NASDAQ OMX

Global Index Data Service℠

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1.0 Introduction

1.1 Background Information

Operated by NASDAQ OMX Information, LLC, the NASDAQ OMX Global Index Data Service (GIDS) is a premier data feed that consolidates all NASDAQ OMX indexes and ETF valuation data for the following NASDAQ OMX markets into a single outbound data stream:

- NASDAQ
- NASDAQ OMX PHLX
- NASDAQ OMX Nordic Exchange
- NASDAQ OMX Baltic Exchange

GIDS provides direct data recipients the opportunity to reduce network, administrative and data center costs by taking one data feed, rather than many. It provides greater dissemination frequency for select indexes, allowing for better trading performance and portfolio valuations. GIDS also standardizes the message formats for index and ETF values to facilitate the processing of cross-market data.

Benefits of GIDS include:

- Supports real-time tick for NASDAQ OMX global-listed index and derivative products, including internalized trades reported to OMX exchanges.
- Enables investors and traders to gauge the market's performance and make buy and sell decisions.
- Encourages widespread distribution of NASDAQ OMX real-time index data to the public via the Internet and other electronic media throughout the world.
- Enables investors and traders to identify and value those securities within a NASDAQ OMX index and to easily track portfolio investments based on NASDAQ OMX indexes.
- Develops portfolio screens and other trading tools for NASDAQ OMX index traders and ETF investors.

Consolidated Data Messages

For Indexes:

- Intraday net asset values
- Settlement values
- Currency Spot values for select instruments
- Daily security weightings and components data
- End-of-day Summary data

For ETFs:

- Intraday portfolio values (IPVs)
- Daily valuation information
    - Net Asset Value per Share
    - Estimated Cash per Share
    - Estimated Cash per Creation Unit
    - Total Cash per Creation Unit
    - Total Shares Outstanding
- ETF Directory message designed to provide the symbols of the ETF valuations

1.2 Future Data Feed Changes

Within version 2009-2.0 of this specification document, NASDAQ OMX made modifications to specification document resulting from feedback from the direct data recipients comments.

Additionally, NASDAQ OMX updated the processing guidelines related to the End of Day summary to reflect the timing of these messages. The messages will be distributed at two intervals. The first at approximately 12:30 PM Eastern Time (ET) for those indexes that are comprised exclusively of foreign component issues and have completed their trade activity for the current day. The second group will be disseminated when the US component issues have completed their trading activity for the day at approximately 5:30 PM ET.

1.3 Connectivity Options

NASDAQ OMX offers a variety of connectivity options for market participant firms and direct data feed subscribers. Please refer to the NASDAQ Connectivity Providers list on the NASDAQ Trader website for more information on how to access NASDAQ OMX products at the U.S. data centers.

1.4 Data Entitlement

NASDAQ OMX Information, LLC Subsidiary offers separate monthly distributor and subscriber fees for access to real-time index data. For additional information on data entitlement levels and fees, please refer to the Pricing List – Data on the NASDAQ Trader website.

Note: Distributors receiving the NASDAQ OMX data feeds are required to submit documentation to NASDAQ OMX indicating how the Information is utilized. Each system utilizing a data feed must be approved by NASDAQ OMX Global Data Products prior to implementation. Any use of the Information in a system that is not approved by NASDAQ OMX will be considered unauthorized. **NASDAQ OMX reserves the right to terminate a firm's data feed access if it is found to have unauthorized systems.** For information on how to obtain approval for any system utilizing a NASDAQ OMX data feed, please refer to the Data Agreements page on the NASDAQ Trader website.

1.5 Document Scope

This data feed interface specifications document defines the communications interface and message format requirements for the direct connect subscribers to this data feed product. All time references in this data feed interface specification are stated in Eastern Standard/Daylight Time.

This document was created on **September 25, 2009**. Please refer to Appendix E of this document for version control information. NASDAQ OMX reserves the right to add, delete, or modify any of the message formats outlined in this document as needed. All direct data feed subscribers will be required to code their systems to handle data feed format changes as dictated by NASDAQ OMX. In advance of each product change, NASDAQ OMX will post a Vendor Alert on the NASDAQ OMX Trader web site detailing the data feed format change and release schedule. Direct Data feed subscribers may request to receive automatic email notifications by filling out the email subscription form on the of NASDAQ Trader website.

2.0 Transmission Characteristics

2.1 Bandwidth Allocations

As noted below, NASDAQ OMX broadcasts two (a primary and a back-up) multicast groups for its data feeds. NASDAQ OMX disseminates data via one logical channel for each multicast group on the extranets. The current bandwidth allocation for the IP multicast channel is as follows:

Data Feed Channel	Bandwidth Allocation (per multicast group)
Index Feed	1.0 Mb

Please note that NASDAQ OMX reserves the right to modify the bandwidth allocation 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 (8th 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 NASDAQ OMX 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. For the data feed, the IP multicast addresses and port assignments are as follows:

	Primary Groups			Back-Up Groups		
Data Channel	**Class D IP Address**	**$Port_{16}$**	**$Port_{10}$**	**Class D IP Address**	**$Port_{16}$**	**$Port_{10}$**
Global Index Data Service	224.3.0.26	D848	55368	224.3.0.27	D849	55369

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 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	S O H	Message 1 header and text	U S	Message 2 header and text	U S	Message n header and text	E T X
	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. NASDAQ OMX strongly warns customers against coding their systems for a particular IP source address. **NASDAQ OMX will <u>not</u> notify data feed customers in advance when it changes the origin of data.**
- **IP DESTINATION ADDRESS** – 32 bit field contains the Registered Class D address for each IP Multicast Group. Please see 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 table above 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 table above 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 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
T	Line Integrity

Retransmission requests may be made by sending an electronic mail message to RETRANQ@NASDAQOMX.com. 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. Please call to NASDAQ OMX Operations at +1 203 926 3400 should you experience any issues with retransmission requests.

To ensure proper identification of each vendor, a line specific password must be supplied to the operator taking the request. To request a retransmission, the firm must provide the following information to SIP Operations Center:

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

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 3.4 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 at +1 301 978 5307 or via electronic mail at dataproducts@nasdaqomx.com.

3.0 Message Header

Each message will begin with a 24-byte header. The Message Header defines the format of the data message that follows.

3.1 Message Header Format

The Message Header is 24-bytes in length and contains the following data fields:

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

Originator ID	Time	Reserved
1	9	1

The field definitions for the message header are outlined in the remainder of this section. Please note that alphabetic and alphanumeric fields are left justified, space filled and numeric fields are right justified, zero filled, unless otherwise specified.

3.2 Field Definitions (Header Only)

3.2.1 Message Category

The Message Category is comprised of one alphabetic byte. This field, along with the Message Type, identifies the message format to follow. The allowable values are as follows:

Code	Description
A	Administrative Messages
C	System Control Messages
P	Real Time Tick Messages

3.2.2 Message Type

The Message Type is comprised of one alphanumeric byte. This field, along with the Message Category, identifies the message format to follow. The allowable values by category are as follows:

Instrument Messages *(Defined in section 4.1)*:

Message Category Code	Message Type Code	Message Format Description
P	A	Tick Details
P	B	Settlement Value
P	C	Instrument Held
P	D	ETF Daily Valuation

Administrative Messages *(Defined in section 4.2)*:

Message Category Code	Message Type Code	Message Format Description
A	A	General Administrative Message (Free-Form Text)
A	B	Index End of Day Summary Message
A	C	NASDAQ OMX Directory Message
A	D	Symbol Participation Message
A	E	ETF Directory Message

Control Messages *(Defined in section 7 of this document)*:

Message Category Code	Message Type Code	Message Format Description
C	C	Market Session Close
C	I	Start-of-Day Message
C	J	End-of-Day Message
C	K	End of Retransmission Requests
C	L	Message Sequence Number Reset
C	O	Market Session Open
C	T	Line Integrity
C	X	End of Trade Reporting
C	Z	End of Transmission

For information on format documentation changes, please refer to Version Control Appendix.

3.2.3 Session Identifier

The Session Identifier is comprised of one alphabetic byte. This field indicates the market session of the message to follow. The allowable values are as follows:

Code	Description
A	All Market Sessions or Session Independent
E	European Market Session*
U	U.S. Market Session**

Session Footnotes:
** The European Market session runs from 2:00 a.m. to 12:00 p.m., Eastern Time (ET).*
*** The US Market Session runs from 7:30 a.m. to 8:00 p.m., ET.*
Please refer to Appendix-Transmission Schedule for assignment of session values for messaging.

3.2.4 Retransmission Requester

The Retransmission Requester is a 2 byte, Alphanumeric, space-filled 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 recipients.

All data recipients must code their systems to process the following values:

Code	Description
O (space)	An original transmission to all recipients
R (space)	A retransmission to all recipients
Specific Vendor ID	To be assigned on vendor-by-vendor basis.

In addition to these two codes, NASDAQ OMX has also assigned a special two-character retransmission requester to each direct subscriber of the data feed. Customers should code their system to process the two-character code assigned to their firm as well as the three global values outlined above. To obtain your retransmission requester, please contact NASDAQ OMX Global Data Products at 301.978.5307. For more information on the retransmission capability, please refer to section 2.6 of this document.

3.2.5 Message Sequence Number

The Message Sequence Number is comprised of eight, numeric bytes. At the beginning of each operational cycle, this number will be set to 00000000 (for the Start of Day) of each data channel. Throughout the day, the message sequence number for each original transmission will be incremented by one with the exception of the following control messages:

- The Start of Day (Category C – Type I) message is sent three times to ensure receipt. All three messages in this series will contain a message sequence number of zero.
- The Line Integrity (Category C – Type T) message is sent at one-minute intervals. The message sequence number for these control messages will not be incremented. The message sequence number will contain the same value as the prior original transmission message.
- The Sequence Number Reset (Category C – Type L) message will contain the number to which the Message Sequence Number counter is to be reset. This number is either zero or a number greater than the highest number previously transmitted.
- The End of Day (Category C – Type J) message is sent three times to ensure receipt. Only the first message in this sequence will be incremented.
- The End of Retransmission Requests (Category C – Type K) message is sent three times to ensure receipt. Only the first message in this sequence will be incremented.
- The End of Transmissions (Category C – Type Z) message is sent three times to ensure receipt. Only the first message in this sequence will be incremented.
- The End of Trade Reporting (Category C – Type X) message is sent three times to ensure receipt. Only the first message in this sequence will be incremented.

For more information on these control messages, please refer to Processing Guidelines section of this document.

3.2.6 Originator ID

The Originator Identifier (ID) is comprised of one, alphabetic byte. This field indicates the NASDAQ OMX system that originated the message that follows. The allowable values are as follows:

Code	Description
E	Feed Handler
X	NASDAQ OMX PHLX Family
Q	NASDAQ OMX NDAQ Family
Y	NASDAQ OMX Nordic Family
Z	NASDAQ OMX Baltic Family (currently not in use*)
<space>	None provided

* Please Note: At this time NASDAQ OMX is identifying all Nordic and Baltic Family of indexes under the Originator ID value of "Y".

3.2.7 Time

The Time Stamp field is a 9 byte, numeric field stated in U.S. Eastern Time (ET). Since the system only disseminates the current day's data, the data feed header shows a Time only field. The Time Stamp field denotes the military time (to the nearest millisecond) that the record was created by the system. The time format is HHMMSSCCC.

3.2.8 Reserved

This one-byte field will be reserved for future use. Initially, this field will be space filled.

4.0 Data Formats

In this section, NASDAQ OMX illustrates the field layout for each message format. The data definition for each field is outlined in section 6 of this document.

4.1 Detail Messages

The following message formats are used to disseminate intra-day tick values for NASDAQ OMX index, spot and settlement values as well as intra-day portfolio values for NASDAQ-listed exchange traded funds (ETFs) to the public. For processing guidelines, please refer to Section 9.0 of this specification.

4.1.1 Tick Details

The following message format will be sent for an instrument at a specific time interval. The interval is a parameter driven interval set by NASDAQ OMX and can vary. For message processing guidelines, please refer to Section 8.0 of this specification.

Category P – Type A

Type	Instrument Identifier	Tick Value	Net Change Direction
1	18	12	1

4.1.2 Settlement Value

The settlement value message format will be used to notify the market data industry of the official settlement price and settlement session used to settle cash derivatives on financial products when they expire.

Category P - Type B

Settlement Identifier	Settlement Session	Settlement Value	Time of calc
18	1	12	9

Please note: the time of calc will be stated in U.S. Eastern Time (ET)

4.1.3 Instrument Held

The Instrument Held message format will be used to notify the market data industry that a financial product is being held from public distribution.

Category P - Type C

Type	Instrument Identifier
1	18

4.1.4 ETF Daily Valuation

The following message format will be used to relay daily valuation information, such as Estimated Cash Amount Per Creation Unit, Total Cash Amount Per Creation Unit, Net Accrued Dividend, Net Asset Value from Trustee, and Total Shares Outstanding, for NASDAQ-listed ETFs. The National Securities Clearing Corporation (NSCC) supplies the daily valuation data for the prior trading day.

The ETF Daily Valuation message format consists of two parts:

- **Message Label:** This section reflects the issue symbol assigned by NASDAQ for quotation and trading. It also denotes how many ETF values are being relayed in the current message.
- **ETF Valuation Attachment(s):** This section identifies the data type, data identifier, and current value for the given daily valuation element.

NASDAQ sends out the ETF Daily Valuation messages as part of the NIDS pre-opening process at approximately 7:00 a.m., ET. For message processing guidelines, please refer to Section 9.0 of this specification.

Category P - Type D
Message Label:

Type	Trading Symbol	Number of ETF Value Attachments
1	18	1

ETF Valuation Attachment(s):

ETF Valuation Data Type	ETF Value Identifier	Sign +/-	Value for ETF Data Element
1	18	1	18

4.2 Administrative Messages

NASDAQ OMX supports a limited number of administrative messages on the data feed.

4.2.1 General Administrative (Free-Form Text) Message

NASDAQ OMX supports a variable length, free-form text message format to be used on an as-needed basis. 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.

Category A - Type A

Text 1 to 300

VARIABLE NUMBER OF BYTES

4.2.2 Index End of Day Summary Message

The End of Day summary message format will be used to relay the summary activity for all indexes for the current trading day. If there is no activity for the trading day for an index, a summary message will not be sent.

Category A - Type B

Instrument Identifier 18	Open Value 12	High Value 12	Low Value 12	Closing Value 12

Net Change Value 12	Net Change Direction 1	Settlement Identifier 18	Settlement Session 1	Settlement Value 12	Closing Market Value 53

Please note: The Settlement information within this message will **only** be populated for instruments that support a settlement value.

4.2.3 NASDAQ OMX Directory Message

This Directory message is used to relay index identifier, index name, divisor, and market value for every NASDAQ OMX index including subordinate index products such as LEAPs, settlement instruments or total return versions.

Category A - Type C

Instrument Identifier	Instrument Name	Divisor	Number of Active Issues in Index	Currency	Start of Day Market Value	Dissemination Frequency
18	50	53	4	3	53	1

Please Note: In order to assist direct data recipients, all settlement ID's will begin with the "Stlmt ID" followed by the associated instrument they relate to, within the Instrument Name field (Stlmt ID – Australian WCO).

4.2.4 Issue Symbol Participation Message

This Issue Symbol Participation data format is used to relay membership and weighting data for all component securities, irrespective of the listing market, in a NASDAQ OMX product.

Category A - Type D

Market Of Origin	Trading Symbol	Instrument Name	Instrument Identifier	Calculation Method	Index Shares for Instrument
4	18	50	18	1	53

4.2.5 ETF Directory Message

The ETF Directory message is designed to provide the symbols of the ETF valuations. The ETF Directory message shall be disseminated as part of the pre-opening process on the new data feed. The field layout is as follows:

Category A - Type E

Market Of Origin	Currency	Trading Symbol	Instrument Name	Symbol for Intra-Day Portfolio Value
4	3	18	50	18

Symbol for Estimated Cash Amount Per Creation Unit	Symbol for Total Cash Amount Per Creation Unit	Symbol for Estimated Cash Per Share (Net Accrued Dividend)	Symbol for Net Asset Value from Trustee	Symbol for Total Shares Outstanding
18	18	18	18	18

4.3 Control Messages

Control messages consist of a message header only. For processing information, please refer to section 7 of this document.

5.0 Field Occurrence Matrix

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

- AT = Attachment to the ETF daily valuation message.

Field Name	Message Category	Message Type
C		
Calculation Method	A	D
Closing Market Value	A	B
Closing Value	A	B
Currency	A	C
D		
Dissemination Frequency	A	C
Divisor	A	C
E		
ETF Valuation Data Type	P	D (AT)
ETF Value Identifier	P	D (AT)
H		
High Value	A	B
I		
Index Shares for Instrument	A	D
Instrument Identifier	P A	A,C B,C,D
Instrument Name	A	C,D,E
L		
Low Value	A	B
M		
Market Of Origin	A	D
N		
Net Change Direction	P A	A B
Net Change Value	A	B
Number of Active Issues in Index	A	C
Number of ETF Value Attachments	P	D
O		
Open Value	A	B
S		
Settlement Identifier	P A	B B
Settlement Session	P A	B B
Settlement Value	P	B
Sign +/-	P	D (AT)
Start of Day Market Value	A	C
Symbol for Estimated Cash Amount Per Creation Unit	A	E
Symbol for Estimated Cash Per Share (Net Accrued Dividend)	A	E
Symbol for Intra-Day Portfolio Value	A	E

Field Occurrences

Field Name	Message Category	Message Type
Symbol for Net Asset Value from Trustee	A	E
Symbol for Total Cash Amount Per Creation Unit	A	E
Symbol for Total Shares Outstanding	A	E
T		
Text	A	A
Tick Value	P	A
Time of calc	P	B
Trading Symbol	P A	D D,E
Type	P	A,C,D
V		
Value for ETF Data Element	P	D (AT)

6.0 Field Definitions

***Note*: All alphabetic and alphanumeric fields are left justified and space filled unless otherwise stated. All numeric fields are right justified and zero filled unless otherwise stated.**

Calculation Method
Category A – Type D

1 byte, Alphanumeric. Indicates the type of calculation method used for the instrument. Allowable values are as follows:

Code	Value
T	Index Calculation based on TSO (True market value weighted)
D	Index Calculation based on DRM (Modified market value weighted)
E	Index Calculation based on equal weighting
F	Index Calculation based on float weighting
P	Index Calculation based on price weighting
<space>	None provided

Closing Market Value
Category A – Type B

53 bytes, Numeric. This field reflects the closing Market Value at the end of day trade reporting for the instrument identified in the message. This value may be space filled.

Please note: For subordinate indexes such as Total Return versions, LEAP's, settlement values this value may be populated as zero.

Closing Value
Category A – Type B

12 bytes, Numeric (including decimal point). This field reflects the final calculated and disseminated tick value for an instrument during the business day.

Please note: For subordinate indexes such as Total Return versions, LEAP's, settlement values this value may be populated as zero.

Currency
Category A – Type C, Category A – Type E

3 bytes, Alphanumeric. This field defines the currency of an issue in ISO Currency codes. NASDAQ OMX will support the ISO 4217 standard, ISO 4217 is the international standard describing three-letter codes (also known as the currency code) to define the names of currencies established by the International Organization for Standardization (ISO).

Dissemination Frequency
Category A – Type C

1 byte, Alphanumeric. This field denotes the frequency that an instrument will be disseminated on the data feed. Allowable values are as follows:

Code	Value
1	1-second updates
2	15-second updates
3	1-minute updates
4	Once a day updates
<space>	None provided

Divisor
Category A – Type C

53 Bytes. Numeric (including decimal point). The Divisor is a number that is adjusted periodically (due to component changes and corporate actions) to ensure continuity of an index. This value is used in the index calculations. The calculation is as follows:

Index Value = (Aggregate Market Value / Divisor)

Please note: For subordinate indexes such as Total Return versions, LEAP's, settlement values this value may be populated as zero.

ETF Valuation Data Type
Category P – Type D (attachment)

1 byte, Alphanumeric. This field indicates the type of ETF valuation data contained in the current message attachment. The allowable ETF Valuation Types are as follows:

Code	Value
M	Estimated Cash Amount Per Creation Unit
T	Total Cash Amount Per Creation Unit
D	Estimated Cash per Share (Net Accrued Dividend)
N	Net Asset Value from Trustee
S	Total Shares Outstanding

Note: For information on the decimal point placement in the ETF Valuation message, please refer to **"Value of the ETF Data Type"** field in the message attachment.

ETF Value Identifier
Category P Type D (attachment)

18 bytes, Alphanumeric (including special characters). The ETF Value Identifier is a symbol assigned by NASDAQ to reflect the given ETF and valuation type value being represented in the attachment. For more information on ETF Symbology, and a list of the valuation identifiers, please refer to ETF Valuation Identifier document located at:
http://www.nasdaqtrader.com/content/productsservices/dataproducts/realtimeindexes/indexsymbols.pdf

High Value
Category A – Type B

12 bytes, Numeric (including decimal point). This field reflects the highest calculated and disseminated tick value for an instrument during the business day.

Please note: For subordinate indexes such as Total Return versions, LEAP's, settlement values this value may be populated as zero.

Index Shares for Issue
Category A – Type D

53 bytes, Numeric (including decimal point). This field represents the number of shares for an issue within a given index and is based on the specific index's Calculation Method. This value is used to calculate the issue's market value. The market value for each issue is summed to get the Aggregate Market Value used in the index calculation below:

Index Value = (Aggregate Market Value / Divisor)

Instrument Identifier
Category P – Type A, Type C

Category A – Type B, Type C, Type D

18 bytes, Alphanumeric (including special characters). The Instrument Identifier denotes the NASDAQ OMX instrument (index; ETF; spot value; settlement value; etc) associated with the value in the message.

Instrument Name
Category A – Type C, Type D, Type E

50 bytes, Alphanumeric (including special characters). Instrument name as defined by the Market of Origin. Due to dependencies on Market of Origin naming protocols and field size limit, instrument name may be abbreviated.

Low Value
Category A – Type B

12 bytes, Numeric (including decimal point). This field reflects the lowest calculated and disseminated tick value for an instrument during the business day.

Please note: For subordinate indexes such as Total Return versions, LEAP's, settlement values this value may be populated as zero.

Market of Origin
Category A - Type D, Category A – Type E

4 bytes, Alphanumeric. This field indicates the market place on which the issue within the message is primarily listed. NASDAQ OMX will support the ISO 10383 standard, an ISO standard for "Codes for exchanges and market identification" (MIC): it defines codes for stock markets. This standard is updated frequently and the latest published standard is available at the maintenance organization of ISO 10383

Please note: NASDAQ OMX may continue to support the following values for US based exchange ID's in place of the MIC value:

Code	Value
A	Amex
N	NYSE LLC
P	NYSE Arca Group
Q	NASDAQ Listed Market
X	NASDAQ OMX PHLX

Net Change Direction
Category P – Type A; Category A – Type B

1 byte, Alphanumeric (including special characters). This field indicates the direction of net change related to the prior day's closing value for a given instrument. The associated values are as follows:

Code	Value
+	Positive or zero net change or (Net Gain)
-	Negative net change or (Net Loss)
Space	No net change calculated

Net Change Value
Category A – Type B

12 bytes, Numeric (including decimal point). This field reflects the difference between the current tick value and the prior day's closing tick value for a given instrument.

Please note: For subordinate indexes such as Total Return versions, LEAP's, settlement values this value may be populated as zero.

Number of Active Issues in an Index
Category A – Type C

4 bytes, Numeric. Indicates the total number of active issues included in the index calculation at the beginning of trading day.

Please note: For subordinate indexes such as Total Return versions, LEAP's, settlement values this value may be populated as zero.

Number of ETF Value Attachments
Category P – Type D

1 byte, Numeric. This field indicates the number of ETF Value Attachments will follow the message label in the current ETF Daily valuation message. The allowable values are 1 to 5.

Open Value
Category A – Type B

12 bytes, Numeric (including decimal point). This field reflects the first calculated and disseminated tick value for an instrument during the business day.

Please note: For subordinate indexes such as Total Return versions, LEAP's, settlement values this value may be populated as zero.

Settlement Identifier
Category P – Type B; Category A – Type B

18 bytes, Alphanumeric (including special characters). The Settlement Identifier denotes the NASDAQ OMX instrument (index; ETF; spot value; settlement value; etc) associated with the value in the message.

Please Note: In order to assist direct data recipients, all settlement ID's will begin with the "Stlmt ID" followed by the associated instrument they relate to, within the Instrument Name field (Stlmt ID – Australian WCO).

Settlement Session
Category P – Type B; Category A – Type B

1 byte, Alphanumeric (including special characters). This field reflects the settlement session for which a derivative is based on. The allowable values are as follows:

Code	Value
O	Instruments settles at the open
C	Instruments settles at the close
M	Instruments settles mid day
<space>	None provided

Settlement Value
Category P – Type B; Category A – Type B

12 bytes, Numeric (including decimal point). This field reflects the value to be used to settle derivatives when they expire. The method used to calculate and timing of dissemination of the value will vary based on the instrument.

Sign
Category P - Type D (attachment)

1 byte, Alphanumeric. This field reflects if the NSCC value for the ETF Value Identifier is a positive number or a negative number. The allowable values are as follows:

Code	Value
+	Positive or zero ETF value
-	Negative ETF value

Start of Day Market Value
Category A – Type C

53 bytes, Numeric. This field reflects the Instrument Market Value at the start of the day. This value is based on the start of day market value of the underlying components provided by the instrument sponsor.

Please note: For subordinate indexes such as Total Return versions, LEAP's, settlement values this value may be populated as zero.

Symbololgy for ETF Directory Message
Category A – Type E

18 bytes, Alphanumeric (including special characters). NASDAQ will assign a separate identifier for each of the ETF valuation statistics for database and display purposes. The ETF Value Identifier will be **assigned by NASDAQ OMX** to reflect the given ETF and valuation type value being represented in the message.

ETF Valuation Statistics
Intra-day Portfolio Value (IPVs)
Estimated Cash Amount Per Creation Unit
Total Cash Amount Per Creation Unit
Net Accrued Dividend (Estimated Cash per Share)
Net Asset Value (NAV) from Trustee
Total Shares Outstanding (TSO)

Text
Category A – Type A

Variable length up to 300 bytes. Alphanumeric. Free-form text is used to notify data feed subscribers of corporate actions or special trading situations.

Tick Value
Category P – Type A

12 bytes, Numeric (including decimal point). This field reflects the calculated value for a given instrument.

For NASDAQ OMX Indices: The Tick Value represents the current net asset value for a proprietary index or instrument. For ETF's: The Tick Value represents an intra-day portfolio value (IPV) for the ETF.

Time of Calc
Category P – Type B

9 byte, Numeric, This field denotes the military time (to the nearest second) that the settlement value was originally calculated. The time format is HHMMSSCCC.

Trading Symbol
Category P – Type D

Category A – Type D; Category A – Type, E

18 bytes, Alphanumeric (including special characters). This field identifies the trading symbol of an instrument as assigned by the Market of Origin and matches the Symbology used for outbound dissemination on the market of origin native dissemination protocols.

Note: To download the NASDAQ symbol directory, please visit the NASDAQ Trader web site at https://www.nasdaqtrader.com/Trader.aspx?id=symbollookup

NASDAQ publishes a list of security additions, deletions, or changes for NASDAQ-listed issues. For information, please refer to the on the NASDAQ Daily List product description on the NASDAQ OMX Trader website.

Type
Category P – Type A; Category P – Type C; Category P – Type D

1 byte, Alphanumeric. This field indicates what type of instrument (index; ETF; spot value; settlement value; etc) is being reported in the message. The allowable values are as follows:

Code	Value
I	Index Value
E	Exchange Traded Fund (ETF)
S	Settlement Value – **not currently supported**
P	Spot Value – **not currently supported**
L	Subordinated product value – **not currently supported**
<space>	None provided

Value for ETF Data Type
Category P - Type D (attachment)

18 bytes, Numeric (including decimal point). This field reflects the absolute value provided for the given ETF data element as provided by the inbound data source. Please note that the "Sign" field dictates if the actual ETF value is a positive or negative number.

The decimal point placement for the value will vary by the ETF Valuation Type. The price composition will be as follows:

ETF Valuation Type	Value for ETF Data Type	Notes
M	000099999999999.99	The Estimated T-1 Cash Amount Per Creation Unit is reported as 12 whole dollar and 2 decimal digits. (4 leading zeros will be added to complete field length requirement). This value can be zero or negative.
T	000099999999999.99	The Total Cash Amount Per Creation Unit is reported as 11 whole dollar and 2 decimal digits. (5 leading zeros will be added to complete field length requirement). This value can be zero or negative.
D	000099999999999.99	The Estimated Cash per Share (Net Accrued Dividend) is reported as 11 whole dollar and 2 decimal digits. (5 leading zeros will be added to complete field length requirement). This value can be zero or negative.
N	000099999999999.99	The Net Asset Value Per Creation Unit is reported as 11 whole dollar and 2 decimal digits. (5 leading zeros will be added to complete field length requirement). This will always have a positive value.
S	999999999999999999	The Total Shares Outstanding is reported as 18 whole digits. (This value will have no decimal point). This will always have a positive value.

7.0 Control Messages

7.1 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 3, 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

Originator ID	Time	Reserved
1	9	1

Control messages are used to notify subscribers of certain system events. NASDAQ OMX supports the following control messages on the 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	K	End of Retransmission Requests
C	Z	End of Transmissions
C	L	Sequence Number Reset
C	X	End of NASDAQ OMX Trade Reporting

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

7.2 Control Message Description

7.2.1 Start Of Day

Category C - Type I

The Start of Day control message signifies the beginning of each operational cycle for processing. Each day, the Start of Day control message will be sent to inform 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.

7.2.2 End Of Day

Category C - Type J

The End of Day control message signals the end of active message dissemination for the operational cycle. The system shall generate and disseminate the End of Day control message upon receipt of the appropriate inbound control messages from all inbound sources. The End of Day message will be sent three times, at one-minute intervals. The first End of Day control message will contain a Message Sequence Number one greater than the highest Message Sequence Number previously transmitted. The Message Sequence Numbers of the subsequent two control messages, however, will not be incremented.

7.2.3 Market Session Open

Category C - Type O

The Market Session Open Control Message signifies the opening of NASDAQ OMX market systems for the session indicated in the Message Header. The Message Sequence Number Field for the Session Open will contain a number one greater than the highest Message Sequence Number previously transmitted.

7.2.4 Market Session Close

Category C - Type C

The Session Close Control Message signals the closing of NASDAQ OMX market systems for the session indicated in the Message Header. Upon receipt of this message, vendors should close the appropriate 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.

7.2.5 End Of Retransmission Requests

Category C - Type K

This message signals that no further retransmission requests will be honored. 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 one greater than the highest Message Sequence Number previously transmitted. The Message Sequence Numbers of the subsequent two control messages, however, will not be incremented. The Message Sequence Number will not be incremented when the message is sent three times in the normal message transmission sequence. Although NASDAQ OMX operations may no longer accept retransmission requests after this control message is disseminated, it will disseminate retransmissions in queue.

7.2.6 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 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 End of Transmissions control message will contain a Message Sequence Number one greater than the highest Message Sequence Number previously transmitted. The Message Sequence Numbers in the subsequent two control messages, however, will not be incremented.

7.2.7 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 the 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.

7.2.8 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 to a number greater than the last number previously transmitted. Please note that, if the Sequence Number Reset message is sent, the feed handler will not be able to process retransmission requests for messages sent prior to the Sequence Number Reset control message.

7.2.9 End of Trade Reporting

Category C – Type X

The End of Trade Reporting Control Message signals that NASDAQ OMX system is closed for market participant transactions. The End of Trade Reporting message will be sent three times, at one-minute intervals. The End of Trade Reporting control message will contain a Message Sequence Number one greater than the highest Message Sequence Number previously transmitted. The Message Sequence Numbers in the subsequent two control messages, however, will not be incremented.

8.0 Message Processing Guidelines – Instrument Messages

NASDAQ OMX reserves the right to add or delete instruments and market indicators as needed.

8.1 Overview

As outlined in Section 4.1 of this document, NASDAQ OMX supports the following message types:

- Tick Details (Category P – Types A)
- Settlement Value (Category P – Types B)
- Instrument Held (Category P – Types C)
- ETF Daily Valuation (Category P – Type D)

The Tick Details message is used to broadcast the current value for an instrument. NASDAQ OMX will differentiate between instrument types via the Type field. Please refer to section 6 for the supported type values.

The NASDAQ OMX Global Index Data Service will include foreign component securities. In order to reach the global marketplace, NASDAQ OMX intends to provide intraday updates for these instruments based on the real-time trading activity of all component securities. NASDAQ OMX intends to support dissemination timing for the Tick Details messages to begin as early as 2:00 a.m., ET; ending at approximately 8:00 p.m. ET. via the Tick Details message format.

Since it is possible to have varying hours of dissemination times for each instrument, NASDAQ OMX will provide advance notice of any new instruments via Vendor notices and include within this notice the hours and frequency of dissemination for each instrument.

8.2 Extended Trading Hour Indicators

In addition to the NASDAQ OMX indices, NASDAQ OMX currently calculates and disseminates the following two extended trading hours indicators on this data feed: The NASDAQ-100 Pre-Market Indicator (PMI) and the NASDAQ-100 After Hours Indicator (AHI). These indicators are disseminated with the Index Type of "I" via the Details message format. While the PMI and AHI are based on the NASDAQ-100 Index, the calculation and dissemination rules for these indicators differ from NASDAQ indices as outlined below:

Index Name	Symbol	Description
NASDAQ-100 Pre-Market Indicator (PMI)	QMI	The PMI was created as a way for investors and traders to gauge trading activity in the top 100 Nasdaq OMX issues during the pre-market session. The PMI, which is based on the same weighting algorithm as the Nasdaq-100 index, uses filtered ".T" and ".U" trade reports from the NASDAQ market center only, in its calculation. The PMI will be disseminated at one-minute intervals from 08:15 to 09:30.

Index Name	Symbol	Description
NASDAQ-100 After Hours Indicator (AHI)	QIV	Similar to the PMI, the AHI is designed to gauge market activity in the top 100 NASDAQ issues during the post-market trading hours session. The AHI is disseminated at one-minute intervals from 16:15 to 18:32.

If subscribers choose to calculate their own high, low, and net change information values for the PMI and the AHI, The recommendation for firms is to use the following technique for calculating net change:

- **Net Change for PMI:** In place of the previous day close for the NASDAQ-100 Pre-Market Indicator, we recommend that vendor's base their net change calculation on the previous day adjusted close value for the NASDAQ-100 Index, as presented in the equation below.

  Net Change for QMI = [Current Value for QMI] – [Prior Day's Close for NDX]

- **Net Change for AHI:** In place of the previous day close for the NASDAQ-100 After Hours Indicator, we recommend that vendors use the current day NASDAQ-100 Index closing value, as presented in the equation below. It is important to note that the closing value for the NASDAQ-100 Index is not final until 5:15 p.m., Eastern Time (ET), and as a result the closing value may change between 4:15 and 5:15 p.m., ET.

  Net Change for QIV = [Current Value for QIV] – [Current Day's Close for NDX]

8.3 Instrument Held Message

If NASDAQ OMX needs to hold an instrument from public dissemination, it will disseminate an Instrument Held message. **This message will be sent only at the time the dissemination halt is instituted.** NASDAQ OMX will broadcast a new Tick Detail message for the symbol to indicate that the disseminate halt is lifted.

In the event that all instruments are to be held, NASDAQ OMX may disseminate the following universal code in the Instrument Held format for message efficiency:

Instrument Identifier Code	Index Category Held
.ALL	All Instruments Held

8.4 Settlement Value

The Settlement Value is used by the derivative markets to settle cash derivatives when they expire. Settlement values are determined by the instrument sponsor and can vary in their calculation methodologies as well as their settlement timing. NASDAQ OMX will only provide settlement information for instruments that support a settlement identifier. For all other indexes the Index Settlement Value and Index Settlement Flag will be populated with zero within the Index Detail Message.

To assist direct data recipients in determining the settlement id and the index it is tied to, all settlement ID's will begin with "Stlmt ID" followed by the associated instrument they relate to, within the Instrument Name field NASDAQ OMX Directory Message (Category A – Type B).

For example the PHLX Gold/Silver Sector:

ID	Instrument Name
XAG	Stlmt ID - PHLX Gold/Silver Sector

In order to facilitate the ease of identifying settlement values GIDS will provide the values in a separate intraday message (Category P – Type B). The message will provide the data recipient with the information details as to the timing of the derivative settlement (settles at the open, close, mid-day, etc).

Please Note: Settlement Value calculation is based on the timing of when each component security in an Index is officially opened by the listing market and is not the same as the first calculated index value which is disseminated at 09:30:15 a.m. ET. It is possible and likely that the Settlement Value will differ substantially from the first disseminated index value and/or the previous day's closing index value.
For additional information please visit the NASDAQ Trader web site at:
https://www.nasdaqtrader.com/content/home/help/indexmethod/settlementvalue.pdf

8.4.1 Display Guidelines

NASDAQ OMX strongly recommends that firms use the provided settlement values for their index displays (rather than calculating their own values).

Due to the importance of this value in the settlement of cash derivatives it is highly recommended for those vendors that maintain a time and sale display that you include the Settlement Values as they are disseminated. In addition if possible the settlement value should be populated in summary displays as its own unique value (populated as N/A if not received).

9.0 Message Processing Guidelines – Administrative

9.1 Overview

NASDAQ OMX will use administrative messages to communicate the directory and issue symbol participation information to subscribers. In addition, NASDAQ OMX will support a free-form text message for those items that do not lend themselves easily to a fixed format message format. The field layouts for these messages are outlined in Section 4 of this document.

9.2 General Administrative Messages

(Category A – Type A)

The General Administrative Message (Category A – Type A) is a free form text message used to notify subscribers of market events or special trading situations. The length of the Administrative Message is variable but cannot exceed a maximum of 300 characters. NASDAQ OMX may generate the General Administrative Message format on an as-needed basis.

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.

9.3 Index End of Day Summary Messages

(Category A – Type B)

Many investors require the end-of-day price summary information. The Index End of Day Summary Directory Messages is intended to provide the summary activity (opening, high, low, close, settlement and closing market values) for all indexes, if there was no activity during the trading day a summary message will not be sent.

Please note: Upon initial implementation, the Index End of Day Summary messages will be disseminated at two intervals. The first at approximately 12:30 PM Eastern Time (ET) for those indexes that are comprised exclusively of foreign component issues and have completed their trade activity for the current day. The second group will be disseminated when the US component issues have completed their trading activity for the day at approximately 5:30 PM ET.

9.4 NASDAQ OMX Directory Messages

(Category A – Type C)

The NASDAQ OMX directory formats are designed to support a greater range of NASDAQ OMX indexes. This message provides the index identifier, index name, market value, and divisor each NASDAQ OMX index. This message will be disseminated in a morning spin, (approximately 2:00 AM eastern time).

If the Divisor is recalculated due to any underlying value change online for any issues listed under the Index, or for any online Participation changes to the index, the directory message will be retransmitted for only the indices affected.

To assist direct data recipients in determining the settlement id and the index it is tied to, all settlement ID's will begin with "Stlmt ID" followed by the associated instrument they relate to, within the Instrument Name field NASDAQ OMX Directory Message (Category A – Type B).

For example the PHLX Gold/Silver Sector:

ID	Instrument Name
XAG	Stlmt ID - PHLX Gold/Silver Sector

9.5 Issue Symbol Participation Message

(Category A – Types D)

As a complement to the NASDAQ OMX Directory message, NASDAQ OMX disseminates the Issue Symbol Participation message for all component securities in a NASDAQ OMX product.

This message provides the market of origin, trading symbol, instrument name, calculation method and current index shares for instrument.

A morning spin for **all** component issues will be disseminated at approximately 2:00 a.m, ET. The Issue Symbol Participation message may also be sent intra-day in the event of a change to a security's index shares within an index or when the security has been added to or removed from an index. Intra-day, NASDAQ will retransmit only the message for affected security.

Please note: Inclusion of the component securities via the issue participation message is at the discretion of the index sponsor and may not be supported for all Instruments disseminated via the GIDS data service.

10.0 Message Processing Guidelines for ETF Valuation Data

10.1 Overview

NASDAQ OMX serves as a listing market for exchange-traded funds (ETFs). ETFs are investment products that hold a pool of securities and are designed to generally correspond with a specific Index. Investors can buy and sell ETFs just like stock, through their broker, throughout the trading day.

From a quotation and trade perspective, ETFs are treated in the same manner as any other NASDAQ-listed security.[1] For ETFs only, NASDAQ also disseminates the following valuation data via the data feed:

Data Element	Definition
Intra-day Portfolio Value (IPVs)	The IPV is the current dollar amount per share of what the ETF is worth. The IPV is defined as the sum of the total current market value, using only NASDAQ Market trades, of the ETF components and the cash amount divided by the creation unit. The IPV is disseminated via the Index Details message format at 15 seconds intervals throughout the trading day.
Estimated Cash Amount Per Creation Unit	The Estimated Cash per Creation Unit is the Dividend Income minus the Accrued Expenses per share in the Trust multiplied by one creation unit. At the beginning of each trading day, NASDAQ disseminates this statistic via the ETF Daily Valuation message format.
Total Cash Amount Per Creation Unit	The Total Cash per Creation Unit is the Estimated Cash plus the Balancing Amount per Creation Unit. At the beginning of each trading day, NASDAQ disseminates this statistic via the ETF Daily Valuation message format.
Estimated Cash per Share (Net Accrued Dividend)	Estimated Cash per Share is the Dividend Income minus the Accrued Expenses in the Trust. It is also referred to as the Net Accrued Dividend or the Net Accrued Income. At the beginning of each trading day, NASDAQ disseminates this statistic via the ETF Daily Valuation message format.
Net Asset Value (NAV) from Trustee	The NAV is the market value of a share. This statistic is calculated by taking the Market Value of the underlying securities plus Dividends Received less Accrued Expenses divided by the shares outstanding of the Trust. At the beginning of each trading day, NASDAQ disseminates the NAV based on the prior day's trading via the ETF Daily Valuation message format.
Total Shares Outstanding (TSO)	The TSO are the total number of shares of the underlying securities that are available in the Trust. At the beginning of each trading day, NASDAQ disseminates the current TSO via the ETF Daily Valuation message format.

[1] Trade data for NASDAQ-listed issues is disseminated via UTP Trade Data Feed (UTDF) and NASDAQ Last Sale (NLS). Quotation data is disseminated via UTP Quotation Data Feed (UQDF), NASDAQ Level 2, and NASDAQ TotalView.

As noted in section 6 of this document, the following ETF Daily Valuation items may be negative or zero:

- Estimated Cash Amount Per Creation Unit
- Total Cash Amount Per Creation Unit
- Estimated Cash per Share (Net Accrued Dividend)

If all three values are zero, however, it is an indication that the trustee was unable to provide the daily values by the dissemination for ETF Daily Valuation spin.

10.2 ETF Symbology

NASDAQ will assign a separate identifier for each of the ETF valuation statistics on NIDS for database and display purposes. The ETF Value Identifier will be **assigned by NASDAQ OMX** to reflect the given ETF and valuation type value being represented in the message attachment.

NASDAQ OMX supports a more flexible symbology structure for its index and ETF valuation data elements. For ETFs introduced in 2008, NASDAQ plans to assign ETF valuation identifiers in the same manner as other data providers. Unless otherwise requested by the issuer, NASDAQ will create ETF valuation symbols by adding the standard dot suffixes to the root ETF trading symbol.

Data Element	ETF Symbol Suffix
Intra-day Portfolio Value (IPVs)	.IV
Estimated Cash Amount Per Creation Unit	.EU
Total Cash Amount Per Creation Unit	.TC
Net Accrued Dividend (Estimated Cash per Share)	.DV
Net Asset Value (NAV) from Trustee	.NV
Total Shares Outstanding (TSO)	.SO

While NASDAQ wishes to move to a standard symbology, it does not want to impede the trading of existing ETFs on its marketplace. NASDAQ OMX has retained the existing valuation symbols for all existing ETFs. In addition, NASDAQ reserves the right to vary from the suffix standard if the issuer so requests.

Because of possible variations, NASDAQ strongly recommends that firms process the automated ETF Directory message for the most up-to-date list of ETF valuation identifiers.

11.0 Format Release and Testing Information

11.1 Release Notification

To keep pace with the changing business environment, NASDAQ OMX may modify its data feed format specifications for direct data feed customers. In advance of each release, NASDAQ OMX will notify direct connect customers of the format change via a Vendor Alert on the NASDAQ OMX web site. 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. If you wish to receive automatic e-mail notification whenever a Vendor Alert is posted to the NASDAQ OMX web site, please send an e-mail request to NASDAQ OMX Global Data Products (mailto:dataproducts@nasdaqomx.com).

11.2 Types of Testing

In advance of each release, NASDAQ OMX will offer test data for its 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 creates sample messages in the new formats to be broadcast on select weeknights from 21:00 to 22:30. To generate the sample data, NASDAQ OMX creates a test script to exercise the full range of values for the affected message formats.

- ***Weekend production tests:*** In advance of major releases, NASDAQ OMX will conduct user acceptance tests (UATs) on select Saturdays for its market participants. As market participants enter information into its production systems, NASDAQ OMX will broadcast this test data in the new data formats to direct data feed subscribers. Prior to each UAT, NASDAQ OMX should post a Vendor Alert and/or a Head Trader Alert with registration information.

- ***Weekend stress tests:*** For bandwidth upgrades and capacity-related releases, NASDAQ OMX will attempt to simulate projected data rates as part of the production test on Saturdays. At the conclusion of the manual entry period, NASDAQ OMX will start software drivers to stress test its system. Please note that the market close event and any post-closing reports will be disseminated only after the stress test is complete. When a UAT includes a stress test, NASDAQ OMX will denote it in the Vendor Alert.

For a list of upcoming testing and release dates for NASDAQ OMX data feed subscribers, please refer to the “Release Schedule” section of the NASDAQ OMX web site. **NASDAQ OMX strongly recommends that all direct subscribers use these testing opportunities to check their hardware and software applications.** During the testing phase, NASDAQ OMX Global Data Products may ask market data vendors or market participants to provide status updates and/or submit testing verification forms as part of the QA process.

11.3 Identification of test data

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

- ***Test Symbols:*** NASDAQ may also send out intra-day test data using special issue symbols and market participant identifiers on its data feeds. Test securities are identified within the NASDAQ Symbol Directory on the NASDAQ OMX web site.

During non-market hours, NASDAQ OMX will broadcast **unmarked** test data on its direct data feeds. Customers should take necessary precautions to protect their systems against database corruption during evenings, weekends, and market holidays. Please refer to the Appendix A of this document for the current data feed transmission schedule.

Appendix – Transmission Schedule

Note: All times referenced regarding are approximate and are stated in US Eastern Time. This transmission schedule is based on a normal trading day. NASDAQ OMX reserves the right to alter this schedule as necessary with minimal advance notice.

Time	Transmission	Message Category	Message Type	Session ID	Originator ID
01:53:00	**Start of Day Control Message**	C	I	A	E
01:54:00	Start of Day Control Message	C	I	A	E
01:55:00	Start of Day Control Message	C	I	A	E
	Line Integrity (Control messages sent at one-minute intervals during operational day)	C	T	A	E
	General Administrative Messages (Free form text messages will be generated on an as-needed basis.)	A	A	A	Various
	Message Sequence Number Reset (Control message will be generated on an as-needed basis)	C	L	A	E
01:56:00	**NASDAQ OMX Directory Message**	A	C	Various	Various
01:57:00	**Issue Symbol Participation Messages**	A	D	Various	Various
01:59:00	**ETF Directory Message**	A	E	A	Q
02:00 – 20:10	**Tick Detail Messages** (Calculation and dissemination of index; spot and ETF Intra-Day Portfolio values)	P	A	Various	Various
02:00 – 20:10	**Settlement Value Messages** (Calculation and dissemination of settlement values at the time of their calculation)	P	B	Various	Various
07:30	**ETF Daily Valuation Messages**	P	D	A	Q
08:15 – 09:30	Calculation and Dissemination of Nasdaq-100 Pre-Market Indicator (One minute intervals)	P	A	A	Q
09:30	**Market Session Open Message**	C	O	Various	Various
12:30:00	**Index End of Day Summary Messages European Index Products**	A	B	Various	Various
16:00	**Market Session Closed Message**	C	C	Various	Various
16:15 – 20:00	Calculation and Dissemination of Nasdaq-100 After-Hours Indicator (One minute intervals)	P	A	A	Q
17:30:00	**Index End of Day Summary Messages US Index Products**	A	B	Various	Various
20:05	**End Trade Reporting Control Message**	C	X	Various	Various
20:06	End Trade Reporting Control Message	C	X	Various	Various
20:07	End Trade Reporting Control Message	C	X	Various	Various
20:08	**End of Day Control Message**	C	J	A	E
20:09	End of Day Control Message	C	J	A	E
20:10	End of Day Control Message	C	J	A	E
20:11	**End of Retransmission Control Message**	C	K	A	E
20:12	End of Retransmission Control Message	C	K	A	E
20:13	End of Retransmission Control Message	C	K	A	E
20:14	**End of Transmissions Message** (Time is approximate; delayed when retransmissions still active)	C	Z	A	E
20:15	End of Transmission Control Message	C	Z	A	E
20:16	End of Transmission Control Message	C	Z	A	E

Appendix – Version Control Information

Version	Date	Description of Documentation Change(s)
2008-1	08/27/2008	• Feed Introduction
2008-1a	11/5/2008	• Modified the ETF Directory (Category A – Type E) message to add two new fields: Market of Origin and Currency • Modified transmission table

2009 Revisions

Version	Date	Description of Documentation Change(s)
2009-1.0	4/24/2009	• Revised Documentation based on vendor feedback.
2009-1.0a	7/22/2009	• Minor editorial changes
2009-2.0	09/25/2009	• Minor editorial changes – added a description to settlement values in section 8