Nasdaq CXC Limited

CHIXMMD 1.1 Multicast Feed Specification

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Synopsis: This document describes the protocol of the Nasdaq CXC Limited (Nasdaq Canada) CHIXMMD Feed. This feed provides a recoverable stream of orders and trades to Nasdaq Canadian Equities' customers and vendors through a Multicast feed.

Revision Date: February 24, 2025

CHIXMMD Feed

1. Introduction

The CHIXMMD Feed is the Multicast data feed for Nasdaq Canada. It disseminates information about orders and executions in real time for Nasdaq Canada's three independent Trading Books: CXC, CX2 and CXD. The feed is a series of sequenced and unsequenced variable length messages. The messages themselves are encoded in printable ASCII bytes.

This document describes the Multicast version. Technical aspects of this data feed including the connection protocol, message types and message structures are described in this document.

2. Revision History

Name	Description	Date
Version 1.0	Initial document	2011-03-28
Version 1.1	Added multicast address information	2011-11-01
Version 1.2	Minor format edits	2011-11-09
Version 1.3	Added Listing Market on Stock Status messages.	2012-05-29
	Added Attribute to support Bypass ('B' = Bypass) on Trade messages.	
	Added Cross Type on Trade messages.	
Version 1.4	Added CX2 connectivity details	2013-02-19
	Added UAT connectivity details	
	Updated comments and examples to incorporate CX2	
Version 1.5	Changed multicast ports for production CX2 stream 1 and stream 2 and CX2 UAT stream 1	2013-04-24
Version 1.6	Updated heartbeat interval in Section 3.1	2013-05-15
	Updated Bandwidth Recommendation	2013-11-27
Version 1.7	Added Attribute to support Market On Close ("C" = Market On Close) on Trade messages.	2015-05-28
Version 1.8	Updated Network Address Summary	2015-07-16
Version 1.9	Added Attributes to support Settlement Terms on Cross orders ('T' = Cash Today, 'C' = Cash Tomorrow,	2016-04-12
	'D' = Delayed Delivery).	
Version 2.0	Updated Network Address Summary to Include CX2 Secondary Site.	2016-06-21
	Updated Message Descriptions to Reference Nasdaq CXD where applicable.	
Version 2.1	Added value 'X' to Cross Type field on Trade messages. Added Nasdaq CXD UAT network addresses.	2016-08-17
Version 2.2	Added Nasdaq CXD production multicast addresses.	2016-10-06

Version 2.3	Added all remaining production and UAT network addresses for Nasdaq INET platform.	2017-01-05
Version 2.4	Added Chicago (CH4) and Markham (3500 Steeles POP) addresses.	2017-03-02
Version 2.5	Updated multicast operating hours. Updated Chicago (CH4) and Markham (3500 Steeles POP) addresses. Removed legacy Nasdaq CX2 production addresses and all legacy UAT addresses.	2017-03-15
Version 2.6	Removed legacy Nasdaq CXC production addresses. Remove value 'B' for Bypass from Order Execution Message and Long Form Order Execution Message. Added value 'D' to Cross Type field of Trade message and Long Form Trade message.	2017-06-15
Version 2.7	Added value 'C' to Listing Market field of Stock Status message for CSE listed securities.	2017-12-13
Version 2.8	Housekeeping update	2018-02-08
Version 2.9	Removed note about Nasdaq CXC order attribution.	2018-08-29
Version 3.0	Added value 'L' to Trade Attribute field of Trade Message and Long Form Trade Message. Added Board Lot Size, Currency and GEF Eligible fields to Stock Status Message. Removed Short Exempt field from Stock Status Message.	2019-08-07
Version 3.1	Added values 'W' and 'R' to Event Code of System Event Message to indicate Market-Wide Circuit Breaker halt and resumption.	2020-07-03
Version 3.2	Update bandwidth requirements	2022-01-31
Version 3.3	Added value 'P' to Trade Attribute field of Trade Message and Long Form Trade Message.	2022-05-30
Version 3.4	Added value 'N' to Listing Market field of Stock Status Message.	2023-01-26
Version 3.5	Changed the definition of value 'C' in the Trade Attribute field of Trade Message and Long Form Trade Message to CXD Conditional. Removed the possible value of 'C' from the Settlement Terms field of the Trade Message and Long Form Trade Message.	2025-02-24

3. Overview

The Multicast Market Data system consists of two data services:

- Real-time Multicast Market Data Feed (CHIXMMD)
- Multicast Message Recovery Service (MMRS)

The real-time multicast market data feed delivers market data in UDP multicast packet streams over the multicast market data network. There are multiple data streams published over the network for resilience purposes. They all carry identical content. By subscribing to these data streams, market data clients receive latest market data updates from the trading system.

The multicast message recovery service offers message recovery to market data clients. Clients can connect to a designated MMRS server and request for past message retransmission. The recovery process is implemented via a TCP connection established by the request client to the MMRS server.

The two data services are made available in both primary and secondary site for resilience purposes. Market data clients may want to rely on primary site services and switch to secondary site services only when necessary due to matching engine location.

3.1 Real-Time Multicast Market Data Feed Service

The Nasdaq Canada CHIXMMD feed delivers real-time market data in the form of UDP packet streams. There are two streams published from the primary site and another two from the secondary site. They are published in different multicast addresses. Refer to section 'Network Configuration Parameters' for address details.

All data streams are identical in terms of market data content. They are identical at message level. However, the protocol allows packing of multiple messages into a UDP packet and different market data servers at different sites may apply packing differently. Therefore the streams may differ at UDP packet level. Market data clients need to be aware of this nature when processing the feed.

Every market data message carries a unique message sequence number which starts at 1 and increments by 1 in the next message. Market data clients may use this sequence number to detect message gap and act on recovery accordingly.

There are regular heartbeat messages published in each data stream to indicate line connection status. The heartbeat message itself does not increment message sequence number and does not carry market data updates. It does carry the next expected sequence number so the market data client can use it to detect if the previous data messages are missing. Normally, the heartbeat message is published every 5 seconds but may be skipped when a data stream has a high volume of messages. Market data clients need to be aware of this nature when determining their heartbeat monitoring scheme.

3.2 Multicast Message Recovery Service

Market data clients may use the service provided by MMRS Server to recover missing messages of the current trading day. This is done so by establishing a TCP connection to a designated MMRS server and following the protocols described in the latter part of this specification to initiate the request. Basically, the client application needs to submit a Login Request together with the sequence number of the first missing message. After validation, the Recovery Server replays messages to the client starting from the requested message.

There is a limit on message volume to replay in a single recovery session. If the limit is reached, the server will terminate the connection. The Market data client must start a new session and continue from the last recovery point. Refer to section 'Network Configuration Parameter' for details on server address and recovery limit setting.

3.3 Real-Time Multicast Market Data Feed Service

The multicast feed will be operating from 04:00 to 19:15. During the operation hours, market data clients may expect to see market data update messages and regular heartbeat messages in the data streams.

3.4 Network Configuration Parameters

The following tables summarize network address & parameter configurations needed for accessing the multicast market data services for each of the Nasdaq Canada books:

Production Nasdaq Canada INET Platform Primary TR2 (45 Parliament St, Toronto)

	CXC	CX2	CXD
Stream A			
Multicast Group	233.128.23.97	233.128.23.105	233.128.23.113
Multicast Port	18070	18071	18072
RP	207.251.255.138	207.251.255.138	207.251.255.138
Source	206.200.1.224/28	206.200.1.224/28	206.200.1.224/28
MMRS	206.200.1.192	206.200.1.193	206.200.1.194
MMRS Port	18170	18171	18172
Stream B			
Multicast Group	233.128.23.98	233.128.23.106	233.128.23.114
Multicast Port	18070	18071	18072
RP	207.251.255.139	207.251.255.139	207.251.255.139
Source	206.200.1.240/28	206.200.1.240/28	206.200.1.240/28
MMRS	206.200.1.208	206.200.1.209	206.200.1.210
MMRS Port	18170	18171	18172

Production Nasdaq Canada INET Platform DR CH4 (350 E. Cermak Rd, Chicago)

	CXC	CX2	CXD
Stream C			
Multicast Group	233.187.20.20	233.187.20.21	233.187.20.22
Multicast Port	18070	18071	18072
RP	207.251.255.97	207.251.255.97	207.251.255.97
Source	206.200.95.0/25	206.200.95.0/25	206.200.95.0/25
MMRS	206.200.92.121	206.200.92.122	206.200.92.123
MMRS Port	18170	18171	18172
Stream D			
Multicast Group	233.187.20.24	233.187.20.25	233.187.20.26
Multicast Port	18070	18071	18072
RP	207.251.255.98	207.251.255.98	207.251.255.98
Source	206.200.95.128/25	206.200.95.128/25	206.200.95.128/25
MMRS	206.200.92.124	206.200.92.125	206.200.92.126
MMRS Port	18170	18171	18172

Production Nasdaq Canada INET Platform MKM POP (3500 Steeles Ave E, Markham)

	CXC	CX2	CXD
Stream E			
Multicast Group	233.128.23.72	233.128.23.73	233.128.23.74
Multicast Port	18070	18071	18072
RP	207.251.255.16	207.251.255.16	207.251.255.16
Source	206.200.58.240/29	206.200.58.240/29	206.200.58.240/29
MMRS	206.200.58.224	206.200.58.225	206.200.58.226
MMRS Port	18170	18171	18172
Stream F			
Multicast Group	233.128.23.76	233.128.23.77	233.128.23.78
Multicast Port	18070	18071	18072
RP	207.251.255.17	207.251.255.17	207.251.255.17
Source	206.200.58.248/29	206.200.58.248/29	206.200.58.248/29
MMRS	206.200.58.232	206.200.58.233	206.200.58.234
MMRS Port	18170	18171	18172

Nasdaq Canada Test Facility (NTF) INET Platform

	CXC	CX2	CXD
Multicast Group	233.128.23.65	233.128.23.66	233.128.23.67
Multicast Port	18070	18071	18072
RP	207.251.255.136	207.251.255.136	207.251.255.136
Source	206.200.59.240/28	206.200.59.240/28	206.200.59.240/28
MMRS	206.200.59.224	206.200.59.225	206.200.59.226
MMRS Port	18170	18171	18172

<u>Bandwidth Recommendation</u>

Market data clients are required to order line circuits with sufficient bandwidth to cater for market data volume published in our data streams. Below table provides guidelines on sizing the bandwidth calculation.

Note that all multicast data streams published in our data network carry identical content. For resilience purpose, market data clients are advised to subscribe to at least two data streams (one from primary site and one from secondary site).

Market data client also need to make provision for message recovery service. Sufficient bandwidth should be arranged so that message recovery can be completed timely.

Multicast Data Stream[1]	65Mbps
Recovery Server	2 Mbps minimum

Figure: Production Bandwidth Recommendation for CXC

Multicast Data Stream[1]	35Mbps
Recovery Server	2 Mbps minimum

Figure: Production Bandwidth Recommendation for CX2

Multicast Data Stream[1]	8Mbps
Recovery Server	2 Mbps minimum

Figure: Production Bandwidth Recommendation for CXD

<u>CHIXMMD Parameters</u>

MTU setting	1500
Heartbeat message frequency	At least 1 in every 5 seconds

Figure: CHIXMMD Configuration Parameters

<u>MMRS Parameters</u>

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[1] Bandwidth requirement of the multicast stream – the figure indicates the requirement for one multicast stream. If the client intends to subscribe to both streams from a single site, the figure should be doubled.

The MMRS Server applies limit checks in serving recovery requests. If a request exceeds the preset limit, the server will disconnect the connection automatically. Market data clients are required to start a new session and continue from the last recovery point.

Message Recovery Range Limit	100,000 messages
Session Time Limit	TBD

Figure: MMRS Configuration Parameters

4. Protocol

4.1 CHIXMMD Protocol

The Real-time Multicast Market Data Feed protocol contains the definition of market data messages and the definition of the multicast packets. The market data messages describe the activities of the trading system. For example, order addition and trade execution are activities in the trading system. The format of the market data messages is described in the next section.

The multicast packet definition describes how market data messages are encoded in a multicast packet.

4.1.1 Multicast Packet Layout

Each multicast packet contains a packet header followed by one or more data messages as illustrated in the following diagram.

Figure 1: CHIXMMD Multicast Packet Layout

The following table describes the packet header layout.

PACKET HEADER				
NAME	**OFFSET**	**LENGTH**	**VALUE**	**REMARKS**
Sequence	0	4	Numeric	Sequence number of the first message.
Message Count	4	2	Numeric	Number of messages in the packet

The following table describes the data message layout. The following layout may repeat in the multicast packet to deliver multiple data messages in one packet.

DATA MESSAGE				
NAME	**OFFSET**	**LENGTH**	**VALUE**	**REMARKS**
Length	Variable	2	Numeric	Length of the Market Data Message
Market Data Message	Variable	Variable	Market Data Message	Content of the Market Data Message

4.1.2 Heartbeat Message

The heartbeat message is used in the multicast feed to indicate health of the multicast feed. The message is delivered regularly by the Market Data Servers.

The heartbeat message is delivered in a single multicast packet and indicated by the message count value of zero in the packet header described below.
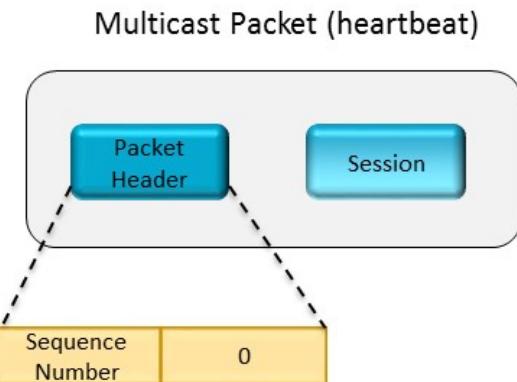
Figure 2: CHIXMMD Heartbeat Packet Layout

The following table describes the heartbeat message layout including the packet header.

HEARTBEAT MESSAGE				
NAME	**OFFSET**	**LENGTH**	**VALUE**	**REMARKS**
Sequence	0	4	Numeric	Sequence number of the next Market Data Message
Message Count	4	2	0	A zero value indicating this is a heartbeat message
Session	6	10	Alphanumeric	Current Session value

The Session field contains the current session of the market data stream being delivered. Client applications should use this field to fill-in the Session field in the Login Request of the Recovery Service.

The Session field will not change during a normal trading day. In unlikely events (e.g. the trading system is restarted in the middle of the day), it may change to a different value. When this happens, the sequence number of the market data messages will be reset to 1.

4.2 MMRS Protocol

The Multicast Message Recovery Service protocol follows the one used in the TCP version of the CHIXMD Feed. The protocol definition is described in the document "CHIXMD Feed Specification". In terms of Market Data Message format, the MMRS protocol uses the same message format in the multicast feed described in section 5 of this document.

The following diagram describes a typical recovery scenario:

Figure 3: Recovery Scenario Example

In the diagram,

> Step 1: Market Data Client identified missing message(s) from the multicast stream and needs to recover the message using the recovery service. The client has to establish a TCP connection with the recovery server and format a Login Request message to request message retransmission.

> Step 2: After receiving the login request, the Recovery Server will validate the user authentication information in the request. The session and message sequence number in the request will also be checked to ensure relevant messages are available for retransmission. A Login Accepted message will be replied to the client to indicate the request is accepted and message retransmission will start soon.

> Step 3: The recovery server starts replaying the past messages one by one, starting from the one requested by the client.

> Step 4: When the client receives the necessary retransmissions, it should send a Logout Request to disconnect the recovery session. After the request is sent, the client may close the TCP connection immediately.

There is a limit on message volume to replay in a single recovery session. If the limit is reached, the server will terminate the connection. Market data client has to start a new session and continue from the last recovery point. The recovery limit is described in the previous section 'Network Configuration Parameter'.

In addition, the recovery server will disconnect a client when playback of the past messages finishes. This is different from the CHIXMD feed which would continue to broadcast the real-time messages.

5. Market Data Messages

The market data message format described below is the same in the multicast service and the TCP based CHIXMD recovery service.

5.1 Data Types

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

All alphanumeric text fields are left justified and padded on the right with spaces, and can include letters or digits.

Standard prices are given in decimal format with 6 whole number places followed by 4 decimal digits. Long form prices are given in decimal format with 12 whole number places followed by 7 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.

Timestamp fields are given in milliseconds past midnight Local Time.

6. Application Protocol - Market Data

The CHIXMMD Feed service is composed of a series of messages that describe orders added to, removed from, and executed on CXC, CX2 and CXD. All of these messages will be contained in a 'Sequenced Data Message' and are inbound messages to the client.

The introduction of long form messages are used when either the price or size is larger than the standard messages can permit. This will be done on a per order basis.

6.1 Add Order Message

An Add Order Message indicates that CXC or CX2 has accepted a visible order into the book. It includes a day-unique Order Reference key assigned to the order. (Note: the issuing of an Add Order Message is not necessarily always for a new order. See section "Modification of Existing Orders".)

Not applicable to CXD.

Add Order Message				
Name	**Offset**	**Length**	**Value**	**Notes**
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"A"	Add Order Message
Order Reference	9	9	Numeric	Day unique order reference number
Buy/Sell Indicator	18	1	Alphanumeric	'B' = Buy Order 'S' = Sell Order
Shares	19	6	Numeric	Total number of shares being added to the book (may be less than the number of shares entered because part of the order may trade before being posted to the book).
Stock	25	10	Alphanumeric	Stock symbol right padded with spaces.
Price	35	10	Price	The display price of the order.
Broker	45	3	Numeric	The three digit numeric TSX Broker Number or 001 for anonymous.

Long Form Add Order Message				
Name	**Offset**	**Length**	**Value**	**Notes**
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"a"	Add Order Message
Order Reference	9	9	Numeric	Day unique order reference number
Buy/Sell Indicator	18	1	Alphanumeric	'B' = Buy Order 'S' = Sell Order
Shares	19	10	Numeric	Total number of shares being added to the book (may be less than the number of shares entered because part of the order may trade before being posted to the book).
Stock	29	10	Alphanumeric	Stock symbol right padded with spaces.
Price	39	19	Price	The display price of the order.
Broker	58	3	Numeric	The three digit numeric TSX Broker Number or 001 for anonymous.

6.2 Order Execution Message

An Order Execution Message is sent whenever an order on the book is executed in whole or in part. *Not applicable to CXD.*

Order Execution Message				
Name	**Offset**	**Length**	**Value**	**Notes**
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"E"	Order Execution Message
Order Reference	9	9	Numeric	The reference key of the order that was executed.
Executed Shares	18	6	Numeric	The number of shares executed on this trade
Trade Reference	24	9	Numeric	Day unique trade reference number
Contra Order Reference	33	9	Numeric	The reference key of the contra-order that was executed.
Trade Attribute	42	1	Alphanumeric	'C' = Market On Close
Broker	43	3	Numeric	The three digit numeric TSX Broker Number or 001 for anonymous.
Contra Broker	46	3	Numeric	The three digit numeric TSX Broker Number of the contra order or 001 for anonymous.

Long Form Order Execution Message				
Name	**Offset**	**Length**	**Value**	**Notes**
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"e"	Order Execution Message
Order Reference	9	9	Numeric	The reference key of the order that was executed.
Executed Shares	18	10	Numeric	The number of shares executed on this trade
Trade Reference	28	9	Numeric	Day unique trade reference number
Contra Order Reference	37	9	Numeric	The reference key of the contra-order that was executed.
Trade Attribute	46	1	Alphanumeric	'C' = Market On Close
Broker	47	3	Numeric	The three digit numeric TSX Broker Number or 001 for anonymous.
Contra Broker	50	3	Numeric	The three digit numeric TSX Broker Number of the contra order or 001 for anonymous.

6.3 Order Cancel Message

An Order Cancel Message is sent whenever an order on the book is fully canceled, its quantity revised down or when a pegged order is re-priced. ***Not applicable to CXD.***

Order Cancel Message				
Name	**Offset**	**Length**	**Value**	**Notes**
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"X"	Order Cancel Message
Order Reference	9	9	Numeric	The reference number of the order being canceled. References a previously sent *Add Order Message*.
Canceled Shares	18	6	Numeric	Number of shares cancelled

Long Form Order Cancel Message				
Name	**Offset**	**Length**	**Value**	**Notes**
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"x"	Order Cancel Message
Order Reference	9	9	Numeric	The reference number of the order being canceled. References a previously sent *Add Order Message*.
Canceled Shares	18	10	Numeric	Number of shares cancelled

6.4 Modification of Existing Orders

A price modification of an existing order is represented in CHIXMD by the issuing of a Cancel Message (for full open quantity) on the existing order followed by an Add Order Message that uses the same Order reference.

Reduction of quantity order is represented in CHIXMD by the issuing of a Cancel Message on the existing order. The cancel message can reduce the number of shares currently pending in the referenced open order by the number of shares indicated. When the number of currently pending shares for an order reaches zero, the order is dead and should be removed from the book.

6.5 Trade Message

A Trade Message is sent when a trade occurs against order quantity not visible on the book (i.e. a fully or partially hidden order).   They do not affect the book and can be ignored if you are building a book. Trade Messages are required to provide time-and-sales and other execution based data; they fill in the gaps left when an order that is not otherwise visible on the order book is executed.
By combining the executions received separately via both Order Execution Messages and Trade Messages, it is possible to build a complete view of all executions that occur.

Note that the Order Reference is always set to 0 (zero) and the Buy/Sell indicator to 'B'. This applies to the Long Form version as well.

Trade Message				
Name	**Offset**	**Length**	**Value**	**Notes**
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"P"	Trade Message
Order Reference	9	9	Numeric	The reference number of the order executed. (always 0)
Buy/Sell Indicator	18	1	Alphanumeric	'B' = buy order executed 'S' = sell order executed (Always 'B')
Shares	19	6	Numeric	Number of shares executed
Stock	25	10	Alphanumeric	Symbol, right padded with spaces
Price	35	10	Price	Match price of the order
Trade Reference	45	9	Numeric	Trade reference number generated for this trade.
Contra Order Reference	54	9	Numeric	The reference number of the contra order executed.
Broker	63	3	Numeric	The three digit numeric TSX Broker Number of the buyer or 001 for anonymous.
Contra Broker	66	3	Numeric	The three digit numeric TSX Broker Number of the seller or 001 for anonymous.
Trade Attribute	69	1	Alphanumeric	'B' = Bypass (intentional crosses only) 'C' = CXD Conditional 'L' = M-ELO 'P' = CXD PureStream
Cross Type	70	1	Alphanumeric	'I' = Internal 'B' = Basis 'C' = Contingent 'V' = VWAP 'X' = Intentional Cross 'D' = Derivative Related
Settlement Terms	71	1	Alphanumeric	'T' = Cash Today 'D' = Delayed Delivery

Long Form Trade Message				
Name	**Offset**	**Length**	**Value**	**Notes**
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"p"	Trade Message
Order Reference	9	9	Numeric	The reference number of the order executed. (always 0)

Buy/Sell Indicator	18	1	Alphanumeric	'B' = buy order executed 'S' = sell order executed (Always 'B')
Shares	19	10	Numeric	Number of shares executed
Stock	29	10	Alphanumeric	Symbol, right padded with spaces
Price	39	19	Price	Match price of the order
Trade Reference	58	9	Numeric	Trade reference number generated for this trade.
Contra Order Reference	67	9	Numeric	The reference number of the contra order executed.
Broker	76	3	Numeric	The three digit numeric TSX Broker Number of the buyer or 001 for anonymous.
Contra Broker	79	3	Numeric	The three digit numeric TSX Broker Number of the seller or 001 for anonymous.
Trade Attribute	82	1	Alphanumeric	'B' = Bypass (intentional crosses only) 'C' = CXD Conditional 'L' = M-ELO 'P' = CXD PureStream
Cross Type	83	1	Alphanumeric	'I' = Internal 'B' = Basis 'C' = Contingent 'V'= VWAP 'X' = Intentional Cross 'D' = Derivative Related
Settlement Terms	84	1	Alphanumeric	'T' = Cash Today 'D' = Delayed Delivery

6.6 Broken Trade Message
A Broken Trade message is sent whenever an execution is broken. A Broken Trade is final; once a trade is broken it cannot be reinstated.

Broken Trades happen only rarely and will only affect applications that build a time-and-sales database or maintain cumulative volumes or high/low calculations. If you are only building a book, you can ignore these messages; they have no effect on the book.

Broken Trade Message				
Name	**Offset**	**Length**	**Value**	**Notes**
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"B"	Broken Trade Message

| Trade Reference | 9 | 9 | Numeric | The trade reference number of the execution that was broken. This refers to a trade reference number from a previously transmitted Order Execution or Trade Message. |

7.0 System Event Message

The system event message type is used to indicate a market state event.

System Event Message				
Name	**Offset**	**Length**	**Value**	**Notes**
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"S"	System Event Message
Event Code	9	1	Alphanumeric	'O' = First message of the day
				'S' = Start of Nasdaq Canada Trading Session
				'Q' = Start of Primary Market Trading Session
				'M' = End of Primary Market Trading Session. Indicates that Pegged orders are no longer available for execution.
				'E' = End of System Hours. Nasdaq Canada is closed and not accepting orders. It is still possible to receive Broken Trade messages and Order Cancel Messages.
				'C' = End of Messages. Last message of the day.
				'W' = Trading Halted due to Market-Wide Circuit Breaker
				'R' = Trading Resumed following Market-Wide Circuit Breaker

8.0 Stock Status Message

This message indicates the current trading status of a stock. At the start of day, the feed will send out a stock status message for each of the symbols trading on CXC, CX2 and CXD. Subsequently, stock status messages will be sent when a stock is halted or is released for trading.

Stock Status Message				
Name	**Offset**	**Length**	**Value**	**Notes**
Time Stamp	0	8	Numeric	Time Stamp
Message Type	8	1	"H"	Stock Trading Action Message
Stock	9	10	Alphanumeric	Stock symbol
Trading State	19	1	Alphanumeric	'H' = Halted, 'T' = Trading

Stock Status Message				
Name	**Offset**	**Length**	**Value**	**Notes**
Reserved	20	1	Alphanumeric	Reserved for future use
Listing Market	21	1	Alphanumeric	'T' = TSX, 'V' = Venture, 'C' = CSE, 'N' = Neo
Board Lot Size	22	4	Numeric	Board Lot Size in Shares
Currency	26	3	Alphanumeric	'CAD' = Canadian Dollars, 'USD' = US Dollars
GEF Eligible	29	1	Alphanumeric	'Y' = GEF Eligible, 'N' = Not GEF Eligible

9.0 Example Output

9.1 Multicast Packet Messages

9.1.1 Single message within packet

MESSAGE TYPE	CHIXMMD FEED MESSAGE	
Trade Message	00 00 03 2f 00 01 00 3b 35 33 32 36 38 36 37 35	|.../...;53268675|
	50 20 20 20 20 20 20 20 20 30 42 20 20 20 34 30	|P 0B 40|
	30 56 4f 44 2e 4c 20 20 20 31 30 30 30 30 30 30	|0VOD.L 1000000|
	30 31 36 30 30 30 30 30 30 35 20 20 20 20 20 20	|0160000005 |
	20 20 30	| 0|

FIELD	HEX	MEANING
Sequence Number	00 00 03 2f	Decimal Value = 815
Message Count	00 01	Decimal Value = 1
Message Length	00 3b	Decimal Value = 59
Message	35 33 32 36 38 36 37 35 50 20 20 20 20 20 20 20 20 20 30 42 20 20 20 34 30 30 56 4f 44 2e 4c 20 20 20 31 30 30 30 30 30 30 30 31 36 30 30 30 30 30 35 20 20 20 20 20 20 20 20 30	ASCII String 53268675 P 0B 400VOD.L 10000000160000005 0

9.1.2 Multiple message within packet

MESSAGE TYPE	CHIXMMD FEED MESSAGE	
Add Order, Order Execution and Order Cancel Message in one packet	00 00 03 1c 00 03 00 2a 35 33 30 36 31 34 33 35	|.......*53061435|
	41 20 20 20 20 20 20 20 20 20 34 42 20 20 20 35 30	|A 4B 50|
	30 56 4f 44 2e 4c 20 20 20 31 30 30 30 30 30 30	|0VOD.L 1000000|
	30 59 00 2a 35 33 30 36 36 34 36 37 45 20 20 20	|0Y.*53066467E |
	20 20 20 20 20 34 20 20 20 34 30 30 31 36 30 30	| 4 4001600|
	30 30 30 30 31 20 20 20 20 20 20 20 20 35 00 18	|00001 5..|
	35 33 30 36 38 34 35 32 58 20 20 20 20 20 20 20	|53068452X |
	20 34 20 20 20 31 30 30	| 4 100|

FIELD	HEX	MEANING
Sequence Number	00 00 03 1c	Decimal Value = 796

Message Count	00 03	Decimal Value = 3
Message Length	00 2a	Decimal Value = 42
Message	35 33 30 36 31 34 33 35 41 20 20 20 20 20 20 20 20 34 42 20 20 20 35 30 30 56 4f 44 2e 4c 20 20 20 31 30 30 30 30 30 30 30 30 59	ASCII String 53061435 A 4B 500VOD.L 10000000Y
Message Length	00 2a	Decimal Value = 42
Message	35 33 30 36 36 34 36 37 45 20 20 20 20 20 20 20 20 34 20 20 20 34 30 30 31 36 30 30 30 30 30 30 31 20 20 20 20 20 20 20 20 35	ASCII String 53066467E 4 400160000001 5
Message Length	00 18	Decimal Value = 24
Message	35 33 30 36 38 34 35 32 58 20 20 20 20 20 20 20 20 34 20 20 20 31 30 30	53068452X 4 100

9.1.3 Heartbeat message

MESSAGE TYPE	CHIXMMD FEED MESSAGE
Heartbeat Message	00 00 03 16 00 00 32 30 31 30 30 39 30 33 30 30 |......2010090300|

FIELD	HEX	MEANING
Sequence Number	00 00 03 16	Decimal Value = 790
Message Count	00 00	Always zero
Session ID	32 30 31 30 30 39 30 33 30 30	ASCII String 2010090300

9.2 Market Data Messages

9.2.1 Order added then fully trades. *Not applicable to CXD.*

Action	CHIXMD Message
Sell of 100 RIM shares entered at 85.89. Order Ref of 113 assigned.	58473879A 113S 100RIM 858900001
Matching buy order entered and trade results with Trade Ref 1000060. Both sides are anonymous by default for CXC. (CX2 is not anonymous by default)	58474382E 113 100 1000060 114 001001

Action	CHIXMD Message

Sell of 100 RIM shares entered at 85.89. Order Ref of 172 assigned. On the order Tag Anonymous (6761)=N, but add message will show 001 for CXC only (CX2 would show the appropriate broker #).	`58549449A      172S    100RIM           858900001`
Matching buy order entered and trade results with Trade Ref 1000094.	`58549950E      172    100   1000094     173 007001`

Note: There is no Add Order message for the buy order. It is not displayed on the book so no alert goes out.
Note: The Execution message has no price. The consumer must infer the execution price based on the limit of the original order.

9.2.2 Order added, fully trades and residual amount of matching order is placed on the book.
Not applicable to CXD.

Action	CHIXMD Message
Buy of 200 RIM shares entered at 85.89. Order Ref of 269 assigned.	`60674054A      269B    200RIM           858900001`
Matching sell order entered for 100 shares of RIM. Execution message sent with Trade Ref 1000146.	`60674557E      269    100   1000146     270 001007`

9.2.3 Pegged/Market Order added to book. *Not applicable to CXD.*

Action	CHIXMD Message
Sell of 800 RIM shares entered with a pegged order attribute. Order Ref 296 assigned. The display price is 85.95.	`60688465A      296B    800RIM           859500001`
Each time the price moves and this order is re-priced a Cancel is sent.	`61205976X      296    800`
Then an Add message is sent but note that the Order Ref is the same. The display price is now 85.88.	`61205977A      296B    800RIM           858800001`

Note: Market orders will behave in the same way as above.

9.2.4 Price Revision. *Not applicable to CXD.*

Action	CHIXMD Message
Sell of 300 RIM shares entered. Order Ref 273 assigned. The display price is 85.99.	`60676069A      273S    300RIM           859900001`
Price is revised to 85.89. Cancel is sent.	`60676585X      273    300`
Then an Add message is sent but note that the Order Ref is the same. The display price is now 85.89.	`60677089A      273S    300RIM           858900001`

9.2.5 Revision of Order Quantity Down. *Not applicable to CXD.*

Action	CHIXMD Message
Sell of 1000 RIM shares entered. Order Ref 276 assigned. The display price is 85.89.	60678601A 276S 1000RIM 858900001
The order is then revised in quantity down by 500 shares; a Cancel message informs the consumer of this.	60679106X 276 500

Note: The consumer is expected to calculate the residual amount of the original order still open.

9.2.6 Revision of Order Quantity Up. *Not applicable to CXD.*

Action	CHIXMD Message
Sell of 1000 RIM shares entered. Order Ref 278 assigned. The display price is 85.88.	60680113A 278B 1000RIM 858800001
The order is then revised in quantity up by 500 shares, a Cancel message is sent.	60680619X 278 1000
Then an Add message is sent but note that the Order Ref is the same. The display quantity is now 1500.	60680619A 278B 1500RIM 858800001

9.2.7 Order Revision Results in Execution. *Not applicable to CXD.*

Action	CHIXMD Message
A visible buy order for 300 RIM shares is placed on the book with a display price of 85.89. Anonymous (6761)=Y or blank.	60675564A 272B 300RIM 858900001
A visible sell order of 300 shares is placed on the book with a display price of 85.99. Anonymous=N, Broker=123. 001 shows on the Add message for CXC. 123 shows on the Add message for CX2.	60676069A 273S 300RIM 859900001
The sell order is revised to a display price of 85.89. This results in a Cancel message.	60676585X 273 300
Then the sell order trades and an Execution message is sent. The broker shows anonymous. The Contra broker is attributed to TSX Broker Number 123.	60676585E 272 300 1000148 273 001123

9.2.8 Execution of a Fully Hidden Order (Minimum Fill)

Action	CHIXMD Message

A non-displayed minimum fill sell order of 3000 RIM shares is put on the book with a price of 85.89.	[No message for non-displayed order]
A visible buy order of 3000 shares is entered at 85.89, Anonymous=N, Broker 123. This results in a Trade message against the hidden order quantity. The Contra broker is attributed to TSX Broker Number 123.	`60682140P        0B  3000RIM          858900  1000152` `281123001`

9.2.9 Trades against a Partially Hidden Order (Iceberg). *Not applicable to CXD.*

Action	CHIXMD Message
A sell order of 10,000 RIM shares is put on the book with a visible quantity of 1000 shares, price is 85.89, Anonymous=N, Broker=123. This results an Add message for the visible amount. 001 shows on the Add message for CXC or 123 for CX2.	`60682681A      282S  1000RIM          858900001`
A Buy order for 500 shares is entered and crosses. 500 shares remain on the book. The Broker is attributed to TSX Broker Number 123.	`60683178E      282   500   1000153     283 123001`
Then a Buy order for 4000 shares is entered and crosses against the iceberg. We first get a visible trade of 500 shares. The Broker is attributed to TSX Broker Number 123.	`60683681E      282   500   1000154     284 123001`
Then a Trade is sent against the not visible quantity of 3500 shares. The Broker is attributed to TSX Broker Number 123.	`60683681P        0B  3500RIM          858900  1000154` `284123001`
Finally the peak is refreshed onto the book. An Add message is sent for 1000 shares.	`60683681A      285S  1000RIM          858900001`

9.2.10 Trade Cancellation (Bust). *Only Broken Trade message applicable to CXD.*

Action	CHIXMD Message
A sell order of 100 RIM shares is put on the book. The display price is 85.89. This results an A message for the visible amount.	`60643017A      206S   100RIM          858900001`
An Execution message is generated by a matching order. The Trade Ref is 1000111.	`60643519E      206   100   1000111     207 001001`
Then the trade is cancelled by Nasdaq Canada. A Broken Trade message goes out for each side of the trade.	`62460063B  1000111` `62460064B  1000111`

9.2.11 Trade Correction. *Only the Broken Trade message followed by a Print message is applicable to CXD.*

Action	CHIXMD Message
A sell order of 1000 ECA shares is put on the book. The display price is 10.00. This results an A message for the visible amount.	`33469031A        47B  1000ECA              100000001`
An Execution message is generated by a matching order. The Trade Ref is 0000010.	`33475511E        47  1000  0000010      48 001001`

Then the trade price is corrected.	`33528041B  0000010`
	`33528041P       0B  1000ECA              100100  0000010`
	`0001001`