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FIX Specifications for Quoting to the Alternative Display Facility (ADF)

Version 1.2

February 2, 2014

TABLE OF CONTENTS

ADF Quoting FIX Specification ver 1.2

ADF Quoting FIX Specification ver 1.2

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1 Overview

1.1 Introduction

The Alternative Display Facility (ADF) is a service of FINRA that supports on-line quoting of National Market System (NMS) equity securities. FINRA members (or their designated third parties) and ECNs (Electronic Communication Networks) are provided with the capability of submitting quote information on NMS equity securities through the use of the Financial Information eXchange Protocol (FIX) linkage.

This document describes the formats of the message text to be used to interface through the NASDAQ network to the FINRA application. Updates to this document will be chronicled in the Revision History section of this document.

For questions concerning FIX connectivity, please contact NASDAQ Technical Support at (212) 231-5180 or via email to: tradingservices@nasdaq.com.

For questions concerning ADF quoting, please contact FINRA Product Management at (866) 899-2107 or via email to: FINRAProductManagement@finra.org.

2 FIX Protocol

The messaging described in this specification adheres to the standard FIX 4.4 protocol. Please refer to http://fixprotocol.org/specifications/FIX.4.4 for further details.

The interface follows the FIX specifications as far as possible. In the majority of cases the structure and semantics of the messages are identical to the standard. In some cases, the protocol has been extended to cover functions not considered by the standard. These extensions are clearly detailed in the document. In other cases, the standard is ambiguous or indicates that the details should be bilaterally agreed between the parties. In these cases this manual provides a detailed description to avoid any possible ambiguity.

2.1 Supported Messages

2.1.1 Administrative messages

Logon (in/out)
Logout (in/out)
Sequence Reset (in/out)
Resend Request (in/out)
Reject (out)
Heartbeat (in/out)
Test Request (in/out)

2.1.2 Application Messages

Quote Entry (in)
Quote Status Report – Reject (out)

3 The FIX Session

The session layer conforms to the standard FIX session. Please see the standard FIX specification for additional details.

3.1 CompIDs

The Sender- and TargetCompID uniquely define the FIX session. A session can only be active (established) between two hosts simultaneously. Any attempts to establish a second FIX session using the same CompIDs (for instance to a backup gateway) in parallel will be rejected.

- The TargetCompID (56) on all *inbound* transactions must be set to "FNRA".
- The SenderCompID (49) on all *outbound* transactions will always be set to "FNRA".

The Sender- and TargetCompID used by the client are defined in a separate agreement.

3.2 SubIDs

For *inbound* transactrions:
- The TargetSubID (57) must be set to "ADFQ".
- The SenderSubID (50) must be set to the user ID defined in a separate agreement.

For *outbound* transactions:
- The TargetSubID (57) will be set to the user ID (same as inbound SenderSubID).
- The SenderSubID (50) will be set to "ADFQ".

3.3 Logon and authentication

At Logon, clients are identified by:
- CompIDs (SenderCompID and TargetCompID)
- IP Address

When the client is authenticated, the system responds with a Logon message to the client.

3.4 Heartbeat intervals

Heartbeat intervals are negotiated at Logon using the HeartBtInt (108) field. The system accepts a heartbeat interval set to 30 s

3.5 Encryption

The system does not support encryption.

3.6 Datatypes and required fields

This specification does not change the data type on any fields defined in the standard FIX specification. There may be places where this specification restricts the value range of a field further than specified in standard FIX. This will be clearly marked in the spec.

All fields listed in this specification that are marked as required in the standard specification, are required also in this specification. This document specifies additional fields as required by FINRA. These fields are marked with an 'F' in the required column of the message listings.

3.7 Character encoding

Standard FIX 7-bit US-ASCII character encoding is used.

3.8 FIX Timestamps

In FIX all timestamps are expressed in GMT/UTC. Please refer to the standard FIX specification for additional details.

3.9 Session lifetime

The FIX session lifetime is restricted to one trading day. The session lifetime is not ended at connectivity loss or even Logouts. The sequence numbers are reset to one each morning.

3.10 Failover and message recovery

At reconnect and Logon standard FIX message recovery is performed. All FIX sessions have at least one primary and one secondary gateway to which the session states are fully replicated. This means that regardless to which gateway a client connects, full message recovery is provided.
A client cannot have the same FIX session active towards multiple gateway instances simultaneously.

3.11 FIX Session Level Test Cases

This implementation is fully compliant with the session-level test cases specified in the standard FIX 4.4 Specification, Volume 2, section "FIX Session-level Test Cases and Expected Behaviors". The only exception is the encryption test cases.

3.12 The Standard Header

All FIX messages contain a Standard Header. The header contains important information such as session identifiers (CompIDs), sequence numbers and message type and length etc.

3.12.1 Inbound Header

Tag	FIX Field name	Req'd	Comment
8	BeginString	Y	
9	BodyLength	Y	
35	MsgType	Y	
49	SenderCompID	Y	As specified in separate agreement
50	SenderSubID	F	Your User ID as defined in separate agreement.
56	TargetCompID	Y	Valid values: "FNRA"
57	TargetSubID	F	Valid values: "ADFQ"
34	MsgSeqNum	Y	
43	PossDupFlag		Always required for retransmitted messages
97	PossResend		
52	SendingTime	Y	Time of message transmission (always expressed in UTC (Universal Time Coordinated, also known as "GMT"))
122	OrigSendingTime		

3.12.2 Outbound Header

Tag	FIX Field name	Req'd	Comment
8	BeginString	Y	
9	BodyLength	Y	
35	MsgType	Y	
49	SenderCompID	Y	Set to "FNRA"
50	SenderSubID	F	Set to "ADFQ"

56	TargetCompID	Y	As specified in separate agreement
57	TargetSubID	F	Your User ID as defined in separate agreement.
34	MsgSeqNum	Y	
43	PossDupFlag		Always required for retransmitted messages
97	PossResend		
52	SendingTime	Y	Time of message transmission (always expressed in UTC (Universal Time Coordinated, also known as "GMT"))
122	OrigSendingTime		

3.13 The Standard Trailer

All FIX messages end with a Standard Trailer. The trailer only includes a simple checksum field. The details on how to calculate the checksum can be found in the standard FIX specification.

Tag	FIX Field name	Req'd	Comment
10	CheckSum	Y	

3.14 Message Details

3.14.1 How to interpret the Required (Req'd) column

A 'Y' marks the field as required in standard FIX (and of course also in this implementation). An 'F' means that the field is required in this implementation although it is not required in standard FIX. No entry at all means the field is optional.

3.14.2 Default values

Fields which has enumerated values, where one is marked as "default value" need not be included in the message at all if the default value is used.

3.14.3 Logon – inbound to FINRA

The response to a logon is either a Logon, which denotes a successful logon, or a Logout.
A client must be prepared to handle failure scenarios including (but not limited to):
A Logon attempt may fail or be rejected for several reasons. The FIX gateway will react differently depending on the kind of failure. The two different actions it may take are:
Silently ignore the Logon.
- If the wrong Sender or Target CompID is specified.
- For other reasons specified in the standard FIX specifications.

Respond with a Logout.
- If the FIX gateway has no connection with the back-end system.
- Logon failure for other reasons than authentication/security.

The Logout response to a Logon will always contain a note on why in the Text (58) field.

Tag	FIX Field name	Req'd	Comment
	Standard Header	Y	MsgType = A
98	EncryptMethod	Y	Encryption not supported. Valid values: 0 = None / Other
108	HeartBtInt	Y	Heartbeat interval. Valid value: 30 s
	Standard Trailer	Y	

ADF Quoting FIX Specification ver 1.2

3.14.4 Logon – outbound from Marketplace

Tag	FIX Field name	Req'd	Comment
	Standard Header	Y	MsgType = A
98	EncryptMethod	Y	Encryption not supported. Valid values: 0 = None / Other
108	HeartBtInt	Y	Heartbeat interval. Valid value: 30 s
	Standard Trailer	Y	

3.14.5 Logout (in/out)

The Logout message is used to gracefully disconnect a FIX session. When receiving a Logout, the counterparty should respond with a Logout. A Logout can also be the response to an unsuccessful Logon attempt.

Tag	FIX Field name	Req'd	Comment
	Standard Header	Y	MsgType = 5
58	Text		Free text
	Standard Trailer	Y	

3.14.6 Sequence Reset (in/out)

This message has two uses. The common usage is with GapFillFlag set to 'Y', which is used in a response to a Resend Request to indicate that a range of messages will not be resent. This is commonly used to avoid resending administrative messages like Heartbeats.
The other (very rare) usage is to reset the sequence numbers to a higher number to get out of a deadlock. This is only triggered by manual intervention.

Tag	FIX Field name	Req'd	Comment
	Standard Header	Y	MsgType = 4
123	GapFillFlag		Indicates that the Sequence Reset message is replacing administrative or application messages which will not be resent.
36	NewSeqNo	Y	New sequence number. The next Sequence Number to be expected after this message.
	Standard Trailer	Y	

3.14.7 Resend Request (in/out)

Resend Request is used to recover messages when a sequence number gap has been detected.

Tag	FIX Field name	Req'd	Comment
	Standard Header	Y	MsgType = 2
7	BeginSeqNo	Y	Message sequence number of first message in range to be resent
16	EndSeqNo	Y	Message sequence number of last message in range to be resent. If request is for a single message BeginSeqNo (7) = EndSeqNo. If request is for all messages subsequent to a particular message, EndSeqNo = "0" (representing infinity).
	Standard Trailer	Y	

3.14.8 Reject (out)

The Reject, or session-level reject, message is sent whenever the FIX gateway is able to at least partially parse the message, but the message does not adhere to the specification and cannot be delivered to the back-end system.

Tag	FIX Field name	Req'd	Comment
	Standard Header	Y	MsgType = 3
45	RefSeqNum	Y	MsgSeqNum of rejected message
371	RefTagID		The tag number of the FIX field being referenced.
372	RefMsgType		The MsgType of the FIX message being referenced.
373	SessionRejectReason	F	Valid values: 0 = Invalid Tag Number 1 = Required Tag Missing 2 = Tag Not Defined For This Message Type 3 = Undefined Tag 4 = Tag Specified Without a Value 5= Value Is Incorrect Out Of Range For This Tag 6 = Incorrect Data Format For Value 9 = CompID Problem 10 = Sending Time Accuracy Problem 11 = Invalid Msg Type 99 = Other
58	Text		Where possible, message to explain reason for rejection
	Standard Trailer	Y	

3.14.9 Heartbeat (in/out)

A heartbeat message is sent at the interval set at Logon. It is also the response to a Test Request message.

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

3.14.10 Test Request (in/out)

Test Request is used to "ping" the counterparty whenever a heartbeat has not arrived at the negotiated heartbeat interval.

Tag	FIX Field name	Req'd	Comment
	Standard Header	Y	MsgType = 1
112	TestReqID	Y	Identifier included in Test Request message to be returned in resulting Heartbeat
	Standard Trailer	Y	

ADF Quoting FIX Specification ver 1.2

4 General Quote Reporting in FIX

4.1 Introduction

ADF supports the quoting and displaying of NMS securities. All Quote Entries are reported real-time via the FIX interface, while viewing of all quotes is supported via the TRAQS web-based application. ADF supports entry of one and two-sided quotes. All quotes must have a combination of price and size on one or both sides of the quote.

4.2 Quote Report Processing

All quoting activity (new quotes, quote updates and quote cancels (aka wipeouts)) will be submitted as Quote Entry messages. There will be no direct update or wipeout of an existing quote, rather any existing quote will be replaced by a new quote entry, when a quoting participant wishes to update or cancel an existing quote.

All accepted Quote Entries will not result in a positive confirmation (ACK) from ADF. ADF will return a reject confirmation in the event a Quote Entry does not pass certain validations.

4.3 Identifiers

4.3.1 Quote ID

All Quote IDs (Tag 117) must be unique per ADF participant on a given day. Any duplicated Quote ID will be rejected. Quote IDs may be no more than 12 characters and must be numeric values only. Quote IDs may use leading zeros and may be in sequential order if the participant desires. Updates or cancels of existing quotes must be submitted with a different Quote ID from the previous quote.

4.3.2 Party Identifiers

Quoting in ADF supports the submission of one party on quote messages. The party will always reflect the quoting firm.

Tag	FIX Field name	Comment
453	NoPartyIDs	Number of parties included in the message. For ADF quoting, the value must always be set to "1".
448	PartyID	The actual identifier of the party. In this case always the 4 character MPID of the FINRA member entering the quote.
447	PartyIDSource	Defines the type of identifier used as PartyID. In this solution always C = Generally accepted market participant identifier (e.g. FINRA mnemonic)
452	PartyRole	Defines the role of the party. For ADF quoting, the value must always be set to "7" (Entering Firm).

In this solution, the use of the Party Sub Identifier group is not supported.

4.4 *Timestamps and dates*

Timestamps and dates can be represented in several ways in FIX. The data types used in this solution are:

Data Type	Format	Comment
UTCTimestamp	YYYYMMDD -HH:MM:SS	The most common data type in FIX. Used in standard FIX tags such as SendingTime (52). **NOTE 1:** times are given in **UTC** (GMT). **NOTE 2:** FIX allows milliseconds as well.
LocalMktDate	YYYYMMDD	Standard date. Notice that it is **NOT** in UTC.
UTCTimeOnly	HH:MM:SS.sss	Basically the time part of a UTCTimestamp. **NOTE:** times are given in **UTC** (GMT).

4.4.1 SendingTime

SendingTime (52) is contained in the header of every FIX message and must contain the time of message transmission.
Format: UTCTimestamp

ADF Quoting FIX Specification ver 1.2

5 Quote Report Message Formats

5.1 Inbound Quote Messages

5.1.1 Quote Entry – Submitting or updating a quote (in)

Tag	FIX tag name		Req'd	Comment
	Standard Header		Y	MsgType = S
117	QuoteID		Y	Unique identifier for each quote entry, not to exceed 12 characters. Must be numeric. Leading zeros are permissible. Must be unique (per submitter) throughout the day.
453	Parties/NoPartyIDs		F	Number of parties. Always set to "1".
→	448	PartyID	F	Market Participant Identifier (MPID) of the participant submitting the quote or quote update.
→	447	PartyIDSource	F	Generally accepted market participant identifier (e.g. FINRA mnemonic). Always set to "C".
→	452	PartyRole	F	Valid value: 7 = Entering Firm
55	Symbol		F	Ticker symbol. Max size: 14 characters.
65	SymbolSfx			Symbol suffix. Additional information about the security (e.g., preferred, warrants, etc.)
22200	LockedCrossOverrideFlag			*FINRA Extension to FIX 4.4.* Identifies the quote as a valid quote even if it will lock or cross the market. Valid values: Y = Yes N = No (default value)
132	BidPx			Specifies the bid price. Required if BidSize is entered. Maximum size: 11 characters. Price format supported: 6x4 (maximum of 6 digits, decimal, followed by maximum of 4 digits).
134	BidSize			Specifies the bid quantity in actual number of shares. Required if BidPx is entered. Maximum size: 7 characters, no decimal or comma allowed. Valid values: 0 – 9999999.
133	OfferPx			Specifies the ask (offer) price. Required if OfferSize is entered. Maximum size: 11 characters. Price format supported: 6x4 (maximum of 6 digits, decimal, followed by maximum of 4 digits).
135	OfferSize			Specifies the ask (offer) quantity in actual number of shares. Required if OfferPx is entered. Maximum size: 7 characters, no decimal or comma

			allowed. Valid values: 0 – 9999999.
22201	QuoteCondition	F	*FINRA Extension to FIX 4.4.* Indicates whether the quote is automatic/open or not (closed). Quotes that are not automatic/open are negotiable. **Note: ADF currently supports automatic quotes only**. Valid values: A = Automatic/Open
	Standard Trailer	Y	

5.2 Inbound Quote Messages Examples

The following section contains examples of quoting activity and how messages should be sent to ADF. For simplicity, only the relevant fields (tags) are used in each example. Please refer to the Quote Entry message layout in section 5.1 for the complete message structure.

Things to note:

- The terms "Offer" and "Ask" are interchangeable in this document.

- The terms "Wipeout" and "Cancel" are interchangeable in this document.

- For this solution, all quoting, including updates and cancellations, use Quote Entry input, therefore all actions are essentially new entries.

- Quote IDs must be unique per ADF participant per day and must be numeric. Duplicated Quote IDs will be rejected. In the event a quote entry is rejected for any reason other than duplicate Quote ID, the quote entry may be resubmitted using that same Quote ID.

- Quote IDs are mandatory for every quote entry submitted.

- Quote IDs of up to 12 numeric characters are allowed, Leading zeros are allowed.

- FIX Quote message rules require that a Bid Size and Bid Price must both be entered, i.e., you cannot enter just a Size without a Price and vice versa. Likewise, the same rule applies to the Ask side.

5.2.1 Quote Entry – One-Sided Bid

Tag 117 QuoteID	Tag 132 BidPx	Tag 134 BidSize	Tag 133 OfferPx	Tag 135 OfferSize	Comments
00002523	25.25	100	NOT SUBMITTED	NOT SUBMITTED	Tags 133 & 135 should not be submitted

5.2.2 Quote Entry – One-Sided Ask

Tag 117 QuoteID	Tag 132 BidPx	Tag 134 BidSize	Tag 133 OfferPx	Tag 135 OfferSize	Comments
259433	NOT SUBMITTED	NOT SUBMITTED	25.50	200	Tags 132 & 134 should not be submitted

5.2.3 Quote Entry – Two Sided Quote

Tag 117 QuoteID	Tag 132 BidPx	Tag 134 BidSize	Tag 133 OfferPx	Tag 135 OfferSize	Comments
123	101.50	10000	102.75	10000	

5.2.4 Quote Entry – Update of an Existing Quote (Both Sides, Prices Only)

Tag 117 QuoteID	Tag 132 BidPx	Tag 134 BidSize	Tag 133 OfferPx	Tag 135 OfferSize	Comments
00000124	101.35	10000	102.10	10000	Both Size tags must be submitted even though the amounts are not changing

5.2.5 Quote Entry – Update of an Existing Quote (Both Sides, Bid Price and Ask Size)

Tag 117 QuoteID	Tag 132 BidPx	Tag 134 BidSize	Tag 133 OfferPx	Tag 135 OfferSize	Comments
125	101.30	10000	102.10	15000	Bid Size and Ask Price tags must be submitted even though the values for each are not changing

5.2.6   Quote Entry – Wipeout of an Existing Quote (Bid Side only)

Tag 117 QuoteID	Tag 132 BidPx	Tag 134 BidSize	Tag 133 OfferPx	Tag 135 OfferSize	Comments
8	0	0	NOT SUBMITTED	NOT SUBMITTED	Zeros are entered for the Price and Size of the side being wiped out. By omitting the tags for the Ask side, that quote stays active.

5.2.7   Quote Entry – Wipeout of an Existing Quote (Both Sides)

Tag 117 QuoteID	Tag 132 BidPx	Tag 134 BidSize	Tag 133 OfferPx	Tag 135 OfferSize	Comments
123456789012	0	0	0	0	Zeros are entered for both sides' Price and Size tags

5.3 Outbound Quote Acknowledgements

An accepted inbound Quote Entry (MsgType = S) <u>will not</u> result in an outbound confirmation. ADF will return a reject acknowledgement if for some reason a quote entry does not pass certain validations (e.g., duplicate QuoteID, invalid symbol, invalid value, etc.). A Quote Status Report will be generated for any application rejects and will contain a reason for the reject.

1.3.1 Quote Status Report – Reject (out)

Unless otherwise specified, the fields returned on the reject acknowledgement will echo back the values submitted on the Quote Entry message.

Tag	FIX tag name		Req'd	Comment
	Standard Header		Y	MsgType = AI
117	QuoteID		Y	QuoteID of the Quote Entry message.
297	QuoteStatus		F	Identifies the quote entry message was rejected. Valid values: 5 = Rejected
453	Parties/NoPartyIDs		F	Number of parties. Always set to "1".
→	448	PartyID	F	Market Participant Identifier (MPID) submitted on the quote entry.
→	447	PartyIDSource	F	Always set to "C".
→	452	PartyRole	F	Valid value: 7 = Entering Firm
55	Symbol		F	Ticker symbol submitted on the quote entry.
65	SymbolSfx			Symbol suffix submitted on the quote entry.
22200	LockedCrossOverrideFlag			Indicator submitted on the quote entry.
132	BidPx			Bid price submitted on the quote entry.
134	BidSize			Bid size submitted on the quote entry.
133	OfferPx			Ask price submitted on the quote entry.
135	OfferSize			Ask size submitted on the quote entry.
22201	QuoteCondition		F	Quote Condition submitted on the quote entry.
300	QuoteRejectReason		F	Reason quote was rejected. Tag 300 will contain the numeric code below. Tag 58 will contain the associated reject reason. Valid values: 1 = Unknown symbol 5 = unknown quote 7 = Invalid bid/ask spread 8 = Invalid price 9 = Not authorized to quote security 99 = Other 100 = Invalid Quote ID 101 = Duplicate Quote ID 102 = Invalid Locked Cross Override 103 = Invalid Quote Condition 104 = Invalid Bid Price

			105 = Invalid Bid Size 106 = Invalid Ask Price 107 = Invalid Ask Size 108 = Cannot Lock/Cross Your Own Quote 109 = Quote Locks/Crosses the Market, Override Req'd 110 = MPID Required 111 = MPID Not Authorized 112 = Only ECN Allowed 200 = Not Within Allowable Time 201 = Quoting Not Allowed 202 = ADF Entry Suspended 206 = FIX Protocol Entry Suspended 207 = WEB Protocol Entry Suspended 208 = Quote Entry Suspended, EMC Halt 209 = Terminal Not Authorized 901 = Symbol is missing 902 = SymbolSfx is missing 904 = Invalid Format 905 = Unknown Function 906 = Invalid Message Length 999 = Temporarily Not Available
58	Text		Reject reasons listed above (Tag 300).
	Standard Trailer	Y	

6 Custom values and user defined fields

This chapter details how this solution deviates from standard FIX 4.4. While great care has been taken to conform to the standard, a number of deviations are unavoidable to support all mechanisms provided by the host. Wherever later versions of FIX (up to version 5.0 SP2) provide the missing functionality, we have chosen to use that.
The deviations come in two forms, added fields and added values to existing fields.

6.1 Fields added

A number of fields had to be added to standard FIX 4.4 to cover all the requirements in this solution. Wherever possible, fields from later versions of FIX (5.0 SP2) has been used. Custom fields have been added in the range222XX range.

The following fields have been added to FIX 4.4:

Tag	FIX tag name	FIX 5.0	Comment
22200	LockedCrossOverrideFlag	No	
22201	QuoteCondition	No	

6.2 Enumerations added

Enum	Enum description	Tag	Comment
100 – 999	See Quote Status Report – Reject Message (5.3.1) for the various codes added to the QuoteRejectReason	300	This list is subject to updates as needed.

7 Limitations

7.1 Field lengths and data types

All fields in this specification adhere to the standard FIX 4.4 field definitions. Please refer to
http://fixprotocol.org/specifications/FIX.4.4 for details.
In addition, this solution imposes the following restrictions on fields:

Tag	FIX tag name	Comment
448	PartyID	PartyID. Max valid 4 character MPIDs.
117	QuoteID	Limited to 12 numeric characters, must be unique on that day.
132	BidPx	Format: Max 11 characters, 6x4 (x = decimal)
133	OfferPx	Format: Max 11 characters, 6x4 (x = decimal)
134	BidSize	Max 7 digits (representing quantity in actual shares).
135	OfferSize	Max 7 digits (representing quantity in actual shares).

ADF Quoting FIX Specification ver 1.2

Revision History

Revision	Date	Comment
1.0	8/14/2013	• Baseline version.
1.1	10/29/2013	• Amended maximum field size of QuoteID (Tag 117) from 8 bytes to 12 bytes. • Updated Tag 300/Tag 58 Reject Reasons.
1.2	2/2/2014	• Removed Closed value (B) from QuoteCondition (Tag 22201).