The Bulletin Board Dissemination Service℠ (BBDS℠)

Data Feed Interface Specification

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1.0 Introduction

1.1 Background

The Bulletin Board Dissemination Service℠ (BBDS℠) is designed to carry market participant and Inside quotation data for the OTC Bulletin Board® (OTCBB). For the full service description, please refer to www.otcbb.com.

BBDS is designed to provide the following data elements for OTCBB securities:

- Real-time market participant quotations and associated inside quotations (when applicable) for all OTCBB securities (except DPPs);
- Indicative market participant quotations and inside quotations (when applicable) for OTCBB DPPs;
- Trading halt information for OTCBB and other OTC issues; and
- Market event control messages and general administrative messages for the OTCBB marketplace.

Please note that trade data for OTCBB issues is available on the Trade Data Dissemination Service℠ (TDDS℠) data feed.

1.2 Entitlement Level

OTCBB data, which is disseminated on the BBDS and TDDS data feeds, is currently included in the UTP Level 1 entitlement.

1.3 Connectivity Options

NASDAQ OMX services as the technology provider for the OTCBB system and associated data feed products. As such, NASDAQ OMX provides firms direct access to the BBDS and TDDS products via its U.S. data centers. Firms may connect to the NASDAQ OMX U.S. data centers via the co-location facility, extranets or direct connectivity providers.

1.4 Scope of Document

This document defines the communications interface and message format requirements for BBDS. All references to a time of day in this specification are in Eastern Standard/Daylight Time.

This document was last updated on November 12, 2012. Please refer to Appendix F of this document for version control information. FINRA and NASDAQ OMX reserves the right to add, delete or modify any of the message formats outlined in this document as needed. As noted above, direct data feed subscribers are required to code their systems to handle data feed format changes. In advance of each BBDS product change, NASDAQ OMX will post a Data News or Data Technical News item on the NASDAQ OMX Trader web site detailing the data feed format change and release schedule. Direct Data feed subscribers may sign up for automatic e-mail notifications at https://www.NASDAQ OMXtrader.com/EASP/TraderEASP.aspx?id=NewsSignup. For UTP Level 1 notifications, firms should select the desired news items under "The NASDAQ Stock Market" heading on the Market Data News tab.

2.0 Transmission Characteristics

2.1 Bandwidth Requirements

The current BBDS bandwidth allocation is:

Data Feed Channel	Bandwidth Allocation (Per Multicast Group)
BBDS	400 Kilobits (Kb)

NASDAQ OMX broadcasts two (a primary and a back-up) multicast groups for its data feeds. Please note that NASDAQ OMX reserves the right to modify the bandwidth allocation for these IP calls as system capacity dictates. Extranet customers are required to maintain sufficient network capacity to handle the NASDAQ OMX data feed products ordered.

2.2 Transmission Protocol

2.2.1 Protocol Overview

Regardless of network option, NASDAQ OMX data feed transmissions will be transmitted in a non-interactive simplex mode using Internet Protocol (IP) multicast. A broadcast transmission with no answer back will be employed. A version of Cisco's Protocol Independent Multicast (PIM) routing protocol will be used to route multicast packets through the network. All transmissions will be in standard ASCII code with 7 data bits (8^{th} bit is zero).

NASDAQ OMX data feeds are designed to adhere to Request for Comment (RFC) 1112 standard from The NIC Group for IP multicast protocol. This RFC states:

> *IP multicasting is the transmission of an IP datagram to a "host group", a set of zero or more hosts identified by a single IP destination address. A multicast datagram is delivered to all members of its destination host group with the same "best-efforts" reliability as regular unicast IP datagrams, i.e., the datagram is not guaranteed to arrive intact at all members of the destination group or in the same order relative to other datagrams.*

To minimize data loss, NASDAQ OMX provides primary and back-up groups for its data feed services. NASDAQ OMX strongly recommends that all direct data feed subscribers program their systems to process both the primary and back-up groups.

The data messages are identical for two groups with the exception of the following UDP message header field values: Source IP Address, Destination IP Address, UDP Source Port Number, and UDP Destination Port Number.

The purpose of two host groups is to provide an extra layer of data redundancy within the extranet and end-user networks. By reading and utilizing both multicast groups into their production environment, IP multicast customers can help to protect themselves against network anomalies which could cause interruptions in data flow. To minimize data loss, NASDAQ OMX strongly recommends that data feed customers process both the primary and back-up groups within their networks.

2.2.2 IP Multicast Addresses

Each IP multicast stream will be assigned a unique Class D host group address for transmission via the extranets. The Class D addresses have been registered by NASDAQ OMX with The NIC Group. Please refer to UDP/IP Addresses page on the NASDAQ OMX Trader website for the current BBDS address and port assignments.

2.3 Transmission Block

Messages sent to data feed recipients are blocked to provide more efficient line utilization. Each block contains a maximum of 1000 data characters. Messages may not span blocks. Each message in a block ends in a Unit Separator (US) except the last message, which ends in an End of Text (ETX). With the exception of certain messages (e.g. Control messages), each message sent over BBDS contains a fixed format header and a text section that has a format and length that varies for each message type.

DATA BLOCK FORMAT

UDP/IP Headers	SOH	Message 1 header and text	US	Message 2 header and text	US	Message n header and text	ETX
	1000 Byte Block (Max) from SOH to ETX						

2.4 UDP/IP Headers

Each IP datagram includes the IP and UDP headers as well as the block text data. The datagram fields can be read left to right starting at the top and working your way down through the datagram.

		0			16	32
IP		VERSION 4 bits	HEADER LENGTH 4 bits	TYPE OF SERVICE 8 bits	TOTAL LENGTH (in bytes) 16 bits	
		IDENTIFICATION 16 bits			FLAGS 3 bits	FRAGMENT OFFSET 13 bits
		TIME TO LIVE 8 bits		PROTOCOL 8 bits	IP HEADER CHECKSUM 16 bits	
		SOURCE IP ADDRESS 32 bits				
		DESTINATION IP ADDRESS 32 bits				
UDP		UDP SOURCE PORT NUMBER 16 bits			UDP DESTINATION PORT NUMBER 16 bits	
		UDP LENGTH 16 bits			UDP CHECKSUM 16 bits	
		UDP Data (BLOCK DATA < 1000 BYTES)				

2.5 Field Descriptions

2.5.1 IP Header Fields

The following field descriptions pertain to the IP header:

- **VERSION** – 4 bit field used to define the current version of the IP protocol for transmission. The value will be set to 4.
- **HEADER LENGTH** – 4 bit field to define the number of 32 bit words in the IP header portion of the datagram. For multicast packets being generated by NASDAQ OMX, the value will be set to 5.
- **TYPE OF SERVICE** – 8 bit field with the first 3 bits generally ignored by most network equipment. The next 5 bits are set to zero. Based on this description this field will always have the value of zero (0) for all multicast packets.
- **TOTAL LENGTH** – 16 bit field contains the length in bytes of the entire IP datagram (including UDP header). Since the maximum length of the block text is 1000 bytes, the maximum value for this field is 1028.
- **IDENTIFICATION FIELD** – 16 bit field contains a value that is incremented by one for each packet sent by the system. Not supported for UDP/IP packets.
- **FLAGS AND FRAGMENT OFFSET** – Combined 16 bit field is only used when an IP datagram is fragmented. Not supported for UDP/IP packets.
- **TIME TO LIVE (TTL)** – 8 bit field contains a value that determines the number of routers that a datagram can pass through. Each router that forwards the

datagram will decrement this value by one; when it reaches zero, the router throws it away. It is initially set to 32 by the multicast source systems.

- **PROTOCOL** – 8 bit field contains a value representing the next level encapsulated protocol. Since multicast uses UDP, the value is set to 0x17, which is 23 decimals.
- **HEADER CHECKSUM** – 16 bit field contains a checksum made up of the IP header fields only. The calculation is based on the one's complement sum of the header broken into 16 bit words.
- **IP SOURCE ADDRESS** – 32 bit field contains the Registered Class C address of the multicast datagram source system. Address may vary depending on origin (system and location) of NASDAQ OMX data. **IP DESTINATION ADDRESS** – 32 bit field contains the Registered Class D address for each IP Multicast Group. Please see the table above for a list of current multicast groups.

2.5.2 UDP Header Fields

The following field descriptions pertain to the UDP header:

- **UDP SOURCE PORT NUMBER** – 16 bit field identifies the $Port_{16}$ address for each IP multicast group. Please see section 3.1 for a list of the current source port numbers.
- **UDP DESTINATION PORT NUMBER** – 16 bit field identifies the $Port_{10}$ address for each IP multicast group. Please see section 3.1 for a list of the current destination port numbers.
- **UDP LENGTH** – 16 bit field contains the length in bytes of the UDP headers plus the Data Block. The maximum value is 1008.
- **UDP CHECKSUM –** 16 bit field contains a checksum made up of the UDP header plus the Data Block. In addition, it includes the UDP pseudo header, which is made up of selected fields from the IP headers such as Source Address, IP Destination Address, Protocol, and UDP Length. The calculation is based on the one's complement sum of the datagram broken into 16 bit words.

2.5.3 UDP Data Fields

The following field descriptions pertain to the Data Block transmission:

- **SOH AND ETX** – The start of a block of data will be indicated by the Start of Header (SOH) control character. The end of the block will be signified by an End of Text (ETX) control character.
- **US** – The Unit Separator (US) character is utilized in message blocks with multiple messages to signify the end of the preceding message but not the end of the block.
- **BLOCK TEXT** – The block text may consist of one or more messages. A message may not span block boundaries. A message shall consist of a Message Header and a Message Text. Each message in a block shall be delimited by a US character except the last message, which will be delimited by an ETX character.
- **DATA FORMAT** – Alphanumeric fields will be left justified and space (hex 20) filled unless otherwise noted. Numeric fields will be right justified and zero (hex 30) filled unless otherwise noted.

2.6 Character Set

All transmissions will be in standard ASCII code: 7 data bits and the 8th bit always zero.

2.7 Retransmission Capability

The NASDAQ OMX front-end processor will log messages transmitted to recipients. The message formats are defined in subsequent sections of this document. This log will be accessible as a record of messages sent, and will provide a full retransmission capability. Message types not logged and therefore unavailable for retransmission include:

Type	Value
M	Start of Test Cycle
N	End of Test Cycle
T	Line Integrity

Please note that the pre-formatted messages contained between the Start and End of the Test Cycle messages will not be available for retransmission. In the event of a system problem, NASDAQ OMX may also be unable to fulfill requests for messages sent prior to the Message Sequence Number Reset or Intra-Day Quote Wipe-Out control message.

BBDS retransmission requests should be sent via electronic mail message to RETRANQ@nasdaqomx.com. To request a retransmission, the firm must provide the following information to NASDAQ OMX Computer Operations:

- Data Feed Subscriber's Firm Name
- NASDAQ OMX-Assigned Retransmission Password
- Missing Message Sequence Number(s)
- Contact Name and Telephone Number

Retransmission requests will only be honored during the period from the Start of Day (Category C – Type I) message through the End of Retransmission Request (Category C – Type K) message. The recipient can specify by message sequence number which message range the recipient would like retransmitted.

Retransmissions will be assigned a low priority in the outgoing message queue in order to prevent any delay or interference with current message delivery. As with original transmissions, retransmissions are broadcast to all direct connect subscribers on both networks. **It is the responsibility of the data feed recipient to ignore retransmitted messages not intended for their firm.** Retransmission messages can be identified by the following attributes:

- **Message Blocking:** Retransmission messages will never be mixed with current messages in the same message block, but current message blocks and retransmission blocks can be interspersed.
- **Message Sequence Number:** The message header will contain the same message sequence number as the original message. Please note that if the Message Sequence Number is reset, no intra-day messages sent prior to the reset control message can be retransmitted.
- **Retransmission Requester:** The message header will contain the unique two-character retransmission requester assigned to the intended recipient. Each firm is given a unique two-character retransmission requester that they should code for in its system. Refer to section 2.7 for more information on the retransmission requester.
- **Date/Time:** The message header will contain the same date and time stamp as

the original message.

To obtain the retransmission requester and passwords for your firm, please contact NASDAQ OMX Global Data Products via e-mail at dataproducts@nasdaqomx.com. For questions about previously requested retransmission, firms may contact the NASDAQ OMX Command Center at +1 203 926 3400.

3.0 Message Header

Each BBDS message will begin with a 22-byte header. The Message Header defines the type of data in the subsequent message. Please note that alphanumeric fields are left justified and space filled unless otherwise specified. Numeric fields are right justified and zero filled unless otherwise specified.

The Message Header always contains 22 characters consisting of the following data fields:

Message Category	Message Type	Session Identifier	Retransmission Requester	Message Sequence Number
1	1	1	2	8

Market Center Originator ID	Date/Time	Reserved
1	7	1

22 BYTES

3.1 Message Category

The Message Category is a 1 byte, alphanumeric character. This field, along with the Message Type, identifies the message. The following table defines the Message Categories that BBDS can transmit:

Category	Usage
C	Control
Q	Quotation
A	Administrative

3.2 Message Type

The Message Type is a 1 byte, alphanumeric character. This field, along with the Message Category, identifies the message. The following defines the Message Types that BBDS transmits.

Quotation Messages:

Category	Type	Usage
Q	1	OTCBB Market Participant Update

Control Messages:

Category	Type	Usage
C	I	Start of Day
C	J	End of Day
C	O	Market Session Open
C	C	Market Session Close
C	A	Emergency Market – Halt
C	B	Emergency Market – Resume
C	K	End of Retransmission Requests
C	Z	End of Transmissions
C	M	Start of Test Cycle
C	N	End of Test Cycle
C	T	Line Integrity
C	L	Sequence Number Reset

Administrative Messages:

Category	Type	Usage
A	A	General Administrative Message (Free-Form Text)
A	H	Trading Action

3.3 Session Identifier

The Session Identifier is a 1 byte, alphanumeric field indicating the market session to which the message applies. It will be one of the following values:

Code	Value
A	All Market Sessions or Session Independent
U	U.S. Market Session (including pre-and post-market)

3.4 Retransmission Requester

The Retransmission Requester is a 2 byte, alphanumeric identifier that signifies the intended recipient of the message. Retransmissions will be sent to all recipients, and it is the responsibility of each recipient to discard retransmitted messages not requested by him. The exception is a retransmission with an "R" Retransmission Requester, which denotes a retransmission addressed to all.

Certain specific or global retransmission codes exist. For BBDS, the codes are as follows:

Code	Value
O (space)	An original transmission to all recipients.
R (space)	A retransmission to all recipients.
T (space)	A test cycle transmission to all.
Vendor Specific ID	A retransmission to an individual firm. Identifiers to be assigned by NASDAQ OMX as needed.

These retransmission codes are upper case and space filled. NASDAQ OMX will also assign a special two-character retransmission requester to each direct subscriber. Customers should code their system to process the two-character code assigned to their firm as well as the three global values outlined above.

3.5 Message Sequence Number (MSN)

The Message Sequence Number is an 8 byte, numeric field that identifies each message. At the beginning of each operational cycle this number will begin with 00000000 as the first message, and will be incremented by one each time a new message is transmitted with the following exceptions:

- Regular retransmission messages have the sequence number of the original message.
- Line Integrity Messages (Category C – Type T) contain the sequence number of the last message transmitted that was not a retransmitted message.
- Sequence Number Reset Messages (Category C – Type L) contain the number to which the Message Sequence Number counter is to be reset. This Message Sequence Number will either be zero or some number greater than the highest number previously transmitted.
- The following control messages will be transmitted three times to ensure positive recognition: End of Day (Category C – Type J), End of Retransmission Requests (Category C – Type K), and End of Transmissions (Category C – Type Z). For each of these message types, the message sequence counter is incremented by one on the first transmission only.
- The following control messages will contain a message sequence number of zero: Start of Day (Category C – Type I) and Start of Test Cycle (Category C – Type M). Category C Type I messages will be transmitted three times to ensure positive recognition, but will have zero as the sequence number on all

three messages. Please note that the start of each test cycle will begin with zero.

Refer to Section 10 of this document for additional information on BBDS control messages.

3.6 Market Center Originator ID

The Originator ID is a 1 byte, alphanumeric character that indicates the market center, which originated the message. The characters currently in use for BBDS are:

Code	Description	Type of Messages
U (Upper case U)	OTCBB System	Used for the full range of quotation, administrative, and event control messages
u (Lower case u)	Non-OTCBB Issues	Used for Trading Action messages only
Q	NASDAQ OMX Market System	Used for Market System Events only
E	Market Independent	Used for Data Feed Handler Generated Events only

3.7 Date/Time

The date/time represents the calendar date and time that NASDAQ OMX received the record. The Date/Time is seven bytes and stated in the following format:

Date Year	Date Month	Date Day	Time Hour	Time Minute	Time Second
2	1	1	1	1	1

Date Year: The year the transaction occurred. This two-byte field will be stated in numeric format, with possible values 00 to 99.

Date Month: The month the transaction occurred. This one byte field is stated in ASCII text format. The numeric month value will be converted into a single ASCII character based on the Date/Time translation table.

Date Day: The day of the month the transaction occurred. This one byte field is stated in ASCII text format. The day value will be converted into a single ASCII character based on the Date/Time translation table.

Time Hour: The hour of the day the transaction occurred in military time. This one byte field is stated in ASCII text format. The hour value will be

converted into a single ASCII character based on the Date/Time translation table.

Time Minute: The minute of the hour the transaction occurred. This one byte field is stated in ASCII text format. The minute value will be converted into a single ASCII character based on the Date/Time translation table.

Time Second: The second of the minute the transaction occurred. This one byte field is stated in ASCII text format. The second value will be converted into a single ASCII character based on the Date/Time translation table.

Note: The Date/Time translation table is located in Appendix C of this document.

3.8 Reserved

The Reserved field is one byte and is reserved for future use. This field will be space-filled.

4.0 Data Formats

This section outlines the message formats used to disseminate information on BBDS. The field values for the message formats are described in Section 7 of this document.

4.1 OTCBB Quotation Messages

The following message format will be used to disseminate the best-priced quotation for all OTCBB quoting participants and the Inside Quote in each issue. For processing guidelines, please refer to Section 8.0 of this document.

4.1.1 OTCBB Market Participant Quote Update

Category Q – Type 1

The OTCBB Market Participant Update is 66 bytes in length (without the appendage) and is comprised of the following fields:

OTCBB Symbol	OTCBB Type	Market Participant Identifier	Market Participant Location ID	Market Participant Status	Market Participant Quote Condition
11	1	4	1	1	1

Reserved (for Market Maker Mode)	Offer Wanted/Bid Wanted Indicator	Unsolicited Indicator	Bid Price Denominator	Bid Price	Bid Size
1	1	1	1	12	7

Ask Price Denominator	Ask Price	Ask Size	Currency	Inside Appendage Indicator
1	12	7	3	1

4.1.2 OTCBB Inside Appendages

If a quoting participant update impacts the OTCBB Inside Quote for an issue, an OTCBB Inside Appendage will be added to the OTCBB Market Participant Quote Update message. The appendage will include all relevant information concerning the best bid and ask of the issue.

Within the Quotation message, the OTCBB Inside Indicator will denote the type of appendage to be included. There are three indicator values:

Code	Value
1	No change to Inside Quote. No Inside appendage attached. Firms should continue to display existing Inside Quote for issue.
2	No Inside exists. No Inside appendage attached. Firms should show Inside Quote fields as blank.
3	Inside Quote Appendage is attached. Firms should update Inside fields to reflect new values contained in appendage.

When attached, the OTCBB Inside Appendage will be 41 bytes in length and contain the following fields:

Inside Quote Condition 1	Inside Bid Price Denominator 1	Inside Bid Price 12	Inside Bid Size 7	Inside Ask Price Denominator 1	Inside Ask Price 12

Inside Ask Size 7

4.2 Administrative Messages

The following message formats will be used to disseminate administrative data for OTCBB issues. For processing guidelines, please refer to Section 9.0 of this document.

4.2.1 General Administrative Message

Category A – Type A

This free format, variable length text message (up to 300 bytes) may be used to notify data feed subscribers of special situations. The administrative message can be used anytime throughout the day.

Text
1 – 300

4.2.2 Trading Action Message

Category A – Type H

This fixed format message, which is 25 bytes in length, will inform subscribers of trading actions, such as halts or trading resumptions, affecting OTCBB or other over-the-counter equity securities.

Stock Symbol	Action	Action Date/Time	Reason Code
11	1	7	6

25 BYTES

4.3 Control Messages

Control messages consist of a message header only. For processing information, please refer to Section 10 of this document.

5.0 Field Occurrences Within Messages

This table provides the Message Category and Message Type for the BBDS format for each message field. Please note that the following abbreviations will be used to identify message appendages:

IO = Inside Appendage

Field Name	Message Category	Message Type
A		
Action	A	H
Action Date/Time	A	H
Ask Price	Q	1
Ask Price Denominator	Q	1
Ask Size	Q	1
B		
Bid Price	Q	1
Bid Price Denominator	Q	1
Bid Size	Q	1
C		
Currency	Q	1
I		
Inside Appendage Indicator	Q	1 (IO)
Inside Ask Price	Q	1 (IO)
Inside Ask Price Denominator	Q	1 (IO)
Inside Ask Size	Q	1 (IO)
Inside Bid Price	Q	1 (IO)
Inside Bid Price Denominator	Q	1 (IO)
Inside Bid Size	Q	1 (IO)
Inside Quote Condition	Q	1 (IO)
M		
Market Participant Identifier	Q	1
Market Participant Location ID	Q	1
Market Participant Quote Condition	Q	1
Market Participant Status	Q	1
O		
Offer Wanted/Bid Wanted Indicator	Q	1
OTCBB Symbol	Q	1
OTCBB Type	Q	1

Field Occurrences

Field Name	Message Category	Message Type
R		
Reason Code	A	H
Reserved	Q	1
S		
Stock Symbol	A	H
T		
Text	A	A
U		
Unsolicited Indicator	Q	1

6.0 Field Descriptions

Unless otherwise stated, all alphanumeric fields will be left justified and space filled. All numeric fields will be right justified and zero filled.

A

Action

Category A – Type H

1 byte, Alphanumeric. This field appears in the Trading Action Message. It is used to indicate the current trading status for the stated issue. The associated values are as follows:

Code	Value
H	Trading Halt
Q	Quotation Resumption
T	Trading Resumption

Action Date/Time

Category A – Type H

7 bytes, Alphanumeric (including special characters). This field appears in the Trading Action Message. The Action Date/Time field within the Trading Action message will reflect the time of the most recent attribute change (action, reason code). The Action Date/Time stated in the following format:

Date Year	Date Month	Date Day	Time Hour	Time Minute	Time Second
2	1	1	1	1	1

Please note that NASDAQ OMX will generate a new Trading Action message whenever one of the attributes (Action, Reason Code) in the Trading Action message was to change.

Please refer to the Date/Time field in the message header for the field layout.

Ask Price

Category Q – Type 1

12 bytes, Numeric. The Ask price is the price at which the quoting participant is willing to sell (offer) the security for at any given time. The Ask price is represented in a combination of whole dollar and decimal digits. The Ask Price Denominator field should be used to determine how to process this field.

Ask Price Denominator

Category Q – Type 1

1 byte, Alphanumeric. The Ask Price Denominator denotes the whole dollar and decimal digit composition of the Ask Price field. The allowable values are as follows:

Code	Denominator Value	Whole Dollar Digits	Decimal Digits
B	100	10	2
C	1000	9	3
D	10,000	8	4

Please note that the default value is "B".

Ask Size

Category Q – Type 1

7 bytes, Numeric. The Ask Size represents the amount of shares available at the quoting participant's Ask Price in the given security. Ask Size will be stated in round lots of either 1 or 100 shares, depending on the minimum quote size for the issue. For information on the minimum quotation size requirement, please refer to FINRA Rule 6433.

B

Bid Price

Category Q – Type 1

12 bytes, Numeric. The Bid Price is the price at which the OTCBB quoting participant is willing to buy the security for at a given time. The Bid Price is represented in a combination of whole dollar and decimal digits. The Bid Price Denominator field should be used to determine how to process this field.

Bid Price Denominator

Category Q – Type 1

1 byte, Alphanumeric. The Bid Price Denominator field denotes the whole dollar and decimal digit composition of the Bid Price field. The allowable values are as follows:

Code	Denominator Value	Whole Dollar Digits	Decimal Digits
B	100	10	2
C	1000	9	3
D	10,000	8	4

Please note that the default value is "B".

Bid Size

Category Q– Type 1

7 bytes, Numeric. The Bid Size represents the amount of shares available at the quoting participant's Bid Price in the given security. Bid Size will be stated in round lots of either 1 or 100 shares, depending on the minimum quote size for the issue. For information on the minimum quotation size requirement, please refer to FINRA Rule 6433.

C

Currency

Category Q – Types 1

3 bytes, Alphanumeric. The Currency field defines the currency of an issue in ISO currency codes. The current value is:

Code	Value
USD	US Dollars

I

Inside Appendage Indicator

Category Q – Type 1

1 byte, Numeric. The Inside Appendage Indicator field indicates how the Inside quote for the OTCBB issue is impacted by the current Market Participant update. The allowable values are as follows:

Code	Value
1	No change to Inside Quote. No Inside appendage attached. Firms should continue to display existing Inside Quote for issue.
2	No Inside exists. No Inside appendage attached. Firms should show Inside Quote fields as blank.
3	Inside Quote Appendage is attached. Firms should update Inside fields to reflect new values contained in appendage.

Inside Ask Price

Category Q – Type 1 (OTCBB Inside Appendage)

12 bytes, Numeric. The Inside Ask Price indicates the best (lowest) ask price available in the OTCBB system for the issue. The Inside Ask Price is represented in a combination of whole dollar and decimal digits. The Inside Ask Price Denominator field should be used to determine how to process this field.

Inside Ask Price Denominator

Category Q – Type 1 (OTCBB Inside Appendage)

1 byte, Alphanumeric. The Inside Ask Price Denominator field denotes the whole dollar and decimal digit composition of the Inside Ask Price field. The allowable values are as follows:

Code	Denominator Value	Whole Dollar Digits	Decimal Digits
B	100	10	2
C	1000	9	3
D	10,000	8	4

Please note that the default value is "B".

Inside Ask Size

Category Q – Type 1 (OTCBB Inside Appendage)

12 bytes, Numeric. This Inside Ask Size field indicates the largest size (in round lots) quoted by an OTCBB market participant at the Inside Price in the issue.

Inside Bid Price

Category Q – Type 1 (OTCBB Inside Appendage)

12 bytes, Numeric. The Inside Bid Price indicates the best (highest) bid price available in the OTCBB system for the issue. The Inside Bid Price is represented in a combination of whole dollar and decimal digits. The Inside Bid Price Denominator field should be used to determine how to process this field.

Inside Bid Price Denominator

Category Q – Type 1 (OTCBB Inside Appendage)

1 byte, Alphanumeric. The Inside Bid Price Denominator field denotes the whole dollar and decimal digit composition of the Inside Bid Price field. The allowable values are as follows:

Code	Denominator Value	Whole Dollar Digits	Decimal Digits
B	100	10	2
C	1000	9	3
D	10,000	8	4

Please note that the default value is "B".

Inside Quote Condition

Category Q – Type 1 (OTCBB Inside Appendage)

1 byte, Alphanumeric. The Inside Quote Condition field indicates the current Inside quotation state for the given OTCBB issue. The allowable values are as follows:

Code	Value
O	Inside Quote Open
C	Inside Quote Closed

M

Market Participant Identifier

Category Q – Type 1

4 bytes, Alphanumeric. The Market Participant Identifier (MPID) field indicates the identifier assigned by NASDAQ OMX to the OTCBB Market Participant that is responsible for generating a quotation message.

For a full list of OTCBB Market Participants (including Market Participant Location Identifiers and Telephone Number, please refer to the Symbol Directory section of the OTCBB website at www.otcbb.com/static/symbol.stm or on the NASDAQ OMX Trader.com website at http://www.nasdaqtrader.com/Trader.aspx?id=symbollookup.

Market Participant Location ID

Category Q – Type 1

1 byte, Alphanumeric. The Market Participant Location ID field identifies the branch or trading desk at Market Maker firm or ECN responsible for entering and maintaining quote in the give OTCBB issue. Please note that the value associated with a Location Identifier may vary from firm-to-firm, with the exception of the following two universal values:

Code	Value
Z	Main Office/Branch
#	ECN
Other Characters	Please refer to OTCBB Symbol Directory at www.otcbb.com/static/symbol.stm for a firm specific value.

Market Participant Quote Condition

Category Q – Type 1

1 bytes, Alphanumeric. The Market Participant Quote Condition field indicates the current quotation state for a Market Participant in a given OTCBB issue. The allowable values are as follows:

Code	Value
O	Market Participant Open
C	Market Participant Closed

Market Participant Status

Category Q – Type 1

1 byte, Alphanumeric. The Market Participant Status field is one byte in length. This alphanumeric field indicates the current status for the Market Participant position for the issue. The allowable values are as follows:

Code	Value
A	Active
D	Deleted
E	Excused/Withdrawn
W	Withdrawn
S	Suspended

O

Offer Wanted/Bid Wanted Indicator

Category Q – Type 1

1 byte, Alphanumeric. The Offer Wanted/Bid Wanted Indicator field indicates a special, unpriced OTCBB quotation from a market participant. The allowable values are as follows:

Code	Value
B	Bid wanted. Market participant is willing to buy OTCBB issue. Please contact the firm directly to negotiate price.
N	Not applicable. Quotation prices are indicated in message.
O	Offer wanted. Market participant is willing to sell OTCBB issue. Please contact firm directly to negotiate price.
W	Bid and Offer Wanted. Market participant is willing to buy and/or sell OTCBB issue. Please contact firm directly to negotiate price.

OTCBB Symbol

Category Q – Type 1

11 bytes, Alphanumeric. The OTCBB Symbol field is 11 bytes in length. This alphanumeric field indicates the issue symbol for the OTCBB security being quoted.

For the current list of OTCBB issues, please refer to the Symbol Directory section of the OTCBB website at www.otcbb.com/static/symbol.stm or via the NASDAQ OMX Trader.com website at http://www.nasdaqtrader.com/Trader.aspx?id=symbollookup. For updates to OTCBB listings, please refer to the OTCBB Daily List at www.otcbb.com/dailylist.

OTCBB Type

Category Q – Type 1

1 byte, Alphanumeric. The OTCBB Type field is 1 byte in length. This alphanumeric field indicates if the OTCBB issue being quoted is eligible for real-time or indicative updates. The allowable values are as follows:

Code	Value
I	Periodic, Indicative quotes for securities other than OTCBB Limited Partnership or Direct Participant Program (DPP) securities, if applicable.
K	Real-time quotes
L	Periodic, indicative quotes. Currently, only OTCBB Limited Partnership or Direct Participant Program (DPP) securities are subject to periodic, indicative updates.

R

Reason Code

Category A – Type H

6 bytes, Alphanumeric. The Reason Code indicates the reason for the current trading action status. The allowable values are as follows:

Reason Code	Description
T1	Halt - News Pending
T2	Halt - News Dissemination
T12	Halt - Additional Information Requested by FINRA
H10	Halt - SEC Trading Suspension
H11	Halt - Regulatory Concern
H12	Halt - SEC Revocation
U1	Halt – Foreign Market/Regulatory
U2	Halt – Component/Derivative of Exchange-Listed Security
U3	Halt – Extraordinary Events
O1	Operations Halt, Contact Market Operations
D	Security Deletion from OTCBB
T3	News and Resumption Times
R4	Qualifications Issues Reviewed/Resolved; Quotations/Trading to Resume
R9	Qualifications Halt Concluded, Filings Met; Quotations/Trading To Resume
C11	Trade Halt Concluded By Other Regulatory Auth.; Quotes/Trades To Resume
Space	Reason Code not available

Reserved

Category Q – Type 1

1 byte, Alphanumeric. The Reserved field is space filled upon initial release. This field is reserved for Market Maker Mode, which may be supported in a future release.

S

Stock Symbol

Category A – Type H;

11 bytes, Alphanumeric. The Stock Symbol field is 11 bytes in length. This alphanumeric field indicates the issue symbol for the OTCBB or other OTC equity security that is impacted by the FINRA Trading Action.

For the current list of OTCBB issues, please refer to the Symbol Directory section of the OTCBB website at www.otcbb.com/static/symbol.stm or on the NASDAQ OMX Trader.com website at http://www.nasdaqtrader.com/Trader.aspx?id=symbollookup For updates to OTCBB listings, please refer to the OTCBB Daily List at www.otcbb.com/dailylist.

T

Text

Category A – Type A

Up to 300 characters, Alphanumeric. Free-form text is used to notify data feed subscribers of special situations.

U

Unsolicited Indicator

Category Q – Type 1

1 byte, Alphanumeric. The Unsolicited Indicator field indicates if the Market Participant is entering an unsolicited quote in a given security. Unsolicited quotes reflect customer limit orders (not proprietary firm interest). The allowable values are as follows:

Code	Value
A	Unsolicited Ask
B	Unsolicited Bid
U	Unsolicited Bid and Ask
Blank	Not applicable. Not an unsolicited quote.

7.0 Quotation Message Processing Guidelines

The BBDS message formats are outlined in Section 5 of this document. The business rules for BBDS are as follows:

7.1 Hours of Operation

The hours of operation for the OTCBB are 07:30 to 18:30. In order to handle pre-opening and post-closing processing, the BBDS operational hours will be slightly longer. Please refer to Appendix B for the current BBDS Schedule of Transmissions.

7.2 Scope of Data

The OTCBB is not a listed securities market. For a security to be quoted on the OTCBB, however, the following preconditions must be met:

- The issuer must meet the OTCBB eligibility standards outlined in FINRA Rules; and
- A Market Maker must complete and submit a Form 211 to the FINRA.

As noted above, BBDS provides the market participant and inside quotations for OTCBB securities. The OTCBB Symbol and Market Participant Directories are available for download from the OTCBB web site at www.otcbb.com/static/symbol.stm and on the NASDAQ OMX Trader.com website at http://www.nasdaqtrader.com/Trader.aspx?id=symbollookup.

NASDAQ OMX handles security additions, deletions, and modifications as part of its normal overnight processing. BBDS subscribers should process the OTCBB Daily List from the OTCBB web site to ensure that they have the most up-to-date Issue Symbol Directory information. To access the Daily List, please refer to www.otcbb.com/dailylist.

7.3 Quotation Processing

7.3.1 Opening Process

The OTCBB service is available for market participant quotation updates from 07:30 to 18:30. Under the rules, however, quotations should only be considered to be firm from 09:30 to 16:00.

At approx. 07:30, NASDAQ OMX will disseminate the opening spin of trading action messages that notify subscribers of halted securities that are carried over from prior days. Additionally at approximately 07:30, NASDAQ OMX will generate a batch file transmission with the current OTCBB Market Participant and Inside Quotation positions for all issues for BBDS recipients. For this opening spin transmission, NASDAQ OMX will use the standard OTCBB Market Participant Quotation and Inside Appendage message format as outlined in section 5.1 of this document.

7.3.2 Intra-Day Quote Processing

The U.S. market session runs from 09:30 to 16:00. However, BBDS will disseminate real-time quotation updates from 07:30 to 18:35 to include the pre- and post- market hours.

7.3.3 Types of OTCBB Quotations

NASDAQ OMX allows market participants to enter real-time quotation updates for domestic, foreign, and American Depositary Receipt (ADR) securities on the OTCBB. Firms may enter priced bid and/or offer quotations, unpriced indications of interest, or unsolicited bid or offer quotations representing customer interest.

If entering an indication of interest, a Market Maker may use the Offer Wanted/Bid Wanted Indicator field within the OTCBB Market Participant Quote Update (Category Q – Type 1) message format to denote whether it is looking to buy or sell a security. If entering customer interest, a Market Maker will use the Unsolicited Indicator field within the same message format. NASDAQ OMX recommends that market data distributors include these two indicators on their quotation displays. The Offer Wanted/Bid Wanted is typically shown in place of the price field. The Unsolicited Indicator is typically shown next to the market participant's quote on the display.

OTCBB allows firms to enter indicative quotations for direct participation program (DPP) securities. Under the FINRA rules, a priced bid and/or offer entered into the OTCBB service for a DPP security shall be non-firm. Moreover, a Market Maker is only permitted to update quotation entries for this class of securities twice daily (i.e., once between 08:30 and 09:30, and once between 12:00 and 12:30). **Due to this restriction, NASDAQ OMX strongly recommends that market data redistributors show an indicator next to market participant quotes in DPP securities to denote the non-firm nature of the quotation price.** NASDAQ OMX uses the OTCBB Type field within the OTCBB Market Participant Quote message to differentiate DPPs from other security types.

To view the full OTCBB marketplace rules, please refer to www.otcbb.com/aboutOTCBB/rulesindex.stm.

7.3.4 Minimum Quote Size

In accordance with the FINRA Rule 6433, FINRA members are required to maintain a minimum display size for priced quotations in OTCBB securities. The minimum quote size is based on the current price of the security. Depending on the price level for the bid or offer, a different minimum size can apply to each size of the market being quoted by the member firm for a given security.

The Quotation Tier Structure (in effect for a minimum of one year beginning November 12, 2012)

Bid or Offer Price	Minimum Quote Size
$0.0001–0.0999	10,000 shares
0.10-0.1999	5,000 shares
0.20–0.5099	2,500 shares
0.51–0.9999	1,000 shares
1.00–174.99	100 shares
175.00+	1 share

Please note that NASDAQ OMX disseminates the quote size in round lots on BBDS. For OTCBB securities, NASDAQ OMX will denote the quotation size based on a round lot of 100 shares for OTCBB securities priced less than $175.00 and based on a a round lot of 1 share for securities priced equal to or more than $175.00.

7.3.5 Closing Process

At the current time, NASDAQ OMX does not support a closing spin for OTCBB issues on BBDS. If a firm wishes to capture the 16:00 close, it must take their own snap shot of the Inside Quotation position for OTCBB issues upon the receipt of the US Market Session Close control message.

7.3.6 OTCBB Inside Quotations

OTCBB will calculate and disseminate its Inside as an appendage to the quoting participant quote message. The OTCBB Inside should reflect the largest market participant interest at the highest bid price and the lowest ask price available in the OTCBB system for the specific security. The OTCBB will calculate an Inside Quotation for a security if the following criteria are met:

- There are at least two active market participants that each display a priced bid quotation and a priced ask quotation.
- The issuer is active in the OTCBB system and not subject to any trading actions.

As outlined in section 5.1 of this document, the Inside Quotation is disseminated as an appendage to the OTCBB Market Participant Quote Update (Category Q – Type 1) message format. The OTCBB Appendage Indicator will be used to notify data feed subscribers how to update their quote display. The field values are as follows:

Code	Value
1	No change to Inside Quote. No Inside appendage attached. Firms should continue to display existing Inside Quote for issue.
2	No Inside exists. No Inside appendage attached. Firms should show Inside Quote fields as blank.
3	Inside Quote Appendage is attached. Firms should update Inside fields to reflect new values contained in appendage.

8.0 Administrative Message Processing Guidelines

BBDS will use administrative messages to communicate intra-day trading halt information for individual issues. In addition, BBDS will support a free-form text message for those items that do not lend themselves easily to a fixed format message format.

8.1 General Administrative Messages

The General Administrative Message (Category A – Type A) is a free form text message used to notify BBDS subscribers of special situations or trading conditions. The length of the Administrative Message is variable but cannot exceed a maximum of 300 characters.

Since the General Administrative Message is a flexible format message, it is up to the individual data feed subscriber to decide how to process these messages. Firms may wish to code their systems to generate a systems alert for data operations as manual processing of the General Administrative message may be required.

8.2 Trading Action Messages

Under Rule 6660 and IM-6660-1, FINRA has the authority to initiate trading and quotation halts in OTCBB and Other-OTC securities.

When FINRA institutes or lifts a trading halt, it will notify vendors via the Trading Action (Category A – Type H) message on BBDS. FINRA may also use the Trading Action message for OTCBB securities if a security is held from dissemination due to operational reasons.

The Trading Action contains the following fields:

Stock Symbol 11	Action 1	Action Date/Time 7	Reason Code 6

As defined in Section 7 of this document, there are three types of trading actions:

Code	Value
H	Trading Halt
Q	Quotation Resumption
T	Trading Resumption

When a trading halt is instituted, BBDS will send a Trading Action message with an Action field value of "H". Upon receipt of the Trading Action - Halt message, market data distributors should show a halt indicator on all real-time quotation and trade data displays

for the affected issue symbol. If the halted issue is quoted via the OTCBB system[1], the Trading Action message will be followed by a series of zero quotations for all Market Participants registered in the issue. Within the quotation messages, NASDAQ OMX will denote that the Inside Market should also be zeroed out. Since FINRA does not control the quotation media for non-OTCBB issues, it will fall to the market data redistributor to clear quotation displays as needed.

Within the Trading Action message, FINRA will denote the reason for the trading action message. As of April 2007, the allowable Reason Code values are:

Reason Code	Description
T1	Halt - News Pending
T2	Halt - News Dissemination
T3	Halt - News and Resumption Times
T12	Halt - Additional Information Requested by FINRA
H10	Halt - SEC Trading Suspension
H11	Halt - Regulatory Concern
H12	Halt - SEC Revocation
U1	Halt – Foreign Market/Regulatory
U2	Halt – Component/Derivative of Exchange-Listed Security
U3	Halt – Extraordinary Events
O1	Operations Halt, Contact Market Operations
D	Security Deletion from OTCBB
R4	Qualifications Issues Reviewed/Resolved; Quotations/Trading to Resume
R9	Qualifications Halt Concluded, Filings Met; Quotations/Trading To Resume
C11	Trade Halt Concluded By Other Regulatory Auth.; Quotes/Trades To Resume
Space	Reason Code not available

Please note that FINRA may send multiple trading halt messages for a security if the Reason Code changes. BBDS will generate a new Trading Action message whenever one of the attributes (Action, Reason Code) within the system changes. The Action Date/Time field within the Trading Action message would reflect the time of the most recent attribute change. The length of a trading halt will vary from security to security. If a trading halt spans multiple days, BBDS will disseminate a Trading Action message at the start of the business day. Trading Action messages disseminated at the start of the business day may have space-filled Action Date/Time and Reason Code fields.

When an issue is ready to resume trading, BBDS will send a new Trading Action message. At its discretion, FINRA Market Watch may offer a positioning (quote only) window for OTCBB market participants before trading resumes in an issue. At the start of the positioning window, OTCBB will send a Trading Action message with an Action value of "Q". During this positioning period, OTCBB members may enter quotations for the issue. During the positioning window, BBDS will disseminate quote updates on a real-time basis for OTCBB issues, but FINRA members will not be allowed to trade by rule. As market

[1] FINRA will denote if the Stock Symbol is quote on the OTCBB system or other OTC venue via the Market Center Originator ID field in the BBDS message header.

participants update their quotes, an inside may be disseminated; however it will contain an Inside Quote Condition of "C" for Closed.

Once an issue can begin trading, BBDS will send another Trading Action message with an Action value of "T" to indicate that trading is now allowed in the issue. Upon receipt of this message, market data distributors should remove any "halt" or "held" status indicator from real-time data displays for the issue. Once the "T" action is disseminated, FINRA members may resume normal trading in the issue.

Once full trading has resumed in an OTCBB issue, NASDAQ OMX will resume its calculation and dissemination of an Inside Quote for BBDS recipients if at all possible. If there is no OTCBB market participant quote update, NASDAQ OMX will send a quotation message with the MPID of "NASD" with OTCBB Appendage Indicator of "3" and the related OTCBB Appendage with an Inside Quote Condition of "O".

In addition to the Trading Action message on BBDS, FINRA also posts trading halt information for OTCBB and Other-OTC securities on the website at www.otcbb.com/marketwatch.

8.3 SEC Trading Suspensions

Under federal securities law, the SEC can suspend trading in any stock for up to ten business days.

When a SEC trading suspension is removed, however, the resumption process is different than described above. In its order, the SEC will state the date and time that the trading suspension is lifted. SEC trading suspensions typically end at 23:59. If the security is still eligible, FINRA will allow market participants to enter both quotation and trades when the OTCBB opens for business the day after the suspension is removed.

For more information on the SEC process as well as a current list of suspended securities, please refer to the SEC web site at http://www.sec.gov/litigation/suspensions.shtml.

9.0 Control Message Processing Guidelines

9.1 Overview

A Control message is a fixed format message that performs a specific system function. All Control Messages consist of a standard Message Header only. As outlined in Section 4, the Message Header is comprised of the following fields:

Message Category	Message Type	Session Identifier	Retransmission Requester	Message Sequence Number
1	1	1	2	8

Market Center Originator ID	Date/Time	Reserved
1	7	1

Control messages are used to notify BBDS subscribers of certain system events. NASDAQ OMX supports the following control messages on the BBDS data feed:

Category	Type	Usage
C	I	Start of Day
C	J	End of Day
C	O	Market Session Open
C	C	Market Session Close
C	A	Emergency Market Halt
C	B	Emergency Market Resume
C	K	End of Retransmission Requests
C	Z	End of Transmissions
C	M	Start of Test Cycle
C	N	End of Test Cycle
C	T	Line Integrity
C	L	Sequence Number Reset

The following Control messages will be session-specific: Market Session Open, Market Session Close, Emergency Market Halt, and Emergency Market Resume. All other control messages will be session independent. For a schedule of transmissions, please refer to Appendix B.

9.2 Control Message Description

9.2.1 Start Of Day

Category C – Type I

The Start of Day control message signifies the beginning of each operational cycle for OTCBB Processing. Each day, the Start of Day control message will be sent to inform BBDS subscribers that all subsequent data transmitted will be real-time updates and should be treated accordingly. The message will be sent three times, at one-minute intervals, with the same Message Sequence Number (00000000) on each message.

9.2.2 End Of Day

Category C – Type J

The End of Day control message signals the end of active message dissemination for the BBDS operational cycle. The End of Day message will be sent three times, at one minute intervals, and will contain a Message Sequence Number of one greater than the highest Message Sequence Number previously transmitted. The Message Sequence Number will not be incremented when the message is sent three times in the normal message transmission sequence.

9.2.3 Market Session Open

Category C – Type O

The Market Session Open Control Message signifies the opening of OTCBB for the session indicated in the Message Header. Upon receipt of this message, vendors will open the appropriate market center security records in their files. The Message Sequence Number Field for the Session Open will contain a number one greater than the highest Message Sequence Number previously transmitted.

Please note that the OTCBB uses the same event control as the NASDAQ OMX market for the Market Session Open. As a result, the Market Center Originator ID value for this message will be "Q".

9.2.4 Market Session Close

Category C – Type C

The Session Close Control Message signals the closing of the Market for the session indicated in the Message Header. Upon receipt of this message, vendors should close the appropriate market center security records in their files. The Message Sequence Number Field for the Market Session Close will contain a number one greater than the highest Message Sequence Number previously transmitted.

Please note that the OTCBB uses the same event control as the NASDAQ OMX market for the Market Session Close. As a result, the Market Center Originator ID value for this message will be "Q".

9.2.5 Emergency Market Condition Halt

Category C – Type A

The Emergency Market Condition Message indicates that an emergency market condition exists and that all quotations should be considered closed. This message will be sent by the primary market center if there is a severe intra-day downturn in the market. The Message Sequence Number field for the Emergency Market Trading Halt control message will contain a number one greater than the highest Message Sequence Number previously transmitted in the last message. Upon receipt of this control message, market data vendors are asked to show an emergency market condition indicator on quotation displays for all OTCBB issues.

Please note that the OTCBB uses the same event control as the NASDAQ OMX market for the Emergency Market Condition Halt. As a result, the Market Center Originator ID value for this message will be "Q". For information on current market circuit breakers, please refer to the "Trading Halt" section of the NASDAQ OMX Trader web site at http://www.NASDAQOMXtrader.com/trader/help/circuitbreaker.stm.

9.2.6 Emergency Market Condition Resume

Category C – Type B

This message is sent by the primary market center to indicate that the emergency market condition has ended. The Message Sequence Number field for the Emergency Market Trading Halt control message will contain a number one greater than the highest Message Sequence Number previously transmitted in the last message. Upon receipt of the Emergency Market Conditions Resume, market data vendors should remove the emergency market indicator from any quotation displays.

Please note that the OTCBB uses the same event control as the NASDAQ OMX market for the Emergency Market Condition Resume. As a result, the Market Center Originator ID value for this message will be "Q. For information on current market circuit breaker thresholds, please refer to the "Trading Halt" section of the NASDAQ OMX Trader web site at http://www.NASDAQtrader.com/trader/help/circuitbreaker.stm .

9.2.7 End Of Retransmission Requests

Category C – Type K

This message signals that NASDAQ OMX may not honor any additional retransmission requests; however, it will continue to process any messages in queue. The End of Retransmission Requests message will be sent three times, at one-minute intervals. The first End of Retransmission Requests control message will contain a Message Sequence Number of one greater than the highest Message Sequence Number previously transmitted. The Message Sequence Number in the subsequent two control messages will not be incremented.

9.2.8 End Of Transmissions

Category C – Type Z

The End of Transmissions Message signals that there will be no further transmissions of data sent through the BBDS line. This message will be transmitted at the end of the day, and will be the last message of the day. The End of Transmissions message will be sent three times, at one-minute intervals. The first End of Transmissions will contain a Message Sequence Number of one greater than the highest Message Sequence Number previously transmitted. The Message Sequence Numbers in the subsequent two control messages will not be incremented.

9.2.9 Start Of Test Cycle

Category C – Type M

The Start of Test Cycle Control Message is transmitted following activation of the BBDS line. It is the first message in the sequence of defined test messages sent prior to the Start of Day Control Message. The Message Sequence Number of the Start of Test Cycle Message always has a message sequence number of 00000000, with each subsequent message in the cycle incrementing the message sequence number by one. Please refer to Appendix D to obtain the actual messages contained in the test cycle.

9.2.10 End Of Test Cycle

Category C – Type N

The End of Test Cycle Control Message is the last message in the sequence of test messages transmitted prior to the Start of Day Control Message. It always has a message sequence number of one greater than the previous test message.

9.2.11 Line Integrity

Category C – Type T

The Line Integrity Control Message will be transmitted at approximately one-minute intervals to verify the operational integrity of BBDS message transmission, and will be intermixed with other messages. The Message Sequence Number will not be incremented for the Line Integrity Message. The Message Sequence Number will be equal to the message sequence number of the last message sent. Line Integrity Messages will not be retransmitted.

9.2.12 Sequence Number Reset

Category C – Type L

The Sequence Number Reset Message forces the resetting of the Sequence Number. The Sequence Number will either be reset to zero or will be set ahead to a number greater than the last number previously transmitted. Please note that, if the Sequence Number Reset message is sent, NASDAQ OMX will not be able to process retransmission requests for messages sent prior to the Sequence Number Reset control message.

10.0 Format Release & Testing Guidelines

10.1 Release Notification

To keep pace with the changing business environment, FINRA and NASDAQ OMX may modify the data feed format specifications for BBDS. In advance of each release, FINRA and NASDAQ OMX will notify its direct connect customers of the BBDS format change via a data News or Data Technical News item on the NASDAQ OMX Trader website. In the notice, NASDAQ OMX will outline the scope of the changes as well as the testing and release schedule. Direct connect customers are required to modify and test their code based on NASDAQ OMX notices.

10.2 Types of Testing

In advance of each release, NASDAQ OMX will offer test data for direct data feed customers to be used for quality assurance (QA) purposes. Depending on the scope of the changes, the testing period will range from one day to one month. For its data feed customers, NASDAQ OMX offers the following types of testing opportunities:

Evening test transmissions: For its evening testing opportunities, NASDAQ OMX will create sample messages in the new formats to be broadcast on select weeknights from 20:30 to 22:30. To generate the sample data, NASDAQ OMX uses a test script to exercise the full range of values for the affected message formats. The test script used to generate the nightly data transmission will be available to direct data feed subscribers upon request.

Saturday production tests: In advance of major releases, NASDAQ OMX will conduct user acceptance tests (UATs) on select Saturdays for its OTCBB participants. As quoting participants enter information into its production systems, NASDAQ OMX will broadcast this test data in the new data formats to direct data feed subscribers only. Prior to each UAT, NASDAQ OMX will post a Data Technical News item with the registration information.

10.3 Identification of test data

During normal operational hours, NASDAQ OMX will identify test data in one of the following two ways:

Test Retransmission Requester: In Section 4.4 of this document, NASDAQ OMX provides for a test retransmission requester for its data feed message header. NASDAQ OMX populates this field for the test cycle messages only. Please refer to Appendix D of this document for the static content in the test cycle transmission.

Test Symbols: NASDAQ OMX may send out intra-day test data using special issue symbols via BBDS. NASDAQ OMX will communicate test issues via the Symbol Directory download file on the OTCBB website at http://www.OTCBBchange.com.

During non-market hours, NASDAQ OMX will broadcast unmarked test data. Customers should take necessary precautions to protect their systems against

database corruption during evenings, weekends, and market holidays. Please refer to the Appendix B of this document for the current transmission schedule.

Appendix A –Glossary of Terms

Ask: The price at which someone who owns a security offers to sell it; also known as the asked or offer price.

Bid: The price a prospective buyer is prepared to pay at a particular time for trading a unit of a given security.

Bulletin Board Dissemination Service (BBDS): The data feed that carries the top-of-file position for each OTCBB Quoting Participant as well as the OTCBB Inside Bid and Offer (BBO).

Electronic Communication Network (ECN): ECNs provide electronic facilities that investors can use to trade directly with each other. As FINRA market participants, ECNs display either one-sided or two-sided quotes that reflect actual orders. Unlike Market Makers, ECNs operate simply as order-matching mechanisms and do not maintain inventories of their own.

Locked/Crossed: A specific price "state" that a security is in. When a security is locked it means that the Bid and the Ask prices are equal. When a security is crossed it means that the Bid price is higher than the Ask price.

Market Maker: Also known as dealers, Market Makers are unique in that they commit their own capital to OTCBB securities — then turn around and re-distribute the stock as needed. By being willing to buy or sell stock using their own funds, market makers provide liquidity to the market.

OTC Bulletin Board (OTCBB): OTCBB is a regulated quotation service that displays real-time quotes, last-sale prices, and volume information in over-the-counter (OTC) equity securities.

OTCBB Inside: The highest bid price and lowest ask price with the largest individual market participant sizes associated with those prices. The OTCBB Inside also includes a condition field to denote the state of the quote (e.g., open or closed) and is disseminated as an appendage to the OTCBB Market Participant Quote Update messages. The OTCBB Inside is synonymous with Best Bid and Offer (BBO).

Quoting Participant or Market Participant: A OTCBB Market Maker or Electronic Communication Network (ECN) with rights to publicly quote OTCBB securities. Please note that the top-of-file from OTCBB Limit Order Book Facility will also appear as a quoting participant on BBDS.

Trade Data Dissemination Service (TDDS) – The data feed that disseminates OTCBB and equities traded over-the-counter.

Appendix B – Transmission Schedule

Note: All times referenced regarding BBDS are approximate and are stated in US Eastern Time. This schedule is based on a normal day.

Time	Transmission	Message Category	Message Type	Session ID	Market Center Originator ID
04:15 to 04:29	**Start of Test Cycle Messages** **Test Messages** **End of Test Cycle Message** (Disseminated once per 1 minute)	C Various C	M Various N	A A A	E E E
04:30	**Start of Day Message**	C	I	A	E
04:31	**Start of Day Message**	C	I	A	E
04:32	**Start of Day Message**	C	I	A	E
	Line Integrity Messages (Disseminated at 1 minute intervals throughout the operational day)	C	T	A	E
	General Administrative Messages **Message Sequence Number Reset** (Messages will be generated as-needed)	A C	A L	A A	E E
07:30	**Trading Action Spin** (Pre-opening spin at 07:30 of Issues in a held state)	A	H	U	U, u
07:30 to 18:35	**OTCBB Market Maker and Inside Quote Messages** (Pre-Opening spin at 07:30; Live updates from 07:30 to 18:30)	Q	1	U	U
07:30 to 18:35	**Trading Action or** **Emergency Market Halt/Resume Messages** (Disseminated on as-needed basis; Trading Action messages affect a single issue; Emergency Market Halt/Resume messages affect all issues)	A C	H A, B	U U	U, u Q
09:30	**Market Session Open Message**	C	O	U	Q
16:00	**Market Session Close Message** (Time is approximate)	C	C	U	Q
18:35	**End of Day Message**	C	J	A	E
18:36	**End of Day Message**	C	J	A	E
18:37	**End of Day Message**	C	J	A	E
18:50	**End of Retransmission Requests Message**	C	K	A	E
18:51	**End of Retransmission Requests Message**	C	K	A	E
18:52	**End of Retransmission Requests Message**	C	K	A	E

Time	Transmission	Message Category	Message Type	Session ID	Market Center Originator ID
19:05	**End of Transmissions Message** (Time is approximate - Delayed when retransmissions still active)	C	Z	A	E
19:06	**End of Transmissions Message**	C	Z	A	E
19:07	**End of Transmissions Message**	C	Z	A	E

Appendix C – ASCII Translation Table for Date/Time Fields

The following translation table is used to represent the Date and Time Stamp fields located in the Message Header and Trading Action message format.

TIME	ASCII	HEXADECIMAL	DECIMAL
0	0	30	48
1	1	31	49
2	2	32	50
3	3	33	51
4	4	34	52
5	5	35	53
6	6	36	54
7	7	37	55
8	8	38	56
9	9	39	57
10	:	3A	58
11	;	3B	59
12	<	3C	60
13	=	3D	61
14	>	3E	62
15	?	3F	63
16	@	40	64
17	A	41	65
18	B	42	66

DATE/TIME TRANSLATION TABLE

TIME	ASCII	HEXADECIMAL	DECIMAL
19	C	43	67
20	D	44	68
21	E	45	69
22	F	46	70
23	G	47	71
24	H	48	72
25	I	49	73
26	J	4A	74
27	K	4B	75
28	L	4C	76
29	M	4D	77
30	N	4E	78
31	O	4F	79
32	P	50	80
33	Q	51	81
34	R	52	82
35	S	53	83
36	T	54	84
37	U	55	85
38	V	56	86
39	W	57	87

DATE/TIME TRANSLATION TABLE

TIME	ASCII	HEXADECIMAL	DECIMAL
40	X	58	88
41	Y	59	89
42	Z	5A	90
43	[	5B	91
44	\	5C	92
45	]	5D	93
46	^	5E	94
47	_	5F	95
48	`	60	96
49	A	61	97
50	B	62	98
51	C	63	99
52	D	64	100
53	E	65	101
54	F	66	102
55	G	67	103
56	H	68	104
57	I	69	105
58	J	6A	106
59	K	6B	107

Appendix D – BBDS Test Cycle Messages

The following messages will be disseminated between the Start of Test and End of Test control messages on the BBDS data channel on the MFX.

Note: In the test messages below, an asterisk "*" is used to denote a space.

1. Message Header:

A	A	A	T*	00000001	E	Actual Time	*

General Administrative Message Label:

ABCDEFGHIJKLMNOPQRSATUVWXYZ1234567890$0987654321$

2. ***Message Header:***

Q	1	U	T*	00000002	U	Actual Time	*

OTCBB Market Participant Quote (without Inside Appendage) Label:

TESTO******	K	ABCD	Z	A	O
*	N	*	D	000000011225	0000500
D	000000012725	0000250	USD	1	

3. ***Message Header:***

Q	1	U	T*	00000003	U	Actual Time	*

OTCBB Market Participant Quote (with Inside Appendage) Label:

TESTO******	K	WXYZ	#	A	O
*	N	*	C	000000001125	0000250
B	000000000000	0000000	USD	3	

Inside Appendage:

O	C	000000001125	0000250	D	000000012725	0000250

4. Message Header:

Q	1	U	T*	00000004	U	Actual Time	*

OTCBB Market Participant Quote (with No Inside Appendage):

OTEST******	L	ABCD	Z	A	O
*	B	*	B	000000000000	0000000
B	000000000000	0000000	USD	2	

5. Message Header:

Q	1	U	T*	00000005	U	Actual Time	*

OTCBB Market Participant Quote (with Inside Appendage):

TESTO******	K	RSTU	Z	A	O
*	N	B	D	000000012725	0000100
B	000000000000	00000000	USD	3	

Inside Appendage:

O	D	000000012725	0000100	D	000000012725
0000250					

Appendix E – Data Quality Contacts

To assist you with your data quality questions, NASDAQ OMX has prepared the following list of OTCBB data quality contacts:

Data Issue	Department or Contact Name	Telephone Number
Technical Format and General Data Transmission Questions about OTCBB data feeds	NASDAQ OMX Global Data Products Or FINRA Product Management	301.978.5307 866.899.2107
OTCBB symbol management	FINRA Operations	866.776.0800; option 2
OTCBB corporate actions, dividend, and IPO price information	FINRA Operations	866.776.0800; option 1
Price Verification for OTCBB quotation and trade transactions as well as Trading Action information	FINRA Operations	866.776.0800

Appendix F – Version Control Information

Version	Date	Description of Documentation Change(s)
2004-1	5/24/2004	• Initial release of documentation on BBDS.
2004-1a	7/27/2004	• Updated the allowable values in the OTCBB Type field to reflect "L" for Limited Partnerships. • Modified the definition for the "I" OTCBB Type field. • Updated the Unsolicited Indicator field in section 7 to reflect that "A" and "B" are reserved for future use.
2004-1b	12/15/2004	• Updated document to reflect new extranet connectivity options.
2006-1	10/16/2006	• Modified section 1 to reflect the ownership transfer to the NASD. • Updated BBDS bandwidth allocation to 75 Kilobits (Kb) per multicast channel in section 2.
2007-1	3/22/2007	• Added Section 1.4 – Upcoming Data Feed Enhancement • Updated Section 2.1 – Bandwidth Allocations to reflect the March 26th planned upgrade • Updated Section 3.6 – Market Center Originator ID to reflect new "u" code • Updated Section 8.2 – Trading Action Processing to accommodate expanded FINRA authority • Updated OTCBB rules URL link. Please note that FINRA renumbered some of its OTCBB marketplace rules in 2006.
2008-1	7/31/2008	• Changed email address for NASDAQ OMX departments to "NASDAQ OMXomx.com". • Updated telephone numbers for NASDAQ OMX departments located in Connecticut.
2008-2	10/29/2008	• Updated bandwidth allocation to 400 Kb for January 26, 2009 release.
2012-1	10/5/2012	• Updated Section 2.2.2 – Feed IP Addresses and Port assignments are listed separately on NASDAQ OMX Trader.com and no longer included in the data feed specification. • Updated Section 7.3.4 – Minimum Quote Sizes will be amended as of November 5, 2012. Tables in this section depict current structure and new structure to be employed beginning November 5, 2012.

		• Updated Appendix E – FINRA contacts now listed for specific process questions. • Entire document – Replaced NASDAQ with NASDAQ OMX.
2012-1a	11/12/2012	• Updated effective date for new minimum quote sizes to November 12, 2012.