

IDX ITCH SPECIFICATION

Technical Specifications

Version 1.15.0



Indonesia Stock Exchange

member of  **WORLD FEDERATION
OF EXCHANGES**

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Document History

VERSION	DATE	SUMMARY OF CHANGES
1.0.0	2015-12-11	First release.
1.1.0	2016-03-24	Added section 5.2 about settlement price updates. Minor modifications. Table 5 - <i>ITCH Last Sale Messages</i> added.
1.2.0	2016-04-26	Updated following IDX review. Added sector directory message. Added ForeignLimit to orderbook. Updated orderbook trading action message. Added section 5.3 on index price update.
1.3.0	2016-05-23	Added system event code 'T' for post-closing. Added Industry Name to Sector directory.
1.4.0	2016-05-27	Updated table descriptions.
1.5.0	2016-05-27	Updated ITCH event message flow.
1.6.0	2016-06-01	Changed "post closing" to "post trading" in <i>Table 8 – System Event Codes</i> and <i>Table 34 – ITCH Event Message flow</i> .
1.7.0	2016-06-02	Updated section 5.5 <i>Add Order [A] and Order Executed With Price [C]</i> .
1.8.0	2016-12-15	Updated <i>Table 12 – ITCH Sector Directory [F]</i> . Field "Industry Name" type is changed to Alpha. Updated <i>Table 18 – ITCH Participant Directory [K]</i> . Changed to Company Full Name and restricted to participant with type Broker. Added Quantity in Lots description in section 4 <i>ITCH Messages</i> .
1.9.0	2017-01-25	Updated <i>Table 8 – System Event Codes</i> – added system event code 'X' for trading suspension and 'Y' for trading activation. Updated <i>Table 25 – ITCH Broken Trade Message [B]</i> - removed statement that Broken Trade Message may never occur at IDX. Updated Section 5.6 <i>Event Message Flow</i> – removed volatility auction reason.
1.10.0	2017-03-16	Updated <i>Table 13 – ITCH Orderbook Directory [R]</i> – updated notes for "IPO Price" field. Updated <i>Table 14 – ITCH Futures Directory [J]</i> – added field "Contract Size". Updated <i>Table 15 – ITCH Options Directory [W]</i> – added field "Contract Size". Updated <i>Table 24 – ITCH Trade Message [P]</i> – updated description text. Updated <i>Table 33 – ITCH News Message [N]</i> – updated length of "NewsText" field. Added <i>Table 34 – ITCH Participant Status [Y]</i> . Updated <i>Table 4 – ITCH News Messages</i> and <i>Table 18 – ITCH Participant Directory [K]</i> .
1.11.0	2017-04-26	Updated section 5.8 <i>Glimpse Snapshot</i> .
1.12.0	2017-09-21	Added ITCH Order Relink [r] message.
1.13.0	2018-12-04	Added ITCH Add Order with Participant [a] message. <i>Table 21 – ITCH Add Order with Participant Message [a]</i> added.

VERSION	DATE	SUMMARY OF CHANGES
1.14.0	2021-09-03	Added Buy/Sell Domicile to ITCH Order Executed [E], ITCH Order Executed with Price [C] and ITCH Trade [P] messages. This update was added due to CR038.
	2022-09-16	Added CrossType 'C' for Call Auction. Updated Table 17 to fix incorrect offset column. Updated Table 31 to add clarification on the value when there is no price.
1.15.0	2023-02-08	Added ITCH Order Clear message [d]. <i>Table 29 - ITCH Order Clear Message [d]</i> added. Best Size fields added to ITCH Indicative Price/Quantity Message [I]. Trading Action Reason 'S' added - Suspended due to Circuit Break. <i>Table 13 - ITCH Orderbook Directory [R]</i> updated.

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1 Context

1.1 Business Context

The document will cover market data dissemination. ITCH[®] is an efficient way of distributing market data in terms of bandwidth required.

1.2 Requirements

The INET ITCH[®] protocol is widely used and considered an industry standard. This standard is ideal for a low latency messaging. X-stream INET Trading should adhere, as closely as possible, to the latest published versions of these fixed width message definitions.

The point-to-point transport layer for ITCH[®] payloads will be SoupBinTCP.

SoupBinTCPv3.0 is required as it supports binary types in the payload. Binary types are employed in the latest ITCH[®] and OUCH standards so required for X-stream INET Trading.

The transport for one-to-many distribution of ITCH[®] market data is MoldUDP64. The Mold protocol provides a sequenced and recoverable UDP multicast stream.

2 ITCH Data Types

Table 1 – ITCH Data Types

DATA TYPE	DESCRIPTION
Alpha	Left justified and right padded.
Integer	Unsigned big-endian binary encoded.
Null-Terminated Alpha	Left justified null terminated, i.e. variable length. Maximum length includes the null character.

3 ITCH Message Sets

Table 2 – ITCH Total View Messages

MESSAGE TYPE	DESCRIPTION
T	ITCH Timestamp, number of seconds since midnight of the system start.
S	System event message.
L	Orderbook price tick table.
M	Orderbook quantity tick table.
F	Sector directory.
R	Orderbook directory.
J	Futures directory.
W	Options directory.
K	Participant Directory
H	Trading action message.
A	Add order message.
a	Add order with participant message.
E	Order executed message.
C	Order executed with price message.
P	Trade message.
B	Broken trade message.
D	Order delete message.
d	Order clear message.
U	Order replace message.
I	Indicative price/quantity message.
G	GLIMPSE snapshot message.
Z	Index directory.
O	Index Member directory.
V	Issuer directory.
r	Order relink message

Table 3 – ITCH Basic Messages

MESSAGE TYPE	DESCRIPTION
T	ITCH Timestamp, number of seconds since midnight of the system start.
S	System event message.
L	Orderbook price tick table.

MESSAGE TYPE	DESCRIPTION
M	Orderbook quantity tick table.
K	Participant directory.
V	Issuer directory.
F	Sector directory.
R	Orderbook directory.
J	Futures directory.
W	Options directory.
Z	Index directory.
H	Trading action message.
P	Trade message.
Q	Best bid offer message.
d	Order clear message.

Table 4 – ITCH News Messages

MESSAGE TYPE	DESCRIPTION
T	ITCH Timestamp, number of seconds since midnight of the system start.
S	System event message.
L	Orderbook price tick table.
M	Orderbook quantity tick table.
V	Issuer directory.
F	Sector directory.
R	Orderbook directory.
J	Futures directory.
W	Options directory.
Z	Index directory.
K	Participant directory.
H	Trading action message.
N	News message.
Y	Participant Status message.

Table 5 - ITCH Last Sale Messages

MESSAGE TYPE	DESCRIPTION
T	ITCH Timestamp, number of seconds since midnight of the system start.
S	System event message.
L	Orderbook price tick table.

MESSAGE TYPE	DESCRIPTION
M	Orderbook quantity tick table.
F	Sector directory.
R	Orderbook directory.
J	Futures directory.
W	Options orderbook directory.
H	Trading action message.
P	Trade message.

4 ITCH Messages

This section describes the messages used by the ITCH market data feeds generated by X-stream INET Trading.

The timestamp message is disseminated whenever there is a new message and the X-stream INET Trading system time has ticked into the next second from midnight.

In this section, the *Quantity* fields have a quantity defined in 'lots'.

Table 6 – ITCH Time Stamp – Seconds [T]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"T"	Time Stamp -Seconds Message Id.
Second	1	4	Integer	Number of seconds since midnight of the first day of the system cycle.

Table 7 – ITCH System Event Message [S]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"S"	System Event Message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Group	5	8	Alpha	Id for symbol grouping (Board level only). Left blank if at System level or Orderbook level.
Instrument	13	12	Alpha	Instrument identifier.
Event Code	25	1	Alpha	Event Code. Refer to System Event codes in table below.
Orderbook	26	4	Integer	Used to identify if the event applies to a single orderbook within the Group. Orderbook Code set to 0 if the event applies at a System level or Group level.

Table 8 – System Event Codes

SYSTEM EVENT CODE	EXPLANATION
'O'	Start of Messages. This is the first message sent.
'S'	Start of System Hours.
'Q'	Start of Market Hours. Trading session. It indicates the Exchange is open and ready to start accepting orders.
'M'	End of Market Hours. End of Trading session.
'P'	Opening auction starts.
'K'	Closing auction starts.
'V'	Scheduled auction starts – a manually scheduled auction outside of defined trading schedule.

SYSTEM EVENT CODE	EXPLANATION
'U'	Scheduled auction closes.
'T'	Start of post trading session.
'A'	Scheduled break starts.
'B'	Scheduled break ends.
'E'	End Of System Hours. It indicates that the Exchange is closed.
'C'	End of Messages. Last message sent.
'X'	Trading suspension
'Y'	Trading activation

Table 9 – ITCH Price Tick Size Table [L]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"L"	Tick Size Table.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Tick Size Table Id	5	4	Integer	Indicates the Tick Size Table id.
Tick Size	9	4	Integer	Price Tick Size.
Price Start	13	4	Integer	Start of Price for this Tick Size.

Table 10 – ITCH Quantity Tick Size Table [M]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"M"	Tick Size Table.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Tick Size Table Id	5	4	Integer	Indicates the Tick Size Table id.
Tick Size	9	8	Integer	Quantity Tick Size.
Quantity Start	17	8	Integer	Start of Quantity for this Tick Size.

Table 11 – ITCH Issuer Directory [V]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"V"	Issuer directory message
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
IssuerId	5	4	Integer	Unique identifier for issuer
Long Name	9	60	Alpha	Full name of Issuer
Code	69	21	Alpha	Issuer code.

Table 12 – ITCH Sector Directory [F]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"F"	Sector directory message
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
SectorId	5	4	Integer	Unique identifier for sector
Sector Name	9	30	Alpha	Full name of Sector
Industry Name	39	30	Alpha	Full name of Industry

Table 13 – ITCH Orderbook Directory [R]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"R"	Orderbook Directory Message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Orderbook	5	4	Integer	Unique orderbook identifier.
ISIN	9	12	Alpha	ISIN code
Sec Code	21	21	Alpha	Security code
SecurityName	42	100	Alpha	Security name
Currency	142	3	Alpha	Trading currency
Group	145	8	Alpha	Id for symbol grouping (board only)
Issuer Id	153	4	Integer	Unique id for Issuer of the security
IPO Price	157	4	Integer	IPO Price of this orderbook. A price of 0x7FFFFFFF indicates the IPO price is not set for this orderbook.
Tradeable Shares	161	8	Integer	Total tradeable shares
Listed Shares	169	8	Integer	Total listed shares
Shares per Lot	177	4	Integer	Shares per lot
Minimum Quantity	181	8	Integer	Minimum Quantity
Quantity Tick Size Table Id	189	4	Integer	Quantity Tick Size Table. Cross reference to Quantity Tick Size table.
Quantity Decimals	193	4	Integer	Quantity Decimals.
Price Tick Size Table Id	197	4	Integer	Price Tick Size Table Id. Cross reference to Price Tick Size table.
Price Decimals	201	4	Integer	Price Decimals.
Delisting or Maturity Date	205	4	Integer	YYYYMMDD 0 represents no delisting date.

NAME	OFFSET	LEN	VALUE	NOTES
Delisting Time	209	4	Integer	HHMMSS Ignore if delisting date is 0 or if we have a Maturity Date, i.e. debt security.
Instrument	213	12	Alpha	The instrument name.
Remarks0	225	8	Alpha	Orderbook short remarks
Remarks1	233	40	Alpha	Orderbook verbose remarks
Foreign Limit	273	4	Integer	The foreign ownership percentage limit of tradeable shares for the orderbook.
SectorId	277	4	Integer	Unique identifier for sector of this orderbook.

Table 14 – ITCH Futures Directory [J]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	“J”	Futures Directory Message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Orderbook	5	4	Integer	Unique orderbook identifier.
ISIN	9	12	Alpha	ISIN code
Sec Code	21	21	Alpha	Security code
Currency	42	3	Alpha	Trading currency
Group	45	8	Alpha	Id for symbol grouping (board only).
Quantity Tick Size Table Id	53	4	Integer	Quantity Tick Size Table. Cross reference to Quantity Tick Size table.
Price Tick Size Table Id	57	4	Integer	Price Tick Size Table. Cross reference to Price Tick Size table.
Price Decimals	61	4	Integer	Price Decimals.
Expiry Date	65	8	Integer	YYYYMMDDHHMMSS
Underlying	73	4	Integer	Orderbook id of the underlying security
Remarks0	77	8	Alpha	Orderbook short remarks
Remarks1	85	40	Alpha	Orderbook short remarks
Contract Size	125	8	Integer	Contract Size

Table 15 – ITCH Options Directory [W]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	“W”	Options Directory Message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Orderbook	5	4	Integer	Unique orderbook identifier.

ISIN	9	12	Alpha	ISIN code.
Sec code	21	21	Alpha	Security code.
Currency	42	3	Alpha	Trading currency.
Group	45	8	Alpha	Id for Orderbook grouping.
Quantity Tick Size Table Id	53	4	Integer	Quantity Tick Size Table. Cross reference to Quantity Tick Size table.
Price Tick Size Table Id	57	4	Integer	Price Tick Size Table. Cross reference to Price Tick Size table.
Price Decimals	61	4	Integer	Price Decimals.
Verb	65	1	Alpha	'P'ut or 'C'all
Strike Price	66	4	Integer	Strike price for this orderbook.
Expiry Date	70	8	Integer	YYYYMMDDHHMMSS
Underlying	78	4	Integer	Orderbook id of the underlying security.
Remarks0	82	8	Alpha	Orderbook short remarks
Remarks1	90	40	Alpha	Orderbook verbose remarks
Contract Size	130	8	Integer	Contract Size

Table 16 –ITCH Index Directory [Z]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"Z"	Index directory message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Orderbook	5	4	Integer	Unique id for index.
Sec code	9	21	Alpha	Index security code.
Price Decimals	30	4	Integer	Price decimals for this Index.

Table 17 – ITCH Index Member Directory [O]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"O"	Index member message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Orderbook Id	5	4	Integer	Unique index orderbook identifier.
Member Orderbook	9	4	Integer	Unique index member orderbook identifier.
Weight	13	8	Integer	Index weighting

Table 18 – ITCH Participant Directory [K]

The message is restricted to participant with type Broker (ICM and TM).

HEADING	OFFSET	LEN	VALUE	NOTES
Type	0	1	"K"	Market Participant Message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Participant Id	5	4	Integer	Unique identifier for the market participant.
Participant Name	9	60	Alpha	Company full name.
Participant Code	69	2	Alpha	Company Code

Table 19 – ITCH Orderbook Trading Action Message [H]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"H"	Orderbook Trading Action Message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Orderbook	5	4	Integer	Unique orderbook identifier.
Trading State	9	1	Alpha	Current trading state for orderbook. At the start of the system cycle "T" is sent for all symbols that are active. Suspended intra-day with "V" then unsuspended with "T".
Reason	10	1	Alpha	Refer to reason in table below.

Table 20 – Trading Action Reasons

TRADING ACTION REASON	EXPLANATION
'N'	Normal Trading
'S'	Suspended due to Circuit Break

Table 21 – ITCH Add Order Message [A]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"A"	Add Order Message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Order Number	5	8	Integer	The unique reference number assigned to the new order. A value of zero indicates that this is a settlement or reference or index price update.
Order Verb	13	1	Alpha	"B"uy "S"ell Sett'L'ement Price Update Blank if reference/index price update.

NAME	OFFSET	LEN	VALUE	NOTES
Quantity	14	8	Integer	The total quantity of the order being added to the book. A value of zero indicates that this is a settlement or reference or index price update.
Orderbook	22	4	Integer	Unique orderbook identifier.
Price	26	4	Integer	The price of the new order. The price is 0x7FFFFFFF for a market order or that a reference price is unavailable.
Domicile	30	1	Alpha	'I'ndonesian 'A'sing 'S'endiri 'F'oreign house

Table 22 – ITCH Add Order with Participant Message [a]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"a"	Add Order Message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Order Number	5	8	Integer	The unique reference number assigned to the new order. A value of zero indicates that this is a settlement or reference or index price update.
Order Verb	13	1	Alpha	"B"uy "S"ell Sett'L'ement Price Update Blank if reference/index price update.
Quantity	14	8	Integer	The total quantity of the order being added to the book. A value of zero indicates that this is a settlement or reference or index price update.
Orderbook	22	4	Integer	Unique orderbook identifier.
Price	26	4	Integer	The price of the new order. The price is 0x7FFFFFFF for a market order or that a reference price is unavailable.
Domicile	30	1	Alpha	'I'ndonesian 'A'sing 'S'endiri 'F'oreign house
Participant Id	31	4	Integer	Unique identifier for the market participant.

Table 23 – ITCH Order Executed Message [E]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"E"	Order Executed Message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Order Number	5	8	Integer	The unique executed order reference number.
Executed Quantity	13	8	Integer	The number of shares executed.
Match Number	21	8	Integer	The unique match identifier.
Trade Indicator	29	1	Alpha	'R'egular trade. 'U'nintentional self-cross.
Buy Participant Id	30	4	Integer	The unique participant id of the buy side. Set to 0 if participant not being sent.
Sell Participant Id	34	4	Integer	The unique participant id of the sell side. Set to 0 if participant not being sent.
Buy Domicile	38	1	Alpha	'I'ndonesian 'A'sing 'S'endiri 'F'oreign house. Set to `` if domicile not being sent.
Sell Domicile	39	1	Alpha	'I'ndonesian 'A'sing 'S'endiri 'F'oreign house. Set to `` if domicile not being sent.

Table 24 – ITCH Order Executed With Price Message [C]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"C"	Order Executed with Price Message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Order Number	5	8	Integer	The unique executed order reference number.
Executed Quantity	13	8	Integer	The number of shares executed.
Match Number	21	8	Integer	The unique match identifier.
Trade Indicator	29	1	Alpha	'R'egular trade. 'U'nintentional self-cross.
Printable	30	1	Alpha	Indicates if the execution should be reflected in volume calculations. 'N' = Non Printable 'Y' = Printable
Execution Price	31	4	Integer	The price at which the execution occurred.
Buy Participant Id	35	4	Integer	The unique participant id of the buy side.
Sell Participant Id	39	4	Integer	The unique participant id of the sell side.
Buy Domicile	43	1	Alpha	'I'ndonesian 'A'sing 'S'endiri 'F'oreign house. Set to `` if domicile not being sent.

NAME	OFFSET	LEN	VALUE	NOTES
Sell Domicile	44	1	Alpha	'I'ndonesian 'A'sing 'S'endiri 'F'oreign house. Set to '' if domicile not being sent.

Table 25 – ITCH Trade Message [P]

On ITCH Total View, this message is used to report only off market trades.

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"P"	Trade Message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Executed Quantity	5	8	Integer	The number of shares executed.
Orderbook	13	4	Integer	Unique orderbook identifier.
Printable	17	1	Alpha	Indicates if the execution should be reflected in volume calculations. 'N' = Non Printable 'Y' = Printable
Execution Price	18	4	Integer	The price at which the execution occurred.
Match Number	22	8	Integer	The unique match identifier.
Trade Indicator	30	1	Alpha	Indicates type of trade. • "N'egDeal Left blank if used to report a regular trade.
Buy Participant Id	31	4	Integer	The unique participant id of the buy side.
Sell Participant Id	35	4	Integer	The unique participant id of the sell side.
Buy Domicile	39	1	Alpha	'I'ndonesian 'A'sing 'S'endiri 'F'oreign house. Set to '' if domicile not being sent.
Sell Domicile	40	1	Alpha	'I'ndonesian 'A'sing 'S'endiri 'F'oreign house. Set to '' if domicile not being sent.

Table 26 – ITCH Broken Trade Message [B]

Message sent if a previously dispatched trade was cancelled during trading hours.

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"B"	Broken Trade Message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Match Number	5	8	Integer	The X-stream INET Trading match number of the execution that was broken.
Reason	13	1	Alpha	The reason the trade was broken. See currently supported Broken Trade Reasons table below.

Table 27 – ITCH Broken Trade Reasons

REASON	EXPLANATION
'S'	Supervisory – The trade was manually broken by the Exchange.

Table 28 – ITCH Order Delete Message [D]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"D"	Order Delete Message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Order Number	5	8	Integer	The reference number of the order being cancelled.

Table 29 – ITCH Order Clear Message [d]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"d"	Order Clear Message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Orderbook	5	4	Integer	Unique orderbook Identifier.

Table 30 – ITCH Order Replace Message [U]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"U"	Order Replace Message Id
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Original Order Number	5	8	Integer	The original order number of the order being replaced.
New Order Number	13	8	Integer	The new reference number for the order at the time of replacement.
Quantity	21	8	Integer	The new total open quantity, i.e. the balance of the new order.
Price	29	4	Integer	The new price for the order. The price is 0x7FFFFFFF (hex) or 2147483647 (dec) for a 'market' order.

Table 31 – ITCH Order Relink Message [r]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"r"	Order Relink Message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Order Number	5	8	Integer	The number of for the order that was updated. This is the order number used to sort the particular order book.
Exchange Order	13	8	Integer	The Exchange order number.

NAME	OFFSET	LEN	VALUE	NOTES
Number				

Table 32 – ITCH Indicative Price/Quantity Message [I]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"I"	Indicative Price/Quantity Message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Theoretical Opening Quantity	5	8	Integer	The total quantity eligible to be matched at the current Theoretical Opening Price.
Orderbook	13	4	Integer	Unique orderbook identifier.
Best Bid	17	4	Integer	The current best buy price. The value of 0x7FFFFFFF (hex) or 2147483647 (dec) indicates that there is no price.
Best Offer	21	4	Integer	The current best sell price. The value of 0x7FFFFFFF (hex) or 2147483647 (dec) indicates that there is no price.
Theoretical Opening Price	25	4	Integer	The current opening price for this orderbook. The value of 0x7FFFFFFF (hex) or 2147483647 (dec) indicates that there is no price.
Cross Type	29	1	Alpha	Cross Type code. Refer to Cross Type codes in table below.
BestBidSize	30	8	Integer	The aggregated quantity at the best bid price.
BestOfferSize	38	8	Integer	The aggregated quantity at the best Offer price.

Table 33 – Cross Type Codes

CROSS TYPE CODE	EXPLANATION
'P'	Opening Auction
'I'	Intraday Auction
'K'	Closing Auction
'C'	Call Auction

Table 34 – ITCH GLIMPSE Snapshot Message [G]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"G"	GLIMPSE snapshot Message Id
SequenceNumber	1	8	Integer	The ITCH Total View sequence number when the GLIMPSE snapshot was taken.

Table 35 – ITCH Best Bid Offer Message [Q]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"Q"	Best Bid Offer Quotation Message Id
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Orderbook	5	4	Integer	Unique orderbook identifier.
Best Bid	9	4	Integer	The best buy price. The value of 0x7FFFFFFF (hex) or 2147483647 (dec) indicates that there is no price.
Best Bid Size	13	8	Integer	Total quantity at the best buy price.
Best Offer	21	4	Integer	The best sell price. The value of 0x7FFFFFFF (hex) or 2147483647 (dec) indicates that there is no price.
Best Offer Size	25	8	Integer	Total quantity at the best sell price.

Table 36 – ITCH News Message [N]

NAME	OFFSET	LEN	VALUE	NOTES
Type	0	1	"N"	News Item message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Orderbook	5	4	Integer	Unique orderbook identifier. 0x7FFFFFFF indicates no orderbook identifier is requirement for this news.
NewsId	9	4	Integer	Unique news item identifier.
Participant Id	13	4	Integer	Participant Id of Reference Firm
Title	17	max(80+1)	Null-Terminated Alpha	News Title
Reference	98	max(255+1)	Null-Terminated Alpha	Reference for news item associated object (e.g. a URL, file pathname)
NewsText	354	Max(5000+1)	Null-Terminated Alpha	News data.

Table 37 – ITCH Participant Status [Y]

The message is restricted to participant with type Broker (ICM and TM).

HEADING	OFFSET	LEN	VALUE	NOTES
Type	0	1	"Y"	Market Participant Status Message Id.
Timestamp	1	4	Integer	Nanoseconds since last Time Stamp seconds message.
Participant Id	5	4	Integer	Unique identifier for the market participant.
Participant Status	9	1	Alpha	'A'ctive or 'S'uspended.

5 Message Kinematics

5.1 Update of Reference Price

An Add Order message with an Order Number and Quantity set to zero and OrderVerb set to blank, is used to indicate the reference price of an order book.

Add Order Messages are sent after the Orderbook Directory message to indicate the initial reference price.

A manual reference price update will generate an Add Order Message.

Reference price changes due to auctions will not generate an Add Order message.

5.2 Update of Settlement Price

An Add Order message with an Order Number and Quantity set to zero and OrderVerb set to "L", is used to indicate the settlement price of an order book.

Add Order Messages are sent after the Orderbook Directory to indicate the initial settlement price.

A manual settlement price update will generate an Add Order Message.

Settlement price updates will only be sent for future and options securities.

5.3 Update of Index Price

An Add Order message with an Order Number and Quantity set to zero and OrderVerb set to blank is used to indicate the price of an index orderbook.

Add Order Messages are sent after the Index Directory message to indicate the initial price for an index.

A change in the index price as a result of a trade will generate an Add Order Message.

5.4 Orderbook Trading Action [H]

The Orderbook Trading Action will send the initial Trading State of Orderbooks.

All Orderbooks, that are trading, will have a Reason as 'N' for normal trading.

When a group of Orderbooks are suspended/unsuspended in X-stream INET Trading then the Orderbook Trading Action [H] message will be sent for all Orderbooks in the group to indicate a change in Trading State.

The ITCH System Event [S] to be received with Event Code 'S' is sent after the first spin at the start of Pre-Open session.

5.5 Add Order [A], Add Order with Participant [a] and Order Executed With Price [C]

During normal trading, when an incoming order gets in and matches, Order Executed [E] message is sent for the passive orders that match the incoming order (aggressor).

An Order Add message is sent with the outstanding balance for the incoming order; no message sent if fully matched. In the case of IOC incoming order, no message is sent for that order.

At the uncross of an auction, the Order Executed With Price [C] is sent for each executed order.

NG board orders consist of two types: Advertising orders and Negotiated orders. Advertising orders will be broadcasted by ITCH using the Add Order with Participant [a] message, however, Negotiated orders are not broadcasted by ITCH.

5.6 Event Message Flow

The ITCH System Event Message [S] will be sent as a result of X-stream INET Trading trade events at the system group and Orderbook level. This will indicate the start of a scheduled auction.

Cross Type code in ITCH Indicative Price/Quantity Message [I] will map the auction session.

The table below shows the possible values of System Event Codes and Cross Type when a transition is triggered or during a particular trading session.

Table 38 – ITCH Event Message flow

TRANSITION	SYSTEM EVENT MESSAGE [S] SYSTEM EVENT CODE (SYSTEM OR GROUP OR ORDERBOOK LEVEL)	ORDERBOOK TRADING ACTION MESSAGE [H] REASON (Orderbook Level)	INDICATIVE PRICE/QUANTITY [I] CROSS TYPE (Orderbook Level)
	'O' – "Start of Messages" First message sent.	S	'N' – "Normal Trading"
AVAILABLE	'S' – "Start of System Hours"	G	
OPN_AUCT	'P' – "Scheduled Opening Auction Starts"	G	'P' – "Open Auction"
OPN_AUCT_END	'U' – "Scheduled Auction Ends"	G	
DAY	'Q' – "Start Of Market Hours"	G	
During Trading (Scheduled Auction)	'V' – "Scheduled Auction Starts"	G O	'I' – "Intraday Auction"
During Auction (Scheduled Auction)	'U' – "Scheduled Auction Closes"	G O	
CLS_AUCT	'K' – "Scheduled Closing Auction Starts"	G	'K' – "Close Auction"
CLS_AUCT_END	'U' – "Scheduled Auction Ends"	G	
POST_TRADING	'T' – "Start of Post Trading"	G	
DAY_END	'M' – "End Of Market Hours"	G	
UNAVAILABLE	'E' – "End of System Hours"	G	
IPXS-EOM	'C' – "End of Messages" Last message sent.	S	
IPXS-ENDSESS			

5.7 Exchange Order Number Link

5.7.1 Add and Amend

The Order Add Message, for a new order entered into a continuous market will have a unique Order Number.

This order number should be used both as an identifier and the sort key for the order book. The Order Number, at this time, would be identical to the Exchange Order Number.

Amendment of price or quantity for a resting order will result in the ITCH TV Order Replace message. Linkage between the Order Number and the Exchange Order Number will be confirmed by the Order Relink message sent immediately after the replace message.

The Order Relink message will have both the Order Number and the Exchange Order Number to confirm the relationship between the two order ids.

5.7.2 Restatement

An Order Relink message may be dispatched to restate the relationship between the Order Number and the Exchange Order Number.

After an auction uncross, open orders are restated with the Order Add message. To confirm the Exchange Order Number, an Order Relink message will follow to link the two order identifiers.

Receipt of an Order Relink message, without a preceding ITCH TV Add or Replace Order Message, means a passive order was amended without the price or quantity being changed but a new Exchange Order Number was assigned.

5.7.3 Market Data Consumers

Market Data consumers that have existing ITCH TV infrastructure may just ignore the Order Relink message. However, those consumers that wish to track the Exchange Order Number will be able to use the Order Relink message and still sort the order book by the Order Number.

5.8 Static Reference Data

The Orderbook Directory Message [R] contains the unique integer Orderbook identifier for use in fast security lookup. Indexes will be included in the Orderbook Directory if they to be published via the ITCH protocol.

5.9 GLIMPSE Snapshot

When a user logs onto the GLIMPSE service, they receive the following reference data as per an ITCH TV session with a timestamp based on the system startup time:

- Start-of-messages System Event
- Price Ticks
- Quantity Ticks
- Orderbook Directory
- Futures Directory
- Options Directory
- Index Directory
- Index Member Directory
- Participant Directory
- Issuer Directory

- Sector Directory
- Trading Actions.

What follows is a replay of all System Event messages and all Trading Action messages, with the timestamp showing the time at which the original message was generated. These are generated in the order in which they occurred, and so are interleaved.

The ITCH Timestamp message may occur multiple times during the replay of System Events and Trading Action message. As with ITCH, the Timestamp message will only be sent if it is different from the last Timestamp message sent.

Finally, we send the messages which reflect the order books' current contents. These messages are time stamped with the time at which the snapshot is generated and include:

- Indicative Price and Quantity
- Reference Prices
- Open Orders.

At the end of the spins, the Snapshot message is sent to indicate the point at which to start processing the ITCH Total View.

5.10 Example ITCH Total View Usage

- If a new order enters the book - [A]dd order is sent
- If an existing order is amended - [U] order replace is sent
- An order is withdrawn - [D]elete order is sent
- During continuous trading when a resting order is hit - [E]xecuted message is sent
- Uncrossing of an auction - [C] executed with price is sent
- Reporting an off market trade - [P] trade record will be dispatched
- Orderbook or group of orderbook suspend - [T]rading action is sent for each orderbook
- Broker is suspended - no message sent as ITCH TV primary purpose is for building orderbooks.
- The ITCH Total View feed maybe consolidated by price at the client, it is not built by price server side.
- Statistics such as High, Low, Last and Opening and Close should be derived by the client from the ITCH TV stream.
- Index orderbooks are used for Index data.

5.11 Configuration and Capacity

ITCH Total View maybe sent over SoupBinTCP3.0 or MoldUDP64. Typically, multicasting ITCH over MoldUDP64 would be for co-located market participants.

ITCH over SoupBinTCP3.0 would usually have one or two port for each firm - it is public data. Depending on the level of service required a typical IPXSEngine would server around 100 ITCH clients.

The performance of the ITCH TV feed depends directly upon the transport protocol (e.g. SoupBinTCP3.0 or MoldUDP64), the size of the individual ITCH messages and the other services also offered on that IPXSEngine.

ITCH TV is public data so there is no filtering per connector. There are other ITCH feeds such as ITCH Best Bid Offer where just the top-of-book is sent.