TSX & TSXV Level 1 QUANTUMFEED

Business Message Specification

Document Revision: 1.0
Date of Issue: November 05, 2010

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Chapter 1 Introduction

This document is the *TSX and TSX Venture(TSXV) Level 1 QUANTUMFEED Business Message Specification*.

The Level 1 QUANTUMFEED™ Business messages provide:

- Trades
- Quotes
- Symbol and stock status

1.1 Intended Audience

The intended audience of this specification consists of business analysts and programmer analysts.

1.2 Scope

The scope of this document is limited to describing the *Business messages* disseminated on the TSX and TSXV Level 1 QUANTUMFEED. The document provides:

- The structure of each type of business message
- Fields that constitute those messages
- The data types and formats to which the fields comply
- Additional details on processing the information contained in those fields

To design and implement systems that can receive and process Level 1 QUANTUMFEED, this document must be used with the following documents:

- *TSX and TSXV QUANTUMFEED Service Access Guide*
- *TMX eXtreme Message Transfer Protocol Specification*

Chapter 2 Business Messages Overview

Business messages disseminated on TSX and TSXV Level 1 QUANTUMFEED contain business-related information; for example: information on trades, information on quotes, and so on. A Business message is composed of two sections: a *message header* and the *message body*.

- The **message header** is common to all Business messages and provides information that is required to process the given message.
- The **message body** contains the business information.

2.1 Business message types

TSX and TSXV Level 1 QUANTUMFEED contains the following types of Business messages.

Message Name	Message Type		Description
	ASCII	HEX	
Symbol Status	J	0x4A	Symbol Status messages contain information regarding equity, debenture, or trading Instruments for the current trading day for both TSX and TSXV markets. One message is disseminated for each valid symbol at the beginning of each trading day.
Equity Trade	s	0x73	An Equity Trade message is generated each time a trade occurs.
Equity Trade Cancelled	t	0x74	An Equity Trade Cancelled message is generated each time a trade is cancelled.
MOC Imbalance	u	0x75	A MOC Imbalance message is disseminated for every MOC-eligible stock. The MOC Imbalance message is disseminated once per MOC-eligible stock at the beginning of the MOC Imbalance trading session.
Stock Status	v	0x76	A Stock Status message is disseminated in response to a change in stock status from the Trading Engine. It contains information regarding the current state of the stock, MOC Price movement delays, and so on.
Equity Quote	w	0x77	An Equity Quote message contains the latest Bid and Ask information for a symbol.

2.2 Message data types

Each field that is contained in the Business messages is formatted according to one of the following data types:

Data Type	Description
Alphanumeric	Alphanumeric fields are left-justified ASCII fields (displayable characters from hex 0x20 to hex 0x7E) that are space padded (hex 0x20) on the right and are sized to their corresponding lengths. **Example**: Consider a field with length *10 bytes*, data type *Alphanumeric* and which must contain the information *"CASH"*. In this scenario, the field contains the value *"CASH "*. The information is left justified and is space (" ") padded on the right. The information and the padding (if required) make the field length 10.
Binary	Binary Level 1 QUANTUM FEED message fields are Little Endian encoded. Length of the binary fields is one of the following: • 1-Byte Binary • 2-Byte Binary • 4-Byte Binary • 8-Byte Binary **Default Value**: Null (binary value 0)

2.3 Message field definitions

For descriptions of fields that make up the Business messages, refer to "Field Definitions" on page 10.

Chapter 3 Business Message Formats

This section contains the structure of each Business message disseminated on TSX and TSXV Level 1 QUANTUMFEED.

Each Business message consists of a message header followed by the message body. For a description of the message header's structure, refer to *TMX eXtreme Message Transfer Protocol Specification*. Only the message body's structure is provided below.

Note: The size of the header is mentioned for message structure completion purposes.

3.1 Message structure

All Business messages must adhere to the Quantum Message Format, as described in *TSX and TSXV QUANTUMFEED Service Access Guide*. Below are the structures of different types of Business messages that are disseminated on the TSX and TSXV Level 1 QUANTUMFEED.

Note: Comments columns in the following tables are intentionally left blank.

3.2 Symbol Status

Field Name	Length (In Bytes)	Data Type	Comments
Message Header	12		
Symbol	9	Alphanumeric	
Stock Group	1	1-Byte Binary	
CUSIP	12	Alphanumeric	
Board Lot	2	2-Byte Binary	
Currency	1	Alphanumeric	
Face Value	8	8-Byte Binary	
Last Sale	8	8-Byte Binary	

Total Message Size = 53 bytes

3.3 Equity Trade

Field Name	Length (In Bytes)	Data Type	Comments
Message Header	12		
Symbol	9	Alphanumeric	
Price	8	8-Byte Binary	
Volume	4	4-Byte Binary	
Buy Broker Number	2	2-Byte Binary	
Sell Broker Number	2	2-Byte Binary	
Bypass	1	Alphanumeric	
Trade Time Stamp	4	4-Byte Binary	
Settlement Terms	1	Alphanumeric	
Cross Type	1	Alphanumeric	
Last Sale Price	8	8-Byte Binary	
Opening Trade	1	Alphanumeric	

Total Message Size = 53 bytes

3.4 Equity Trade Cancelled

Field Name	Length (In Bytes)	Data Type	Comments
Message Header	12		
Symbol	9	Alphanumeric	
Volume	4	4-Byte Binary	
Price	8	8-Byte Binary	
Buy Broker Number	2	2-Byte Binary	
Sell Broker Number	2	2-Byte Binary	
Trade Time Stamp	4	4-Byte Binary	
Last Sale Price	8	8-Byte Binary	

Total Message Size = 49 bytes

3.5 MOC Imbalance

Field Name	Length (In Bytes)	Data Type	Comments
Message Header	12		
Symbol	9	Alphanumeric	
Imbalance Side	1	Alphanumeric	
Imbalance Volume	4	4-Byte Binary	

Total Message Size = 26 bytes

3.6 Stock Status

Field Name	Length (In Bytes)	Data Type	Comments
Message Header	12		
Symbol	9	Alphanumeric	
Comment	40	Alphanumeric	
Stock State	2	Alphanumeric	
Trading System Time Stamp	8	8-Byte Binary	
Calculated Closing Price	8	8-Byte Binary	
VWAP	8	8-Byte Binary	
Resume Trade Time	4	4-Byte Binary	

Total Message Size = 91 bytes

3.7 Equity Quote

Field Name	Length (In Bytes)	Data Type	Comments
Message Header	12		
Symbol	9	Alphanumeric	
Bid Price	8	8-Byte Binary	
Bid Size	4	4-Byte Binary	
Ask Price	8	8-Byte Binary	
Ask Size	4	4-Byte Binary	

Total Message Size = 45 bytes

Chapter 4 Field Definitions

A

Field Name	Description	Data Type and Size	Valid Field Values and Comments
Ask Price	Contains the ask price for the symbol	Binary (8 Bytes)	6 implied decimal places **Example:** An Ask Price of 50.45 is represented by 01010000 11001110 00000001 00000011 00000000 00000000 00000000 00000000. The feed client must convert the binary to decimal and divide the resulting number by 1,000,000 to obtain the Ask Price.
Ask Size	Contains the ask size volume for the symbol	Binary (4 Bytes)	No implied decimal places **Example**: An Ask Size of 2500 is represented by 11000100 00001001 00000000 00000000.

B

Field Name	Description	Data Type and Size	Valid Field Values and Comments
Bid Price	Contains the bid price for the symbol	Binary (8 Bytes)	6 implied decimal places **Example:** A Bid Price of 50.45 is represented by 01010000 11001110 00000001 00000011 00000000 00000000 00000000 00000000. The feed client must convert the binary to decimal and divide the resulting number by 1,000,000 to obtain the Bid Price.
Bid Size	Contains the bid size volume for the symbol	Binary (4 Bytes)	No implied decimal places. **Example**: A Bid Size of 2500 is represented by 11000100 00001001 00000000 00000000.
Board Lot	Contains the board lot size	Binary (2 Bytes)	No implied decimal places **Example**: A Board Lot value of 500 is represented by 11110100 00000001.
Buy Broker Number	An Exchange-assigned public number uniquely identifying a Partici-pating Organization associated with a buy order	Binary (2)	No implied decimal places **Example**: A TSX broker number 009 is represented by 00001001 00000000.

Field Name	Description	Data Type and Size	Valid Field Values and Comments
Bypass	Indicates that the orders are tradable against only visible/disclosed volumes and bypass the undisclosed volume of iceberg orders, RT participation, autofill, and the special terms book. Any part of the balance of the order's quantity not filled immediately is "killed/cancelled"	Alphanumeric (1 Byte)	Valid values are: • "Y": The order is a Bypass. • "N": The order is not a Bypass.

C

Field Name	Description	Data Type and Size	Valid Field Values and Comments
Calculated Closing Price	The price at which MOC orders will trade at Closing. It is published only when outside acceptable limits set by the Exchange, triggering an extension to the MOC limit order entry session.	Binary (8 Bytes)	6 implied decimal places **Example:** A Calculated Closing Price of 50.45 is represented by 01010000 11001110 00000001 00000011 00000000 00000000 00000000 00000000. The feed client must convert the binary to decimal and divide the resulting number by 1,000,000 to obtain the Calculated Closing Price.

Field Name	Description	Data Type and Size	Valid Field Values and Comments
Comment	A text field corresponding to a reason code entered when a stock is halted; or, the initiator of a delayed opening on a stock, or when there is a change to the RT/Oddlot trader on a stock. As well, this is a system-generated text field to describe the disabling of the MOC session by TSX Trading Services.	Alphanumeric (40 Bytes)	
Cross Type	Type of crosses originating from a Participating Organization between managed accounts that have the same manager	Alphanumeric (1 Byte)	Valid values are: • "I": Internal • "B": Basis • "C": Contingent (TSX only) • "S": Special Trading session (TSX only) • "V": VWAP – Volume Weighted Average Price (TSX only)
Currency	The currency associated with a reported price	Alphanumeric (1 Byte)	Valid values are: • "U": USD • "C": CAD
CUSIP	Clearing and settlement registration number	Alphanumeric (12 Bytes)	

F

Field Name	Description	Data Type and Size	Valid Field Values and Comments
Face Value	The face value of a debenture	Binary (8 Bytes)	6 implied decimal places **Example:** A Face Value of 50.45 is represented by 01010000 11001110 00000001 00000011 00000000 00000000 00000000 00000000. The feed client must convert the binary to decimal and divide the resulting number by 1,000,000 to obtain the face value.

I

Field Name	Description	Data Type and Size	Valid Field Values and Comments
Imbalance Side	Indicates which side has an imbalance volume for Market on Close	Alphanumeric (1 Byte)	Valid values are: • “B”: Buy Side • “S”: Sell Side • “ ”: No imbalance exists
Imbalance Volume	Identifies the volume of shares of the imbalance side for Market on Close	Binary (4 Bytes)	No implied decimal places **Example**: A volume of 2,500 is represented by 11000100 00001001 00000000 00000000.

L

Field Name	Description	Data Type and Size	Valid Field Values and Comments
Last Sale	Last sale price of a stock	Binary (8 Bytes)	6 implied decimal places **Example:** A last sale price of 50.45 is represented by 01010000 11001110 00000001 00000011 00000000 00000000 00000000 00000000. The feed client must convert the binary to decimal and divide the resulting number by 1,000,000 to obtain the last sale price.

O

Field Name	Description	Data Type and Size	Valid Field Values and Comments
Opening Trade	Indicates whether the trade occurred at the opening or was the first board lot trade of the day.	Alphanumeric (1 Byte)	Valid values are: • "Y" • "N"

P

Field Name	Description	Data Type and Size	Valid Field Values and Comments
Price	The price in a valid currency	Binary (8 Bytes)	6 implied decimal places. **Example:** A Price of 50.45 is represented by 01010000 11001110 00000001 00000011 00000000 00000000 00000000 00000000. The feed client must convert the binary to decimal and divide the resulting number by 1,000,000 to obtain the price.

R

Field Name	Description	Data Type and Size	Valid Field Values and Comments
Resume Trade Time	The time at which a halted stock will resume trading	Binary (4 Bytes)	No implied decimal places. **Example:** A Resume Trade Time of 121010 is represented by 10110010 11011000 00000001 00000000. Feed clients can obtain the Resume Trade Time by converting the binary to decimal. The Resume Trade Time has the format HHMMSS.

S

Field Name	Description	Data Type and Size	Valid Field Values and Comments
Sell Broker Number	An Exchange-assigned number uniquely identifying a Participating Organization associated with a sell order	Binary (2 Bytes)	No implied decimal places **Example**: A TSX broker number 009 is represented by 00001001 00000000.
Settlement Terms	Settlement terms associated with the order	Alphanumeric (1 Byte)	Valid values are: • "C": Cash • "N": NN • "M": MS • "T": CT • "D": If there is a valid Settlement Date associated with the order
Stock Group	An identifier of the stock group	Binary (1 Byte)	No implied decimal places **Example**: A Stock Group of 3 is represented by 00000011.

Field Name	Description	Data Type and Size	Valid Field Values and Comments
Stock State	The state of the stock	Alphanumeric (2 Bytes)	Valid values are: • "AR": Authorized Delayed • "IR": Inhibited Delayed • "AS": Authorized Halted • "IS": Inhibited Halted • "AG": Authorized Frozen • "IG": Inhibited Frozen • "AE": Authorized Price Movement Delayed • "AF": Authorized Price Movement Frozen • "IE": Inhibited Price Movement Delayed • "IF": Inhibited Price Movement Frozen • "A": Authorized • "I": Inhibited
Symbol	A unique alphanumeric identifier for a security	Alphanumeric (9 Bytes)	

T

Field Name	Description	Data Type and Size	Valid Field Values and Comments
Trade Time Stamp	The time at which the trade occurred, manually set when a trade is added	Binary (4 Bytes)	No implied decimal places **Example**: A Trade Time Stamp of 121010 is represented by 10110010 11011000 00000001 00000000. Feed clients can obtain the Trade Time Stamp by converting the binary to decimal. The Trade Time Stamp is of the format HHMMSS.

Field Name	Description	Data Type and Size	Valid Field Values and Comments
Trading System Time Stamp	The time at which the event being reported occurred in the Trading Engine	Binary (8 Bytes)	Microseconds since the Epoch (00:00:00 UTC, January 1, 1970) **Example**: A Trading System Time Stamp of 2010-10-20 11:12:44.032174 is represented as 10101110 00010000 01011111 11010111 00001101 10010011 00000100 00000000.

V

Field Name	Description	Data Type and Size	Valid Field Values and Comments
Volume	The quantity of shares for an order or trade	Binary (4 Bytes)	No implied decimal places **Example**: A volume of 2500 is represented by 11000100 00001001 00000000 00000000.
VWAP	Volume weighted average price based on trades occurring in the continuous market for MOC	Binary (8 Bytes)	6 implied decimal places **Example:** A VWAP of 50.45 is represented by 01010000 11001110 00000001 00000011 00000000 00000000 00000000 00000000. The feed client must convert the binary to decimal and divide the resulting number by 1,000,000 to obtain the VWAP

Appendix A Acronyms and Definitions

- **ASCII**: American Standard Code for Information Interchange
- **COP**: Calculated Opening Price
- **CUSIP**: Committee on Uniform Security Identification Procedures
- **MOC**: Market On Close
- **RT**: Registered Trader
- **TSX**: Toronto Stock Exchange
- **TSXV** : TSX Venture Exchange
- **USD**: United States dollar
- **VWAP**: Volume Weighted Average Price

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