ITCH Market Data Specification for Security Token

Version 1.2

Table of Contents

1. Introduction 3
2. Overview 3
3. Data Types 3
4. Outbound Sequenced Messages 3
4.1 Timestamp – Seconds Message 3
4.2 System Event Message 3
4.3 Price Tick Size Message 4
4.4 Orderbook Directory Message 4
4.5 Trading State Message 5
4.6 Order Added Messages 6
4.7 Order Executed with Price Message 7
4.8 Order Deleted Message 7
4.9 Order Replaced Message 7
4.10 Order Book State Message 8
4.11 Equilibrium Price Update Message 8
Revision History 9

1. Introduction

This document explains access to the security token market data services of Osaka Digital Exchange (ODX) PTS via the ITCH protocol.It describes the service's configuration and specifies the application messages. For further information and inquiries regarding market data services or for questions concerning connectivity please contact ODX Technical Support via email to: sysope@odx.co.jp.

2. Overview

The message protocol of ITCH is widely used and considered an industry standard. It provides tick-by-tick details for orders in the ODX PTS execution system.

ODX PTS offers SoupBinTCP as transport layer for ITCH messages.

3. Data Types

Integer fields are unsigned big-endian (network byte order) binary encoded numbers.

Alpha fields are left-justified and padded on the right with spaces.

Price fields are 4 byte Integer fields. When converted to fixed point number format they have 8 whole number digits and 2 decimal place. The maximum representable value is 21,474,836.46 (7FFFFFFE hex).

Quantity fields are 4 byte Integer fields with a maximum representable value of 2,147,483,647 (7FFFFFFF hex).

4. Outbound Sequenced Messages

Outbound messages are generated by the ITCH host and received by the client's application.

4.1 Timestamp – Seconds Message

The timestamp is separated into two parts to improve bandwidth efficiency: the 'seconds' part comes as a standalone Timestamp – Seconds Message and reflects the number of seconds past midnight that the message was generated, and the 'nanoseconds' part comes as a field within individual messages as the number of nanoseconds since the most recent Timestamp – Seconds Message.

A Timestamp – Seconds Message will be sent for every second in which there is at least one other message type sent.

Name	Offset	Length	Type	Comments
Message Type	0	1	Alpha	Value is T = Timestamp – Seconds Message.
Timestamp – Seconds	1	4	Integer	Number of seconds since midnight.

4.2 System Event Message

System Event Messages signal data feed, system and market events.

Name	Offset	Length	Type	Comments
Message Type	0	1	Alpha	Value is S = System Event Message.

Name	Offset	Length	Type	Comments
Timestamp – Nanoseconds	1	4	Integer	Number of nanoseconds since last Timestamp – Seconds Message.
Group	5	4	Alpha	Orderbook group identifier. Blank = system wide event.
System Event	9	1	Alpha	Refer to the System Events table below.

Table 1: System Events

Value	Description
O	Start of Messages – Always the first message sent in any trading day excepting Timestamp – Seconds Messages.
C	End of Messages – Always the last message sent in any trading day.

4.3 Price Tick Size Message

Price Tick Size Messages define a set of price tick size tables. Price Tick Size Messages are sent before Orderbook Directory Messages.

Name	Offset	Length	Type	Comments
Message Type	0	1	Alpha	Value is L = Price Tick Size Message.
Timestamp – Nanoseconds	1	4	Integer	Number of nanoseconds since last Timestamp – Seconds Message.
Price Tick Size Table Id	5	4	Integer	Price tick size table identifier.
Price Tick Size	9	4	Price	Price tick size.
Price Start	13	4	Price	Start of price range for this price tick size.

4.4 Orderbook Directory Message

Orderbook Directory Messages provide information about orderbooks available in the ODX PTS execution system.

Orderbook Directory Messages are sent at the start of each trading day.

Initial Reference Prices are provided via Order Added Messages sent after the Orderbook Directory Messages.

Name	Offset	Length	Type	Comments
Message Type	0	1	Alpha	Value is R = Orderbook Directory Message.
Timestamp – Nanoseconds	1	4	Integer	Number of nanoseconds since last Timestamp – Seconds Message.
Orderbook ID	5	4	Alpha	Orderbook ID

Name	Offset	Length	Type	Comments
Orderbook Code	9	12	Alpha	International Securities Identification Number (ISIN).
Exchange Symbol	21	12	Alpha	Exchange Symbol
Group	33	4	Alpha	Orderbook group identifier. Values: DAY = Daytime market
Round Lot Size	37	4	Quantity	Number of shares that represent a round lot.
Price Tick Size Table Id	41	4	Integer	Price tick size table identifier.
Price Decimals	45	4	Integer	Number of decimal places in price fields. Value is 2.
Upper Price Limit	49	4	Price	Maximum tradable price.
Lower Price Limit	53	4	Price	Minimum tradable price.
Restriction of Market Order	57	1	Alpha	Restriction of Market Order Values: Y = True N = False
Attention Flag	58	1	Alpha	Security under supervision Values: Y = True N = False
Termination Flag	59	1	Alpha	Security to be delisted Values: Y = True N = False

4.5 Trading State Message

A Trading State Message indicates the current trading state of an orderbook.

Prior to the start of system hours, ODX PTS initiates an orderbook trading state spin. In this spin, Trading State Messages are sent for all orderbooks which are eligible for trading at the start of system hours. If an orderbook is absent from the orderbook trading state spin, clients should assume that the orderbook is suspended at the start of system hours.

After the start of system hours, Trading State Messages are sent to relay changes in the trading state for individual orderbooks.

Name	Offset	Length	Type	Comments
Message Type	0	1	Alpha	Value is H = Trading State Message.
Timestamp – Nanoseconds	1	4	Integer	Number of nanoseconds since last Timestamp – Seconds Message.
Orderbook ID	5	4	Alpha	Orderbook ID
Group	9	4	Alpha	Orderbook group identifier. Values: DAY = Daytime market
Trading State	13	1	Alpha	Current trading state. Values: T = Trading V = Suspended

4.6 Order Added Messages

An Order Added Message indicates that a new order has been accepted bythe ODX PTS execution system and was added to the book. These messages include an Order Number which is unique per day per orderbook group.

Reference prices are provided via Order Added Messages with Order Number value of zero. Initial reference prices are sent after the Orderbook Directory Messages. A manual reference price update will generate an Order Added Message.

Name	Offset	Length	Type	Comments
Message Type	0	1	Alpha	Value is A = Order Added Message.
Timestamp – Nanoseconds	1	4	Integer	Number of nanoseconds since last Timestamp – Seconds Message.
Order Number	5	8	Integer	Reference number of the accepted order. Zero indicates as reference price message.
Buy/Sell Indicator	13	1	Alpha	Side of the order. Values: B = Buy S = Sell Ignore if reference price message.
Quantity	14	4	Quantity	Total number of shares added to the book. Ignore if reference price message.
Orderbook ID	18	4	Alpha	Orderbook ID
Group	22	4	Alpha	Orderbook group identifier. Values: DAY = Daytime market
Price	26	4	Price	Price of the order. 7FFFFFFF hex - market order. Reference Price if zero in Order Number

4.7 Order Executed with Price Message

This message is sent when two orders executed at auction price. This message includes a Match Number which is unique per day

It is possible to receive several Order Executed with Price Messages for the same Order Number if that order is executed in multiple parts.

Name	Offset	Length	Type	Comments
Message Type	0	1	Alpha	Value is C = Order Executed Message with Price
Timestamp – Nanoseconds	1	4	Integer	Number of nanoseconds since last Timestamp – Seconds Message.
Order Number	5	8	Integer	Reference number of the executed order.
Executed Quantity	13	4	Quantity	Number of shares executed.
Match Number	17	8	Integer	Reference number of the match.
Trade Price	25	4	Price	Trade Price
Occurred as Cross	29	1	Alpha	“Y” – trade occurred at the cross

4.8 Order Deleted Message

An Order Deleted Message is sent whenever an order in the book has been cancelled. All remaining shares are no longer accessible so the order must be removed from the book.

Name	Offset	Length	Type	Comments
Message Type	0	1	Alpha	Value is D = Order Deleted Message.
Timestamp – Nanoseconds	1	4	Integer	Number of nanoseconds since last Timestamp – Seconds Message.
Order Number	5	8	Integer	Reference number of the cancelled order.

4.9 Order Replaced Message

An Order Replaced Message is sent whenever an order in the book has been replaced. The new order details are provided for the replacement, along with a New Order Number to be used henceforth.

Name	Offset	Length	Type	Comments
Message Type	0	1	Alpha	Value is U = Order Replaced Message.
Timestamp – Nanoseconds	1	4	Integer	Number of nanoseconds since last Timestamp – Seconds Message.
Original Order Number	5	8	Integer	Reference number of the original order.
New Order Number	13	8	Integer	Reference number of the replaced order.
Quantity	21	4	Quantity	New total number of shares displayed in the book.
Price	25	4	Price	New price of the order. 7FFFFFFF hex - market order.

4.10 Order Book State Message

An Order Book State Message is sent whenever an Orderbook state update.

Name	Offset	Length	Type	Comments
Message Type	0	1	Alpha	Value is O = Orde Book State Message.
Timestamp – Nanoseconds	1	4	Integer	Number of nanoseconds since last Timestamp – Seconds Message.
Orderbook ID	5	4	Alpha	Orderbook ID
State Name	9	20	Alpha	Name of Orderbook State. Refer to Orderbook State Name Table

Table 2: Order Book State Name

Name	Comments
PreOpen	Start Pre-Open Period
PreOpenNCP	Start Non-Cancel Period for Pre-Open
OpeningAuction	Start Opening Auction
Break	Start Session Break
PreClose	Start Pre-Close Period
PreCloseNCP	Start Non-Cancel Period for Pre-Close
ClosingAuction	Start Closing Auction
Closed	Trading Session is closed

4.11 Equilibrium Price Update Message

An Equilibrium Price Update Message is sent during Pre-Open, Pre-Open NCP, Pre-Close or Pre-Close NCP periods. As orders are added, modified, cancelled or deleted, this message will be dissimilated to inform the market the potential crossing price.

After the crossing completed, equilibrium price is sent with 7FFFFFFF hex.

Name	Offset	Length	Type	Comments
Message Type	0	1	Alpha	Value is Z = Equilibrium Price Update Message.
Timestamp – Nanoseconds	1	4	Integer	Number of nanoseconds since last Timestamp – Seconds Message.
Orderbook ID	5	4	Alpha	Orderbook ID
Equilibrium Price	9	4	Price	Equilibrium Price 7FFFFFFF hex - no price is available.

Revision History

Date	Version	Description
2023-02-15	0.1	Initial Draft
2023-03-21	0.2	Update Orderbook Directory Message
2023-03-31	0.3	Publish Reference Price as Order Added Message
2023-05-04	0.4	Add Exchange Symbol in Orderbook Directory Message
2023-06-09	0.5	Remove value “DAY” in Group in System Event Message 7FFFFFFF hex in Price for Market Order in Order Added Message and Order Replaced Message
2023-09-19	0.6	Updates Section 4.10 value from “Closing Auction” to “ClosingAuction”
2024-06-12	1.1	(1) Update of data type from “Integer” to “Price” for the following fields: Section 4.3 - Price Tick Size Message "Price Tick Size" and "Price Start" Section 4.4 - Orderbook Directory Message "Upper Price Limit" and "Lower Price Limit" Section 4.6 - Order Added Message "Price" Section 4.9 - Order Replaced Message "Price" (2) Update of data type from “Integer” to “Quantity” for the following fields: Section 4.6 – Order Added Message Quantity Section 4.7 – Order Executed with Price Message Executed Quantity Section 4.9 – Order Replaced Message Quantity
2024-06-13	1.2	Update of data type from “Integer” to “Quantity” for the following field: Section 4.4 - Orderbook Directory Message Round Lot Size