OPRA

OPTIONS PRICE REPORTING AUTHORITY

PARTICIPANT INTERFACE SPECIFICATION

June 14, 2011
Version 1.10

BATS Options
C2 Options Exchange, Incorporated
Chicago Board Options Exchange, Incorporated
International Securities Exchange, LLC
NASDAQ OMX BX, Inc.
The NASDAQ Stock Market, Inc.
NASDAQ OMX PHLX, Inc.
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ADDENDUMS

TCP/IP FOR NATIONAL MARKET SYSTEM (NMS) PARTICIPANT INPUT – VERSION 3.0 DATED 10/3/07

SUMMARY OF CHANGES

VERSION 1.0 – SEPTEMBER 19, 2002	
PAGE(S)	**DESCRIPTION**
All	Specification Re-write

VERSION 1.1 – DECEMBER 2, 2002	
PAGE(S)	**DESCRIPTION**
5, Appendices C and D	Inclusion of Best Bid and Best Offer (BBO): change in background and addition of Best Bid and Best Offer Overview and "Kill" procedures

VERSION 1.2 – AUGUST 31, 2004	
PAGE(S)	**DESCRIPTION**
Page 9	Updated the Reserved field description in the SOD message header.
Pages 9, 10, 11,and 68	Removed reference to ASCII null filled for "Reserved" fields in the Message Header.

VERSION 1.3 – SEPTEMBER 13, 2004	
PAGE(S)	**DESCRIPTION**
Multiple	Completion of Specification Re-Write

VERSION 1.4 – APRIL 10, 2006	
SECTION(S)	**DESCRIPTION**
6.05	Correct typo
7.30	Updated
10.01	Correct typo
Appendix A	Updated
Appendix B	Change in closing time for equity options
Appendix C	Change from five cents to one cent

VERSION 1.5 – AUGUST 22, 2008	
SECTION(S)	**DESCRIPTION**
4.12, 4.13, 4.16, 6.11, 6.12, 6.13 Section 7 - Various	Expanded Message Header Added Message Header ID Increased message sequence number
6.04, 6.05, 6.06 Sections 7 and 8 -Various items	Removed reference to additional index groups and showed correct message length
4.15, 6.0, 6.06 6.08, 6.09, Sections 7 and 9 - Various items	Support for FCO's no longer provided
6.01, 6.02, 6.03, 6.07, Sections 7 and 8 -Various items, 9.05	Updated Equity/Index messages to reflect interim and final symbology change Redefined expiration date field Rename strike price reduced to 6 bytes Year field expanded to 2 bytes
Various	Updated participants

VERSION 1.6 – DECEMBER 30, 2008	
SECTION(S)	**DESCRIPTION**
4.15, 6.0, 10.01, 10.17	Category H, Type N – Line Integrity Message
4.15, 6.0, 6.1	New type codes for Category "a" message
4.15, 6.0, Appendix C	Redefine Type Codes for Category "k" messages
6.11	Status request – change field size to 10 bytes
4.14, 10.01	Update participant names
6.06, 6.08, 6.09, 6.10, Sections 7 – various items	Reference to FCO's removed
Addendum 6.0 7.32	TCP/IP Version 3.0 Kf = Non Firm Note added

VERSION 1.7 – DECEMBER 30, 2009	
SECTION(S)	**DESCRIPTION**
4.14,10.01	BATS and C2 added
4.15, 6.0	Type code “x” added for last sale message
4.16	Updated
4.15, 6.0, 10.01, 10.17	H,N message removed (added in error)
4.15. 6.0, 10.01, 10.17	H,O message added
Appendix F&G	Removed
6.01, 6.02, 6.03, 6.06	Symbology changes reflected
6.07,6.08, 6.09, 7.27	Field length corrected
Various	Updated participants

VERSION 1.8 – JUNE 8, 2010	
SECTION(S)	**DESCRIPTION**
6.01, 6.02, 6.03 & 6.06	Symbology changes reflected
6.04 & 6.05	Reserved fields put back in/taken out in error
Appendix B	Schedule updated
Appendix E	Strike price tables removed

VERSION 1.9 – DECEMBER 22, 2010	
SECTION(S)	**DESCRIPTION**
4.15	Type Codes X and Y added for Category k message
6.0	Type Codes X and Y added for Category k message
6.02	Type Codes X and Y added for Category k message
Appendix B Appendix C Appendix D	C2 added to schedule, 6:15 a.m. PHLX Good Morning Removed/BBO not computed by Participant Renamed Appendix C

VERSION 1.10 – JUNE 14, 2011	
SECTION(S)	**DESCRIPTION**
6.02	Category k, - Corrected to add 1 byte reserved field back in the message

1.0 INTRODUCTION

The Securities Industry Automation Corporation (SIAC) serves as the Processor for the Options Price Reporting Authority (OPRA). In fulfilling its role as the Processor, SIAC plans, develops, operates and maintains the OPRA system.

1.01 BACKGROUND

OPRA is a computer system that disseminates, on a current and continuous basis, information about transactions that occurred on the options markets.

OPRA receives options transactions generated by participating U.S. Options Participants. In addition, OPRA calculates and identifies the "Best Bid and Best Offer" (BBO – highest bid and lowest offer). OPRA consolidates this information and disseminates it via computer-to-computer linkages to the financial community in the U.S. and abroad.

Essential in ensuring the timely reporting of option equity/index transactions are the OPRA IP Multicast data streams. OPRA has a unique set of multicast addresses assigned to each of its output data "lines". Options market data generated by each Participant is assembled in prescribed message formats and transmitted to the appropriate TCP/IP Processor address via the Participants' private communications facility. As each message is received, it is merged with messages received from all Participants, and the consolidated message stream is transmitted using IP multicast simultaneously to all data recipients via their private communications facilities. Approved data recipients of the OPRA service can redistribute OPRA data worldwide to their customers as part of their individual services or use the data for their own purposes.

Computer systems that support the processing and dissemination of options transactions are operational at two sites. The two sites provide back-up capability in the event of a disaster at either location. Through computerized communications equipment, OPRA transaction data is simultaneously disseminated from both sites. If a disaster should occur at one of the locations, all of the computer processing operations in support of options reporting would be transferred to the surviving site. An OPRA dual site configuration is illustrated in **Appendix A**.

1.02 SCOPE

This specification defines the communications and input message format requirements for Participants (Exchanges/Data Providers) to interface with OPRA.

2.0 GENERAL DESIGN OF DATA DISTRIBUTION NETWORK

The OPRA communications interface design utilizes the TCP/IP protocol.

TCP/IP NETWORK INTERFACE
The requirements for the TCP/IP Network Interface are defined in **Section 4.0** of this document and in the addendum to this document, **"TCP/IP for National Market System (NMS) Participant Input"**. This addendum is available from www.opradata.com.

2.01 TCP/IP INPUT PACING

All Participants have pre-assigned input bandwidth targets which are enforced through continuous input pacing by the OPRA Processor. The input pacing rates are not fixed and can be varied depending on changing traffic conditions. This mechanism is similar to the OPRA Processor's output pacing. For example, if Participant "A" experiences a surge in traffic and requires more bandwidth than their present pacing rate allows, the OPRA Processor will attempt to "borrow" bandwidth from another Participant who is not fully utilizing their allocated bandwidth. If extra bandwidth is available from Participant "B", their pacing rate is lowered and Participant "A's" pacing rate is correspondingly raised.

Participant "A" can continue transmitting at such an elevated rate indefinitely, as long as Participant "B" does not require the bandwidth. If some of Participant "B's" bandwidth has been "loaned" away to another Participant and Participant "B" experiences a surge in traffic requiring their full bandwidth, their pacing rate will be returned to the level at which they are entitled by their pre-arranged bandwidth target. Thus, the sum of the entire Participants' pre-assigned bandwidth targets can never exceed the overall capacity of the OPRA Processor. However, Participants may exceed their bandwidth targets as long as other Participants are not fully utilizing their bandwidth targets.

3.0 OPRA INTERFACE METHOD

Any Participant may input to OPRA over multiple logical TCP/IP connections. Each logical connection is considered as a complete independent entity. OPRA will not attempt to correlate input coming in over these multiple inputs. Participants have the option of inputting over all input lines on a round robin basis or utilizing specific lines for symbols by first letter of symbol.

Error Recovery Techniques, such as communications hardware error detection and retries, allow a choice of user options permitting the application modules to concern themselves with "higher" level error recovery: resetting the logical connection, resetting the channel, etc.

Restart considerations consist of getting the systems involved back into synchronization from the point of failure. In the event of a TCP/IP socket connection interruption and re-establishment, SIAC recommends that the Participant system, prior to sending data, generate an inquiry message to obtain the last sequence number received by OPRA. This can be accomplished by utilizing the Category L, Status Request message (Participant generated), and the Category M, Processor Status – Solicited message (SIAC generated). If there is a discrepancy between the sequence number the Participant system is ready to send, and the sequence number OPRA is ready to receive, the Participant system should re-send the messages in question, before generating any new messages.

If a Participant is unable to utilize the above method, SIAC recommends an alternative method. The Participant system, prior to sending data, should re-send the five blocks of data sent prior to the disconnect. OPRA will reject those messages (due to a lower than expected sequence number) it has already received and process those it has not received.

3.01 GENERAL DESIGN CONSIDERATION

OPRA receives and transmits variable length blocks having maximum lengths of 1004 characters. The length includes a Block Length Header, text and control characters. The number of messages contained in a block is variable and the end of each message is delimited by a Unit Separator character (US), except for the last record in the block, which ends with an End of Text (ETX) character.

4.0 TRANSMISSION CHARACTERISTICS

4.01 TRANSMISSION BLOCK

All data transmitted between the Participants and OPRA are sent in blocks composed of a TCP/IP Header (TH), Block Length Header (BL) and multiple messages.

Only one type of transmission block is used for all types of messages. A message is a unit of data that can be processed by the receiving system independently of other data. A message may not span a block boundary.

TCP/IP HEADER	BLOCK LENGTH HEADER	S O H	MESSAGE 1 HEADER & TEXT	U S	MESSAGE 2 HEADER & TEXT	U S	~ ~ ~	MESSAGE v HEADER & TEXT	E T X	P A D

4.02 TCP/IP HEADER

The message format begins with a standard TCP/IP Header, (**for a description of the TCP/IP Header, please reference the addendum to this document, "TCP/IP for NMS Participant Input"**). This addendum is available from www.opradata.com. Note the TCP/IP Header is **not** returned to the application on reading the socket.

4.03 BLOCK LENGTH HEADER

Following the TCP/IP Header is the Block Length Header. The Block Length Header contains the size of the block (in bytes) and is required at the beginning of every block. The Block Length Header includes the length of the message, from Start of Header (SOH), End of Text (ETX), the PAD character, if present, and the Block Length Header itself.

The Block Length Header contains the total length of the block including the length of this header. This is a **4 Byte** (not ASCII) binary field and conforms in all cases to the following data fields:

BLOCK LENGTH 2	RESERVED 2

|←----- 4 BYTES -----→|

4.04 BLOCK LENGTH

The Block Length field is a **2 Byte**, (16 bits) binary (not ASCII) Left Justified. Indicates the length of the block.

4.05 RESERVED

The Reserved field is a **2 Byte**, spaced filled field. Field reserved for future use.

4.06 SOH AND ETX

The Start of Header (SOH) control character (x01) indicates the beginning of the block, whereas an End of Text (ETX) control character (x03) signifies the end of the block.

4.07 MESSAGE HEADER

The Message Header (MH), which is a fixed length, fixed format area defining message type, sequence and other control parameters, and a Message Text segment, which is a variable length and format area containing data required to perform a specific function. Refer to **Section 4.12** for a description of the Message Header fields.

4.08 US

The Unit Separator (US) control character (x1F) is needed in multiple message blocks to signify the end of the preceding message but not the end of the block. An ETX control character delimits the last message.

4.09 PAD

The OPRA system requires that the length of the block be an "even" number. In the event that the length of the block is not an even number, a PAD character representation is required after the ETX character. This should consist of a HEX 'FF' character.

4.10 DATA FORMAT

ASCII filler characters are inserted, as required, in accordance with the following rules:

1. Zeros (hex 30) are inserted in numeric fields. All numeric fields are right justified, as required.

2. Spaces (hex 20) are inserted in alphabetic fields. All alphabetic fields are left justified, as required.

3. Spaces (hex 20) are inserted in Alphanumeric fields, All Alphanumeric fields are right or left justified, as required.

4.11 CHARACTER SET

All transmissions are in standard 8-bit ASCII code.

4.12 MESSAGE HEADER

The Message Header is part of the message text. It is supplied in each message and contains a total of **14 Bytes** conforming in all cases to the following data fields:

INPUT MESSAGE HEADER

INPUT MESSAGE HEADER (New) – 14 Bytes

MESSAGE HEADER ID (Numeric)	Participant ID	MESSAGE IDENTIFICATION	MESSAGE SEQUENCE NUMBER
1	**1**	**2**	**10**

|←---------- 14 BYTES ----------→|

4.13 MESSAGE HEADER ID – one(1)byte, numeric field indicating new header and symbol in record. The field will contain a value of one (1).

4.14 PARTICIPANT ID

The Participant ID field is a **1 Byte**, Alphabetic character that identifies the Participant or the Processor as the originator of the message as follows:

CODE	VALUE
A	NYSE AMEX
B	Boston Stock Exchange
C	Chicago Board Options Exchange
I	International Securities Exchange
N	NYSE Arca
O	Options Price Reporting Authority
Q	NASDAQ Stock Market
W	C2
X	NASDAQ OMX PHLX
Z	BATS

Note: Messages with PARTICIPANT ID Code O, Options Price Reporting Authority (OPRA), are sent by SIAC on behalf of OPRA.

4.15 MESSAGE IDENTIFICATION

The Message Identification field is a **2 Byte**, Alphabetic upper or lower case character, Space filled field. The first character entered in the Message Identification field identifies the **Message Category**. The second character entered in the Message Identification field identifies the **Message Type**. The Message Type character is Space filled to either indicate a specific value, or that a Message Type is not applicable to a specified Message Category.

LOWER CASE CODE	**VALUE**
a	EQUITY AND INDEX LAST SALE
d	OPEN INTEREST
f	EQUITY AND INDEX END OF DAY SUMMARY
k	EQUITY AND INDEX QUOTE WITH SIZE
UPPER CASE CODE	**VALUE**
C	ADMINISTRATIVE
H	CONTROL
L	STATUS REQUEST
M	PROCESSOR STATUS - SOLICITED
N	PROCESSOR STATUS - UNSOLICITED
Y	UNDERLYING VALUE MESSAGE

4.15 MESSAGE IDENTIFICATION - Message Type (second alpha character):

The following **Message Types**, all mutually exclusive, apply to **Category a Equity and Index Last Sale** messages.

CODE	VALUE	
Space Filled	REG-ULAR	Indicates that the transaction was a regular sale and was made without stated conditions.
A	CANC	Transaction previously reported (other than as the **last** or **opening** report for the particular option contract) is now to be cancelled.
B	OSEQ	Transaction is being reported late **and** is out of sequence; i.e., later transactions have been reported for the particular option contract.
C	CNCL	Transaction is the last reported for the particular option contract and is now cancelled.
D	LATE	Transaction is being reported late, but is in the correct sequence; i.e., no later transactions have been reported for the particular option contract.
E	CNCO	Transaction was the first one (opening) reported this day for the particular option contract. Although later transactions have been reported, this transaction is now to be cancelled.
F	OPEN	Transaction is a late report of the opening trade and is out of sequence; i.e., other transactions have been reported for the particular option contract.
G	CNOL	Transaction was the only one reported this day for the particular option contract and is now to be cancelled.
H	OPNL	Transaction is a late report of the opening trade, but is in the correct sequence; i.e., no other transactions have been reported for the particular option contract.
I	AUTO	Transaction was executed electronically. Prefix appears solely for information; process as a regular transaction.
J	REOP	Transaction is a reopening of an option contract in which trading has been previously halted. Prefix appears solely for information; process as a regular transaction.
K	AJST	Transaction is an option contract for which the terms have been adjusted to reflect a stock dividend, stock split, or similar event. Prefix appears solely for information; process as a regular transaction.
L	SPRD	Transaction represents a trade in two options in the same class (a buy and a sell in the same class). Prefix appears solely for information; process as a regular transaction.
M	STDL	Transaction represents a trade in two options in the same class (a buy and a sell in a put and a call). Prefix appears solely for information; process as a regular transaction.
N	STPD	Transaction is the execution of a sale at a price agreed upon by the floor personnel involved, where a condition of the trade is that it reported following a non-stopped trade of the same series at the same price.
O	CSTP	Cancel stopped transaction.

P	BWRT	Transaction represents the option portion of a buy/write (buy stock, sell call options). Prefix appears solely for information; process as a regular transaction.
Q	CMBO	Transaction represents the buying of a call and the selling of a put for the same underlying stock or index. Prefix appears solely for information; process as a regular transaction.
R	SPIM	Transaction was the execution of an order which was “stopped” at a price that did not constitute a Trade-Through on another market at the time of the stop. Prefix appears solely for information; process like normal transaction.
S	ISOI	Transaction was the execution of an order identified as an Intermarket Sweep Order. Prefix appears solely for information; process like normal transaction.
T	BNMT	Transaction reflects the execution of a “benchmark trade”. A “Benchmark Trade” is a trade resulting from the matching of “Benchmark Orders”. A “Benchmark Order” is an order for which the price is not based, directly or indirectly, on the quoted price of the option at the time of the order’s execution and for which the material terms were not reasonably determinable at the time a commitment to trade the order was made. Prefix appears solely for information; process like normal transaction.
X	XMPT	Transaction is Trade Through Exempt. The transaction should be treated like a regular sale.

4.15 MESSAGE IDENTIFICATION- Message Type (second alpha character):

The **Message Type** character for **Category C Administrative, Category d Open Interest, Category f Equity and Index End of Day Summary, Category L Status Request, Category M Processor Status – Solicited Category N Processor Status - Unsolicited** and **Category Y Underlying Value – Last Sale** messages are **Space filled**.

The following **Message Types** apply to **Category H Control** messages. Refer to **Control Message Descriptions** section for definition of values:

CODE	VALUE
A	Start of Test Cycle
B	End of Test Cycle
C	Start of Day
D	Good Morning
E	Start of Summary
F	End of Summary
G	Early Market Close
H	End of Transaction Reporting
I	Good Night
J	End of Day
K	Reset Sequence Number
L	Start of Open Interest
M	End of Open Interest
O	Line Integrity-Input

4.15 MESSAGE IDENTIFICATION- Message Type (second alpha character):

The following **Message Types** apply to **Category k Equity and Index Quote With Size**:

CODE	VALUE
Space filled	Regular Trading
F	Non-Firm Quote
R	Rotation
T	Trading Halted
A	Eligible for Automatic Execution
B	Bid contains Customer trading interest
O	Offer contains Customer trading interest
C	Both Bid and Offer contain Customer trading interest
X	Offer side of quote not firm; bid side firm
Y	Bid Side of quote not firm; offer side firm

The following **Message Types** apply to **Category Y Underlying Value** message:

CODE	VALUE
Space filled	Index based on Last Sale
I	Index based on Bid and Offer

Note: Additional Message Category(s) and Message Type(s) will be implemented as required. If Participants are not prepared to process new Message Category(s) and/or New Message Type(s) when implemented, they should be able to handle them to the extent that they do not impact their normal data processing.

4.16 Message Sequence Number – Expanded to 10 bytes.

The Message Sequence Number (MSN) is a **10 Byte**, Numeric, Right Justified, Zero filled field. All messages are assigned a sequence number. The MSN field contains a number one greater than the number of the last message transmitted. A sequence number of 9999999999 will effect resetting of the MSN counters such that the sequence number of the succeeding message will be 0000000000. The sequence number in the header for Category L, M and N will all be 0's.

Note: The sequence number is restricted to 1,999,999,999 until further changes are made.

5.0 MESSAGE FORMATS

Each message transmitted by OPRA consists of a Message Header and Message Text. The particular Message Category and Message Type entered in the Message Identification field of the Message Header determines the format of the text. Message formats are fixed field formats (with the exception of Administrative messages which have unformatted text). Control messages can consist of the standard Message Header only, or the standard Message Header immediately followed by text. The textual portion of the message is in variable field (free form).

5.01 MESSAGE FORMAT FIELD DESCRIPTIONS

Detailed information on each field specified in every message format is contained in alphabetical order in the **Field Descriptions** section of this document.

5.02 SCHEDULE OF DAILY OPRA MESSAGES

A schedule of daily OPRA messages transmitted over the OPRA IP multicast data streams are provided in **Appendix B.**

5.03 QUOTE KILL PROCEDURE

Reference **Appendix C** for the special BBO Operational “Kill” procedure feature.

6.0 SUMMARY OF MESSAGE CATEGORIES AND TYPES

CATEGORY(S)	TYPE(S)	MESSAGE DESCRIPTION
a	**Space filled**	REGULAR SALE
a	**A**	CANC
a	**B**	OSEQ
a	**C**	CNCL
a	**D**	LATE
a	**E**	CNCO
a	**F**	OPEN
a	**G**	CNOL
a	**H**	OPNL
a	**I**	AUTO
a	**J**	REOP
a	**K**	AJST
a	**L**	SPRD
a	**M**	STDL
a	**N**	STPD
a	**O**	CSTP
a	**P**	BWRT
a	**Q**	CMBO
a	**R**	SPIM
a	**S**	ISOI
a	**T**	BNMT
a	**X**	XMPT
C	**Space filled**	Administrative
d	**Space filled**	Open Interest
H	**A**	Start of Test Cycle
H	**B**	End of Test Cycle
H	**C**	Start of Day
H	**D**	Good Morning
H	**E**	Start of Summary
H	**F**	End of Summary
H	**G**	Early Market Close
H	**H**	End of Transaction Reporting
H	**I**	Good Night
H	**J**	End of Day
H	**K**	Reset Sequence Number
H	**L**	Start of Open Interest
H	**M**	End of Open Interest
H	**O**	Line Integrity-Input

6.0 SUMMARY OF MESSAGE CATEGORIES AND TYPES (continued)

CATEGORY(S)	TYPE(S)	MESSAGE DESCRIPTION
k	**Space filled**	Regular Trading
k	**F**	Non Firm
k	**R**	Rotation
k	**T**	Trading Halted
k	**A**	Eligible for Automatic Execution
k	**B**	Bid contains Customer trading interest
k	**O**	Offer contains Customer trading interest
k	**C**	Both Bid and Offer contain Customer trading interest
k	**X**	Offer side of quote not firm; bid side firm
k	**Y**	Bid side of quote not firm; offer side firm
L	**Space filled**	Status Request
M	**Space filled**	Processor Status - Solicited
N	**Space filled**	Processor Status - Unsolicited
Y	**Space filled**	Index based on Last Sale
Y	**I**	Index based on Bid and Offer

6.01 EQUITY AND INDEX LAST SALE

34 BYTES

The Equity and Index Last Sale message is used to report equity and index options last sale information.

CATEGORY	TYPE
a	**Space filled, A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, X**

SECURITY SYMBOL	EXPIRATION MONTH	**EXPIRATION DATE**	**YEAR**	STRIKE PRICE DENOMINATOR CODE	**EXPLICIT STRIKE PRICE**
5	**1**	**2**	**2**	**1**	**6**

|←---------- 17 BYTES ----------→|

FORMERLY STRIKE PRICE CODE (Space Filled)	VOLUME	PREMIUM PRICE DENOMINATOR CODE	PREMIUM PRICE	SESSION INDICATOR
1	**6**	**1**	**8**	**1**

|←---------- 17 BYTES ----------→|

6.02 EQUITY AND INDEX QUOTE WITH SIZE

47 BYTES

The Equity and Index Quote With Size message is used to report equity and index options quote with size.

CATEGORY	TYPE
k	**Space filled, F, R, T, A, B, O, C, X, Y**

SECURITY SYMBOL 5	EXPIRATION MONTH **1**	**EXPIRATION DATE** **2**	**YEAR** **2**	STRIKE PRICE DENOMINATOR CODE **1**	**EXPLICIT STRIKE PRICE** **6**

|←---------- 17 BYTES ----------→|

FORMERLY STRIKE PRICE CODE (Space Filled) 1	PREMIUM PRICE DENOMINATOR CODE **1**	BID PRICE **8**	BID SIZE **5**	OFFER PRICE **8**	OFFER SIZE **5**	SESSION INDICATOR **1**	RESERVED FIELD 1

|←---------- 30 BYTES ----------→|

6.03 OPEN INTEREST

25 BYTES

The Open Interest message is used to report Equity and Index contract volume on current options that have not been exercised and have not yet reached expiration. Open Interest messages are sent by SIAC on behalf of OPRA, however, they contain the Participant ID code of the Participant associated with the Open Interest message.

CATEGORY	TYPE
d	**Space filled**

SECURITY SYMBOL	EXPIRATION MONTH	**EXPIRATION DATE**	**YEAR**	STRIKE PRICE DENOMINATOR CODE	**EXPLICIT STRIKE PRICE**
5	**1**	**2**	**2**	**1**	**6**

|←---------- 17 BYTES ----------→|

FORMERLY STRIKE PRICE CODE (Space Filled)	OPEN INTEREST VOLUME
1	**7**

|←---- 8 BYTES ----→|

6.04 UNDERLYING VALUE – LAST SALE

15 BYTES

The Underlying Value – Last Sale message is a fixed length record containing one Index value.

CATEGORY	TYPE
Y	Space filled

NUMBER OF INDICES IN GROUP
2

|← 2 BYTES →|

INDEX SYMBOL #1	RESERVED	INDEX VALUE
3	2	8

|←----- TOTAL OF 13 BYTES -----→|

6.05 UNDERLYING VALUE – BID AND OFFER

23 BYTES

The Underlying Value – Bid and Offer message is a fixed length record. Each group contains the Bid Index Value and Offer Index Value of a stock index.

CATEGORY	TYPE
Y	I

NUMBER OF INDICES IN GROUP
2

|← 2 BYTES →|

INDEX SYMBOL #1	RESERVED	BID INDEX VALUE	OFFER INDEX VALUE
3	2	8	8

|←-------- TOTAL OF 21 BYTES -------→|

6.06 EQUITY AND INDEX END OF DAY SUMMARY

101 BYTES

The Equity and Index End of Day Summary messages are transmitted shortly before the Good Night messages. It provides, by symbol, a Participant's open, high, low, last, net change and underlying information. **If no quote or last sale occurred for a security, no Equity and Index End of Day Summary is generated for that security.**

CATEGORY	TYPE
f	**Space filled**

SECURITY SYMBOL	EXPIRATION MONTH	**EXPIRATION DATE**	**YEAR**	STRIKE PRICE DENOMINATOR CODE	**EXPLICIT STRIKE PRICE**
5	**1**	**2**	**2**	**1**	**6**

|←---------- 17 BYTES ----------→|

FORMERLY STRIKE PRICE CODE (Space Filled)	VOLUME	OPEN INTEREST VOLUME	PREMIUM PRICE DENOMINATOR CODE	OPEN PRICE	HIGH PRICE	LOW PRICE	LAST PRICE
1	**6**	**7**	**1**	**8**	**8**	**8**	**8**

|←---------- 47 BYTES ----------→|

NET CHANGE INDICATOR	NET CHANGE	UNDERLYING PRICE DENOMINATOR CODE	UNDERLYING PRICE	BID PRICE	OFFER PRICE
1	**8**	**1**	**11**	**8**	**8**

|←---------- 37 BYTES ----------→|

6.07 STATUS REQUEST

10 BYTES

The Status Request message is used by the Participants' computer and the OPRA processor for message sequence number synchronization purposes. The OPRA system, upon receipt of this message, transmits back to the requesting participant a Category M Processor Status – Solicited message containing the sequence number of the next expected message. The Status Request message will be transmitted by participant in a separate message block containing only the Status Request message.

CATEGORY	TYPE
L	Space filled

```
SPACE
FILLED
     10
|← 10 BYTES →|
```

6.08 PROCESSOR STATUS - SOLICITED

10 BYTES

The Processor Status - Solicited message is sent to a Participant on the input line it was received as a response to a Category L Status Request message and contains the number of the last message received preceding reception of the Category L Status Request message. The Processor Status - Solicited message will be transmitted by SIAC in a separate message block containing only the Processor Status - Solicited message.

CATEGORY	TYPE
M	Space filled

```
MESSAGE
SEQUENCE
NUMBER

     10
|← 10 BYTES →|
```

6.09 PROCESSOR STATUS - UNSOLICITED

20 BYTES

The Message Sequence Number (MSN) is checked for (n+1), where n equals the MSN of the previous message. The Processor Status - Unsolicited message is sent to a Participant signifying one of the following: a sequence number gap (the MSN is greater than (n+1), the message is accepted and processed normally; the MSN is less than (n+1), the message is assumed to have been already received and will be ignored; or, the MSN is equal to the last one received, the message is ignored.

CATEGORY	TYPE
N	Space filled

EXPECTED MESSAGE SEQUENCE NUMBER 10	RECEIVED MESSAGE SEQUENCE NUMBER 10

|←----- 20 BYTES ----- →|

7.0 FIELD DESCRIPTIONS

ASCII code characters are defined as follows:

TERMINOLOGY	DESCRIPTION
Alphabetic	ASCII characters upper case **A – Z** or lower case **a – z**
Numeric	ASCII characters **0 – 9**
Alphanumeric	Any combination of Alphabetic and Numeric as defined above
Special	Any printable ASCII character **except** Alphanumeric as defined above, i.e.; White Space and Punctuation

Note: Reference Section 4.10 Data Format for ASCII filler character rules.

FIELD DESCRIPTIONS

- B -

7.01 BID INDEX VALUE

8 Bytes, Numeric. Right Justified, Zero filled. When there is no Bid Index Value, this field is Zero filled. The digits to the right of the decimal point represent the numerator of a fraction. The denominator is always represented in 100ths (e.g., 99.99). It may represent a value of Zero or greater.

The Bid Index Value represents the value of the index's calculation formula using the current bid values of the component securities.

- B -

7.02 BID PRICE

8 Bytes, Numeric. Right Justified, Zero filled. A Zero in this field represents a valid Bid Price.

The **8 Byte** Bid Price is the whole and decimal portion of the Bid Price information with the Premium Price Denominator Code determining the location of the decimal point.

Represents the price at which a buyer is willing to buy an option.

7.03 BID SIZE

5 Bytes, Numeric. Right Justified, Zero filled. When there is no Bid Size, this field is Zero filled.

The Bid Size identifies the number of contracts being bought for an option at the Bid Price.

When the Bid Size and the Bid Price are all zeroes, it represents a cancel of a previous quote.

- E -

7.04 EXPECTED MESSAGE SEQUENCE NUMBER

10 Bytes, Numeric. Right Justified, Zero filled.

Indicates the expected message sequence number.

7.05 EXPIRATION DATE

2 Bytes, Numeric. Right Justified. Indicates the date the series expires.

Field contains values 1 to 31 indicating the date the series expires. This date falls on a Saturday for Standard expirations, a Friday for Weekly expirations and the last business day of the appropriate month for Quarterly expirations.

- E -

7.06 EXPIRATION MONTH PUT/CALL INDICATOR

1 Byte, Alphabetic. Indicates the expiration month and identifies the option as a Put or a Call.

CALL OPTIONS		PUT OPTIONS	
CODE	VALUE	CODE	VALUE
A	JANUARY	M	JANUARY
B	FEBRUARY	N	FEBRUARY
C	MARCH	O	MARCH
D	APRIL	P	APRIL
E	MAY	Q	MAY
F	JUNE	R	JUNE
G	JULY	S	JULY
H	AUGUST	T	AUGUST
I	SEPTEMBER	U	SEPTEMBER
J	OCTOBER	V	OCTOBER
K	NOVEMBER	W	NOVEMBER
L	DECEMBER	X	DECEMBER

7.07 EXPLICIT STRIKE PRICE

6 Bytes, Numeric. Right Justified, Zero filled. The Explicit Strike Price is the whole and decimal portion of the Explicit Strike Price information with the Strike Price Denominator Code determining the location of the decimal point. See “Strike price denominator code” for additional details.

Represents the stated price per share for which the underlying security may be purchased (in the case of a call) or sold (in the case of a put) by the option holder upon exercise of the option contract.

- H -

7.08 HIGH PRICE

8 Bytes, Numeric. Right Justified, Zero filled.

The **8 Byte** High Price is the whole and decimal portion of the High Price information with the Premium Price Denominator Code determining the location of the decimal point.

Represents the highest price paid for an option during the trading day.

- I -

7.09 INDEX SYMBOL

3 Bytes, Alphabetic. Left Justified, Space filled.

Identifies the unique symbol assigned to an index.

7.10 INDEX VALUE

8 Bytes, Numeric. Right Justified, Zero filled. When there is no Index Value, this field is Zero filled. The digits to the right of the decimal point represent the numerator of a fraction. The denominator is always represented in 100ths (e.g., 99.99). It may represent a value of Zero or greater.

Contains the index value using last sale values of index components.

- L -

7.11 LAST PRICE

8 Bytes, Numeric. Right Justified, Zero filled.

The **8 Byte** Last Price is the whole and decimal portion of the Last Price information with the Premium Price Denominator Code determining the location of the decimal point.

Represents the last price paid for an option during the trading day.

7.12 LOW PRICE

8 Bytes, Numeric. Right Justified, Zero filled.

The **8 Byte** Low Price is the whole and decimal portion of the Low Price information with the Premium Price Denominator Code determining the location of the decimal point.

Represents the lowest price paid for an option during the trading day.

- M -

7.13 MESSAGE SEQUENCE NUMBER (MSN)

10 Bytes, Numeric. Right Justified, Zero Filled.

Indicates the last message sequence number received and safe stored preceding receipt of a Category L Status Request message. Value is sent in text of Category M message.

- N -

7.14 NET CHANGE INDICATOR

1 Byte, Special or Numeric. Will contain a plus (**+**) sign, a minus (**–**) sign or a Zero (**0**).

Represents for a Participant the upward, downward or unchanged price movement in an option's trades.

- N -

7.15 NUMBER OF INDICES IN GROUP

2 Bytes, Numeric. Right Justified, always “01”.

Represents the total number of indices contained in a particular message.

- O -

7.16 OFFER INDEX VALUE

8 Bytes, Numeric. Right Justified, Zero filled. When there is no Offer Index Value, this field is Zero filled. The digits to the right of the decimal point represent the numerator of a fraction. The denominator is always represented in 100ths (e.g., 99.99). It may represent a value of Zero or greater.

The Offer Index Value represents the value of the index’s calculation formula using the current Offer(ed) values of the component securities.

- O -

7.17 OFFER PRICE

8 Bytes, Numeric. Right Justified, Zero filled. A Zero in this field represents an invalid Offer Price.

The **8 Byte** Offer Price is the whole and decimal portion of the Offer Price price information with the Premium Price Denominator Code determining the location of the decimal point.

Represents the price at which a seller is offering to sell an option.

7.18 OFFER SIZE

5 Bytes, Numeric. Right Justified, Zero filled. When there is no Offer Size, this field is Zero filled.

The Offer Size identifies the number of contracts for sale for an option.

When the Offer Price and the Offer Size are all zeroes, it represents a cancel of a previous quote.

7.19 OPEN INTEREST VOLUME

7 Bytes, Numeric. Right Justified, Zero filled.

Represents the total number of outstanding option contracts that have not been exercised and have not yet reached expiration.

- O -

7.20 OPEN PRICE

8 Bytes, Numeric. Right Justified, Zero filled.

The **8 Byte** Open Price is the whole and decimal portion of the Open Price information with the Premium Price Denominator Code determining the location of the decimal point.

Represents the first price paid for an option during the trading day.

- P -

7.21 PREMIUM PRICE

8 Bytes, Numeric. Right Justified, Zero filled. When there is no Premium Price, this field is Zero filled.

The **8 Byte** Premium Price is the whole and decimal portion of the Premium Price information with the Premium Price Denominator Code determining the location of the decimal point.

Represents the price of an option contract, determined in the competitive marketplace, which the buyer of the option pays to the option writer for the rights conveyed by the option contract.

- P -

7.22 PREMIUM PRICE DENOMINATOR CODE

1 Byte, Alphanumeric. Space filled. The Premium Price Denominator Code field indicates the position of the floating decimal point.

Denominator Code	Denominator Value	Whole	Numerator 8 Byte Price Field (number of decimal places)
A	10	7	1
B	100	6	2
C	1,000	5	3
D	10,000	4	4
E	100,000	3	5
F	1,000,000	2	6
G	10,000,000	1	7
H	Not Defined		
I	No Fraction	8	0

Note: The International Securities Exchange normally uses Code D, but uses other codes where necessary. All other Participants use Code B.

- R -

7.23 RECEIVED MESSAGE SEQUENCE NUMBER

10 Bytes, Numeric. Right Justified, Zero filled.

Indicates the received message sequence number.

- R -

7.24 RESERVED

Variable (V) Bytes, Alphanumeric. Reserved fields are Space or Zero filled unless otherwise defined.

Fields reserved for future use.

Note: Reserved fields will be redefined and implemented as required. If data recipients are not prepared to process new field(s) when implemented, they should be able to handle them to the extent that they do not impact their normal data processing.

- S -

7.25 SECURITY SYMBOL

5 Bytes, Alpha Numeric. Left Justified, Space filled.

The **5 Byte** security symbol is used for Equity and Index options.

Identifies the unique symbol assigned to the underlying security.

- S -

7.26 SESSION INDICATOR

1 Byte, Alphabetic, Space filled.

The Session Indicator identifies the session in which the trade or quote originated.

CODE	VALUE
a (lower case)	Morning (A.M.) session
Space filled	Normal session

The a.m. session has been terminated. Processing Requirements have been left in.

Special processing requirements for the A.M. session messages include:

LAST SALES

- Volume is included in Equity and Index End of Day Summary
- Highs/Lows are not affected in Equity and Index End of Day Summary
- Data recipients should display the Session Indicator

QUOTES

- Data recipients should display the Session Indicator

EQUITY AND INDEX END OF DAY SUMMARY

- No special Equity and Index End of Day Summary will be sent at the end of the A.M. session

- S -

7.27 STRIKE PRICE CODE

1 Byte, Alphabetic.

Represents the price per share for which the underlying security may be purchased (in the case of a call) or sold (in the case of a put) by the option holder upon exercise of the option contract. Refer to **Appendix E** for the Strike Price Code tables used for a particular product, e.g., equity and index options, CBOE Dow Jones Industrial Average, etc. As of February 2010, field will be space filled.

- S -

7.28 STRIKE PRICE DENOMINATOR CODE

1 Byte, Alphanumeric, Space filled.

The Strike Price Denominator Code field indicates the position of the floating decimal point.

Denominator		Whole	Numerator 6 Byte Price Field (number of decimal places)
Code	Value		
A	10	5	1
B	100	4	2
C	1,000	3	3
D	10,000	2	4
E	100,000	1	5

- U -

7.29 UNDERLYING PRICE DENOMINATOR CODE

1 Byte, Alphanumeric. Space filled.

The Underlying Price Denominator field indicates the position of the floating decimal point.

Denominator Code	Denominator Value	Whole	Numerator 12 Byte Price Field (number of decimal places)
A	10	11	1
B	100	10	2
C	1,000	9	3
D	10,000	8	4
E	100,000	7	5
F	1,000,000	6	6
G	10,000,000	5	7
H	100,000,000	4	8

Note: The above Price Denominator Codes are based on Equity underlying code information. However, OPRA only supports a maximum of 11 BYTES in the Underlying Price Denominator field.

- U -

7.30 UNDERLYING STOCK PRICE

11 Bytes, Numeric. Right Justified, Zero filled. When there is no Underlying Stock Price, this field is Zero filled.

The **11 Byte** Underlying Stock Price is the whole and decimal portion of the Underlying Stock Price information with the Underlying Stock Price Denominator Code determining the location of the decimal point.

Represents the price of the underlying security.

- V -

7.31 VOLUME

6 Bytes, Numeric. Right Justified, Zero filled.

The **6 Byte** volume is used for Equity and Index options.

Represents the total number of contracts traded for an option in one trade, or the total number of contracts traded for an option for the entire trading day.

- Y -

7.32 YEAR

2 Bytes, Numeric. Contains the last 2 digits of the expiration year.

8.0 FIELD APPEARANCES WITHIN MESSAGES

FIELD APPEARANCES WITHIN MESSAGES

FIELD NAME	MESSAGE APPEARANCE	NUMBER OF APPEARANCES/ MESSAGES
	- B -	
Bid Index Value	Underlying Value – Bid and Offer	**1**
Bid Price	Equity and Index Quote	**1**
	with Size	**1**
	Equity and Index End of Day Summary	
Bid Size	Equity and Index Quote with Size	**1**
	- E -	
Expected Message Sequence Number	Processor Status – Unsolicited	**1**
Expiration Date	Equity and Index Last Sale	**1**
	Equity and Index Quote	**1**
	with Size	**1**
	Open Interest	
	Equity and Index End of Day Summary	**1**

FIELD APPEARANCES WITHIN MESSAGES

FIELD NAME	MESSAGE APPEARANCE	NUMBER OF APPEARANCES/ MESSAGES
	- E -	
Explicit Strike Price	Equity and Index Last Sale	**1**
	Equity and Index Quote with Size	**1**
	Open Interest	**1**
	Equity and Index End of Day Summary	**1**
	- H -	
High Price	Equity and Index End of Day Summary	**1**
	- I -	
Index Symbol	Underlying Value – Last Sale	**1**
	Underlying Value – Bid and Offer	**1**
Index Value	Underlying Value – Last Sale	**1**

FIELD APPEARANCES WITHIN MESSAGES

FIELD NAME	MESSAGE APPEARANCE	NUMBER OF APPEARANCES/ MESSAGES
	- L -	
Last Price	Equity and Index End of Day Summary	**1**
Low Price	Equity and Index End of Day Summary	**1**
		1
	- M -	
Message Sequence Number	Processor Status - Solicited	**1**
	- N -	
Net Change	Equity and Index End of Day Summary	**1**
Net Change Indicator	Equity and Index End of Day Summary	**1**
Number of Indices in Group	Underlying Value – Last Sale	**1**
	Underlying Value – Bid and Offer	**1**

FIELD APPEARANCES WITHIN MESSAGES

FIELD NAME	MESSAGE APPEARANCE	NUMBER OF APPEARANCES/ MESSAGES
	- O -	
Offer Index Value	Underlying Value – Bid and Offer	**1**
Offer Price	Equity and Index Quote with Size Equity and Index End of Day Summary	**1** **1**
Offer Size	Equity and Index Quote with Size	**1**
Open Interest Volume	Open Interest Equity and Index End of Day Summary	**1** **1**
Open Price	Equity and Index End of Day Summary	**1**
	- P -	
Premium Price	Equity and Index Last Sale	**1**
Premium Price Denominator Code	Equity and Index Last Sale Equity and Index Quote with Size Equity and Index End of Day Summary	**1** **1** **1**

FIELD APPEARANCES WITHIN MESSAGES

FIELD NAME	MESSAGE APPEARANCE	NUMBER OF APPEARANCES/ MESSAGES
	- R -	
Received Message Sequence Number	Processor Status – Unsolicited	**1**
Reserved	Equity and Index Last Sale	**2**
	Equity and Index Quote With size	**2**
	Open Interest	**2**
	Equity and Index End of Day Summary	**2**
	Underlying Value – Last Sale	**1**
	Underlying Value – Bid And Offer	**1**
	- S -	
Security Symbol	Equity and Index Last Sale	**1**
	Equity and Index Quote with Size	**1**
	Open Interest	**1**
	Equity and Index End of Day Summary	**1**

FIELD APPEARANCES WITHIN MESSAGES

FIELD NAME	MESSAGE APPEARANCE	NUMBER OF APPEARANCES/ MESSAGES
	- S -	
Session Indicator	Equity and Index Last Sale	**1**
	Equity and Index Quote with Size	**1**
Strike Price Code	Equity and Index Last Sale	**1**
	Equity and Index Quote with Size	**1**
	Open Interest	**1**
	Equity and Index End of Day Summary	**1**
Strike Price Denominator Code	Equity and Index Last Sale	**1**
	Equity and Index Quote with Size	**1**
	Open Interest	
	Equity and Index End of Day Summary	**1** **1**
	- U -	
Underlying Price Denominator Code	Equity and Index End of Day Summary	**1**
Underlying Stock Price	Equity and Index End of Day Summary	**1**

FIELD APPEARANCES WITHIN MESSAGES

FIELD NAME	MESSAGE APPEARANCE	NUMBER OF APPEARANCES/ MESSAGES
	- V -	
Volume	Equity and Index Last Sale	**1**
	Equity and Index End of Day Summary	**1**
	- Y -	
Year	Equity and Index Last Sale	**1**
	Equity and Index Quote with Size	**1**
	Open Interest	
	Equity and Index End of Day Summary	**1** **1**

9.0 ADMINISTRATIVE MESSAGES

9.01 Administrative Message (unformatted) – Category C, Type = (Space filled)

Administrative (unformatted) messages (called admins) are those messages that, because of the nature of the information they contain, cannot be readily arranged in a fixed format.

9.02 Administrative Message Length

The length of an administrative message is variable. The total length of the entire message **cannot** exceed **468** characters, including the SOH character, the Message Header, the ETX character and all characters between those characters.

9.03 Administrative Message Text

For most administrative messages, the text section of the Administrative message is transmitted in free format.

9.04 ALERT ALERT ALERT Administrative Message

Should OPRA and/or a Participant experience a failure, SIAC, at the request of OPRA and/or a Participant, will disseminate an administrative message which will always begin with the text: **ALERT ALERT ALERT** and will be followed by free form text indicating the situation being encountered.

9.05 Administrative Equity and Index FLEX Message Standards

Participants use **Category C, Type = (Space filled)** Administrative messages to transmit market data on nonstandard options that do not fit normal formats.

The following standards have been adopted by the Participants to transmit **FLEX** (equity and index options) information. The formatted text immediately follows the last character in the Message Header.

Summary of Changes for Symbology:

1. Security Symbol is 5 characters and alphanumeric
2. Request Identifier remains identified as alphanumeric, but will only be used as numeric.
3. Strike Prices and Premium Prices will now be represented as decimal in the text fields (see examples below).
4. Clearing Symbol in the text field (if used) will follow the OCC standard as described in the OCC Symbology Plan (dropping the expiration day).

9.05 Administrative Message Standards (continued)

EQUITY AND INDEX OPTIONS			
Field Descriptions	**Bytes**	**Character**	**Details**
Product Type	4	Alphabetic	FLEX
Filler	1	Space	
FLEX Type	3	Alphabetic	I – Index E – Equity
Filler	1	Space	
Security Symbol	5	Alphanumeric Left Justified Space filled	
Filler	1	Space	
Message Type	3	Alphabetic	RFQ - Request for Quote QTE - Quote LST - Last Sale CXL - Cancel ADM – Admin Message IND - Indicative Quote
Filler	1	Space	
Request Identifier	5	Alphanumeric Left Justified Space filled	
Filler	1	Space	
Text	V	Alphanumeric	Variable text up to 428 character free form

9.05 Administrative Message Standards (continued)

EQUITY INDICATIVE QUOTE (IND)			
Field Descriptions	**Bytes**	**Character**	**Details**
Product Type	4	Alphabetic	FLEX
Filler	1	Space	
FLEX Type	3	Alphabetic	E – Equity
Filler	1	Space	
Security Symbol	5	Alphanumeric Left Justified Space filled	MSFT(Space)
Filler	1	Space	
Message Type	3	Alphabetic	IND - Indicative Quote
Filler	1	Space	
Text	V	Alphanumeric	2 YR ATMC 1.55-1.63
This message is an Equity FLEX Indicative Quote MSFT 2 Year at-the-money call. 1.55% bid, offered at 1.63%.			

EQUITY ADMINISTRATIVE MESSAGE (ADM)			
Field Descriptions	**Bytes**	**Character**	**Details**
Product Type	4	Alphabetic	FLEX
Filler	1	Space	
FLEX Type	3	Alphabetic	E – Equity
Filler	1	Space	
Security Symbol	5	Alphanumeric Left Justified Space filled	MSFT(Space)
Filler	1	Space	
Message Type	3	Alphabetic	ADM – Admin Message
Filler	1	Space	
Text	V	Alphanumeric	RFQ MSFT1 Market Closed
This message is an Equity FLEX Administrative Message that RFQ MSFT1 has been closed.			

9.05 Administrative Message Standards (continued)

INDEX OPTIONS REQUEST FOR QUOTE (RFQ)			
Field Descriptions	**Bytes**	**Character**	**Details**
Product Type	4	Alphabetic	FLEX
Filler	1	Space	
FLEX Type	3	Alphabetic	I - Index
Filler	1	Space	
Security Symbol	5	Alphanumeric Left Justified Space filled	OEX
Filler	1	Space	
Message Type	3	Alphabetic	RFQ - Request for Quote
Filler	1	Space	
Request Identifier	5	Alphanumeric Left Justified Space filled	1
Filler	1	Space	
Text	V	Alphanumeric	Call 12/31/01 105% EUR CL $20M QUOTE IN % BY 1030 CST
This message is an Index FLEX Request for Quote for OEX call, Expiration date 12/31/01, Strike Price 5% out of the money (calculated at the close), European Expiration, settled on the close $20,000,000. Quotes must be made in percentages of the closing index value and must be in by 10:30 central standard time.			

INDEX OPTIONS QUOTE (QTE)			
Field Descriptions	**Bytes**	**Character**	**Details**
Product Type	4	Alphabetic	FLEX
Filler	1	Space	
FLEX Type	3	Alphabetic	I - Index
Filler	1	Space	
Security Symbol	5	Alphanumeric Left Justified Space filled	XMI
Filler	1	Space	
Message Type	3	Alphabetic	QTE - Quote
Filler	1	Space	
Request Identifier	5	Alphanumeric Left Justified Space filled	12
Filler	1	Space	
Text	V	Alphanumeric	4 ½%-5% $10Mx$10M
This message is an Index FLEX Quote for XMI, according to the terms of the request assigned identifier RFQ12. Bid 4/12%-Offer 5%, size $10,000,000 up.			

9.05 Administrative Message Standards (continued)

INDEX OPTIONS LAST SALE (LST)			
Field Descriptions	**Bytes**	**Character**	**Details**
Product Type	4	Alphabetic	FLEX
Filler	1	Space	
FLEX Type	3	Alphabetic	I - Index
Filler	1	Space	
Security Symbol	5	Alphanumeric Left Justified Space filled	SPX
Filler	1	Space	
Message Type	3	Alphabetic	LST – LAST SALE
Filler	1	Space	
Request Identifier	5	Alphanumeric Left Justified Space filled	2
Filler	1	Space	
Text	V	Alphanumeric	250 @ 23.75 5NSX
This message is an Index FLEX Last Sale for SPX Request for Quote number 2. 250 contracts traded at 23.75; clearing symbol is 5NSX.			

9.05 Administrative Message Standards (continued)

EQUITY OPTIONS LAST SALE (LST)			
Field Descriptions	**Bytes**	**Character**	**Details**
Product Type	4	Alphabetic	FLEX
Filler	1	Space	
FLEX Type	3	Alphabetic	E - Equity
Filler	1	Space	
Security Symbol	5	Alphanumeric Left Justified Space filled	IBM
Filler	1	Space	
Message Type	3	Alphabetic	LST – LAST SALE
Filler	1	Space	
Request Identifier	5	Alphanumeric Left Justified Space filled	2
Filler	1	Space	
Strike Price	1-9	Alphanumeric	125.125
Filler	1	Space	
Type (call or put)	1	Alphabetic	C
Filler	1	Space	
Exercise Style (Amer, Eur)	3-4	Alphanumeric	AMER
Filler	1	Space	
Expiration Date	10	Alphanumeric	01.02.09
Filler	1	Space	
Volume	5	Alphanumeric	500
Filler	1	Space	
Premium	1-9	Alphanumeric	3.57
Filler	1	Space	
Clearing Symbol	6	Alphanumeric	1IBM
This message is an Equity FLEX Last Sale for IBM, 125.125 Call. American exercise, expiring 01/02/09. 500 sold at 3.57			

10.0 CONTROL MESSAGES

10.01 CONTROL MESSAGE SUMMARY

Control messages perform specified system advisory and control functions.

A Control message may be originated by a Participant and transmitted to OPRA or to the data recipients, or may be originated by SIAC on behalf of OPRA for transmission to the Participants, the data recipients or both. Participants send a control message for each TCP/IP connection. The following represents all Control messages that may be originated by a Participant or by OPRA that are sent to all lines:

MESSAGE IDENTIFICATION CATEGORY	TYPE	CONTROL MESSAGE
H	**A**	Start of Test Cycle
H	**B**	End of Test Cycle
H	**C**	Start of Day
H	**D**	Good Morning
H	**E**	Start of Summary
H	**F**	End of Summary
H	**G**	Early Market Close
H	**H**	End of Transaction Reporting
H	**I**	Good Night
H	**J**	End of Day
H	**K**	Reset Sequence Number
H	**L**	Start of Open Interest
H	**M**	End of Open Interest
H	**O**	Line Integrity-Input

Control messages can consist of the standard Message Header only, or the standard Message Header immediately followed by text. The textual portion of the message is in variable field (free form).

Control messages are **not** blocked with any other messages.

10.01 CONTROL MESSAGE SUMMARY (continued)

For all Control messages, the **Participant ID** field in the **Message Header** will contain a character identifying OPRA or the Participant originating the message as follows:

CODE	VALUE
A	NYSE AMEX
B	Boston Stock Exchange
C	Chicago Board Options Exchange
I	International Securities Exchange
N	NYSE Arca
O	Options Price Reporting Authority
Q	NASDAQ Stock Market
W	C2
X	NASDAQ OMX PHLX
Z	BATS

A Participant, SIAC on behalf of OPRA, or both can originate Control messages as follows:

PARTICIPANT ID CODE	CONTROL MESSAGE
O	Start of Test Cycle
O	End of Test Cycle
O	Start of Day
A, B, C, I, N, Q, W, X or Z	Good Morning
A, B, C, I, N, Q, W, X or Z	Start of Summary
A, B, C, I, N, Q, W, X or Z	End of Summary
A, B, C, I, N, Q, W, X or Z	Early Market Close
A, B, C, I, N, Q, W, X or Z	End of Transaction Reporting
A, B, C, I, N, Q, W, X or Z	Good Night
O	End of Day
O	Reset Sequence Number
O	Start of Open Interest
O	End of Open Interest
O	Line Integrity

10.01 CONTROL MESSAGE SUMMARY (continued)

The first alphabetic upper case character of the **Message Identification** field in the **Message Header** contains the Message Category character **"H" meaning Control Message.** The second alphabetic upper case character of the **Message Identification** field in the **Message Header** contains one of the following characters **"A-N"** designating the particular **Message Type**.

In textual portions of Control messages, the Participant Identification identifies the abbreviated name of the originating Participant or the Processor as follows:

Participant/Processor Identification Abbreviation	**Participant/Processor**
AMEX	NYSE AMEX
BATS	BATS
BOX	Boston Stock Exchange
CBOE	Chicago Board Options Exchange
???	C2
ISE	International Securities Exchange
NASD	NASDAQ Stock Market
NYSE	NYSE Arca
OPRA	Options Price Reporting Authority
PHLX	NASDAQ OMX PHLX

In the free form textual portions of Control messages, where specified, **MM=Month, DD=Day, HH=Hour and MM=Minute** (The time is Eastern Time and format is Military).

10.02 CONTROL MESSAGE DESCRIPTIONS

10.03 Test Cycle Comments

Any Participant or OPRA may transmit the Start of Test Cycle message after the lines are started and before the Category H, Type C Start of Day message is sent out. Its function is to exercise the line to verify transmission integrity. A Test Cycle consists of:

- A Start of Test Cycle message
- Any number of other OPRA messages of any Category and Type
- An End of Test Cycle message

Each Test Cycle message is initiated by transmission of the Start of Test Cycle message and is terminated by transmission of an End of Test Cycle message. In between, any valid OPRA message(s) may appear. The Test Cycle can be repeated until shortly before transmission of the Start of Day message. Refer to **Appendix F** for a sample listing of Test Cycle messages.

The Message Sequence Number (MSN) in Start of Test Cycle messages will **not** be checked by OPRA.

10.04 Start of Test Cycle – Category H, Type A

The Start of Test Cycle message is transmitted to signal the start of the transmission of a Test Cycle.

The Start of Test Cycle message will consist of the standard Message Header immediately followed by the textual message:

"START OF TEST CYCLE"

The MSN of any Start of Test Cycle message is set to Zero.

Test cycle messages received from a Participant will be discarded by OPRA.

10.05 End of Test Cycle - Category H, Type B

The End of Test Cycle message is transmitted to signal the end of the transmission of a Test Cycle.

The End of Test Cycle message will consist of the standard Message Header immediately followed by the textual message:

"END OF TEST CYCLE"

The MSN field contains a number greater than the number of the last test message transmitted in the Test Cycle. Message Sequence numbers will **not** be checked by OPRA.

Test cycle messages received from a Participant will be discarded by OPRA.

10.06 Start of Day – Category H, Type C

The Start of Day message is transmitted to Participants and data recipients at the beginning of the day to signal the start of message reception from the Participants, processing of messages by OPRA and transmission of messages to the data recipients.

A Start of Day message will be transmitted to each Participant by OPRA to the Participant's private communications channel once OPRA has completed transmission of the Start of Day message to all data recipients. A Participant should not initiate data transfer with OPRA until receipt of this message. However, a Participant may transmit Control and Administrative messages to OPRA before the Start of Day message has been initiated.

Test cycle messages can be repeated until shortly before transmission of the Start of Day message.

10.06 Start of Day – Category H, Type C (continued)

The Start of Day message will consist of the standard Message Header immediately followed by the textual message:

"START OF DAY"

The Message Sequence Number (MSN) field always contains a sequence number of Zero.

10.07 Good Morning - Category H, Type D

The Good Morning message is transmitted by a Participant following acknowledgement of receipt of the Start of Day message to signal the beginning of transaction processing by that Participant.

The Good Morning message will consist of the standard Message Header immediately followed by the textual message:

"(PARTICIPANT IDENTIFICATION) GOOD MORNING – MMDD HHMM"

example: **"CBOE GOOD MORNING – 0102 0930"**

The MSN field contains a number one greater than the number of the last message transmitted.

10.08 Start of Summary - Category H, Type E

The Start of Summary message is transmitted by a Participant to signal the beginning of transmission of one or more End of Day Summary messages by that Participant.

The Start of Summary message will consist of the standard Message Header immediately followed by the textual message:

"(PARTICIPANT IDENTIFICATION) START OF SUMMARY – MMDD HHMM"

example: **"CBOE START OF SUMMARY – 0102 1000"**

The MSN field contains a number one greater than the number of the last message transmitted.

10.09 End of Summary - Category H, Type F

The End of Summary message is transmitted by a Participant to signal the end of transmission of one or more End of Day Summary messages by that Participant.

The End of Summary message will consist of the standard Message Header immediately followed by the textual message:

"(PARTICIPANT IDENTIFICATION) END OF SUMMARY – MMDD HHMM"

example: **"CBOE END OF SUMMARY – 0102 1530"**

The MSN field contains a number one greater than the number of the last message transmitted.

10.10 Early Market Close - Category H, Type G

The Early Market Close message is transmitted by a Participant to signal that the Participant originating the message is closing prior to normal market close time. Actual time of closing will be indicated by transmission of the Category H, Type H End of Transaction Reporting and the Category H, Type I Good Night messages by the Participant.

The Early Market Close message will consist of the standard Message Header immediately followed by the textual message:

"(PARTICIPANT IDENTIFICATION) MARKET CLOSED EARLY – MMDD HHMM"

example: **"CBOE MARKET CLOSED EARLY – 0102 1500"**

The MSN field contains a number one greater than the number of the last message transmitted.

10.11 End of Transaction Reporting - Category H, Type H

The End of Transaction Reporting message is transmitted by a Participant to signify that the Participant has terminated reporting of transactions.

The End of Transaction Reporting message will consist of the standard Message Header immediately followed by the textual message:

"END OF (PARTICIPANT IDENTIFICATION) REPORTING – MMDD HHMM"

example: **"END OF CBOE REPORTING – 0102 1600"**

The MSN field contains a number one greater than the number of the last message transmitted.

10.12 Good Night - Category H, Type I

The Good Night message is transmitted by a Participant to advise all data recipients that there are no further messages of any type transmitted for the day by that Participant.

The Good Night message will consist of the standard Message Header immediately followed by the textual message:

"(PARTICIPANT IDENTIFICATION) GOOD NIGHT – MMDD HHMM"

example: **"CBOE GOOD NIGHT – 0102 1630"**

The MSN field contains a number one greater than the highest MSN previously transmitted.

10.13 End of Day - Category H, Type J

The End of Day message signals the end of transmission of original data over the lines.

The End of Day message will consist of the standard Message Header immediately followed by the textual message:

"OPRA END OF DAY"

The MSN field contains a number one greater than the highest MSN previously transmitted.

Note: Under normal conditions, upon receiving the Category H, Type J End of Day message, it is the Participant's responsibility to terminate their production OPRA input feeds to SIAC.

Data traffic intended for testing purposes only is disseminated on the production network during non-production hours. Data recipients should ensure they process required input only.

10.14 Reset Sequence Number - Category H, Type K

OPRA transmits a Reset Sequence Number message to the data recipients when the sequence numbers on a line require resetting to a number specified in the Message Sequence Number field in the Message Header.

The Reset Sequence Number message will **not** be transmitted to Participants via the Participant's private communications channels.

The Reset Sequence Number message will consist of the standard Message Header immediately followed by the textual message:

"SET MESSAGE SEQUENCE NUMBER"

The MSN field contains the number to which the MSN counter is to be reset.

10.15 Start of Open Interest - Category H, Type L

The Start of Open Interest message is transmitted by a Participant to advise all data recipients of the beginning of transmission of a series of one or more Open Interest messages.

The Start of Open Interest message will consist of the standard Message Header immediately followed by the textual message:

"(PARTICIPANT IDENTIFICATION) START OF OPEN INTEREST – MMDD HHMM"

example: **"CBOE START OF OPEN INTEREST – 0102 1100"**

The MSN field contains a number one greater than the number of the last message transmitted that was not a retransmitted message.

Note:	**The Start of Open Interest control message is followed by transmission of Open Interest messages for each Participant and is ended by an End of Open Interest control message. During this cycle, Open Interest messages are sent by SIAC on behalf of OPRA. The individual Open Interest messages contain the Participant ID code of the Participant associated with the Open Interest message while the control messages contain an "O" as the Participant ID code in the Message Header.** **If a Participant initiates Open Interest messages, the Start and End of Open Interest control messages as well as the individual Open Interest messages contain the Participant ID code in the Message Header of the Participant initiating the messages.**

10.16 End of Open Interest - Category H, Type M

The End of Open Interest message is transmitted by a Participant to advise all data recipients of the end of transmission of a series of one or more Open Interest messages.

The End of Open Interest message will consist of the standard Message Header immediately followed by the textual message:

"(PARTICIPANT IDENTIFICATION) END OF OPEN INTEREST – MMDD HHMM"

example: **"CBOE END OF OPEN INTEREST – 0102 1545"**

The MSN field contains a number one greater than the number of the last message transmitted.

10.17 Line Integrity –Input Message – Category H, Type O

OPRA supports a Category H Type O Line Integrity message which will be generated from a Participant to OPRA via their input lines at a set interval (e.g., 1-second; 5- seconds). Its purpose is to provide verification of input line integrity (e.g., I'm alive). The Category H Type O Line Integrity message will be comprised of the standard OPRA message header only as defined in Section 4.12.

Line Integrity Message Characteristics:

The Message Header Field characteristics will remain the same as in the OPRA Participant Input Interface Specification, with the exception of the Message Sequence Number field will not increment; the field will Contain the last MSN generated by the Participant.

The new Participant to OPRA Control H Type O Line Integrity Message will be transmitted as the only message in a block.

The Category H Type O Line Integrity message functionality will include a configurable parameter setting to accommodate pre-set response time intervals between a Participant and OPRA.

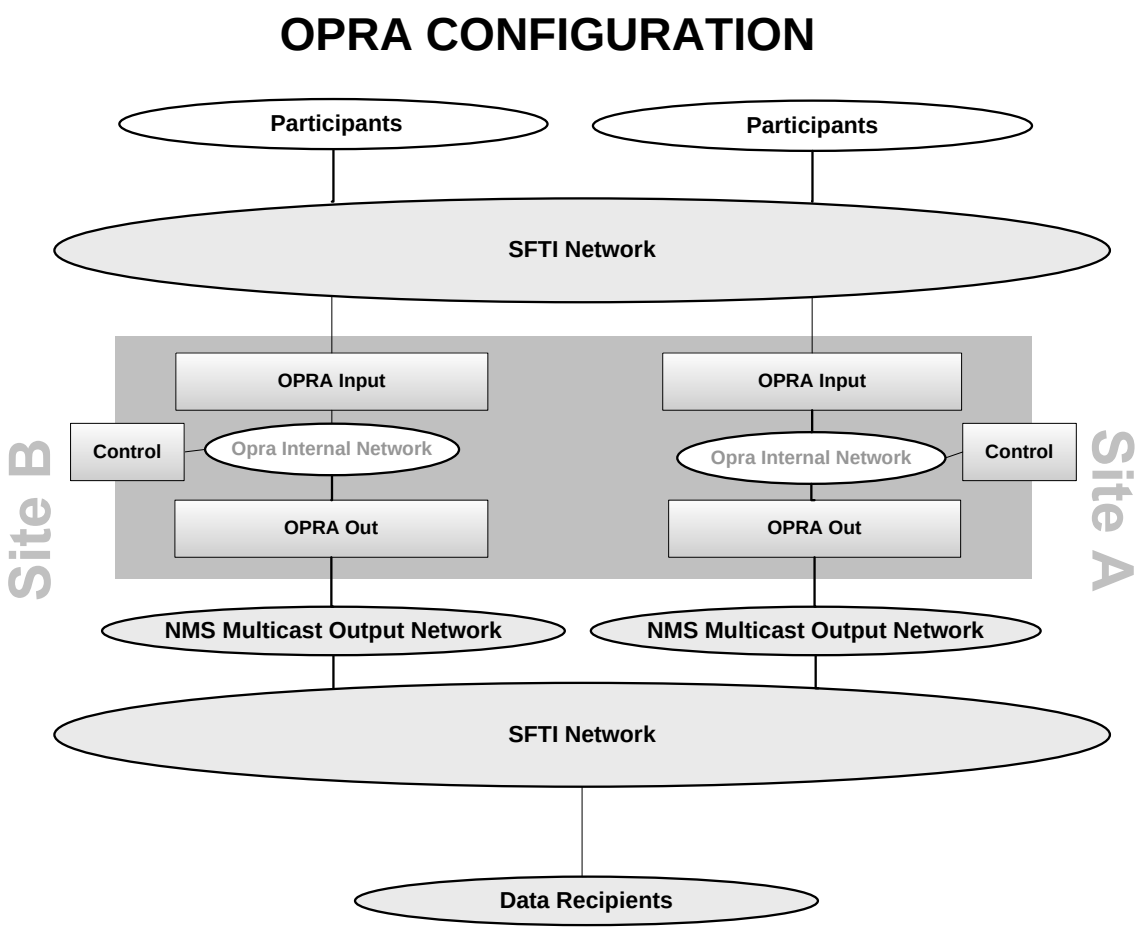
OPRA will have a timer to determine when a Participant Should be disconnected if no Category H Type O message is received once the Participant lines are connected (e.g., 1-second; 5 seconds).

A Participant must input data or a Category H Type O Line Integrity message at every defined interval. If OPRA does not receive a Category H Type O Line Integrity message from a Participant after two consecutive interval periods (e.g., two one second periods) OPRA will disconnect the Participant input line.

In instances whereby the configurable interval or response timeframes requires a change, Participants will be informed of same.

OPRA will have global disconnect command to enable/disable the Category H Type O for all Participants (the ability to turn the Category H Type O feature off by Participant, by multiple Participants, by All Participants).

APPENDIX A: OPRA DUAL SITE CONFIGURATION



APPENDIX B: SCHEDULE OF DAILY OPRA MESSAGES

Note: Time ranges shown have approximate times indicated, are dependent on daily traffic volume, and are subject to change based on a Participant's hours of operation. The Times are Eastern time.

TIME	TRANSMISSION
1:20 a.m.	Start all output lines
1:25 a.m.	Start of Test Cycle message (followed by Equity/Index test cycle messages)
2:05 a.m.	End of Test Cycle message
6:10 a.m.	Start of Day message on output lines 1-24-(Equity/Index)
6:15 a.m.	PHLX Good Morning
6:30 a.m.	Equity/Index Open Interest messages
6:45-7:15 a.m.	Equity/Index Good Morning message from AMEX, BATS, BOX, CBOE, C2, ISE and NASD
7:30 a.m.	ISE FX Options trading begins
8:20 a.m.	CBOE Interest Rate Options trading begins
8:30 a.m.	Equity/Index Good Morning message from NYSE

APPENDIX B: SCHEDULE OF DAILY OPRA MESSAGES (continued)

TIME	**TRANSMISSION**
9:30 a.m.	Equity/Index Options trading begins*
9:30 a.m.	PHLX World Currency Options trading begins
3:00 p.m.	CBOE Interest Rate Products trading ends
4:00 p.m.	Equity Options trading ends
4:15 p.m.	Index Options trading ends
4:15 p.m.	ISE FX Options trading ends
4:25 – 5:30 p.m.	Equity/Index End of Day Summary message
5:02 p.m.	End of Transaction Reporting message from each Participant
5:15 – 5:25 p.m.	Good Night message from each Participant
6:30 p.m.	End of Day message. System brought down.

*Some Index Options have non-standard trading hours.

APPENDIX C: QUOTE "KILL" PROCEDURE

If a Participant informs SIAC Operations that they are experiencing system or other problems resulting in the unreliability of their quotes, upon the request of that Participant, SIAC Operations can execute a "KILL" procedure, whereby a zero quote is generated for every issue for which that Participant had entered a quote.

When a Participant is in a "KILLED" state, their trades and administrative messages **will continue** to be processed normally.