Document title

XDP DEPTH OF BOOK FEED CLIENT SPECIFICATION

NYSE ARCABOOK, NYSE OPENBOOK ULTRA, NYSE MKT OPENBOOK ULTRA

Version	Date
1.9a	24 Mar 2014

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PREFACE

DOCUMENT HISTORY

The following table provides a description of all changes to this document.

VERSION NO.	DATE	CHANGE DESCRIPTION
1.0a	12/15/10	Initial distribution
1.0b	02/17/11	Changes to Symbol Index Map message Addition of the vendor mapping message Change to the imbalance message
1.0c	02/22/11	Msg type 3, 4, 32 , 33, 34 (Section 3.14, 3.15, 3.17, 3.18, 3.19) clarification
1.0d	03/21/11	Page 23: Added Trading Session Msgtype usage for NYSE/MKT Page 23: Added Trading Session times Pages 25-26: Added 0 reason code Page 27: Added execution message sending rules Page 49: addition of Trading Session msg type processing rules Page 52-53: addition of the symbol sequence number and change to the sequence of messages that appear in a refresh header
1.0e	03/21/11	Addition of the SourceTime seconds to the imbalance msg type
1.0f	03/23/11	Addition of the Ticker Designation field to the FTP symbol mapping file.
1.0g	06/17/11	Updated: – ReasonCode fields in Sections 2.1.5, 2.1.6 and 2.1.7 – Artwork throughout document
1.1	08/19/11	Added Appendix A (The FIX FAST Protocol in XDP) Minor formatting updates
1.2	09/29/11	– Split original spec into two and created a new “XDP Common Client Spec” – Removed the reference to the line handler. – Added Refresh Message types – Added Bit Shift values of 0x03, 0x06 and 0x07 to TradeSession field (Add Order Message and Order Book Add Order Refresh Message) – Updated the Modify reason – Updated Delete reason – Updated Execution reason – Fixed format issue for the Compaction table

VERSION NO.	DATE	CHANGE DESCRIPTION
		– Format updates throughout
1.3	01/11/12	Addition of chapter on Product ID.
1.4	01/30/12	Updated Table 13 (XDP Compacted Depth of Book Message Template)
1.5	04/12/12	Updated the 'ReasonCode' fields in Table 7 (Order Book Modify Message Fields), Table 8 (Order Book Delete Message Fields) and Table 9 (Order Book Execution Message Fields).
1.6	04/24/2012	Minor updates to Appendix and throughout
1.7	05/17/2012	Changed name to NYSE MKT throughout
	08/14/2012	Rebranded with new NYSE Technologies template
1.8	11/06/2013	Added applicable values for various markets, added field notes, removed compacted protocol
1.9	11/29/2013	Amended table 1 and 2 in section 1.2 and table 9 in section 5.2. Added note to table 11 in section 7.1
1.9a	03/17/2014	New message types: Add Order Attributed Messages (msg type '107') and Add Refresh Order Attributed Messages (msg type '108')

REFERENCE MATERIAL

The following lists the associated documents, which either should be read in conjunction with this document or which provide other relevant information for the user:

- SFTI US Technical Specification
- SFTI US Customer Guide
- NYSE Symbology

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FURTHER INFORMATION

For additional product information, visit, http://www.nyxdata.com

For updated capacity figures, visit our capacity pages at: http://www.nyxdata.com/capacity

For details of IP addresses, visit our IP address pages at: http://www.nyxdata.com/ipaddresses

For a full glossary, visit: http://www.nyxdata.com/glossary

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1. XDP DEPTH OF BOOK FEED ORDER BOOK INFORMATION

1.1 OVERVIEW

The XDP Depth of Book feed provides real-time order by order view of the Exchange's order book for all traded securities. The depth of book product includes the depth of book updates (i.e. OpenBook Ultra/ArcaBook), the stock security status information, and Stock Imbalances. The data feed uses the push-based publishing model. This means that data will be published based on its availability. Once information is available, it will be published to clients.

1.2 PUBLICATION TIMES

Table 1 Normal Trading Days (All times are EST)

MSGTYPE	DESCRIPTION	NYSE / NYSE MKT	NYSE ARCA
100	Add Order Message	7:00am – 4:00pm	4:00am – 8:00pm
101	Modify Order Message	7:00am – 4:00pm	4:00am – 8:00pm
102	Delete Order Message	7:00am – 4:00pm	4:00am – 8:00pm
103	Execution Message	9:30am –4:00pm	4:00am – 8:00pm
105	Imbalance Message	8:30am-Stock Open, 3:45pm – 4:00pm	8:30am-Stock Open, 3:45pm- 4pm
106	Order Book Add Order Refresh Message	4:00am – 8:00pm	4:00am – 8:00pm

Table 2 Early Closing Days (All times are EST)

MSGTYPE	DESCRIPTION	NYSE / NYSE MKT	NYSE ARCA
100	Add Order Message	7:00am – 1:00pm	4:00am – 1:00pm
101	Modify Order Message	7:00am – 1:00pm	4:00am – 1:00pm
102	Delete Order Message	7:00am – 1:00pm	4:00am – 1:00pm
103	Execution Message	9:30am – 1:00pm	4:00am – 1:00pm
105	Imbalance Message	8:30am-Stock Open, 12:45pm -1:00pm	8:30am-Stock Open, 12:45pm -1:00pm
106	Order Book Add Order Refresh Message	7:00am – 1:00pm	4:00am – 1:00pm

1.3 CONTROL MESSAGE TYPES

Table 3 Control Message Types used in the Data Feed

MSGTYPE	DESCRIPTION	NYSE	MKT	ARCA
1	Sequence Number Reset	x	x	x
2	Time Reference Message	x	x	x
3	Symbol Index Mapping	x	x	x
4	Vendor Mapping Message	x	x	x
5	Option Series Index Mapping			
10	Retransmission Request Message	x	x	x
11	Request Response Message	x	x	x
12	Heartbeat Response Message	x	x	x
13	Symbol Index Mapping Request Message	x	x	x
15	Refresh Request Message	x	x	x
31	Message Unavailable	x	x	x
32	Symbol Clear	x	x	x
33	Trading Session Change	x	x	x
34	Security Status Message	x	x	x
35	Refresh Header Message	x	x	x

1.4 REFRESH MESSAGE TYPES

Table 4 Refresh Message Types used in the Refresh Feed

MSGTYPE	DESCRIPTION
35	Refresh Header Message
3	Symbol Index Mapping
105	Imbalance Message
34	Security Status Message
33	Trading Session Change
106	Order Book Add Order Refresh Message
108	Order Book Attributed Add Order Refresh Message

1.5 TRADING SESSIONS

Table 5 Trading Sessions (All times are EST)

SESSIONVALUE	DESCRIPTION	NYSE / NYSE MKT	NYSE ARCA
1	Morning Hours	N/A	4:00am – 9:30am
2	National Hours	9:30am – 4:00pm	9:30am – 4:00pm 9:30am – 4:15pm (ETFs)
4	Late Hours	N/A	4:00pm – 8:00pm 4:15pm – 8:00pm (ETFs)

2. ORDER BOOK ADD ORDER MESSAGE – MSG TYPE ‘100’

2.1 MESSAGE STRUCTURE

Table 6 describes the body fields of an Order Book Add Order message, MsgType ‘100’.

Table 6 Order Book Add Order Message Format

FIELD NAME	OFFSET	SIZE (BYTES)	FORMAT	DESCRIPTION
Msg Size	0	2	Binary Integer	Size of the message. NYSE – 31 Bytes NYSE MKT – 31 Bytes NYSE Arca – 31 Bytes
Msg Type	2	2	Binary Integer	This field identifies the type of message ‘100’ – Add Order Message
SourceTimeNS	4	4	Binary Integer	This field represents the nanosecond offset from the time reference second in UTC time (EPOCH)
SymbolIndex	8	4	Binary Integer	This field identifies the numerical representation of the symbol.
SymbolSeqNum	12	4	Binary Integer	This field contains the symbol sequence number
OrderID	16	4	Binary Integer	The Order ID identifies a unique order.
Price	20	4	Binary Integer	This field contains the price point. Use the Price scale from the symbol-mapping index.
Volume	24	4	Binary Integer	This field contains the order quantity in shares.
Side	28	1	ASCII Character	This field indicates the side of the order Buy/Sell. Valid values: ‘B’ – Buy ‘S’ – Sell
OrderIDGTCIndicator	29	1	Binary Integer	This field specifies if Trade Order ID is a GTC order 0 – Day Order 1 – GTC Order
TradeSession	30	1	Binary Integer	Valid values: ▪ 1 – Ok for morning hours ▪ 2 – Ok for national hours (core)

FIELD NAME	OFFSET	SIZE (BYTES)	FORMAT	DESCRIPTION
				▪ 3 – OK for morning and core ▪ 4 – Ok for late hours ▪ 6 – OK for core and late ▪ 7 – OK for morning, core, and late Note: For NYSE and NYSE MKT, only 2 is applicable.

3. ORDER BOOK ATTRIBUTED ADD ORDER MESSAGE – MSG TYPE '107'

3.1 MESSAGE STRUCTURE

Table 7 describes the body fields of an Order Book Attribution Add Order message, MsgType '107'.

Table 7 Order Book Attribution Add Order Message Fields

FIELD NAME	OFFSET	SIZE (BYTES)	FORMAT	DESCRIPTION
Msg Size	0	2	Binary Integer	Size of the message. NYSE – 31 Bytes NYSE MKT – 31 Bytes NYSE Arca – 36 Bytes
Msg Type	2	2	Binary Integer	This field identifies the type of message. 107 – Attributed Add Order Message
SourceTimeNS	4	4	Binary Integer	This field represents the nanosecond offset from the time reference second in UTC time (EPOCH)
SymbolIndex	8	4	Binary Integer	This field identifies the numerical representation of the symbol.
SymbolSeqNum	12	4	Binary Integer	This field contains the symbol sequence number
OrderID	16	4	Binary Integer	The Order ID identifies a unique order
Price	20	4	Binary Integer	This field contains the price point. Use the Price scale from the symbol-mapping index.
Volume	24	4	Binary Integer	This field contains the order quantity in shares
Side	28	1	ASCII Character	This field indicates the side of the order Buy/Sell. Valid values: ■ 'B' – Buy ■ 'S' – Sell
OrderIDGTCIndicator	29	1	Binary Integer	This field specifies if Trade Order ID is a GTC order: ■ 0 – Day Order ■ 1- GTC Order
TradeSession	30	1	Binary Integer	Valid values: ■ 1 – Ok for morning hours ■ 2 – Ok for national hours (core)

FIELD NAME	OFFSET	SIZE (BYTES)	FORMAT	DESCRIPTION
				■ 3 – OK for morning and core ■ 4 – Ok for late hours ■ 6 – OK for core and late ■ 7 – OK for morning, core, and late
FirmID	31	5	ASCII Character	This field provides market participant's firm ID

4. ORDER BOOK MODIFY MESSAGE – MSG TYPE '101'

4.1 MESSAGE SENDING RULES

XDP Depth of Book feed sends this message when an order in the Order Book is modified. The Order ID refers to the original order sent in the add order message. The following events trigger a modify order message.

- The price of an order changes
- The size of an order changes
- An order is routed to an away market with some shares remaining in the Order Book

Note: If an away market declines a routed order, a Modify Order message is sent to "add" the declined shares back to Order Book.

4.2 MESSAGE STRUCTURE

Table 7 describes the body fields of an Order Book Modify message, MsgType '101'.

Table 7 Order Book Modify Message Format

FIELD NAME	OFFSET	SIZE (BYTES)	FORMAT	DESCRIPTION
Msg Size	0	2	Binary Integer	Size of the message. NYSE – 31 Bytes NYSE MKT – 31 Bytes NYSE Arca – 31 Bytes
Msg Type	2	2	Binary Integer	This field identifies the type of message '101' – Modify Message
SourceTimeNS	4	4	Binary Integer	This field represents the nanosecond offset from the time reference second in UTC time (EPOCH)
SymbolIndex	8	4	Binary Integer	This field identifies the numerical representation of the symbol.
SymbolSeqNum	12	4	Binary Integer	This field contains the symbol sequence number
OrderID	16	4	Binary Integer	This identifies a unique order.
Price	20	4	Binary Integer	This field contains the price point. Use the Price scale from the symbol mapping index.
Volume	24	4	Binary Integer	This field contains the order quantity in shares
Side	28	1	ASCII Character	This field indicates the side of the order Buy/Sell. Valid values:

FIELD NAME	OFFSET	SIZE (BYTES)	FORMAT	DESCRIPTION
				'B' – Buy 'S' – Sell
OrderIDGTCIndicator	29	1	Binary Integer	This field specifies if Trade Order ID is a GTC order: 0 – Day Order 1 – GTC Order
ReasonCode	30	1	Binary Integer	Modify Reason: ■ 5 – Change (lost position in book) ■ 6 – Routed (keep position in book) ■ 7 – Modify Fill keep position Note: Reason Code 7 not applicable to NYSE or NYSE MKT. Note: This field is left as a future enhancement. The default value is currently set as 0, which has no underlying meaning.

5. ORDER BOOK DELETE MESSAGE – MSG TYPE '102'

5.1 MESSAGE SENDING RULES

XDP Depth of Book feed sends this message when an order is taken off of the order book. The following events will trigger the transmission of a delete order message.

- An order is cancelled
- An order expires
- An order is routed to an away market. Note: If the away market declines the matching engine preference, an Add Order message with the original Order ID will be sent to return the order to the Order Book

5.2 MESSAGE STRUCTURE

Table 8 describes the body fields of an Order Book Delete message, MsgType '102'.

Table 8 Order Book Delete Message Format

FIELD NAME	OFFSET	SIZE (BYTES)	FORMAT	DESCRIPTION
Msg Size	0	2	Binary Integer	Size of the message. NYSE – 23 Bytes NYSE MKT – 23 Bytes NYSE Arca – 23 Bytes
Msg Type	2	2	Binary Integer	This field identifies the type of message 102 – Delete Message
SourceTimeNS	4	4	Binary Integer	This field represents the nanosecond offset from the time reference second in UTC time (EPOCH)
SymbolIndex	8	4	Binary Integer	This field identifies the numerical representation of the symbol.
SymbolSeqNum	12	4	Binary Integer	This field contains the symbol sequence number.
OrderID	16	4	Binary Integer	The Order ID identifies a unique order.
Side	20	1	ASCII Character	This field indicates the side of the order Buy/sell. Valid values: 'B' – Buy 'S' – Sell
OrderIDGTCIndicator	21	1	Binary	This field specifies if Trade Order ID is a GTC

FIELD NAME	OFFSET	SIZE (BYTES)	FORMAT	DESCRIPTION
			Integer	order: 0 – Day Order 1 – GTC Order
ReasonCode	22	1	Binary Integer	Delete Reason: ■ 1 – User Cancel ■ 2 – Modify (taken off book, Order ID may add again) ■ 3 – Delete Filled Note: Reason Code 3 is only applicable to NYSE Arca. Note: This field is left as a future enhancement. The default value is currently set as 0, which has no underlying meaning.

6. ORDER BOOK EXECUTION MESSAGE – MSG TYPE '103'

6.1 MESSAGE SENDING RULES

If the reason codes are set to zero, signifying that this feature has not yet been implemented, the feed will disseminate the following:

1. In the event an order is partially filled, the data feed will first send an execution message followed by a modify message for the OrderID that has been partially executed.
2. In the event an order is fully executed, the data feed will first send an execution message followed by a delete for the OrderID that has been fully executed.

If the reason codes are not to zero, then the data feed will only send the execution message with the appropriate reason code when a trade occurs.

1. In the event an order is partially filled, the execution message will show a reason code value of "7" requiring that the corresponding OrderID should have its volume reduced by the volume amount on the execution message.
2. In the event an order is fully executed, the data feed will send an execution message with a reason code value of "3". The corresponding OrderID should then be removed from the book since the volume has been fully executed.

6.2 MESSAGE STRUCTURE

Table 9 describes the body fields of an Order Book Execution message, MsgType '103'.

Table 9 Order Book Execution Message Format

FIELD NAME	OFFSET	SIZE (BYTES)	FORMAT	DESCRIPTION
Msg Size	0	2	Binary Integer	Size of the message: NYSE – 34 Bytes NYSE MKT – 34 Bytes NYSE Arca– 34 Bytes
Msg Type	2	2	Binary Integer	This field identifies the type of message 103 – Execution Message
SourceTimeNS	4	4	Binary Integer	This field represents the nanosecond offset from the time reference second in UTC time (EPOCH)
SymbolIndex	8	4	Binary Integer	This field identifies the numerical representation of the symbol.
SymbolSeqNum	12	4	Binary Integer	This field contains the symbol sequence number
OrderID	16	4	Binary Integer	The Order ID identifies a unique order.

FIELD NAME	OFFSET	SIZE (BYTES)	FORMAT	DESCRIPTION
Price	20	4	Binary Integer	This field contains the price the order execution price. Use the Price scale from the symbol mapping index.
Volume	24	4	Binary Integer	This field contains the order quantity in shares
OrderIDGTCIndicator	28	1	Binary Integer	This field specifies if executed Order is a GTC order. Valid values: 0 – Day Order 1 – GTC Order
ReasonCode	29	1	Binary Integer	Execution Reason: ▪ 0 – Default ▪ 3 – Filled ▪ 7 – Partial Fill (Did not lose position) Note: For NYSE Arca, only 0 is applicable. Note: This field is left as a future enhancement. The default value is currently set as 0, which has no underlying meaning.
TradeID	30	4	Binary Integer	The TradeID identifies a unique transaction in the matching engine and allows clients to correlate execution reports to the last sale.

7. ORDER BOOK ADD ORDER REFRESH MESSAGE – MSG TYPE '106'

7.1 MESSAGE SENDING RULES

NYSE Depth of Book feed sends this message only during a refresh or after a symbol clear which will result in a book refresh.

7.2 MESSAGE STRUCTURE

Table 10 describes the body fields of an Order Book Add Order Refresh message, MsgType '106'.

Table 10 Order Book Add Order Refresh Message Fields

FIELD NAME	OFFSET	SIZE (BYTES)	FORMAT	DESCRIPTION
Msg Size	0	2	Binary Integer	Size of the message. NYSE – 35 Bytes NYSE MKT – 35 Bytes NYSE Arca – 35 Bytes
Msg Type	2	2	Binary Integer	This field identifies the type of message 106 – Add Order Refresh Message
SourceTime	4	4	Binary Integer	This field specifies the time when the msg was generated in the order book. The number represents the number of seconds in UTC time (EPOCH)
SourceTimeNS	8	4	Binary Integer	This field represents the nanosecond offset from the time reference second in UTC time (EPOCH)
SymbolIndex	12	4	Binary Integer	This field identifies the numerical representation of the symbol.
SymbolSeqNum	16	4	Binary Integer	This field contains the symbol sequence number.
OrderID	20	4	Binary Integer	The Order ID identifies a unique order.
Price	24	4	Binary Integer	This field contains the price point. Use the Price scale from the symbol-mapping index.
Volume	28	4	Binary Integer	This field contains the order quantity in shares.
Side	32	1	ASCII Character	This field indicates the side of the order buy/sell. Valid values: 'B' – Buy

FIELD NAME	OFFSET	SIZE (BYTES)	FORMAT	DESCRIPTION
				'S' – Sell
OrderIDGTCIndicator	33	1	Binary Integer	This field specifies if Trade Order ID is a GTC order: 0 – Day Order 1 – GTC Order
TradeSession	34	1	Binary Integer	Valid values: ▪ 1 – Ok for morning hours ▪ 2 – Ok for national hours (core) ▪ 3 – OK for morning and core ▪ 4 – Ok for late hours ▪ 6 – OK for core and late ▪ 7 – OK for morning, core, and late Note: For NYSE and NYSE MKT, only 2 is applicable.

8. ORDER BOOK ATTRIBUTED ADD ORDER REFRESH MESSAGE – MSG TYPE ‘108’

8.1 MESSAGE SENDING RULES

NYSE Arca Depth of Book feed sends this message only during a refresh or after a symbol clear which will result in a book refresh.

8.2 MESSAGE STRUCTURE

Table 10 describes the body fields of an Order Book Attributed Add Order Refresh message, MsgType ‘108’.

Table 11 Order Book Add Order Refresh Message Fields

FIELD NAME	OFFSET	SIZE (BYTES)	FORMAT	DESCRIPTION
Msg Size	0	2	Binary Integer	Size of the message. NYSE – 35 Bytes NYSE MKT – 35 Bytes NYSE Arca – 40 Bytes
Msg Type	2	2	Binary Integer	This field identifies the type of message. 108 – Attributed Add Order Refresh Message
SourceTime	4	4	Binary Integer	This field specifies the time when the msg was generated in the order book. The number represents the number of seconds in UTC time (EPOCH)
SourceTimeNS	8	4	Binary Integer	This field represents the nanosecond offset from the time reference second in UTC time (EPOCH)
SymbolIndex	12	4	Binary Integer	This field identifies the numerical representation of the symbol.
SymbolSeqNum	16	4	Binary Integer	This field contains the symbol sequence number
OrderID	20	4	Binary Integer	The Order ID identifies a unique order.
Price	24	4	Binary Integer	This field contains the price point. Use the Price scale from the symbol-mapping index.
Volume	28	4	Binary Integer	This field contains the order quantity in shares
Side	32	1	ASCII Character	This field indicates the side of the order Buy/sell. Valid values: ■ ‘B’ – Buy

FIELD NAME	OFFSET	SIZE (BYTES)	FORMAT	DESCRIPTION
				■ 'S' – Sell
OrderIDGTCIndicator	33	1	Binary Integer	This field specifies if Trade Order ID is a GTC order ■ 0 – Day Order ■ 1 – GTC Order
TradeSession	34	1	Binary Integer	Valid values: ■ 1 – Ok for morning hours ■ 2 – Ok for national hours (core) ■ 3 – OK for morning and core ■ 4 – Ok for late hours ■ 6 – OK for core and late ■ 7 – OK for morning, core, and late
FirmID	35	5	ASCII Character	This field provides market participant's firm ID

9. IMBALANCE MESSAGE– MSG TYPE '105'

9.1 MESSAGE STRUCTURE

Table 11 describes the body fields of an Imbalance Message, MsgType '105'. This message will be disseminated.

Table 11 Imbalance Message Fields

FIELD NAME	OFFSET	SIZE (BYTES)	FORMAT	DESCRIPTION
Msg Size	0	2	Binary Integer	Size of the message. NYSE – 52 Bytes NYSE MKT – 52 Bytes NYSE Arca – 52 Bytes
Msg Type	2	2	Binary Integer	This field identifies the type of message 105 – Imbalance Message
SourceTime	4	4	Binary Integer	This field specifies the time when the msg was generated in the order book. The number represents the number of seconds in UTC time (since EPOCH)
SourceTimeNS	8	4	Binary Integer	This field represents the nanosecond offset from the time reference second in UTC time (EPOCH)
SymbolIndex	12	4	Binary Integer	This field identifies the numerical representation of the symbol.
SymbolSeqNum	16	4	Binary Integer	This field contains the symbol sequence number
ReferencePrice	20	4	Binary Integer	The Reference Price is the Last Sale if the last sale is at or between the current best quote. Otherwise the Reference Price is the Bid Price if last sale is lower than Bid price, or the Offer price if last sale is higher than Offer price.
PairedQty	24	4	Binary Integer	This field contains the paired off quantity at the reference price point
TotalImbalanceQty	28	4	Binary Integer	This field contains the total imbalance quantity at the reference price point
MarketImbalanceQty	32	4	Binary Integer	This field indicates the total market order imbalance at the reference price Note: For NYSE Arca, positive or negative Imbalance Quantities denote a Buy or Sell imbalance, respectively.

FIELD NAME	OFFSET	SIZE (BYTES)	FORMAT	DESCRIPTION
AuctionTime	36	2	Binary Integer	Projected Auction Time (hhmm)
AuctionType	38	1	ASCII Character	'O' – Open (4am) Arca Only 'M' – Market (9:30am) 'H' – Halt 'C' – Closing 'R' – Regulatory Imbalance **Note:** For the NYSE / NYSE MKT, the opening imbalance will have an "M" Auction Type
ImbalanceSide	39	1	ASCII Character	This field indicates the side of the imbalance Buy/sell. Valid Values: 'B' – Buy 'S' – Sell Space – No imbalance **Note:** This field is a future enhancement for NYSE Arca and will have a '0' value until such time. **Note:** This field is not yet implemented and is left as a future release. Clients will be notified upon availability.
ContinuousBook ClearingPrice	40	4	Binary Integer	The Continuous Book Clearing Price is defined as the price closest to last sale where imbalance is zero. If a Book Clearing Price is not reached, the Clearing Price, a zero will be published in the Book Clearing Price Field **Note:** This field is a future enhancement for NYSE Arca and will have a '0' value until such time. **Note:** This field is not yet implemented and is left as a future release. Clients will be notified upon availability.
ClosingOnly ClearingPrice	44	4	Binary Integer	This field contains the indicative price against closing only order only **Note:** This field is a future enhancement for

FIELD NAME	OFFSET	SIZE (BYTES)	FORMAT	DESCRIPTION
				NYSE Arca and will have a '0' value until such time. **Note:** This field is not yet implemented and is left as a future release. Clients will be notified upon availability.
SSRFilingPrice	48	4	Binary Integer	This field contains the SSR Filing Price. This price is the price at which Sell Short interest will be filed in the matching in the event a Sell Short Restriction is in effect for the security. **Note:** The SSR Filing price is based on the National Best Bid at 9:30am. This price remains static after the SSR Filing price has been determined. **Note:** This field is a future enhancement for NYSE Arca and will have a '0' value until such time. **Note:** This field is not yet implemented and is left as a future release. Clients will be notified upon availability.

9.2 NYSE IMBALANCE CALCULATION

MESSAGE TYPE	DESCRIPTION
Opening	**Interest Included:** All electronic interest eligible to trade in the opening including DMM sQuotes at the Reference Price. Odd-lot interest is excluded. **Calculation** Reference price is equal to the last sale (previous closing price) unless there is a Rule 15 or Mandatory indication published. If an indication is published, the reference price is determined as follows: ■ If the Bid Price from the indication (the lower price) is higher than the last sale, the Reference Price will be the Bid. ■ If the Offer Price from the indication (the higher price) is lower than the last sale, the Reference Price will be the Offer. ■ If the Last Sale is within the indication range the Book shall use the Last Sale as the Reference Price. ■ If multiple indications have been published, the Book shall always use the latest. **Continuous Book Clearing Price** is the price closest to Reference Price where imbalance is zero.

MESSAGE TYPE	DESCRIPTION
	SSR Filing Price is the price at which Sell Short interest will be filed in the matching in the event a Sell Short Restriction is in effect for the security. The SSR Filing price is based on the National Best Bid at 9:30am. This price remains static after the SSR Filing price has been determined.
Closing	**Interest Included:** ■ All MOC/LOC interest eligible for the close will be included as well as the round lot portion of PRLs. ■ D-Quotes interest is included beginning at 3:55pm EST ■ Odd-lot interest, DMM and crowd interest will be excluded. ■ Closing Only order interest Included in calculation only when off-setting. **Calculation:** **Reference Price** is the Last Sale if the last sale is at or between the current NY best quote. Otherwise the Reference Price is the Bid Price if last sale is lower than Bid price, or the Offer price if last sale is higher than Offer price. **Continuous Book Clearing Price** is the price closest to Reference Price where imbalance is zero. **Closing Only Clearing Price** is defined as the closing only interest where price closest to last sale where imbalance is zero.

9.3 NYSE IMBALANCE DATA EXCEPTIONS

The following are situations in which no imbalance information will be disseminated:

- If the NYSE last sale price, paired quantity and imbalance quantity are the same as the previous calculation, No message will be generated.
- If there is **no** Last Sale Price (for example,, Trading Halted), a single Closing Paired/Imbalance message with zero is published.
- If there is paired quantity, but no imbalance quantity, the Closing Paired/Imbalance message with paired quantity and paired number of orders and **zero** imbalance quantity will be published.

9.4 NYSE PUBLICATION TIMES

MESSAGE	PUBLICATION PERIOD
NYSE Opening Imbalances	Opening Imbalance messages are disseminated every 5 minutes between 8:30am EST and 9:00am EST. Opening Imbalance messages are disseminated every 1 minute between 9:00am EST and 9:20am EST. Opening Imbalance messages are disseminated every 15 second between 9:20am EST and 9:35am EST
NYSE Closing Imbalances	Closing Imbalance messages are disseminated every 5 seconds between 3:45pm EST and 4:00pm EST (or until Market close on early closing days).

	Please check the NYSE website for any changes to trading hours.

9.5 NYSE ARCA IMBALANCE CALCULATION

NYSE Arca conducts three single-price auctions for NYSE Arca primary listings in; the Opening Auction, the Market Order Auction and the Closing Auction. The Opening and Closing Auctions allow NYSE Arca ETP holders to participate in real-time price discovery. As a part of the auction process, NYSE Arca calculates and continually disseminates the indicative match price, indicative match volume and the auction imbalance.

MESSAGE TYPE	DESCRIPTION
Limit Order Opening Auction	**Interest Included:** All order types are eligible to participate in the Opening Auction with the exception of Passive Liquidity (PL), Midpoint Passive Liquidity (MPL) and Discretionary orders. Only Limit Orders that are eligible for the Opening Session will participate in the Opening Auction. Orders that participate in the Opening Auction cannot be canceled between 3:59 a.m. ET and 4:00 a.m. ET, the conclusion of the Opening Auction. **Calculation** ■ The Opening Auction will occur at the Indicative Match Price — the price at which the maximum volume of orders is executable at the time of the auction. ■ If two or more prices can maximize executable volume, the Opening Auction occurs at the price closest to the previous closing price in an effort to maintain continuity. In such a situation, for the purpose of determining the indicative match price, NYSE Arca uses the maximum size of both sides and displays the price closest to the previous close at the larger aggregate size. ■ Unexecuted orders become eligible for the Opening Session immediately upon conclusion of the Opening Auction. **Reference Price** - The price at which the maximum volume of shares are executable. **Continuous Book Clearing Price** - Field is set to zero, this is a future enhancement. **SSR Filing Price** - Field is set to zero, this is a future enhancement.
Market Order Opening Auction	**Eligible Symbols:** ■ The Market Order Auction is run for NYSE Arca primary listed stocks, ■ NYSE listed stock subject to a sub-penny trading conditions and exchange listed ETFs and ETNs. ■ Auction specific order types, such as Limit on Open or Market on Open if submitted in non-NYSE Arca listed symbols are rejected.

MESSAGE TYPE	DESCRIPTION
	■ Market Orders submitted in non-NYSE Arca listed symbols are routed to the primary listing exchange. ■ **Interest Included:** ■ Limit Orders (eligible for either the Opening Session and/or National hours Trading Session) ■ Market Orders and auction-only limit orders will participate in the Market Order Auction. **Calculation** ■ The match price is the price that maximizes the volume that can be executed. ■ The Market Order Auction will use the match price closest to the closing price of the previous trading day (based on normal market hours) if more than one indicative match price is valid. ■ Imbalances and indicative match prices in the Market Order Auction reflect market orders only. In the following examples, the limit orders are "auction only" limit orders. **Reference Price** - The price at which the maximum volume of shares are executable. **Continuous Book Clearing Price** - Field is set to zero, this is a future enhancement. **SSR Filing Price** - Field is set to zero, this is a future enhancement.
Closing Auction	**Eligible Symbols:** ■ The Closing Auction is run for NYSE Arca primary listed stocks, NYSE listed stocks subject to a sub-penny trading conditions and exchange listed ETFs and ETNs. ■ Auction specific order types, such as Limit on Close or Market on Close, submitted in non-NYSE Arca listed primaries are rejected. **Interest Included:** ■ All MOC/LOC interest eligible for the close will be included ■ Auction Only Orders ■ The non-displayed portions of reserve orders, will participate in the NYSE Arca Closing Auction. ■ The reserve portion of an order will not display in the indicative matched volume, but will contribute to the indicative match price. **Calculation:** ■ If there are no order imbalances, orders will be executed in the Closing Auction at the Indicative Match Price as of 4:00 p.m. ET.

MESSAGE TYPE	DESCRIPTION
	■ The indicative match price will be the price at which the maximum number of shares in the total imbalance can execute. ■ If there are multiple prices at which the total imbalance can equally execute, the indicative price will be based on the price closest to the Consolidated Tape last sale. ■ If the price closest to the Consolidated Tape last sale would trade through the NYSE Arca Book, the indicative match price will be the best price available where no trade through occurs. **Reference Price** - The price at which the maximum volume of shares are executable. **Continuous Book Clearing Price** - Field is set to zero, this is a future enhancement. **Closing Only Clearing Price** - Field is set to zero, this is a future enhancement.

9.6 NYSE ARCA PUBLICATION TIMES

MESSAGE	PUBLICATION PERIOD
Opening Imbalances	Beginning at 3:30 a.m. ET and updated real-time thereafter until 4:00am
Market Imbalances	Beginning at 4:00a.m. ET and updated real-time thereafter until 9:30am
Closing Imbalances	Beginning at 3:00 p.m. ET and updated real-time thereafter until 4:00pm

10. PRODUCT ID

Table 12 describes the Product IDs associated with NYSE, NYSE MKT and NYSE Arca XDP Depth of Book.

Table 12 Product ID

EXCHANGE	PRODUCT ID	DESCRIPTION
NYSE	2	NYSE OpenBook Ultra
NYSE MKT	51	NYSE MKT OpenBook Ultra
NYSE Arca	151	NYSE ArcaBook