

Omega Securities Inc.
Operating Omega ATS & Lynx ATS
ITCH 3.0 Specification
(Market Data)

Version 3.02

Table of Contents

Revision History.....	3
Overview.....	5
Introduction.....	5
Deviations from Standard ITCH.....	5
Data Types.....	6
Message Formats.....	6
Message Type.....	6
Time Messages.....	6
Seconds Message.....	6
Milliseconds Message.....	6
System Event Message.....	6
System Event Message.....	6
System Event Codes.....	7
Stock Related Messages.....	7
Stock Directory.....	7
Stock Directory Extended Form.....	8
Stock Trading Action.....	9
Add Order – ExecBroker Attribution Message.....	9
Add Order - Attribution.....	9
Add Order – Attribution (Long Form).....	9
Modify Order Messages.....	10
Order Executed Message.....	10
Order Executed Message (Long Form).....	10
Order Executed With Price Message.....	11
Order Executed With Price Message (Long Form).....	11
Trade Message.....	11
Trade Message (Long Form).....	12
Cross Trade Message.....	13
Order Cancel Message.....	13
Order Cancel Message (Long Form).....	13
Order Delete Message.....	13
Busted (ie. Broken) Trade Message.....	14

Revision History

Date	Version	Description	Author
August 13, 2007	1.0.8	First Public Release.	Norman Bates
November 19, 2007	1.0.12	Removed ITCH 2.0a section, modified ITCH 3.0.	NB
September 18, 2008	1.0.15	Added Trade Bust message type ("B").	NB
January 8, 2009	1.0.17	<ul style="list-style-type: none"> Starting sequence number in Login Request Packet changed to 1. In Add Order with Attribution message - changed the Execbroker length from 4 characters to 3 and changed 'OMG' to a numerical value. In Add Order with Attribution message -added a Reserved field with offset 40 and length 1 after the Execbroker field 	Raymond Tung
December 7, 2009	2.00	<ul style="list-style-type: none"> Separated ITCH specification from FIX and SOUP. Added <u>Deviations from Standard ITCH</u> section. Executed with Price message – Removed "C" message type. Add Order message – changed Reserved field to Alphanumeric. Order Executed message – added Contra Broker ID field (3 characters), and Reserved field (1 character). Trade Message – added message type Cross Trade Message – added message type 	Raymond Tung
December 16, 2009	2.01	<ul style="list-style-type: none"> Order Executed message – corrected offset on Contra Broker ID from "36" to "25". Order Executed message – corrected offset on Reserved field from "39" to "28". 	Raymond Tung
March 25, 2010	2.02	<ul style="list-style-type: none"> Changed effective date to May 3, 2010. Changed reference of Order Executed with Price message type to Order Executed message type under <u>Deviations from Standard ITCH</u> section. 	Raymond Tung
December 3, 2010	2.03	<ul style="list-style-type: none"> Added Long Form message type for: <ul style="list-style-type: none"> Add Order message Order Executed message Order Executed with Price message Trade message Order Cancel message Added Stock Directory message type. Added Stock Directory Extended Form message type. Added Order Executed with Price message type. Added explicit Bypass value to Order Executed and Order Executed with Price message types. 	Raymond Tung
April 3, 2012	2.04	<ul style="list-style-type: none"> Added value for Alpha Exchange in Stock Directory Messages 	Raymond Tung
March 23, 2013	3.00	<ul style="list-style-type: none"> Added references to Lynx ATS General updates 	Raymond Tung
March 1, 2016	3.01	<ul style="list-style-type: none"> Replaced Alpha with Aequitas in Market Category 'Z' 	RT

July 4, 2017	3.01	<ul style="list-style-type: none"> • Removed bypass marker for everything but crosses • Removed Bypass marker from Order Executed Message (long form) • Removed Bypass marker from Order Executed Message (with price) • Removed cross types <ul style="list-style-type: none"> Basis Cross Contingent Cross VWAP Cross • Added Derivative Cross to crosses. 	Tyler Bignell
July 26, 2017	3.02	<ul style="list-style-type: none"> • Corrected offset on Order Executed Message (Long Form) • Changed location of effective date to the footer • Changed revision to 3.02 	Tyler Bignell

Overview

Introduction

The information in this section is specific to the Omega Securities Inc's marketplaces, Omega ATS and Lynx ATS. The entire ITCH 3.00 specification is available from NASDAQ at:

<http://www.nasdaqtrader.com/content/technicalsupport/specifications/dataproducts/tvitch-v3.pdf>

Deviations from Standard ITCH

- Added Buy Broker ID & Sell Broker ID for attribution to:
 - Order Executed message type.
 - Trade message type.
 - Cross Trade message type.
- Added Bypass field to: Cross Trade message type.
- Added Reserve field to: Order Executed message type.
- Exec Broker field is three characters in length, with the fourth character reserved for future use.
- All Stock field is 10 characters in length in:
 - Add Order – ExecBroker Attribution message type.
 - Trade message type.
 - Cross Trade message type.
- Stock Directory and Extended Form Directory has additional fields to accommodate information.
- All Long Form Message Types deviate from standard ITCH where Shares field is 10 characters in length.

Data Types

All numeric fields are composed of a string of ASCII coded digits, right justified and space filled on the left.

All alpha fields are left justified and padded on the right with spaces.

Prices are given in decimal format with 6 whole number places followed by 4 decimal digits. The whole number portion is padded on the left with spaces; the decimal portion is padded on the right with zeros.

The decimal point is implied by position; it does not appear inside the price field.

Message Formats

The ITCH 3.0 feed is composed of a series of messages that describe orders added to, removed from, and executed on Omega.

Message Type

Time Messages

For bandwidth efficiency reasons, Omega will use separate time stamp messages. The messages will be sequenced so that data feed recipients can apply the time stamps properly. The time stamp is broken into two separate messages: seconds and milliseconds. Please note that the timestamp for new seconds will always be immediately followed by a time stamp for new milliseconds.

Seconds Message

Name	Offset	Length	Value	Comments
Message Type	0	1	'T'	Seconds Message
Second	1	5	Numeric	Number of seconds since midnight

Milliseconds Message

Name	Offset	Length	Value	Comments
Message Type	0	1	'M'	Milliseconds Message
Millisecond	1	3	Numeric	Number of milliseconds since last second

System Event Message

The system event message type is used to signal a market or data feed handler event.

System Event Message

Name	Offset	Length	Value	Comments
Message Type	0	1	'S'	System Event Message

Event Code	1	1	Alphanumeric	System Event Code
------------	---	---	--------------	-------------------

System Event Codes

“O” Start of Messages. Outside of time stamp messages, the start of day message is the first message sent in any trading day.

“S” Start of System hours. This message indicates that the marketplace is open and ready to start accepting orders.

“Q” Start of Market hours. This message is intended to indicate that Market Hours orders are available for execution.

“M” End of Market hours. This message is intended to indicate that Market Hours orders are no longer available for execution.

“E” End of System hours. It indicates that the marketplace is now closed and will not accept any new orders today. It is still possible to receive Broken Trade messages and Order Delete messages after the End of Day.

“C” End of Messages. This is always the last message sent in any trading day.

Stock Related Messages

Omega ATS and Lynx ATS use administrative messages to provide additional information on securities and their trading status.

Prior to the start of system hours, Omega ATS or Lynx ATS will send out a Trading Action spin. In the spin, a Stock Trading Action message with “T” (Trading Resumption) represents securities that are eligible for trading for the applicable marketplace feed. If a security is absent from the pre-opening Trading Action spin, firms should assume that the security is being treated as halted by Omega ATS or Lynx ATS at the start of the system hours.

After the start of system hours, the marketplace will use the Trading Action message to relay changes in trading status for an individual security. Messages will also be sent when a stock is halted or is released for trading intraday.

Stock Directory

This message type is used to relay additional information on stocks available on Omega ATS or Lynx ATS. This may be used to build a security master list.

Name	Offset	Length	Value	Comments
Message Type	0	1	‘R’	Stock Directory Message
Stock	1	10	Alphanumeric	Denotes the security symbol on Omega/Lynx.
Market Category	11	1	Alpha	Indicates the listing market ‘T’ = TSX ‘V’ = Venture ‘C’ = CNSX

				'Z' = Aequitas
Round Lot	12	6	Numeric	Indicates the number of shares that represent a round lot for the issue.
CUSIP	18	9	Alphanumeric	9 character code identifying North American securities for the purpose of clearing and settlement.
Currency	27	3	Alpha	Currency of security traded 'CAD' = Canadian Dollars 'USD' = US Dollars
Shortable	30	1	Alpha	Indicates the short status of the security 'E' = Short Exempt 'S' = Shortable 'N' = Not Shortable
Dividend Indicator	31	1	Alpha	'A' = Annual 'S' = Semi Annual 'Q' = Quarterly 'M' = Monthly

Stock Directory Extended Form

This message type has additional fields and will be used to convey security information on fixed income securities. This may be used to build a security master list.

Name	Offset	Length	Value	Comments
Message Type	0	1	'r'	Fixed Income Directory Message
Security	1	10	Alphanumeric and "."	Denotes the security symbol on Omega/Lynx.
Market Category	11	1	Alpha	Indicates market of origin: 'T' = TSX 'V' = Venture 'C' = CNSX 'O' = Omega 'Z' = Aequitas
Round Lot	12	6	Numeric	Indicates the number of shares that represent a round lot for the issue.
CUSIP	18	9	Alphanumeric	9 character code identifying North American securities for the purpose of clearing and settlement.
Currency	27	3	Alpha	Currency of security traded 'CAD' = Canadian Dollars 'USD' = US Dollars
Shortable	30	1	Alpha	Indicates the short status of the security 'E' = Short Exempt 'S' = Shortable 'N' = Not Shortable
Frequency	31	1	Alpha	'A' = Annual 'S' = Semi Annual 'Q' = Quarterly 'M' = Monthly
Security Type	32	1	Alpha	'b' = Bonds

				'd' = Debentures 'r' = Rights 'n' = Notes 'w' = Warrants
Expiry Date	33	8	Date	Date of expiry in the format YYYYMMDD
Description	41	20	String	Description of the security

Stock Trading Action

Name	Offset	Length	Value	Comments
Message Type	0	1	'H'	Stock Trading Action Message
Stock	1	10	Alphanumeric	Stock symbol
Trading State	11	1	Alpha	'H' = Halted 'T' = Trading on Omega/Lynx
Reserved	12	1	Alpha	Reserved
Reason	13	4	Alphanumeric	Trading Action reason

Add Order – ExecBroker Attribution Message

An Add Order Message indicates that a new order has been accepted by Omega ATS or Lynx ATS and was added to the respective order book. The message includes a day-unique Order Reference Number used by each marketplace to track the order.

Add Order - Attribution

Name	Offset	Length	Value	Comments
Message Type	0	1	'F'	Add Order Message
Order Reference Number	1	9	Numeric	The unique reference number assigned to this new order. Increasing, but not necessarily sequential
Buy/Sell Indicator	10	1	Alpha	'B' = Buy order 'S' = Sell order
Shares	11	6	Numeric	Total number of shares added to the book
Stock	17	10	Alpha	Stock Symbol
Price	27	10	Numeric	Display Price of the new order
ExecBroker	37	3	Numeric	Identifier of firm entering the order or '1' for anonymous.
Reserved	40	1	Alphanumeric	Reserved – Default as space

Add Order – Attribution (Long Form)

The long form message type is used when an order with share size greater than 6 characters is present.

Name	Offset	Length	Value	Comments
Message Type	0	1	'f'	Add Order Message
Order Reference Number	1	9	Numeric	The unique reference number assigned to this new order. Increasing, but not necessarily sequential
Buy/Sell Indicator	10	1	Alpha	'B' = Buy order 'S' = Sell order
Shares	11	10	Numeric	Total number of shares added to the book
Stock	21	10	Alpha	Stock Symbol
Price	31	10	Numeric	Display Price of the new order
ExecBroker	41	3	Numeric	Identifier of firm entering the order or '1' for anonymous.
Reserved	44	1	Alphanumeric	Reserved – Default as space

Note: The Stock and ExecBroker fields diverge from the generic ITCH protocol in length. An additional field has also been reserved for future use.

Modify Order Messages

Modify Order messages always include the Order Reference Number of the Add Order to which the update applies. To determine the current display shares for an order, ITCH 3.0 subscribers must deduct the number of shares stated in the Modify message from the original number of shares stated in the Add Order message with the same reference number. Omega ATS or Lynx ATS may send multiple Modify Order messages for the same order reference number and the effects are cumulative. When the number of display shares for an order reaches zero, the order is dead and should be removed from the book.

Order Executed Message

This message is sent whenever an order on the book is executed in whole or in part. It is possible to receive several Order Executed Messages for the same order if that order is executed in several parts. The multiple Order Executed Messages on the same order are cumulative.

Name	Offset	Length	Value	Comments
Message Type	0	1	'E'	Order Executed Message
Order Reference Number	1	9	Numeric	The unique order number referencing a previous Add Order Message
Executed Shares	10	6	Numeric	Number of shares executed
Match Number	16	9	Numeric	Omega generated match number of this execution
Contra Broker ID	25	3	Numeric	Active Side's broker number or '1' for anonymous
Reserved	28	1	Alphanumeric	Reserved for future use.

Order Executed Message (Long Form)

Name	Offset	Length	Value	Comments
------	--------	--------	-------	----------

Message Type	0	1	'e'	Order Executed Message
Order Reference Number	1	9	Numeric	The unique order number referencing a previous Add Order Message
Executed Shares	10	10	Numeric	Number of shares executed
Match Number	20	9	Numeric	Omega generated match number of this execution
Contra Broker ID	29	3	Numeric	Active Side's broker number or '1' for anonymous
Reserved	32	1	Alphanumeric	Reserved for future use.

Order Executed With Price Message

This message is sent whenever an order on the book is executed in whole or in part at a price different from the initial display price. Since the execution price is different than the display price of the original Add Order, Omega ATS and Lynx ATS include a price field within this execution message.

It is possible to receive multiple Order Executed and Order Executed With Price messages for the same order if that order is executed in several parts. The multiple Order Executed messages on the same order are cumulative.

Name	Offset	Length	Value	Comments
Message Type	0	1	'C'	Order Executed Message
Order Reference Number	1	9	Numeric	The unique order number referencing a previous Add Order Message
Executed Shares	10	6	Numeric	Number of shares executed
Match Number	16	9	Numeric	Omega generated match number of this execution
Contra Broker ID	25	3	Numeric	Active Side's broker number or '1' for anonymous
Execution Price	28	10	Numeric	Price of execution if different than original order
Reserved	38	1	Alphanumeric	Reserved for future use.

Order Executed With Price Message (Long Form)

Name	Offset	Length	Value	Comments
Message Type	0	1	'c'	Order Executed Message
Order Reference Number	1	9	Numeric	The unique order number referencing a previous Add Order Message
Executed Shares	10	10	Numeric	Number of shares executed
Match Number	20	9	Numeric	Omega generated match number of this execution
Contra Broker ID	29	3	Numeric	Active Side's broker number or '1' for anonymous
Execution Price	32	10	Numeric	Price of execution if different than original order
Reserved	42	1	Alphanumeric	Reserved for future use.

Trade Message

This message is sent whenever a hidden order executes in whole or in part and can be ignored for the purposes of maintaining a book.

Name	Offset	Length	Value	Comments
Message Type	0	1	'p'	Trade Message identifier
Order Reference Number	1	9	Numeric	The unique order number referencing a previous Add Order Message
Buy/Sell Indicator	10	1	Alphabetic	The type of non-displayed order on the book being matched. 'B' = buy order 'S' = sell order Always 'B' for mid point peg orders.
Shares	11	6	Numeric	The number of shares being matched in this execution.
Stock	17	10	Alphanumeric	The security symbol associated with the match execution.
Price	27	10	Numeric	The match price of the order. Refer to Data Types for field processing notes.
Match Number	37	9	Numeric	Omega generated session-unique Match Number for this trade. The Match Number is referenced in the Trade Break Message.
Buy Broker ID	46	3	Numeric	Buy firm's broker number or '1' for anonymous
Sell Broker ID	49	3	Numeric	Sell firm's broker number or '1' for anonymous

Trade Message (Long Form)

Name	Offset	Length	Value	Comments
Message Type	0	1	'p'	Trade Message identifier
Order Reference Number	1	9	Numeric	The unique order number referencing a previous Add Order Message
Buy/Sell Indicator	10	1	Alphabetic	The type of non-displayed order on the book being matched. 'B' = buy order 'S' = sell order Always 'B' for mid point peg orders.
Shares	11	10	Numeric	The number of shares being matched in this execution.
Stock	21	10	Alphanumeric	The security symbol associated with the match execution.
Price	31	10	Numeric	The match price of the order. Refer to Data Types for field processing notes.
Match Number	41	9	Numeric	Omega generated session-unique Match Number for this trade. The Match Number is referenced in the Trade Break Message.
Buy Broker ID	50	3	Numeric	Buy firm's broker number or '1' for anonymous
Sell Broker ID	53	3	Numeric	Sell firm's broker number or '1' for anonymous

Cross Trade Message

Name	Offset	Length	Value	Comments
Message Type	0	1	'Q'	Cross Trade Message
Shares	1	9	Numeric	The number of shares matched in the Cross
Stock	10	10	Alphanumeric	Security symbol associated with the cross trade message.
Cross Price	20	10	Numeric	The price at which the cross occurred. Refer to Data Types for field processing notes.
Match Number	30	9	Numeric	The Omega ATS or Lynx ATS generated day-unique Match Number for this execution.
Cross Type	39	1	Alphabetic	'I' = Internal Cross 'M' = Intentional Cross 'D' = Derivative Cross
Buy Broker ID	40	3	Numeric	Buy firm's broker number
Sell Broker ID	43	3	Numeric	Sell firm's broker number
Bypass	46	1	Alpha	'Y' = Bypass 'N' = Non Bypass

Order Cancel Message

This message is sent whenever an order on the book is modified as a result of a partial cancellation.

Name	Offset	Length	Value	Comments
Message Type	0	1	'X'	Order Cancel Message
Order Reference Number	1	9	Numeric	The unique order number referencing a previous Add Order Message being cancelled or reduced.
Cancelled Shares	10	6	Numeric	The number of shares to be removed from the display size of the order as the result of a cancellation.

Order Cancel Message (Long Form)

Name	Offset	Length	Value	Comments
Message Type	0	1	'x'	Order Cancel Message
Order Reference Number	1	9	Numeric	The unique order number referencing a previous Add Order Message being cancelled or reduced.
Cancelled Shares	10	10	Numeric	The number of shares to be removed from the display size of the order as the result of a cancellation.

Order Delete Message

This message is sent whenever an order on the book is being cancelled. All remaining shares are no longer accessible so the order should be removed from the book.

Name	Offset	Length	Value	Comments
------	--------	--------	-------	----------

Message Type	0	1	'D'	Order Delete Message
Order Reference Number	1	9	Numeric	The unique order number referencing a previous Add Order Message being deleted

Busted (ie. Broken) Trade Message

If a firm is only using the ITCH feed to build a book, it may ignore these messages as they have no impact on the current book. Any outstanding orders on the book associated with the trade being busted will be canceled prior to executing the bust and the order will not be reposted afterwards.

Name	Offset	Length	Value	Comments
Message Type	0	1	'B'	Busted Trade Message
Match Number	1	9	Numeric	The Omega ATS or Lynx ATS Match Number of the execution that was broken. This refers to a Match Number from a previously transmitted Order Executed Message, Order Executed With Price Message, or Trade Message.