TS3 Trading System

FIX Specification

02/27/2024
Version 6.2.5

Contents

1 Revision History

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Revision	Date	Author(s)	Description
1.0.0	11/2/2011	SIM	Initial revision.
1.0.1	11/14/2011	SRT	Update options section to bring it up-to-date.
1.0.2	11/17/2011	SIM	Add DirectEdge routing instructions.
1.0.3	11/21/2011	SIM	Add ROUC DirectEdge routing instruction.
1.0.4	11/22/2011	SIM	Update EDGE, CRSF, BYX, INET, BSX, and PSX market support.
1.1.0	12/01/2011	SIM	Add MinQty support to ARCA, ArcaDirect, BATS, BYX, EDGE, and INET-FIX.
1.1.1	12/01/2011	SIM	Add Regular Session Only support for ARCA, ArcaDirect, and EDGE.
1.1.2	12/12/2011	SIM	Add PostOnly to KMATCH. Add LockedCrossedAction. Update BATS/BYX market support.
1.1.3	12/30/2011	SIM	Add Lava Price Improved Pegging, corrected typo on side tag description.
1.1.4	1/12/2012	SIM	Correct MILM support. Add BIDS support. Update locked/crossed action support.
1.2.0	1/31/2012	SRT	Add LongSaleAffirmLongQuantity for equities and options DVP clients.
1.2.1	1/31/2012	CLD	Add Post Only to CRSF venue in Market Support table.
1.2.2	1/31/2012	SIM	Add BSX-FIX and PSX-FIX in Market Support table. Update Nasdaq-specific suppport.
1.2.3	1/31/2012	CLD	Add CSLP venue to Market Support table.
1.3.0	2/8/2012	CLD	Correct TIF values for ARCA FIX in Market Support table.
1.3.1	2/8/2012	CLD	Add LAVA Locked/Crossed Action to Market Support table.
1.3.2	2/29/2012	VV	Add Market Display Price Support to INET-FIX section.
1.3.3	3/19/2012	SRT	Add Removed Invisible liquidity code.
2.0.0	3/31/2012	SIM	Added DBSX market support.
2.0.1	3/31/2012	SIM	Added blended liquidity code.
2.0.2	3/31/2012	SRT	Added multiple new liquidity codes.
2.0.3	4/16/2012	CLD	Added On Open Then Day TimeInForce value for INET and INET-FIX.

2.1.0	4/19/2012	SRT	Bunch of new liquidity codes for Edge and allow more routing strategies.
2.1.1	4/27/2012	SRT	Add missing OrdType in ExecutionReport.
2.1.2	05/17/2012	VV	Add new BATS/BYX Locked/Crossed actions.
2.2.0	5/31/2012	CLD	Added Midpoint Pegged Post Only display option to INET-FIX.
2.2.1	5/31/2012	CLD	Removed tag 9038 'Display NASDAQ Only'
2.2.2	5/31/2012	CLD	Updated Market Support tables for equities and options.
2.2.3	5/31/2012	SIM	Added new liquidity codes.
3.0.0	6/30/2012	CLD	Updated market support tables.
3.0.1	6/30/2012	CLD	Updated Direct Edge routing instructions.
3.0.2	6/30/2012	SRT	Added Nasdaq BX Options venue, named XBXO.
3.0.3	6/30/2012	CLD	Added Direct Edge XPRS venue.
3.0.4	6/30/2012	CLD	TimeInForce=D 'On Open Then Day' is only supported on INET and INET-FIX.
3.0.5	6/30/2012	CLD	Added multiple new liquidity codes.
3.1.0	7/31/2012	SRT	Added Firm-Broker-Dealer as accepted CustomerOrFirm.
3.1.1	7/31/2012	CLD	Added new FIX tag 9071 Retail Price Offset.
3.2.0	8/31/2012	VV	Added DirectEdge Midpoint Discretionary peg type.
3.2.1	9/24/2012	SRT	Added ARCA tracking liquidity value.
3.3.0	10/01/2012	SRT	Added Miami International Securities Exchange, named XMIO.
3.3.1	10/01/2012	SRT	Added RMPT routing strategy for EDGA.
3.4.0	11/01/2012	SRT	Added JPMX market support.
3.4.1	11/01/2012	CLD	Intraday cross type is no longer supported on INET.
3.4.2	11/01/2012	SRT	Pass-through exchange provided LastMkt.
3.4.3	11/01/2012	CLD	Added tag 9061 NYSE Routing Instructions.
3.4.4	11/01/2012	CLD	Added XNYS (NYSE UTP Direct) venue to Market Support table.
3.4.5	11/01/2012	CLD	Added Appendix C Exchange Destinations.
3.4.6	11/01/2012	CLD	Added CTOE to Multi-Leg Order Request section.
3.5.0	12/01/2012	SRT	Support SAVE, QSAV, QTFY, SOLV, CART strategies in INET-FIX.
3.5.1	12/01/2012	SRT	Add ARCA PO+ order type.

3.6.0	1/1/2013	CLD	Removed tags 9055 NyseClosingOffset and 9071 RetailPriceOffset.
3.6.1	1/1/2013	CLD	Removed Intermarket Sweep Order from list of supported NYSE routing instructions.
3.6.2	1/1/2013	SRT	Fix equities Market Options to indicate MaxFloor is supported on CBSX and NYX.
3.6.3	1/14/2013	VV	Added description of ProactiveIfLocked Locked/Crossed action and Inside Limit order type for ARCA/ARCE.
3.6.4	2/11/2013	SRT	Routable orders to PHLX will use routing instruction FIND for non-customer types.
3.7.0	3/1/2013	SRT	Use ExDestination values in Equities Market Options section and other cleanup.
3.7.1	3/1/2013	CLD	Added new TimeInForce values Late Limit On Open and Late Limit On Close which are supported on BATS (BZX).
3.7.2	3/1/2013	CLD	Added new TimeInForce values Pre-open Session and Post-close Session which are supported on KMATCH.
3.7.3	3/1/2013	CLD	Added routing instructions for Knight Match Session II.
3.7.4	3/1/2013	SRT	LastMkt will contain executing venue MIC and will be present on all fills.
3.7.5	3/1/2013	SRT	Add Citadel Apogee (CDEL) dark pool support.
3.7.6	3/1/2013	CLD	Updated equities and options Market Support tables.
3.7.7	3/1/2013	CLD	Updated liquidity table.
3.7.8	3/1/2013	RL	Added description of new canonical symbology.
3.7.9	3/1/2013	CLD	Added CICX venue.
3.7.10	3/7/2013	SRT	Document Rule80A in Equities NewOrderSingle.
3.8.0	4/1/2013	SRT	Support Penny-Spread Mid-Point Peg on Lava.
3.8.1	4/1/2013	SRT	Document missing order options in JPMX.
3.9.0	5/1/2013	CLD	Added tag 47, Order Capacity, to new options orders.
3.9.1	5/1/2013	CLD	Added tag 9072, Route Delivery Method, to new equities orders on EDGAA and EDGXX.
3.9.2	5/1/2013	KGR	Added GTCO market support.

3.9.3	5/1/2013	CLD	Added support for tag 111, Max Floor, to EDGAA and EDGXX.
3.9.4	6/14/2013	RL	Added liquidity codes 124, 125, and 126.
3.9.5	7/1/2013	KGR	Added Wash Trade Prevention documentation.
3.9.6	8/1/2013	KGR	Update description for tag 47, Order Capacity.
3.9.7	9/1/2013	JWK	Added support for ISE/GMNI specific tags in execution reports.
3.9.8	9/1/2013	RL	Documented NoContraBrokers repeating-group
3.9.9	9/17/2013	RL	Added Mid-Point Peg and Post-only to NYX/XNYS
4.0.0	10/24/2013	JWK	Updated liqudity values and added INET routing instruction QCST.
4.0.1	10/29/2013	JWK	Added PDQ Venue.
4.0.2	11/22/2013	KGR	Removed references to EGDAZ and EDGXZ.
4.0.3	11/22/2013	KGR	Document XNYS support of Wash Trade Prevention.
4.0.4	12/12/2013	KGR	Document POSIT support of mid-point peg.
4.0.5	12/17/2013	JWK	Added retail price improvement support to INET and INET-FIX.
4.0.6	12/23/2013	JWK	Restore support for EGDAZ and EDGXZ.
4.0.7	2/12/2014	JWK	Support ROUE strategy on EDGAZ/EDGXZ.
4.0.8	4/1/2014	KGR	Added PDQ Liquidity Provider Venue.
4.0.9	4/10/2014	JWK	Support Midpoint Peg on PDQA
4.0.10	4/22/2014	LAR	Added IEX Market Venue.
4.0.11	5/20/2014	KGR	Added ARCA RLP orders.
4.1.0	5/22/2014	JWK	Added AES Venue.
4.1.1	6/17/2014	JWK	Added MinQty support to CBX.
4.1.2	6/18/2014	JWK	Locked/Crossed support for KMATCH and LX.
4.1.3	6/27/2014	KGR	Denote MLXN's general unavailability.
4.1.4	8/7/2014	JWK	Added DASH and NITE venues.
4.1.5	9/10/2014	JWK	Added Route Peg order type to EDGAA/EDGXX and EDGAZ/EDGXZ.
4.1.6	9/19/2014	JWK	DASH Venue - Added SMOKE, STRIKE, MinQty and Aggression. Strategy tag moved from 9068 to 9100.
4.1.7	9/22/2014	JWK	Indicate market-side FIX tag numbers for ISE counter fields.

4.1.8	10/31/2014	JWK	Remove Primary Peg and PegDifference support on MILM.
4.1.9	11/12/2014	SRT	Lime supports 4am to 6:30p ET trading. Fix typo on OrigSendingTime tag.
4.2.0	12/19/2014	JWK	Add support for EDGX and EDGA over BOE 2.0.
4.2.1	12/22/2014	JWK	Remove depreciated EDGAA/EDGXX features.
4.2.2	01/06/2015	JWK	Added ISO requirement section.
4.2.3	01/30/2015	JWK	Support RPI in BSX/BSX-FIX. Indicate depreciated ARCA/ARCE order types.
4.2.4	02/18/2015	JWK	Support AllowRouting tag on EDGAA/EDGXX.
4.2.5	03/02/2015	JWK	Updated liquidity table.
4.2.6	02/18/2015	SRT	Introduce CSFB venue, which is same as CRSF.
4.2.7	03/06/2015	SRT	Remove NSX, CBSX, LAVA venues since they are no longer supported.
4.2.8	03/18/2015	JWK	Add support for MinimumTriggerVol on NYX/XNYS.
4.2.9	03/18/2015	JWK	Add routing instructions for PDQ.
4.2.10	03/19/2015	SRT	Remove SIG venue since it is no longer supported.
4.2.11	03/24/2015	JWK	Support LastCapacity on execution reports.
4.2.12	04/20/2015	JWK	Vortex now supports cancel/replace.
4.2.13	05/20/2015	JWK	Add BATS BOE2.0 Venues BYXB and BZXB.
4.2.14	05/28/2015	JWK	Add tag 8006 MarketLiquidity to execution reports.
4.2.15	06/09/2015	JWK	Support Primary Peg on PDQA
4.2.16	06/23/2015	SRT	Expose stop and stop limit orders that are supported on some venues
4.2.17	08/17/2015	SKP	Add market liquidity pass through in tag 8006 for participating markets.
4.3.0	09/01/2015	SRT	Add Direct Edge Options.
4.3.1	09/01/2015	SRT	Implement LockedCrossAction for BATS and EDGX Options.
4.3.2	10/14/2015	SKP	Add MOPP to routing instructions for INET FIX tag 9032.
4.3.3	10/14/2015	SKP	Add SKNY, MOPB, SKIP to routing instructions for INET FIX tag 9032.
4.3.4	11/30/2015	JWK	Add support for partial-cancel on NYX.

4.3.5	12/07/2015	JWK	Add support for ARCA IOI Dark-pool opt out option
4.3.6	12/17/2015	JWK	Add directed NSX routing to INET-FIX
4.3.7	01/08/2016	SKP	Fix Citadel CDEL values, add documentation for ARCABB
4.3.7	01/13/2016	SKP	Add supplemental order type for NASDAQ OUCH and INETFlite
4.3.7	01/14/2016	SKP	Add auctionId and TIF 59=9 for MIAX.
4.4.0	02/01/2016	SRT	Add support for ISE Mercury exchange and Sungard Global Network.
4.4.1	02/19/2016	SRT	Removed unsupported dark pools.
4.4.2	02/19/2016	KMS	Removed SGN and CDELBB from specs.
4.4.3	04/07/2016	SKP	Fixed relevant markets for tag 9036.
4.4.4	04/11/2016	SKP	Added support for StopPx for BZXB, BYXB, EDGAB, EDGXB.
5.0.0	05/06/2016	MSK	Added LARE and A1 trading algorithms
5.0.1	05/16/2016	SKP	Add tag 9068 to MIAX/XMIO for MaxPriceLevels and removed routing from IEX.
5.0.2	05/31/2016	SRT	Add back NSX support.
5.1.0	06/30/2016	SRT	Allow hidden and max-floor for IEX.
5.1.1	06/30/2016	SKP	Add quickstart, minimumTriggerVol and minimumTriggerPerc for LARE.
5.1.2	06/30/2016	SKP	Add maxMarketOrderSlippageAmount for LARE.
5.1.3	07/05/2016	SRT	Include BATS market fee code on executions.
5.1.4	07/08/2016	SKP	Add excluded venues tag to LARE.
5.1.5	07/15/2016	SKP	Add direxted BX and PSX routing to INET-FIX.
5.2.0	09/07/2016	SRT	Add IEX as protected market for ISO.
5.2.1	09/27/2016	JWK	Add ISO flag to LARE.
5.3.0	10/03/2016	SRT	Add more TIF for LARE.
5.3.0	10/03/2016	SKP	Add TIF behavior and market participation for LARE.
5.3.1	10/03/2016	SRT	Add VenueCategory order option to LARE.
5.4.0	01/01/2017	SRT	Add support for TIF GTD and TimeInMarket for LARE.
5.4.1	01/10/2017	SRT	Add support for MIAX Pearl.
5.5.0	02/01/2017	SRT	Added TargetVenues to LARE. Made VenueCategory as unsupported.

5.5.1	03/09/2017	SRT	Changed options venue names to start with D. Also removed ArcaTracking since it is no longer supported.
5.6.0	03/29/2017	SRT	Add tag 9571 (Optional Clearing Data) and 8008 (Market Exec ID) for Equities and Options.
5.6.1	03/31/2017	SRT	Added SIGMA-XT venue, this is SIGMA-X through Nasdaq.
5.6.2	04/05/2017	SRT	Fix options ExDestination balues to be Dxxx.
5.6.3	04/20/2017	SRT	Remove 9108/9109 tags from algo as it is not supported.
5.6.4	04/21/2017	SRT	Added support for RouteDeliveryMethod for DTBSO/DEDGO.
5.6.5	05/16/2017	SRT	Update 9310/9311 range for A1 target.
5.6.6	07/17/2017	JWK	Add AMXP Venue
5.7.0	07/17/2017	SRT	Updated LSR section. More updates to come
5.8.0	09/06/2017	SRT	Add ARCP (arca pillar) venue
5.8.1	09/07/2017	SRT	Add TIF 2,7 to IEX
5.8.2	09/11/2017	EAB	Add ARCP-FIX Venue
5.8.3	09/11/2017	SRT	Added VOL and OPTWAP for DASH
5.9.0	01/03/2018	JWK	Added LSS venue for benchmark algos
6.0.0	03/02/2018	JWK	Added DELX. Updated tag support for LSS.
6.0.1	05/09/2018	EAB	Added GSLT
6.0.2	06/27/2018	EAB	Replaced GSLT with GARCA/GBZX/GEDGX/GNYX
6.0.3	07/26/2019	EAB	Added NYSP
6.0.4	02/13/2019	EAB	Added OTC Venue
6.0.5	01/22/2020	KPM	Updated Venues
6.0.6	07/22/2020	KPM	Added INST
6.0.7	05/21/2021	NZ	Added MEMX through Goldman(GMEMX)
6.0.8	05/21/2021	NZ	Added MPRL through Goldman(GMPRL
6.0.9	05/21/2021	OJ	Added LTSE through Goldman(GLTSE)
6.1.0	06/21/2021	OJ	Added IEX D-Order type
6.1.1	06/21/2021	OJ	Added OTC Restatements
6.1.2	10/05/2021	OJ	Added CANNACORD(CSTI) Market Venue
6.1.3	10/14/2021	OJ	Added SPEEDROUTE(SPDR) Market Venue
6.1.4	12/28/2021	OJ	Added LAMPOST(LAMP) Equities Market Venue
6.1.5	12/28/2021	OJ	Added LAMPOST(LAMPO) Options Market Venue

6.1.6	02/03/2022	NZ	Added MIAX PEARL (MPRLE) Market Venue
6.1.7	02/10/2022	NZ	Added MEMX (MEMX) Market Venue
6.1.8	04/12/2022	OJ	Added INTELLIGENT CROSS (INCR) Market Venue
6.1.9	12/12/2022	OJ	Added WOLVERINE Options (WEXO) Market Venue
6.2.0	01/09/2022	OJ	Added XTX(XTXD) Market Venue
6.2.1	01/26/2023	OFB	Added PRAGMA
6.2.2	07/10/2023	OFB	Added CITADEL Equities (CIDEL) and Options (CIDELO)
6.2.3	08/31/2023	OJ	Added ISO Order Implementation Notes
6.2.4	01/26/2023	OFB	Added PRAGMA EQuotes
6.2.5	02/27/2024	OFB	Added OTC end of day auction order types

2 Overview

This document describes the Lime Trading Corp implementation of FIX 4.2. It is divided into four sections: a section on Lime's -specific information, a section on Lime's implementation of the session-layer protocol, a section on Lime's implementation of the application-layer protocol and the appendices. To view a comprehensive guide to the entire FIX protocol, see http://www.fixprotocol.org/.

The primary purpose of this document is to explain what features of FIX Lime supports and how Lime adapts/customizes the FIX protocol to support Lime-specific functionality.

3 Implementation Notes

3.1 Usernames and Accounts

A client can have multiple usernames to represent different groups or individuals within their organization, and each of those usernames can be authorized for only a subset of the client's accounts. Any given username is authorized to log into any given number of accounts, and any account can have multiple usernames authorized for it. Passwords are linked to a particular username. Usernames are specified in tag 553 in a logon message, and are required. The password associated with the username can be specified in tag 554 or tag 57 in a logon message.

3.2 Fix Message Size Limits

The Lime trading system will not accept FIX messages any larger than 2K (2048 bytes), and no messages with any particular field larger than 512 bytes. Any such messages will result in a session level reject.

3.3 Unknown Tags

The Lime trading system will not accept any tags not explicitly described in this document. Any messages containing any such tags will be rejected with a session level reject.

3.4 Decimalization

Different markets allow different precision for prices. If Lime determines that the decimalization for an order is invalid (i.e. the limit price has too manydigits after the decimal point for the desired route), our trading system will reject the order. Otherwise, the order will be forwarded to market. In this case the market may modify the price of the order (by rounding down for a buy or rounding up for a sell) or reject the order as it sees fit.

3.5 Hours of Operation

Lime regular trading hours are from 6:00 to 17:30 (6 AM to 5:30 PM) ET. The servers do not allow for overnight connections, and Lime will disconnect all FIX sessions at some point after 17:30. Login may begin at 5:50 each morning

Lime also supports extended trading hours but this is not available by default. Clients should enquire with Lime Execution Services if extended trading hours is desired.

3.6 Breaks and Corrections

When Lime receives a trade break/bust from a venue, an execution report will be sent to the customer with ExecTransType(20)=1(Cancel), as is standard in FIX. However, Lime does not handle trade corrections (price adjustments) in the standard FIX manner. Instead, trade corrections are a two-part process: first we send the client a break/bust of the original trade, followed by a standard execution with the corrected trade information.

3.7 Bulk Cancels

Lime provides a custom FIX message to allow clients to send out cancel requests for multiple orders in a single message.

3.8 Symbology

Please see Appendix A for a discussion of symbology.

3.9 ISO Orders

3.9.1 Direct Market Access

Requires account enablement. Please see tags 9017/9060 and the ISO Requirement section of this document.

3.9.2 LARE (Lime Smart Router)

SweepType ISO requires account enablement and is only applicable to strategies that include all lit markets in sweep phases. SweepType ISO may also be configured as the default sweep type for a particular routing strategy via account configuration.

When enabled, SweepType ISO allows, but does not guarantee, the router to send marketable IOC sweep orders to venues using ISO execution instructions. With an ISO IOC sweep, the router will prioritize targeting visible liquidity at both every market's protected bid or offer and any additional liquidity it sees in any order book feeds the router incorporates before incrementing child limit prices to the next marketable price level, and

at the final price level the router may incorporate relative weight configuration into the allocation.

SweepType ISO will only engage for LIMIT orders. Other reasons the router may refrain from using ISO instructions on child orders include market data delays or outages, venue routing outages, configured child order quantity constraints, open child orders at a venue from a prior sweep round, or parent order parameters such as MaxFloor or Invisible that typically indicate less aggressive fill objectives.

Pleae see the LARE (Lime Smart Router) section of this document.

4 Standard Header

The standard header precedes all messages, application level as well as session level. The header identifies the message type, length, destination, sequence number, origination point and time.

Tag	Field Name	Req'd	Comments
8	BeginString	Y	
9	BodyLength	Y	
35	MsgType	Y	*Session level:* '0' Heartbeat '1' Test Request '2' Resend Request '3' Reject (message reject) '4' Sequence Reset '5' Logout 'A' Logon 'j' Business Message Reject *Application Level (to Lime):* 'D' New Order 'F' Order Cancel 'G' Cancel Replace 's' Bulk Cancel (custom) *Application Level (from Lime):* '8' Execution Report '9' Order Cancel Report

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Tag	Field Name	Req'd	Comments
49	SenderCompID	Y	Pre-arranged "account name" for messages from client. "LIME" for messages from LIME.
56	TargetCompID	Y	"LIME" for messages to LIME. Pre-arranged "account name" for messages to client.
34	MsgSeqNum	Y	
50	SenderSubID	N	This field is ignored
57	TargetSubID	N	Pre-arranged "password" for the current username. This field is only examined for logon messages if specified if tag 554 is not specified. For all other messages this field is ignored.
43	PossDupFlag	N	Always required for retransmitted messages, whether prompted by the sending system or as the result of a resend request.
97	PossResend	N	Lime will ignore this field but reject an order with a duplicate ClOrdID.
52	SendingTime	Y	GMT FIX date-time the message was sent.
122	OrigSendingTime	Y	Required for when 43='Y'

5 Standard Trailer

Tag	Field Name	Req'd	Comments
10	CheckSum	Y	Modulo 256 checksum of all characters in message up to and including the delimiter preceding the CheckSum field. Value must always be three digits with leading zeroes if necessary.

6 Session Level Messages

6.1 Heartbeat

Lime Brokerage will use the heartbeat interval specified by the client in the Logon message to determine if the client is alive. The recommended heartbeat interval for FIX connections to Lime Brokerage is 15 seconds. After 2 * HeartBtInt seconds of inactivity, Lime Brokerage will send a logout message and drop the connection. Note that the server will

send heartbeats at the heartbeat interval specified in the logon message unconditionally, regardless of other traffic it might be sending.

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

6.2 Logon

The logon message must be the first message you send after establishing a TCP connection to Lime Brokerage. EncryptMethod must be 0 (no encryption). In the case that a client is disconnected intraday and logs back in, the client may receive a reply message with a sequence number that is greater than expected. In this case the client should issue a resend-request to recover missing messages. Username must be specified in tag 553, while the username's password can be specified in tag 554 or tag 57. Tag 57 will only be checked if tag 554 is not specified. It is no longer required to specify the password in tag 57 for every message.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 'A'
57	TargetSubId	N	Password associated with the user connecting to this session. If tag 554 (password) is specified, then that value is used and this field is ignored. Either this tag or tag 554 must be specified.
98	EncryptMethod	Y	Value = '0'
108	HeartBtInt	Y	Number of seconds in between heartbeats for this session. Recommended value is '15'.
553	Username	Y	Username representing the user connecting to this session.
554	Password	N	Password associated with the user connecting to this session. If not specified, then tag 57 (TargetSubId) is checked for the password. Either this tag or tag 57 must be present.

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Tag	Field Name	Req'd	Comments
7001	Cancel All On Disconnect	N	If 7001 = 'Y', Lime will attempt to cancel all open orders on session disconnect.
	Standard Trailer	Y	

6.3 Test Request

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

6.4 Resend Request

The party that receives a resend request first shall resend the appropriate messages before sending their own resend request. Lime Brokerage will support both types of resend request: requesting a range of sequence numbers and requesting all messages after a certain sequence. For example, if the client receives messages 20-25 and then 29, the client could request 26-28 and then process 29, or could discard 29 and request 26-0, where "zero" indicates infinity. The latter is the preferable method as any messages pending after 29 will be sent in the resend request. All messages in answer to a Resend Request must be flagged PossDup.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = '2'
7	BeginSeqNo	Y	
16	EndSeqNo	Y	Recommended value '0' (infinity)
	Standard Trailer	Y	

6.5 Reject

We recommend using the Reject message as sparingly as possible. Any message that is rejected will never be resent. Note that a message reject is different than an application-layer reject (a message reject indicates a parsing or some other protocol-layer problem, whereas an application-layer reject might be for an order specification that is missing some necessary data or might represent any ordinary order reject, due to a buying power or

short-sale violation, for example).

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = '3'
45	RefSeqNum	Y	MsgSeqNum of rejected message
58	Text	N	Where possible, message to explain reason for rejection.
371	RefTagId	N	Tag number of the tag responsible for the reject (if appropriate)
372	RefMsgType	N	The MsgType (tag 35) value of the message being rejected.
373	Session Reject Reason	N	Supported values: '0' Invalid Tag Number '1' Required tag missing '2' Tag not defined for message type '3' Undefined tag '4' Tag specified without a value '5' Value is incorrect '6' Incorrect format or value '7' Decryption problem '8' Signature problem '9' CompID problem '10' Sending time accuracy problem '11' Invalid message type
	Standard Trailer	Y	

6.6 Sequence Reset / Gap Fill

When specifying a Sequence Reset – Gap Fill in response to a Resend Request, the client should mark this message as PossDup because it occurs during a resend. In all cases except the Sequence Reset – Reset message, the session will be terminated if the incoming sequence number is less than expected and the PossDupFlag is not set. A Logout message indicating this condition will be sent if this occurs. Lime will never send a Sequence Reset – Reset message.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = '4'
123	GapFillFlag	Y	Lime recommends always setting 123='Y'. Lime will never send a sequence reset message without setting this tag to 'Y' (i.e. Lime will never send a sequence reset-reset message).
36	NewSeqNo	Y	
	Standard Trailer	Y	

6.7 Logout

The client should be the party that breaks the TCP connection after the logout process has completed.

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

6.8 Business Message Reject

Business message rejects have very similar semantics to normal session level rejects, except they typically represent validation failures done deeper into the business logic and less of a generic session level validation error. Logically a business message reject is similar to a session level reject, except it usually represents a validation error that is deeper in the "business logic" and not as generic as a session level reject. Note that like a session level reject, this should not be confused with an application-level reject (such as an execution report with an ExecType of rejected).

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 'j'
372	RefMsgType	Y	The MsgType of of the message being rejected.

Continued on next page

Tag	Field Name	Req'd	Comments
380	Business Reject Reason	Y	Supported values: '0' Other '1' Unknown ID '2' Unknown security '3' Unsupported message type '4' Application not available '5' Conditionally required tag missing
45	RefSeqNumber	N	MsgSeqNum of rejected message.
379	Business Reject Ref Id	N	The "business level" identifier for the message being rejected. This can be a client order ID, a Lime order ID, or an execution ID depending on the message.
58	Text	N	String giving reason for business reject.
	Standard Trailer	Y	

7 US Equities

7.1 New Order - Single

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 'D'
11	ClOrdID	Y	Alphanumeric. Day-unique ID for the order chosen by client. Max 16 characters. Different ClOrdID validation modes can be configured for an account.
55	Symbol	Y	Symbol (uppercase) See discussion of symbology in Appendix A.
65	SymbolSfx	N	See discussion of symbology in Appendix A.
48	SecurityID	N	String. Security identifier value (e.g. CUSIP, SEDOL, ISIN, etc). If specified, the value will be echoed back in Execution Reports for the order. Max 16 characters.

Continued on next page

Tag	Field Name	Req'd	Comments
22	SecurityIDSource	N	String. If specified, the value will be echoed back in Execution Reports for the order. Max 16 Characters.
54	Side	Y	Character. Supported values: '1' Buy '2' Sell '5' Sell Short '9' Buy to Cover[1]
38	OrderQty	Y	Desired quantity for entire order[2]
40	OrdType	Y	Character. Supported values: '1' Market Order '2' Limit Order '3' Stop Order '4' Stop-Limit Order
44	Price	N	Required for limit orders[3]
99	StopPrice	N	Required for Stop and Stop-Limit orders. Designated the stop trigger price.
47	Rule80A	N	Character. Must be specifically configured for client use. Supported values: 'A' Agency 'P' Principal 'R' RisklessPrincipal

Continued on next page

[1]Identical to Buy, the only difference being how the trade will be reported to clearing.

[2]Use MaxFloor to specify quantity of shares to display for reserve orders

[3]Different markets allow different precision for prices. If Lime determines that the price for an order is invalid (i.e. the limit price has too many digits after the decimal point for the desired route), the trading system will reject the order. Otherwise, the order will be forwarded to market, in which case, under certain circumstances, the market might modify the price of the order (by rounding down for a buy or rounding up for a sell) or reject the order for an invalid price as it sees fit.

Tag	Field Name	Req'd	Comments
100	ExDestination	Y	All orders must include a market destination. If specified, tag 100 will be used. If tag 100 is not specified, the destination must be specified in tag 9012. See Appendix C for valid values.
59	TimeInForce	N	Character. Supported values: '0' Day (default) '2' On Open '3' IOC '5' Extended Day '6' GTD '7' On Close '8' Time In Market 'A' Late Limit On Open (BYXB/BZXB only)[4] 'B' Late Limit On Close (BYXB/BZXB only)[5] 'D' On Open Then Day 'E' Pre-open Session 'F' Post-close Session
110	MinQty	N	Minimum quantity of an order to be executed.
111	MaxFloor	N	Quantity to display at the exchange[6]
126	ExpireTime	N	Conditionally required if 59= 6 (GTD). Fix timestamp representing time this GTD order should expire.
211	PegDifference	N	Decimal. Signed amount added to the price of the peg for a pegged order.
389	Discretion Offset	N	Decimal.

Continued on next page

[4]Must set BATS routing instruction (tag 9016) to B.

[5]Must set BATS routing instruction (tag 9016) to B.

[6]This integer represents the number of shares (of the total OrderQty) to display at the exchange. This value must be a multiple of 100; otherwise it will be rounded down to the highest multiple of 100 not greater than the value. If this value is 0, it is ignored (i.e., the order is treated as a regular, not reserve, order.

Tag	Field Name	Req'd	Comments
7928	Wash Trade Prevention	N	Character. Must be specifically configured for client use. Supported values: 'N' Cancel Newest 'O' Cancel Oldest 'B' Cancel Both
9001	TimeInMarket	N	Integer. Required for time-in-market orders. Specify number of milliseconds the order should be live. Specifying a value of 0 is equivalent to IOC.
9003	Invisible	N	Boolean. Enabling this option will result in a hidden order.
9004	PostOnly	N	Boolean. Enabling this option will guarantee the order does not remove liquidity. The order will be rejected by the market if it is marketable or would lock or cross the market.
9009	ShortSaleAffirm	N	Boolean. Required for DVP clients who wish to place sell-short orders. If client can't populate this field LocateReqd (Tag 114) must be used.
9067	ShortSaleAffirm LongQuantity	N	Integer. Mandatory for DVP clients who wish to place sell-short order on a security with a long position. The long portion of the order must be identified using this tag for compliance purposes.
9010	LongSaleAffirm	N	Boolean. Required for DVP clients who wish to place sell-long orders.
9011	AllowRouting	N	Boolean. Allow the order to route out from the destination (specified in tag 100 or 9012) to the NBBO. If the tag is not specified then the default behavior is that limit orders won't be routed out but market orders will.

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Tag	Field Name	Req'd	Comments
9012	Alternate ExDestination	N	String. Alternative to tag 100 to specify the destination. Either tag 100 or 9012 is required. If tag 100 is present, the value of this tag is ignored.
9014	Route To NYSE	N	Boolean. Valid for NYSE-listed securities. If this tag is enabled, the order will sweep the specified destination, possibly removing liquidity. If it does not fill on the current market, it will be routed to the NYSE for execution.
9017	ISO	N	Boolean. Used to specify ISO orders. Must be specifically configured for client use.
9050	ClientData	N	String. Value will be echoed on execution reports.
9052	ClientData	N	String. Value will be echoed on execution reports.
9053	ClientData	N	String. Value will be echoed on execution reports.
9060	ISO Group ID	N	String. Day-unique identifier that is used to correlate orders pertaining to a single sweep operation across all markets. All ISO orders belonging to an intermarket sweep must have the same identifier. Mandatory for all ISO orders if Lime is responsible for RegNMS requirement.
9034	Peg Type	N	Character. Supported values: '1' Primary '2' Market '3' Mid-Point '4' Alternate Mid-Point (BZXB/BYXB only) '8' Discretionary Mid-Point 'E' Midpoint Extended (MELO - INET/INET-FIX only) 'j' IEX D-Limit Order

Continued on next page

Tag	Field Name	Req'd	Comments
9064	Locked/Crossed Action	N	Character. Supported values: 'R' Reject 'P' Price Adjust 'H' Hide Not Slide 'L' Price Adjust (Reject Crossed) 'S' Single Reprice 'B' Blind 'M' No Midpoint Match (Mid-Point Pegged orders on BZXB/BYXB only) 'D' Multiple Display-Price Sliding (BZXB/BYXB only) 'A' Proactive If Locked (ARCP only)
9066	Regular Session Only	N	Boolean. Used in conjunction with time in force of "day" to specify an order only valid during market hours and exclude pre-market eligibility.
9571	OptionalClearing Data	N	String (max 10). Clients can provide optional clearing data in this field that would be passed through to the markets in the respective optional clearing data tag. This is useful to correlate exchange drops and/or to have trades booked to the correct clearing account. This field is only allowed upon request and requires enablement by Lime Technical Solutions team.
	Standard Trailer	Y	

7.1.1 Market Support

ExDestination	TimeInForce	PegType	PegDifference	AllowRouting	MaxFloor	Invisible	Post Only	MinQty	Discretion Offset	ISO	Regular Session Only	Partial Cancel
AES	0				•							
AMXP	0,2,3,5,7	2,3,8	•	•	•	•		•		•		
ARCABB	0,2,3	1,2	•		•		•	•	•		•	
ARCP	0,2,3,5,7	1,2,3	•	•	•	•	•	•		•	•	
BIDS	0,3,6	1,2,3	•					•	•			
BSX*	0,3,5,6,8	3				•	•	•		•		
BYXB	0,2,3,5,6,7	1,2,3,4	•	•	•	•	•	•	•	•		
BZXB	0,2,3,5,6,7	1,2,3,4	•	•	•	•	•	•	•	•		
CBX	0,3,6	1,2,3						•				
CDEL	3,4	3						•				
CIDEL	0,2,3,4,7											
CRSF	0,3	1,2,3					•	•		•		
CSFB	0,3	1,2,3					•	•		•		
CSTI	0,1,2,3,5,7				•			•				
DBSX	0,3	1,2,3						•				
EDGAB	0,3,5,6	1,2,3,4,8	•	•	•	•	•	•	•	•	•	
EDGXB	0,3,5,6	1,2,3	•	•	•	•	•	•	•	•	•	
GARCA	0,1,3,6,7				•			•				
GBZX	0,1,3,6,7				•			•				
GEDGX	0,1,3,6,7				•			•				
GNYX	0,1,3,6,7				•			•				
IEX	0,2,3,4,6,7	1,3,8			•	•		•		•		
INET*	0,2,3,5,6,7,8,D	3,E				•	•	•		•		
INET-FIX*	0,2,3,5,6,7,D	1,2,3,E	•	•	•	•	•	•		•		
INCR	0,3	1,2,3			•			•				
JPMX	0,3	1,2,3					•	•				
KMATCH	0,3,E,F	1,2,3					•	•				
LAMP	0,2,3,5.6,7											
LEVEL	0,3,6	1,2,3	•					•				
LX	0,3	1,2,3						•				
MEMX	0,3,4,6	1,3			•	•		•				

Continued on next page

ExDestination	TimeInForce	PegType	PegDifference	AllowRouting	MaxFloor	Invisible	Post Only	MinQty	Discretion Offset	ISO	Regular Session Only	Partial Cancel
MPRLE	0,3,R	3			•			•				
NSXP	0,2,3,5,7	1,2,3	•	•	•	•	•	•		•	•	
NYSP	0,2,3,5,7	3		•	•	•	•	•		•	•	
NYX	0,2,3,7	3		•	•	•	•		•	•		•
OTC	0,3,5,7	1,3		•	•		•					•
PDQ	0,3	3						•				
PDQA	3	1,3						•	•			
POSIT	0	3						•				
PRAGMA	0,2,3,7	1,3			•			•				
PSX*	0,3,5,6,8	3				•	•	•		•		
SIGMA-XT	0,3	1,2,3					•	•				
SPDR	0,2,3,5,7											
XNYS	0,2,3,7	3		•	•	•	•	•	•	•		
XTXD	3							•				
LARE	0,2,3,5,7,D	1,2,3	•	•	•	•		•	•		•	
LSS	0	1,2,3	•		•	•		•				

ExDestination	OrdType	Locked/Crossed Action	Wash Trade Prevention
AES	1,2		
AMXP	1,2		O,N,B
ARCABB	1,2	B	O,N,B
ARCP	1,2	A	O,N,B
BIDS	1,2		
BSX	1,2		
BYXB	1,2,3,4	R,P,L,M,D	O,N,B
BZXB	1,2,3,4	R,P,L,M,D	O,N,B
CBX	1,2		
CDEL	1,2		
CIDEL	1,2,3,4		
CRSF	1,2		
CSFB	1,2		

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ExDestination	OrdType	Locked/Crossed Action	Wash Trade Prevention
CSTI	1,2,3,4		
DBSX	1,2		
EDGAB	1,2,3,4	R,P,L,D	O,N,B
EDGXB	1,2,3,4	R,H	O,N,B
GARCA	1,2		
GBZX	1,2		
GEDGX	1,2		
GNYX	1,2		
IEX	1,2		
INCR	1,2		
INET	1,2		
INET-FIX	1,2		
JPMX	1,2		
KMATCH	1,2	R	
LAMP	1,2,3,4		
LEVEL	1,2		
LX	1,2	R	
MEMX	1,2		
MPRLE	1,2		
NSXP	1,2	A	O,N,B
NYSP	1,2	A	O,N,B
NYX	1,2,3		O,N
OTC	1,2		
PDQ	1,2		
PDQA	2		
POSIT	1,2		
PRAGMA	1,2		O,N,B
PSX	1,2		
SIGMA-XT	1,2		
SPDR	1,2,3,4		
XNYS	1,2,3		O,N
XTXD	1,2		
LARE	1,2		
LSS	1,2		

* BSX, INET, INET-FIX, and PSX support Post Only via Nasdaq Post Only tag (9036).

7.1.2 AES (Credit Suisse Algo)

Tag	Field Name	Req'd	Comments
9100	Strategy	Y	String. Supported values: '1' VWAP. '3' TWAP.
9111	Execution Style	Y	Integer. Supported values: '2' Patient. (Custom strategies only) '5' Normal. '8' Aggressive.
9515	Auction	N	Integer. Supported values: '1' Default.
9101	Start Time	N	UTC Timestamp.
9102	End Time	N	UTC Timestamp.
9103	Max Participation	N	Integer. 0 - 99 (Custom strategies only)
9147	Min Participation	N	Integer. 0 - 99 (Custom strategies only)

- MaxFloor is routed to Display-Size on AES. Custom strategies only.
- This venue is currently restricted. Please contact Lime for more information.

7.1.3 AMXP (NYSE AMERICAN)

- Primary market directed routing, inside limit, and dark primary peg not supported at this time.

7.1.4 ARCP (NYSE ARCA Pillar Equities)

Tag	Field Name	Req'd	Comments
9040	Arca Tracking	N	Boolean.
9068	Market routing instructions	N	String. Specify routing instructions. Supported values: '1' Primary Until 9:45. '2' Inside Limit order. 'RPI' Retail Price Improvement order.

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Tag	Field Name	Req'd	Comments
9072	Route Delivery Method	N	String. 'D' No trade against IOI
9073	Arca PreOpen	N	Boolean. Enables trading exclusively in trading session 1.

- Requires limit price for mid-point pegged orders.
- RPI orders must be Day
- In case of pegging, only mid-point peg is supported for RPI orders

7.1.5 BYXB/BZXB (BATS Equities)

Tag	Field Name	Req'd	Comments
9016	BATS routing instructions	N	String. Any valid BOE v2 routing instruction.
9019	Dark Scan	N	Boolean. Scans for dark liquidity.
9037	No Rescrape At Limit	N	Boolean. Available only to fully routable IOC orders. After walking the price down to the limit there will be no final scrape at BATS.
9065	Edge Routing Instructions	N	String. Any valid BOE v2 RoutStrategy.
9068	Market Routing Instructions	N	String. Any valid BOE v2 Destination value.*
9072	Route Delivery Method	N	String. Supported values: 'RTI' Route to Improve 'RTF' Route to Fill 'V' Visible Peg ****
'RTI'	Route to Improve		
'RTF'	Route to Fill		
'V'	Visible Peg **		

* Destination value is only valid with 9065 = "DIRC" (Directed) or 9016 = "A" (PostToAway).
** Requires peg value in PegType tag.

7.1.6 BIDS (BIDS Dark Pool)

- Uses FIX to connect to BIDS dark pool.

7.1.7 CBX (Instinet Dark Pool)

- Changing MinQty is supported on cancel-replace. In order to preserve the MinQty requirement across a cancel-replace, tag 110 must be present and equal to the value in the original order. MinQty requirements can be removed by omitting the tag in the replace message.

7.1.8 CRSF (Credit Suisse Crossfinder)

- Cancel-Replace not supported.

7.1.9 CSFB (Credit Suisse Crossfinder)

- Cancel-Replace not supported.

7.1.10 EDGAB/EDGXB

Tag	Field Name	Req'd	Comments
9016 Any valid RoutingInstruction value is accepted.	BATS routing instructions	N	String. Equivalent to BOE 2.0 RoutingInstruction.
9065 Any valid RoutStrategy value is accepted.	Edge Routing Instructions	N	String. Equivalent to BOE 2.0 RoutStrategy.
9068 Any valid Destination value is accepted.***	Market Routing Instructions	N	String. Equivalent to BOE 2.0 ExDestination.

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Tag	Field Name	Req'd	Comments
9072	Route Delivery Method	N	String. Supported values: 'RTI' Route to Improve 'RTF' Route to Fill 'V' Visible Peg ****

CPI = Competition for Price Improvement
CLC = Comprehensive Liquidity Check
* For all Directed ISO strategies, Tag 18 must be populated with "f" and Tag 59 must be "3" IOC, or the order will be rejected.
** SWPB orders will be canceled immediately if the order quantity is not enough to clear all protected quotes at or better than the specified price on the order.
*** Destination value is only valid with 9065 = "DIRC" (Directed) or 9016 = "A" (PostToAway).
**** Requires peg value in PegType tag.

7.1.11 GARCA (NYSE ARCA via Goldman Sachs)

- Uses FIX to connect to NYSE ARCA via Goldman Sachs low-latency DMA.

7.1.12 GBZX (BATS Z via Goldman Sachs)

- Uses FIX to connect to BATS Z via Goldman Sachs low-latency DMA.

7.1.13 GEDGX (BATS Direct Edge X via Goldman Sachs)

- Uses FIX to connect to BATS Direct Edge X via Goldman Sachs low-latency DMA.

7.1.14 GNYX (NYSE via Goldman Sachs)

- Uses FIX to connect to NYSE via Goldman Sachs low-latency DMA.

7.1.15 INET/BSX/PSX/INET-FIX Support

Tag	Field Name	Req'd	Comments
9022	Imbalance Only	N	Boolean. Valid for INET or INET-FIX orders. Used to specify orders with a display value of Imbalance-Only.

Continued on next page

Tag	Field Name	Req'd	Comments
9032	INET FIX Routing Instructions	N	String. Valid for INET-FIX. Supported values: 'DOTA' DOTA strategy. INET-FIX only. 'SCAN' SCAN strategy. INET-FIX only. 'STGY' STGY strategy. INET-FIX only. 'TFTY' TFTY strategy. INET-FIX only. 'SAVE' SAVE strategy. INET-FIX only. 'QSAV' QSAV strategy. INET-FIX only. 'QTFY' QTFY strategy. INET-FIX only. 'SOLV' SOLV strategy. INET-FIX only. 'CART' CART strategy. INET-FIX only. 'QCST' QCST strategy. INET-FIX only. 'MOPP' MOPP strategy. INET-FIX only. 'SKNY' SKNY strategy. INET-FIX only. 'MOPB' MOPB strategy. INET-FIX only. 'SKIP' SKIP strategy. INET-FIX only. 'ISCN' Directed order to NSX. IOC only. INET-FIX only. 'ISPX' Directed order to PSX. IOC only. INET-FIX only. 'ISBX' Directed order to BX. IOC only. INET-FIX only.
9035	Intraday Cross	N	Boolean. Valid for INET-FIX only. Used to specify an order is an Intraday-Cross.
9036	Nasdaq Post Only	N	Boolean. Valid for INET, INET-FIX, BSX, or PSX only. Enabling this option will guarantee the order does not remove liquidity, but the order may be posted at a NASDAQ-adjusted price. Any adjusted new price would come back in the Order Accept execution report in the MarketConfirmPrices (9028) field.
9068	Market Routing Instructions	N	String. Supported values for INET, INET-FIX, BSX: 'RPI' Retail Price Improvement Order.[7] Supported values for INET, BSX and PSX: 'S' Supplemental Order.[8]
9509	Market Display Price	N	Float. Valid for INET-FIX. Used to specify display price for discretionary orders.

[7]RPI orders must have an explicit limit price set in tag 44, and cannot be pegged.

[8]Supplemental orders must have an explicit limit price set in tag44, must be invisible, have at least round lot size, and cannot be pegged.

- TimeInForce of On-Open-Then-Day is not valid for NYSE-routed orders.

7.1.16 JPMX (JP Morgan Dark Pool)

- Only market and limit orders allowed.

7.1.17 KMATCH (Knight Match)

Tag	Field Name	Req'd	Comments
9068	Market routing instructions	N	String. Specify routing instructions. Supported values: 'KM2' Knight Match Session II

7.1.18 NYX/XNYS (NYSE Equities)

Tag	Field Name	Req'd	Comments
9061	NYSE Routing Instructions[9]	N	String. Supported values for NYX (CCG): 'CO' Closing Offset Order 'DNS' Do Not Ship 'RPI' Retail Price Improvement[10] 'SOC' NMS IOC Supported values for XNYS (UTP Direct): 'C' Closing Offset Order 'D' Do Not Ship '7' AutoExecution 'R' Retail Price Improvement[11] 'S' NMS IOC
143	TargetLocationId	N	NYSE trading partner LocationID. Client account can be configured to pass this to NYSE.
9568	MinimumTriggerVol[12]	N	Integer. Minimum Trigger Volume for midpoint-peg orders. Cannot be used with WashTradePrevention.

7.1.19 OTC (OTC Link ECN)

[9] To specify an Intermarket Sweep Order, use tags 9017 and 9060.
[10] The retail price improvement must be specified in tag 389 Discretion Offset.
[11] The retail price improvement must be specified in tag 389 Discretion Offset.
[12] Can be changed on cancel-replace message.

Tag	Field Name	Req'd	Comments
9534	Unsolicited	N	Boolean. In order to quote in securities that are not Piggy Back Qualified in OTC Link ATS, orders in those securities must be indicated as unsolicited; UnsolicitedFlag Tag 9534 must be 'Y'. If Tag 9534 is not set to Y, the order will be treated as fully hidden.
9022	Imbalance Only	N	Boolean. Valid only for LOC orders. Used to specify orders with a display value of Imbalance-Only.

7.1.20 PRAGMA (NYSE Floor Broker)

Tag	Field Name	Req'd	Comments
143	TargetLocationId	Y	NYSE trading partner LocationID. Client account can be configured to pass this to NYSE.
9100	Strategy	N	NYSE Order Catagory. Supported values: 'DORDER' (Default) — One Touch DOrders 'EQUOTE_ONETOUCH' — One Touch EQuotes 'EQUOTE_HIGHTOUCH' — High Touch EQuotes

7.1.21 PDQ (PDQ Dark Pool)

Tag	Field Name	Req'd	Comments
9068	Market routing instructions	N	String. Specify routing instructions. Supported values: 'DARKVPS' — PDQ Dark VPS 'PDQMPT' — PDQ MPT 'SMARTDARK' — PDQ Smart Dark 'SMARTMID' — PDQ Smart Mid

- PDQ routes all unmatched orders through its Dark Partners.
- Pegged orders must be of order type limit.

7.1.22 PDQA (PDQ Dark Pool)

Tag	Field Name	Req'd	Comments
23	IoiId	Y	Alphanumeric. Indication of Interest ID this order is responding to.

- All orders must be of order type limit.
- MinQty must be greater than or equal to 100 if specified.

7.1.23 LARE (Lime Smart Router)

Tag	Field Name	Type	Comments
9100	Strategy	String	Strategy identifier. 'LSR' LSR equities algo strategy 'LSRD' LSR Darksweep algo strategy 'LSRDP' LSR Darksweep Post algo strategy 'LSRH' LSR Hidden markets algo strategy 'LSRC' LSR Cheap markets algo strategy 'LSRP' LSR Passive algo strategy 'LSRA' LSR Aggressive algo strategy 'LSRPTA' LSR Passive to Aggresive algo strategy 'LSRN' LSR Neutral algo strategy 'LSRW' LSR Wheel algo strategy 'LSRDW' LSR Dark Wheel algo strategy 'LSRHNS' LSR Hide and Sweep algo strategy
9101	StartTime	UTC Timestamp	Strategy starting time (effective time) Supported values: n/a Default value Current time Range n/a Step Size 1 minute
9102	EndTime	UTC Timestamp	Strategy ending time (expire time). Supported values: n/a Default value 16:00 ET (4PM Eastern Time) Range n/a Step Size 1 minute
9568	MinimumTriggerVol	Integer	Minimum quantity for visible liquidity before orders are sent to markets. Optional value. Cannot be combined with tag 9569.
9569	MinimumTriggerPerc	Float	Minimum percentage of order quantity for visible liquidity before orders are sent to markets. Optional value. Cannot be combined with tag 9568.

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Tag	Field Name	Type	Comments
9321	Quickstart	Boolean	Overrides strategy settings for quickstart. Only applicable for limit orders. Cannot be combined with MinimumTriggerVol(tag 9568) and MinimmumTriggerPerc(tag 9569).
9322	MaxMarketOrderSlippageAmount	Float	Maximum slippage allowed for market orders from arrival price before canceling back the remaining unfilled order.
9323	ExcludedVenues	String	Comma separated list of venues, identified by ExDestination, to be excluded for this order. White spaces are forbidden. Maximum length is 512 characters.
9327	TargetVenues	String	Comma separated list of venues, identified by ExDestination, to be explicitly included for this order. I.e., all other venues configured in the strategy will be excluded except primary listing venue during auction. White spaces are forbidden. Maximum length is 512 characters.
9326	VenueCategory	Character	Venue category to target for this order. 'A' All venues in the configured strategy 'L' Lit venues only (both non-inverted and inverted)
9325	SweepType	Character	Parent order sweep type. Will override value configured on strategy. 'S' Standard (default) 'I' ISO

Behavior of the various strategies varies depending on the Time In Force sent and when the order was received as follows:

TimeInForce	Received	Prior 9.30am	During reg Hours	After 4pm
IOC	before 9.30 am	IOC	IOC	IOC
	during regular Hours	-	IOC	IOC
	after 4 pm	-	-	IOC
Day	before 9.30 am	IOC / Day	IOC / Day	cancel back
	during regular Hours	-	IOC / Day	cancel back
	after 4 pm	-	-	reject
Day + regular Session Only	before 9.30 am	Day (for Auction)	[IOC] / Day	cancel back

Continued on next page

TimeInForce	Received	Prior 9.30am	During reg Hours	After 4pm
	during regular Hours	-	IOC / Day	cancel back
	after 4 pm	-	-	reject
On Open	before 9.30 am	Auction (on Primary)	cancel back	-
	during regular Hours	-	reject	-
	after 4 pm	-	-	reject
On Close	before 9.30 am	Auction (on Primary)	-	cancel back
	during regular Hours	-	Auction	cancel back
	after 4 pm	-	-	reject
On Open then Day	before 9.30 am	Auction (on Primary)	[IOC] / Day	cancel back
	during regular Hours	-	reject	-
	after 4 pm	-	-	reject
Extended Day	before 9.30 am	IOC / GTX	IOC / GTX	IOC / GTX
	during regular Hours	-	IOC / GTX	IOC / GTX
	after 4 pm	-	-	IOC / GTX

In addition only lit markets will participate in pre-market trade, auctions, and post-market trade. Of the lit markets not all support all trading sessions:

ExDestination	Participates in Pre-Market	Participates in Open Auction	Participats in Regular Hours	Participates in Closing Auction	Participates in Post-Market
AMXP	•	•	•	•	
ARCP	•	•	•	•	•
BSX	•	•	•	•	•
BYXB	•	•	•	•	•
BZXB	•	•	•	•	•

Continued on next page

ExDestination	Participates in Pre-Market	Participates in Open Auction	Participats in Regular Hours	Participates in Closing Auction	Participates in Post-Market
EDGXB	•	•	•	•	•
EDGAB	•	•	•	•	•
IEX	•	•	•	•	•
INET	•	•	•	•	•
INET-FIX	•	•	•	•	•
CHX			•		
PSX	•	•	•	•	•
XNYS		•	•	•	
PRAGMA		•	•	•	

7.1.23.1 LSR

Strategy Aggressive Lit-Dark two-phase strategy to take all visible liquidity and post the remaining on all lit markets and continuously ping the dark pools. This two phase strategy sweeps all lit markets and dark pools before moving on to the post phase.

Phase 1 - Sweep Lit and Dark Pools Sweeps the following lit markets and dark pools in parallel. It continues sweeping until there are no more executions and then sweeps another 20 times before moving to next phase. The built in delay between each sweep (decision interval) is 100 microseconds, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable. Note that this strategy uses price level sweep as default and to request ISO sweeps, the clients would need to specify that using SweepType tag.

Also, you can achieve fully hidden posting using Invisible order option.

Lit Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
AMXP	50	2000	-	-	-
ARCP	100	2000	-	-	-
BYXB	200	2000	-	-	-

Continued on next page

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BZXB	100	2000	-	-	-
BSX	150	2000	-	-	-
EDGXB	100	2000	-	-	-
EDGAB	400	2000	-	-	-
INET-FIX	100	10000	-	-	-
XNYS	100	2000	-	-	-
PSX	50	2000	-	-	-
IEX	1	500	-	-	-
CHX	1	500	-	-	through BZXB
NSXP	150	2000	-	-	-

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BIDS	100	500	100	-	Only if limit price is 10% better than near side NBBO
CBX	100	500	100	-	Only if limit price is 10% better than near side NBBO
CSFB	100	500	-	-	Only if limit price is 10% better than near side NBBO
PDQ	100	500	-	-	Only if limit price is 10% better than near side NBBO
CDEL	100	500	-	-	Only if limit price is 10% better than near side NBBO
KMATCH	150	500	-	-	Only if limit price is at or better than near side NBBO

Continued on next page

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
LEVEL	100	500	100	-	Only if limit price is 10% better than near side NBBO
SIGMA-XT	150	500	-	-	Only if limit price is at or better than near side NBBO
JPMX	100	500	-	-	Only if limit price is 10% better than near side NBBO
UBSA	150	500	-	-	Only if limit price is at or better than near side NBBO

Phase 2 - Post Lit and Sweep Dark Pools In parallel, posts on all lit markets and continuously sweeps dark pools with exponential back-off. Client can request posting on dark pools but this is an account level configuration that would need to be enabled. Note that the client won't have an ability to choose between posting or sweeping on dark pools at order level.

Lit Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
AMXP	25	1000	-	-	-
ARCP	100	1000	-	-	-
BYXB	50	1000	-	-	-
BZXB	100	1000	-	-	-
BSX	50	1000	-	-	-
EDGXB	100	1000	-	-	-
EDGAB	25	1000	-	-	-
INET-FIX	100	2000	-	1000	-
XNYS	100	1000	-	-	-
PSX	50	1000	-	-	-
IEX	1	100	-	-	-
CHX	1	100	-	-	through BZXB
NSXP	25	1000	-	-	-

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BIDS	100	500	100	-	Only if limit price is 10% better than near side NBBO
CBX	100	500	100	-	Only if limit price is 10% better than near side NBBO
CSFB	100	500	-	-	Only if limit price is 10% better than near side NBBO
PDQ	100	500	-	-	Only if limit price is 10% better than near side NBBO
CDEL	100	500	-	-	Only if limit price is 10% better than near side NBBO
KMATCH	150	500	-	-	Only if limit price is at or better than near side NBBO
LEVEL	100	500	100	-	Only if limit price is 10% better than near side NBBO
SIGMA-XT	150	500	-	-	Only if limit price is at or better than near side NBBO
JPMX	100	500	-	-	Only if limit price is 10% better than near side NBBO
UBSA	150	500	-	-	Only if limit price is at or better than near side NBBO

Parameters The following optional parameters are available to be specified on the parent order. If not specified then the defaults in the strategy will apply.

Tag	Name	Comments
110	MinQty	N
111	MaxFloor	N
9101	StartTime	N
9102	EndTime	N
9034	PegType	N
211	PegDifference	N
9323	ExcludedVenues	N
9325	SweepType	N
9327	TargetVenues	N
9568	MinimumTriggerVol	N
9569	MinimumTriggerPerc	N
9321	Quickstart	N
9322	MaxMarketOrderSlippageAmount	N
9326	VenueCategory	N

7.1.23.2 LSRD: LSR-DARKSWEEP

Strategy Aggresive Dark-only two-phase strategy to take all available liquidity in dark pools and post the remainder on all dark pools. This two phase strategy sweeps dark pools followed by posting in dark pools.

Phase 1 - Sweep Dark Pools Sweeps the following dark pools in parallel. It continues sweeping until there are no more executions and then sweeps another 20 times before moving to next phase. The built in delay between each sweep (decision interval) is 100 microseconds, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BIDS	100	500	100	-	-
CBX	100	500	100	-	-
CSFB	100	500	-	-	-

Continued on next page

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
PDQ	100	500	-	-	-
KMATCH	150	500	-	-	-
LEVEL	100	500	100	-	-
LX	100	500	100	-	-
SIGMA-XT	150	500	-	-	-
DBSX	100	500	-	-	-
CDEL	100	500	-	-	-
JPMX	100	500	-	-	-
UBSA	150	500	-	-	-

Phase 2 - Post Dark Pools In parallel, continuously sweeps dark pools.

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BIDS	100	500	100	-	-
CBX	100	500	100	-	-
CSFB	100	500	-	-	-
PDQ	100	500	-	-	-
KMATCH	150	500	-	-	-
LEVEL	100	500	100	-	-
LX	100	500	100	-	-
SIGMA-XT	150	500	-	-	-
DBSX	100	500	-	-	-
CDEL	100	500	-	-	-
JPMX	100	500	-	-	-
UBSA	150	500	-	-	-

Parameters The following optional parameters are available to be specified on the parent order. If not specified then the defaults in the strategy will apply.

Tag	Name	Comments
110	MinQty	N
9101	StartTime	N
9102	EndTime	N
9034	PegType	N
211	PegDifference	N

7.1.23.3 LSRDP: LSR-DARKSWEEP-POST

Strategy Aggresive Dark-only two-phase strategy to take all available liquidity in dark pools and post the remainder on all dark pools. This two phase strategy sweeps dark pools followed by posting in dark pools.

Phase 1 - Sweep all Dark pools Sweeps the following dark pools in parallel. It continues sweeping until there are no more executions and then sweeps another 20 times before moving to next phase. The built in delay between each sweep (decision interval) is 100 microseconds, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BIDS	100	500	100	-	-
CBX	100	500	100	-	-
CSFB	100	500	-	-	-
PDQ	100	500	-	-	-
KMATCH	100	500	-	-	-
LEVEL	100	500	100	-	-
LX	100	500	100	-	-
SIGMA-XT	100	500	-	-	-
DBSX	100	500	-	-	-
CDEL	100	500	-	-	-
UBSA	100	500	-	-	-

Phase 2 - Post on Dark pools In parallel, sweeps and posts on all dark pools with limit price.

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BIDS	100	500	100	-	-
CBX	100	500	100	-	-
CSFB	100	500	-	-	-
PDQ	100	500	-	-	-
KMATCH	100	500	-	-	-
LEVEL	100	500	100	-	-
LX	100	500	100	-	-
SIGMA-XT	100	500	-	-	-
DBSX	100	500	-	-	-
UBSA	100	500	-	-	-

Parameters The following optional parameters are available to be specified on the parent order. If not specified then the defaults in the strategy will apply.

Tag	Name	Comments
110	MinQty	N
111	MaxFloor	N
9101	StartTime	N
9102	EndTime	N
9034	PegType	N
211	PegDifference	N

7.1.23.4 LSRH: LSR-HIDDEN

Strategy Aggressive Lit-Dark two-phase strategy that takes all visible liquidity by sweeping and post the remaining on all lit markets as hidden while continuously pinging the dark pools. This is similar to standard LSR except that it will be completely hidden.

Phase 1 - Sweep Lit and Dark Pools Sweeps the following lit markets and dark pools in parallel. It continues sweeping until there are no more executions and then sweeps another 20 times before moving to next phase. The built in delay between each sweep (decision interval) is 100 microseconds, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Lit pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
AMXP	50	2000	-	-	-
ARCP	100	2000	-	-	-
BYXB	200	2000	-	-	-
BZXB	100	2000	-	-	-
BSX	150	2000	-	-	-
EDGXB	100	2000	-	-	-
EDGAB	400	2000	-	-	-
INET-FIX	100	10000	-	-	-
XNYS	100	2000	-	-	-
PSX	50	2000	-	-	-
CHX	1	500	-	-	through BZXB
NSXP	150	2000	-	-	-

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BIDS	100	500	100	-	-
CBX	100	500	100	-	-
CSFB	100	500	-	-	-
PDQ	100	500	-	-	-
KMATCH	150	500	-	-	-
LEVEL	100	500	100	-	-
SIGMA-XT	150	500	-	-	-
DBSX	100	500	-	-	-
CDEL	100	500	-	-	-
JPMX	100	500	-	-	-
UBSA	150	500	-	-	-

Phase 2 - Post Lit and Dark Pools In parallel, posts on all lit markets as hidden and continuously sweeps dark pools with exponential back-off.

Lit pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
AMXP	50	1000	-	0	-
ARCP	100	1000	-	0	-
BYXB	50	1000	-	0	-
BZXB	100	1000	-	0	-
BSX	50	1000	-	0	-
EDGXB	100	1000	100	0	-
EDGAB	50	1000	100	0	-
INET-FIX	100	2000	-	0	-
XNYS	100	1000	-	0	-
PSX	50	1000	-	0	-
CHX	1	1000	-	0	-
NSXP	50	1000	-	0	-

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BIDS	100	500	100	-	-
CBX	100	500	100	-	-
CSFB	100	500	-	-	-
PDQ	100	500	-	-	-
KMATCH	150	500	-	-	-
LEVEL	100	500	100	-	-
SIGMA-XT	150	500	-	-	-
DBSX	100	500	-	-	-
CDEL	100	500	-	-	-
JPMX	100	500	-	-	-

Continued on next page

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
UBSA	150	500	-	-	-

Parameters The following optional parameters are available to be specified on the parent order. If not specified then the defaults in the strategy will apply.

Tag	Name	Comments
110	MinQty	N
9101	StartTime	N
9102	EndTime	N

7.1.23.5 LSRC: LSR-CHEAP

Strategy Aggressive Lit-Dark two-phase strategy that takes all visible liquidity on cost effective venues before moving on to higher cost venues and then posts on venue with higher rebates.

Phase 1 - Sweep Lit and Dark Pools Sweeps the following lit markets and dark pools in parallel. It continues sweeping until there are no more executions and then sweeps another 20 times before moving to next phase. The built in delay between each sweep (decision interval) is 100 microseconds, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Lit Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
AMXP	50	500	-	-	-
ARCP	-	-	-	-	Skips this venue during sweep
BYXB	100	2000	-	-	-
BZXB	-	-	-	-	Skips this venue during sweep
BSX	100	2000	-	-	-
EDGXB	-	-	-	-	Skips this venue during sweep
EDGAB	200	2000	-	-	-

Continued on next page

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
INET-FIX	-	-	-	-	Skips this venue during sweep
XNYS	-	-	-	-	Skips this venue during sweep
PSX	-	-	-	-	Skips this venue during sweep
IEX	-	-	-	-	Skips this venue during sweep
CHX	-	-	-	-	Skips this venue during sweep
NSXP	100	500	-	-	-

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BIDS	100	500	100	-	Only if limit price is at or better than near side NBBO
CBX	100	500	100	-	Only if limit price is at or better than near side NBBO
CSFB	100	500	-	-	Only if limit price is at or better than near side NBBO
PDQ	100	500	-	-	Only if limit price is at or better than near side NBBO
CDEL	100	500	-	-	Only if limit price is at or better than near side NBBO
KMATCH	150	500	-	-	Only if limit price is at or better than near side NBBO

Continued on next page

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
LEVEL	100	500	100	-	Only if limit price is at or better than near side NBBO
SIGMA-XT	150	500	-	-	Only if limit price is at or better than near side NBBO
DBSX	100	500	-	-	Only if limit price is at or better than near side NBBO
JPMX	100	500	-	-	Only if limit price is at or better than near side NBBO
UBSA	150	500	-	-	Only if limit price is at or better than near side NBBO

Phase 2 - Post Lit and sweep Dark Pools In parallel, posts on all lit markets and continuously sweeps dark pools with exponential back-off. Note that any liquidity that wasn't swept on previous phase will be swept here before posting.

Lit Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
AMXP	50	1000	-	-	-
ARCP	100	1000	-	-	-
BYXB	-	-	-	-	-
BZXB	100	1000	-	-	-
BSX	-	-	-	-	-
EDGXB	100	1000	-	-	-
EDGAB	-	-	-	-	-
INET-FIX	100	2000	-	1000	-
XNYS	100	1000	-	-	-
PSX	100	1000	-	-	-
IEX	1	100	-	-	-

Continued on next page

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
NSXP	-	-	-	-	-

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BIDS	100	500	100	-	Only if limit price is at or better than near side NBBO
CBX	100	500	100	-	Only if limit price is at or better than near side NBBO
CSFB	100	500	-	-	Only if limit price is at or better than near side NBBO
PDQ	100	500	-	-	Only if limit price is at or better than near side NBBO
CDEL	100	500	-	-	Only if limit price is at or better than near side NBBO
KMATCH	150	500	-	-	Only if limit price is at or better than near side NBBO
LEVEL	100	500	100	-	Only if limit price is at or better than near side NBBO
SIGMA-XT	150	500	-	-	Only if limit price is at or better than near side NBBO
DBSX	100	500	-	-	Only if limit price is at or better than near side NBBO
JPMX	100	500	-	-	Only if limit price is at or better than near side NBBO

Continued on next page

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
UBSA	150	500	-	-	Only if limit price is at or better than near side NBBO

Parameters The following optional parameters are available to be specified on the parent order. If not specified then the defaults in the strategy will apply.

Tag	Name	Comments
110	MinQty	N
111	MaxFloor	N
9101	StartTime	N
9102	EndTime	N
9034	PegType	N
211	PegDifference	N
9323	ExcludedVenues	N
9327	TargetVenues	N
9568	MinimumTriggerVol	N
9569	MinimumTriggerPerc	N
9322	MaxMarketOrderSlippageAmount	N
9326	VenueCategory	N

7.1.23.6 LSRP: LSR-PASSIVE

Strategy A Passive to Aggressive Multi phase strategy that sweeps Dark markets with mid point pegging, then sweeps Inverted Lit markets with mid point pegging, followed by sweep on Non-Inverted Lit markets with mid point pegging and finally sweeps and posts on all Lit markets.

Phase 1 - Sweeps Dark pools mid-point Sweeps the following dark pools with mid point pegging in parallel. It continues sweeping until there are no more executions and then sweeps once before moving to next phase. The delay between each sweep (decision interval) is set to 0.001 milli-second, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BIDS	100	500	100	-	-
CBX	100	500	100	-	-
PDQ	100	500	-	-	-
CDEL	100	500	-	-	-
LEVEL	100	500	100	-	-
SIGMA-XT	150	500	-	-	-
DBSX	100	500	-	-	-
JPMX	100	500	-	-	-

Phase 2 - Sweeps Inverted Lit pools mid-point Sweeps the following Inverted Lit pools with mid point pegging in parallel. It continues sweeping until there are no more executions and then sweeps once before moving to next phase. The delay between each sweep (decision interval) is set to 0.001 milli-second, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Inverted Lit Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
EDGAB	400	2000	-	-	-
BYXB	200	2000	-	-	-
BSX	150	2000	-	-	-

Phase 3 - Sweeps Non-Inverted Lit pools mid-point Sweeps the following Non-Inverted Lit pools with mid point pegging in parallel. It continues sweeping until there are no more executions and then sweeps once before moving to next phase. The delay between each sweep (decision interval) is set to 0.001 milli-second, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Non-Inverted Lit Pools

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
AMXP	50	2000	-	-	-
ARCP	100	2000	-	-	-
BZXB	100	2000	-	-	-

Continued on next page

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
EDGXB	100	2000	-	-	-
INET-FIX	100	10000	-	-	-
XNYS	100	2000	-	-	-
PSX	50	2000	-	-	-

Phase 4 - Post Lit Pools mid-point In parallel, posts on all lit markets using mid-point pegging.

Lit Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
AMXP	25	1000	-	-	-
ARCP	100	1000	-	-	-
BYXB	50	1000	-	-	-
BZXB	100	1000	-	-	-
BSX	50	1000	-	-	-
EDGXB	100	1000	-	-	-
EDGAB	25	1000	-	-	-
INET-FIX	100	2000	-	1000	-
XNYS	100	1000	-	-	-
PSX	50	1000	-	-	-

Parameters The following optional parameters are available to be specified on the parent order. If not specified then the defaults in the strategy will apply.

Tag	Name	Comments
110	MinQty	N
9101	StartTime	N
9102	EndTime	N

7.1.23.7 LSRPTA: LSR-PASSIVE-TO-AGGRESIVE

Strategy A Passive to Aggressive Multi phase strategy that sweeps Lit and Dark markets with passive price offset of 0.01, then sweeps Inverted Dark markets with mid point pegging, followed by sweep on Non-Inverted Lit markets with mid point pegging and finally sweeps and posts on all Lit and Dark pools.

Phase 1 - Sweep Lit and Dark Pools a penny passive Sweeps the following lit markets and dark pools in parallel with a passive price offset of 0.01. For example if a buy order is set for Dollar 20, then the order will be placed for Dollar 19.99. It continues sweeping until there are no more executions and then sweeps once before moving to next phase.

Lit Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
AMXP	50	2000	-	-	-
ARCP	100	2000	-	-	-
BYXB	200	2000	-	-	-
BZXB	100	2000	-	-	-
BSX	150	2000	-	-	-
EDGXB	100	2000	-	-	-
EDGAB	400	2000	-	-	-
INET-FIX	100	10000	-	-	-
XNYS	100	2000	-	-	-
PSX	50	2000	-	-	-
IEX	1	500	-	-	-
CHX	1	500	-	-	through BZXB
NSXP	150	1000	-	-	-

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BIDS	100	500	100	-	-
CBX	100	500	100	-	-
CSFB	100	500	-	-	-
PDQ	100	500	-	-	-

Continued on next page

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
CDEL	100	500	-	-	-
KMATCH	150	500	-	-	-
LEVEL	100	500	100	-	-
SIGMA-XT	150	500	-	-	-
DBSX	100	500	-	-	-
LX	100	500	100	-	-
UBSA	150	500	-	-	-

Phase 2 - Sweep Inverted and Dark Pools using mid-point Sweep all inverted-lit markets and dark markets in parallel with pegging to mid-point. It continues sweeping until there are no more executions and then sweeps once before moving to next phase.

Inverted Lit Markets:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
EDGAB	400	2000	-	-	-
BYXB	200	2000	-	-	-

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BIDS	100	500	100	-	Only if limit price is 10% better than near side NBBO
CBX	100	500	100	-	Only if limit price is 10% better than near side NBBO
CSFB	100	500	-	-	Only if limit price is 10% better than near side NBBO
PDQ	100	500	-	-	Only if limit price is 10% better than near side NBBO

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Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
CDEL	100	500	-	-	Only if limit price is 10% better than near side NBBO
KMATCH	150	500	-	-	Only if limit price is at or better than near side NBBO
LEVEL	100	500	100	-	Only if limit price is 10% better than near side NBBO
SIGMA-XT	150	500	-	-	Only if limit price is at or better than near side NBBO
DBSX	100	500	-	-	Only if limit price is 10% better than near side NBBO
LX	100	500	100	-	Only if limit price is 10% better than near side NBBO
UBSA	150	500	-	-	Only if limit price is at or better than near side NBBO

Phase 3 - Sweep Non Inverted and Lit Markets using mid-point Sweep all non-inverted lit markets in parallel with pegging to mid-point. It continues sweeping until there are no more executions and then sweeps once before moving to next phase.

Non-Inverted Lit Markets:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
AMXP	50	2000	-	-	-
ARCP	100	2000	-	-	-
BZXB	100	2000	-	-	-
EDGXB	100	2000	-	-	-
INET-FIX	100	10000	-	-	-
XNYS	100	2000	-	-	-

Continued on next page

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
PSX	50	2000	-	-	-
IEX	1	500	-	-	-
CHX	1	500	-	-	through BZXB
NSXP	150	2000	-	-	-

Phase 4 - Post Lit and Dark Pools In parallel, sweeps and posts on all lit markets and dark pools with limit price.

Lit Markets:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
AMXP	25	1000	-	-	-
ARCP	100	1000	-	-	-
BYXB	50	1000	-	-	-
BZXB	100	1000	-	-	-
BSX	50	1000	-	-	-
EDGXB	100	1000	-	-	-
EDGAB	25	1000	-	-	-
INET-FIX	100	2000	-	1000	-
XNYS	100	1000	-	-	-
PSX	50	1000	-	-	-
IEX	1	100	-	-	-
CHX	1	100	-	-	through BZXB
NSXP	25	1000	-	-	-

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BIDS	100	500	100	-	Only if limit price is 10% better than near side NBBO
CBX	100	500	100	-	Only if limit price is 10% better than near side NBBO
CSFB	100	500	-	-	Only if limit price is 10% better than near side NBBO
CDEL	100	500	-	-	Only if limit price is 10% better than near side NBBO
KMATCH	150	500	-	-	Only if limit price is at or better than near side NBBO
LEVEL	100	500	100	-	Only if limit price is 10% better than near side NBBO
SIGMA-XT	150	500	-	-	Only if limit price is at or better than near side NBBO
DBSX	100	500	-	-	Only if limit price is 10% better than near side NBBO
LX	100	500	100	-	Only if limit price is 10% better than near side NBBO
UBSA	150	500	-	-	Only if limit price is at or better than near side NBBO

Parameters The following optional parameters are available to be specified on the parent order. If not specified then the defaults in the strategy will apply.

Tag	Name	Comments
110	MinQty	N
111	MaxFloor	N

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Tag	Name	Comments
9101	StartTime	N
9102	EndTime	N
9323	ExcludedVenues	N
9327	TargetVenues	N
9322	MaxMarketOrderSlippageAmount	N
9326	VenueCategory	N

7.1.23.8 LSRA: LSR-AGGRESSIVE

Strategy Aggressive Lit-Dark two-phase strategy to take all visible liquidity and posts the remainder as iceberg on primary market.

Phase 1 - Sweep Lit Sweeps the following lit markets in parallel. It continues sweeping until there are no more executions and then sweeps another 4 times before moving to next phase. The built in delay between each sweep (decision interval) is 100 microseconds, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable. Note that this strategy uses price level sweep as default and to request ISO sweeps, the client would need to specify that using SweepType tag.

Also, you can achieve fully hidden posting using Invisible order option.

Lit Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
AMXP	50	2000	-	-	-
ARCP	100	2000	-	-	-
BYXB	200	2000	-	-	-
BZXB	100	2000	-	-	-
BSX	150	2000	-	-	-
EDGXB	100	2000	-	-	-
EDGAB	400	2000	-	-	-
INET-FIX	100	10000	-	-	-
XNYS	100	2000	-	-	-
PSX	50	2000	-	-	-

Continued on next page

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
IEX	1	500	-	-	-
CHX	1	500	-	-	through BZXB
NSXP	150	2000	-	-	-

Phase 2 - Post Lit primary Post the remainder shares to the primary listing market with only 100 shares displayed.

Lit Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
AMXP	100	5000	-	100	Tape B
ARCP	100	5000	-	100	-
BZXB	100	5000	-	100	-
INET-FIX	100	5000	-	100	Tape C
XNYS	100	5000	-	100	Tape A

Parameters The following optional parameters are available to be specified on the parent order. If not specified then the defaults in the strategy will apply.

Tag	Name	Comments
110	MinQty	N
111	MaxFloor	N
9101	StartTime	N
9102	EndTime	N
9034	PegType	N
211	PegDifference	N
9323	ExcludedVenues	N
9325	SweepType	N
9327	TargetVenues	N
9568	MinimumTriggerVol	N
9569	MinimumTriggerPerc	N

Continued on next page

Tag	Name	Comments
9321	Quickstart	N
9322	MaxMarketOrderSlippageAmount	N

7.1.23.9 LSRN: LSR-NEUTRAL

Strategy A Passive to Aggressive Multi phase strategy that sweeps Dark, Inverted Lit markets, and Non-Inverted Lit markets with mid point pegging initially, then sweeps liquidity on Dark and Inverted markets without pegging and finally sweeps and posts on all Lit markets as iceberg post.

Phase 1 - Sweeps Dark pools mid-point Sweeps the following dark pools with mid point pegging in parallel. It continues sweeping until there are no more executions and then sweeps three times before moving to next phase. The delay between each sweep (decision interval) is set to 0.001 milli-second, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BIDS	100	500	100	-	Only if limit price is 50% better than near side NBBO
CBX	100	500	100	-	Only if limit price is 50% better than near side NBBO
CSFB	100	500	-	-	Only if limit price is 50% better than near side NBBO
PDQ	100	500	-	-	Only if limit price is 50% better than near side NBBO
CDEL	100	500	-	-	Only if limit price is 50% better than near side NBBO
LEVEL	100	500	100	-	Only if limit price is 50% better than near side NBBO

Continued on next page

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
SIGMA-XT	150	500	-	-	Only if limit price is 50% better than near side NBBO
DBSX	100	500	-	-	Only if limit price is 50% better than near side NBBO
JPMX	100	500	-	-	Only if limit price is 50% better than near side NBBO
UBSA	150	500	-	-	Only if limit price is 50% better than near side NBBO

Phase 2 - Sweeps Inverted Lit pools mid-point Sweeps the following Inverted Lit pools with mid point pegging in parallel. It continues sweeping until there are no more executions and then sweeps three times before moving to next phase. The delay between each sweep (decision interval) is set to 0.001 milli-second, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Inverted Lit Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
EDGAB	400	2000	-	-	Only if limit price is 50% better than near side NBBO
BSX	150	2000	-	-	Only if limit price is 50% better than near side NBBO
BYXB	200	2000	-	-	Only if limit price is 50% better than near side NBBO

Phase 3 - Sweeps Lit pools mid-point Sweeps the following Non-Inverted Lit pools with mid point pegging in parallel. It continues sweeping until there are no more executions and then sweeps three times before moving to next phase. The delay between each sweep (decision interval) is set to 0.001 milli-second, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Non-Inverted Lit Pools

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
AMXP	50	2000	-	-	Only if limit price is 50% better than near side NBBO
ARCP	100	2000	100	-	Only if limit price is 50% better than near side NBBO
BYXB	200	2000	-	-	Only if limit price is 50% better than near side NBBO
BZXB	100	2000	-	-	Only if limit price is 50% better than near side NBBO
BSX	150	2000	-	-	Only if limit price is 50% better than near side NBBO
EDGXB	100	2000	-	-	Only if limit price is 50% better than near side NBBO
EDGAB	400	2000	-	-	Only if limit price is 50% better than near side NBBO
INET-FIX	100	10000	-	-	Only if limit price is 50% better than near side NBBO
XNYS	100	2000	-	-	Only if limit price is 50% better than near side NBBO
PSX	50	2000	-	-	Only if limit price is 50% better than near side NBBO
IEX	1	500	-	-	Only if limit price is 50% better than near side NBBO
CHX	1	500	-	-	Only if limit price is 50% better than near side NBBO

Continued on next page

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
NSXP	150	2000	-	-	Only if limit price is 50% better than near side NBBO, through BZXB

Phase 4 - Sweeps Dark pools and inverted lit markets in parallel Sweeps the following dark pools and inverted lit markets in parallel, continues sweeping until there are no more executions and then sweeps five times before moving to next phase. The delay between each sweep (decision interval) is set to 0.001 milli-second, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Inverted Lit Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
EDGAB	1	500	-	-	Only if limit price is at or better than near side NBBO
BSX	1	500	-	-	Only if limit price is at or better than near side NBBO
BYXB	1	500	-	-	Only if limit price is at or better than near side NBBO

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BIDS	100	500	100	-	Only if limit price is 10% better than near side NBBO
CBX	100	500	100	-	Only if limit price is 10% better than near side NBBO
CSFB	100	500	-	-	Only if limit price is 10% better than near side NBBO

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Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
PDQ	100	500	-	-	Only if limit price is 10% better than near side NBBO
CDEL	100	500	-	-	Only if limit price is 10% better than near side NBBO
KMATCH	150	500	-	-	Only if limit price is at or better than near side NBBO
LEVEL	100	500	100	-	Only if limit price is 10% better than near side NBBO
SIGMA-XT	150	500	-	-	Only if limit price is at or better than near side NBBO
DBSX	100	500	-	-	Only if limit price is 10% better than near side NBBO
JPMX	100	500	-	-	Only if limit price is at or better than near side NBBO
LX	100	500	100	-	Only if limit price is 10% better than near side NBBO
UBSA	150	500	-	-	Only if limit price is at or better than near side NBBO

Phase 5 - Sweeps Lit markets Sweeps the following Lit markets in parallel, continues sweeping until there are no more executions and then sweeps twice before moving to next phase. The delay between each sweep (decision interval) is set to 0.001 milli-second, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Inverted Lit Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
AMXP	50	2000	-	-	-
ARCP	100	2000	-	-	-
BYXB	200	2000	-	-	-
BZXB	100	2000	-	-	-
BSX	150	2000	-	-	-
EDGXB	100	2000	-	-	-
EDGAB	400	2000	-	-	-
INET-FIX	100	10000	-	-	-
XNYS	100	2000	-	-	-
PSX	50	2000	-	-	-
IEX	1	500	-	-	-
CHX	1	500	-	-	through BZXB
NSXP	150	2000	-	-	-

Phase 6 - Post Lit Pools In parallel, sweeps and posts on all lit markets with limit price but only 100 shares visible per market.

Lit Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
ARCP	100	5000	-	100	-
BZXB	100	5000	-	100	-
EDGXB	100	5000	-	100	-
INET-FIX	100	5000	-	100	-
XNYS	100	5000	-	100	-
PSX	50	5000	-	100	-

Parameters The following optional parameters are available to be specified on the parent order. If not specified then the defaults in the strategy will apply.

Tag	Name	Comments
110	MinQty	N
111	MaxFloor	N
9101	StartTime	N
9102	EndTime	N

7.1.23.10 LSRW: LSR-WHEEL

Strategy A Multi phase strategy that sweeps Dark pools, then sweeps protected markets, and finally sweeps and posts on INET-FIX.

Phase 1 - Sweep Dark Pools Sweeps the following dark pools in parallel, continues sweeping until there are no more executions and then sweeps once before moving to next phase. The delay between each sweep (decision interval) is set to 0.001 milli-second, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
CDEL	200	500	-	-	Only if limit price is 10% better than near side NBBO
CSFB	200	500	-	-	Only if limit price is 10% better than near side NBBO
PDQ	200	500	-	-	Only if limit price is 10% better than near side NBBO
KMATCH	200	500	-	-	-
SIGMA-XT	200	500	-	-	-
JPMX	100	500	-	-	Only if limit price is 10% better than near side NBBO
LEVEL	100	500	100	-	Only if limit price is 10% better than near side NBBO

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Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
LX	100	500	100	-	Only if limit price is 10% better than near side NBBO
CBX	100	500	100	-	Only if limit price is 10% better than near side NBBO
BIDS	100	500	100	-	Only if limit price is 10% better than near side NBBO

Phase 2 - Sweep Protected Pools Sweeps the following protected pools in parallel, continues sweeping until there are no more executions and then sweeps twice before moving to next phase. The delay between each sweep (decision interval) is set to 0.001 milli-second, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Protected Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
AMXP	50	2000	-	-	-
ARCP	100	2000	-	-	-
BYXB	200	2000	-	-	-
BZXB	100	2000	-	-	-
BSX	150	2000	-	-	-
EDGXB	100	2000	-	-	-
EDGAB	400	2000	-	-	-
INET-FIX	100	10000	-	-	-
XNYS	100	2000	-	-	-
PSX	50	2000	-	-	-
IEX	1	500	-	-	-
CHX	1	500	-	-	through BZXB
NSXP	150	2000	-	-	-

Phase 3 - Post INET-FIX Sweeps and posts on INET-FIX with routing enabled.

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
INET-FIX	100	2000	-	1000	-

Parameters The following optional parameters are available to be specified on the parent order. If not specified then the defaults in the strategy will apply.

Tag	Name	Comments
110	MinQty	N
111	MaxFloor	N
9101	StartTime	N
9102	EndTime	N
9034	PegType	N
211	PegDifference	N

7.1.23.11 LSRDW: LSR-DARKWHEEL

Strategy A Multi Phase strategy that sweeps the given list of venues in parallel with midpoint peg during 1st, 2nd and 3rd phase, then Sweeps given list of venues in sequence with midpoint peg during 4th and finally Posts the remaining on SIGMA-X with midpoint peg.

Phase 1 - Sweep requested Dark Pools Sweeps the following markets in parallel with midpoint pegging and equal weight. It continues sweeping until there are no more executions and then sweeps another 10 times before moving to next phase. The built in delay between each sweep (decision interval) is 100 microseconds, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
CDEL	200	500	-	-	Only if limit price is 10% better than near side NBBO
SIGMA-XT	200	500	-	-	-

Phase 2 - Sweep requested Dark Pools Sweeps the following markets in parallel with midpoint pegging and equal weight. It continues sweeping until there are no more executions and then sweeps another 10 times before moving to next phase. The built in delay between each sweep

(decision interval) is 100 microseconds, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
JPMX	200	500	-	-	Only if limit price is 10% better than near side NBBO
BIDS	200	500	100	-	Only if limit price is 10% better than near side NBBO
CBX	200	500	100	-	Only if limit price is 10% better than near side NBBO
KMATCH	200	500	-	-	-

Phase 3 - Sweep requested Dark Pools Sweeps the following markets in parallel with midpoint pegging and equal weight. It continues sweeping until there are no more executions and then sweeps another 10 times before moving to next phase. The built in delay between each sweep (decision interval) is 100 microseconds, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
DBSX	200	500	-	-	Only if limit price is 10% better than near side NBBO
LEVEL	200	500	100	-	Only if limit price is 10% better than near side NBBO
LX	200	500	100	-	Only if limit price is 10% better than near side NBBO

Phase 4 - Sweep Dark Pools Sweeps the following markets with midpoint pegging and equal weight sequentially in order listed below. It continues sweeping every market until there are no more executions and then sweeps again once before moving to next market. The built in

delay between each sweep (decision interval) is 100 microseconds, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Dark Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
CDEL	200	500	-	-	-
SIGMA-XT	200	500	-	-	-
KMATCH	200	500	-	-	-
BIDS	200	500	100	-	-
JPMX	200	500	-	-	-
CBX	200	500	100	-	-
DBSX	200	500	-	-	-
LEVEL	200	500	100	-	-
LX	200	500	100	-	-

Phase 5 - Post SIGMA-X Sweeps and posts on SIGMA-X using mid-point pegging

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
SIGMA-XT	150	500	-	-	-

Parameters The following optional parameters are available to be specified on the parent order. If not specified then the defaults in the strategy will apply.

Tag	Name	Comments
110	MinQty	N
9101	StartTime	N
9102	EndTime	N

7.1.23.12 LSRHNS: LSR-HIDE-N-SWEEP

Strategy A Multi Phase strategy that sweeps the given list of venues in sequence during 1st phase and in parellel during 2nd and 3rd phase. Finally Posts the remaining on Primary venues.

Phase 1 - Sweep requested Dark Pools Sweeps the following markets with midpoint pegging as hidden in the sequential order listed below. It continues sweeping every market until there are no more executions and then sweeps again once before moving to next market. The built in delay between each sweep (decision interval) is .001 milliseconds, which is the delay to accumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Venues:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BYXB	200	2000	-	0	-
BSX	150	2000	-	0	-
CSFB	100	500	-	-	-
PDQ	100	500	-	-	-
EDGAB	400	2000	100	0	-
EDGXB	100	2000	100	0	-
INET-FIX	100	10000	-	0	-
ARCP	100	2000	-	-	-
AMXP	100	50	-	0	-
BZXB	100	2000	-	0	-

Phase 2 - Sweep requested Dark Pools Sweeps the following markets in parallel as hidden. It continues sweeping until there are no more executions and then sweeps again once before moving to next phase. The built in delay between each sweep (decision interval) is 100 microseconds, which is the delay toaccumulate all responses and any fills before reallocating shares for the next sweep attempt. This delay is configurable.

Venues:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BYXB	200	2000	-	0	-
EDGAB	200	2000	-	0	-
BSX	200	2000	-	0	-
XNYS	150	2000	-	0	-
INET-FIX	150	10000	-	0	-
BZXB	150	2000	-	0	-

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Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
EDGXB	150	2000	-	0	-
CBX	150	500	100	-	Only if limit price is 10% better than near side NBBO
AMXP	150	2000	-	0	-
ARCP	150	2000	-	-	-
PSX	150	2000	-	0	-
IEX	150	500	-	-	-
CDEL	150	500	-	-	Only if limit price is 10% better than near side NBBO
KMATCH	150	500	-	-	-
SIGMA-XT	150	500	-	-	-
LX	150	500	100	-	Only if limit price is 10% better than near side NBBO
JPMX	100	500	-	-	Only if limit price is 10% better than near side NBBO
LEVEL	100	500	100	-	Only if limit price is 10% better than near side NBBO
BIDS	100	500	100	-	Only if limit price is 10% better than near side NBBO
CSFB	100	500	-	-	Only if limit price is 10% better than near side NBBO
PDQ	100	500	-	-	Only if limit price is 10% better than near side NBBO

Phase 3 - Sweep requested Pools Sweeps the following markets in parallel with equal weight. It continues sweeping until there are no more executions and then sweeps another 3 times before moving to next phase. The built in delay between each sweep (decision interval) is 100 microseconds, which is the delay to accumulate all responses and any fills before reallocating shares

for the next sweep attempt. This delay is configurable.

Venues:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
BYXB	150	2000	-	-	-
EDGAB	150	2000	-	-	-
BSX	150	2000	-	-	-
XNYS	150	2000	-	-	-
INET-FIX	150	10000	-	-	-
BZXB	150	2000	-	-	-
EDGXB	150	2000	-	-	-
CBX	150	500	100	-	-
ARCP	150	2000	-	-	-
PSX	150	2000	-	-	-
AMXP	150	2000	-	-	-

Phase 4 - Post Lit primary Post the remainder shares to the primary listing market with only 100 shares displayed in each and route-out enabled.

Lit Pools:

Venues	Relative Weight	Max Quantity	Min Quantity	Max Floor	Comment
AMXP	100	5000	-	100	Tape B
ARCP	100	5000	-	100	-
BZXB	100	5000	-	100	-
INET-FIX	100	5000	-	100	Tape C
XNYS	100	5000	-	100	Tape A

Parameters The following optional parameters are available to be specified on the parent order. If not specified then the defaults in the strategy will apply.

Tag	Name	Comments
110	MinQty	N

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Tag	Name	Comments
111	MaxFloor	N
9101	StartTime	N
9102	EndTime	N

7.1.24 LSS (Lime Benchmark Algos)

Tag	Field Name	Type	Comments
9099	OddLotSplitting	Boolean	Enable odd lot splitting. Compatible with the 'VWAP', 'TWAP', 'IS' or 'CLOSE' strategies
9100	Strategy	String	Strategy identifier Supported values: 'CLOSE' — CLOSE algo strategy 'IS' — IS also strategy 'POV' — POV algo strategy 'SCALEPOV' — Scale POV algo strategy 'TWAP' — TWAP algo strategy 'VWAP' — VWAP algo strategy
9101	StartTime	UTC Timestamp	Strategy starting time (effective time) Supported values: n/a Default value: Current time Range: n/a Step Size: 1 minute
9102	EndTime	UTC Timestamp	Strategy ending time (expire time). Supported values: n/a Default value: 16:00 ET (4PM Eastern Time) Range: n/a Step Size: 1 minute
9103	MaxParticipation	Decimal	Maximum Participation. Supported values: Up to 2 decimal places Default value: No default value Range: 0.01 - 99.99 Step Size: 0.01

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Tag	Field Name	Type	Comments
9106	IWouldPx	Decimal	I Would Price. Supported values: Up to 4 decimal places Default value: No default value Range: >0 Step Size: 0.0001
9111	Aggression	Integer	Aggression Supported values: Integers 0-10 Default value: No default value Range: 0,1 ... 10 Step Size: 1
9112	TiltMode	Integer	Determines the methodology used to tilt VWAP based schedule in IS and CLOSE algos Supported values: 1 = ModelDriven, 2 = Simple Default value: ModelDriven Range: 1-2 Step Size: 1
9117	BlockLimit	Integer	Block Limit Supported values: Integers Default value: No default value Range: 100-1,000,000 Step Size: 1000

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Tag	Field Name	Type	Comments
9145	Tracking	Integer	Tracking Supported values: 1 = AP-Revert-Low 2 = AP-Revert-Med 3 = AP-Revert-High 4 = AP-Trend-Low 5 = AP-Trend-Med 6 = AP-Trend-High 7 = S&P-Revert-Low 8 = S&P-Revert-Med 9 = S&P-Revert-High 10 = S&P-Trend-Low 11 = S&P-Trend-Med 12 = S&P-Trend-High 13 = Sector-Revert-Low 14 = Sector-Revert-Med 15 = Sector-Revert-High 16 = Sector-Trend-Low 17 = Sector-Trend-Med 18 = Sector-Trend-High 19 = RefPx-Revert-Low 20 = RefPx-Revert-Med 21 = RefPx-Revert-High 22 = RefPx-Trend-Low 23 = RefPx-Trend-Med 24 = RefPx-Trend-High Default value: No default value Range: 1-24 Step Size: 1 Values 19-24 require RefPx
9146	RefPx	Decimal	Reference Price Supported values: n/a Default value: No default value Range: >0 Step Size: 0.0001
9147	MinParticipation	Float	Minimum Participation Supported values: n/a Default value: No default value Range: 0.01 - 99.99 Step Size: 0.01

Continued on next page

Tag	Field Name	Type	Comments
9310	OnOpenQty	Integer	On Open Quantity Supported values: n/a Default value No default value Range ≥ -1. -1 indicates automatic calculation based on historical values. Step Size
9311	OnCloseQty	Integer	On Close Quantity Supported values: n/a Default value No default value Range ≥ -1. -1 indicates automatic calculation based on historical values. Step Size

7.1.24.1 CLOSE Strategy

Minimizes risk-adjusted slippage relative to the closing price by creating a back-weighted trajectory vs VWAP volume profile. Aggression parameter influences how strongly to tilt the trajectory towards the order end time.

TiltMode can be used to specify tilt methodology. In the default ModelDriven mode, the Aggression parameter is mapped to a risk tolerance value which combines with the instrument's liquidity and volatility profile to determine the strength of the tilt – the tilt vs the VWAP schedule will more pronounced with higher aggression, higher instrument liquidity, higher instrument volatility, and longer order duration. In Simple mode, Aggression 10 means 50% of the order will be scheduled in the time the VWAP schedule would target completing the last 20% of the order, regardless of the instrument and duration of the order, Aggression 5 means 35% will be scheduled where VWAP would schedule 20%, whereas Aggression 0 will behave similarly to VWAP.

In addition to the required FIX tags for orders as described above, the below parameters are available on the CLOSE strategy, all of which may be modified via Cancel/Replace.

Strategy Parameters

Tag	Field Name	Req'd
9101	StartTime	N
9102	EndTime	N
9103	MaxParticipation	N
9106	IWouldPx	N

Continued on next page

Tag	Field Name	Req'd
9111	Aggression	N
9112	TiltMode	N
9311	OnCloseQty	N

7.1.24.2 IS Strategy

Seeks to minimize risk-adjusted slippage relative to the arrival price by creating a front-weighted trajectory vs VWAP volume profile. Aggression parameter influences how strongly to tilt the trajectory towards the order start time. A Tracking parameter may also be used to dynamically adjust the tilt to pursue trend following or reversionary behavior.

TiltMode can be used to specify tilt methodology. In the default ModelDriven mode, the Aggression parameter is mapped to a risk tolerance value which combines with the instrument's liquidity and volatility profile to determine the strength of the tilt – the tilt vs the VWAP schedule will more pronounced with higher aggression, higher instrument liquidity, higher instrument volatility, and longer order duration. In Simple mode, with neutral Tracking, Aggression 10 means 50% of the order will be scheduled in the time the VWAP schedule would target completing the first 20% of the order, regardless of the instrument and duration of the order, Aggression 5 means 35% will be scheduled where VWAP would schedule 20%, whereas Aggression 0 will behave similarly to VWAP.

In addition to the required FIX tags for orders as described above, the below parameters are available on the IS strategy, all of which may be modified via Cancel/Replace.

Strategy Parameters

Tag	Field Name	Req'd
9101	StartTime	N
9102	EndTime	N
9103	MaxParticipation	N
9106	IWouldPx	N
9111	Aggression	N
9112	TiltMode	N
9145	Tracking	N
9146	ReferencePx	N
9310	OnOpenQty	N

7.1.24.3 POV Strategy

Tracks and reacts to real-time market volumes to target a user-defined participation rate. Be X percent of the volume. In addition to the required FIX tags for orders as described above, the below parameters are available on the POV strategy.

Strategy Parameters

Tag	Field Name	Req'd
9101	StartTime	N
9102	EndTime	N
9103	MaxParticipation	Y
9106	IWouldPx	N
9111	Aggression	N
9117	BlockLimit	N

7.1.24.4 SCALEPOV Strategy

Builds on the POV strategy by dynamically adjusting target market participation rate as a function of real-time market conditions relative to a chosen benchmark. Scale between X and Y percent of the volume, depending on market conditions. In addition to the required FIX tags for orders as described above, the below parameters are available on the SCALEPOV strategy.

Strategy Parameters

Tag	Field Name	Req'd
9101	StartTime	N
9102	EndTime	N
9103	MaxParticipation	Y
9106	IWouldPx	N
9117	BlockLimit	N
9145	Tracking	N
9146	ReferencePx	N
9147	MinParticipation	Y

7.1.24.5 TWAP Strategy

Executes desired quantity at a constant rate over a user-defined interval. Spread it out over the day/number of hours. In addition to the required FIX tags for orders as described above, the below parameters are available on the TWAP strategy.

Strategy Parameters

Tag	Field Name	Req'd
9101	StartTime	N
9102	EndTime	N
9103	MaxParticipation	N
9106	IWouldPx	N
9310	OnOpenQty	N
9311	OnCloseQty	N

7.1.24.6 VWAP Strategy

Creates a pre-trade schedule based on historical volume patterns and targets the volume weighted average price. Match the volume-weighted average price over the day/ number of hours. In addition to the required FIX tags for orders as described above, the below parameters are available on the VWAP strategy.

Strategy Parameters

Tag	Field Name	Req'd
9101	StartTime	N
9102	EndTime	N
9103	MaxParticipation	N
9106	IWouldPx	N
9310	OnOpenQty	N
9311	OnCloseQty	N

7.2 Order Cancel Request

The order cancel request message requests the cancellation of all of the remaining shares or contracts of an existing order. Lime Brokerage supports the ability to send one message to cancel all open orders. This reduces message traffic during high-volume periods of the day, and also is significantly faster for clients that have a large number of outstanding orders.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 'F'
11	ClOrdID	Y	Unique ID of cancel request as assigned by the client.
37	OrderID	N	Optional. If populated this field must be the numeric 64-bit Lime order ID that was populated in tag 37 of the order acknowledgment to the client. If populated, the value of tag 41 is ignored. Specifying the correct Lime order ID in tag 37 will result in slightly faster processing of the cancel request by Lime.
41	OrigClOrdID	Y	ClOrdID of the order begin cancelled.
9020	CancelAllOpen	N	Boolean. If enabled, tags 37 and 41 are ignored and Lime will attempt to cancel all open orders for the account.
	Standard Trailer	Y	

7.3 Order Partial Cancel Request

The order partial cancel request message requests the cancellation of part of the open order quantity. Partial cancel is only supported on NYX. All subsequent messages in this order chain should continue to use the OrigClOrdID or OrderID of the open order.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 'F'
11	ClOrdID	Y	Unique ID of cancel request as assigned by the client.
37	OrderID	N	Optional. If populated this field must be the numeric 64-bit Lime order ID that was populated in tag 37 of the order acknowledgment to the client. If populated, the value of tag 41 is ignored. Specifying the correct Lime order ID in tag 37 will result in slightly faster processing of the cancel request by Lime.
41	OrigClOrdID	Y	ClOrdID of the order being partially cancelled.
151	LeavesQty	Y	Order quantity to be left open. This quantity does not include fills.
	Standard Trailer	Y	

7.4 Order Cancel Replace Request

The order cancel/replace request is used to change the parameters of an existing order. Do not use this message to cancel the remaining quantity of an outstanding order; use the Cancel Request message for this purpose. The Lime implementation of Cancel Replace does not support the use of this message to "re-open" an already completed order (i.e. an order that has been completely filled or cancelled). All such orders will be rejected by the Lime system.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 'G'
40	OrdType	N	Use this to change orders from limit to market. If not specified, it will default to OrdType of previous order in chain. Supported values: '1' Market '2' Limit '3' Stop Order '4' Stop-Limit Order
41	OrigClOrdID	Y	ClOrdID of the previous order in the chain (NOT the initial order of the chain).

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Tag	Field Name	Req'd	Comments
37	OrderID	N	Optional, see Comments for tag 37 above in the Order Cancel Request message description. If populated, this tag must be the Lime order ID for the previous order in the chain.
11	ClOrdID	Y	Alphanumeric, 16 characters maximum. Unique client order ID for the new order.
38	OrderQty	N	This value represents the total intended order quantity (including the amount already executed for this chain of orders).
44	Price	N	Required for limit order types when changing price. Should not be specified if OrdType = 1.
99	StopPrice	N	Required for Stop and Stop-Limit orders. Designated the stop trigger price.
110	MinQty	N	Minimum quantity of an order to be executed. Specify if one wishes to change this value on the replace. Changing MinQty is only supported on ARCP venues.
9692	ModifySetting	N	Use this to indicate that you want C/R messages sent to exchanges using order modify requests, for supported venues (NYSE and INET family exchanges). For successfully modified orders, execution reports will include tag 9693. Supported values: 1 — Disabled, send the destination venue a Cancel/Replace message (default) 3 — Auto, our servers will conditionally convert the C/R message to a modify request if the C/R message can be converted to a modify request. A C/R message may be converted to a modify request if the destination venue supports modify requests, and if the C/R message only reduces order quantity without modifying other fields. If successful, the resulting Cancel/Replace execution report will contain integer value 1 in body tag 9693.
	Standard Trailer	Y	

7.5 Bulk Cancel Request

A "bulk cancel" request provides a mechanism to send cancel requests for multiple orders in a single message. The bulk cancel request as a whole has a unique identifier, just like a normal cancel request, but in addition a unique identifier must be provided for each order to be cancelled.

For example, if there are three active orders with client order id's 100, 101, and 102, then: "11=200—9021=201:100,202:101,203:102" would be a valid bulk cancel request. (Assuming 200,201,202,203 had not already been used as client ids.)

Bulk cancel requests have no special response message. Individual cancel or cancel-reject acknowledgments will be sent for each order.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 's'
11	ClOrdID	Y	Unique client id identifying this bulk cancel request as a whole.
9021	CancelPairs	Y	Comma-separated list of "cancel pairs" of orders to cancel. Each pair takes the form "ClOrdID:OrigClOrdId", where "OrigClOrdID" is the ClOrdID of the order to be cancelled, and "ClOrdID" is a unique identifier representing the cancel request for this order.
	Standard Trailer	Y	

7.6 Order Cancel Reject

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = '9'
37	OrderID	Y	64-bit numeric Lime order id.
11	ClOrdID	Y	Unique order id assigned by institution to the cancel request or to the replacement order. If the cancel reject is in response to a cancel request, and that cancel request was not made by the client directly. (IE, cancel-all, cancel on disconnect, or a market unsolicited cancel), then this field will have value "¡NONE¿".
41	OrigClOrdID	Y	Client order id which could not be canceled/replaced. Client order id of the previous order (NOT the initial order of the chain) when canceling-replacing an order.
39	OrdStatus	Y	Order status after this cancel reject is applied.
58	Text	N	Unbounded String field conveying the reason for the rejection. Not all markets provide this information.

Continued on next page

Tag	Field Name	Req'd	Comments
102	CxlRejReason	N	Optional code which gives the reason for the cancel reject. Generally will only be present if 434 = '1'. Not all markets provide this information. Supported values: '0' Too late to cancel '1' Unknown or completed order '2' Broker option '3' Order already has a pending cancel '6' Duplicate ClOrdID
434	CxlRejResponseTo	N	Distinguishes cancel/cancel-replace rejects. Supported values: '1' Cancel Reject '2' Cancel Replace Reject
	Standard Trailer	Y	

7.7 Execution Report

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = '8'
150	ExecType	Y	Character. The type of this Execution Report. FIX 'Execution Reports' are not only used to communicate fills. They are the standard container for application-level messages from server to client. ExecType describes what type of message this is. Supported Values: '0' New (Order has been accepted) '1' Partial Fill '2' Fill (order is now completely filled) '3' Done for day '4' Canceled (U R OUT) '5' Replace (order has been cancel-replaced) '8' Rejected (order has been rejected) 'D' Restated , with ExecRestatementReason(378) set

Continued on next page

Tag	Field Name	Req'd	Comments
39	OrdStatus	Y	Character. Describes the current state of the order (or chain of orders if cancel-replaced). Supported Values: '0' New (Order has been accepted) '1' Partial Fill '2' Fill (order is now completely filled) '3' Done for day '4' Canceled (U R OUT) '5' Replace (order has been cancel-replaced) '6' Pending Cancel 'E' Pending Replace '8' Rejected (order has been rejected)
37	OrderID	Y	64-bit number (or up to 20 digits).
11	ClOrdID	Y	This tag will be populated on all execution reports for orders placed via FIX. When an execution report is in response to a cancel request, this tag will represent the client order id submitted on the cancel request and tag 41 will contain the client order ID of the order itself. If the execution report is in response to a cancel request, and that cancel request was not made by the client directly. (IE, cancel-all, cancel on disconnect, or a market unsolicited cancel), then this field will have value "¡NONE¿".
41	OrigClOrdID	N	Will be populated on all execution reports of ExecType (tag 150) 4 (Canceled) or 5 (Replaced) when the cancel or replace request was submitted via FIX. When 150=5 (Replaced) this tag will represent the ClOrdID of the previous order in the chain.
17	ExecID	Y	This execution ID will be unique across all trading days. Max size is 80 alphanumeric characters. Subscribers should inspect the value of this tag in order to detect duplicate fills (the same value in tag 17 means the same fill).
76	ExecBroker	Y	The route/destination. This is the same String that was submitted in tag 100 (or 9012) on the new order.
20	ExecTransType	Y	Supported values: '0' New (normal) '1' Cancel (only will occur on trade breaks)

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Tag	Field Name	Req'd	Comments
19	ExecRefID	N	When 20=1, indicating a trade break, the subscriber should inspect this tag to identify the execution being broken (the value of tag 19 here will match the value of tag 17 for a previous execution).
55	Symbol	Y	See discussion of symbology in Appendix A
65	SymbolSfx	N	See discussion of symbology in Appendix A
54	Side	Y	Identical to value submitted in New Order message.
48	SecurityID	N	Security identifier value (e.g. CUSIP, SEDOL, ISIN, etc). Type is specified in SecurityIDSource (tag 22). If specified in the original order this tag is simply echoed back in the Execution Report. Otherwise, this tag is not present.
22	SecurityIDSource	N	Identifies class or source of the SecurityID (tag 48) value. If specified in the original order this tag is simply echoed back in the Execution Report. Otherwise this tag is not present.
38	OrderQty	Y	Identical to value submitted in New Order message.
40	OrdType	Y	Identical to value submitted in New Order message.
44	Price	N	For limit orders, identical to value submitted in New Order message.
32	LastShares	Y	Quantity of shares or contracts filled on this fill when ExecType = Filled or Partially Filled. Otherwise this tag is 0.
31	LastPx	Y	Price of this fill when ExecType = Filled or Partially Filled. Otherwise this tag is 0.
30	LastMkt	N	Executing venue MIC that will be present on all original fills. Note that the routed-to venue is not provided by many markets, in which case we will use the market MIC itself. See Appendix C for valid values.
29	LastCapacity	N	Broker capacity in order execution.

Continued on next page

Tag	Field Name	Req'd	Comments
151	LeavesQty	Y	Number of shares or contracts open for further execution. If the OrdStatus is Rejected (in which case the order is no longer active) then LeavesQty will be 0, otherwise LeavesQty = OrderQty - CumQty. If the OrdStatus is Cancelled, LeavesQty will contain the remaining open quantity in response to a Partial Cancel, and will be 0 in response to a Cancel.
14	CumQty	Y	Number of shares or contracts executed in total so far for this order or chain of orders.
6	AvgPx	Y	Average price of fills so far for this order or chain of orders.
60	TransactTime	Y	Lime Brokerage will always send a transaction time. This is the time the event occurred (as opposed to the time it was sent).
58	Text	N	Unbounded String field. Will contain a reject reason when 150=8.
8001	Liquidity	N	Integer. Will be present when 150=1 or 150=2 and the execution was on a venue that provides a flag indicating liquidity (added, removed, etc.)
8004	Position	N	Integer. Only will be populated on subscriber request. If subscriber elects to have this feature activated, then when 150=1 or 150=2, this tag will contain the customer's new position in the security as a result of this execution.
8005	BuyingPower	N	Float. Will only be populated on subscriber request. If subscriber elects to have this feature activated, then when 150=1 or 150=2, this tag will contain the customer's current buying power as a result of this execution.
8006	MarketLiquidity	N	String. Contains the native market liquidity value on execution. See table below for individual markets.
8007	MarketFeeCode	N	String. Contains the native market fee code on execution. Currently only populated for BATS venues (BZXB, BYXB, EDGAB, EDGXB).
8008	MarketExecID	N	String. Requires configuration by Lime Technical Solutions team. When configured, this field will contains the ExecID reported by the market.

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Tag	Field Name	Req'd	Comments
9028	Market Confirm Prices	N	Decimal price field. Some markets may adjust the price at which an order is accepted (eg INET for short sales and post-only orders). If 150=0 and the market-adjusted price differs from the original client-entered price in tag 44, MarketConfirmPrices(9028) will be populated with the market-adjusted price. This is no longer an account-configured field.
382	NoContraBrokers	N	Number of contra-brokers in repeating group. Order of tags within repeating group doesn't matter except the first tag which is used as entry delimiter. Only present if provided by market. Group count *may* be zero.
→ 337	ContraTrader	N	String.
→ 375	ContraBroker	N	String.
→ 437	ContraTradeQty	N	Float.
→ 438	ContraTradeTime	N	String.
9050	ClientData	N	If specified in the original order this tag is simply echoed back in the Execution Report. Otherwise this tag is not present.
9052	ClientData	N	If specified in the original order this tag is simply echoed back in the Execution Report. Otherwise this tag is not present.
9053	ClientData	N	If specified in the original order this tag is simply echoed back in the Execution Report. Otherwise this tag is not present.
9508	ExternalClOrdId	N	If account is configured, in order ack execution reports this field will be populated with ClOrdId sent to market.
9511	NbboWeightIndicator	N	Float. Optionally present when ExecType = 'New' or 'Replaced'. Indicates the "weight" of this order for the purposes of exchange per-order billing. Currently only supported on Nasdaq routes.
378	ExecRestatementReason	N	Supported values: '3' Repricing of order with ExecRestatementReason(9690) set '5' Partial decline of OrderQty(38)

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Tag	Field Name	Req'd	Comments
9690	EffectiveLimitPrice	N	EffectiveLimitPrice (New effective limit price of the order).
9693	OrderModifiedIndicator	N	Contains integer value 1 if an order modify request was accepted by a venue. See the associated documentation for tag 9692 in the section of this document describing Cancel/Replace requests.
	Standard Trailer	Y	

7.7.1 Market Liquidity

Market	Tag 8006 Values[13]
AMXP	9730+30
ARCABB	9730
ARCP	Liquidity Indicator+LastMkt
BOE	BaseLiquidity+SubLiquidityIndicator
BIDS	9730
BOX	9730
CBSX	9730
CBX	9882
CRSF	9200
DBSX	851
IEX	851+9730
INET	Liquidity Flag
INET-FIX	76+9882
ISE	9730
JPMX	9730
KMATCH	851
LEVEL	5037
LX	851
MAGIC	76+9882
MIAX	9730
MSPL	851
NOM2	9882
NSXP	Liquidity Indicator+LastMkt
NYSP	Liquidity Indicator+LastMkt
NYX	9578+9570+9426
PDQ	9621
PHLX	9882
SIGMA-XT	9882
XNYS	BillingIndicator+ExecAwayMktID+BillingRate

8 US Options

8.1 New Order - Single

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 'D'
11	ClOrdID	Y	Alphanumeric. Day-unique ID for the order chosen by client. Max 16 characters.
55	Symbol	Y	OSI Symbol (uppercase) or 3 character root OPRA code.
47	Order Capacity	N	Must be specifically configured for client use. Supported values: 'A' Agency 'P' Principal
77	OpenClose	Y	Supported values: 'O' Open 'C' Close
200	MaturityMonthYear	Y	Supported format: YYYYMM
201	PutOrCall	Y	Supported values: '0' Put '1' Call
202	StrikePrice	Y	Strike price of underlying.
205	MaturityDay	Y	1-31.
167	SecurityType	Y	Must be "OPT".
54	Side	Y	Supported values: '1' Buy '2' Sell
38	OrderQty	Y	Desired quantity for entire order[14]
40	OrdType	Y	Supported values: '1' Market Order '2' Limit Order
44	Price	N	Required for limit orders[15]

Continued on next page

[13]For FIX markets the values given specify the FIX tags passed through in tag 8006, if more than one combined with '+', for binary markets it indicates the field names as per market specifications.

[14]Use MaxFloor to specify quantity of shares to display for reserve orders

[15]Different markets allow different precision for prices. If Lime determines that the price for an order is invalid (i.e. the limit price has too many digits after the decimal point for the desired route), the trading system will reject the order. Otherwise, the order will be forwarded to market, in which case, under certain circumstances, the market might modify the price of the order (by rounding down for a buy or rounding

Tag	Field Name	Req'd	Comments
100	ExDestination	Y	All orders must include a market destination. If specified, tag 100 will be used. If tag 100 is not specified, the destination must be specified in tag 9012. See Appendix C for valid values.
59	TimeInForce	N	Supported values: '0' Day (default) '2' On Open '3' IOC '4' FOK '6' GTD '7' On Close '9' At Crossing[16]
126	ExpireTime	N	UTC Timestamp. Conditionally required if 59= 6 (GTD). Fix timestamp representing time this GTD order should expire.
110	MinQty	N	Minimum quantity of an order to be executed.
111	MaxFloor	N	Quantity to display at the exchange[17]
204	CustomerOrFirm	N	Specify customer type for the order. The customer type is typically configured on your account but upon request we can allow you to specify this on an order-by-order basis. The tag is optional and ignored if the type is specified via configuration but is mandatory otherwise. Supported values: '0' Customer '1' Firm '2' Firm Broker Dealer '5' Market Maker '8' Professional Customer
389	Discretion Offset	N	Decimal.
9004	PostOnly	N	Boolean. Enabling this option will guarantee the order does not remove liquidity. The order will be rejected by the market if it is marketable or would lock or cross the market.

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up for a sell) or reject the order for an invalid price as it sees fit.

[16]Only on XMIO for liqudity gathering events in combination with auctionId.

[17]This integer represents the number of shares (of the total OrderQty) to display at the exchange. This value must be a multiple of 100; otherwise it will be rounded down to the highest multiple of 100 not greater than the value. If this value is 0, it is ignored (i.e., the order is treated as a regular, not reserve, order.

Tag	Field Name	Req'd	Comments
9011	AllowRouting	N	Boolean. Allow the order to route out from the destination (specified in tag 100 or 9012) to the NBBO. If the tag is not specified then the default behavior is that limit orders won't be routed out but market orders will.
9017	ISO	N	Boolean. Intermarket Sweep Order. Must be specifically configured for client use.
9050	ClientData	N	String. Value will be echoed on execution reports.
9052	ClientData	N	String. Value will be echoed on execution reports.
9053	ClientData	N	String. Value will be echoed on execution reports.
9060	ISO Group ID	N	String. Day-unique identifier that is used to correlate orders pertaining to a single sweep operation across all markets. All ISO orders belonging to an intermarket sweep must have the same identifier. Mandatory for all ISO orders if Lime is responsible for RegNMS requirement.
9041	AllOrNone	N	Boolean. Execute entire quantity of order or none at all
9064	Locked/Crossed Action	N	Character. Supported values: 'R' Reject 'B' Blind 'P' Price Adjust 'L' Price Adjust (Reject Crossed) 'D' Multiple Display-Price Sliding (BATS /BYX only) 'N' No Rescrape At Limit
9571	OptionalClearing Data	N	String (max 10). Clients can provide optional clearing data in this field that would be passed through to the markets in the respective optional clearing data tag. This is useful to correlate exchange drops and/or to have trades booked to the correct clearing account. This field is only allowed upon request and requires enablement by Lime Technical Solutions team.

8.1.1 Cabinet Orders

CAB orders are executed for a total value of $1.00 per trade. These are typically used for book keeping purposes only. New Order Single message can be used for these trades but the following

fields differ from what is indicated in New Order Single.

Tag	Field Name	Req'd	Comments
77	OpenClose	Y	Must be 'C' (close)
54	Side	Y	Must be '2' (sell)
40	OrdType	Y	Must be '2' (limit)
44	Price	N	Must be zero.

8.1.2 Market Support

ExDestination	TimeInForce	AllOrNone	AllowRouting	MaxFloor	Invisible	PostOnly	MinQty	DiscretionOffset	ISO	Locked/Crossed Action
CIDELO	0,2,3,4,7			•			•			
DAMXO	0,2,3,4,6	•	•	•					•	R,B
DARCO	0,2,3,4,6	•	•	•		•			•	R,B
DBOX	0,2,3		•						•	
DBTSO	0,3,6		•	•		•	•	•	•	
DCBOE	0,3,4,7	•	•	•					•	
DCTOE	0,3,4,7	•	•	•					•	
DEDGO	0,3,6		•			•	•		•	R,P,L,D,N
DASH	0,2,3,4	•		•			•			
DISE	0,3,4	•	•	•					•	
DGMNI	0,3,4	•	•	•					•	
DMCRY	0,3,4	•	•	•					•	
DNDQO	0,2,3,4	•	•				•		•	
DXBXO	0,2,3,4	•	•				•		•	
DPHLX	0,2,3	•	•						•	
DXMIO	0,2,3,4		•						•	
DMPRL	0,3		•						•	
INST	0,2,3		•							
LAMPO	0,2,3,4,5,6,7									
MPRL	0,2,3,4,9,R		•	•		•	•			
XMIO	0,2,3,4,9,R		•	•		•	•			
WEXO	0,2,3,4,5			•			•			

8.1.3 DAMXO (AMEX Options)

- ISO orders cannot be routable
- ISO orders must have TimeInForce[59] = IOC

8.1.4 DARCO (ARCA Options)

- Routable orders cannot specify ISO

8.1.5 DBOX (Boston Options Exchange)

- Time in Force "At Open" can only be used before market opens. Any remaining quantity that does not get filled will be converted to limit order and stay in BOX order book. These orders will not be routed out to any other exchange and will be canceled if the market crosses NBBO.
- Note that if you placed a market order that got partially filled then the remaining quantity is booked as limit order at the price the market order was filled unless you specified Time In Force as IOC. To cancel replace this order, you must specify order type as Limit with the price you want to book.
- Market orders cannot be ISO.

8.1.6 DBTSO/DEDGO (BATS and EDGX Options)

Tag	Field Name	Req'd	Comments
9016	BATS routing instructions	N	Character. Allows the customer to instruct BATS to route the order to a certain destination. Supported values: 'A' Routable to ARCA only 'B' BATS only, no routing (Default) 'C' BATS only wait 'D' EDGX Options 'E' Routable to ISE only 'F' Routable to MIAX only 'H' Routable to C2 only 'K' Routable to BOX only 'N' Routable to Nasdaq only 'P' BATS only Post only 'R' Routable to all electronic market centers (equivalent to setting 9011 = Y) 'U' Routable to AMEX only 'W' Routable to CBOE only 'X' Routable to PHLX only 'Z' Routable to BZX Options only 'g' Routable to Gemini only 'M' Routable to ISE Mercury only 'RL' Recycle
9072	Route Delivery Method	N	Supported values: 'RTI' Route to Improve 'RTF' Route to Fill

- Routable and/or market orders cannot be ISO.

8.1.7 DCBOE (Chicago Board Options Exchange)

- Limit orders are by default not-routable. Due to this AllOrNone [9041] is not permitted unless you specify AllowRouting [9011] = true.
- Cancel Replace is not supported.
- ISO order must have TimeInForce [59] = Day or IOC.
- ISO orders cannot also specify AllOrNone [9041] = true.

8.1.8 DASH (Dash Financial SOR)

Please refer to DASH FIX Interface Algo specification for more details. Only limited information is provided here for sake of integration.

Tag	Field Name	Req'd	Comments
9100	Strategy	N	String. Dash strategy to use. Supported values: 'SMART' SMART SENSOR Strategy 'SMOKE' DASH SMOKE Strategy 'STRIKE' DASH STRIKE Strategy 'VOL' DASH VOL Strategy 'OPTWAP' DASH OPTWAP Strategy '1' AMEX via DASH SOR 'N' ARCA via DASH SOR '84' BATS via DASH SOR 'B' BOX via DASH SOR 'C2OX' CTWO via DASH SOR 'W' CBOE via DASH SOR 'EDGO' EDGE via DASH SOR 'GMNI' GMNI via DASH SOR 'MCRY' MCRY via DASH SOR 'Y' ISE via DASH SOR 'XMIO' MIAX via DASH SOR 'MPRL' MIAX Pearl via DASH SOR 'EMLD' MIAX Emerald via DASH SOR '64' Nasdaq via DASH SOR 'XBXO' Nasdaq BX via DASH SOR 'X' PHLX via DASH SOR
9111	Aggression	N	Integer. Aggression for the order. SENSOR and STRIKE only. Supported values: '1' Low Aggression '2' Medium Aggression (Default) '3' High Aggression
9101	Start Time	N	UTC Timestamp. Start time in second granularity. OPTWAP only

Continued on next page

Tag	Field Name	Req'd	Comments
9102	End Time	N	UTC Timestamp. End time in second granularity. OPTWAP only
9121	Plus Minus Cents Per Share	N	Float. Specifies range for stock price to work the order. Specify 0.25 for 25 cents. VOL and OPTWAP only
9316	Stock Ref Price	N	Float. Stock reference price. VOL and OPTWAP only
9106	Option Ref Price	N	Float. Option reference price. VOL only
9509	Finish Price	N	Float. When the option's price (bid for sells/ask for buys), if available, reaches the FinishPrice or better, the algorithm will immediately cross the spread to hit/lift the bid/offer with as many contracts as shown—regardless of what is currently dictated by the TWAP profile—until either the order is completed or the bid/ask price is no longer at or better than the FinishPrice. OPTWAP only
9062	Go Dormant Price	N	Float. For buys (sells), if the bid (ask) is below (above) this price, OPTWAP will pause execution until the bid (ask) comes back into the range defined by the limit price (if any) and the GoDormantPrice. OPTWAP only
9057	Stock Px Out Of Range Behavior	N	Character. Specifies strategy behavior for the case when stock price goes out of range specified by tags StockRefPrice and PlusMinusCentsPerShare. OPTWAP only Supported values: 'C' Cancel Back (default) 'P' Pause
9301	Fee Sensitivity	N	Integer. Fee sensitivity for the order. All algos except STRIKE Supported values: 1 Most fee sensitive 2 In the middle (default) 3 Fee insensitive
9147	Working Delta	N	Float. Working delta. 50 delta can be specified as 50 or 0.5. VOL only

- Cabinet order (CAB) is not supported.

8.1.9 DISE (International Securities Exchange)

Tag	Field Name	Req'd	Comments
9056	ISE Exposure Flag	N	Multiple Value String. Supported values: 'C' Attributable Order
9057	ISE Display When	N	Character. Specify when display quantity should be refreshed Supported values: '1' Immediate (after each fill) '2' Exhaust (default: after entire displayed quantity is filled)
9058	ISE Display Range	N	Integer. Number to add/subtract from display quantity for new random quantity

- ISO orders cannot also specify AllOrNone [9041] = true.
- ISO order must have TimeInForce [59] = Day or IOC.

8.1.10 DNDQO (Nasdaq Options)

- Cabinet order (CAB) is not supported.
- Nasdaq does not support non-zero MinQty [110] to be live in their books and hence you must also specify TimeInForce [59] = IOC.
- ISO orders cannot also specify AllOrNone [9041] = true.

8.1.11 DXBXO (Nasdaq BX Options)

- Cabinet order (CAB) is not supported.
- Nasdaq BX does not support non-zero MinQty [110] to be live in their books and hence you must also specify TimeInForce [59] = IOC.
- ISO orders cannot also specify AllOrNone [9041] = true.

8.1.12 DPHLX (Nasdaq PHLX)

- ISO orders cannot also specify AllOrNone [9041] = true.
- Routable orders will use routing instruction of SRCH for Customer and Professional Customer orders. For all other CutomerOrFirm types FIND will be used.

8.1.13 DXMIO (Miami International Securities Exchange)

Tag	Field Name	Req'd	Comments
9515	AuctionId	N	Integer. Required if TIF is AtCrossing(9). Value is numeric event ID for liquidity gathering event published in the Top Of Market feed. Value of zero is accepted for Opening, but rejected for other events.
9068	Market routing instructions	N	Integer. Maps to tag 1090 Max Price Levels. Valid values are -1 to 99. -1 to disable protection for this order, 0 to only trade at initial reference price (IRP), 1-99 indicates max number of ticks the order may trade beyond IRP.

- Cabinet order (CAB) is not supported.
- ISO orders must also specify TimeInForce [59] = IOC.

8.1.14 DMPRL (Miami International PEARL Exchange)

Tag	Field Name	Req'd	Comments
9068	Market routing instructions	N	Integer. Maps to tag 1090 Max Price Levels. Please refer to the MIAX Pearl spec for valid values. The value provided in this tag will be passed as-is.

- Cabinet order (CAB) is not supported.
- ISO orders must also specify TimeInForce [59] = IOC.

8.1.15 INST (Instinet Options Smart Order Router)

Please refer to the Instinet USA Options Trading Solutions specification for more details. Only limited information is provided here for the sake of integrity.

Tag	Field Name	Req'd	Comments
9100	Strategy	N	String. Instinet strategy to use. Supported values:

'SMARTOPT'	Instinet Smart Options Router (Default)
'AMEXO'	AMEX via Instinet
'PCXO'	ARCA via Instinet
'BATSO'	BATS via Instinet
'BOXO'	BOX via Instinet
'C2O'	CTWO via Instinet
'CBOEO'	CBOE via Instinet
'EDGXO'	EDGEX via Instinet
'GEMINI'	GMNI via Instinet
'ISEMO'	MCRY via Instinet
'ISEO'	ISE via Instinet
'MIAX'	MIAX via Instinet
'MIAXPRL'	MIAX Pearl via Instinet
'MIAXEMLD'	MIAX Emerald via Instinet
'NASDAQO'	Nasdaq via Instinet
'XBXO'	Nasdaq BX via Instinet
'PHLXO'	PHLX via Instinet

- Cabinet order (CAB) is not supported.

8.2 Order Cancel Request

The order cancel request message requests the cancellation of all of the remaining contracts of an existing order. Lime Brokerage supports the ability to send one message to cancel all open orders. This reduces message traffic during high-volume periods of the day, and also is significantly faster for clients that have a large number of outstanding orders.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 'F'
11	ClOrdID	Y	Unique ID of cancel request as assigned by the client.
37	OrderID	N	Optional. If populated this field must be the numeric 64-bit Lime order ID that was populated in tag 37 of the order acknowledgement to the client. If populated, the value of tag 41 is ignored. Specifying the correct Lime order ID in tag 37 will result in slightly faster processing of the cancel request by Lime.
41	OrigClOrdID	Y	ClOrdID of the order begin cancelled.

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Tag	Field Name	Req'd	Comments
9020	CancelAllOpen	N	Boolean. If enabled, tags 37 and 41 are ignored and Lime will attempt to cancel all open orders for the account.
	Standard Trailer	Y	

8.3 Order Cancel/Replace Request

The order cancel/replace request is used to change the parameters of an existing order. Do not use this message to cancel the remaining quantity of an outstanding order; use the Cancel Request message for this purpose.

The Lime implementation of Cancel Replace does not support the use of this message to "re-open" an already completed order (i.e. an order that has been completely filled or cancelled). All such orders will be rejected by the Lime system.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 'G'
40	OrdType	N	Use this to change orders from limit to market. If not specified, it will default to OrdType of previous order in chain. Supported values: '1' Market '2' Limit
41	OrigClOrdID	Y	ClOrdID of the previous order in the chain (NOT the initial order of the chain).
37	OrderID	N	Optional, see Comments for tag 37 above in the Order Cancel Request message description. If populated, this tag must be the Lime order ID for the previous order in the chain.
11	ClOrdID	Y	Alphanumeric, 16 characters maximum. Unique client order ID for the new order.
38	OrderQty	N	This value represents the total intended order quantity (including the amount already executed for this chain of orders).
44	Price	N	Required for limit order types when changing price. Should not be specified if OrdType = 1.
	Standard Trailer	Y	

8.4 Mult-Leg Order Request

Multi-leg orders are sent atomically to a destination and the destination typically executes them atomically as well. Atomic execution means all legs execute or none and the execution honors the specified leg ratio. However the execution reports are sent per leg.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 'AB'
11	ClOrdID	Y	Alphanumeric. Day-unique ID for the order chosen by client. Max 16 characters.
38	OrderQty	Y	Desired quantity for entire order[18]
40	OrdType	Y	Supported values: '1' Market Order '2' Limit Order
44	Price	N	Required for limit orders[19] Positive value means debit; negative means credit; 0 means neutral.
100	ExDestination	Y	All orders must include a market destination. If specified, tag 100 will be used. If tag 100 is not specified, the destination must be specified in tag 9012. See Appendix C for valid values.
59	TimeInForce	N	Supported values: '0' Day (default) '2' On Open '3' IOC '4' FOK '7' On Close
167	SecurityType	Y	Must be "MLEG".

Continued on next page

[18] Use MaxFloor to specify quantity of shares to display for reserve orders

[19] Different markets allow different precision for prices. If Lime determines that the price for an order is invalid (i.e. the limit price has too many digits after the decimal point for the desired route), the trading system will reject the order. Otherwise, the order will be forwarded to market, in which case, under certain circumstances, the market might modify the price of the order (by rounding down for a buy or rounding up for a sell) or reject the order for an invalid price as it sees fit.

Tag	Field Name	Req'd	Comments
204	CustomerOrFirm	N	Specify customer type for the order. The customer type is typically configured on your account but upon request we can allow you to specify this on an order-by-order basis. The tag is optional and ignored if the type is specified via configuration but is mandatory otherwise. Supported values: '0' Customer '1' Firm '2' Firm Broker Dealer '5' Market Maker '8' Professional Customer
9041	AllOrNone	N	Boolean. Execute entire quantity of order or none at all
9009	ShortSaleAffirm	N	Boolean. Required for DVP clients who wish to place orders with sell-short equity leg. If client can't populate this field LocateReqd (Tag 114) must be used.
9050	ClientData	N	String. Value will be echoed on execution reports.
9052	ClientData	N	String. Value will be echoed on execution reports.
9053	ClientData	N	String. Value will be echoed on execution reports.
9067	ShortSaleAffirm LongQuantity	N	Integer. Mandatory for DVP clients who wish to place sell-short order on a stock with a long position. The long quantity of the order must be identified using this tag for compliance purposes.
9010	LongSaleAffirm	N	Boolean. Required for DVP clients who wish to place orders with sell-long equity leg.
555	NoLegs	Y	Number of legs in repeating group. Order of tags within repeating group doesn't matter except the first tag which is used as delimiter.
→ 600	LegSymbol	Y	In case of options this is the root symbol (uppercase), for eg., MSFT. In case of equities, specify stock symbol.
→ 608	LegCFICode	Y	Supported values: 'OC' Option Call 'OP' Option Put 'ES' Equity Common Shares

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Tag	Field Name	Req'd	Comments
→ 611	LegMaturityDate	N	Supported format YYYYMMDD. Mandatory for options. Must not be specified for equities.
→ 612	LegStrikePrice	N	Strike price of underlying. Mandatory for options. Must not be specified for equities.
→ 623	LegRatioQty	Y	The ratio of quantity for this individual leg relative to the entire multi-leg security. LegRatioQty x OrderQty
→ 624	LegSide	Y	Supported values: '1' Buy '2' Sell '5' Sell Short (equities only) '9' Buy to Cover[20]
→ 564	LegPositionEffect	N	Supported values: 'O' Open 'C' Close Mandatory for options. Must not be specified for equities.
→ 654	LegRefID	Y	Alphanumeric. Must be day-unique in the same space as ClOrdID. Max 16 characters.

[20]Identical to Buy, the only difference being how the trade will be reported to clearing.

8.4.1 Market Support

Venue	TimeInForce	Max Leg Count	Equity Leg?	AllOrNone	AllowRouting
CIDELO	0,2,3,4,7	2 - 6			
DAMXO	0,3	2 - 5			
DARCO	0,3	2 - 5			
DBOX	0,3	2 - 4			
DBTSO		N/A			
DCBOE	0	2 - 4	•		
DCTOE	0	2 - 4	•		
DASH	0	2 - 4	•	•	
DEDGO		N/A			
DISE	0,3,4	2 - 5	•	•	
DGMNI	0,3,4	2 - 5	•	•	
DMCRY	0,3,4	2 - 5	•	•	
DNDQO		N/A			
DXBXO		N/A			
DPHLX	0,3	2 - 6	•	•	
DXMIO		N/A			
DMPRL		N/A			
INST	0,3	N/A	•		
WEXO	0	N/A	•		

8.4.2 DAMXO (AMEX Options)

- Cancel replace is not supported.

8.4.3 DARCO (ARCA Options)

- Cancel replace is not supported.

8.4.4 DCBOE (Chicago Board Options Exchange)

- Cancel Replace is not supported.

8.4.5 DCTOE (Chicago Board Options Exchange C2)

- Cancel Replace is not supported.

8.4.6 DISE (International Securities Exchange)

Tag	Field Name	Req'd	Comments
9056	ISE Exposure Flag	N	Multiple Value String. Supported values: 'C' Attributable Order

8.4.7 INST (Instinet Options Smart Order Router)

Please refer to the Instinet USA Options Trading Solutions specification for more details. Only limited information is provided here for the sake of integrity.

Tag	Field Name	Req'd	Comments
9100	Strategy	N	String. Instinet strategy to use. Supported values:
			'SMARTOPTS' Instinet Smart Options Spread Router (Default)
			'AMEXO' AMEX via Instinet
			'PCXO' ARCA via Instinet
			'BATSO' BATS via Instinet
			'BOXO' BOX via Instinet
			'C2O' CTWO via Instinet
			'CBOEO' CBOE via Instinet
			'EDGXO' EDGEX via Instinet
			'GEMINI' GMNI via Instinet
			'ISEMO' MCRY via Instinet
			'ISEO' ISE via Instinet
			'MIAX' MIAX via Instinet
			'MIAXPRL' MIAX Pearl via Instinet
			'MIAXEMLD' MIAX Emerald via Instinet
			'NASDAQO' Nasdaq via Instinet
			'XBXO' Nasdaq BX via Instinet
			'PHLXO' PHLX via Instinet

- Cabinet order (CAB) is not supported.

8.5 Multileg Cancel Request

The order cancel request message requests the cancellation of all of the remaining contracts of an existing order. Lime Brokerage supports the ability to send one message to cancel all open orders. This reduces message traffic during high-volume periods of the day, and also is significantly faster for clients that have a large number of outstanding orders.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 'F'
11	ClOrdID	Y	Unique ID of cancel request as assigned by the client.
37	OrderID	N	Optional. If populated this field must be the numeric 64-bit Lime order ID that was populated in tag 37 of the order acknowledgement to the client. If populated, the value of tag 41 is ignored. Specifying the correct Lime order ID in tag 37 will result in slightly faster processing of the cancel request by Lime.
41	OrigClOrdID	Y	ClOrdID of the order begin cancelled.
9020	CancelAllOpen	N	Boolean. If enabled, tags 37 and 41 are ignored and Lime will attempt to cancel all open orders for the account.
	Standard Trailer	Y	

8.6 Multileg Cancel/Replace Request

The order cancel/replace request is used to change the parameters of an existing order. Do not use this message to cancel the remaining quantity of an outstanding order; use the Cancel Request message for this purpose.

The Lime implementation of Cancel Replace does not support the use of this message to "re-open" an already completed order (i.e. an order that has been completely filled or cancelled). All such orders will be rejected by the Lime system.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 'G'
40	OrdType	N	Use this to change orders from limit to market. If not specified, it will default to OrdType of previous order in chain. Supported values: '1' Market '2' Limit
41	OrigClOrdID	Y	ClOrdID of the previous order in the chain (NOT the initial order of the chain). Either this or tag 37 must be present.
37	OrderID	N	Optional, see Comments for tag 37 above in the Order Cancel Request message description. If populated, this tag must be the Lime order ID for the previous order in the chain.

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Tag	Field Name	Req'd	Comments
11	ClOrdID	Y	Alphanumeric, 16 characters maximum. Unique client order ID for the new order.
38	OrderQty	N	This value represents the total intended order quantity (including the amount already executed for this chain of orders).
44	Price	N	Required for limit order types when changing price. Should not be specified if OrdType = 1.
	Standard Trailer	Y	

8.7 Exercise Request

Use this message to submit exercise instruction. Note that once submitted the operation is irrevocable and irreversible. For this reason the Lime system does not support Replace, Cancel, or Reverse actions. One request message should be sent for each exercise instruction containing exactly one options position to exercise. Exercise of partial position (qty ¡ position) is allowed. All types of options that are exercisable and supported by Lime system can be exercised using this message.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 'AL'
710	PosReqID	Y	Unique identifier for the Exercise Request assigned by you, the client. NOTE: Lime system will not validate the uniqueness and will merely echo this value in the corresponding Exercise Report message(s).
60	TransactTime	N	Time this request was initiated.
55	Symbol	Y	OSI Base Symbol. Eg., MSFT. See discussion of symbology in Appendix A.
200	MaturityMonthYear	Y	Format YYYYMM. Expiration month-year of option.
201	PutOrCall	Y	Supported values: '0' Put '1' Call
202	StrikePrice	Y	Strike price of option.
205	MaturityDay	Y	1-31. Expiration day of option.
167	SecurityType	Y	Must be OPT.
58	Text	N	Free form string ignored by the Lime system.
702	NoPositions	Y	Must be 1

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Tag	Field Name	Req'd	Comments
→ 703	PosType	Y	Supported values: 'EX' Options Exercise quantity
→ 704	LongQty	Y	Quantity to exercise
	Standard Trailer	Y	

8.8 Order Cancel Reject

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = '9'
37	OrderID	Y	64-bit numeric Lime order id.
11	ClOrdID	Y	Unique order id assigned by institution to the cancel request or to the replacement order. If the cancel reject is in response to a cancel request, and that cancel request was not made by the client directly. (IE, cancel-all, cancel on disconnect, or a market unsolicited cancel), then this field will have value ¡NONE¿.
41	OrigClOrdID	Y	Client order id which could not be canceled/replaced. Client order id of the previous order (NOT the initial order of the chain) when canceling-replacing an order.
39	OrdStatus	Y	Order status after this cancel reject is applied.
58	Text	N	Unbounded String field conveying the reason for the rejection. Not all markets provide this information.
102	CxlRejReason	N	Optional code which gives the reason for the cancel reject. Generally will only be present if 434 = '1'. Not all markets provide this information. Supported values: '0' Too late to cancel '1' Unknown or completed order '2' Broker option '3' Order already has a pending cancel '6' Duplicate ClOrdID
434	CxlRejResponseTo	N	Distinguishes cancel/cancel-replace rejects. Supported values: '1' Cancel Reject '2' Cancel Replace Reject

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Tag	Field Name	Req'd	Comments
	Standard Trailer	Y	

8.9 Execution Report

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = '8'
150	ExecType	Y	The type of this Execution Report. FIX 'Execution Reports' are not only used to communicate fills. They are the standard container for application-level messages from server to client. ExecType describes what type of message this is. Supported values: '0' New (Order has been accepted) '1' Partial Fill '2' Fill (Order is now completely filled) '3' Done for day '4' Canceled (UR OUT) '5' Replace (Order has been cancel-replaced) '8' Rejected (Order has been rejected)
39	OrdStatus	Y	Describes the current state of the order (or chain of orders if cancel replaced). Valid values: 0 New (Order has been accepted) 1 Partial Fill 2 Fill (Order is now completely filled) 3 Done for day 4 Canceled (UR OUT) 5 Replaced (Order has been cancel-replaced) 6 Pending Cancel E Pending Replace 8 Rejected (Order has been rejected)
37	OrderID	Y	64-bit number (or up to 20 digits). Lime generated order ID.

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Tag	Field Name	Req'd	Comments
11	ClOrdID	Y	This tag will be populated on all execution reports for orders placed via FIX. When an execution report is in response to a cancel request, this tag will represent the client order id submitted on the cancel request and tag 41 will contain the client order ID of the order itself. If the execution report is in response to a cancel request, and that cancel request was not made by the client directly. (IE, cancel-all, cancel on disconnect, or a market unsolicited cancel), then this field will have value ¡NONE¿.
41	OrigClOrdID	N	String. Will be populated on all execution reports of ExecType (tag 150) 4 (Canceled) or 5 (Replaced) when the cancel or replace request was submitted via FIX. When 150=5 (Replaced) this tag will represent the ClOrdID of the previous order in the chain.
17	ExecID	Y	This execution ID will be unique across all trading days. Max size is 80 alphanumeric characters. Subscribers should inspect the value of this tag in order to detect duplicate fills (the same value in tag 17 means the same fill).
76	ExecBroker	Y	The route/destination. This is the same String that was submitted in tag 100 (or 9012) on the new order.
20	ExecTransType	Y	Valid values: '0' New (normal) '1' Cancel (will occur only on trade breaks)
19	ExecRefID	N	When 20=1, indicating a trade break, the subscriber should inspect this tag to identify the execution being broken (the value of tag 19 here will match the value of tag 17 for a previous execution).
55	Symbol	Y	As specified in order.
77	OpenClose	Y	As specified in order.
200	MaturityMonthYear	Y	As specified in order.
201	PutOrCall	Y	As specified in order.
202	StrikePrice	Y	As specified in order.
205	MaturityDay	Y	As specified in order.
167	SecurityType	Y	As specified in order.
54	Side	Y	As specified in order.
38	OrderQty	Y	As specified in order.

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Tag	Field Name	Req'd	Comments
40	OrdType	Y	As specified in order.
44	Price	N	For limit orders, as specified in order.
32	LastShares	Y	Quantity of contracts filled on this fill when ExecType = Filled or Partially Filled. Otherwise this tag is 0.
31	LastPx	Y	Price of this fill when ExecType = Filled or Partially Filled. Otherwise this tag is 0.
30	LastMkt	N	Executing venue MIC that will be present on all original fills. Note that the routed-to venue is not provided by some markets, in which case we will use the market MIC itself. See Appendix C for valid values.
29	LastCapacity	N	Broker capacity in order execution.
151	LeavesQty	Y	Number of contracts open for further execution. If the OrdStatus is Canceled, or Rejected (in which case the order is no longer active) then LeavesQty will be 0, otherwise LeavesQty = OrderQty - CumQty.
14	CumQty	Y	Number of contracts executed in total so far for this order or chain of orders.
6	AvgPx	Y	Average price of fills so far for this order or chain of orders.
60	TransactTime	Y	Lime Brokerage will always send a transaction time. This is the time the event occurred (as opposed to the time it was sent).
58	Text	N	Will contain a reject reason when 150=8.
8001	Liquidity	N	Integer. Will be present when 150=1 or 150=2 and the execution was on a venue that provides a flag indicating liquidity (added, removed, etc.)
8004	Position	N	Integer. Will only be populated on subscriber request. If subscriber elects to have this feature activated, then when 150=1 or 150=2, this tag will contain the customer's new position in the security as a result of this execution.

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Tag	Field Name	Req'd	Comments
8005	BuyingPower	N	Float. Will only be populated on subscriber request. If subscriber elects to have this feature activated, then when 150=1 or 150=2, this tag will contain the customer's current buying power as a result of this execution.
8008	MarketExecID	N	String. Requires configuration by Lime Technical Solutions team. When configured, this field will contains the ExecID reported by the market.
204	CustomerOrFirm	N	As specified in order only if you are enabled to provide the type. Typically the type is configured at the account level, in which case this tag will not be included.
382	NoContraBrokers	N	Number of contra-brokers in repeating group. Order of tags within repeating group doesn't matter except the first tag which is used as entry delimiter. Only present if provided by market. Group count *may* be zero.
→ 337	ContraTrader	N	String.
→ 375	ContraBroker	N	String.
→ 437	ContraTradeQty	N	Float.
→ 438	ContraTradeTime	N	String.
9050	ClientData	N	If specified in the original order this tag is simply echoed back in the Execution Report. Otherwise this tag is not present.
9052	ClientData	N	If specified in the original order this tag is simply echoed back in the Execution Report. Otherwise this tag is not present.
9053	ClientData	N	If specified in the original order this tag is simply echoed back in the Execution Report. Otherwise this tag is not present.
	Standard Trailer	Y	

8.9.1 DNDQO (Nasdaq Options)

Tag	Field Name	Req'd	Comments
9028	MarketConfirmPrices	N	Floating Point. INET may adjust the price at which an order is accepted (eg for short sales and post-only orders). If 150=0 and the market-adjusted price differs from the original client-entered price in tag 44, MarketConfirmPrices(9028) will be populated with the market-adjusted price.

8.9.2 DXBXO (Nasdaq BX Options)

Tag	Field Name	Req'd	Comments
9028	MarketConfirmPrices	N	Floating Point. INET may adjust the price at which an order is accepted (eg for short sales and post-only orders). If 150=0 and the market-adjusted price differs from the original client-entered price in tag 44, MarketConfirmPrices(9028) will be populated with the market-adjusted price.

8.9.3 DISE & GMNI & MCRY

Tag	Field Name	Req'd	Comments
9512	IseCounterExecBroker	N	String. Value received from ISE in CounterpartyExecBroker tag (9176).
9513	IseCounterClearing	N	String. Value received from ISE in CounterpartyExecBrokerClearingFirm tag (9439).
9514	IseCounterCustOrFirm	N	Character. Value received from ISE in CounterpartyCustomerOrFirm tag (9404).

8.10 Multi-Leg Execution Report

An execution per leg of multi-order will be sent. All tag values are in the context of the leg, for eg., the OrderQty in execution report is multi-leg order's OrderQty (38) multiplied by respective leg's legRatioQty (623).

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = '8'

Continued on next page

Tag	Field Name	Req'd	Comments
150	ExecType	Y	The type of this Execution Report. FIX 'Execution Reports' are not only used to communicate fills. They are the standard container for application-level messages from server to client. ExecType describes what type of message this is. Supported values: '0' New (Order has been accepted) '1' Partial Fill '2' Fill (Order is now completely filled) '3' Done for day '4' Canceled (UR OUT) '5' Replace (Order has been cancel-replaced) '8' Rejected (Order has been rejected)
39	OrdStatus	Y	Describes the current state of the order (or chain of orders if cancel replaced). Valid values: 0 New (Order has been accepted) 1 Partial Fill 2 Fill (Order is now completely filled) 3 Done for day 4 Canceled (UR OUT) 5 Replaced (Order has been cancel-replaced) 6 Pending Cancel E Pending Replace 8 Rejected (Order has been rejected)
37	OrderID	Y	64-bit number (or up to 20 digits). Lime generated order ID.
11	ClOrdID	Y	This tag will be populated on all execution reports for orders placed via FIX. When an execution report is in response to a cancel request, this tag will represent the client order id submitted on the cancel request and tag 41 will contain the client order ID of the order itself. If the execution report is in response to a cancel request, and that cancel request was not made by the client directly. (IE, cancel-all, cancel on disconnect, or a market unsolicited cancel), then this field will have value "¡NONE¿".

Continued on next page

Tag	Field Name	Req'd	Comments
41	OrigClOrdID	N	Will be populated on all execution reports of ExecType (tag 150) 4 (Canceled) or 5 (Replaced) when the cancel or replace request was submitted via FIX. When 150=5 (Replaced) this tag will represent the ClOrdID of the previous order in the chain.
17	ExecID	Y	This execution ID will be unique across all trading days. Max size is 80 alphanumeric characters. Subscribers should inspect the value of this tag in order to detect duplicate fills (the same value in tag 17 means the same fill).
76	ExecBroker	Y	The route/destination. This is the same String that was submitted in tag 100 (or 9012) on the new order.
20	ExecTransType	Y	Valid values: '0' New (normal) '1' Cancel (will occur only on trade breaks)
19	ExecRefID	N	When 20=1, indicating a trade break, the subscriber should inspect this tag to identify the execution being broken (the value of tag 19 here will match the value of tag 17 for a previous execution).
55	Symbol	Y	As specified in order.
77	OpenClose	N	As specified on multi-leg order in LegPositionEffect(564). Not present for equities but always present for options
200	MaturityMonthYear	N	As specified on multi-leg order in LegMaturityMonthYear (610) or LegMaturityDate (611). Not present for equities but always present for options
201	PutOrCall	N	As specified on multi-leg order in LegCFICode (608). Not present for equities but always present for options
202	StrikePrice	N	As specified on multi-leg order in LegStrikePrice (612). Not present for equities but always present for options

Continued on next page

Tag	Field Name	Req'd	Comments
205	MaturityDay	N	As specified on multi-leg order in LegMaturityDay (611). Not present for equities but always present for options
167	SecurityType	Y	As specified in order.
54	Side	Y	As specified on order in LegSide (624).
38	OrderQty	Y	As specified on order.
40	OrdType	Y	As specified in order.
44	Price	N	For limit orders, as specified in order.
32	LastShares	Y	Quantity of contracts filled on this fill when ExecType = Filled or Partially Filled. Otherwise this tag is 0.
31	LastPx	Y	Price of this fill when ExecType = Filled or Partially Filled. Otherwise this tag is 0.
30	LastMkt	N	Executing venue MIC that will be present on all original fills. Note that the routed-to venue is not provided by some markets, in which case we will use the market MIC itself. See Appendix C for valid values.
29	LastCapacity	N	Broker capacity in order execution.
151	LeavesQty	Y	Number of contracts open for further execution. If the OrdStatus is Canceled, or Rejected (in which case the order is no longer active) then LeavesQty will be 0, otherwise LeavesQty = OrderQty - CumQty.
14	CumQty	Y	Number of contracts executed in total so far for this order or chain of orders.
6	AvgPx	Y	Average price of fills so far for this order or chain of orders.
60	TransactTime	Y	Lime Brokerage will always send a transaction time. This is the time the event occurred (as opposed to the time it was sent).
58	Text	N	Unbounded String field. Will contain a reject reason when 150=8.
8001	Liquidity	N	Integer. Will be present when 150=1 or 150=2 and the execution was on a venue that provides a flag indicating liquidity (added, removed, etc.)

Continued on next page

Tag	Field Name	Req'd	Comments
8004	Position	N	Integer. Will only be populated on subscriber request. If subscriber elects to have this feature activated, then when 150=1 or 150=2, this tag will contain the customer's new position in the security as a result of this execution.
8005	BuyingPower	N	Floating Point. Will only be populated on subscriber request. If subscriber elects to have this feature activated, then when 150=1 or 150=2, this tag will contain the customer's current buying power as a result of this execution.
442	Multi-Leg Reporting Type	Y	Indicates type of execution report. Always 2, i.e., one per leg.
654	LegRefID	Y	As specified on multi-leg order in LegRefID (654).
204	CustomerOrFirm	N	As specified in order only if you are enabled to provide the type. Typically the type is configured at the account level, in which case this tag will not be included.
382	NoContraBrokers	N	Number of contra-brokers in repeating group. Order of tags within repeating group doesn't matter except the first tag which is used as entry delimiter. Only present if provided by market. Group count *may* be zero.
→ 337	ContraTrader	N	String.
→ 375	ContraBroker	N	String.
→ 437	ContraTradeQty	N	Float.
→ 438	ContraTradeTime	N	String.
9050	ClientData	N	If specified in the original order this tag is simply echoed back in the Execution Report. Otherwise this tag is not present.
9052	ClientData	N	If specified in the original order this tag is simply echoed back in the Execution Report. Otherwise this tag is not present.
9053	ClientData	N	If specified in the original order this tag is simply echoed back in the Execution Report. Otherwise this tag is not present.
	Standard Trailer	Y	

8.11 Exercise Report

Each Exercise Request is followed by one or two Exercise Report messages. In case of success, two reports will be sent; one acknowledging the request (722 = 0) and other with execution details (722 = 3). In case of failure, only one report will be sent with reject status (722 = 2). Note that business rejects will be sent if the message is mal-formed to the extent that an Exercise Report cannot be constructed.

Tag	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 'AM'
721	PosMaintRptID	Y	Unique identifier assigned by the Lime system for this report. Is day-unique.
710	PosReqID	Y	Echoed back from Exercise Request message.
722	PosMaintStatus	Y	Status of Exercise Request. '0' Accepted '2' Rejected '3' Completed
723	PosMaintResult	N	Result of Exercise Request. Not included if PosMaintStatus = Accepted. '0' Successful Completion '4000' Rejected (mal-formed or unsupported request) '4001' Rejected (requested quantity not available) '4002' Rejected (early exercise not allowed) '4003' Rejected (electronic exercise disabled for account)
60	TransactTime	N	Time this report was initiated.
55	Symbol	Y	Echoed back from Exercise Request message.
200	MaturityMonthYear	Y	Echoed back from Exercise Request message.
201	PutOrCall	Y	Echoed back from Exercise Request message.
202	StrikePrice	Y	Echoed back from Exercise Request message.
205	MaturityDay	Y	Echoed back from Exercise Request message.
167	SecurityType	Y	Echoed back from Exercise Request message.
58	Text	N	Human readable reject reason.
→ 702	NoPositions	Y	Number of repeating group members.
→ 703	PosType	N	Mandatory only for EX. Supported values: 'EX' Options Exercise quantity 'TX' Transaction from exercise

Continued on next page

Tag	Field Name	Req'd	Comments
→ 704	LongQty	N	Definition varies based on PosType. Mandatory only if PosType = EX. Quantity to exercise if PosType = EX. Echoed from Exercise Request. Long position of underlying resulting from exercise in PosType = TX.
→ 705	ShortQty	N	Short position of underlying resulting from exercise. Positive number.
	Standard Trailer	Y	

The NoPositions repeating group contains one or two entries in case of PosMaintStatus = Completed. The first entry is echo of NoPositions group values from Exercise Request. The second is the result of successful exercise containing the quantity of shares credited/debited from exercise transaction. If the second entry is not present then the exercise did not result in credit/debit of underlying shares. Note that the credit/debit of underlying shares is done in real-time and it is possible that your long sale of credited shares may be rejected. We expect your system to try again later. This is because your equity and options FIX connections may be on different physical servers and Lime system currently does not support blocking transactions that span physical servers.

9 ISO Requirement

9.1 ISO Group ID

An ISO group identifier is required for all ISO orders. For FIX users, it must be passed in Tag 9060 (ISOGroupId); Lime API users should use the property "ISOGroupId=¡value¿" that must be added to `\other_options"` parameter of the sendOrder() call. The format of the FIX tag and the Lime API property is a free-form string. LimeInside API users must pass the group ID in the "isoGroupId" field in the "properties" parameter of the placeOrder() call where it is a 32-bit integer.

The purpose of the group ID is to identify a group of ISO orders and it needs to be unique for the group of ISO orders throughout a trading day. So if an ISO sweep was sent out to hit all the protected quotes a unique group ID must be used and included in the field on every order that is part of that group. Once the group ID has been used it cannot be reused during the same day. An ISO order that doesn't contain a group ID will be rejected. This is true even for ISO orders that are not sent in groups but sent as individual orders whose objective is to bypass a delayed or stale quote.

9.2 End Of Day Quotes Snapshot File

Clients are required to provide the following in a Comma Separated Values (CSV) file at End of Trading Day for Lime to satisfy regulatory requirement for ISO orders. One top-of-book quote per RegNMS protected venue is required to be provided for each ISO sweep event.

This files must be uploaded to Lime provided FTP location soon after trading is complete (by 7PM EST). The FTP details will be provided to the client during the onboarding process.

9.2.1 File Format

Column Name	Description
Account	Lime Account name used as SenderCompID.
ISOGroupId	Day-unique identifier that is used to correlate orders pertaining to a single sweep operation across all markets. All ISO orders belonging to an inter-market sweep must have the same identifier.
MIC	MIC code of venue where the quote was received from. See Appendix for valid MIC codes.
Symbol	Provide only the base symbol and not the suffix for preferred symbols. For eg., in case of AA.PR, just provide AA
BidPrice	Top of book bid price
BidSize	Top of book bid size

Continued on next page

Column Name	Description
AskPrice	Top of book ask price
AskSize	Top of book ask size

9.2.2 Example

```
Account,ISOGroupId,MIC,Symbol,BidPrice,BidSize,AskPrice,AskSize
LIME123,1,XNAS,STRT,70.50,100,70.51,200
LIME123,1,ARCX,STRT,70.50,100,70.51,100
LIME123,1,XBOS,STRT,70.51,200,70.52,100
LIME123,1,XPHL,STRT,70.51,100,70.52,100
LIME123,1,BATS,STRT,70.51,100,70.52,100
LIME123,1,BATY,STRT,70.51,100,70.52,100
LIME123,1,XCHI,STRT,0,0,0,0
LIME123,1,EDGA,STRT,70.51,100,70.52,100
LIME123,1,EDGX,STRT,70.51,100,70.52,100
LIME123,1,XNYS,STRT,70.51,100,70.52,100
```

9.3 Sending Order to CHX

To send a directed ISO to the CHX via BATS you need to first enable routing to CHX, set the TimeInForce value to IOC, and then mark the order as an ISO with an ISO Group ID. The current passthrough for sending directed ISOs to CHX via BATS is `$0.0033`.

9.4 Market Data For CHX

Lime does not provide market data via Citrius for CHX so to receive this protected quote, clients may use the UQDF or SIAC market data and pull in CHX market data via those quote offerings. As an alternative, clients may establish a relationship directly with CHX. The CHX data feed is currently free but Lime will charge a fixed cost for the amount of bandwidth used (plus tax) for the transportation of the data from the Lime data center in Chicago to the Lime data center in Jersey City.

9.5 Protected Markets

Market	ISO-10383 MIC
NYSE	XNYS
NYSE ARCA	ARCX
NYSE MKT (AMEX)	XASE
Nasdaq	XNAS
Nasdaq OMX BX	XBOS
Nasdaq OMX PSX	XPHL

Continued on next page

Market	ISO-10383 MIC
BATS BZX	BATS
BATS BYX	BATY
Chicago Board Stock Exchange	CBSX
Chicago Stock Exchange	XCHI
EDGA	EDGA
EDGX	EDGX
National Stock Exchange	XCIS
Investors Exchange (IEX)	IEXG

A Symbology

A.1 US Equities

As of April 1st 2013, Lime will support variants of CMS, CQS, and Nasdaq (AKA BATS) symbology. Clients can specify a symbol using either just tag 55, or tag 55 and tag 65 together. If tag 55 is used alone, than a suffix can be provided along with the root. If both tag 55 and tag 65 are provided, than tag 55 will contain just the root, and tag 65 the suffix.

Supported symbologies are:

- Root and CMS suffix in tag 55, joined with a dot
- Root and CMS suffix in tag 55, joined with a space
- Root and CQS suffix in tag 55
- Root and Nasdaq suffix in tag 55
- Root in tag 55, CMS suffix in tag 65
- Root in tag 55, CQS suffix in tag 65

In addition, Lime supports a variant of CQS with all / replaced with a dot. This is for compatibility with the Citrus Quote Server and will not be elaborated further.

Clients no longer have to use the symbology matching the exchange they are directing the order to. Lime will handle translating the symbol to the native symbology of the destination exchange.

Internally, Lime normalizes the symbol to CMS symbology split into tag 55 and tag 65. ***This means that regardless of how the client specified the symbol, it will always be echoed back in execution-reports using tag 55 and tag 65 with CMS symbology.***

A.1.1 Examples

Below is a table demonstrating all possible forms of the hypothetical symbol *FOO* in all symbologies that Lime supports. Replace *FOO* with any other root to obtain its equivalent in that symbology.

Type	CMS (*Variant 1*)	CMS (*Variant 2*)	CMS (*Variant 3*)		CQS (*Variant 1*)	CQS (*Variant 2*)		Nasdaq
	55=	55=	55=	65=	55=	55=	65=	55=
Preferred	FOO.PR	FOO PR	FOO	PR	FOOp	FOO	p	FOO-
Preferred Class **A**[1]	FOO.PR**A**	FOO PR**A**	FOO	PR**A**	FOOp**A**	FOO	p**A**	FOO-**A**
Class **A**[2]	FOO.**A**	FOO **A**	FOO	**A**	FOO/**A**	FOO	**A**	FOO.**A**
Warrants	FOO.WS	FOO WS	FOO	WS	FOO/WS	FOO	/WS	FOO+
Warrants Class **A**[1]	FOO.WS**A**	FOO WS**A**	FOO	WS**A**	FOO/WS/**A**	FOO	/WS/**A**	FOO+**A**
When Distributed	FOO.WD	FOO WD	FOO	WD	FOO/WD	FOO	/WD	FOO$
Preferred When Distributed	FOO.PRWD	FOO PRWD	FOO	PRWD	FOOp/WD	FOO	p/WD	FOO-$
Preferred Class **A** When Distributed[1]	FOO.PR**A**WD	FOO PR**A**WD	FOO	PR**A**WD	FOOp**A**/WD	FOO	p**A**/WD	FOO-**A**$
Called	FOO.CL	FOO CL	FOO	CL	FOO/CL	FOO	/CL	FOO*
Class **A** Called[1]	FOO.**A**CL	FOO **A**CL	FOO	**A**CL	FOO/**A**/CL	FOO	/**A**/CL	FOO.**A***
Preferred Called	FOO.PRCL	FOO PRCL	FOO	PRCL	FOOp/CL	FOO	p/CL	FOO-*
Preferred **A** Called[1]	FOO.PR**A**CL	FOO PR**A**CL	FOO	PR**A**CL	FOOp**A**/CL	FOO	p**A**/CL	FOO-**A***
Emerging Company Marketplace	FOO.EC	FOO EC	FOO	EC	FOO/EC	FOO	/EC	FOO!
Partial Paid	FOO.PP	FOO PP	FOO	PP	FOO/PP	FOO	/PP	FOO@
Convertible	FOO.CV	FOO CV	FOO	CV	FOO/CV	FOO	/CV	FOO%
Convertible Called	FOO.CVCL	FOO CVCL	FOO	CVCL	FOO/CV/CL	FOO	/CV/CL	FOO%*
Class **A** Convertible[1]	FOO.**A**CV	FOO **A**CV	FOO	**A**CV	FOO/**A**/CV	FOO	/**A**/CV	FOO.**A**%
Preferred Class **A** Convertible[1]	FOO.PR**A**CV	FOO PR**A**CV	FOO	PR**A**CV	FOOp**A**/CV	FOO	p**A**/CV	FOO-**A**%
Rights	FOO.RT	FOO RT	FOO	RT	FOOr	FOO	r	FOOˆ
Units	FOO.U	FOO U	FOO	U	FOO/U	FOO	/U	FOO=
When Issued	FOO.WI	FOO WI	FOO	WI	FOOw	FOO	w	FOO#
Rights When Issued	FOO.RTWI	FOO RTWI	FOO	RTWI	FOOrw	FOO	rw	FOOˆ#
Preferred When Issued	FOO.PRWI	FOO PRWI	FOO	PRWI	FOOpw	FOO	pw	FOO-#
Preferred **A** When Issued[1]	FOO.PR**A**WI	FOO PR**A**WI	FOO	PR**A**WI	FOOp**A**w	FOO	p**A**w	FOO-**A**#
Class **A** When Issued[1]	FOO.**A**WI	FOO **A**WI	FOO	**A**WI	FOO/**A**w	FOO	/**A**w	FOO.**A**#
Warrant When Issued	FOO.WSWI	FOO WSWI	FOO	WSWI	FOO/WSw	FOO	/WSw	FOO+#
Test	FOO.TEST	FOO TEST	FOO	TEST	FOO/TEST	FOO	/TEST	FOO˜

[1] Classes **A**-**Z** permitted
[2] Classes **A**-**T**, **V**-**Z** permitted (to avoid conflict with Unit symbology)

A.2 US Futures

Futures symbols are specified in the format:
< *basesymbol* >< *monthcode* >< *yearcode* >

< *basesymbol* > Can be arbitrarily long. If the last character is a space then it is trimmed out

< *monthcode* > Single character from list "FGHJKMNQUVXZ", which is Jan - Dec in order.

< *yearcode* > Can be one or two characters (e.g., "9" or "09"). If the year code starts with a "0" then it is trimmed out.

Example: ESH9 is the symbol for trading S&P mini with contract expiry in March 2009. Other accepted inputs are "ES H9", "ESH09", "ES H09" but the symbol will be converted to ESH9 before it is sent to market and the same is included in all messages sent to client.

A.3 US Options

The OSI initiative targets Feb 12, 2010 to start symbology transition across the options industry. This is also referred to as the date the symbology conversion is complete. However, this is only the start of the consolidation phase, where sets of options symbols grouped by underlying are converted in stages. The consolidation plan is expected to be complete by May 2010. Between

this period, there will always be a set of c̈onsolidatedänd ünconsolidatedöptions. Please refer to www.theocc.com for more details on OSI.

Symbol	Year	Month	Day	C/P	Strike (Int)	Strike (Dec)
MSFT	06	03	18	C	00047	500

The following minimum field sizes are enforced:

- Symbol - 6 characters
- Year - 2 characters
- Month - 2 characters
- Day - 2 characters
- Call/Put indicator - 1 character
- Strike Dollar - 5 character
- Strike Decimal - 3 characters

When the minimum values are adopted, the total symbol will be 21 characters in length.

For new order single messages, the following fields must be specified:

- Tag 55 - OSI symbol or 3 character OPRA root code
- Tag 200 - Expiration month-year in format YYYYMM
- Tag 201 - Put or call
- Tag 202 - Strike price
- Tag 205 - Specify an expiration day (from 1-31)

For each leg of a multileg order, the following fields must be specified:

- Tag 600 - OSI symbol or 3 character OPRA root code
- Tag 608 - CFI Code ('OC' for options call, 'OP' for options put)
- Tag 611 - Expiration date in format YYYYMMDD
- Tag 612 - Strike price

B Liquidity Values

Liquidity Value	Description
0	None
1	Added

Continued on next page

Liquidity Value	Description
2	Removed
4	Opening Auction
5	Oddlot
6	Routed
7	Routed (Arca)
9	Closing (Not Billable)
10	Closing (Billable)
11	Opening (Not Billable)
12	Opening (Billable)
13	Routed (NYSE)
14	Halt (IPO, Not Billable)
15	Halt (IPO, Billable)
16	Intraday Post Market Cross
17	Added Internalized
18	Added Special
19	Removed Special
20	Re-Routed Nyse
21	Added (Flash)
22	Removed (Flash)
23	Cross
24	Added (Invisible)
25	Added (Routed NYSE)
26	Removed (Routed NYSE)
27	Closing (Routed NYSE)
28	Opening (Routed NYSE)
29	Routed (BX)
30	Routed Oddlot (Arca)
31	Routed (DirectEdge)
32	Removed Routed (NASDAQ)
33	Removed Routed (BX)
34	Opening Routed (NASDAQ)
35	Rerouted
36	Closing Auction
37	INET Thrifty Routed (BX)
38	INET Thrifty Routed (NYSE)
39	INET Thrifty Routed
40	Routed (AMEX)
41	Routed (BOX)
42	Routed (CBOE)
43	Routed (ISE)
44	Routed (PHLX)
45	Routed(BATS)
46	Routed (C2)

Continued on next page

Liquidity Value	Description
47	Routed (NASDAQ)
48	Not Maker-Taker
49	No Maker-Taker Info
50	Auction
51	Invisible
52	INET Thrifty Routed PSX
53	Added (Block)
54	Added (Mid-Point)
55	Removed (Mid-Point)
56	Routed ROUT
57	Contra Retail
58	Contra Self
59	Routed ROUX
60	Matched Mid-Point
61	Routed IOCX / IOCT
62	Routed PSX
65	Blended
66	Removed (Invisible)
67	Added Routed (NASDAQ)
68	Routed Special
69	Routed ROUC
70	Internalized Pre and Post Market
71	Routed Pre and Post Market
72	Added (EDGX)
73	Removed Routed (BATS BYX)
74	Closing Routed
75	Removed Internalized
76	Added Price Improved
77	Added Invisible Price Improved
78	Added Set NBBO
79	Removed Set NBBO
80	Added (LAVA)
81	Iso
82	Routed ROUD/ROUE
83	Removed (LAVA)
84	Routed ROUZ
85	Removed Routed INET (NASDAQ)
86	Added Routed (AMEX)
87	Added Routed (ARCA)
88	Added Mid-Point RMPT
89	Removed ROUZ/ROUQ/ROUD
90	Removed MidPoint (RMPT)
91	Routed Mid-Point (RMPT)

Continued on next page

Liquidity Value	Description
92	Added Routed (EDGA)
93	Added Routed (BX)
94	Added Routed (NSX)
95	Added Routed (CHX)
96	Added Routed (PSX)
97	Added Routed (CBSX)
98	Added Routed (BATS BYX)
99	Added Routed (BATS BZX)
100	Routed SWPA/SWPB/SWPC
101	Mid-Point MatchCross
102	Added (Mid-Point Peg)
103	Removed (Contributory)
104	Added (vs. Contributory)
105	Added (vs. Order Delivery)
106	Midpoint (Added/Removed)
107	Added Mid-Point Discretionary
108	Removed Mid-Point Discretionary
109	Routed ROUQ
110	Retail Price Offset
111	ARCA Tracking
112	INET SAVE Routed
113	INET SAVE Routed (NYSE)
114	INET SAVE Routed (BX)
115	INET SAVE Routed (PSX)
116	INET CART Routed (BX)
117	INET CART Routed (PSX)
118	Routed (MIAX)
119	Retail Match
120	Non-retail Match
121	Retail and Non-retail Match
122	Removed IOC
123	Added Knight Match 2
124	Retail Added
125	Retail Removed
126	Non-Displayed Route Peg Added
127	Added Joined NBBO
128	INET QCST Routed Removed
129	INET QCST Routed
130	INET QCST Routed (BX)
131	Routed (GMNI)
132	Added Retail Price Improvement
133	Self Crossed (IEX)
134	Removed RPI

Continued on next page

Liquidity Value	Description
135	Retail Removed (Midpoint or NBBO)
136	Added Routed (Nasdaq) ROOC
137	Opening or Closing (Routed Arca)
138	Routed to NSX
139	Routed to MCRY
140	Opening (Routed American)
141	Closing (RoutedAmerican)
142	Primary Until 9:45 (Routed Nyse)
143	Primary Until 9:45 (Routed Arca)
144	Primary Until 9:45 (Routed American)
145	Closing D-Quote (Early)
146	Closing D-Quote (Late)

C Exchange Destinations

C.1 US Equities

ExDestination (Tag 100)	Description	ISO-10383 MIC
AES	Credit Suisse Algo	CAES
ARCP	NYSE ARCA using Pillar	ARCX
BIDS	BIDS Dark Pool	BIDS
BSX	Nasdaq OMX BX using OUCH	XBOS
BYXB	BATS BYX using BOE 2.0	BATY
BZXB	BATS BZX using BOE 2.0	BATS
CBX	Instinet Dark Pool	ICBX
CDEL	Citadel	CDEL
CRSF	Credit Suisse Crossfinder Dark Pool	CAES
CSFB	Credit Suisse Crossfinder Dark Pool	CAES
CSTI	Canaccord Genuity	
DBSX	Deutsche Bank SuperX Dark Pool	DBSX
EDGAB	EDGA Exchange using BOE 2.0	EDGA
EDGXB	EDGX Exchange using BOE 2.0	EDGX
IEX	IEX Market	IEXG
INET	Nasdaq using OUCH	XNAS
INET-FIX	Nasdaq using FIX	XNAS
INCR	INTELLIGENTCROSS	INCR
JPMX	JP Morgan Dark Pool (JISU platform)	JPMX
KLINK	Knight Link Dark Pool	KNLI
KMATCH	Knight Match Dark Pool	KNMX
LAMP	LAMPOST CAPITAL	LAMP
LEVEL	Citi Lava Trading LEVEL ATS Dark Pool	LEVL

Continued on next page

ExDestination (Tag 100)	Description	ISO-10383 MIC
LX	Barclays Capital LX Dark Pool	BARX
MEMX	MEMX LLC EQUITIES.	MEMX
MPRLE	MIAX PEARL: ELECTRONIC TRADING FOR EQUITIES.	ERL
NSX	National Stock Exchange	XCIS
NYX	NYSE using FIX	XNYS
NYSP	NYSE	XNYS
OTC	OTC Link ECN FIX	OTCX
PDQ	PDQ Dark Pool (Liquidity Seeker)	PDQX
PDQA	PDQ Dark Pool (Liquidity Provider)	PDQX
POSIT	ITG POSIT Dark Pool	ITGI
PSX	Nasdaq OMX PSX using OUCH	XPHL
SIGMA-XT	Goldman Sachs SIGMA-X Dark Pool through Nasdaq technology	SGMA
SPDR	SpeedRoute	
XNYS	NYSE using UTP Direct	XNYS
XTXD	XTX EXECUTION SERVICES LLC	XTXD

C.2 US Options

ExDestination (Tag 100)	Description	ISO-10383 MIC
DAMXO	NYSE MKT (formerly NYSE AMEX) using ArcaDirect	AMXO
DARCO	NYSE ARCA using ArcaDirect	ARCO
DBOX	Boston Options Exchange	XBOX
DBTSO	BATS Options using FIX	BATO
DCBOE	Chicago Board Options Exchange	XCBO
DCTOE	Chicago Board Options C2 Exchange	C2OX
DEDGO	EDGX Options using FIX	EDGO
DASH	Dash Financial Smart Order Router	
DISE	International Securities Exchange	XISX
DGMNI	ISE Gemini Exchange	GMNI
DMCRY	ISE Mercury Exchange	MCRY
DNDQO	Nasdaq Options	XNDQ
DXBXO	Nasdaq BX Options	XBXO
DPHLX	Nasdaq PHLX	XPHO
DXMIO	Miami International Securities Exchange (MIAX Options)	XMIO
DMPRL	Miami International Securities Exchange (PEARL)	MPRL
INST	Instinet Options Smart Order Router	
LAMPO	LAMPOST CAPITAL	LAMP
MPRL	MIAX PEARL: ELECTRONIC TRADING FOR EQUITIES.	MPRL
XMIO	MIAMI INTERNATIONAL SECURITIES EXCHANGE.	XMIO
WEXO	Wolverine Execution Services	