FIX Market Data

DBOX Order Book

Version 1.3
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Contents

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Summary of Document Changes

Version	Date	Change
1.0	5/16/2016	First Draft
1.1	7/20/2016	Second Draft
1.2	10/17/2016	Third Draft
1.3	3/02/2017	Fourth Draft

Introduction

Overview

The information in this Delaware Board of Trade FIX document describes the adaptation of the standard FIX 4.2 for vendors and subscribers to communicate with the Delaware Board of Trade quotation and execution platform. FIX 4.2 tags, as described in detail on the Financial Information Exchange Protocol Committee website, www.fixprotocol.org as well as custom tags are used extensively in this document and the reader should familiarize themselves with the latest updates to this release.

If an application message in Financial Information Exchange Protocol version 4.2, or previous FIX versions, is not included in this document, the message is ignored by DBOX.

Intended Audience

This document should be used by:

- Electronic Access Firms
- Market Makers
- Service Bureaus
- Clearing Firms

The Delaware Board of Trade Platform

The operational components of the Delaware Board of Trade platform consist of two order books, the first the DBOX book which is a price/time matching algorithm with displayed quotes, the second the DBOT which is a price/size matching algorithm with no displayed quotes(dark).

Delaware Board of Trade Displayed Market (DBOX)

The DBOT interdealer quotation system is a venue for market participants to post orders and firm quotes in the DBOT market making book. Two-sided, one-sided or non-priced quotations are accepted and displayed in price/ time priority. The top of book (inside price best bid/offer) is available in our DBOT Quote Level I and Level II market data.

Orders and firm quotes are submitted to the DBOX system and the DBOX will maintain an electronic book through which orders can be displayed and matched. The order book matching algorithm uses price/time priority criteria for crossing the order and also checks other available venues to assure best execution. All orders and market maker quotes at the same price, and size level are filled according to time priority.

Hours of Operation

The following table identifies the hours of operations. The Delaware Board of Trade operational hours will be 7:00 am to 4:00 pm ET. The table below also indicates when each matching services are available.

Market Center	Sessions	Hours	Descriptions
DBOX	Pre-Market	7:00 am – 9:30 am	Accept order from 6:00 am to 9:00am
	Normal Market Hours	9:30 am – 4:00 pm	

Data Types

All FIX timestamps are GMT as per FIX standard. Clients are expected to synchronize their clocks with an external time source.

Prices – Clients should program their systems to allow execution prices to be returned with up to six decimals

- The order prices above a $1.00 may be priced up to two decimals
- The order prices below a $1.00 or more may be priced up to four decimals

Minimum Order Size Requirements for Display OTC Equity Securities

Clients by entering orders must honor the minimum display size defined in the table below. Depending on the price level of the bid or offer, a different minimum size can apply to each side of the market for the order(s) by the client in a given security.

Price (Bid or Offer)	Minimum Quote Size
0.00 – 0.0999	10,000
0.10-0.1999	5,000
0.20-0.5099	2500
0.51 – 0.999	100
1.00- 174.99	100
175+	1

Symbology

For inbound FIX message to DBOX, we accept both CMS and NASDAQ/BATS symbology. When using CMS format, we expect customer to send root symbol in tag 55 and CMS suffix in tag 65. When using NASDAQ/BATS symbology, we expect customer to send everything in tag 55.

Security Categorization	**CMS Suffix**	**NASDAQ/BATS Integrated Platform Suffix**
Preferred	PR	-
Preferred Class “A”*	PRA	-A
Preferred Class “B”*	PRB	-B
Class “A”*	A	.A
Class “B”*	B	.B
Preferred when distributed	PRWD	-$
When distributed	WD	$
Warrants	WS	+
Warrants Class “A”*	WSA	+A
Warrants Class “B”*	WSB	+B
Called	CL	*
Class “A” Called*	ACL	.A*
Preferred called	PRCL	-*
Preferred “A” called*	PRACL	-A*
Preferred “A” when issued*	PRAWI	-A#
Emerging Company Marketplace	EC	!
Partial Paid	PP	@
Convertible	CV	%
Convertible called	CVCL	%*
Class Convertible	ACV	.A%
Preferred (class A) Convertible	PRACV	-A%
Preferred (class A) when Distributed	PRAWD	-A$
Rights	RT	^

Units	U	=
When issued	WI	#
Rights when issued	RTWI	^#
Preferred when issued	PRWI	-#
Class "A" when issued*	AWI	.A#
Warrant when issued	WSWI	+#
TEST symbol	TEST	~

FIX API - Market Data

Recovery

The DBOX FIX market data feed provides a primary and secondary site for customer to connect. Two sites are synced in real time, so the session info (such as incoming/outgoing sequence number, etc...) is kept at both sites.

Only one site is active at any time. The inactive site will reject socket connection attempts.

When initiating the connection, customer's process should first attempt primary site, if fails, then attempt secondary site, and so on...

Standard Header/Trailer

Message Header

Tag	Field Name	Req'd	Comments
8	BeginString	Y	"FIX.4.2"
9	BodyLength	Y	(Always unencrypted, must be second field in message)
35	MsgType	Y	(Always unencrypted, must be third field in message)
49	SenderCompID	Y	Provided by DBOX system administrator, must be specified in all FIX messages to DBOX, will be echoed back in TargetCompID in all FIX messages to customers.

56	TargetCompID	Y	Provided by customer, always echoed back in SenderCompID in all FIX messages to customers.
115	OnBehalfOfCompID	N	Required for service bureau connection
34	MsgSeqNum	Y	(Can be embedded within encrypted data section.)
43	PossDupFlag	N	Always required for retransmitted messages, whether prompted by the sending system or as the result of a resend request. (Can be embedded within encrypted data section.)
97	PossResend	N	Ignored by DBOX
52	SendingTime	Y	Required
122	OrigSendingTime	N	Required for message resends. If data is not available set to same value as SendingTime (Can be embedded within encrypted data section.)

Message Trailer

Tag	Field Name	Req'd	Comments
10	CheckSum	Y	(Always unencrypted, always last field in message)

Session Messages

Heartbeat (MsgType = 0)

This message is intended to monitor the status of the communications link during periods of inactivity.

The FIX market data accepts and generates Heartbeat messages as per the FIX specification.

- Inbound: Handled as specified
- Outbound: In response to a test request or timeout.
- Response: None

The heartbeat message should be sent if agreed upon Heartbeatinterval has elapsed since the last message sent. If any proceeding Heartbeatinterval a Heartbeat message need not be sent.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 0
112	TestReqID	N	Required when the heartbeat is the result of a Test Request message.
	Standard Trailer	Y	

Logon (MsgType = A)

The logon message identifies and authenticates the user or member, and establishes a connection to the FIX Gateway. The FIX gateway accepts Logon messages as per the FIX specification. Further, the FIX gateway supports the logon sequence required for session authentication. After a successful logon as described in the specification the FIX gateway will:

1. Initiate retransmission processing via a resend request if the Logon sequence number is greater than the value expected Initiate logout processing via a Logout message with an appropriate error message, then waits for a confirming Logout before disconnecting if the Logon sequence number is less than expected. If the confirming Logout has not been received within a short period of time the session will be disconnected.
2. Handle retransmission requests
3. Initiate a Logon using the SenderCompID in the message header.
4. Will forwarded to the FIX client messages that are waiting in the outbound queue.
5. Begin regular message communication.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = A
108	HeartBtInt	Y	Heartbeat interval in seconds
	Standard Trailer	Y	

Test Request (MsgType = 1)

If a Heartbeatinterval + 1 second have elapsed since the last message received, a Test Request should be issued. If another Heartbeatinterval + 1 second go by without receiving a message, the TCP connection should be dropped.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 1
112	TestReqID	Y	
	Standard Trailer	Y	

Resend Request (MsgType = 2)

The resend request message initiates the retransmission of messages. The FIX client or Gateway may generate a resend request when a message sequence number gap is detected. Refer to the FIX protocol documentation for a full description of resend processing.

The FIX system handles resend requests conformant to the FIX protocol. Refer to the FIX 4.2 specification for details on resend processing.

A Resend Request message should be processed even if it is received ahead of sequence. Only after resending the request range (all marked PossDup= “Y”, including gap fills) should Resend Request issued in the opposite direction.

(All marked PossDup= “Y”, including gap fills) should Resend Request issued in the opposite direction.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 2
7	BeginSeqNo	Y	
16	EndSeqNo	Y	
	Standard Trailer	Y	

Reject (Msg Type = 3)

This message is used by the FIX Gateway to reject messages that violate session level rules and are unable to be processed. The gateway checks inbound messages for the presence of its required tags. It also validates the message type tag session level rejects are used to indicate violations of the session protocol, or missing fields.

Tag	Field Name	Req'd	Comments

	Standard Header	Y	MsgType = 3
45	RefSeqNum	Y	MsgSeqNum of rejected message
58	Text	N	Where possible, message to explain reason for rejection
	Standard Trailer	Y	

Sequence Reset (MsgType = 4)

This message is used to reset the incoming sequence number of the opposing side. This message supports two modes:

1. Sequence Reset-GapFill - GapFillFlag=Y
2. Sequence Reset-Reset - GapFillFlag=N (Only used to recover from Disaster)

The GapFill can be used to mark a place of a message(s) or administration messages that are not being resent. To view the complete functionality of the Sequence Reset (Gap Fill) message refer to the FIX protocol.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 4
123	GapFillFlag	N	Y=Gap fill beginning at NewSeqNo N=NewSeqNo is ignored – manual recovery attempted
36	NewSeqNo	Y	Next requested sequence number
	Standard Trailer	Y	

Logout (MsgType = 5)

The Logout message initiates or confirms the termination of a FIX session.

The FIX gateway will receive and generate logout messages as required by the FIX Protocol. The gateway follows the prescribed sequence of messages for the proper termination of the session.

Messages received by the gateway after the client logs out are stored in a log file for transmission to the client once the client logs in again within the same trading day. The messages to be transmitted are dependent on the sequence number reconciliation that occurs on a logon handshake.

Upon receipt of a Logout message:

1. A confirming logout message will be sent by the gateway to the client; then, 3 The session will be disconnected.

The FIX gateway should never initiate a logoff except when a severe error has occurred.

Either side may issue a logout to close the session.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 5
58	Text	N	
	Standard Trailer	Y	

Note: Logout is not required.

Application Messages – Customer to DBOX

Market Data Request (MsgType = V)

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = V
262	MDReqID	Y	Unique identifier for Market Data Request Must be unique, or the ID of previous Market Data Request to disable if SubscriptionRequestType = Disable previous Snapshot + Updates Request (2)
263	SubscriptionRequestType	Y	Subscription Request Type Valid values: 1 = Snapshot + Updates (Subscribe) 2 = Disable previous Snapshot + Update Request (Unsubscribe)

264	MarketDepth		Y	Depth of market for Book Snapshot The actual value is ignored. DBOX reports top of book in snapshot, and reports full book in updates
265	MDUpdateType		N	Specifies the type of Market Data update. The actual value is ignored. When a client subscribes, they will receive incremental refresh Valid values: 1 = Incremental Refresh
266	AggregatedBook		N	Specifies whether or not book entries should be aggregated. The actual value is ignored. When a client subscribes, they will receive aggregated book. Valid values: Y = one book entry per side per price
267	NoMDEntryTypes		Y	Number of MDEntryType fields requested. Actual values are ignored. When a client subscribes, they will receive bid/offer information
->	269	MDEntryType	Y	Type of Market Data Entry the client wishes to receive. Actual value is ignored
146	NoRelatedSym		Y	Number of symbols requested
->	55	Symbol	Y	Must be the first field in the repeating group
->	65	SymbolSfx	N	
	Standard Trailer		Y	

Example FIX Message

A request for market data on symbol would appear as

8=FIX.4.29=12435=V49=TESTMD56=TEST34=352=20130819-19:04:49262=35184372088833263=1264=0265=1266=Y267=2269=0269=1146=155=MSFT10=164

Application Messages –DBOX to Customer

Market Data – Top of Book Snapshot (MsgType=W)

Tag	Field Name		Req'd	Comments
	Standard Header		Y	MsgType = W
262	MDReqID		Y	The MDReqID of the MarketDataRequest message.
55	Symbol		Y	Identifier for the symbol
65	SymbolSfx		N	
268	NoMDEntries		Y	Number of market data entries in this snapshot.
->	269	MDEntryType	Y	Type of market data entry. Valid values: 0 = Bid 1 = Offer 2 =Trade
->	270	MDEntryPx	Y	Price of the market data entry.
->	271	MDEntrySize	N	Number of shares represented by the Market Data Entry.
	Standard Trailer		Y	

Example FIX Message

In response to valid market data request, DBOX will report the current best bid and offer in the market. The FIX message would appear as

8=FIX.4.29=13035=W49=TEST56=TESTMD34=352=20130819-19:04:4955=MSFT268=2269=0270=30.01271=100269=1270=30.99271=100262=3518437208883310=186

Market Data – Incremental Refresh (MsgType=X)

Tag	Field Name		Req'd	Comments
	Standard Header		Y	MsgType = X
262	MDReqID		Y	The MDReqID of the MarketDataRequest message.
268	NoMDEntries		Y	Number of market data entries in this snapshot.
->	279	MDUpdateAction	Y	The Market Data update action type. It must be the first field in the repeating group. The only valid values are 0 = New 2 = Delete
->	269	MDEntryType	Y	Type of market data entry. Valid values: 0 = Bid 1 = Offer
->	278	MDEntryID	Y	Market data identifier
->	55	Symbol	Y	Identifier for the symbol
->	65	SymbolSfx	N	
->	270	MDEntryPx	N	Price of the market data entry For Trade, this is execution price
->	271	MDEntrySize	N	Number of shares represented by the Market Data Entry For Trade, this is execution quantity
->	387	TotalVolumeTraded	N	Trade only, number of shares traded for this security
	Standard Trailer		Y	

Example FIX Message

In response to valid market data request, DBOX will provide incremental updates. The FIX message would appear as

8=FIX.4.29=13635=X49=TEST56=TESTMD34=552=20130819-19:05:40262=35184372088833268=1279=0269=0278=108086391056891905155=MSFT270=30.02271=50010=059

8=FIX.4.29=13435=X49=TEST56=TESTMD34=752=20130819-19:05:57262=35184372088833268=1279=2269=0278=108086391056891905155=MSFT270=30.02271=010=224

Market Data Request Reject (MsgType=Y)

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = Y
262	MDReqID	Y	The MDReqID of the MarketDataRequest message.
58	Text	N	Reason for the rejection.
	Standard Trailer	Y	