



# US Equities (BYX) FIX Specification

Version 1.3.0

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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.

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.

## 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.

- Order prices below \$1.00 may be priced up to four decimal places.
- Order prices of \$1.00 or more may be priced up to two decimal places.

Example:

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

## 1.4 Document Format

Blue highlighted sections highlight key differences between the BATS BYX and BZX specifications.

## 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 "BYXX". 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</i> =Y) 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.
<b>SenderComplID</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>TargetComplID</b>	Sent in every FIX message to BATS.	"BYXX"
<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 *SenderComplID*, *SenderSubID* and *TargetComplID* ("BYXX") 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 *HearbeatInterval* + 1 seconds have elapsed since the last message received, a Test Request should be issued. If another *HearbeatInterval* + 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: "BYXX" 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>	Service Bureau must use. Identifies end-client on messages to BATS. Must be allowed NSCC MPID. May be used by non-service bureau to specify which clearing arrangement to use if multiple clearing arrangements are configured. Alternatively, non-service bureau may use 439 instead.
116	<i>OnBehalfOfSubID</i>	End-client sub identifier. 4 Characters alphanumeric, otherwise not validated. Recorded and returned in <i>DeliverToSubID</i> . Available via



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		FIX Drop.
128	<i>DeliverToCompld</i>	Service Bureau use. Identifies end-client on messages <b>from</b> BATS. Must be allowed NSCC MPID.
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	<i>PreventMemberMatch</i>	Refer to definition in the New Order Single Section 4.4.1 for more details.
9303	<i>RoutingInst</i>	Refer to definition in the New Order Single Section 4.4.1 for more details.
9479	<i>DisplayIndicator</i>	Refer to definition in the New Order Single Section 4.4.1 for more details.
9617	<i>ModifySequence</i>	Refer to definition in the Execution Report Section 4.5.1 for more details.
9618	<i>MaxRemovePct</i>	Refer to definition in the New Order Single Section 4.4.1 for more details.
9619	<i>CancelOrigOnReject</i>	Refer to definition in the Order Cancel/Replace Section 4.4.3 for more details.
9620	<i>CorrectedPrice</i>	Refer to definition in the Trade Cancel/Correct Section 4.5.3 for more details.
9621	<i>ExchangeAccessFee</i>	Refer to definition in the Execution Report Section 4.5.1 for more details.
9622	<i>DiscretionAmount</i>	Refer to definitions in the New Order Single Section 4.4.1 and Execution Report Section 4.5.1 for more details.
9687	<i>BypassHidden</i>	Refer to definition in the New Order Single Section 4.4.1 for more details.
9688	<i>OrigCompID</i>	Refer to definition in the Execution Report Section

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		4.5.1 for more details.
9689	<i>OrigSubID</i>	Refer to definition in the Execution Report Section 4.5.1 for more details.
9690	<i>WorkingPrice</i>	Refer to definition in the Execution Report Section 4.5.1 for more details.
9691	<i>InitialDisplayPrice</i>	Refer to definition in the Execution Report Section 4.5.1 for more details.
9730	<i>TradeLiquidityIndicator</i>	Refer to definitions in the Execution Report Section 4.5.1 and Trade Cancel/Correct Section 4.5.3 for more details.

## 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. "Y" indicates an application level resend and is NOT SUPPORTED.</p> <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</i>="Y".</p> <p>To remain economical, fast <i>and</i> safe, all New Order messages with <i>PossResend</i>="Y" 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 Standard FIX Drop on an opt-in basis at the port level. Available by default on Order by Order FIX Drop (Market Maker Quoter users should refer to Section 6.2.1). 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>For proper OATS handling, <i>CIOrdId</i> must comply with OATS 'Routed Order ID' as defined in Appendix A of the 'OATS Reporting Technical Specifications'.</p> <p>If the <i>CIOrdId</i> matches a live order it will be rejected as duplicate (unless <i>PossResend</i>="Y", see above). <b>Note: BATS only enforces the uniqueness of <i>CIOrdID</i> values among currently live orders. However we</b></p>

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		<b>strongly recommend that you keep your <i>ClOrdID</i> values day unique.</b>
60	<i>TransactTime</i>	Time order initiated/released. Required by FIX 4.2 but not used by BATS.
55	<i>Symbol</i>	Symbol (upper case) <b>Entire BATS format symbol</b> or symbol root if using CQS or CMS format.
65	<i>SymbolSfx</i>	SymbolSfx: CQS or CMS suffix if used. <b>Do not send <i>SymbolSfx</i> if using BATS format or if symbol does not have a suffix.</b> (Refer to Symbology link in Chapter 7.)
54	<i>Side</i>	Buy = "1" Sell = "2" Sell Short = "5" (client affirms ability to borrow) Sell Short Exempt = "6" ( <i>supported effective 11/10/10</i> )
114	<i>LocateReqd</i>	Optional, only processed for Sell Short and Sell Short Exempt N = client affirms ability to borrow ( <b>Default</b> ) Y = client does not affirm ability to borrow (results in a reject)
38	<i>OrderQty</i>	Number of shares 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 hidden or IOC
40	<i>OrdType</i>	Market = "1" Limit = "2" Pegged = "P"  Market implies <i>TimeInForce</i> of IOC. Pegged requires <i>ExecInst</i> =L, M, P or R. Pegged orders may not be routable.
44	<i>Price</i>	Limit Price. Order rejected if priced finer than the minimum trading increment for the stock.

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9622	<i>DiscretionAmount</i>	<p>Discretion is implicitly added to bid prices and subtracted from offer prices.</p> <p>Order will be displayed at <i>Price</i> but can execute in discretionary range.</p> <p>A discretionary order will use the minimum amount of discretion necessary to achieve execution.</p> <p>Zero applies no discretion (<b>Default</b>).</p> <p>Max discretion to apply to Price (non-negative 0.00 to 99.99).</p> <p>Non-zero <i>DiscretionAmount</i> does not mix with IOC, Post-Only (9303 = P or Q) or directed orders (9303 = <i>destination</i>).</p>
211	<i>PegDifference</i>	<p><b>Optional signed</b> dollar value up to 4 decimal places* is <b>added</b> to result of peg calculation.</p> <p><b>Default</b> is zero.</p> <p>Must be &gt;= 0 for Sell orders.</p> <p>Must be &lt;= 0 for Buy orders.</p> <p>Must be zero (or not specified) for Midpoint peg or non-pegged orders</p> <p>*PegDifference is rounded (down for Buy, up for Sell) if the resulting price is above \$1.00.</p>
110	<i>MinQty</i>	<p><b>Optional</b> minimum* fill quantity for <b>BATS-Only (BYX)</b> hidden or IOC orders.</p> <p><b>Ignored</b> unless order is <b>BATS-Only (BYX)</b> hidden or <b>BATS-Only (BYX)</b> IOC</p> <p><b>Default</b> is zero.</p> <p>*When removing liquidity limits the minimum <b>total</b> fill size, which may be made up of several <b>consecutive</b> smaller fills.</p>
47	<i>Rule80A (aka OrderCapacity)</i>	<p>A = Agency P = Principal R = Riskless</p> <p>Other values from the FIX 4.2 specification will be accepted.</p>

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59	<i>TimeInForce</i>	<p>"0" = DAY (Expires at end of market day.)</p> <p>"1" = GTC (Allowed, but treated same as Day.)</p> <p>"3" = IOC (Portion not filled immediately is cancelled. Market orders are implicitly IOC.)</p> <p>"5" = GTX (Expires at end of extended day.)</p> <p>"6" = GTD (Expires at earlier of specified <i>ExpireTime</i> or end of extended day.)</p>
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>	<p><b>Single value only (with no trailing space)</b></p> <p>f = Intermarket Sweep (Directed or BATS)</p> <p>u = BATS+DRT (access liquidity on the BYX order book, then route to DRT Dark Liquidity Partners (DLPs), then return to BYX order book or be canceled depending on user's instruction)</p> <p>v = Force DRT (to override a port-level opt-out of DRT)</p> <p>w = Do not DRT (default is to DRT unless overridden at port level)</p> <p>t = DarkScan (Quick pre-scan for dark liquidity at DarkScan DLPs prior to accessing BATS book. Followed by access of protected markets via CYCLE.)</p> <p>z = DarkScan+DRT (Quick pre-scan for dark liquidity at DarkScan DLPs prior to accessing BATS book. Followed by access of DRT DLPs prior to CYCLE through protected markets.)</p> <p>P = Market Peg (peg Buy to NBBO Offer, peg Sell to NBBO Bid)</p> <p>R = Primary Peg (peg Buy to NBBO Bid, peg Sell to NBBO Offer)</p> <p>M = Midpoint (peg to NBBO Midpoint)</p> <p>L = Alternate Midpoint (less aggressive of midpoint and 1 tick inside NBBO)</p> <p><b>NOTE: value L differs in meaning from standard FIX 4.2</b></p> <p>All other values are ignored.</p> <p><b>Peg Orders:</b></p> <p>Midpoint Pegged orders (M and L) will be forced to hidden (<i>DisplayIndicator</i> = "I"), regardless of what is sent in the <i>DisplayIndicator</i> tag 9479.</p> <p>Only <b>Hidden</b> Primary and Market Pegs (<i>DisplayIndicator</i>=I) will be accepted at this time. If <i>DisplayIndicator</i> = "V", the</p>

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		<p>Primary/Market Peg order will be rejected. If <i>DisplayIndicator</i> is not sent, <i>DisplayIndicator</i> = "I" will be implied.</p> <p><b>Routeable Orders:</b> DarkScan (t), DarkScan+DRT (z), Force DRT (v), and BATS+DRT (u) requires 9303 = "R" in the 1<sup>st</sup> character position.</p> <p>If the 1<sup>st</sup> character of 9303 = "R" or is not specified, then Force DRT (v) will be implied.</p>
7928	<i>PreventMemberMatch</i>	<p>Member Match Trade Prevention: 2 characters (not space separated):</p> <p>1<sup>st</sup> character – MMTP Modifier:  N=Cancel Newest  O = Cancel Oldest  B = Cancel Both  D = Decrement Larger / Cancel Smaller  d = Same as (D) above, but only decrement LeavesQty. Do not restate OrdQty.</p> <p>2<sup>nd</sup> character – Unique ID Level:  F = Prevent Match at BYX Member level  M = Prevent Match at MPID Level</p> <p>The Unique ID level (character 2) of both orders must match to prevent a trade.</p> <p>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. If order-entry software is prepared to handle unexpected restatement messages, this exception may be overridden at the port level by requesting "Allow MMTP Decrement Override" functionality.</p> <p>Users of MMTP Modifier D or d AND users of Allow MMTP Override functionality must be prepared to receive a FIX Restatement (ExecReport with ExecType = D) that decrements LeavesQty (and also OrdQty for method D).</p>

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9303	RoutingInst	<p>This tag currently supports up to 3 characters as follows:</p> <p>1<sup>st</sup> character: Specifies the target destination.</p> <p>2<sup>nd</sup> character: Used to enable/disable Re-Route on Lock/Cross.</p> <p>3<sup>rd</sup> character: Specifies the routing strategy.</p> <table><tr><th>1<sup>st</sup> Character</th><th>Destination</th></tr><tr><td>A</td><td>NYSE ARCA</td></tr><tr><td>B</td><td>BATS (BYX) Only</td></tr><tr><td>C</td><td>NSX</td></tr><tr><td>D</td><td>EDGA</td></tr><tr><td>G</td><td>EDGX</td></tr><tr><td>I</td><td>BATS (BYX) Only ISO (deprecated in favor of 9303=B and 18=f)</td></tr><tr><td>K</td><td>Boston</td></tr><tr><td>L</td><td>LavaFlow</td></tr><tr><td>M</td><td>Chicago</td></tr><tr><td>N</td><td>NASDAQ</td></tr><tr><td>P</td><td>BATS (BYX) Only Post Only (will reject rather than remove visible liquidity)</td></tr><tr><td>Q</td><td>BATS (BYX) Only Post Only At Limit (remove shares that improve upon limit price and up to MaxRemovePct of remaining OrdQty at limit price)</td></tr><tr><td>R (default)</td><td>Smart Route to Visible Markets</td></tr><tr><td>T</td><td>TRAC</td></tr><tr><td>U</td><td>NYSE AMEX</td></tr><tr><td>V</td><td>DATA</td></tr><tr><td>W</td><td>CBSX</td></tr><tr><td>X</td><td>Philadelphia</td></tr><tr><td>Y</td><td>NYSE</td></tr><tr><td>Z</td><td>BATS Exchange (BZX) – B2B</td></tr></table> <p>Post Only does not mix with <i>TimeInForce=IOC</i>.</p> <p>BATS (BYX) Only Post Only orders do not interact with hidden orders on entry.</p> <p>BATS (BYX) Only Post Only At Limit orders do not interact with hidden orders on entry at the stated limit price.</p>	1 <sup>st</sup> Character	Destination	A	NYSE ARCA	B	BATS (BYX) Only	C	NSX	D	EDGA	G	EDGX	I	BATS (BYX) Only ISO (deprecated in favor of 9303=B and 18=f)	K	Boston	L	LavaFlow	M	Chicago	N	NASDAQ	P	BATS (BYX) Only Post Only (will reject rather than remove visible liquidity)	Q	BATS (BYX) Only Post Only At Limit (remove shares that improve upon limit price and up to MaxRemovePct of remaining OrdQty at limit price)	R (default)	Smart Route to Visible Markets	T	TRAC	U	NYSE AMEX	V	DATA	W	CBSX	X	Philadelphia	Y	NYSE	Z	BATS Exchange (BZX) – B2B
1 <sup>st</sup> Character	Destination																																											
A	NYSE ARCA																																											
B	BATS (BYX) Only																																											
C	NSX																																											
D	EDGA																																											
G	EDGX																																											
I	BATS (BYX) Only ISO (deprecated in favor of 9303=B and 18=f)																																											
K	Boston																																											
L	LavaFlow																																											
M	Chicago																																											
N	NASDAQ																																											
P	BATS (BYX) Only Post Only (will reject rather than remove visible liquidity)																																											
Q	BATS (BYX) Only Post Only At Limit (remove shares that improve upon limit price and up to MaxRemovePct of remaining OrdQty at limit price)																																											
R (default)	Smart Route to Visible Markets																																											
T	TRAC																																											
U	NYSE AMEX																																											
V	DATA																																											
W	CBSX																																											
X	Philadelphia																																											
Y	NYSE																																											
Z	BATS Exchange (BZX) – B2B																																											



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9303  
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RoutingInst  
(cont.)

2<sup>nd</sup> and 3<sup>rd</sup> characters are only applicable when the 1<sup>st</sup> character is 'R'.

2 <sup>nd</sup> Character	Re-Route on Lock/Cross
L	Yes. Allow for use of CYCLE or Parallel strategy up to limit or discretion price on entry and allow for re-route via CYCLE or Parallel strategy after the order has booked <i>only if another market locks or crosses</i> the limit or discretion price.
N (default)	Do not Re-Route

3 <sup>rd</sup> Character	Routing Strategy
C	CYCLE
D (default)	Parallel-D
R	TRIM
S	SLIM
T	Parallel-T – <i>Coming Soon</i>
2	Parallel-2D – <i>Coming Soon</i>

In order to specify values for the 2<sup>nd</sup> and/or 3<sup>rd</sup> character, the prior character(s) MUST be populated with a valid value. If tag 9303 is not specified, a default value of RND is implied (All Visible Markets/No Re-Route/Parallel-D). Empty values in the 2<sup>nd</sup> and/or 3<sup>rd</sup> character positions will imply the default value from their respective position.

As the default instruction for tag 9303 is subject to change with little or no notice, it is recommended you specify values for all 3 character positions if you wish to maintain maximum control of your routing decisions.

For more information regarding the various routing strategies available on BATS, refer to <http://www.batstrading.com/features/>.

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9303  
(cont.)

RoutingInst  
(cont.)

ExecInst (18) values are supported in combination of 9303 1<sup>st</sup> character values as follows:

RoutingInst (9303)	Destination	Not Present	ExecInst (18)			
			f	v	t u z	M L P R (peg)
A	NYSE ARCA	OK	OK	REJ	REJ	REJ
B	BATS (BYX) Only	OK	OK	REJ	REJ	OK
C	NSX	OK	OK	REJ	REJ	REJ
D	EDGA	OK	OK	REJ	REJ	REJ
G	EDGX	OK	OK	REJ	REJ	REJ
I	BATS (BYX) Only ISO (deprecated in favor of 9303=B 18=f)	OK	OK	REJ	REJ	REJ
K	Boston	OK	OK	REJ	REJ	REJ
L	LavaFlow	OK	OK	REJ	REJ	REJ
M	Chicago	OK	OK	REJ	REJ	REJ
N	NASDAQ	OK	OK	REJ	REJ	REJ
P	BATS (BYX) Only Post Only (will reject rather than remove liquidity)	OK	OK	REJ	REJ	OK
Q	BATS (BYX) Only PostOnlyAtLimit Will remove shares that <b>improve</b> upon the limit price, and up to MaxRemovePct of remaining OrdQty <b>at</b> the limit price	OK	OK	REJ	REJ	REJ
R (default)	Smart Route to Visible Markets	OK	REJ	OK	OK	REJ
T	TRAC	OK	OK	REJ	REJ	REJ
U	NYSE AMEX	OK	OK	REJ	REJ	REJ
V	DATA	OK	OK	REJ	REJ	REJ
W	CBSX	OK	OK	REJ	REJ	REJ
X	Philadelphia	OK	OK	REJ	REJ	REJ
Y	NYSE	OK	OK	REJ	REJ	REJ
Z	BATS Exchange (BZX) – B2B	OK	OK	OK	REJ	REJ

If ExecInst(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

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		(BYX) Only (9303=B) and ExecInst(18)=f, the order is treated as an ISO on the BATS book.
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>I: Invisible (implied on all Peg orders).</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>
9687	<i>BypassHidden</i>	<p>N: (<b>Default</b>) Allow for removing liquidity against hidden orders.</p> <p>Y: Opt out of removing liquidity against hidden orders.</p>
439	<i>ClearingFirm</i>	<p>Firm that will clear trade. Must be allowed NSCC MPID. 4 characters upper case alphanumeric.</p> <p>NOTE: Shares storage with <i>OnBehalfOfCompID</i>. If both fields are sent they must be equal.</p>

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440	<i>ClearingAccount</i>	Supplemental identifier (optional) 4 characters alphanumeric, not otherwise validated. Recorded and returned in execution reports. Available via FIX Drop. NOTE: Shares storage with <i>OnBehalfOfSubID</i> . If both fields are sent then <i>OnBehalfOfSubID</i> takes precedence for Service Bureau connections, and <i>ClearingAccount</i> takes precedence for other connections.
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.  <u>Integer 0-100</u> 0 = Don't remove any shares at limit price. 100 = Remove any amount at limit price.
	Standard Message Trailer	

#### 4.4.1.1 Re-Route Orders

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

- 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 Re-Route order, the “add liquidity only” order will receive the provider rebate and the Re-Route order will pay the remove fee.

#### 4.4.1.2 Peg Orders

Midpoint Pegs (ExecInst=M and L):

- Implicitly hidden.
- May execute at a half-penny price increment above \$1.00.
- Will not execute during crossed NBBO.
- May not use PegDifference.

Primary and Market pegs (ExecInst R and P)

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- Must be hidden for now (Visible will be rejected).
- Will be temporarily clipped to the less aggressive side of the NBBO during crossed NBBO.
- May use a non-aggressive PegDifference.

Peg orders are prioritized behind non-pegged orders at each price and display level. With regard to hidden peg orders, regular peg orders (ExecInst R and P) have a higher priority than Midpoint peg orders ranked at the same price.

When discretion is used on a pegged order, the DiscretionAmount always is applied to the current Pegged price.

A resting peg order may remove liquidity when re-priced by an NBBO movement.

#### 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>ClOrdID</i> has not yet been seen, the cancel is treated as normal. If <i>ClOrdID</i> already exists, the resent cancel is ignored. "N" (default) indicates a new cancel.
11	<i>ClOrdID</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>ClOrdIDs</i> will be rejected (or ignored if <i>PossResend</i> ="Y").
41	<i>OrigClOrdID</i>	<i>ClOrdID</i> of the order to cancel.
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.
65	<i>SymbolSfx</i>	Must match original order if used.

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54	<i>Side</i>	Buy = "1" Sell = "2" Sell Short = "5" (client affirmed ability to borrow) Sell Short Exempt = "6" ( <i>supported effective 11/10/10</i> ) Must match original order.
38	<i>OrderQty</i>	Number of shares for order. Must match original order.
	Standard Message Trailer	

#### 4.4.3 Order Cancel/Replace Request

Only *Price*, *Side*, *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 (but not from Limit to Peg or Peg to Limit). *Side* may only be used to change an order from a short sell to a long sell or vice versa and will not result in a loss of an order's time priority.

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 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 (due to OATS restrictions) where re-use of the existing *ClOrdID* is allowed.

Tag	Field Name	Description
35	Standard Message Header	<i>MsgType</i> ="G"

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97	<i>PossResend</i>	<p>“Y” Indicates an application level resend. If the <i>CIOrdID</i> does not indicate an already pending cancel/replace, the cancel is treated as normal. If <i>CIOrdID</i> does indicate an already pending cancel/replace then the resent cancel/replace is ignored.</p> <p>“N” (default) indicates a new cancel.</p>
1	<i>Account</i>	<b>Ignored</b> – Value preserved from original order except in the case of Order by Order FIX Drop messages resulting from Market Maker Quoter events, where value will equal <i>Max Number of Hits</i> (refer to Section 6.2.1 for more information).
11	<i>CIOrdId</i>	<p>Day-unique ID chosen by member. 20 characters or less. Characters in ASCII range 33-126 are allowed, except for comma, semicolon, and pipe.</p> <p>Duplicate order <i>CIOrdIds</i> will be rejected (or ignored if <i>PossResend</i>="Y").</p>
41	<i>OrigCIOrdID</i>	<p><i>CIOrdID</i> of the order to replace.</p> <p>In the case of multiple changes to a single order, this will be the <i>CIOrdID</i> of the <b>most recent</b> accepted change.</p>
37	<i>OrderId</i>	<p><i>OrderId</i> supplied by BATS on the order acknowledgement.</p> <p>In the case of multiple changes to a single order, this will be the <i>OrderId</i> from the most recent acknowledgement.</p>
60	<i>TransactTime</i>	Time cancel/replace initiated/released.
55	<i>Symbol</i>	<b>Ignored</b> – value preserved from original order
65	<i>SymbolSfx</i>	<b>Ignored</b> – value preserved from original order
54	<i>Side</i>	<p>Buy = "1"</p> <p>Sell = "2"</p> <p>Sell Short = "5" (client affirmed ability to borrow)</p> <p>Sell Short Exempt = "6" (<i>supported effective 11/10/10</i>)</p> <p><b>Optional:</b> (defaults to original order if not sent).</p> <p>Side may only be used to modify a Short Sell to a Long Sell or vice versa.</p>
38	<i>OrderQty</i>	<p>Number of shares for order.</p> <p>This will modify the <i>OrderQty</i> of the current order; it does <b>not</b> directly set the remaining quantity.</p>
40	<i>OrdType</i>	<p>Market="1", Limit="2", Peg="P"</p> <p><b>Optional:</b> (defaults to original order if not sent).</p>

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		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 stock.
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) Not sent for a "regular" fill that results from a DarkScan order.
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 Standard FIX Drop, only "1" or "2" will be sent and will always equal <i>OrdStatus</i> (tag 39). For Order by Order FIX Drop, all execution information will be sent. Refer to section 6.2.
378	<i>ExecRestatementReason</i>	Only present when 150=D 4 = State Change 5 = Reduction of <i>OrdQty</i>

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11	<i>ClOrdID</i>	<i>ClOrdID</i> of the order being accepted, executed or rejected. -or- <i>ClOrdID</i> of the cancel or replace <b>request</b> . -or- <i>ClOrdID</i> of the order subject to unsolicited cancel ( <i>OrigClOrdID</i> will not be present).
41	<i>OrigClOrdID</i>	<i>ClOrdID</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. <b>BYXX = Internally matched (BYX)</b> BATS = BATS Exchange (BZX) INET = Routed to Nasdaq ARCA = Routed to NYSE Arca NSX = Routed to NSX AMEX = Routed to NYSE AMEX BEX = Routed to Boston CBSX = Routed to CBOE Stock Exchange CHX = Routed to Chicago DATA = Routed to Track EDGA = Routed to Direct Edge EDGX = Routed to Direct Edge FLOW = Routed to LavaFlow NYSE = Routed to New York PSX = Routed to Philadelphia TRAC = Routed to Track DARK = Routed to DarkScan Pool (for 18=t OR 18=z) DRT = Routed to DRT Pool ( <i>formerly DART</i> )

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39	<i>OrdStatus</i>	<p>State of order.</p> <p>“0” = New  “1” = Partially Filled  “2” = Filled  “4” = Canceled  “5” = Replaced  “6” = Pending Cancel  “8” = Rejected  “A” = Pending Ack  “E” = Pending Replace</p> <p>For FIX Drop, only “1” or “2” will be sent and will always equal ExecType (tag 150). For Order by Order FIX Drop, all execution information will be sent. Refer to section 6.2.</p>
103	<i>OrdRejReason</i>	<p>Optional when <i>ExecType</i> is Rejected (8).</p> <p>”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). For Order by Order FIX Drop, all execution information will be sent. Refer to section 6.2 and section 6.2.1.
55	<i>Symbol</i>	Copied from order (available in FIX Drop, always BATS format in DROP).
65	<i>SymbolSfx</i>	Copied from order (available in FIX Drop, not available in DROP).
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.

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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.
32	<i>LastShares</i>	Quantity of shares traded on this fill (zero for non-fills).  <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 shares that would have matched.</b>
31	<i>LastPx</i>	Price of this fill (zero for non-fills).  <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>
151	<i>LeavesQty</i>	Quantity of shares still open for further execution. Will be zero if order is dead, otherwise will be <i>OrderQty-CumQty</i> . <b>Note:</b> It is possible for <i>LeavesQty</i> to be zero when <i>ExecType</i> = 5 indicating that the order is dead.
14	<i>CumQty</i>	Cumulative quantity of shares 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>	<b>Must request opt-in at firm or port level receive this field</b>  Only present on MMTP triggered cancel/restatement.  BATS OrderId of contra side of prevented match.

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9730	<i>TradeLiquidityIndicator</i>	<p>Present for fills (150=1 or 150=2):  A = trade added liquidity  AH = trade added hidden 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 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 <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.  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>

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9617	<i>ModifySequence</i>	FIX Drop only. Base 36 number of times order has been replaced.
9688	<i>OrigCompID</i>	FIX Drop only. TargetCompID of original FIX exec report. FIX Drop port must be configured to send this optional field.
9689	<i>OrigSubID</i>	FIX Drop only. TargetSubID of original FIX exec report FIX Drop port must be configured to send this field.
60	<i>TransactTime</i>	GMT date-time that transaction occurred.
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> <p>Reason codes are one of the following:</p> <p>A = Admin  D = Duplicate ClOrdId  F = Could not reflect to consolidated quote (SIP/SIAC)  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  S = Short-sale price violation  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</p>
	<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.)
- 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</i> ="9"
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 (Available in FIX Drop).
65	<i>SymbolSfx</i>	Copied from original trade being cancelled/corrected (Available in FIX Drop).
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 shares 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.
60	<i>TransactTime</i>	GMT date-time of cancel/correct.
	Standard Msg Trailer	

## 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 FIX Drop

BATS offers two types of FIX Drop ports (Standard FIX Drop and Order by Order FIX Drop). Both port types do not accept orders. Their purpose is to provide real time information about order flow. They may be configured to send order flow based on various combinations of information relating to specific member firms, clearing MPIDS and/or sessions. With proper authorization (e.g. clearing or sponsored relationships), a single FIX Drop session can be used to obtain information about multiple members.

### 6.1 Standard FIX Drop

Standard FIX Drop ports only send execution information (i.e. execution reports where ExecType (tag 150) is Partially Filled (1) or Filled (2)).

### 6.2 Order by Order FIX Drop

Order by Order FIX Drop ports are designed to send more than execution information.

All order message types are supported including, but not limited to Acknowledgements (tag 150=0), Partially Filled (tag 150=1), Filled (tag 150=2), Cancelled (tag 150=4), Replaced (tag 150=5), Rejected (tag 150=8), Order Cancel Rejects (tag 35=9) and optionally (if configured at

the port level) Trade Breaks (tag 35=UCC). If the Rejects/Cancel are due to incomplete clearing information, they may be unavailable on Order by Order FIX Drop ports.

### 6.2.1 Max Number of Hits

BATS has repurposed FIX Tag 1 on Order by Order FIX Drop ports to allow Registered Market Makers utilizing the BATS Market Maker Quoter to actively monitor the number of hits the Market Maker has remaining before BATS will pull both sides of their automated quote. FIX Tag 1 on Order by Order FIX Drop ports will be used to maintain a count of hits remaining for a given security for all Market Maker Quoter events.

In event of an execution, FIX Tag 1 should be monitored for a value of "0" as at that point the Market Maker's quote will be pulled and the Market Maker will need to take appropriate action in order to continue to fulfill their quote obligations. This may involve contacting the BATS Trade Desk to re-establish their automated quote or the Market Maker may choose to start fulfilling their quote obligation on their own.

In the case where the **Max Quote** (refer to the [BATS US Equities Market Maker Quoter Specification](#)) parameter has not been defined for a registered security, a value of "UNLIMITED" will be displayed in FIX Tag 1.

## 6.3 Port Options

Both types of FIX Drop ports can be optionally configured with the following features:

1. Support various BATS supported symbology types.
2. Send Trade Break Messages (tag 35= UCC). Please note that enabling trade breaks on Order By Order drop port will be dependent on enabling trade breaks on corresponding FIX order entry port.
3. Enable Unique Wash Execution IDs.

## 7 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).

## 8 Support

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

## Revision History

Document Version	Date	Description
1.0.0	04/15/10	Initial draft.
1.0.1	05/10/10	Opt-in support added for MMTP Decrement method to work with other method types. Opt-in support added to allow Sponsored Participants to override port level MMTP settings on an order by order basis with approval of Sponsor. Added Contra for BATS Y-Exchange.
1.0.2	05/26/10	DarkScan (18=z) now defaults to DarkScan+DART. 18=t becomes DarkScan w/ DART opt-out.
1.0.3	06/01/10	Clarification added regarding Post Only behavior.
1.0.4	07/21/10	Removed ISE references.
1.0.5	07/28/10	Removed RouteOddLotToSlowExchange (tag 7771).
1.1.0	08/20/10	Renamed DART to DRT.
1.1.1	08/25/10	9479=I Implied for all Peg Orders.
1.2.0	08/31/10	Updated 9303 definitions to include support for new Smart Order Routing strategies. BATS Specific Fields section converted into a reference table. Now accepting FIX 4.2 compatible values for Rule80A (tag 47). RECYCLE references renamed to Re-Route.
1.2.1	09/03/10	Updated tag 54 for Short Exempt (Reg SHO).
1.2.2	09/10/10	Added BATS Exchange (BZX) destination (9303=Z).
1.2.3	09/22/10	Default routing strategy changed to Parallel-D. Clarification added regarding Post Only behavior with respect to interaction with hidden orders.
1.3.0	10/12/10	Added Max Number of Hits section to Order by Order FIX Drop section. Added 9303 strategy definitions to include support for SLIM and TRIM order types. B2B support for DRT defined.