

OPRA
**OPTIONS PRICE REPORTING
AUTHORITY**

**BINARY
PARTICIPANT INTERFACE
SPECIFICATION**

May 11, 2018

Version 2.5

TABLE OF CONTENTS

1.0	INTRODUCTION	7
1.01	BACKGROUND	7
1.02	SCOPE	7
2.0	GENERAL DESIGN OF DATA DISTRIBUTION NETWORK	8
2.01	TCP/IP INPUT PACING	8
3.0	OPRA INTERFACE METHOD	9
3.01	GENERAL DESIGN CONSIDERATION	9
4.0	TRANSMISSION CHARACTERISTICS	10
4.01	DATA TRANSMISSION	10
4.02	BLOCK SEPARATOR	10
4.03	OPRA BINARY BLOCK STRUCTURE	10
4.04	BLOCK HEADER	11
VERSION.....	.....	11
BLOCK SIZE.....	.....	11
RESERVED .....	.....	11
RESERVED .....	.....	11
RESERVED .....	.....	11
MESSAGES IN BLOCK.....	.....	12
BLOCK TIMESTAMP .....	.....	12
4.05	BLOCK DATA	13
4.06	BLOCK PAD BYTE	13
4.07	DATA FORMAT	14
5.0	MESSAGE HEADER	15
5.01	MESSAGE HEADER FIELD DESCRIPTIONS	15
PARTICIPANT ID.....	.....	15
MESSAGE CATEGORY.....	.....	16
MESSAGE TYPE .....	.....	16
SESSION INDICATOR .....	.....	19
PARTICIPANT REFERENCE NUMBER (PRN).....	.....	19
6.0	MESSAGE FORMATS	20
6.01	MESSAGE FORMAT FIELD DESCRIPTIONS	20
6.02	SUMMARY OF MESSAGE CATEGORIES AND TYPES	21
6.03	EQUITY AND INDEX LAST SALE	23
6.04	OPEN INTEREST	24
6.05	EQUITY AND INDEX END OF DAY SUMMARY	25
6.06	EQUITY AND INDEX QUOTE MESSAGES	26
6.07	ADMINISTRATIVE	29
6.08	CONTROL	30
6.09	SEQUENCE / MESSAGE COUNT STATUS	31
6.10	UNDERLYING VALUE – LAST SALE	35
6.11	UNDERLYING VALUE – BID AND OFFER	36
7.0	FIELD DESCRIPTIONS	37
7.01	BID INDEX VALUE	38
7.02	BID PRICE	38
7.03	BID SIZE	38
7.04	DENOMINATOR CODE(S)	39

7.05	EXPECTED BLOCK SEQUENCE NUMBER.....	39
7.06	EXPIRATION BLOCK.....	40
7.07	HIGH PRICE.....	41
7.08	INDEX VALUE	41
7.09	INDEX VALUE DENOMINATOR CODE	41
7.10	LAST PRICE	42
7.11	LOW PRICE.....	42
7.12	MESSAGE COUNT	42
7.13	NET CHANGE	42
7.14	OFFER INDEX VALUE.....	43
7.15	OFFER PRICE	43
7.16	OFFER SIZE	43
7.17	OPEN INTEREST VOLUME	43
7.18	OPEN PRICE	43
7.19	PREMIUM PRICE.....	44
7.20	PREMIUM PRICE DENOMINATOR CODE	44
7.20	RECEIVED MESSAGE SEQUENCE NUMBER	44
7.21	RESERVED	44
7.22	SECURITY SYMBOL	45
7.23	SESSION INDICATOR.....	45
7.23	STRIKE PRICE	45
7.24	STRIKE PRICE DENOMINATOR CODE	45
7.25	TRADE IDENTIFIER	46
7.26	UNDERLYING PRICE DENOMINATOR CODE	46
7.27	UNDERLYING PRICE	46
7.28	VOLUME.....	46
8.0	FIELD APPEARANCES WITHIN MESSAGES.....	47
9.0	ADMINISTRATIVE MESSAGES	53
9.01	ADMINISTRATIVE MESSAGE	53
9.02	ADMINISTRATIVE MESSAGE LENGTH	53
9.03	ADMINISTRATIVE MESSAGE TEXT	53
9.04	ALERT ALERT ALERT ADMINISTRATIVE MESSAGE.....	53
9.05	ADMINISTRATIVE EQUITY AND INDEX FLEX MESSAGE STANDARDS	53
10.0	CONTROL MESSAGES.....	58
10.01	CONTROL MESSAGE SUMMARY	58
10.02	CONTROL MESSAGE DESCRIPTIONS.....	61
10.03	TEST CYCLE COMMENTS.....	61
10.04	START OF TEST CYCLE – CATEGORY H, TYPE A.....	61
10.05	END OF TEST CYCLE - CATEGORY H, TYPE B	62
10.06	START OF DAY – CATEGORY H, TYPE C	62
10.07	GOOD MORNING - CATEGORY H, TYPE D	62
10.08	START OF SUMMARY - CATEGORY H, TYPE E	63
10.09	END OF SUMMARY - CATEGORY H, TYPE F	63
10.10	EARLY MARKET CLOSE - CATEGORY H, TYPE G.....	63
10.11	END OF TRANSACTION REPORTING - CATEGORY H, TYPE H	64
10.12	GOOD NIGHT - CATEGORY H, TYPE I	64
10.13	END OF DAY - CATEGORY H, TYPE J.....	64
10.14	RESET BLOCK SEQUENCE NUMBER - CATEGORY H, TYPE K	65
10.15	START OF OPEN INTEREST - CATEGORY H, TYPE L	65
10.16	END OF OPEN INTEREST - CATEGORY H, TYPE M.....	65
10.17	LINE INTEGRITY MESSAGE - CATEGORY H, TYPE O.....	66
10.18	DISASTER RECOVERY DATA CENTER ACTIVATION - CATEGORY H, TYPE P.....	66
APPENDIX A:	OPRA CONFIGURATION.....	67
APPENDIX B:	SPECIAL BBO OPERATIONAL “KILL” PROCEDURE	68

APPENDIX C: SCHEDULE OF DAILY OPRA MESSAGES.....	69
APPENDIX D: SPECIAL PROCESSING FIELD RESTRICTIONS	71
APPENDIX D: SPECIAL PROCESSING FIELD RESTRICTIONS	72
APPENDIX D: SPECIAL PROCESSING FIELD RESTRICTIONS, CONTINUED	73

ADDENDUMS

1. TCP/IP FOR NATIONAL MARKET SYSTEM (NMS) PARTICIPANT INPUT

THE ADDENDUM IS AVAILABLE FROM WWW.OPRADATA.COM UNDER INPUT SPECIFICATIONS-BINARY.

DOCUMENT HISTORY

Version	Date	Description
1.8	4/10/2015	- Appendix 'C' – Extended the time for the “Goodnight Message/System Shut Down” from 6:30 to 7:00pm et
1.9	5/4/2015	- Section 4.04: Block Header - updated with new version number - Section 5.0: Message Header - updated to include the new expanded message header - Message Formats (throughout): updated to include the new expanded message header
2.0	5/18/2015	- Section 5.01, 10.01 and Appendix 'C': Added New Exchange: EDGX Options
2.1	3/22/2016	- Section 5.0: Message Header - updated to remove the old header - Message Formats (throughout): updated to remove the old header - Appendix D – Expanded Index Symbol – Remove 3 digit restriction
2.2	10/21/2016	- Added new Participant MIAX PEARL
2.3	5/12/2017 & 8/21	- 5.00 & 6.00 - Added new Indicative Value Message Type 'I'
2.4	7/11/2017	- Revise NYSE AMEX to NYSE American
2.5	5/11/2018	- 10.17 Updated Line Integrity characteristics section with OPRA response back to participant

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 Markets. 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.

Options market data generated by each Participant is assembled in prescribed message formats and transmitted to the appropriate TCP/IP Processor address via the Participant’s private communications facility. As each block is received, it is transmitted 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 option transactions are operational at primary and backup sites. The backup site provides recovery capability in the event of a disaster at the primary site. Through computerized communications equipment, OPRA transaction data is disseminated from either the primary or backup site. The OPRA site configuration is illustrated in **Appendix A**.

1.02 SCOPE

This specification defines the interface specification and message format requirements for Participants inputting into 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 rate targets which are enforced through continuous input pacing by the OPRA Processor. The input pacing rates are not fixed and can vary depending on changing traffic conditions. For example, if Participant “A” experiences a surge in traffic and requires more bandwidth than their present pacing rate allows, the OPRA Processor will “borrow” bandwidth from excess system capacity if available

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 letters of the symbol.

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 N, Sequence Number Status, Type L, Status Inquiry Request (Participant generated), and Category N, Sequence Number Status Type M, Sequence Response – 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 it has already received (due to a lower than expected sequence number) and process those it has not received.

3.01 GENERAL DESIGN CONSIDERATION

OPRA receives and transmits variable length blocks having maximum lengths of 1000 characters. The length includes a Block Header, Block Data and an optional Block Pad Byte.

4.0 TRANSMISSION CHARACTERISTICS

4.01 DATA TRANSMISSION

Data transmitted between the Participants and OPRA is sent using TCP/IP. For a description of the TCP/IP Segment, please reference section 7 of the addendum to this document, “TCP/IP for NMS Participant Input”). This addendum is available from www.oprapdata.com. TCP/IP Header is not returned to the application on reading the socket.

The OPRA data is sent as an OPRA Binary Block, and makes up the TCP/IP payload. Since TCP/IP is byte-stream, an OPRA Binary Block boundary may not match the TCP segment boundary; for example, a single TCP segment may contain more than one OPRA Binary Block or an OPRA Binary Block can be spread between two TCP segments.

The block separator will be used to determine the start of the OPRA Binary Block. It is the Participant’s responsibility to create the correct OPRA Binary Block structure: block separator, version byte, block length, check sum and pad byte (when needed). Incorrect block length information or a displaced pad byte will result in lost messages.

In the case of an incorrectly formatted block, the OPRA system will search for the next block separator before it will resume processing. To ensure that the block separator bytes are not, in fact, actual data within the block, OPRA will additionally check for a valid block header, check sum and the next block separator at the correct position given by the block length before considering the block valid.

4.02 BLOCK SEPARATOR

The separator is a 2 Byte sequence of Hex 0xA5 & 0x5A (offers better guarantees that the format will be identified correctly).

4.03 OPRA BINARY BLOCK STRUCTURE

Block Structure	Bytes
Block Header	21
Block Data	Variable
Block Pad Byte (if required)	1

A block can have a maximum of 1,000 characters inclusive of Block Separator, Header, Data, and Pad Byte.

4.04 BLOCK HEADER

Field Name	Length (bytes)	Modification
Version	1	Current: Version 2 New: Version 4
Block Size	2	
Reserved*	1	
Reserved*	1	
Reserved*	1	
Block Sequence Number	4	
Messages In Block	1	
Block Timestamp	8	
Block CheckSum	2	
Total Length:	21	

VERSION

- **CURRENT VERSION: 1 Byte, unsigned integer. (Hex 0x02) for current version.**
Designates the OPRA binary version (Note: this version will continue to be supported)
- **NEW VERSION: 1 Byte, unsigned integer. (Hex 0x04) for new version. Designates the OPRA binary version**

BLOCK SIZE

2 Bytes, unsigned integer. Size in bytes of entire block (as described in 3.01)

RESERVED

1 Byte, unsigned integer. Value is binary zero (Hex 0x00). Reserved for future use.

RESERVED

1 Byte, unsigned integer. Value is binary zero (Hex 0x00). Reserved for future use.

RESERVED

1 Byte, unsigned integer. Value is binary zero (Hex 0x00). Reserved for future use.

* Note: To maintain consistency between the input and output message format the “Reserved” field is represented as three separate fields.

BLOCK SEQUENCE NUMBER

4 Bytes, unsigned integer. All transmission blocks are assigned a sequential Block Sequence Number. Currently, it rolls over after 1,999,999,999. On a per line basis, the Block Sequence Number on the lines are set to Zero at the start of each day, and incremented by one each time a block is transmitted, with the following conditions:

1. The first good morning message from a Participant contains a zero block sequence number.
2. All Sequence Number Status Messages (Category ‘N’) have a zero block sequence number.

MESSAGES IN BLOCK

1 byte, unsigned integer. The number of messages contained in the block data.

BLOCK TIMESTAMP

8 Bytes, contains the block timestamp. The first 4 bytes (Seconds) contains the number seconds from epoch 1/1/1970, 00:00:00 UTC. The next 4 bytes contain the nanosecond portion of the time currently rounded to the nearest microsecond (e.g., 972402000).

SIAC recommends to represent this time in HH:MM:SS.mmmmmm format EST/EDT when communicating with OPRA.

BLOCK CHECKSUM

2 Bytes, Unsigned Integer. Lower 16 bits of the 32 bit sum of all bytes in the block, excluding the Block Checksum field.

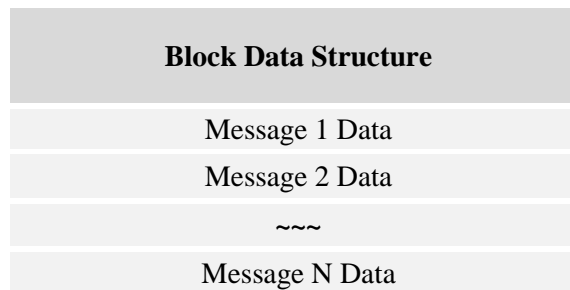
4.05 BLOCK DATA

The Block Data consists of one or more OPRA messages.

A message consists of a Message Header, which is of fixed length and format, and Message Data, which is variable in length and format.

Message categories C (Administrative) and H (Control) are each sent in their own individual block.

The Block Data structure is depicted below:



4.06 BLOCK PAD BYTE

1 Byte, unsigned integer contains binary zero (Hex 0x00). Only used when the length of a block consists of an odd number of bytes. It is then added to the block to ensure the block is an even number of bytes.

4.07 DATA FORMAT

1. Numeric values will be 1, 2, 4 or 8 byte binary integers and will be sent in network order (big-endian)
2. Any value that is unused or does not apply to a given message type has a value of Hex 0x00, except where noted.
3. Prices and index values are represented as either 2 byte unsigned integers in Short Quotes (category q) or 4 byte signed integers in all other message categories, except where noted. Price and index values will be restricted to 8 digits and will be non-negative.
4. All other numeric fields (sizes, volumes, fields in the block header) will be represented as 1, 2, or 4 byte unsigned integers, except where noted. Reference Appendix 'D' for field size restrictions.
5. ASCII characters are either digits ('0'-'9'), upper or lower case letters ('A'-'Z', 'a'-'z') or space (' ').
6. All negative values will be represented as 2's compliment.

5.0 MESSAGE HEADER

The Message Header supplied on each message contains the following number of bytes and data fields:

MESSAGE HEADER FORMAT	
Field Name	Length
Participant ID	1
Message Category	1
Message Type	1
Session Indicator	1
Participant Reference Number	4
Total Length	8

All messages, except for categories ‘C’ & ‘H’, have a fixed length, which is determined by reading the Message Category.

5.01 MESSAGE HEADER FIELD DESCRIPTIONS

PARTICIPANT ID

The Participant ID field is a **1 Byte**, ASCII character that identifies the Participant or Processor that initiated the message (* = application pending):

CODE	VALUE
A	NYSE American
B	Boston Options Exchange
C	Chicago Board Options Exchange
E	EDGX Options
H	ISE GEMINI
I	International Securities Exchange
J	ISE MERCURY Exchange
M	Miami International Securities Exchange
N	NYSE ARCA
O	Options Price Reporting Authority
P	MIAX PEARL
Q	NASDAQ Stock Market
T	NASDAQ OMX BX Options
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.

MESSAGE CATEGORY

The Message Category field is a 1 **Byte**, ASCII character, either an upper or lower case letter.

LOWER CASE CODE	VALUE
a	EQUITY AND INDEX LAST SALE
d	OPEN INTEREST
f	EQUITY AND INDEX END OF DAY SUMMARY
k	LONG EQUITY AND INDEX QUOTE
q	SHORT EQUITY AND INDEX QUOTE
UPPER CASE CODE	VALUE
C	ADMINISTRATIVE
H	CONTROL
N	SEQUENCE NUMBER STATUS
Y	UNDERLYING VALUE MESSAGE

MESSAGE TYPE

The Message Type field is a 1 **Byte**, ASCII character, either an upper or lower case letter, or a space. 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.

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

Chart on following page.

MESSAGE TYPE, continued

MESSAGE TYPES		
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	OSQ	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 an order involving a single option leg (buy or sell of a call or put) and stock. 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. Process like a normal transaction.
S	ISOI	Transaction was the execution of an order identified as an Intermarket Sweep Order. Process like normal
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 quote 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. Process like a normal transaction except don’t update “last”.
X	XMPT	Transaction is Trade Through Exempt. The transaction should be treated like a regular sale.

MESSAGE TYPE, continued

The **Message Type** character for the **Category C (Administrative)**, **Category f (Equity and Index End of Day Summary)**, and **Category d (Open Interest)** 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 Block Sequence Number
L	Start of Open Interest
M	End of Open Interest
O	Line Integrity
P	Disaster Recovery Data Center Activation

The following **Message Types** apply to **Category k (Long Equity and Index Quote)** and **Category q (Short Equity and Index Quote)**:

CODE	VALUE
Space	Regular Trading
F	Non-Firm Quote
I	Indicative Value
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

MESSAGE TYPE, continued

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

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

The following **Message Types** apply to the **Category N – Sequence / Message Count Status** message:

CODE	VALUE
L	Block Sequence Number Status Inquiry Request
M	Block Sequence Number Status Response
N	Block Sequence Number Status Mismatch
R	Message Count Status Inquiry Request
S	Message Count Status Response

SESSION INDICATOR

1 Byte, unsigned integer.

- Hex 0x00 for regular trading session (only used during Regular OPRA Session (unchanged value))
- ASCII 'X' for Pre-Market extended hours trading session (only used during Pre-Market Extended Session (New Value))

PARTICIPANT REFERENCE NUMBER (PRN)

4 Byte, unsigned integer

- The PRN is for optional use by the Participant
- The PRN does not need to be unique on a per security basis

6.0 MESSAGE FORMATS

Each message transmitted by Participants or OPRA consists of a Message Header and Message Data. The particular Message Category, Message Type, determines the format of the data and the message length. Administrative and Control messages contain an additional field with the data length.

Message formats are fixed field formats (with the exception of Administrative messages which have unformatted data). The data for control messages can contain any text or binary data. The textual portion of the message is a variable field (free form). If a control message contains binary data, its format depends on the message type.

6.01 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.

6.02 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	STD L
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
f	Space filled	Equity and Index End of Day Summary
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 Block Sequence Number
H	L	Start of Open Interest
H	M	End of Open Interest
H	O	Line Integrity
H	P	Disaster Recovery Data Center Activation

SUMMARY OF MESSAGE CATEGORIES AND TYPES (continued)

CATEGORY(S)	TYPE(S)	MESSAGE DESCRIPTION
k, q	Space filled	Regular Trading
k, q	F	Non-Firm Quote
k, q	I	Indicative Value
k, q	R	Rotation
k, q	T	Trading Halted
k, q	A	Eligible for Automatic Execution
k, q	B	Bid contains Customer Trading Interest
k, q	O	Offer contains Customer Trading Interest
k, q	C	Both Bid and Offer contain Customer Trading Interest
k, q	X	Offer Side of Quote Not Firm; Bid Side Firm
k, q	Y	Bid Side of Quote Not Firm; Offer Side Firm
N	L	Block Sequence Number Status Inquiry Request
N	M	Block Sequence Number Status Response
N	N	Block Sequence Number Status Mismatch
N	R	Message Count Status Inquiry Request
N	S	Message Count Status Response
Y	Space filled	Index based on Last Sale
Y	I	Index based on Bid and Offer

6.03 EQUITY AND INDEX LAST SALE

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

Field Name	Length (bytes)	Field Restrictions
Message Header	8	
Security Symbol	5	
Reserved	1	
Expiration Block	3	
Strike Price Denominator Code	1	
Strike Price	4	x
Volume	4	x
Premium Price Denominator Code	1	
Premium Price	4	x
Trade Identifier	4	
Reserved	4	
Total Length:	39	

Note: Reference Appendix 'D' for details regarding field restrictions

6.04 OPEN INTEREST

The Open Interest message is used to report 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.

Note: Currently, these messages are not reported by the Participants, only by OPRA.

Message Category	Type
d	Space filled

Field Name	Length (bytes)	Field Restrictions
Message Header	8	
Security Symbol	5	
Reserved	1	
Expiration Block	3	
Strike Price Denominator Code	1	
Strike Price	4	x
Open Interest Volume	4	x
Total Length:	26	

Note: Reference Appendix ‘D’ for details regarding field restrictions

6.05 EQUITY AND INDEX END OF DAY SUMMARY

The Equity and Index End of Day Summary message is transmitted shortly before the Good Night messages. It provides, by symbol, a Participant’s open, high, low, last, net change and underlying information.

Note: If no quote or last sale occurred for a security, no Equity and Index End of Day Summary is generated.

Message Category	Type
f	Space filled

Field Name	Length (bytes)	Field Restrictions
Message Header	8	
Security Symbol	5	
Reserved	1	
Expiration Block	3	
Strike Price Denominator Code	1	
Strike Price	4	x
Volume	4	x
Open Interest Volume	4	x
Premium Price Denominator Code	1	
Open Price	4	x
High Price	4	x
Low Price	4	x
Last Price	4	x
Net Change	4	x
Underlying Price Denominator Code	1	
Underlying Price	8	x
Bid Price	4	x
Offer Price	4	x
Total Length:	68	

Note: Reference Appendix ‘D’ for details regarding field restrictions

6.06 EQUITY AND INDEX QUOTE MESSAGES

An Equity and Index Quote message is used to report an equity and index option's quote.

For bandwidth efficiencies, there are two Equity and Index Quote Message formats:

- 1) Long Equity and Index Quote (Category k) – Contains a full quote, using four byte integers for all prices and sizes.
- 2) Short and Expanded Short Equity and Index Quotes (Category q) – Contains a “short” quote, using two byte unsigned integers for prices and sizes.

Below are the following short quote, category ‘q’ restrictions:

- a) Security Symbol is restricted to a maximum of four (category ‘q’) characters.
- b) Strike Price Denominator Code is implied to be ‘A’ (one digit to the right of the decimal point)
- c) Premium Price Denominator Code is implied to be ‘B’ (two digits to the right of the decimal point).

Any quote that meets the requirements of the Short Quote given above must be sent as a Short Equity and Index Quote message. Any other quote (Security Symbol of five characters, any price or size unable to fit in a two byte integer with the given Denominator Code restrictions), will be sent as a Long Equity and Index Quote message.

Note: Reference Appendix ‘D’ for details regarding field restrictions

6.06.1 LONG EQUITY AND INDEX QUOTE

Message Category	Type
k	Space filled,
	A, B, C, F, I, O,
	R, T, X, Y

Field Name	Length (bytes)	Field Restrictions
Message Header	8	
Security Symbol	5	
Reserved	1	
Expiration Block	3	
Strike Price Denominator Code	1	
Strike Price	4	x
Premium Price Denominator Code	1	
Bid Price	4	x
Bid Size	4	x
Offer Price	4	x
Offer Size	4	x
Total Length:	39	

Note: Reference Appendix 'D' for details regarding field restrictions

6.06.2

SHORT EQUITY AND INDEX QUOTE

Message Category	Type
q	Space filled,
	A, B, C, F, I, O,
	R, T, X, Y

Field Name	Length (bytes)	Field Restrictions
Message Header	8	
Security Symbol	4	
Expiration Block	3	
Strike Price	2	x
Bid Price	2	x
Bid Size	2	x
Offer Price	2	x
Offer Size	2	x
Total Length:	25	

Note: Reference Appendix 'D' for details regarding field restrictions

6.07 ADMINISTRATIVE

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.

Message Category	Type
C	Space filled

Field Name	Length (bytes)
Message Header	8
Message Data Length	2
Message Data (Free-Form ASCII Text <u>or</u> Binary Data)	Variable (Max 450)

- Message Data Length is a 2 Byte unsigned integer which represents the length of the Message Data field. Message Data Length can be zero if there is no message data.
- ‘C’ messages will be sent individually, one to a block
- Existing Message Data Length: Variable (6 Bytes + Message Data length)
- **New Message Data Length: Variable (10 Bytes + Message Data length)**

6.08 CONTROL

Control messages perform specified system advisory and control functions, for example “The Good Morning” message.

Category	Type
H	A, B, C, D, E
	F, G, H, I, J,
	K, L, M, N, O, P

Field Name	Length (bytes)
Message Header	8
Message Data Length	2
Message Data (Free-Form ASCII Text <u>or</u> Binary Data)	Variable (Max 450)

- Message Data Length is a two byte unsigned integer which represents the length of the Message Data field. Message Data Length can be zero if there is no message data.
- ‘H’ messages will be sent singly, one to a block
- Existing Message Data Length: Variable (6 Bytes + Message Data length)
- **New Message Data Length: Variable (10 Bytes + Message Data length)**

6.09 SEQUENCE / MESSAGE COUNT STATUS

- The Sequence Status message types ('L', 'M' and 'N') are used to synchronize the Block Sequence Numbers sent to OPRA by the Participants.
- The Message Count Status types ('R' and 'S') are used to retrieve the count of messages received on an individual line since startup.

There are five message types:

- 1) **Type 'L'** – Block Sequence Number Status Inquiry Request – This message is sent by the Participant to OPRA to request the last Block Sequence Number received on that line.
- 2) **Type 'M'** – Block Sequence Response – Sent to the participant by OPRA in response to a Type 'L' message, it contains the last Block Sequence Number received on that input line.
- 3) **Type 'N'** – Block Sequence Mismatch – This message is sent to the participant by OPRA when it detects a sequence number mismatch. It contains the Block Sequence Number that was expected on that line, and the number that was actually received. Note: This function is currently not enabled

There are two conditions under which this occurs:

- a) The received Block Sequence Number is greater than expected – The block is accepted and processed normally.
 - b) The received Block Sequence Number is less than expected – The block is assumed to be a retransmission, and is ignored.
- 4) **Type 'R'** – Message Count Status Inquiry Request – This message is sent by the Participant to OPRA to request the message count on that line.
 - 5) **Type 'S'** – Message Count Status Response – This message is sent from OPRA to the participants in response to a 'Message Count Status Request'. It contains the count of messages received on an individual line since startup. This message count does not include category 'N' (all types) nor Line Integrity messages (category 'H', type 'O').

Note: The Message Count Status Response will roll over after 9,999,999,999.

- All Sequence Number Status messages are sent individually, in their own block.

6.09.1 BLOCK SEQUENCE NUMBER STATUS INQUIRY REQUEST

Category	Type
N	L

Field Name	Length (bytes)
Message Header	8
Reserved	4
Reserved	4
Total Length:	16

6.09.2 BLOCK SEQUENCE NUMBER STATUS RESPONSE

Category	Type
N	M

Field Name	Length (bytes)
Message Header	8
Block Sequence Number	4
Reserved	4
Total Length:	16

6.09.3 BLOCK SEQUENCE NUMBER STATUS MISMATCH

Category	Type
N	N

Field Name	Length (bytes)
Message Header	8
Expected Block Sequence Number	4
Received Block Sequence Number	4
Total Length:	16

6.09.4 MESSAGE COUNT STATUS INQUIRY REQUEST

Category	Type
N	R

Field Name	Length (bytes)
Message Header	8
Reserved	8
Total Length:	16

6.09.5 MESSAGE COUNT STATUS RESPONSE

Category	Type
N	S

Field Name	Length (bytes)
Message Header	8
Message Count	8
Total Length:	16

6.10 UNDERLYING VALUE – LAST SALE

The Underlying Value – Last Sale message (Message Type ‘space ’) is a fixed length record containing the Last Sale Index Value.

Message Category	Type
Y	Space filled

Field Name	Length (bytes)	Field Restrictions
Message Header	8	
Security Symbol	5	x
Reserved	1	
Index Value Denominator Code	1	
Index Value	4	x
Reserved	4	
Total Length:	23	

Note: Reference Appendix ‘D’ for details regarding field restrictions

6.11 UNDERLYING VALUE – BID AND OFFER

The Underlying Value – Bid and Offer message (Message Type ‘I’) is a fixed length record containing the Last Sale Bid/Offer Index Value.

Message Category	Type
Y	I

Field Name	Length (bytes)	Field Restrictions
Message Header	8	
Security Symbol	5	x
Reserved	1	
Index Value Denominator Code	1	
Bid Index Value	4	x
Offer Index Value	4	x
Total Length:	23	

Note: Reference Appendix ‘D’ for details regarding field restrictions

7.0 FIELD DESCRIPTIONS

ASCII code characters are defined as follows:

TERMINOLOGY	DESCRIPTION
Alphabetic	ASCII characters: upper case A – Z <u>or</u> lower case a – z
Numeric	ASCII characters numeric 0 – 9
Alphanumeric	Any combination of Alphabetic and Numeric as defined above
Space	A space character ‘ ’

Note 2: Price and size fields in equity quotes have two sizes and message formats:

- 1) Long quotes (Category k), Four Bytes**
- 2) Short quotes (Category q), Two Bytes**

FIELD DESCRIPTIONS, continued

- B -

7.01 BID INDEX VALUE

4 Bytes, signed integer.

The Bid Index Value is the whole and decimal portion of the Bid Index Value information with the Premium Price Denominator Code determining the location of the decimal point.

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

7.02 BID PRICE

4 Byte signed integer (for Categories f and k), **2 byte** unsigned integer (for Category q). A Zero in this field represents a valid Bid Price.

The 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

4 or 2 Bytes, unsigned integer. When there is no Bid Size, this value is Zero.

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 both zero, it represents a cancel of a previous quote.

FIELD DESCRIPTIONS, continued**- D -****7.04 DENOMINATOR CODE(S)****1 Byte**, alphabetic.

The following Denominator Codes are used for all Denominator Code fields. These are, Index Value Denominator Code, Premium Price Denominator Code, Strike Price Denominator Code, and Underlying Price Denominator Code.

Denominator		Numerator	Field Limit			
Code	Value	(number of decimal places)	Index Value Denom	Premium Price Denom	Strike Price Denom	Underlying Price Denom
A	10	1	YES	YES	YES	YES
B	100	2	YES	YES	YES	YES
C	1,000	3	YES	YES	YES	YES
D	10,000	4	YES	YES	YES	YES
E	100,000	5	YES	YES	YES	YES
F	1,000,000	6	YES	YES	NO	YES
G	10,000,000	7	YES	YES	NO	YES
H	100,000,000	8	NO	NO	NO	YES
I	No Fraction	0	YES	YES	YES	YES

Field Limits:

- Index Value Denominator Code supports denominator code ‘A’ thru ‘G’ and ‘I’
- Premium Price Denominator Code supports denominator code ‘A’ thru ‘G’ and ‘I’
- Strike Price Denominator Code supports denominator code ‘A’ thru ‘E’ and ‘I’
- Underlying Price Denominator Code supports ALL denominator codes

- E -**7.05 EXPECTED BLOCK SEQUENCE NUMBER****4 Bytes**, unsigned integer. Indicates the expected message sequence number.

FIELD DESCRIPTIONS, continued

- E -

7.06 EXPIRATION BLOCK

Expiration Block is a three byte field which represents the expiration month, day, and year of the option, and is used in Message Categories a, d, f, k and q.

Field Name	Length (bytes)
Expiration Month	1
Expiration Day	1
Expiration Year	1
Total Length:	3

- **Expiration Month: 1 Byte**, alphabetic. Indicates the expiration month and identifies the option as a Call or a Put.

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

- **Expiration Day: 1 Byte**, unsigned integer. Contains Hex 0x01 to 0x1F (decimal 1 to 31), indicating the day of the month 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. For accelerated options, the original date continues to be sent.
- **Expiration Year: 1 Byte**, unsigned integer. Contains Hex 0x00 to 0x63 (decimal 0 to 99). Represents the year, starting with year 2000.

FIELD DESCRIPTIONS, continued

- H -

7.07 HIGH PRICE

4 Bytes, signed integer.

The 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 -

7.08 INDEX VALUE

4 Bytes, signed integer.

The Index Value is the whole and decimal portion of the Index Value information with the Premium Price Denominator Code determining the location of the decimal point.

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

7.09 INDEX VALUE DENOMINATOR CODE

1 Byte, alphabetic.

The Index Value Denominator Code field indicates the position of the floating decimal point within either the Index Value, Bid Index Value, or Offer Index Value fields.

Reference section 7.04 for Denominator Code(s) and Value(s)

FIELD DESCRIPTIONS, continued

- L -

7.10 LAST PRICE

4 Bytes, signed integer.

The 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.

7.11 LOW PRICE

4 Bytes, signed integer.

The 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 -

7.12 MESSAGE COUNT

8 Bytes, unsigned integer.

Contains the count of messages received on an individual Participant line since startup. This message count does not include category 'N' block sequence types 'L', 'M' and 'N', nor Line Integrity messages (category 'H', type 'O')

- N -

7.13 NET CHANGE

4 Bytes, signed integer.

The Net Change is the whole and decimal portion of the Net Change information with the Premium Price Denominator Code determining the location of the decimal point.

Represents the change in the price of an option from the closing price of one day to the closing price on the next day on which the option is traded.

This value can be positive, negative or zero.

FIELD DESCRIPTIONS, continued

- O -

7.14 OFFER INDEX VALUE

4 Bytes, signed integer.

The Offer Index Value is the whole and decimal portion of the Offer Index Value information with the Premium Price Denominator Code determining the location of the decimal point.

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

7.15 OFFER PRICE

4 Bytes, signed integer (for Categories f and k), 2 byte unsigned integer (for Category q). A Zero in this field represents an invalid Offer Price.

The Offer Price is the whole and decimal portion of the Offer 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.

7.16 OFFER SIZE

4 or 2 Bytes, unsigned integer. When there is no Offer Size, this value is zero.

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

7.17 OPEN INTEREST VOLUME

4 Bytes, unsigned integer.

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

7.18 OPEN PRICE

4 Bytes, signed integer.

The 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.

FIELD DESCRIPTIONS, continued

- P -

7.19 PREMIUM PRICE

4 Bytes, signed integer.

The 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.

7.20 PREMIUM PRICE DENOMINATOR CODE

1 Byte, alphabetic.

The Premium Price Denominator Code field indicates the position of the floating decimal point within either the Premium Price, Bid Price, Offer Price, Open Price, High Price, Low Price, or Last Price fields.

Reference section 7.04 for Denominator Code(s) and Value(s)

- R -

7.20 RECEIVED MESSAGE SEQUENCE NUMBER

4 Bytes, unsigned integer. Indicates the received message sequence number.

7.21 RESERVED

Variable (V) Bytes, unsigned integer. Reserved fields filled with Hex 0x00.

Fields reserved for future use.

FIELD DESCRIPTIONS, continued

- S -

7.22 SECURITY SYMBOL

**4 Bytes (short quote only (category ‘q’) or
6 Bytes (for all message categories except for short quotes (category ‘q’))**
Alphanumeric. Left Justified, Space filled.

The security symbol is used for Equity and Index options.

Identifies the unique symbol assigned to the underlying security.

7.23 SESSION INDICATOR

1 Byte, unsigned integer.

- Hex 0x00 for regular trading session (only used during Regular OPRA Session (unchanged value))
- ASCII ‘X’ for Pre-Market extended hours trading session (only used during Pre-Market Extended Session (New Value))

7.23 STRIKE PRICE

4 Byte, signed integer (for Categories a, d, f and k), 2 byte unsigned integer (for Category q).

The Strike Price is the whole and decimal portion of the Strike Price information with the Strike Price Denominator Code determining the location of the decimal point.

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.

7.24 STRIKE PRICE DENOMINATOR CODE

1 Byte, alphabetic.

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

Reference section 7.04 for Denominator Code(s) and Value(s)

FIELD DESCRIPTIONS, continued

- T -

7.25 TRADE IDENTIFIER

4 Bytes, unsigned integer.

Fields reserved for future use. Filled with Hex 0x00.

- U -

7.26 UNDERLYING PRICE DENOMINATOR CODE

1 Byte, alphabetic.

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

Reference section 7.04 for Denominator Code(s) and Value(s)

7.27 UNDERLYING PRICE

8 Bytes, signed integer.

The 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 -

7.28 VOLUME

4 Bytes, unsigned integer.

The 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.

8.0 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 End of Day Summary	1
	Long Equity and Index Quote	1
	Short Equity and Index Quote	1
Bid Size	Long Equity and Index Quote	1
	Short Equity and Index Quote	1
Block CheckSum	Block Header	1
Block Size	Block Header	1
Block Timestamp	Block Header	1
Block Sequence Number	Block Header	1
	Sequence/Message Count Status – Block Sequence Number Status	1
	Mismatch (Type N)	1
- D -		
Data Feed Indicator	Block Header	1
- E -		
Expiration Block	Equity and Index Last Sale	1
	Open Interest	1
	Equity and Index End of Day Summary	1
	Long Equity and Index Quote	1
	Short Equity and Index Quote	1
Expected Block Sequence Number	Sequence/Message Count Status – Block Sequence Number Status Mismatch (Type N)	1

FIELD APPEARANCES WITHIN MESSAGES, continued

FIELD NAME	MESSAGE APPEARANCE	NUMBER OF APPEARANCES/MESSAGES
- H -		
High Price	Equity and Index End of Day Summary	1
- I -		
Index Value	Underlying Value – Last Sale	1
Index Value Denominator	Underlying Value – Last Sale	1
Code	Underlying Value – Bid and Offer	1

FIELD APPEARANCES WITHIN MESSAGES, continued

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
- M -		
Message Count	Sequence/Message Count Status	1
Message Data	Administrative	1
	Control	1
Message Data Length	Administrative	1
	Control	1
Message Header	Equity and Index Last Sale	1
	Open Interest	1
	Equity and Index End of Day Summary	1
	Long Equity and Index Quote	1
	Short Equity and Index Quote	1
	Administrative	1
	Control	1
	Sequence/Message Count Status – Block Sequence Number	1
	Inquiry Request (Type L)	
	Sequence/Message Count Status – Block Sequence Number	1
	Status Response (Type M)	
	Sequence/Message Count Status – Block Sequence Number	1
	Status Mismatch (Type N)	
	Sequence/Message Count Status – Message Count Status Inquiry Request (Type R)	1
Sequence/Message Count Status – Message Count Status (Type S)	1	
Underlying Value – Last Sale	1	
Underlying Value – Bid and Offer		
Messages in Block	Block Header	1
- N -		
Net Change	Equity and Index End of Day Summary	1

FIELD APPEARANCES WITHIN MESSAGES, continued

FIELD NAME	MESSAGE APPEARANCE	NUMBER OF APPEARANCES/ MESSAGES
- O -		
Offer Index Value	Underlying Value – Bid and Offer	1
Offer Price	Equity and Index End of Day Summary	1
	Long Equity and Index Quote	1
	Short Equity and Index Quote	1
Offer Size	Long Equity and Index Quote	1
	Short Equity and Index Quote	1
Open Interest Volume	Open Interest	1
	Equity and Index End of Day Summary	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	1
	Equity and Index End of Day Summary	1
	Long Equity and Index Quote	1

FIELD APPEARANCES WITHIN MESSAGES, continued

FIELD NAME	MESSAGE APPEARANCE	NUMBER OF APPEARANCES/MESSAGES
- R -		
Received Block Sequence Number	Sequence/Message Count Status – Block Sequence Number Status Mismatch (Type N)	1
Retransmission Indicator	Block Header	1
Reserved	Sequence/Message Count Status – Request and Response (Type L)	1
	Sequence/Message Count Status – Request and Response (Type M)	2
	Sequence/Message Count Status – Message Count Status (Type S)	1
- S -		
Security Symbol	Equity and Index Last Sale	1
	Open Interest	1
	Equity and Index End of Day Summary	1
	Long Equity and Index Quote	1
	Short Equity and Index Quote	1
	Expanded Short Equity and Index Quote	1
	Underlying Value – Last Sale	1
	Underlying Value – Bid and Offer	1
Session Indicator	Message Header	1

FIELD APPEARANCES WITHIN MESSAGES. continued

FIELD NAME	MESSAGE APPEARANCE	NUMBER OF APPEARANCES/MESSAGES
- S -		
Strike Price	Equity and Index Last Sale	1
	Open Interest	1
	Equity and Index End of Day Summary	1
	Long Equity and Index Quote	1
	Short Equity and Index Quote	1
Strike Price Denominator Code	Equity and Index Last Sale	1
	Open Interest	1
	Equity and Index End of Day Summary	1
	Long Equity and Index Quote	1
- T -		
Trade Identifier	Equity and Index Last Sale	1
- U -		
Underlying Price Denominator Code	Equity and Index End of Day Summary	1
Underlying Price	Equity and Index End of Day Summary	1
- V -		
Version	Block Header	1
Volume	Equity and Index Last Sale	1
	Equity and Index End of Day Summary	1

9.0 ADMINISTRATIVE MESSAGES

9.01 Administrative Message

Category C, Type = (Space filled); Unformatted

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.

Administrative messages are not blocked with any other messages. They will be sent individually, one to a block.

9.02 Administrative Message Length

The length of an administrative message is variable. The total length of the message data cannot exceed 450 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.

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 425 character free form

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%.

Administrative Message, continued

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.			

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 12/31/13 105% EUR CL \$20M QUOTE IN % BY 1030 CST
This message is an Index FLEX Request for Quote for OEX call, Expiration date 12/31/13, 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.			

Administrative Message, continued

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.			

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.			

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 01/02/13. 500 sold at 3.57			

10.0 CONTROL MESSAGES

10.01 CONTROL MESSAGE SUMMARY

Control messages perform specified system advisory and control functions.

The following represents all Control messages that are sent by OPRA or the Participants:

MESSAGE IDENTIFICATION		CONTROL MESSAGE
CATEGORY	TYPE	
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 Block Sequence Number
H	L	Start of Open Interest
H	M	End of Open Interest
H	O	Line Integrity
H	P	Disaster Recovery Data Center Activation

In the following discussion of Control Messages, Message Header means both the Message Header fields and the Message Data Length fields.

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. They will be sent singly, one to a block.

Message Length: Variable (6 Bytes + Message Data length)

The length of a Control Message is variable. The total length of the entire message cannot exceed 450 characters, including the Message Header, Message Data Length, and the message text.

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 and in the textual portions of Control messages, the Participant Identification identifies the abbreviated name of the originating Participant as follows (* = application pending):

CODE	PARTICIPANT/PROCESSOR IDENTIFICATION ABBREVIATION	VALUE
A	AMEX	NYSE American
B	BOX	Boston Options Exchange
C	CBOE	Chicago Board Options Exchange
E	EDGX	EDGX Options
H	GEMINI	ISE GEMINI
I	ISE	International Securities Exchange
J	MERCURY	ISE MERCURY Exchange
M	MIAX	Miami International Securities Exchange
N	NYSE	NYSE ARCA
O	OPRA	Options Price Reporting Authority
P	PEARL	MIAX PEARL
Q	NASD	NASDAQ Stock Market
W	C2	C2
T	BX	NASDAQ OMX BX Options
X	PHLX	NASDAQ OMX PHLX
Z	BATS	BATS

CONTROL MESSAGE SUMMARY, continued

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

PARTICIPANT ID CODE	CONTROL MESSAGE	TYPE
O	Start of Test Cycle	A
O	End of Test Cycle	B
O	Start of Day	C
Any valid code except 'O'	Good Morning	D
Any valid code except 'O'	Start of Summary	E
Any valid code except 'O'	End of Summary	F
Any valid code except 'O'	Early Market Close	G
Any valid code except 'O'	End of Transaction Reporting	H
Any valid code except 'O'	Good Night	I
O	End of Day	J
O	Reset Block Sequence Number	K
O	Start of Open Interest	L
O	End of Open Interest	M
Any valid code except 'O'	Line Integrity	O
O	Disaster Recovery Data Center Activation	P

Note: In the free form textual portions of Control messages, where specified, MM=Month, DD=Day, hh=hour, mm=minute and ss=second (The time is reflected in 24 hour clock Eastern Time).

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. Reference Section 9.0 for a sample of Test Cycle messages.

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 Block Sequence Number of any Start of Test Cycle message is set to Zero.

CONTROL MESSAGE DESCRIPTIONS, continued

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 message.

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

“END OF TEST CYCLE”

10.06 Start of Day – Category H, Type C

The Start of Day message signals the start of normal data recipient processing of messages received over a line.

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

“START OF DAY”

Administrative and other messages may precede SOD messages, therefore the Block Sequence Number (BSN) field of the SOD messages is incremented accordingly.

10.07 Good Morning - Category H, Type D

The Good Morning message is transmitted by a Participant 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”**

CONTROL MESSAGE DESCRIPTIONS, continued

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”**

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”**

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.

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”**

CONTROL MESSAGE DESCRIPTIONS, continued

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”**

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”**

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”

CONTROL MESSAGE DESCRIPTIONS, continued

10.14 Reset Block Sequence Number - Category H, Type K

The Reset Block Sequence Number message is transmitted when the block sequence number requires resetting.

The Reset Block Sequence Number message will consist of the block header and message header followed by an empty body with a size of zero.

The Block Sequence Number field contains the number to which the Block Sequence Number counter is to be reset.

10.15 Start of Open Interest - Category H, Type L

The Start of Open Interest message signals 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: **“OPRA START OF OPEN INTEREST – 0102 0630”**

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 signals 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: **“OPRA END OF OPEN INTEREST – 0102 0631”**

CONTROL MESSAGE DESCRIPTIONS, continued

10.17 Line Integrity Message - Category H, Type O

The purpose of the Line Integrity Message is to provide verification of Participant input line integrity (e.g., I'm alive). It is generated from a Participant to OPRA via their input lines at a set interval (e.g., 1-second; 5-seconds). OPRA, in response to receiving the current Line Integrity message (category H, type O) from a participant, will send a corresponding Line Integrity message (category H, type O) with sequence number and timestamp in the opposite direction back to the Participant.

Line Integrity Message Characteristics:

The Line Integrity message functionality includes a configurable parameter setting to accommodate pre-set response time intervals between a Participant and OPRA.

OPRA has 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. The input data must carry the previously transmitted Block Sequence Number; the SBN should NOT increment. If OPRA does not receive a Category H Type O Line Integrity message or data 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, in response to receiving the current Line Integrity message (category H, type O) from a participant, will send a corresponding Line Integrity message (category H, type O) with sequence number and timestamp in the opposite direction from OPRA back to the Participant.

This feature can be enabled on a Participant basis.

10.18 Disaster Recovery Data Center Activation - Category H, Type P

The Disaster Recovery Center Activation control message will be disseminated from the Disaster Recovery site to signify that OPRA has switched processing from the Primary Data Center to the Disaster Recovery Center.

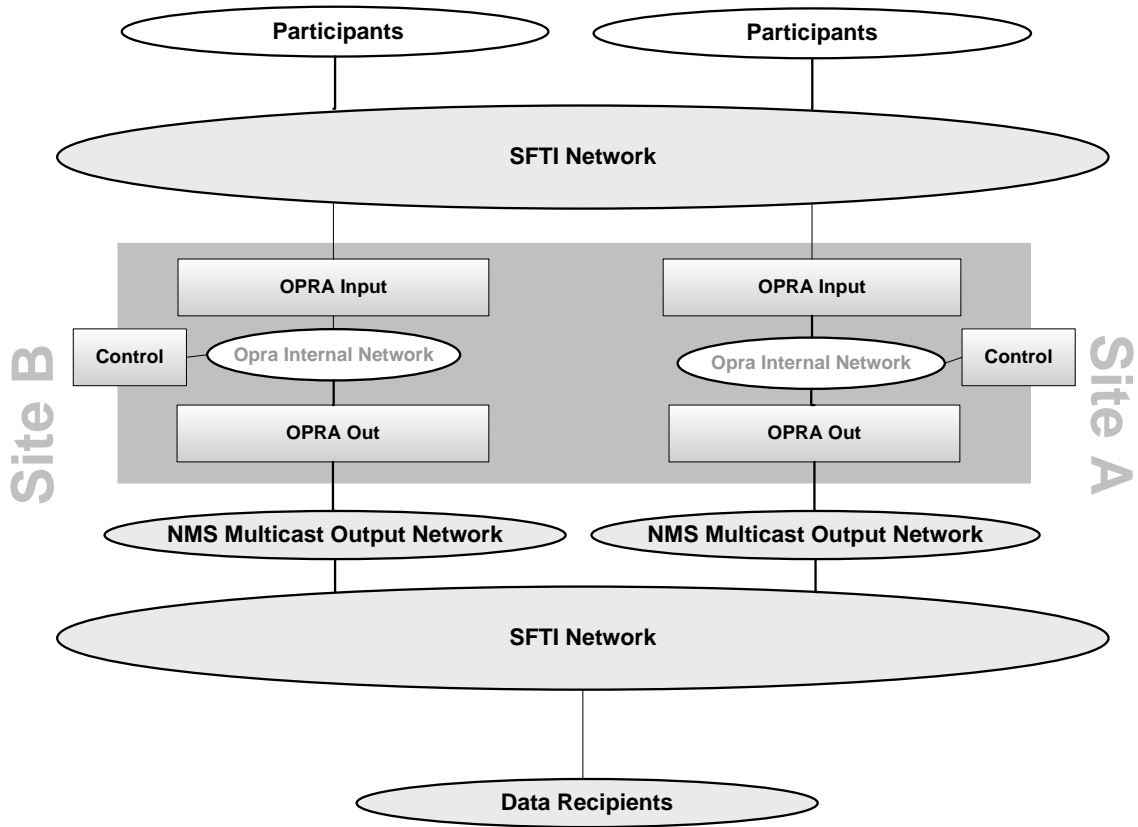
The message will consist of the standard Message Header immediately followed by the textual message:

“(PARTICIPANT IDENTIFICATION) Disaster Recovery Data Center Activated – MMDD hhmm”

example: “DISASTER RECOVERY DATA CENTER ACTIVATED – 0102
0931”

APPENDIX A: OPRA CONFIGURATION

OPRA CONFIGURATION



APPENDIX B: SPECIAL BBO OPERATIONAL “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.

APPENDIX C: 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.

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
2:30 a.m.	Start of Day message on lines - EXTENDED SESSION
2:45 a.m.	Equity/Index Open Interest messages – EXTENDED SESSION
3:00 a.m.	Extended Session Begins
6:10 a.m.	Start of Day message on lines - REGULAR SESSION
6:15 a.m. – 7:00 a.m.	NASDAQ, BX, PHLX Good Morning
6:30 a.m.	Equity/Index Open Interest messages – REGULAR SESSION
6:45-7:15 a.m.	Equity/Index Good Morning message from AMEX, BATS, BOX, CBOE, C2, EDGX, ISE, ISE GEMINI, ISE MERCURY and MIAX
7:30 a.m.	ISE FX Options trading begins
8:30 a.m.	Equity/Index Good Morning message from NYSE
9:15 a.m.	Extended Session Ends
9:30 a.m.	Equity/Index Options trading begins*
9:30 a.m.	PHLX World Currency Options trading begins
4:00 p.m.	Equity Options trading ends
4:00 p.m.	PHLX World Currency Options trading ends
4:15 p.m.	Index Options trading ends
4:15 p.m.	ISE FX Options trading ends
4:25 – 7:00 p.m.	Equity/Index End of Day Summary message

APPENDIX C: SCHEDULE OF DAILY OPRA MESSAGES, continued

7:00 p.m.	End of Transaction Reporting message from each Participant
5:15 – 7:00 p.m.	Good Night message from each Participant
7:00 p.m.	End of Day message. System brought down.

***Some Index Options have non-standard trading hours.**

APPENDIX D: SPECIAL PROCESSING FIELD RESTRICTIONS**PRICE FIELDS**

- 1) For all prices with an associated denominator code, if the numeric value exceeds the OPRA output field size requirement, OPRA will normalize the numeric value by modifying the denominator code and eliminating the trailing zeros.

For example. \$174.35

	Binary Input		OPRA FAST – Output	
Input	Denom Code	OPRA Binary Strike Price	Strike Price Denom Code (OPRA Normalized)	OPRA Conversion to ASCII Strike Price (6 bytes)
Binary	D	1743500	C	174350

Note: If the numeric value (e.g., premium price, Strike Price) cannot be normalized, then OPRA will not process the message.

Please reference the chart in Appendix ‘A’ for all price, size and volume fields

SIZE/VOLUME FIELDS:

- 1) Quote (cat k,q,s): Bid Size & Offer Size must be between 0 and 99,999 (5 positions)
- 2) Last Sale (cat a): Volume must be between 0 and 999,999 (6 positions)
- 3) Open Interest (cat d): Open Interest Volume must be between 0 and 9,999,999 (7 positions)
- 4) End of Day Summary (cat f): Volume must be between 0 and 999,999 (6 positions) and Open Interest Volume must be between 0 and 9,999,999 (7 positions)

CATEGORY Y – UNDERLYING LAST SALE MESSAGE:

- 1) Underlying Value (cat Y): Security Symbol must be between 1 and 3 characters long
- 2) Index Values cannot have more than two significant digits to the right of the decimal point. For example: An Index Value with a denominator code of ‘D’, 375.3570 will be rejected (please note a reject message is not sent back to the Participant). An Index Value with a denominator code of ‘D’ 375.3400 will be processed.
- 3) Price Denominator code will always be normalized to ‘B’

Note: If the above conditions are not met, then OPRA will reject the message. As such, a reject message is not sent back to the Participant.

Please reference the following chart for field restrictions and special processing

APPENDIX D: Special Processing Field Restrictions

Field	Message Cat	Binary Input/ Output Length	Binary Spec Notations	Binary Participant Input - Special Processing Field Restrictions				OPRA FAST/ Conversion to ASCII
				Note: If OPRA cannot normalize, then OPRA will reject the message (a reject message is not sent to the Participant)				
				Binary Significant digits Limited To	Denom Code	Value Limit	Security Symbol Limit	Length (Bytes)
Security Symbol	a,d,f,k,	5		5				5
	Y	5		5			1 to 3	5
	q	4		4				4
Strike Price	a,d,f,k	4		6	Normalize Price Denominator code if price is too large to fit OPRA FAST/ASCII Conversion	999,999		6
	q,	2	Strike Price Denom is expected to be 'A'			65,535		6
Volume	a,f	4		6		999,999		6
Premium Price	a	4		8	Normalize Price Denominator code if price is too large to fit OPRA FAST/ASCII Conversion	99,999,999		8
Open Interest Volume	d,f	4		7		9,999,999		7
Index Value	Y	4		8	Price Denominator code will always be normalized to 'B'	99,999.99		8
Bid Index Value	Y	4		8	Price Denominator code will always be normalized to 'B'	99,999.99		8

Message Categories:

'a' Equity and Index Last Sale
'd' Open Interest
'f' Equity and Index EOD Summ
'k' Long Equity and Index Quote
'q' Short Equity and Index Quote

Message Categories, cont'd:

's' Expanded Short Equity and Index Quote
'C' Administrative
'H' Control
'N' Sequence Number Status
'Y' Underlying Value Message

APPENDIX D: Special Processing Field Restrictions, continued

Field	Message Cat	Binary Input/Output Length	Binary Spec Notations	Binary Participant Input - Special Processing Field Restrictions				Conversion to ASCII
				Note: If OPRA cannot normalize, then OPRA will reject the message (a reject message is not sent to the Participant)				
Offer Index Value	Y	4		8	Price Denominator code will always be normalized to 'B'	99,999.99		8
Open Price	f	4		8	Normalize Price Denominator code if price is too large to fit OPRA FAST/ASCII Conversion	99,999,999		8
High Price	f	4		8		99,999,999		8
Low Price	f	4		8		99,999,999		8
Last Price	f	4		8		99,999,999		8
Underlying Price	f	8		8		99,999,999		8
Net Change	f	4		8		99,999,999		8

Bid Price	f,k	4		8	Normalize Price Denominator code if price is too large to fit OPRA FAST/ASCII Conversion	99,999,999		8
	q	2	Premium Price Denom is expected to be 'B'			65,535		8
Offer Price	f,k	4		8	Normalize Price Denominator code if price is too large to fit OPRA FAST/ASCII Conversion	99,999,999		8
	q	2	Premium Price Denom is expected to be 'B'			65,535		8
Bid Size	k	4		5		99,999		5
	q	2			65,535		5	
Offer Size	k	4		5		99,999		5
	q	2			65,535		5	

Message Categories:
'a' Equity and Index Last Sale
'd' Open Interest
'f' Equity and Index EOD Summ
'k' Long Equity and Index Quote
'q' Short Equity and Index Quote

Message Categories, cont'd:
's' Expanded Short Equity and Index Quote
'C' Administrative
'H' Control
'N' Sequence Number Status
'Y' Underlying Value Message

APPENDIX D: Special Processing Field Restrictions, continued

Field	Message Cat	Binary Input/Output Length	Binary Spec Notations	Binary Participant Input - Special Processing Field Restrictions Note: If OPRA cannot normalize, then OPRA will reject the message (a reject message is not sent to the Participant)	Conversion to ASCII	Field
Best Bid Price	Best Bid & Double Appendage	4		8	NA (OPRA Sends)	8
Best Bid Size	Best Bid & Double Appendage	4		5		5
Best Offer Price	Best Offer & Double Appendage	4		8		8
Best Offer Size	Best Offer & Double Appendage	4		5		5
Price	Single Appendage (Binary)	4		8		8
Size	Single Appendage (Binary)	4		5		5

Message Categories:

'a' Equity and Index Last Sale
'd' Open Interest
'f' Equity and Index EOD Summ
'k' Long Equity and Index Quote
'q' Short Equity and Index Quote

Message Categories, cont'd:

's' Expanded Short Equity and Index Quote
'C' Administrative
'H' Control
'N' Sequence Number Status
'Y' Underlying Value Message