



# US Options FIX Specification

Version 1.1.2

February 4, 2010

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## 1 Introduction

### 1.1 Overview

BATS members use a subset of the FIX 4.2 protocol for order entry and drop copies. Drop copy ports do not accept orders and only send execution reports where ExecType (tag 150) is Partially Filled (1) or Filled (2). Drop ports for sponsored access may be configured to also send execution reports where ExecType (tag 150) is New (0), Canceled (4) or Replaced (5). Drop copy ports may be configured to send various combinations of member and clearing MPIDs.

It is assumed that the reader is familiar with the FIX 4.2 protocol as described at <http://www.fixprotocol.org>. This document describes the differences between the BATS implementation and the FIX 4.2 standard.

Please refer to [www.batstrading.com](http://www.batstrading.com) for updates and further information on BATS policies and procedures.

### 1.2 Hours of Operation

Refer to the web site for hours of operation.

All orders are live upon acceptance by BATS. Orders are rejected if they are received outside the hours BATS is available for trading. BATS does not have an opening or closing auction.

All orders remaining after the Extended Session will be cancelled automatically (execution reports will be delivered).

### 1.3 Data Types

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

Prices - Members should program their systems to allow execution prices to be returned with up to four decimals.

Example:

0.0001 to 0.9999	Accepted
1.0010, 1.0001, 12.3456	Rejected – subpenny not allowed.
1.0000, 1.00, 12.3400, 12.34, etc.	Accepted – round penny (extra trailing zeroes are fine).

## 2 Protocol

### 2.1 Message Format

FIX messages are ASCII formatted. The member will be provided with a *SenderCompId* and *SenderSubId* that must be sent on every message. The *TargetCompId* for all messages the member sends will be "BATS". All messages the member receives will have the Sender and Target fields swapped.

### 2.2 Sequence Numbers

Sequence numbers, both inbound and outbound, will be reset to 1 each night during the down time.

Messages are processed in sequence order. Behind sequence messages (other than Sequence Reset – Reset) cause immediate logout. Ahead of sequence messages (other than a Resend Request) trigger a message recovery via a Resend Request.

### 2.3 Version Compatibility

BATS uses the FIX 4.2 session protocol.

## 3 Sessions

The following session messages are supported in both directions:

Message	Type	Comment
Logon	A	Begin session (or resume a broken session).
Heartbeat	0	
Test Request	1	
Resend Request	2	
Reject	3	Malformed message or improper session level handling.
Sequence Reset	4	Both Gap Fill ( <i>GapFillFlag=Y</i> ) and Reset.
Logout	5	Used to gracefully close session.

### 3.1 Connectivity

<b>IP Address</b>	Address to connect to.	Supplied by BATS.
<b>TCP Port</b>	Port to connect to.	Supplied by BATS.

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<b>SenderCompID</b>	Sent in every FIX message to BATS.	Supplied by BATS.
<b>SenderSubID</b>	Sent in every FIX message to BATS.	Supplied by BATS.
<b>TargetCompID</b>	Sent in every FIX message to BATS.	"BATS"
<b>TargetSubID</b>	Sent in every FIX message to BATS.	"TEST" for test system. "PROD" for production.

For information on connectivity options to BATS, refer to the BATS US Equity/Options Connectivity Manual at:

[http://www.batstrading.com/resources/membership/BATS\\_Connectivity\\_Manual.pdf](http://www.batstrading.com/resources/membership/BATS_Connectivity_Manual.pdf)

### 3.2 Logon

The logon must be the first message sent by the member after the TCP connection is established. *EncryptMethod* is ignored (FIX level encryption is not supported).

The IP Address of the member, the *SenderCompID*, *SenderSubID* and *TargetCompID* ("BATS") and *TargetSubID* ("TEST"/"PROD") will be validated. If validation fails the connection will be dropped without a reject (to avoid corrupting the members sequence in the case that the member merely mistakenly connected to the wrong port).

If connection is unexpectedly broken, upon reconnection the member may receive a login reply with a sequence number greater than expected. This means that in-flight messages were missed (likely important execution reports). The member should issue a Resend Request to retrieve the missed messages.

Similarly BATS will issue a Resend Request to the member for messages that it missed. The member may wish to send gap fill messages in place of new orders to avoid re-submission of potentially stale orders.

*HeartbeatInterval* must be specified by the member in the logon message. This value will be clamped between 5 and 300 seconds and returned in the logon reply message. We recommend using as low a value as the reliability and latency of your telecommunications channel will allow.

### 3.3 Heartbeat

A Heartbeat message should be sent if the agreed upon *HeartbeatInterval* has elapsed since the last message sent. If any message has been sent during the preceding *HeartbeatInterval* a Heartbeat message need not be sent.

### 3.4 Test Request

If a *HeartbeatInterval* + 1 seconds have elapsed since the last message received, a Test Request should be issued. If another *HeartbeatInterval* + 1 seconds go by without receiving a message the TCP connection should be dropped. This ensures that a broken TCP connection

will be detected even if the TCP stack doesn't notice (this has been observed to happen in WAN environments, particularly when a VPN is involved).

### **3.5 Resend Request**

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

As discussed in the FIX 4.2 specification, it is possible to send an open or closed sequence range in a Resend Request (an open range uses sequence zero as the EndSeqNo). BATS will honor either type of request, but will always issue Resend Requests with a closed sequence range.

### **3.6 Reject**

Session level rejects are used to indicate violations of the session protocol, or missing (or bogus) fields. These are to be expected during development and certification, while the member is being adapted for BATS, but should be extremely rare in production. Application layer rejects (like Order Reject and Cancel Reject) are normal.

### **3.7 Sequence Reset**

Sequence Reset - Gap Fill messages (*GapFillFlag="Y"*) must be received in sequence. Any messages (including any Gap Fills) sent in response to a Resend Request should have *PossDup="Y"*.

Sequence Reset - Reset (*GapFillFlag* not "Y") is used only as a last resort, and always by human intervention, to allow an otherwise hopelessly confused session to be resumed. In these cases all chance at automatic message recovery are lost.

### **3.8 Logout**

Either side may issue a logout to gracefully close the session. The side that issues the logout should process messages normally until it sees the logout reply, and then break the TCP connection. BATS will typically only request logout after the scheduled end of FIX session.

## 4 FIX Messages

### 4.1 Standard Message Header

Tag	Field Name	Description
8	<i>BeginString</i>	FIX.4.2 Must be first field in message.
9	<i>BodyLength</i>	Length of message following <i>BodyLength</i> field up to and including the delimiter preceding the CheckSum field. Must be second field in message.
35	<i>MsgType</i>	Must be third field in message.
49	<i>SenderCompID</i>	ID of sender: Assigned by BATS for messages sent to BATS. ( <i>TargetCompID</i> for messages from BATS)
50	<i>SenderSubID</i>	Sub ID of sender: Assigned by BATS for messages sent to BATS. ( <i>TargetSubID</i> for messages from BATS)
56	<i>TargetCompID</i>	ID of destination: "BATS" for messages sent to BATS. ( <i>SenderCompID</i> for messages from BATS)
57	<i>TargetSubID</i>	Sub ID of destination: "TEST" for messages sent to BATS test system. "PROD" for messages sent to BATS production system. ( <i>SenderSubID</i> for messages from BATS)
34	<i>MsgSeqNum</i>	Sequential sequence number for session.
43	<i>PossDupFlag</i>	Indicates a message resent from the admin level (has a duplicate sequence number). Default is "N".
52	<i>SendingTime</i>	GMT date-time that message was sent.
122	<i>OrigSendingTime</i>	For messages with <i>PossDupFlag</i> ="Y", indicates time that message was first sent.
115	<i>OnBehalfOfCompID</i>	Identifies end-client on messages <b>to</b> BATS. Used to specify clearing information.
116	<i>OnBehalfOfSubID</i>	End-client sub identifier. 4 Characters alphanumeric, otherwise not validated. Recorded and returned in <i>DeliverToSubID</i> . Available via DROP.

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128	<i>DeliverToCompld</i>	Identifies end-client on messages <b>from</b> BATS. Used to specify clearing information.
129	<i>DeliverToSubID</i>	Returns <i>OnBehalfOfSubID</i> optionally sent by client.

## 4.2 Standard Message Trailer

Tag	Field Name	Description
10	<i>CheckSum</i>	Modulo 256 checksum of all characters in message up to and including the delimiter preceding the CheckSum field. Three digits with leading zeroes if necessary.

## 4.3 BATS Specific Fields

The following FIX fields are specific to BATS:

Tag	Field Name	Description																		
7928	PreventMemberMatch	Member Match Trade Prevention: 2 characters (not space separated): 1 <sup>st</sup> character: N=Cancel Newest O = Cancel Oldest B = Cancel Both D = Decrement Larger / Cancel Smaller 2 <sup>nd</sup> character: F = Prevent Match at BATS Exchange Member level M = Prevent Match at MPID Level																		
9303	<i>RoutingInst</i>	<table border="1"> <thead> <tr> <th><b>RoutingInst (9303)</b></th> <th><b>Destination</b></th> </tr> </thead> <tbody> <tr> <td>A</td> <td>NYSE ARCA</td> </tr> <tr> <td>B</td> <td>BATS Only</td> </tr> <tr> <td>C</td> <td>BATS Only WAIT order. Will cause the order to wait 1 second before processing.</td> </tr> <tr> <td>E</td> <td>ISE</td> </tr> <tr> <td>K</td> <td>Boston Options Exchange</td> </tr> <tr> <td>N</td> <td>NASDAQ</td> </tr> <tr> <td>P</td> <td>BATS Only Post Only (<i>will reject rather than remove liquidity</i>)</td> </tr> <tr> <td>Q</td> <td>BATS Only Post Only At Limit (<i>remove contracts that improve upon limit price and up to MaxRemovePct of remaining</i>)</td> </tr> </tbody> </table>	<b>RoutingInst (9303)</b>	<b>Destination</b>	A	NYSE ARCA	B	BATS Only	C	BATS Only WAIT order. Will cause the order to wait 1 second before processing.	E	ISE	K	Boston Options Exchange	N	NASDAQ	P	BATS Only Post Only ( <i>will reject rather than remove liquidity</i> )	Q	BATS Only Post Only At Limit ( <i>remove contracts that improve upon limit price and up to MaxRemovePct of remaining</i> )
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9479	<i>DisplayIndicator</i>	<p>V: <b>(Default)</b> As determined by port level setting (defaults to S).</p> <p>S: Display Price Sliding (this is to override an opt-out of Display Price Sliding at the port level).</p> <p>L: Display Price Sliding, but reject if order <i>crosses</i> NBBO on entry.</p> <p>R: Reject the order if it cannot be booked and displayed without adjustment.</p> <p>N: NoRescrapeAtLimit</p>												
9617	<i>ModifySequence</i>	<b>Drop only.</b> Base 36 number of times order has been replaced.												
9618	<i>MaxRemovePct</i>	For PostOnlyAtLimit (9303=Q) what percentage of the order quantity which remains after price improvement may be removed at the limit price.												
9619	<i>CancelOrigOnReject</i>	<p>N = Leave original order alone.</p> <p>Y = Cancel original order if replacement is fails.</p> <p>Default is configurable per port (N if not configured).</p>												
9620	<i>CorrectedPrice</i>	UCC trade correction message, this holds the corrected price.												
9621	<i>ExchangeAccessFee</i>	Access fee for this fill (up to 5 decimal places, negative for rebate).												
9622	<i>DiscretionAmount</i>	Max discretion to apply to Price (non-negative 0.00 to 99.99).												
9688	<i>OrigCompID</i>	<b>Drop only.</b> TargetCompID of original FIX exec report. Drop port must be configured to send this optional field.												
9689	<i>OrigSubID</i>	<b>Drop only.</b> TargetSubID of original FIX exec report. Drop port must be configured to send this optional field.												
9690	<i>WorkingPrice</i>	Optional. Must be enabled at the firm or port level. Only												

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		<p>present on Accepted or Replaced, and only when order is fully or partially booked.</p> <p>If <i>Price</i> had to be adjusted to a less aggressive value to avoid crossing the NBBO, the adjusted price will be reported here, otherwise equals <i>Price</i>.</p>
9691	<i>InitialDisplayPrice</i>	<p>Optional. Must be enabled at the firm or port level. Only present on Accepted or Replaced, and only when order is fully or partially booked.</p> <p>If order had to be temporarily displayed at a less aggressive value to avoid locking the NBBO, the initial displayed price will be reported here, otherwise equals <i>WorkingPrice</i>.</p>
9730	<i>TradeLiquidityIndicator</i>	<p>A = Added Liquidity R = Removed Liquidity X = Routed</p> <p>Must request opt-in at firm or port level to receive the 2<sup>nd</sup> characters in this field. To allow for future expansion of this field, please ignore values with an unknown character in the 2<sup>nd</sup> position.</p> <p>For members that opt-in to State Change Tracking at the port level, order acks (150=0) and modify acks (150=5) will carry 9730 messages defined as follows: A=Zero or more immediate partial remove fills followed by posting. R=Zero or more immediate partial remove fills followed by a cancel (or full fill). X=Zero or more immediate partial remove fills followed by routing.</p>

#### 4.4 Order Protocol – Member to BATS

##### 4.4.1 New Order Single

Tag	Field Name	Description
35	Standard Message Header	<i>MsgType</i> ="D"
97	<i>PossResend</i>	<p>"N" (default) indicates a new order.</p> <p>"Y" indicates an application level resend and is NOT SUPPORTED.</p>

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		<p>For reasons of economy, BATS does not track (in primary storage) the <i>CIOrdID</i> values of orders that are no longer live.</p> <p>For reasons of performance, BATS does not access secondary storage to enforce unique <i>CIOrdID</i> values against orders that are no longer live.</p> <p>Without full duplicate <i>CIOrdID</i> value enforcement, it is not possible to safely implement the full behavior specified in the FIX 4.2 Protocol for <i>PossResend="Y"</i>.</p> <p>To remain economical, fast <i>and</i> safe, all New Order messages with <i>PossResend="Y"</i> will be simply ignored.</p>
1	<i>Account</i>	<p><b>Optional.</b> Reflected back on execution reports associated with this order. 16 characters or less (ASCII 33-126) Available via FIX DROP on an opt-in basis at the port level. Not available via DROP.</p>
11	<i>CIOrdId</i>	<p>Day-unique ID chosen by client. 20 characters or less. Characters in ASCII range 33-126 are allowed, except for comma, semicolon, and pipe.</p> <p>If the <i>CIOrdId</i> matches a live order it will be rejected as duplicate (unless <i>PossResend="Y"</i>, see above). <b>Note: BATS only enforces the uniqueness of <i>CIOrdID</i> values among currently live orders. However we strongly recommend that you keep your <i>CIOrdID</i> values day unique.</b></p>
60	<i>TransactTime</i>	Time order initiated/released. Required by FIX 4.2 but not used by BATS.
77	<i>OpenClose</i>	Indicates status of client position in the option. Open = "O" Close = "C"
167	<i>SecurityType</i>	Indicates the type of security OPT=Options
200	<i>MaturityMonth</i>	Indicates Maturity Month (YYYYMM)
205	<i>MaturityDay</i>	Expiration date day of the month Format: DD

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201	<i>PutOrCall</i>	Put = "0" Call = "1"
202	<i>StrikePrice</i>	Strike Price for option 0 – 99999.999
55	<i>Symbol</i>	Symbol (upper case) <b>Entire BATS format symbol</b>
54	<i>Side</i>	Buy = "1" Sell = "2"
38	<i>OrderQty</i>	Number of contracts for order, 1 to 999,999
111	<i>MaxFloor</i>	Portion of <i>OrderQty</i> to display. The balance is reserve. 0 displays entire quantity ( <b>Default</b> ). The displayed quantity of each order at a price level is decremented first. When displayed quantity is fully decremented it is reloaded up to <i>MaxFloor</i> from reserve. <b>Ignored</b> if order is IOC
40	<i>OrdType</i>	Market = "1" Limit = "2"  Market implies <i>TimeInForce</i> of IOC.
44	<i>Price</i>	Limit Price. Order rejected if priced finer than the minimum trading increment for the option.
9622	<i>DiscretionAmount</i>	Discretion is implicitly added to bid prices and subtracted from offer prices. Order will be displayed at <i>Price</i> but can execute in discretionary range. A discretionary order will use the minimum amount of discretion necessary to achieve execution. Zero applies no discretion ( <b>Default</b> ). Non-zero <i>DiscretionAmount</i> does not mix with IOC, Post-Only (9303 = P or Q) or directed orders (9303 = <i>destination</i> ).
110	<i>MinQty</i>	<b>Optional</b> minimum* fill quantity for BATS-Only IOC orders. <b>Ignored</b> unless order is BATS-Only IOC <b>Default</b> is zero.  *When removing liquidity limits the minimum <b>total</b> fill size, which may be made up of several <b>consecutive</b> smaller fills.
47	<i>Rule80A (aka</i>	The capacity for the order

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	<i>OrderCapacity</i> )	C = Customer M = Market Maker F = Firm
59	<i>TimeInForce</i>	“0” = DAY (Expires at end of market day.) “1” = GTC (Allowed, but treated same as Day.) “3” = IOC (Portion not filled immediately is cancelled. Market orders are implicitly IOC.) “6” = GTD (Expires at earlier of specified <i>ExpireTime</i> or end of market day.)
126	<i>ExpireTime</i>	Required for <i>TimeInForce</i> = “6” (GTD) orders, specifies the date-time (in GMT) that the order expires. Values may be specified at a millisecond level.
18	<i>ExecInst</i>	<b>Single value only (with no trailing space)</b> f = Intermarket Sweep (Directed or BATS) All other values are ignored.
7928	PreventMemberMatch	Member Match Trade Prevention: 2 characters (not space separated):  1 <sup>st</sup> character – MMTP Modifier: N=Cancel Newest O = Cancel Oldest B = Cancel Both D = Decrement Larger* / Cancel Smaller  2 <sup>nd</sup> character – Unique ID Level: F = Prevent Match at BATS Exchange Member level M = Prevent Match at MPID Level  The Unique ID level (character 2) of both orders must match to prevent a trade.  The MMTP Modifier (character 1) of the inbound order will be honored, except that if the inbound order specifies Decrement and the resting order does not, and the resting order is larger, then both orders will be cancelled. This exception is to protect the order-entry software for the resting order from receiving an unexpected restatement message.  *Users of MMTP Modifier D must be prepared to receive a FIX Restatement (ExecReport with ExecType = D) that

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		includes both OrdQty and LeavesQty.			
9303	<i>RoutingInst</i>	<b>RoutingInst (9303)</b>	<b>Destination</b>	<b>Execlnst (18) not present</b>	<b>Execlnst (18) f</b>
		A	NYSE ARCA	OK	OK
		B	BATS Only	OK	OK
		C	BATS Only WAIT	OK	OK
		E	ISE	OK	OK
		K	Boston	OK	OK
		N	NASDAQ	OK	OK
		P	BATS Only Post Only ( <i>will reject rather than remove liquidity</i> )	OK	OK
		Q	BATS Only PostOnlyAtLimit <i>Will remove contracts that <b>improve</b> upon the limit price, and up to MaxRemovePct of remaining OrdQty <b>at</b> the limit price</i>	OK	OK
		<b>R (default)</b>	ALL – CYCLE	OK	REJ
		RL	RECYCLE - <i>only if another market locks or crosses</i>	OK	REJ
		U	NYSE AMEX	OK	OK
		W	CBOE	OK	OK
		X	Philadelphia	OK	OK
		Post Only does not mix with <i>TimeInForce=IOC</i> .			
		Note: If Execlnst(18)=f and the order is directed to a market center, the order is sent to the market center as a directed ISO and does not interact with the BATS book. If the order is BATS Only (9303=B) and Execlnst(18)=f, the order is treated as an ISO on the BATS book.			

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9479	<i>DisplayIndicator</i>	<p>V: <b>(Default)</b> As determined by port level setting (defaults to S).</p> <p>S: Display Price Sliding (this is to override an opt-out of Display Price Sliding at the port level).</p> <p>L: Display Price Sliding, but reject if order <i>crosses</i> NBBO on entry.</p> <p>R: Reject the order if it cannot be booked and displayed without adjustment.</p> <p>N: NoRescrapeAtLimit</p> <p><b>Display Price Sliding:</b> If the limit price of the unexecuted remainder of a day order does not lock or cross the NBBO then BATS books it as is. If the limit price does lock or cross the market BATS offers Display Price Sliding.</p> <p>Display Price Sliding permanently adjusts the booked price on entry to the strongest price that does not <b>cross</b> the NBBO. It will temporarily adjust the displayed price to the strongest price that does not <b>lock</b> the NBBO. When the NBBO widens, the display price will be readjusted to the booked price. The display price may be temporarily weaker than the booked price.</p> <p><b>NoRescrapeAtLimit:</b> Applicable only to Fully Routable IOC orders (9303=R and 59=3). After walking the price down to the limit, there will be no final scrape at BATS and the cancel code will state "X: Expired" rather than "N: No Liquidity".</p>
439	<i>ClearingFirm</i>	<p>CMTA Number of the firm that will clear the trade. Must be supplied for CMTA orders and left unspecified for non-CMTA orders.</p>
440	<i>ClearingAccount</i>	<p>Supplemental identifier (optional) This field is reported to the OCC as the Account Id. Up to 4 characters alphanumeric, not otherwise validated. Recorded and returned in execution reports. Available via DROP.</p> <p>When using CMTA, this value is the sub-account for the CMTA member instead of the sub-account of the BATS member executing the trade.</p>
9618	<i>MaxRemovePct</i>	<p>For PostOnlyAtLimit (9303=Q) what percentage of the</p>

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		<p>order quantity which remains after price improvement may be removed at the limit price.</p> <p><u>Integer 0-100</u> 0 = Don't remove any contracts at limit price. 100 = Remove any amount at limit price.</p>
	Standard Message Trailer	

#### 4.4.1.1 RECYCLE Orders

The following conventions are used when assigning liquidity add/remove status on fills that involve discretion or RECYCLE:

- An IOC order is always charged the remove fee. Whatever order it hits always gets the provider rebate.
- A non IOC order that hits a discretionary order at other than its display price gets the provider rebate. The resting discretion order is charged the remove fee.
- A discretion order that hits a resting discretion order gets the provider rebate. The resting discretion order is charged the remove fee, but uses the minimum necessary amount of reserve.
- An inbound “add liquidity only” order may execute against a discretionary order at its displayed price. In this case the “add liquidity only” order gets the provider rebate and the resting discretionary order pays the remove fee.
- In event an inbound “add liquidity only” order executes against a resting RECYCLE order, the “add liquidity only” order will receive the provider rebate and the RECYCLE order will pay the remove fee.

#### 4.4.2 Order Cancel Request

Tag	Field Name	Description
35	Standard Message Header	<i>MsgType</i> ="F"
97	<i>PossResend</i>	“Y” Indicates an application level unsolicited resend. If <i>CIOrdID</i> has not yet been seen, the cancel is treated as normal. If <i>CIOrdID</i> already exists, the resent cancel is ignored. “N” (default) indicates a new cancel.
11	<i>CIOrdID</i>	Day-unique cancel ID chosen by member. 20 characters or less. Characters in ASCII range 33-126 are allowed, except for comma, semicolon, and pipe. Duplicate order <i>CIOrdIDs</i> will be rejected (or ignored if <i>PossResend</i> ="Y").
41	<i>OrigCIOrdID</i>	<i>CIOrdID</i> of the order to cancel.

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37	<i>OrderId</i>	<i>OrderID</i> supplied by BATS on the order acknowledgement. (Optional but recommended for performance).
60	<i>TransactTime</i>	Time cancel initiated/released. Required by FIX 4.2 but not used by BATS.
55	<i>Symbol</i>	Symbol (upper case). Must match original order.
77	<i>OpenClose</i>	Open/Close position indicator Open = "O" Close = "C"
200	<i>MaturityMonthYear</i>	Maturity Month
205	<i>MaturityDay</i>	Expiration date day of month Format: DD
201	<i>PutOrCall</i>	Put = "0" Call = "1"
202	<i>StrikePrice</i>	Strike Price for option 0 – 99999.999
54	<i>Side</i>	Buy = "1" Sell = "2"
38	<i>OrderQty</i>	Number of contracts for order. Must match original order.
	Standard Message Trailer	

#### 4.4.3 Order Cancel/Replace Request

Only *Price*, *OrderQty* and *OrdType* may be adjusted. Any change in *Price* or any increase in *OrderQty* will result in the order losing its time priority. *OrdType* may be adjusted from Limit to Market.

Other fields (including *ExecInst*) **will be ignored**, and the value from the original order will be re-used. In particular note that when a Day-ISO is modified the ISO designation is applied to the new order.

Changes in *OrderQty* result in an adjustment of the current order's *OrderQty*. The new *OrderQty* does **not** directly replace the current order's *LeavesQty*. Rather a delta is computed from the current *OrderQty* and the replacement *OrderQty*. This delta is then applied to the current *LeavesQty*. If the resulting *LeavesQty* is less than or equal to zero the order is

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cancelled. This results in safer behavior when the replace request overlaps partial fills for the current order, leaving the member in total control of the share exposure of the order.

*MaxFloor* and *DiscretionAmount* are preserved from the original order and applied to the new size and price.

A Cancel/Replace should not be issued until the ack for the previous Cancel/Replace has been received for that order (or the New Order Ack for the first Cancel/Replace). The FIX handler will reject a new Cancel/Replace if it has not seen the prior Cancel/Replace from the Matching Engine.

Cancel/Replace requests that merely reduce *OrderQty* may be overlapped if the existing *ClOrdID* is re-used. This is the only case where re-use of the existing *ClOrdID* is allowed.

Tag	Field Name	Description
35	Standard Message Header	<i>MsgType</i> ="G"
97	<i>PossResend</i>	"Y" Indicates an application level resend. If the <i>ClOrdID</i> does not indicate an already pending cancel/replace, the cancel is treated as normal. If <i>ClOrdID</i> does indicate an already pending cancel/replace then the resent cancel/replace is ignored. "N" (default) indicates a new cancel.
1	<i>Account</i>	<b>Ignored</b> – value preserved from original order
11	<i>ClOrdId</i>	Day-unique ID chosen by member. 20 characters or less. Characters in ASCII range 33-126 are allowed, except for comma, semicolon, and pipe. Duplicate order <i>ClOrdIds</i> will be rejected (or ignored if <i>PossResend</i> ="Y").
41	<i>OrigClOrdID</i>	<i>ClOrdID</i> of the order to replace. In the case of multiple changes to a single order, this will be the <i>ClOrdID</i> of the <b>most recent</b> accepted change.
37	<i>OrderId</i>	<i>OrderId</i> supplied by BATS on the order acknowledgement. In the case of multiple changes to a single order, this will be the <i>OrderId</i> from the most recent acknowledgement.
60	<i>TransactTime</i>	Time cancel/replace initiated/released.
55	<i>Symbol</i>	<b>Ignored</b> – value preserved from original order
77	<i>OpenClose</i>	<b>Ignored</b> – value preserved from original order
200	<i>MaturityMonth</i>	<b>Ignored</b> – value preserved from original order
205	<i>MaturityDay</i>	<b>Ignored</b> – value preserved from original order

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201	<i>PutOrCall</i>	<b>Ignored</b> – value preserved from original order
202	<i>StrikePrice</i>	<b>Ignored</b> – value preserved from original order
54	<i>Side</i>	Must match original order.
38	<i>OrderQty</i>	Number of contracts for order. This will modify the <i>OrderQty</i> of the current order; it does <b>not</b> directly set the remaining quantity.
40	<i>OrdType</i>	Market="1", Limit="2"  <b>Optional:</b> (defaults to original order if not sent). May replace Limit with Market, but otherwise must match original order (or not sent).
44	<i>Price</i>	Limit Price. Order rejected if priced finer than the minimum trading increment for the option.
18	<i>ExecInst</i>	<b>Ignored</b> – value preserved from original order
9619	<i>CancelOrigOnReject</i>	N = Leave original order alone. Y = Cancel original order if replacement fails (an unsolicited cancel report will be sent for original order in this case). Default is configurable per port (N if not configured).
	Standard Message Trailer	

## 4.5 Order Protocol – BATS to Member

### 4.5.1 Execution Report

Tag	Field Name	Description
35	Standard Message Header	<i>MsgType</i> ="8"
52	<i>SendingTime</i>	GMT date-time that execution report was sent by BATS.
20	<i>ExecTransType</i>	"0" = New "1" = Cancel "2" = Correct "3" = Status
17	<i>ExecID</i>	Day-unique id of execution message. Will be zero for <i>ExecTransType</i> of Status (3).
18	<i>ExecInst</i>	<i>ExecInst</i> from order (if any)

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19	<i>ExecRefID</i>	Only present when <i>ExecTransType</i> = Cancel (1) or Correct (2). Refers to the <i>ExecID</i> of the message being cancelled or corrected.
150	<i>ExecType</i>	Reason for this execution report: “0” = New (acknowledgement of new order) “1” = Partial Fill “2” = Fill “4” = Canceled “5” = Replaced “8” = Rejected “D” = Restated  For Drop, only “1” or “2” will be sent and will always equal <i>OrdStatus</i> (tag 39).
378	<i>ExecRestatementReason</i>	Only present when 150=D 4 = State Change 5 = Reduction of <i>OrdQty</i>
11	<i>CIOrdID</i>	<i>CIOrdID</i> of the order being accepted, executed or rejected. -or- <i>CIOrdID</i> of the cancel or replace <b>request</b> . -or- <i>CIOrdID</i> of the order subject to unsolicited cancel ( <i>OrigCIOrdID</i> will not be present).
41	<i>OrigCIOrdID</i>	<i>CIOrdID</i> of the order being cancelled or replaced (for a solicited cancel or cancel/replace, otherwise not present).
37	<i>OrderId</i>	<i>OrderId</i> (supplied by BATS).
382	<i>NoContraBrokers</i>	Only present on trades. Always 1.
375	<i>ContraBroker</i>	Only present on trades. BATS = Internally matched INET = Routed to Nasdaq ARCA = Routed to NYSE Arca ISE = Routed to ISE AMEX = Routed to NYSE AMEX BOX = Routed to Boston CBOE = Routed to CBOE PHLX = Routed to Philadelphia
39	<i>OrdStatus</i>	State of order. “0” = New

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		<p>“1” = Partially Filled  “2” = Filled  “4” = Canceled  “5” = Replaced  “6” = Pending Cancel  “8” = Rejected  “A” = Pending Ack  “E” = Pending Replace</p> <p>For Drop, only “1” or “2” will be sent and will always equal ExecType (tag 150).</p>
103	<i>OrdRejReason</i>	<p>Optional when <i>ExecType</i> is Rejected (8).  “0” = Broker option  “1” = Unknown symbol  “2” = Exchange closed  “3” = Order exceeds limit  “5” = Unknown order  “6” = Duplicate order  “8” = Stale order</p>
1	<i>Account</i>	Copied from order (available in FIX DROP, not available in Drop).
55	<i>Symbol</i>	Copied from order
77	<i>OpenClose</i>	Copied from order
200	<i>MaturityMonth</i>	Copied from order
205	<i>MaturityDay</i>	Copied from order
201	<i>PutOrCall</i>	Copied from order
202	<i>StrikePrice</i>	Copied from order
54	<i>Side</i>	Copied from order.
38	<i>OrderQty</i>	Copied from order.
111	<i>MaxFloor</i>	Copied from order.
44	<i>Price</i>	Copied from order.
9622	<i>DiscretionAmount</i>	Copied from order.
59	<i>TimeInForce</i>	Copied from order.
126	<i>ExpireTime</i>	Copied from order if <i>TimeInForce</i> is GTD (6).
439	<i>ClearingFirm</i>	Copied from order if present.
440	<i>ClearingAccount</i>	Copied from order if present.

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32	<i>LastShares</i>	<p>Quantity of contracts traded on this fill (zero for non-fills).</p> <p><b>May opt-in at firm or port level to receive this field on a MMTP triggered cancel/restatement where both sides were either reduced or cancelled (i.e. inbound Cancel Both or Decrement). With MMTP, the number of contracts that would have matched.</b></p>
31	<i>LastPx</i>	<p>Price of this fill (zero for non-fills).</p> <p><b>May opt-in at firm or port level to receive this field on a MMTP triggered cancel/restatement where both sides were either reduced or cancelled (i.e. inbound Cancel Both or Decrement). With MMTP, the price at which LastShares would have matched.</b></p>
151	<i>LeavesQty</i>	<p>Quantity of contracts still open for further execution. Will be zero if order is dead, otherwise will be <i>OrderQty-CumQty</i>.</p> <p><b>Note:</b> It is possible for <i>LeavesQty</i> to be zero when <i>ExecType</i> = 5 indicating that the order is dead.</p>
14	<i>CumQty</i>	Cumulative quantity of contracts executed for this order.
6	<i>AvgPx</i>	Average price of executions for this order weighted by trade size. Zero if <i>CumQty</i> is zero.
198	<i>SecondaryOrderID</i>	<p><b>Must request opt-in at firm or port level receive this field</b></p> <p>Only present on MMTP triggered cancel/restatement.</p> <p>BATS OrderId of contra side of prevented match.</p>
9730	<i>TradeLiquidityIndicator</i>	<p>Present for fills (150=1 or 150=2): A = trade added liquidity R = trade removed liquidity X = routed</p> <p>Must request opt-in at firm or port level to receive the 2nd characters in this field. To allow for future expansion of this field, please ignore values with an unknown character in the 2nd position.</p> <p>For members that opt-in to Report MMTP Fields functionality (at firm or port level), the A / R values may</p>

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		<p>be presented on an MMTP triggered cancel/restatement.</p> <p>For members that opt-in to State Change Tracking at the port level, order acks (150=0), modify acks (150=5) and restatements (150=D with 378=4) will carry 9730 messages defined as follows:  A=Zero or more immediate partial remove fills followed by posting.  R=Zero or more immediate partial remove fills followed by a cancel (or full fill).  X=Zero or more immediate partial remove fills followed by routing.</p>
9621	<i>ExchangeAccessFee</i>	<p>Only present for fills.  Access fee for this fill (up to 5 decimal places, negative for rebate).</p>
9690	<i>WorkingPrice</i>	<p>Optional. Must be enabled at the firm or port level. Only present on Accepted or Replaced, and only when order is fully or partially booked.  If Price had to be adjusted to a less aggressive value to avoid crossing the NBBO, the adjusted price will be reported here, otherwise equals Price.</p>
9691	<i>InitialDisplayPrice</i>	<p>Optional. Must be enabled at the firm or port level. Only present on Accepted or Replaced, and only when order is fully or partially booked.  If order had to be temporarily displayed at a less aggressive value to avoid locking the NBBO, the initial displayed price will be reported here, otherwise equals WorkingPrice.</p>
9617	<i>ModifySequence</i>	<p>Drop only. Base 36 number of times order has been replaced.</p>
9688	<i>OrigCompID</i>	<p>Drop only. TargetCompID of original FIX exec report  Drop port must be configured to send this optional field.</p>
9689	<i>OrigSubID</i>	<p>Drop only. TargetSubID of original FIX exec report  Drop port must be configured to send this optional field.</p>
60	<i>TransactTime</i>	<p>GMT date-time that transaction occurred.</p>
58	<i>Text</i>	<p>If present, indicates reason for reject or cancel. Format is one letter reason code followed by colon and space followed by free form text message. (e.g. "N: No Liquidity at price")</p>

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		Reason codes are one of the following: A = Admin D = Duplicate ClOrdId F = Could not reflect to consolidated quote (OPRA) H = Halted K = Order Rate Threshold Exceeded L = Order would lock or cross NBBO N = Ran out of liquidity to execute against O = ClOrdId doesn't match a known order P = Can't modify an order that is pending fill Q = Waiting for first trade R = Routing unavailable T = Fill would trade-through NBBO U = User requested V = Would Wash W = AddLiquidityOnly order would remove X = Order expired Y = Symbol not supported Z = Unforeseen reason
	<i>Standard Message Trailer</i>	

**4.5.1.1 State Change Tracking**

For members that wish to track the state of their routable orders, they may **opt-in** to the following functionality at the port level by contacting the BATS Trade Desk.

Order acks (150=0), modify acks (150=5) and restatements (150=D with 378=4) will carry 9730 (liquidity) as follows:

- A = Zero or more immediate partial remove fills followed by posting.
- R = Zero or more immediate partial remove fills followed by a cancel (or full fill).
- X = Zero or more immediate partial remove fills followed by routing.

When an order returns from the router, a restatement will be generated with:

- 150 = D (Restated)
- 378 = 4 (State Change)
- 58 = A (Admin)
- 9730 = A, X or R (as defined in 4.5.1)
- Order details to match the order (OrdQty, Price, etc.)

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- Cumulative execution details to match the current status (CumQty, LeavesQty, etc.)
- Current execution details zeroed (LastPx, LastShares, etc.)

#### 4.5.2 Cancel Reject

Rejects a Cancel or Cancel/Replace request.

**When a Cancel/Replace is rejected, by default the original order is left alive. A Cancel Reject should not be used as a sign that the original order has been cancelled. Even if the *CancelOrigOnReject = Y* option is being used a separate “unsolicited” cancel will be sent to close out the original order.**

Tag	Field Name	Description
35	Standard Message Header	<i>MsgType="9"</i>
11	<i>ClOrdID</i>	<i>ClOrdID</i> from the Cancel or Cancel/Replace request.
41	<i>OrigClOrdID</i>	<i>ClOrdID</i> of the order that failed to be cancelled or replaced.
37	<i>OrderId</i>	<i>OrderId</i> of order that failed to be cancelled or replaced. "NONE" if <i>CxlRejReason</i> is Unknown (1).
39	<i>OrdStatus</i>	<i>OrdStatus</i> of order that failed to be cancelled or replaced.
1	<i>Account</i>	Copied from Cancel or Cancel/Replace request.
434	<i>CxlRejResponseTo</i>	"1" = Cancel "2" = Cancel/Replace
102	<i>CxlRejReason</i>	"0" = Too late to cancel. "1" = Unknown order. "3" = Already pending cancel or pending replace.
58	<i>Text</i>	Free form text message.
	Standard Message Trailer	

### 4.5.3 Trade Cancel/Correct

Sends a trade/cancel or correct message for trade break.

**Trade Cancel/Correct (UCC) is an optional message that must be enabled at the port level. It may be enabled for current-day only or for all cancels and corrections. Only the price of a trade may be corrected, all other details remain the same. Trade cancels and corrections do not alter live order state.**

Tag	Field Name	Description
35	Standard Message Header	<i>MsgType</i> ="UCC"
20	<i>ExecTransType</i>	"1" = Trade Cancel "2" = Trade Correct
17	<i>ExecID</i>	Day-unique id of execution message.
19	<i>ExecRefID</i>	Refers to the <i>ExecID</i> of the message being cancelled or corrected.
37	<i>OrderId</i>	<i>OrderId</i> of the original trade being cancelled/corrected.
11	<i>ClOrdID</i>	<i>ClOrdID</i> of the original trade being cancelled/corrected.
55	<i>Symbol</i>	Copied from original trade being cancelled/corrected.
77	<i>OpenClose</i>	Copied from original trade being cancelled/corrected.
200	<i>MaturityMonth</i>	Copied from original trade being cancelled/corrected.
205	<i>MaturityDay</i>	Copied from original trade being cancelled/corrected.
201	<i>PutOrCall</i>	Copied from original trade being cancelled/corrected.
202	<i>StrikePrice</i>	Copied from original trade being cancelled/corrected.
54	<i>Side</i>	Copied from original trade being cancelled/corrected.
9730	<i>TradeLiquidityIndicator</i>	Copied from original trade being cancelled/corrected.
439	<i>ClearingFirm</i>	Copied from original trade being cancelled/corrected (if present).
440	<i>ClearingAccount</i>	Copied from original trade being cancelled/corrected (if present).
9620	<i>CorrectedPrice</i>	Only for Trade Corrects. Corrected price.
32	<i>LastShares</i>	Quantity of contracts on the original trade being cancelled/corrected.
31	<i>LastPx</i>	Price on the original trade being cancelled/corrected.
42	<i>OrigTime</i>	GMT date-time of original trade.

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60	<i>TransactTime</i>	GMT date-time of cancel/correct.
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## 5 Implementation Issues

### 5.1 Automatic Cancel on Disconnect or Malfunction

**All open orders for a member will be cancelled automatically if no messages have been received from the member for two heartbeat intervals.** This is done to prevent orders from being stuck in an unknown state in the event of telecommunications failure. Members should choose their heartbeat interval carefully based on the latency and reliability of their telecommunications channel. The minimum supported interval is 5 seconds, and this is also the recommended interval if the latency and reliability of your telecommunications channel support it. Execution reports for the automatically cancelled orders are available upon reconnection. Members are responsible for rerouting orders to other market centers based on their business needs. This should be rare, but all open orders may also be cancelled in the event of a complete or partial system malfunction.

### 5.2 Access Fees Returned on Execution Reports

The access fee associated with each fill is calculated to 5 decimals and returned on each execution report. Negative numbers indicate liquidity rebates. Members should program their systems to read, validate, and pass along this field in order to avoid making software changes to their systems when the BATS fee schedule changes. The sum of the access fees received during a month should equal the access fee charged or rebated on a member's monthly bill, rounded to the nearest penny.

### 5.3 Service Bureau Configuration

Service Bureaus require special configuration. *OnBehalfOfCompld* should be set for Order, Cancel and Cancel/Replace messages sent to BATS. Orders with an unknown *OnBehalfOfCompld* will be rejected. *ClOrdId* values are required to be unique only within a given *OnBehalfOfCompld*. Execution Report and Cancel Reject messages sent by BATS will have the *DeliverToCompld* set. **Orders must be cancelled or replaced using the same *OnBehalfOfCompld* as was sent on the Order.**

### 5.4 Common Session Level Issues

BATS uses FIX 4.2 as specified by the FPL document **Version 4.2 (with Errata 20010501)** with business level extensions described in our own FIX spec. The session level of the FPL spec is followed as closely as possible.

The version with errata cleared up **many** ambiguities with session level present in the earlier Version 4.2 (March 1, 2000).

Important notes direct from the public FPL spec (**blue lines are anchor locations in the FPL document, bold emphasis is from original spec, purple emphasis added by BATS, green notes added by BATS**) :

#### 5.4.1 **FINANCIAL INFORMATION EXCHANGE PROTOCOL / FIX MESSAGE FORMAT AND DELIVERY / Ordered Message Processing**

The FIX protocol assumes complete ordered delivery of messages between parties. Implementers should consider this when designing message gap fill processes. Two options exist for dealing with gaps, **either request all messages subsequent to the last message received or ask for the specific message missed while maintaining an ordered list of all newer messages**. For example, if the receiver misses the second of five messages, the application **could ignore messages 3 through 5 and generate a resend request for messages 2 through 5, or, preferably 2 through 0 (where 0 represents infinity)**. Another option would involve saving messages 3 through 5 and resending only message 2. **In both cases, messages 3 through 5 should not be processed before message 2.**

#### 5.4.2 **FINANCIAL INFORMATION EXCHANGE PROTOCOL / SESSION PROTOCOL / Logon**

After the initiator has been authenticated, the acceptor will respond **immediately** with a confirming *Logon* message.

#### 5.4.3 **FINANCIAL INFORMATION EXCHANGE PROTOCOL / SESSION PROTOCOL / Message Recovery**

When the incoming sequence number does not match the expected number corrective processing is required. Note that the *SeqReset-Reset* message (**[BATS: this refers only to GapFillFlag=No 123=N]**) to be used only to recover from a disaster scenario vs. normal resend request processing) is an exception to this rule as it should be processed without regards to its *MsgSeqNum*. **If the incoming message has a sequence number less than expected and the PossDupFlag is not set, it indicates a serious error. It is strongly recommended that the session be terminated and manual intervention be initiated.** If the **incoming sequence number is greater than expected, it indicates that messages were missed and retransmission of the messages is requested via the Resend Request** (see the earlier section, *Ordered Message Processing*).

...

If there are consecutive administrative messages to be resent, **it is suggested that only one SeqReset-GapFill message be sent in their place**. The sequence number of the *SeqReset-GapFill* message is the next expected outbound sequence number. **The NewSeqNo field of the GapFill message contains the sequence number of the highest administrative message in this group plus 1**. For example, during a Resend operation there are 7 sequential administrative messages waiting to be resent. They start with sequence number 9 and end with sequence number 15. Instead of transmitting 7 Gap Fill messages (which is perfectly legal, but not network friendly), a *SeqReset-GapFill* message may be sent. **The sequence number of the Gap Fill message is set to 9 because the remote side is expecting that as the next**

**sequence number.** The *NewSeqNo* field of the GapFill message contains the number 16, because that will be the sequence number of the next message to be transmitted.

Sequence number checking is a vital part of FIX session management. However, a discrepancy in the sequence number stream is **handled differently for certain classes of FIX messages**. The table below lists the actions to be taken when the incoming sequence number is greater than the expected incoming sequence number.

**NOTE: In \*ALL\* cases except the Sequence Reset - Reset message, the FIX session should be terminated if the incoming sequence number is less than expected and the PossDupFlag is not set. A Logout message with some descriptive text should be sent to the other side before closing the session.**

**Response by Message Type**

Message Type	Action to Be Taken on Sequence # Mismatch
Logon	Must always be the first message transmitted. Authenticate and accept the connection. <b>After sending a Logon confirmation back, send a ResendRequest</b> if a message gap was detected in the <i>Logon</i> sequence number.

....

**5.4.4 FINANCIAL INFORMATION EXCHANGE PROTOCOL / ADMINISTRATIVE MESSAGES / Resend Request**

Note: the **sending application may wish to consider the message type when resending messages**; e.g. if a new order is in the resend series and a significant time period has elapsed since its original inception, the sender may not wish to retransmit the order given the potential for changed market conditions. (The **Sequence Reset-GapFill message is used to skip messages that a sender does not wish to resend.**)

**5.4.5 FINANCIAL INFORMATION EXCHANGE PROTOCOL / ADMINISTRATIVE MESSAGES / Sequence Reset (Gap Fill)**

The sequence reset message is used by the sending application to reset the incoming sequence number on the opposing side. **This message has two modes: "Sequence Reset-Gap Fill" when GapFillFlag is 'Y' and "Sequence Reset-Reset" when GapFillFlag is N or not present.** The "Sequence Reset-Reset" mode should **ONLY** be used to recover from a disaster situation which cannot be otherwise recovered via "Gap Fill" mode. The sequence reset message can be used in the following situations:

- During normal resend processing, the sending application may choose not to send a message (e.g. an aged order). The Sequence Reset – Gap Fill is used to mark the place of that message.
- During normal resend processing, a number of **administrative messages are not resent, the Sequence Reset – Gap Fill message is used to fill the sequence gap created.**

...

The sending application will initiate the sequence reset. **The message in all situations specifies NewSeqNo to reset as the value of the next sequence number immediately following the messages and/or sequence numbers being skipped.**

...

If the GapFillFlag field is present (and equal to Y), the MsgSeqNum should conform to standard message sequencing rules (i.e. the MsgSeqNum of the Sequence Reset-GapFill message **should represent the beginning MsgSeqNum in the GapFill range** because the remote side is expecting that next message).

The sequence reset can only increase the sequence number. If a sequence reset is received attempting to decrease the next expected sequence number the message should be rejected and treated as a serious error. It is possible to have multiple ResendRequests issued in a row (i.e. 5 to 10 followed by 5 to 11). **If sequence number 8, 10, and 11 represent application messages while the 5-7 and 9 represent administrative messages**, the series of messages as result of the Resend Request may appear as **SeqReset-GapFill with NewSeqNo of 8, message 8, SeqReset-GapFill with NewSeqNo of 10, and message 10**. This could then followed by SeqReset-GapFill with NewSeqNo of 8, message 8, SeqReset-GapFill with NewSeqNo of 10, message 10, and message 11. One must be careful to ignore the duplicate SeqReset-GapFill which is attempting to lower the next expected sequence number. This can be detected by checking to see if its MsgSeqNum is less than expected. If so, the SeqReset-GapFill is a duplicate and should be discarded.

## 6 References

For more information on BATS Symbology, please refer to the BATS Symbology Reference document at [http://www.batstrading.com/resources/membership/BATS\\_Symbology.pdf](http://www.batstrading.com/resources/membership/BATS_Symbology.pdf).

## 7 Support

Please e-mail questions or comments regarding this specification to [tradedesk@batstrading.com](mailto:tradedesk@batstrading.com).

BATS US Options  
FIX Specification (Version 1.1.2)

## Revision History

Document Version	Date	Description
0.1	09/17/09	Initial draft version.
1.0	10/05/09	Release 1.0 distributed.
1.0.1	10/08/09	Various minor updates.
1.1.0	10/28/09	New technical specification template and tag 115/128 info updates.
1.1.1	01/29/10	Added State Change Tracking. Removed 375=NYSE
1.1.2	02/04/10	Added Common Session Level Issues.