



The Chicago Stock Exchange, Inc.
Application Development

CHX Layoff Vendor Specification
FIX Protocol



TABLE OF CONTENTS

REVISION HISTORY3

INTRODUCTION4

CLOCK SYNCHRONIZATION4

UNSUPPORTED FIX MESSAGES5

THE FIX SESSION6

MESSAGE HEADER..... 6

LOGON MESSAGE..... 7

OTHER SESSION CONTROL MESSAGES 7

EMAIL 7

MESSAGES SENT FROM LAYOFF FIRMS TO CHX8

COPIES OF ORDERS, ORDER CANCEL OR ORDER MODIFICATION 8

COPIES OF TRADES, TRADE BUST OR TRADE CORRECTION..... 9

EXAMPLES 11



Revision History

Date	By	Description of changes
11/30/2004	RGG	Original release.
01/26/2005	VS	Remove "OrigTime". Add "LastMkt".
03/11/2005	VS	Added Examples
06/16/2005	S'LG	Changed ClOrdID, OrigClOrdID and Rule80A to be required columns.. Updated "Valid values" for Rule80A.
03/14/07	TBL/ GL	Changed DeliverToCompID to be required field populated with valid CHX trading account give up. Changed Examples
8/21/07	GL	Updated SettlmntTyp and ExecInst values for RegNMS.
10/29/07	GL	Fix to remaining SettlmntType and ExecInst entries to reflect RegNMS values from 8/21/07 revision.
7/11/08	GL	Add Tag 76 (ExecBroker).
8/4/08	GL	Formatting and cover page changes for web distribution.



Introduction

This document is a supplement of the FIX 4.0 and FIX 4.1 Protocol Specifications, which can be accessed at www.fixprotocol.org. Conceptually, this specification is a subset of the FIX Protocol v4.0 and FIX Protocol v4.1 Specifications. It is meant to clarify portions of the FIX protocol as they relate to layoff service providers that interact with the Chicago Stock Exchange Inc. (CHX) and its membership.

Note: CHX can support FIX v4.0 and FIX v4.1. Any fields denoted in the message tables as “**New for FIX v4.1**” are included in the message for FIX v4.1, and are excluded from the message for FIX v4.0 unless otherwise specified.

Clock Synchronization

Rule 4 of Article VI of the Chicago Stock Exchange Inc. Rules and Regulations states “Each member or layoff service provider to synchronize its business clocks used for the purpose of recording the date and time of any event that must be recorded pursuant to this provision with reference to a time source as designated by the Exchange, and shall maintain the synchronization of all such clocks in conformity with such procedures as are prescribed by the Exchange.”

The CHX employs a series of Symmetricom TimeVault appliances to establish a consistent, reliable system of synchronized time. These servers are used to ensure our internal time is synchronized to external, authoritative time source for all our computer systems. The Exchange uses Global Positioning Satellite (GPS), Automated Computer Time Service (ACTS) and Network Time Protocol (NTP) (in order of preference) to provide the authoritative time for internal systems.

Redundancy has been built in to ensure the Exchange always has an external time source. If GPS should happen to fail, the TimeVault oscillator continues to provide time at the same time as it activates ACTS. There will be a switch back to GPS once it is again available.

If there is a situation where both GPS and ACTS should fail, the TimeVault oscillator continues to provide time at the same time as it activates NTP. TimeVault will revert back to either GPS or ACTS should only one of them become available or to the better of the two if both become available.

The Exchange offers use of its Time Services to member firms and layoff vendor services. Please contact the Exchange’s NT/LAN Technical Support Department to take advantage of these services.



Unsupported FIX Messages

The CHX does not support the following FIX message types for DOT drop copy interface:

- New Order - Single
- Order Cancel Reject
- Order Cancel Request
- Order Cancel/Replace Request
- Order Status Request
- Don't Know Trade
- Advertisements
- Indications of Interest
- News
- Quote Request
- Quote
- Allocation
- Allocation ACK
- New Order List
- List Status
- List Execute
- List Cancel Request
- List Status Request



The FIX Session

This section describes general information, which will be needed to establish and maintain a FIX connection with the CHX.

- The CHX supports FIX version 4.0 and version 4.1.
- Must use TCP/IP protocol for FIX messaging.
- The CHX FIX engine will always behave as the server. The broker must connect to CHX FIX system at a pre-arranged IP address and port number.
- The CHX will provide the broker with two IP addresses: one for the primary host and the other for the backup host. The TCP port number will be the same for both the primary and backup host.
- In the message header of inbound messages, the *TargetCompID* field's value is always "CHX".
- In the message header of inbound messages, the *SenderCompID* field's value will be determined at contact. The *SenderCompID* field has a maximum length of 4 characters.

Message Header

Each administrative or application message is preceded by a standard header.

All messages sent from layoff firms to CHX must have the *DeliverToCompID* field (tag# 128) populated with a valid CHX trading account to identify the firm which sent the order. Vendors please contact CHX customer or Celeste Gianfrancisco, Manager Member Services to obtain valid CHX trading account values.

Tag	Field Name	Req'd	Value
8	BeginString	Y	Identifies beginning of new message and protocol version.
9	BodyLength	Y	The length of the message up to the checksum field.
35	MsgType	Y	Defines the message type: Valid values: 0 = Heartbeat 1 = Test Request 2 = Resend Request 3 = Reject 4 = Sequence Reset 5 = Logout 8 = Execution Report A = Logon C = E-Mail
34	MsgSeqNum	Y	The message sequence number.
49	SenderCompID	Y	Assigned value used to identify the sender of the message.
56	TargetCompID	Y	Assigned value used to identify the receiver of the message.
128	DeliverToCompID	Y	The valid CHX trading account (4 character alpha). This is a required field for all execution reports and is used to identify the firm which sent the original order.
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	Required when message may be duplicate of another message sent under a different sequence number.
52	SendingTime	Y	Time of message transmission expressed in "GMT".

Logon Message

While data encryption is supported within the FIX specification, the CHX does not support this feature. The CHX only establishes connections to brokers via a dedicated circuit.

Therefore, the following clarifications on the logon message must be stated

Tag	Field Name	Req'd	Value
	<i>Standard Header</i>	Y	<i>MsgType = A</i>
98	<i>EncryptMethod</i>	Y	Always 0 (None).
108	<i>HeartBtInt</i>	Y	Pre-arranged between CHX and the broker. CHX will adjust to this value (received from the firm) and put it in the confirmation Logon message (sent to the firm)
141	<i>ResetSeqNumFlag</i>	N	CHX doesn't support 24-hour connectivity so if a firm sends a logon with <i>ResetSeqNumFlag=Y</i> , it will reject the logon message. This is a FIX v4.1 field.

The fields *RawDataLength* and *RawData* are not supported

Other Session Control Messages

All other administrative messages for session control – **Heartbeat, Test Request, Resend Request, Reject, Sequence Reset and Logout** – are support as described in the FIX Protocol Specification, which can be accessed at www.fixprotocol.org.

Email

The following table describes the CHX support for inbound or outbound e-mail messages.

Tag	Field Name	Req'd	Value
	<i>Standard Header</i>	Y	<i>MsgType = C</i>
94	EmailType	Y	CHX always sends "0" (New).
33	LinesOfText	Y	Specifies the number of repeating lines of text specified
58	Text	Y	Repeating field, number of instances defined in LinesOfText
147	Subject	Y	This is a FIX v4.1 field.
164	EmailThreadId	Y	This is a FIX v4.1 field.
37	OrderID	N	CHX may populate this field.



Messages Sent from Layoff Firms to CHX

All copies of orders, order cancel, order modification, trades, trade bust and trade correction are sent to CHX using the Execution Report message (MSGType = 8).

Copies of Orders, Order Cancel or Order Modification

Tag	Field Name	Req'd	Value
	<i>Standard Header</i>	Y	<i>MsgType = 8</i>
20	ExecTransType	Y	0 = New
11	ClOrdID	Y	This field must at a minimum be unique for the current day. For multi-day, the firm must assure uniqueness of this field across days. Embedding a date with the <i>ClOrdID</i> would be one solution. This should be the 24 character UID assigned by CHX to an order if electronically submitted from a CHX application.
41	OrigClOrdID	Y	ClOrdID of the previous order (NOT the initial order of the day), used to identify the previous order in cancel and cancel/replace requests. This is a FIX v4.1 field.
37	OrderId	Y	Unique identifier for order as assigned by layoff firm.
17	ExecID	Y	Unique identifier of Execution Report message (not trade) as assigned by layoff firm.
32	LastShares	Y	Quantity of shares bought/sold; meaningless for this copy; always 0.
31	LastPx	Y	Price of <i>LastShares</i> ; meaningless for this copy; always 0.
39	OrdStatus	Y	Valid values: 0 = New 1 = Partially filled 2 = Filled 4 = Canceled 5 = Replaced
150	ExecType	Y	Valid values: This is a FIX v4.1 field. 0 = New (for orders) 4 = Canceled (for order cancel) 5 = Replaced (for order modification)
14	CumQty	Y	Total number of shares filled.
151	LeavesQty	Y	Amount of shares open for further execution. This is a FIX v4.1 field.
6	AvgPx	Y	Calculated average price of all fills on this order.
55	Symbol	Y	Stock symbol
65	SymbolSfx	N	Symbol suffix
54	Side	Y	Valid values: 1 = Buy 2 = Sell 5 = Sell short 6 = Sell short exempt
38	OrderQty	Y	Original order quantity



40	OrdType	Y	Valid values: 1 = Market 2 = Limit 3 = Stop 4 = Stop limit 5 = Market on close 6 = With or without 7 = Limit or better 8 = Limit with or without 9 = On basis
44	Price	N	Required if specified on the order.
99	StopPx	N	Required if specified on the order.
59	TimeInForce	N	Absence of this field is interpreted as DAY. Valid values: 0 = Day 1 = Good Till Cancel (GTC) 2 = At the Opening (OPG) 3 = Immediate or Cancel (OC) 4 = Fill or Kill (FOK) 5 = Good Till Crossing (GTX) 6 = Good Till Date
126	ExpireTime	N	Required if <i>TimeInForce</i> = GTD.
47	Rule80A	Y	Valid values: A, B, U, W or Y = Agency; H, I, J, or K = Individual Investor All other codes are considered Principal..
63	SettlmntTyp	N	Valid values: 0 = Regular 1 = Cash 2 = Next Day (T+1) 3 = T+2 4 = T+3 5 = T+4 6 = Future 7 = When And If Issued 8 = Sellers Option 9 = T+5
64	FultSettDate	N	Required when <i>SettlmntTyp</i> = 6 (Future) or 8 (Sellers Option).
18	ExecInst	N	Valid values 1 = Not held 5 = Held E = Do not increase - DNI F = Do not reduce - DNR G = All or none - AON f = Inter-market Sweep Order (ISO)
60	TransactTime	Y	Time of order acknowledgement, order cancellation or order replacement. (expressed in GMT)
58	Text	Y	Always has "[COPY]" at the beginning. Then followed by any text, if any.

Copies of Trades, Trade Bust or Trade Correction

Tag	Field Name	Req'd	Value
-----	------------	-------	-------



	<i>Standard Header</i>	Y	<i>MsgType = 8</i>
20	ExecTransType	Y	0 = New (for trades) 1 = Cancel (for trade bust) 2 = Correct (for trade correction)
11	ClOrdID	Y	This field must at a minimum be unique for the current day. For multi-day, the firm must assure uniqueness of this field across days. Embedding a date with the <i>ClOrdID</i> would be one solution. This should be the 24 character UID assigned by CHX to an order if electronically submitted from a CHX application.
37	OrderId	Y	Unique identifier for order as assigned by layoff firm.
17	ExecID	Y	Unique identifier of Execution Report message (not trade) as assigned by layoff firm.
19	ExecRefID	N	Required for Cancel and Correct <i>ExecTransType</i> messages.
32	LastShares	Y	Quantity of shares bought/sold.
31	LastPx	Y	Price of <i>LastShares</i> .
39	OrdStatus	Y	Valid values: 0 = New 1 = Partially filled 2 = Filled
150	ExecType	Y	Valid values: This is a FIX v4.1 field. 1 = Partially filled 2 = Filled
14	CumQty	Y	Total number of shares filled.
151	LeavesQty	Y	Amount of shares open for further execution. This is a FIX v4.1 field.
6	AvgPx	Y	Calculated average price of all fills on this order.
55	Symbol	Y	Stock symbol
65	SymbolSfx	N	Symbol suffix
54	Side	Y	Valid values: 1 = Buy 2 = Sell 5 = Sell short 6 = Sell short exempt
38	OrderQty	Y	Original order quantity
40	OrdType	Y	Valid values: 1 = Market 2 = Limit 3 = Stop 4 = Stop limit 5 = Market on close 6 = With or without 7 = Limit or better 8 = Limit with or without 9 = On basis
44	Price	N	Required if specified on the order.
99	StopPx	N	Required if specified on the order.



59	TimeInForce	N	Absence of this field is interpreted as DAY. Valid values: 0 = Day 1 = Good Till Cancel (GTC) 2 = At the Opening (OPG) 3 = Immediate or Cancel (OC) 4 = Fill or Kill (FOK) 5 = Good Till Crossing (GTX) 6 = Good Till Date
126	ExpireTime	N	Required if <i>TimeInForce</i> = GTD.
47	Rule80A	Y	Valid values: A, B, U, W or Y = Agency; H, I, J, or K = Individual Investor All other codes are considered Principal..
63	SettlmntTyp	N	Valid values: 0 = Regular 1 = Cash 2 = Next Day(T+1) 3 = T+2 4 = T+3 5 = T+46 = Future 7 = When And If Issued 8 = Sellers Option 9 = T+5
64	FultSettDate	N	Required when <i>SettlmntTyp</i> = 6 (Future) or 8 (Sellers Option).
18	ExecInst	N	Valid values 1 = Not held 5 = Held E = Do not increase - DNI F = Do not reduce - DNR G = All or none – AON f = Inter-market Sweep Order (ISO)
60	TransactTime	Y	Time of execution, trade bust or trade correction.
58	Text	Y	Always has “[COPY]” at the beginning. Then followed by any text, if any.
30	LastMkt	N	
76	ExecBroker	Y	The NSCC ID of the entity participating on the trade in the away market for orders initiated by CHX institutional brokers. Not always the DTCC clearing number, as the trade may be cleared by someone other than the broker. This is the four digit numeric that NSCC uses to identify trading "agents".

Examples

Example 1: CHX layoff an order in CMS message format

QRT
CHA 1

BUY
500 AVP 42.24
DAY P



LEKA
4D32430000014089A452D42
200503080812

Copy of orders in FIX 4.0 format

MsgType (35)	= FixTypeExecutionRpt
SenderCompID (49)	= "Layoff firm"
TargetCompID (56)	= CHX
DeliverToCompID (128)	= "LEKA"
SendingTime(52)	= "Message sent time"
OrderID (37)	= "Layoff firm generates this value"
ClOrdID(11)	= "4D32430000014089A452D42"
ExecID (17)	= "Layoff firm generates this value"
ExecTransType (20)	= 0 (New)
OrdStatus (39)	= 0 (New)
Side (54)	= BUY
LastShares (32)	= 0
Symbol (55)	= AVP
LastPx (31)	= 0
OrderQty (38)	= 500
OrdType (40)	= Limit
Price (44)	= 42.24
CumQty (14)	= 0
AvgPx (6)	= 0
TransactTime(60)	= "Order received time at layoff firm"
Rule80A(47)	= P
Text(58)	= "[COPY]"

Example 2: Layoff order was entered from directed terminal

Copy of orders in FIX 4.0 format

MsgType (35)	= FixTypeExecutionRpt
SenderCompID (49)	= "Layoff firm"
TargetCompID (56)	= CHX
DeliverToCompID (128)	= "LEKA"
SendingTime(52)	= "Message sent time"
OrderID (37)	= "Layoff firm generates this value"
ClOrdID(11)	= "Layoff firm generates this value"
ExecID (17)	= "Layoff firm generates this value"
ExecTransType (20)	= 0 (New)
OrdStatus (39)	= 0 (New)
Side (54)	= BUY
LastShares (32)	= 0
Symbol (55)	= AVP
LastPx (31)	= 0
OrderQty (38)	= 500
OrdType (40)	= Limit
Price (44)	= 42.24
CumQty (14)	= 0
AvgPx (6)	= 0
TransactTime(60)	= "Order received time at layoff firm"
Rule80A(47)	= A
Text(58)	= "[COPY]"



Example 3: CHX send cancel/replace request

MsgType (35)	= FixTypeCancelReplace
SenderCompID (49)	= CHX
OnBehalfOfCompID (115)	= CHEA
TargetCompID (56)	= "Layoff firm"
SendingTime(52)	= "Message sent time"
ClOrdID(11)	= "DDDD4300000014089A452D42"
OrigClOrdID (41)	= "BBBB4300000014089A452D42"
Side (54)	= BUY
OrderQty (38)	= 500
Symbol (55)	= ASKJ
OrdType (40)	= Limit
Price (44)	= 22
HandlInst(21)	= 1
ClientID (109)	= CHEA
Rule80A(47)	= A

Copy of cancel/replace confirmation in FIX 4.0 format

MsgType (35)	= FixTypeExecutionRpt
SenderCompID (49)	= "Layoff firm"
TargetCompID (56)	= CHX
DeliverToCompID (128)	= "CHEA"
SendingTime(52)	= "Message sent time"
OrderID (37)	= "Layoff firm generate this value"
ClOrdID(11)	= "DDDD4300000014089A452D42"
ExecID (17)	= "Layoff firm generate this value"
ExecTransType (20)	= 0 (New)
OrdStatus (39)	= 5 (Replace)
Side (54)	= BUY
LastShares (32)	= 0
Symbol (55)	= ASKJ
LastPx (31)	= 0
OrderQty (38)	= 500
OrdType (40)	= Limit
Price (44)	= 22
CumQty (14)	= 0
AvgPx (6)	= 0
TransactTime(60)	= "Order received time at layoff firm"
Rule80A(47)	= A
Text(58)	= "[COPY]"

Copy of cancel/replace confirmation in FIX 4.1 format (differences from FIX 4.0 in *italics*)

MsgType (35)	= FixTypeExecutionRpt
SenderCompID (49)	= "Layoff firm"
TargetCompID (56)	= CHX
DeliverToCompID (128)	= "CHEA"
SendingTime(52)	= "Message sent time"
OrderID (37)	= "Layoff firm generate this value"
ClOrdID(11)	= "DDDD4300000014089A452D42"
<i>OrigClOrdID (41)</i>	= " <i>BBBB4300000014089A452D42</i> "
ExecID (17)	= "Layoff firm generate this value"
ExecTransType (20)	= 0 (New)
<i>ExecType (150)</i>	= <i>5 (Replace)</i>
OrdStatus (39)	= 5 (Replaced)



Side (54) = BUY
LastShares (32) = 0
Symbol (55) = ASKJ
LastPx (31) = 0
OrderQty (38) = 500
OrdType (40) = Limit
Price (44) = 22
CumQty (14) = 0
AvgPx (6) = 0
TransactTime(60) = "Order received time at layoff firm"
Rule80A(47) = A
Text(58) = "[COPY]"