



## **Trading Wire Protocols**

### **Rules of Engagement For Clients**

### **ZVZZT Test Order Mode**

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**Revision History:**

<u>Version</u>	<u>Date</u>	<u>Notes</u>
0.1	8/14/2012	Initial version.
0.2	8/27/2012	Finalized OUCH.
0.3	10/26/2012	Added ArcaDirect, BATS BOE, DirectEdge.
0.31	11/2/2012	Incorporated comments.
0.32	1/10/2013	Add additional ArcaDirect variants 2-4.
0.33	6/18/2013	BATS Symbology rules on New Order message.
0.34	7/30/2013	Updates for BATS Modify Order, SymbolSfx.
0.z35	7/30/2013	Updated for Zvzzt Test Order Mode.
0.z36	9/18/2013	Update client terminology.
0.4	10/7/2013	Add NYSE UTPDirect.
0.41	10/29/2013	Update FIX Drop Copy error notification channel.
0.5	1/29/2014	Update for On-Close orders
0.51	2/27/2014	Update for On-Close Replace orders, suffixes for OUCH Replace messages.
0.6	7/1/2014	Updated for MOC/LOC support
0.7	9/24/2014	Add NYSE CCG FIX
0.71	10/13/2014	Clarify NYSE CCG FIX re: no MOCLOC support.
0.8	11/18/2014	Add Nasdaq RASH
0.9	12/23/2014	Add BATS BOE 2.0
0.91	12/30/2014	Updated BATS BOE 2.0 for NewOrderV2 bitfield 6, and ModifyOrderV2 bitfield 2.
0.92	2/3/2015	Add auction lockout times.
0.93	6/11/2015	Modify confidentiality disclaimers on cover page; add new Confidentiality disclaimer language to new p.2; misc grammar and formatting updates.
0.94	6/22/2015	Added new Section 5 “Symbology”
0.10	8/11/2015	Add Credit Suisse OUCH
0.11	8/19/2015	Updated NYSE CCG FIX (Tag 1 may be used for broker locate)
0.12	9/22/2015	Removed 3.1 Rejected Order Notification over separate OUCH

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# 1 Introduction

The Riskbot™ Real-Time Market Access and Risk Management System enables firms to trade electronically on a distributed basis with low latency and full regulatory compliance to SEC Rule 15c3-5.

In order to enforce 15c3-5 compliance, Riskbot inspects all trading messages from the client. If an order violates risk checks, Riskbot will reject the order and send a gap-fill ZVZZT test order to the market in its place. The client will be notified over an error notification channel of the rejection of the offending order.

Alternatively, based on application policy configuration, Riskbot can disconnect the trading session if a high order reject rate is encountered.

Riskbot supports the following trading protocols:

- NASDAQ OUCH 4.2 (UFO and SoupBinTCP) trading protocol
- ArcaDirect 4.1
- BATS BOE 1.5.x
- BATS BOE 2.0.19
- DirectEdge XPRS 1.x
- NYSE UTPDirect 1.16
- NYSE CCG 5.7
- NASDAQ RASH 1.1
- Credit Suisse OUCH v1.2

This document describes:

- requirements for Login Request messages.
- how an order will be rejected for each trading protocol.
- how the client can get extended information about why an order was rejected.
- additional restrictions on order types.
- modifications clients must make to their EnterOrder and ReplaceOrder messages for each trading protocol.

In particular, this version of the HPR ROE describes the BadOrderHandling mode of operation known as ZvzztTestOrder.

## 2 Login Requests for all trading protocols

When the client opens a trading connection to the market through Riskbot, the username and password provided in the LoginRequest message MUST be the username and password provided by HPR for that connection.

On success, Riskbot will overwrite the username/password in the LoginRequest message with values required to establish the connection to the market.

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An incorrect username or password will result in silent connection termination.

### 3 Rejected Order Reason Over Error Notification Channel

In later sections, we will describe how orders are rejected for each trading protocol.

In this section, we describe how clients may be notified about specific reasons why orders were rejected by Riskbot.

With the `ZvzztTestOrder BadOrderHandlingMode`, the client is required have an error notification channel open to HPR.

#### 3.1 Rejected Order Notification over separate FIX Drop Copy

The client will be notified over a limited FIX Drop Copy session when Riskbot rejects an order.

The client will open a limited FIX Drop Copy session to the Central Risk Manager. This limited FIX drop copy session will only provide notification of rejected orders (35=8 + 150=8 or 35=9 + 434=2) rejected by Riskbot.

The Text (58) FIX field will describe the reason for the order being stopped. See the Reject Reason Code table in the following section.

Fills, Acks and Rejects by the exchange (not Riskbot) may optionally be included on this notification channel.

Contact HPR support for a copy of the *HPR FIX Drop Copy Specification*.

#### 3.2 HPR order marking characters

In order to support OnOpen/OnClose auction orders and Broker Locate attestation, HPR requires that the client **must mark all** OUCH, UTP, and ArcaDirect orders with a character that reflects OnOpen/OnClose auction participation and any Broker Locate attestation.

BATS and DirectEdge orders only require an HPR marking character for Broker Locate attestation on short sale orders.

On ArcaDirect and UTP, the marking character is the first character of the Account field; for OUCH, the marking character is the first character of the ClOrdID/OrderToken.

The marking character encodes:

1. whether the order is an onOpen/onClose auction order
2. the BrokerLocate code for the order (values BL1-BL3 for short sale orders requiring BrokerLocate attestation, or BL0 to indicate no Locating Broker – eg for a Buy or Long Sale)
3. (for OUCH only) the side of the order

HPR will allow up to four Broker-Locate values (BL0, BL1, BL2, BL3). Contact HPR support for mappings of BL0-BL3 values to specific brokers. (Note that in previous versions of this HPR Rules of Engagement, BL0-BL3 were expressed as A-D.)

### 3.3 HPR order marking for OUCH

For OUCH, the client must set the first character of all OrderTokens to a marking character that encodes Side, OnOpen/OnClose and BrokerLocate for the order.

<u>Side</u>	<u>Is Auction Order?</u>	<u>BrokerLocate</u>	<u>OrderToken char[0]</u>
SS/SSE	False	BL0	<b>A</b>
SS	False	BL1	<b>B</b>
SS	False	BL2	<b>C</b>
SS	False	BL3	<b>D</b>
S	False	BL0	<b>E</b>
S	False	BL1	<b>F</b>
S	False	BL2	<b>G</b>
S	False	BL3	<b>H</b>
B	False	n/a	<b>I</b>
SS/SSE	True	BL0	<b>J</b>
SS	True	BL1	<b>K</b>
SS	True	BL2	<b>L</b>
SS	True	BL3	<b>M</b>
S	True	BL0	<b>N</b>
S	True	BL1	<b>O</b>
S	True	BL2	<b>P</b>
S	True	BL3	<b>Q</b>
B	True	n/a	<b>R</b>

### 3.4 HPR order marking for ArcaDirect, UTPDirect, RASH

For NYSE UTPDirect and ArcaDirect, the client is required to set the first character of the Account Field to a marking character encoding OnOpen/OnClose and BrokerLocate for all Enter, Replace and Cancel messages.

For NASDAQ Rash, the client is required to set the first character of the Client Order ID to a marking character encoding OnOpen/OnClose and BrokerLocate for all Enter Order and Enter Order Cross messages.

<u>Is Auction Order?</u>	<u>BrokerLocate</u>	<u>Character</u>
False	BL0	<b>A</b>
False	BL1	<b>B</b>
False	BL2	<b>C</b>

False	BL3	<b>D</b>
True	BL0	<b>J</b>
True	BL1	<b>K</b>
True	BL2	<b>L</b>
True	BL3	<b>M</b>

## 4 Symbology

The Riskbot supports all suffix-less symbols on all exchanges. However, there is currently limited support for suffix-based symbols per Exchange. A summary of supported and non-supported suffixes appears in the table below:

	NASDAQ		BOEv2		ArcaDirect	UTPDirect
	Enter	Replace	Enter	Replace	Enter/Replace	Enter/Replace
<i>Preferred</i>	X	X <sup>1</sup>	X		X	X
<i>Preferred Class "A"</i>	X	X <sup>1</sup>	X		X	X
<i>Preferred Class "B"</i>	X	X <sup>1</sup>	X		X	X
<i>Class "A"</i>	X	X <sup>1</sup>	X		X	X
<i>Class "B"</i>	X	X <sup>1</sup>	X		X	X
<i>Preferred when distributed</i>	X		X			
<i>When distributed</i>	X		X		X	
<i>Warrants</i>	X	X <sup>1</sup>	X		X	X
<i>Warrants Class "A"</i>	X	X <sup>1</sup>	X		X	X
<i>Warrants Class "B"</i>	X	X <sup>1</sup>	X		X	X
<i>Called</i>	X		X		X	
<i>Class "A" Called</i>	X		X		X	
<i>Preferred called</i>	X		X			
<i>Preferred "A" called</i>	X		X			
<i>Preferred "A" when issued</i>	X		X		X	
<i>Emerging Company Marketplace</i>	X		X			
<i>Partial Paid</i>	X		X			
<i>Convertible</i>	X		X			
<i>Convertible called</i>	X		X			
<i>Class Convertible</i>	X		X			
<i>Preferred (class A) Convertible</i>	X		X			
<i>Preferred (class A) when Distributed</i>	X		X			
<i>Rights</i>	X		X			



	NASDAQ		BOEv2		ArcaDirect	UTPDirect
	Enter	Replace	Enter	Replace	Enter/Replace	Enter/Replace
<i>Units</i>	X		X			
<i>When issued</i>	X		X		X	
<i>Rights when issued</i>	X		X			
<i>Preferred when issued</i>	X		X		X	
<i>Class "A" when issued</i>	X		X		X	
<i>Warrant when issued</i>	X		X		X	
<i>TEST symbol</i>	X		X			

#### Notes:

<sup>1</sup> See Section 7.2 Error: Reference source not found on syntax for NASDAQ replace orders with suffixes

X = supported

Blank = not currently supported

## 5 Open/Closing Auction Order Handling

The markets NYSE, NASDAQ and ARCA specify “Lock-out” periods during the lead-up to the OnOpen and OnClose auctions.

During the venues' designated Lock-out periods, HPR will satisfy the compliance requirement to stop Cancel and Replace requests for Open/Closing auction orders, and stop entry of OnOpen/OnClose non-ImbalanceOnly auction orders. This will only be enforced on OUCH (NASDAQ), NYSE (UTP) and ARCA.

Requirements:

1. The client must **mark** each order with a character as specified in the preceding section.
2. The client may Replace or Cancel OnOpen/OnClose orders before the Lock-out period. (A replacement order must meet these marking requirements.)
3. During each venue's lock-out period, the client may continue to enter ImbalanceOnly (or ClosingOffset for UTP) orders, but the client may not Replace or Cancel any OnOpen/OnClose orders. During the lock-out period, if the client attempts to enter an OnOpen/OnClose non-ImbalanceOnly order, or attempts to Replace or Cancel an OnOpen/OnClose order, HPR will disconnect the trading session.

### 5.1 Auction Lockout periods

Nasdaq OnOpen Lockout Period	9:28am to 9:30am
Nasdaq OnClose Lockout Period	3:50pm to 4:00pm
NYSE OnClose Lockout Period	3:45pm to 4:00pm

ArcaDirect OnClose Lockout Period	3:59pm to 4:00pm
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OnClose lockout periods will be adjusted earlier to accommodate the exchanges' 1pm early close on the Friday after Thanksgiving and on Christmas Eve.

## 6 OUCH message modifications

### 6.1 OUCH EnterOrder messages

The left-most character of the 14-character Order Token for all OUCH EnterOrder messages MUST be populated with an HPR OUCH marking character:

FORMAT: MCCCCCCCCCCCCC

1. M: the left-most (first) character MUST be an HPR OUCH marking character as defined in section 4.1.
2. CCCCCCCCCCCCC: the remaining 13 characters are available for use by the client.

For the left-most character of client OrderTokens, 'Z' is a value reserved for HPR use. Client EnterOrder OrderTokens MUST NOT start with 'Z'.

### 6.2 OUCH ReplaceOrder messages

If the client elects to use OUCH ReplaceOrder trading messages, then the following format MUST be used when forming the 14-character OUCH replacement OrderToken:

FORMAT: MSSSSSCCCCCCCC

1. M: the left-most (first) character MUST be an HPR OUCH marking character as defined in section 4.1. (Note that this marking char MUST match the marking char of the original order.)
2. SSSSS: the next five characters of the OrderToken MUST contain the Symbol. The symbol MUST be left-justified (within the five-character field) and MUST be padded to the right with the ascii digit for zero (hex 0x30). Note that the following symbol types are supported:
  - Class: replace the '.' with a lower-case 'c'. Eg: BRK.A is “BRKcA”
  - Preferred: replace the '-' with a lower-case 'p'. Eg: KFN- is “KFNp”
  - Warrant: replace the '+' with a lower-case 'w'. Eg: GM+A is “GMwA”
3. CCCCCCCC: the remaining eight characters of the OrderToken are available for use by the client.

An example of a replacement OrderToken for an order to Sell Short IBM shares with no OnOpen/OnClose auction participation and using BrokerLocate code BL1 would look like:

BIBM00abcdefgh

...where “abcdefgh” is a client-chosen string.

A later release of Riskbot will support a mode where the marking character and Symbol are not required in the replacement OrderToken, with possible added latency.

## **6.3 OUCH ModifyOrder messages**

OUCH ModifyOrder messages require that the order being modified was placed using an OrderToken that complies with the formatting requirements for a replacement OrderToken as described in the preceding section: MSSSSSCCCCCCCC

## **6.4 OUCH Order Rejection**

An OUCH EnterOrder message stopped by Riskbot will result in:

- the original violating order being stopped at the Riskbot gateway
- a gap-fill order being sent to the market to Buy 1 share of ZVZZT at \$0.01. This gap-fill order will have the same client OrderToken, except that the first character will be overwritten with the reserved value 'Z'.
- a market OrderAck for the ZVZZT gap-fill order

For example, if a client order with client OrderToken “ABCD” is stopped by the Riskbot, the client will see an OrderAck for OrderToken “ZBCD” for a gap-fill order to buy 1 share of ZVZZT at \$0.01.

An OUCH ReplaceOrder message stopped by Riskbot will result in no message from the market. (There will be a notification in the client's Error Notification Channel.)

## **7 ArcaDirect message modifications**

Since the ArcaDirect Logon message does not include a Password field, HPR will not provide a password for ArcaDirect connections.

ArcaDirect Execution Report Verbose Format (2v2) messages are not supported.

### **7.1 ArcaDirect NewOrder (Variants 1-4) messages**

NewOrder Variant4 (for complex orders) is not supported. If a NewOrder Variant4 message is encountered, the trading session will be disconnected.

For all NewOrder messages Variants 1-3: The left-most (first) character of the Account field MUST be an HPR marking character as defined in section 4.2.

Bit mask: 0xF0000000

For the most significant 4 bits of ArcaDirect ClientOrderIDs, 0xf is a value reserved for HPR use. The most significant 4 bits of ClientOrderIDs for NewOrder messages MUST NOT be 0xf.

### **7.2 ArcaDirect ReplaceOrder (Variants 1-4) messages**

All ArcaDirect ReplaceOrder Variant1, Variant2 and Variant4 messages require that the left-most (first) character of the Account field MUST be an HPR marking character as defined in section 4.2.

ReplaceOrder Variant3 (options only) is not supported.

### **7.3 Order Cancel message**

The left-most (first) character of the Account field MUST be an HPR marking character as defined in section 4.2.

## **7.4 ArcaDirect Order Rejection**

An ArcaDirect NewOrder message stopped by Riskbot will result in:

- the original violating order being stopped at the Riskbot gateway
- a gap-fill order being sent to the market to Buy 1 share of ZVZZT at \$0.01. This gap-fill order will have the same ClientOrderID, except that the most significant 4 bits will be overwritten with the reserved value 0xf.
- a market OrderAck for the ZVZZT gap-fill order

For example, if a client order with client OrderToken “1234” (0x4d2) is stopped by the Riskbot, the client will see an OrderAck for client OrderToken “4026533074” (0xf00004d2) for an order to buy 1 share of ZVZZT at \$0.01.

An ArcaDirect ReplaceOrder message stopped by Riskbot will result in an explicit Order/Cancel/replaceReject message (messageType=8, variant 1) from the market with rejectedMessageType=3 and rejectReason=1.

## **8 BATS BOE v1 message modifications**

### **8.1 BATS BOE v1 NewOrder messages**

BATS BOE NewOrder messages MUST include the following optional BOE fields:

- ClearingFirm
- ClearingAccount
- Price
- ExecInst
- OrdType
- TimeInForce
- MinQty
- MaxFloor
- Symbol
- Capacity

(Some of these values can be set to default 0x0 values...see the BATS BOE specification.) Please check with HPR support if you intend to use other NewOrder optional fields.

BATS BOE NewOrder messages MUST NOT include the following optional BOE fields:

- SymbolSfx

The client must use the “BATS format” Symbology when entering NewOrder messages.

*If the client is required to specify the locating broker on all short sales, then the left-most character of the 20-character ClOrdID for a NewOrder message for a Short Sale order MUST be populated with a Locate code character:*

FORMAT: LCCCCCCCCCCCCCCCCCCC

Note that the Locate code characters for BL0-BL3 are A-D.

For the left-most character of client OrderTokens, 'Z' is a value reserved for HPR use. Client ClOrdIDs for NewOrder messages MUST NOT start with 'Z'.

## **8.2 BATS BOE v1 ModifyOrder messages**

BATS BOE ModifyOrder messages MUST include the following optional BOE fields:

- ClearingFirm
- OrderQty
- Price
- OrdType
- CancelOrigOnReject
- ExecInst
- Side

Please check with HPR support if you intend to use other ModifyOrder optional fields.

If the client elects to use BATS BOE ModifyOrder trading messages, then the following format MUST be met when forming the 20-character BATS BOE replacement ClOrdID:

FORMAT: SSSSLCCCCCCCCCCCCCCC

1. SSSSS: the first five characters of the ClOrdID MUST contain the Symbol. The symbol MUST be left-justified (within the five-character field) and MUST be padded to the right with the ascii digit for zero (hex 0x30).
1. L: Broker Locate character, if the order is a Short Sale and the client is required to specify the locating broker on short sales.
4. CCCCCCCCCCCCCC: the remaining fourteen characters of the OrderToken are available for use by the client.

## **8.3 BATS BOE v1 Order Rejection**

A BATS BOE NewOrder message stopped by Riskbot will result in:

- the original violating order being stopped at the Riskbot gateway
- a gap-fill order being sent to the market to Buy 1 share of ZVZZT at \$0.01. This gap-fill order will have the same client ClOrdID, except that the first character will be overwritten with the reserved value 'Z'.
- a market OrderAck for the ZVZZT gap-fill order

For example, if a client order with client ClOrdID “ABCD” is stopped by the Riskbot, the client will see an OrderAck for client OrderToken “ZBCD” for an order to buy 1 share of ZVZZT at \$0.01.

A BATS BOE ModifyOrder message stopped by Riskbot will result in an explicit UserModifyRejected (messageType=0xE) message from the market with orderRejectReason=O.

## **9 BATS BOE v2**

There is no support for Bulk Orders messages or MOC/LOC for BATS BOE v2 at this time.

### **9.1 BATS BOE v2 NewOrder messages**

BATS BOE NewOrder messages MUST include bit fields 1-6 and are required to include the following BOE fields:

- Bitfield 1
  - ClearingFirm
  - ClearingAccount
  - Price
  - ExecInst
  - OrdType
  - TimeInForce
  - MinQty
  - MaxFloor
- Bitfield 2
  - Symbol
  - Capacity
  - RoutingInst
- Bitfield 3
  - Account
  - DisplayIndicator
  - MaxRemovePct
  - DiscretionAmount
  - PegDifference
- Bitfield 4 (no fields)
- Bitfield 5
  - AttributedQuote
  - ExtExecInst
- Bitfield 6 (\*)

(Some of these values can be set to default 0x0 values...see the BATS BOE specification.)

\* - As of this ROE version, clients are free to use any (or none of the) optional fields from Bitfield 6. Note that future versions of this ROE may be updated to require or disallow specific fields from Bitfield 6.

If any client orders are sent with a set of optional fields different from what is specified above, the Riskbot will terminate the connection.

Please check with HPR support if you intend to use other NewOrder optional fields.

BATS BOE NewOrder messages MUST NOT include the following optional BOE fields:

- SymbolSfx

The client must use the “BATS format” Symbology when entering NewOrder messages.

PreventMatch optional field is **DISALLOWED** for NewOrder msgs. Instead, if the client wants self-cross-prevention (MTP), they will have to set the DefaultMTPValue for the session.

*If the client is required to specify the locating broker on all short sales, then the left-most character of the 20-character ClOrdID for a NewOrder message for a Short Sale order MUST be populated with a Locate code character:*

FORMAT: LCCCCCCCCCCCCCCCCCCC

Note that the Locate code characters for Broker 0 through Broker 3 are 'A' through 'D' respectively.

For the left-most character of client OrderTokens, 'Z' is a value reserved for HPR use. Client ClOrdIDs for NewOrder messages MUST NOT start with 'Z'.

## **9.2 BATS BOE v2 ModifyOrder messages**

BATS BOE ModifyOrder messages MUST include bit fields 1-2 and are required to include the following BOE fields:

- Bitfield 1
  - ClearingFirm
  - OrderQty
  - Price
  - OrdType
  - CancelOrigOnReject
  - ExecInst
  - Side
- Bitfield 2 (\*)

\* - As of this ROE version, clients are free to use any (or none of the) optional fields from Bitfield 2. Note that future versions of this ROE may be updated to require or disallow specific fields from Bitfield 2.

If any client orders are sent with a set of optional fields different from what is specified above, the Riskbot will terminate the connection.

Please check with HPR support if you intend to use other ModifyOrder optional fields.

If the client elects to use BATS BOE ModifyOrder trading messages, then the following format MUST be met when forming the 20-character BATS BOE replacement ClOrdID:

FORMAT: LSSSSSSCCCCCCCCCCCCCCC

1. L: Broker Locate character, if the order is a Short Sale and the client is required to specify the locating broker on short sales.

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1. SSSSSS: the first six characters of the ClOrdID MUST contain the Symbol. The symbol MUST be left-justified (within the six-character field) and MUST be padded to the right with the ascii digit for zero (hex 0x30).
2. CCCCCCCCCCCCCC: the remaining thirteen characters of the OrderToken are available for use by the client.

### **9.3 BATS BOE v2 Login Request**

The client MUST request *LeavesQty* field to be returned for Order Acknowledgement V2, Order Modified V2, and Order Canceled V2 messages.

### **9.4 BATS BOE v2 Order Rejection**

A BATS BOE NewOrder message stopped by Riskbot will result in:

- the original violating order being stopped at the Riskbot gateway
- a gap-fill order being sent to the market to Buy 1 share of ZVZZT at \$0.01. This gap-fill order will have the same client ClOrdID, except that the first character will be overwritten with the reserved value 'Z'.
- a market OrderAck for the ZVZZT gap-fill order

For example, if a client order with client ClOrdID “ABCD” is stopped by the Riskbot, the client will see an OrderAck for client OrderToken “ZBCD” for an order to buy 1 share of ZVZZT at \$0.01.

A BATS BOE ModifyOrder message stopped by Riskbot will result in an explicit UserModifyRejected (messageType=0xE) message from the market with orderRejectReason=O.

## **10 DirectEdge XPRS message modifications**

### **10.1 DirectEdge XPRS EnterOrder messages**

If the client is required to specify the locating broker on all short sales, then the left-most character of the 14-character OrderToken for an EnterOrder message (short or extended) for a Short Sale order MUST be populated with a Locate code character:

FORMAT: LCCCCCCCCCCCCC

Note that the Locate code characters for BL0-BL3 are A-D.

For the left-most character of client OrderTokens, 'Z' is a value reserved for HPR use. Client OrderTokens MUST NOT start with 'Z'.

### **10.2 DirectEdge XPRS ReplaceOrder messages**

If the client elects to use ReplaceOrder trading messages, then the following format MUST be met when forming the 14-character replacement OrderToken:

FORMAT: BSSSSSSSSSSSSS

1. B: the left-most (first) character of the OrderToken MUST indicate the Side ('B' = buy, 'S' = sell, 'T' = sell short) of the order. (Note that this Side value MUST match the side of the original order.)



5. SSSSS: the next five characters of the OrderToken MUST contain the Symbol. The symbol MUST be left-justified (within the five-character field) and MUST be padded to the right with the ascii digit for zero (hex 0x30).
6. CCCCCCCC: the remaining eight characters of the OrderToken are available for use by the client.

### **10.3 DirectEdge XPRS Order Rejection**

A DirectEdge XPRS EnterOrder message stopped by Riskbot will result in:

- the original violating order being stopped at the Riskbot gateway
- a gap-fill order being sent to the market to Buy 1 share of ZVZZT at \$0.01. This gap-fill order will have the same client OrderToken, except that the first character will be overwritten with the reserved value 'Z'.
- a market OrderAck for the ZVZZT gap-fill order

For example, if a client order with client ClOrdID “ABCD” is stopped by the Riskbot, the client will see an OrderAck for client OrderToken “ZBCD” for an order to buy 1 share of ZVZZT at \$0.01.

A DirectEdge XPRS ReplaceOrder message stopped by Riskbot will result in an explicit Rejected (messageType='J') message from the market with reason=I.

## **11 NYSE UTPDirect message modifications**

Protocol support for NYSE UTPDirect Version 1.16 API Version 1.3.

### **11.1 New Order messages**

New Order messages, variants 1 – 4 are supported.

The left-most (first) character of the Account field MUST be an HPR marking character as defined in section 4.2.

For the left-most character of ClientOrderID, 'Z' is a value reserved for HPR use. ClientOrderID MUST NOT start with 'Z', e.g. “ZBC 1234/10052013” is NOT valid.

### **11.2 Order Cancel/Replace messages**

Order Cancel/Replace messages, variants 1 – 4 are supported.

The left-most (first) character of the Account field MUST be an HPR marking character as defined in section 4.2.

For the left-most character of ClientOrderID, 'Z' is a value reserved for HPR use. ClientOrderID MUST NOT start with 'Z', e.g. “ZBC 1234/10052013” is NOT valid.

### **11.3 Order Cancel message**

The left-most (first) character of the Account field MUST be an HPR marking character as defined in section 4.2.

## 11.4 Order Rejection

A New Order message stopped by Riskbot will result in:

- the original violating order being stopped at the Riskbot
- a gap-fill order being sent to the market to Buy 1 share of a test symbol at \$0.01. This gap-fill order will have the same client OrderToken, except that the first character will be overwritten with the reserved value 'Z'.
- a market OrderAck for the test symbol gap-fill order

For example, if a client order with ClientOrderID “ABC 1234/10052013” is stopped by the Riskbot, the client will see an OrderAck with ClientOrderId “ZBC 1234/10052013” for an order to buy 1 share of a test symbol at \$0.01.

A Replace Order message stopped by Riskbot will result in a Reject with rejectMsgType=3, Text=“REJ - Can't find ClOrdID”, and the OrigClientOrderID set to “ZZZ 9999/MMDDYYY”.

## 12 Zvzzt Gap-Fill Order Handling

Since NewOrders that are stopped at the Riskbot result in Gap-Fill orders for ZVZZT sent on to the market, the client should expect to receive OrderAck messages from the market for these ZVZZT Gap-Fill orders. (Note that since the test symbol ZVZZT could be halted in production, the client should also be prepared to receive OrderReject msgs for these ZVZZT Gap-Fill orders.)

These ZVZZT Gap-Fill OrderAck messages may be identified by the presence of a reserved first character (or most significant 4 bits) of the client ClOrdID or OrderToken, as described above for each trading protocol.

The client is free to cancel these ZVZZT Gap-Fill orders as corresponding OrderAcks are received.

The client will also be notified about stopped orders on the Error Notification Channel. The client may elect to also receive notifications of the ZVZZT Gap-Fill orders.

## 13 NYSE CCG FIX

Riskbot supports NYSE CCG FIX with minimal changes needed to the protocol. There are size restrictions on the values of specific FIX tags.

MOC/LOC (Auction) marking is not supported on NYSE CCG FIX. Broker Locate code marking is done by setting the first character of the ClOrdId (Tag 11) to a corresponding Broker Locate code 'A'-'D'. Alternatively, the first character of Account (Tag 1) may be used for Broker Locate. Contact HPR Support to have each of your sessions configured accordingly.

Any orders stopped for a risk violation by the Riskbot on a FIX session will be replaced with a sequenced Test Request. This request will be sent to the market in place of the stopped order, and the market will respond with a Test Request response.

### 13.1 Field size and format restrictions

Riskbot supports a maximum size on tags that are associated with risk checks:

Order Quantity (38)	10 digits
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Price (44)	10 digit whole number and up to 4 decimal digits
Symbol (55)	8 characters maximum

## 14 NASDAQ RASHport

Riskbots supports NASDAQ RASH connections and are required to follow the restrictions and marking requirements as listed below.

### 14.1 Enter Order and Enter Order Cross messages

The left-most (first) character of the Client Order ID MUST be an HPR marking character as defined in section 4.2. The value of 'Z' as the left-most character of the Client Order ID is reserved for HPR use. ClientOrderID MUST NOT start with 'Z', e.g. “Z0123456789012” is NOT valid.

“Customer Type” field is REQUIRED to be on every Enter Order and Enter Order Cross message.

### 14.2 Order Cancel message

No modifications or restrictions apply to this message.

### 14.3 Order Rejection

An Enter Order or Enter Order Cross message stopped by Riskbot will result in:

- the original violating order being stopped at the Riskbot
- a gap-fill order being sent to the market to Buy 1 share of a test symbol at \$0.01. This gap-fill order will have the same client OrderToken, except that the first character will be overwritten with the reserved value 'Z'.

## 15 Credit Suisse OUCH

Riskbot supports Credit Suisse OUCH connections and are required to follow the restrictions and marking requirements as listed below.

### 15.1 Enter Order messages

The left-most (first) character of the Client Order ID MUST be an HPR marking character as defined in section 4.2. The value of 'Z' as the left-most character of the Client Order ID is reserved for HPR use. ClientOrderID MUST NOT start with 'Z', e.g. “Z0123456789012” is NOT valid.

### 15.2 Order Cancel message

No modifications or restrictions apply to this message.

### 15.3 Order Rejection

An Enter Order message stopped by Riskbot will result in:

- the original violating order being stopped at the Riskbot

- a gap-fill order being sent to the market to Buy 1 share of a test symbol at \$0.01. This gap-fill order will have the same client OrderToken, except that the first character will be overwritten with the reserved value 'Z'.