Trade
3	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*

* 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.

Usage

F	T	I	8	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*

* 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.

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
- 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
- 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

APPENDIX B: BITWISE REPRESENTATION

Quote Update Messages in a Single Segment

```
0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+--------------
|                   Transport Header                    | B  1-4
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                   Transport Header                    | B  5-8
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                   Transport Header                    | B  9-12
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                   Transport Header                    | B 13-16
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                   Transport Header                    | B 17-20
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                   Transport Header                    | B 21-24
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                   Transport Header                    | B 25-28
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                   Transport Header                    | B 29-32
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                   Transport Header                    | B 33-36
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                   Transport Header                    | B 37-40
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|       Message Length       | Message Type |P|H|  (Flags) | B 41-44
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                        Timestamp                      | B 45-48
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                        Timestamp                      | B 49-52
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                         Symbol                        | B 53-56
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                         Symbol                        | B 57-60
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                        Bid Size                       | B 61-64
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+--------------
|                        Bid Price                      | B 65-68
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                        Bid Price                      | B 69-72
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                        Ask Price                      | B 73-76
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                        Ask Price                      | B 77-80
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                        Ask Size                       | B 81-84
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|       Message Length       | Message Type |P|H|  (Flags) | B 85-88
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                          ...                          | B 89-128
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+--------------
|                          ...                          | B 129+
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Trade Report Messages in a Single Segment

```
0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+--------------
|                    Transport Header                    | B  1-4
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                    Transport Header                    | B  5-8
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                    Transport Header                    | B  9-12
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                    Transport Header                    | B 13-16
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                    Transport Header                    | B 17-20
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                    Transport Header                    | B 21-24
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                    Transport Header                    | B 25-28
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                    Transport Header                    | B 29-32
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                    Transport Header                    | B 33-36
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                    Transport Header                    | B 37-40
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|      Message Length      |  Message Type  |F|T|I|8|(Flags)| B 41-44
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                      Timestamp                        | B 45-48
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                      Timestamp                        | B 49-52
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                       Symbol                         | B 53-56
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                       Symbol                         | B 57-60
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                        Size                          | B 61-64
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+--------------
|                       Price                          | B 65-68
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                       Price                          | B 69-72
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                      Trade ID                        | B 73-76
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                      Trade ID                        | B 77-80
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                      Reserved                        | B 81-84
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|      Message Length      |  Message Type  |F|T|I|8|(Flags)| B 85-88
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                        ...                           | B 89-124
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+--------------
|                        ...                           | B 125+
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Trade Break Messages in a Single Segment

```
0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+--------------
|                     Transport Header                          | B  1-4
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                     Transport Header                          | B  5-8
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                     Transport Header                          | B  9-12
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                     Transport Header                          | B 13-16
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                     Transport Header                          | B 17-20
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                     Transport Header                          | B 21-24
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                     Transport Header                          | B 25-28
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                     Transport Header                          | B 29-32
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                     Transport Header                          | B 33-36
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                     Transport Header                          | B 37-40
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|        Message Length     |  Message Type  |F|T|I|8|(Flags)| B 41-44
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                         Timestamp                             | B 45-48
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                         Timestamp                             | B 49-52
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                          Symbol                               | B 53-56
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                          Symbol                               | B 57-60
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                          Size                                 | B 61-64
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+--------------
|                          Price                                | B 65-68
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                          Price                                | B 69-72
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                         Trade ID                              | B 73-76
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                         Trade ID                              | B 77-80
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                         Reserved                              | B 81-84
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|        Message Length     |  Message Type  |F|T|I|8|(Flags)| B 85-88
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                           ...                                 | B 89-124
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+--------------
|                           ...                                 | B 125+
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

REVISION HISTORY

Version	Date	Change
1.00	November 3, 2014	Initial document
1.10	December 10, 2014	Added Multicast Addresses section
1.20	April 29, 2015	Added DR multicast details
1.30	May 12, 2015	Updated Address and Contact Info
1.40	October 27, 2015	Updated DR A-side source IP address
1.50	June 28, 2016	Added Trade Report and Trade Break Messages Provided new Multicast Addresses Added retransmission capabilities and connectivity details Removed the 30 second quote refresh functionality
1.51	July 14, 2016	Corrected PIM RP Statement Sample
1.52	July 28, 2016	Update the timestamp description to identify cases where timestamps may not monotonically increase. Identified that a zero quote will be sent prior to market open for each eligible symbol.
1.53	July 29, 2016	Added Message Protocol ID and Channel ID to the specification
1.54	August 23, 2016	Added Example Messages section
1.55	May 2, 2017	Added ITF to the Network Details section
1.56	May 9, 2017	Updated the ITF Gap Fill Server Address Port numbers. Clarified Trade Eligibility Guidelines.