

OPRA

**OPTIONS PRICE REPORTING
AUTHORITY**

**DATA RECIPIENT INTERFACE
SPECIFICATION**

**July 24, 2008
Version 1.13**

**American Stock Exchange, LLC
Boston Stock Exchange, Inc.
Chicago Board Options Exchange, Incorporated
International Securities Exchange, Inc.
The NASDAQ Stock Market LLC
NYSE Arca, Inc.
Philadelphia Stock Exchange, Inc.**

**Joseph P. Corrigan
Executive Director**

**Phone: (312) 786-7190
Fax: (312) 786-7409
E-Mail: corrigan@cboe.com**

TABLE OF CONTENTS

1.0	INTRODUCTION.....	9
1.01	BACKGROUND.....	9
1.02	SCOPE.....	10
2.0	GENERAL DESIGN OF DATA DISTRIBUTION NETWORK	10
3.0	TRANSMISSION CHARACTERISTICS	12
3.01	TRANSMISSION BLOCK	12
3.02	SOH AND ETX	12
3.03	US.....	12
3.04	BLOCK TEXT	13
3.05	BLOCK TEXT FORMAT	13
3.06	DATA FORMAT	13
3.07	CHARACTER SET	14
3.08	RETRANSMISSION CAPABILITY	14
3.09	OPRA TRAFFIC DISTRIBUTION	16
4.0	MESSAGE HEADER	16
4.01	MESSAGE HEADER FIELD DESCRIPTIONS	16
4.02	PARTICIPANT ID	16
4.03	RETRANSMISSION REQUESTER	17
4.04	MESSAGE IDENTIFICATION.....	18
4.05	MESSAGE SEQUENCE NUMBER (MSN).....	22
4.06	TIME	22
5.0	MESSAGE FORMATS	23
5.01	MESSAGE FORMAT FIELD DESCRIPTIONS	23
5.02	SCHEDULE OF DAILY OPRA MESSAGES.....	23
5.03	BEST BID AND BEST OFFER (BBO) OVERVIEW	23
6.0	SUMMARY OF MESSAGE CATEGORIES AND TYPES.....	24
6.01	EQUITY AND INDEX LAST SALE.....	26
6.02	EQUITY AND INDEX QUOTE WITH SIZE	27
6.03	BEST BID APPENDAGE	28
6.04	BEST OFFER APPENDAGE.....	29
6.05	OPEN INTEREST	30
6.06	UNDERLYING VALUE – LAST SALE.....	31
6.07	UNDERLYING VALUE – BID AND OFFER.....	32
6.08	UNDERLYING VALUE – SPOT VALUE	33
6.09	EQUITY AND INDEX END OF DAY SUMMARY	34
6.10	FCO LAST SALE	35
6.11	FCO QUOTE	36
6.12	FCO END OF DAY SUMMARY.....	37
7.0	FIELD DESCRIPTIONS.....	38
7.01	BBO INDICATOR (BEST BID AND BEST OFFER INDICATOR).....	38
7.02	BEST BID PARTICIPANT ID	41
7.03	BEST OFFER PARTICIPANT ID.....	41
7.04	BEST BID PREMIUM PRICE DENOMINATOR CODE.....	41
7.05	BEST OFFER PREMIUM PRICE DENOMINATOR CODE	41
7.06	BEST BID PRICE.....	42

DATA RECIPIENT INTERFACE SPECIFICATION

7.07	BEST BID SIZE	42
7.08	BEST OFFER PRICE	42
7.09	BEST OFFER SIZE.....	43
7.10	BID INDEX VALUE	43
7.11	BID PRICE.....	43
7.12	BID SIZE	44
7.13	DECIMAL PLACEMENT INDICATOR	44
7.14	EXPIRATION DATE.....	45
7.15	EXPLICIT STRIKE PRICE.....	45
7.16	FCO SYMPOL.....	46
7.17	FOREIGN CURRENCY SPOT VALUE.....	46
7.18	HIGH PRICE.....	46
7.19	INDEX SYMBOL	47
7.20	INDEX VALUE	47
7.21	LAST PRICE	47
7.22	LOW PRICE.....	48
7.23	NET CHANGE	48
7.24	NET CHANGE INDICATOR	49
7.25	NUMBER OF FOREIGN CURRENCY SPOT VALUES IN GROUP.....	49
7.26	NUMBER OF INDICES IN GROUP	49
7.27	OFFER INDEX VALUE	49
7.28	OFFER PRICE	50
7.29	OFFER SIZE	50
7.30	OPEN INTEREST VOLUME	51
7.31	OPEN PRICE.....	51
7.32	PREMIUM PRICE.....	52
7.33	PREMIUM PRICE DENOMINATOR CODE.....	53
7.34	RESERVED	53
7.35	SECURITY SYMBOL	54
7.36	SESSION INDICATOR	55
7.37	STRIKE PRICE CODE	56
7.38	STRIKE PRICE DENOMINATOR CODE	57
7.39	UNDERLYING PRICE DENOMINATOR CODE.....	59
7.40	UNDERLYING STOCK PRICE.....	60
7.41	VOLUME.....	60
7.42	YEAR.....	60
8.0	FIELD APPEARANCES WITHIN MESSAGES.....	62
9.0	ADMINISTRATIVE MESSAGES	70
9.01	ADMINISTRATIVE MESSAGE (UNFORMATTED) – CATEGORY C, TYPE = (SPACE FILLED)	70
9.02	ADMINISTRATIVE MESSAGE LENGTH.....	70
9.03	ADMINISTRATIVE MESSAGE TEXT.....	70
9.04	ALERT ALERT ALERT ADMINISTRATIVE MESSAGE	70
9.05	ADMINISTRATIVE MESSAGE STANDARDS FOR FLEX AND UCOM.....	70
10.0	CONTROL MESSAGES.....	76
10.01	CONTROL MESSAGE SUMMARY.....	76
10.02	CONTROL MESSAGE DESCRIPTIONS	79
10.03	TEST CYCLE COMMENTS	79
10.04	START OF TEST CYCLE – CATEGORY H, TYPE A	79
10.05	END OF TEST CYCLE - CATEGORY H, TYPE B	80
10.06	START OF DAY – CATEGORY H, TYPE C	80
10.07	GOOD MORNING - CATEGORY H, TYPE D.....	81
10.08	START OF SUMMARY - CATEGORY H, TYPE E	81
10.09	END OF SUMMARY - CATEGORY H, TYPE F	82

DATA RECIPIENT INTERFACE SPECIFICATION

10.10	EARLY MARKET CLOSE - CATEGORY H, TYPE G.....	82
10.11	END OF TRANSACTION REPORTING - CATEGORY H, TYPE H.....	83
10.12	GOOD NIGHT - CATEGORY H, TYPE I.....	83
10.13	END OF DAY - CATEGORY H, TYPE J.....	84
10.14	RESET SEQUENCE NUMBER - CATEGORY H, TYPE K.....	84
10.15	START OF OPEN INTEREST - CATEGORY H, TYPE L.....	85
10.16	END OF OPEN INTEREST - CATEGORY H, TYPE M.....	86
APPENDIX A:	OPRA CONFIGURATION.....	87
APPENDIX B:	OPRA TRAFFIC DISTRIBUTION.....	88
APPENDIX C:	SCHEDULE OF DAILY OPRA MESSAGES.....	91
APPENDIX D:	BEST BID AND BEST OFFER (BBO) OVERVIEW.....	93
APPENDIX E:	STRIKE PRICE TABLES.....	97
APPENDIX F:	SAMPLE TEST CYCLE MESSAGES.....	101

ADDENDUMS

- 1. COMMON IP MULTICAST DISTRIBUTION NETWORK RECIPIENT INTERFACE SPECIFICATION – VERSION 1.29 DATED 2/27/07**
- 2. AUTOLINK/RAPS USERS GUIDE – VERSION 1.1.6 DATED 8/10/07**
- 3. FAST FOR OPRA – VERSION 1.00.02 - DATED 3/26/07**

THE ADDENDUMS ARE AVAILABLE FROM WWW.OPRADATA.COM

OPRA	OPTIONS PRICE REPORTING AUTHORITY
DATA RECIPIENT INTERFACE SPECIFICATION	

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
All	Inclusion of Best Bid and Best Offer (BBO): changes in background, formats, field descriptions and field appearances within messages, addition of Best Bid and Best Offer Overview and "Kill" procedures

VERSION 1.2 - MARCH 17, 2003	
PAGE(S)	DESCRIPTION
All	Completion of Re-write

VERSION 1.3 - DECEMBER 3, 2004	
PAGE(S)	DESCRIPTION
4, 5, 15, 83	Change in definition of Category a and O, Type Code P. Update of "Common IP Multicast Distribution Network" to reflect SFTI. Change in equity and index option traffic distribution.

VERSION 1.4 - FEBRUARY 22, 2005	
SECTION	DESCRIPTION
Table of Contents, 4.05	Update of Common IP Multicast Distribution Network Specification to reflect new addresses. (version 1.25). Change in point 2, Section 4.05 - reset to 1 instead of zero.

VERSION 1.5 - MARCH 31, 2005	
SECTION(S)	DESCRIPTION
Appendix B and F	Change in Equity and Index option traffic distribution. Change in sample test cycle messages to reflect new traffic distribution.

VERSION 1.6 - DECEMBER 12, 2005

SECTION(S)	DESCRIPTION
Table of Contents	Update Addendums
3.08	Change in messages available after sequence number rollover
3.09 and Appendix B	Additional output lines and change in line assignment
4.02	BSE active
4.04	Update codes
6.0	Quote message = k
7.01	Definition of space
7.33	Change in note
7.38	Correction in usage
Appendix A	Updated
Appendix C	Updated
Appendix D	Change from five cents to one cent
Appendix F	Test messages updated

VERSION 1.7 - MARCH 29, 2006

SECTION(S)	DESCRIPTION
6.0	Correct typo
Appendix A	Updated
Appendix B	24 line traffic distribution
Appendix C	Change in closing time for equity options

OPRA	OPTIONS PRICE REPORTING AUTHORITY
DATA RECIPIENT INTERFACE SPECIFICATION	

VERSION 1.8 - NOVEMBER 1, 2006	
SECTION(S)	DESCRIPTION
Appendix C	Change Opening time for FCO products

VERSION 1.9 - DECEMBER 20, 2006	
SECTION(S)	DESCRIPTION
Appendix B	Change in Traffic Distribution

VERSION 1.10 - JANUARY 10, 2007	
SECTION(S)	DESCRIPTION
Appendix B	Change in Traffic Distribution incorporating January 10, 2007 notice. (January 9, 2007 notice never put in specification.)

VERSION 1.11 - JULY 5, 2007	
SECTION(S)	DESCRIPTION
Table of Contents	1. Version 1.29 OPRA Multi Cast added 2. Addendum 3 added - FAST for OPRA Version 1.00.02 - March 26, 2007
4.02 and 10.01	New participant code for NYSE Arca and NASDAQ
Appendix E	Additional strike price tables

OPRA	OPTIONS PRICE REPORTING AUTHORITY
DATA RECIPIENT INTERFACE SPECIFICATION	

VERSION 1.12 - AUGUST 24, 2007	
SECTION(S)	DESCRIPTION
Table of Contents	Addendum 2 - updated to reflect Autolink version 1.1.6
Appendix B	Change in traffic distribution, effective September 17, 2007

VERSION 1.13 - JULY 24, 2008	
SECTION(S)	DESCRIPTION
Appendix B	Change in traffic distribution, effective August 25, 2008

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 and Foreign Currency Options (FCO) transactions are the OPRA IP multicast data streams. OPRA has a unique set of multicast addresses assigned to each of its 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 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 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 interface specification and message format requirements for data recipients (vendors, broker/dealers or others who receive the data feed) connecting to the National Market System (NMS) IP multicast distribution network.

2.0 GENERAL DESIGN OF DATA DISTRIBUTION NETWORK

The NMS IP multicast distribution network disseminates all market data and Time Beacon information in the form of multicast addressed IP datagrams.

Data available via the NMS IP multicast distribution network includes:

OPRA Real-Time Production Data

A copy of each OPRA real-time production message is available from both of SIAC's operational sites. These redundant copies are delivered via two distinct multicast data streams.

OPRA Real-Time Retransmission Data

The retransmission data streams are available from both sites, but are **not** delivered via redundant data streams.

The data recipient may choose to receive the retransmission data from either or both sites.

OPRA After-Hours Playback Data

There are two sets of IP multicast data feeds dedicated for after hours playback test data. One set of IP multicast data feeds supports the playback of production messages and the other set supports the playback of test messages. This playback data is made available via a single set of multicast data feeds and can be obtained from either site. Dual sited redundant after hours playback via the production system is also available.

Time Beacon

Selected nodes that source multicast data within the NMS IP multicast distribution network generate a single Time Beacon packet once a minute. Time Beacon nodes are located at each site. Each set of nodes will issue a Time Beacon packet to the same multicast group.

GENERAL DESIGN OF DATA DISTRIBUTION NETWORK (con't)**IP MULTICAST NETWORK INTERFACE**

The requirements for the NMS IP multicast distribution network interface are defined in the addendum to this document, "**Common IP Multicast Distribution Network Recipient Interface Specification**". This is available from WWW.OPRADATA.COM.

3.0 TRANSMISSION CHARACTERISTICS**3.01 TRANSMISSION BLOCK**

Encapsulated within each IP packet is a transmission block. One type of transmission block is used for all types of messages:

S		E
O	BLOCK TEXT	T
H		X

|<----- **TRANSMISSION BLOCK** ----->|

A block can have a maximum of 1,000 characters inclusive of text.

3.02 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.

3.03 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.

3.04 BLOCK TEXT

The block text can consist of multiple messages. A message is a unit of data that can be processed by the receiving station independently of other data. A message may not span a block boundary.

A message consists of a Message Header, which is of fixed length and format, and a Message Text segment that is variable in length and format. A US character delimits each message, while an ETX character delimits the last message in the block.

3.05 BLOCK TEXT FORMAT

The block text consists of multiple messages with each message consisting of a Message Header and, with the exception of certain control messages, message text.

The block text is depicted below:

S	MESSAGE 1	U	MESSAGE 2	U	~	MESSAGE v	E
O	HEADER	S	HEADER	S	~	HEADER	T
H	& TEXT		& TEXT		~	& TEXT	X

|<----- BLOCK TEXT ----->|

3.06 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.

3.07 CHARACTER SET

All transmissions are in standard 8-bit ASCII code.

3.08 RETRANSMISSION CAPABILITY

If data recipients do not receive a message(s), a retransmission of a message(s) can be requested. The following Message Category and Types (included in the Message Identification field of the Message Header) are not included in retransmissions:

MESSAGE IDENTIFICATION CATEGORY	MESSAGE IDENTIFICATION TYPE	DESCRIPTION
H	A	Start of Test Cycle
H	B	End of Test Cycle
H	C	Start of Day
Cycles of test messages are <u>not</u> available for retransmissions.		

AutoLink, a PC based facility, is utilized for automatically receiving and processing OPRA message retransmission requests.

AutoLink works in conjunction with the Retransmission and Playback System (RAPS), a server associated with the OPRA host, which supports OPRA retransmissions. In addition, RAPS provides data playback capability facilitating test requirements to IP multicast data recipients.

Utilizing AutoLink, a data recipient may request retransmission(s) from a touch-tone telephone set. The facility has automatically generated voice responses prompting a data recipient to enter information for retransmission requests.

Along with the uniquely assigned retransmission requester ID code, which is included in the retransmission requestor field of the Message Header of any retransmitted message, a data recipient is required to enter the appropriate data "lines" on which the "gap" occurred and the sequence number(s) to be retransmitted. The request will be forwarded to AutoLink, then to a RAPS server associated with the OPRA host, and out to the proper IP multicast groups.

RETRANSMISSION CAPABILITY (continued)

When a message is retransmitted, its retransmission requester field contains the character identifying the data recipient who requested the retransmission.

The Message Sequence Number field in the Message Header of each message retransmitted contains the original message sequence number.

If the Message Sequence Number counter for a line has been reset to One, no messages transmitted after reset are available for retransmission.

Retransmissions are sent at a lower message rate in order **not** to delay transmission of current messages.

Retransmitted messages are never combined with original messages in the same block.

The total number of retransmissions requested at any one time by a particular data recipient may be divided into several smaller message blocks. After each block is transmitted, requests for retransmissions from other data recipients are accepted in turn. Messages retransmitted to each data recipient are transmitted in separate message blocks and are **not** intermingled with retransmissions to other data recipients.

Retransmission requests are accepted after the period following transmission of the Category H, Type C (Start of Day) message.

An **AutoLink/RAPS Users Guide** for automated retransmission requests is provided as an addendum to this document. This is available from WWW.OPRADATA.COM

Note:	It is the responsibility of the data recipient to ignore retransmitted messages not requested by them.
--------------	---

OPRA TRAFFIC DISTRIBUTION

OPRA messages are disseminated over multiple IP multicast lines designated as Line 1 (L1), Line 2 (L2), Line 3 (L3), etc., thru Line 9 (L9). For current distribution of traffic, refer to **Appendix B**. In the 1st Quarter 2006, OPRA will add additional IP multicast lines. The lines will also be renamed. FCO traffic will be on FCO 1. Equity and index options traffic will be on OPRA 1 through 24.

4.0 MESSAGE HEADER

The Message Header supplied on each message contains a total of **18 Bytes** and conforms in all cases to the following data fields:

PARTICIPANT ID	RETRANSMISSION REQUESTER	MESSAGE IDENTIFICATION	MESSAGE SEQUENCE NUMBER	TIME
1	1	2	8	6
←----- 18 BYTES ----->				

4.01 MESSAGE HEADER FIELD DESCRIPTIONS

4.02 PARTICIPANT ID

The Participant ID field is a **1 Byte**, Alphabetic character that identifies the Participant or Processor that initiated the message:

CODE	VALUE
A	American Stock Exchange
B	Boston Stock Exchange
C	Chicago Board Options Exchange
I	International Securities Exchange
N	NYSE ARCA*
O	Options Price Reporting Authority
P	Pacific Exchange*
Q	NASDAQ**
X	Philadelphia Stock Exchange

* - The ID for NYSE Arca changed from P to N on July 2, 2007

** - Trading starts second half of 2007

Note: Messages with PARTICIPANT ID Code O, Options Price

Reporting Authority (OPRA), are sent by SIAC on behalf of OPRA.

4.03 RETRANSMISSION REQUESTER

The Retransmission Requester field is a **1 Byte**, Alphabetic/Special character, Space filled field. The characters can be upper case, lower case or a special character. It identifies the data recipient requesting the retransmission. A Space character (indicating original message) is entered in the Retransmission Requester field for non-retransmission messages.

The alphabetic upper case character "V" is entered in the Retransmission Requester field to indicate transmission of the associated message to all data recipients. A unique identification character is assigned to each participating data recipient.

Note: It is the responsibility of the data recipient to ignore retransmitted messages not requested by them.

4.04 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.

MESSAGE IDENTIFICATION - Message Category (first alpha character):

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
F	FCO END OF DAY SUMMARY
H	CONTROL
O	FCO LAST SALE
U	FCO QUOTE
Y	UNDERLYING VALUE MESSAGE

MESSAGE IDENTIFICATION - Message Type (second alpha character):

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

MESSAGE IDENTIFICATION- Message Type (second alpha character):

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 Type** applies to **Category F FCO End of Day Summary** message:

CODE	VALUE
P	FCO End of Day Summary

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

MESSAGE IDENTIFICATION- Message Type (second alpha character):

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

CODE	VALUE
Space filled	Regular Trading
F	Non-Firm Quote
R	Rotation
T	Trading Halted
A	Eligible for Automation Execution
I	Inactive (applies only to Category U FCO Quote)
B	Bid from Specialist Book
O	Offer from Specialist Book
C	Both Bid and Offer from Specialist Book

Note: For codes B, O and C only, in addition to special market conditions, type codes are used to identify the quote as being from the Specialist Book from the Participant originating the quote. The quote should be processed like any other quote message. The type codes can be displayed, however, if it is not displayed, the codes B, O and C should be treated like a Space filled Message Type code.

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

CODE	VALUE
Space filled	Index based on Last Sale
I	Index based on Bid and Offer
F	Foreign Currency Spot
C	Closing Spot

Note: Additional Message Category(s) and Message Type(s) will be implemented as required. If data recipients 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.

4.05 MESSAGE SEQUENCE NUMBER (MSN)

The Message Sequence Number (MSN) is an **8 Byte**, Numeric, Right Justified, Zero filled field. All messages are assigned a sequence number. On a per line basis, the MSN on the lines are set to Zero at the start of each day and are incremented by one each time a message (other than a Retransmission or Reset Message Sequence Number message) is transmitted. The following exceptions or special considerations should be noted:

1. Retransmitted messages contain the MSN of the original message.
2. The MSN field in the Message Header of a **Category H, Type K Reset Sequence Number** message contains the number to which the MSN counter is to be reset. This number is either one (1) in the event the sequence numbers rolls over from 99,999,999 or a number greater than the highest number previously transmitted.
3. The **Category H, Type C Start of Day** message contains a Zero message sequence number.

Should OPRA experience a line failure and recovery, the message sequence number for the recovered line(s) is reset to a multiple of 100,000 greater than the last number transmitted and message transmission is resumed.

4.06 TIME

The Time (Eastern Time) field is a **6 Byte**, Numeric Character, Zero filled field. Format is (Military) HHMMSS where HH=Hour, MM=Minute and SS=Second. Indicates the Time that a transaction is disseminated. For Retransmissions, the Time will contain the original Time that the transaction was disseminated.

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 is provided in **Appendix C**.

5.03 BEST BID AND BEST OFFER (BBO) OVERVIEW

A Best Bid and Best Offer (BBO) Overview is provided in **Appendix D**.

6.0 SUMMARY OF MESSAGE CATEGORIES AND TYPES

CATEGORY(S)	TYPE(S)	MESSAGE DESCRIPTION
a, O	Space filled	REGULAR SALE
a, O	A	CANC
a, O	B	OSEQ
a, O	C	CNCL
a, O	D	LATE
a, O	E	CNCO
a, O	F	OPEN
a, O	G	CNOL
a, O	H	OPNL
a, O	I	AUTO
a, O	J	REOP
a, O	K	AJST
a, O	L	SPRD
a, O	M	STDL
a, O	N	STPD
a, O	O	CSTP
a, O	P	BWRT
a, O	Q	CMBO
C	Space filled	Administrative
d	Space filled	Open Interest
f	Space filled	Equity and Index End of Day Summary
F	P	FCO 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 Sequence Number
H	L	Start of Open Interest
H	M	End of Open Interest

OPRA	OPTIONS PRICE REPORTING AUTHORITY
DATA RECIPIENT INTERFACE SPECIFICATION	

SUMMARY OF MESSAGE CATEGORIES AND TYPES (continued)

CATEGORY(S)	TYPE(S)	MESSAGE DESCRIPTION
k, U	Space filled	Regular Trading
k, U	F	Non-Firm Quote
k, U	R	Rotation
k, U	T	Trading Halted
k, U	A	Eligible for Automation Execution
U	I	Inactive
k, U	B	Bid From Specialist Book
k, U	O	Offer From Specialist Book
k, U	C	Both Bid and Offer From Specialist Book
Y	Space filled	Index based on Last Sale
Y	I	Index based on Bid and Offer
Y	F	Foreign Currency Spot
Y	C	Closing Spot

6.01 EQUITY AND INDEX LAST SALE

35 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

SECURITY SYMBOL	RESERVED	EXPIRATION DATE	YEAR
5	2	1	1
←----- 9 BYTES -----→			

STRIKE PRICE CODE	STRIKE PRICE DENOMINATOR CODE	EXPLICIT STRIKE PRICE	VOLUME
1	1	7	6
←----- 15 BYTES -----→			

PREMIUM PRICE DENOMINATOR CODE	PREMIUM PRICE	SESSION INDICATOR	RESERVED
1	8	1	1
←----- 11 BYTES -----→			

**6.02 EQUITY AND INDEX QUOTE WITH SIZE
MINIMUM 47 BYTES
MAXIMUM 79 BYTES**

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

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

SECURITY SYMBOL	RESERVED	EXPIRATION DATE	YEAR
5	2	1	1
←----- 9 BYTES -----→			

STRIKE PRICE CODE	STRIKE PRICE DENOMINATOR CODE	EXPLICIT STRIKE PRICE	PREMIUM PRICE DENOMINATOR CODE
1	1	7	1
←----- 10 BYTES -----→			

BID PRICE	BID SIZE	OFFER PRICE	OFFER SIZE
8	5	8	5
←----- 26 BYTES -----→			

SESSION INDICATOR	BBO INDICATOR
1	1
←--- 2 BYTES ---→	

6.03 BEST BID APPENDAGE

16 BYTES

The Best Bid Appendage is generated whenever a new quote causes a new Best Bid, and only if the new quote does not contain the Best Bid information. If it is determined that a new Best Bid Appendage is required, the appropriate Best Bid information is appended following the BBO Indicator field of the Equity and Index Quote With Size message. Refer to **Appendix D** for the Best Bid and Best Offer Overview.

BEST BID PARTICIPANT ID	BEST BID PREMIUM PRICE DENOMINATOR CODE	BEST BID PRICE	BEST BID SIZE	RESERVED
1	1	8	5	1

←----- 16 BYTES -----→

6.04 BEST OFFER APPENDAGE

16 BYTES

The Best Offer Appendage is generated whenever a new quote causes a new Best Offer, and only if the new quote does not contain the Best Offer information. If it is determined that a new Best Offer Appendage is required, the appropriate Best Offer information is appended following either the BBO Indicator field of the Equity and Index Quote With Size message, or after the Best Bid Appendage, if present. Refer to **Appendix D** for the Best Bid and Best Offer Overview.

BEST OFFER PARTICIPANT ID	BEST OFFER PREMIUM PRICE DENOMINATOR CODE	BEST OFFER PRICE	BEST OFFER SIZE	RESERVED
1	1	8	5	1
←----- 16 BYTES -----→				

OPRA	OPTIONS PRICE REPORTING AUTHORITY
DATA RECIPIENT INTERFACE SPECIFICATION	

6.05 OPEN INTEREST

27 BYTES

The Open Interest message is used to report Equity, Index and FCO 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	RESERVED	EXPIRATION DATE	YEAR	STRIKE PRICE CODE
5	2	1	1	1

|←----- 10 BYTES -----→|

STRIKE PRICE DENOMINATOR CODE	EXPLICIT STRIKE PRICE	OPEN INTEREST VOLUME	RESERVED
1	7	7	2

|←----- 17 BYTES -----→|

6.06 UNDERLYING VALUE – LAST SALE

MAXIMUM 67 BYTES

The Underlying Value – Last Sale message is a variable length record and can accommodate a maximum number of five (5) Index groups. Each group contains the Last Sale Index Value of a stock index.

CATEGORY	TYPE
Y	Space filled

NUMBER OF INDICES IN GROUP <p style="text-align: center;">2</p> ← 2 BYTES →

INDEX GROUP #1

INDEX SYMBOL	RESERVED	INDEX VALUE
#1		
3	2	8

| ←----- TOTAL OF 13 BYTES -----> |

(CAN INCLUDE UP TO 5 INDEX GROUPS)



INDEX GROUP #5

INDEX SYMBOL	RESERVED	INDEX VALUE
#5		
3	2	8

| ←----- TOTAL OF 13 BYTES -----> |

6.07 UNDERLYING VALUE – BID AND OFFER

MAXIMUM 65 BYTES

The Underlying Value – Bid and Offer message is a variable length record and can accommodate a maximum number of three (3) Index groups. 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 GROUP #1

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

|←----- TOTAL OF 21 BYTES ----->|

(CAN INCLUDE UP TO 3 INDEX GROUPS)



INDEX GROUP #3

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

|←----- TOTAL OF 21 BYTES ----->|

6.08 UNDERLYING VALUE – SPOT VALUE

MAXIMUM 67 BYTES

The Underlying Value – Spot Value message is a variable length record and can accommodate a maximum number of five (5) Index groups. Each group contains either the Foreign Currency Spot Value or the Closing Spot Value.

CATEGORY	TYPE
Y	F, C

NUMBER OF
FOREIGN CURRENCY
SPOT VALUES
IN GROUP
2

|←-- 2 BYTES --→|

INDEX GROUP #1

FCO SYMBOL #1	DECIMAL PLACEMENT INDICATOR	FOREIGN CURRENCY SPOT VALUE
3	2	8

|←----- TOTAL OF 13 BYTES -----→|

(CAN INCLUDE UP TO 5 INDEX GROUPS)



INDEX GROUP #5

FCO SYMBOL #5	DECIMAL PLACEMENT INDICATOR	FOREIGN CURRENCY SPOT VALUE
3	2	8

|←----- TOTAL OF 13 BYTES -----→|

6.09 EQUITY AND INDEX END OF DAY SUMMARY

103 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	RESERVED	EXPIRATION DATE	YEAR	STRIKE PRICE CODE
5	2	1	1	1

|----- 10 BYTES -----|

STRIKE PRICE DENOMINATOR CODE	EXPLICIT STRIKE PRICE	VOLUME	OPEN INTEREST VOLUME	PREMIUM PRICE DENOMINATOR CODE
1	7	6	7	1

|----- 22 BYTES -----|

OPEN PRICE	HIGH PRICE	LOW PRICE	LAST PRICE	NET CHANGE INDICATOR
8	8	8	8	1

|----- 33 BYTES -----|

NET CHANGE	UNDERLYING PRICE DENOMINATOR CODE	UNDERLYING STOCK PRICE	BID PRICE	OFFER PRICE	RESERVED
8	1	11	8	8	2

|----- 38 BYTES -----|

OPRA	OPTIONS PRICE REPORTING AUTHORITY
DATA RECIPIENT INTERFACE SPECIFICATION	

6.10 FCO LAST SALE

13 BYTES

The FCO Last Sale message is used to report FCO last sale information.
--

CATEGORY	TYPE
O	Space filled, A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q

SECURITY SYMBOL	EXPIRATION DATE	STRIKE PRICE CODE	VOLUME	PREMIUM PRICE
3	1	1	4	4
←----- 13 BYTES -----→				

OPRA	OPTIONS PRICE REPORTING AUTHORITY
DATA RECIPIENT INTERFACE SPECIFICATION	

6.11 FCO QUOTE

13 BYTES

The FCO Quote message is used to report FCO quote information.
--

CATEGORY	TYPE
U	Space filled, F, R, T, A, I, B, O, C

SECURITY SYMBOL	EXPIRATION DATE	STRIKE PRICE CODE	BID PRICE	OFFER PRICE
3	1	1	4	4

|←----- 13 BYTES -----→|

OPRA	OPTIONS PRICE REPORTING AUTHORITY
DATA RECIPIENT INTERFACE SPECIFICATION	

6.12 FCO END OF DAY SUMMARY

43 BYTES

The FCO 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 FCO End of Day Summary is generated for that security.**

CATEGORY	TYPE
F	P

SECURITY SYMBOL	EXPIRATION DATE	STRIKE PRICE CODE	VOLUME	OPEN INTEREST VOLUME
3	1	1	4	7

|----- 16 BYTES -----|

OPEN PRICE	HIGH PRICE	LOW PRICE	LAST PRICE	NET CHANGE INDICATOR
4	4	4	4	1

|----- 17 BYTES -----|

NET CHANGE	UNDERLYING STOCK PRICE	RESERVED
4	5	1

|----- 10 BYTES -----|

OPRA	OPTIONS PRICE REPORTING AUTHORITY
DATA RECIPIENT INTERFACE SPECIFICATION	

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 numeric 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 3.06 Data Format for ASCII filler character rules.

FIELD DESCRIPTIONS

- B -

7.01 BBO INDICATOR (BEST BID AND BEST OFFER INDICATOR)

1 Byte, Alphabetic or space filled. Indicates the effect the new quote has on the Best Bid and/or the Best Offer. If it is determined that a BBO appendage or appendages are required, the appropriate Best Bid and/or Best Offer information is appended following the BBO Indicator field of the Equity and Index Quote With Size message. If it is determined that the new quote is the new Best Bid and/or Best Offer, there is no change, or there is no Best Bid and/or Best Offer, an appendage is not present.

BBO INDICATOR

<u>CODE</u>	<u>VALUE</u>
A	No Best Bid change, No Best Offer change New quote does not affect the Best Bid or Best Offer. No appendage is required.

FIELD DESCRIPTIONS

- B -

BBO INDICATOR (cont'd)

<u>CODE</u>	<u>VALUE</u>
B	No Best Bid change, Quote contains Best Offer New quote does not affect the Best Bid, but is the Best Offer. No appendage is required.
C	No Best Bid Change, Best Offer Appendage New quote does not affect the Best Bid, a new Best Offer is generated and the new Best Offer information is contained in the Best Offer Appendage.
D	No Best Bid Change, No Best Offer New quote does not affect the Best Bid, and there is no Best Offer. No appendage is required.
E	Quote contains Best Bid, No Best Offer Change New quote is itself the Best Bid, but does not affect the Best Offer. No appendage is required.
F	Quote contains Best Bid, Quote contains Best Offer New quote is itself the Best Bid and Best Offer. No appendage is required.
G	Quote contains Best Bid, Best Offer Appendage New quote is itself the Best Bid, a new Best Offer is generated and the new Best Offer information is contained in the Best Offer Appendage.
H	Quote contains Best Bid, No Best Offer New quote is itself the Best Bid, and there is no Best Offer. No appendage is required.
I	No Best Bid, No Best Offer Change There is no Best Bid, and the quote does not affect the Best Offer. No appendage is required.

FIELD DESCRIPTIONS**- B -****BBO INDICATOR (cont'd)**

<u>CODE</u>	<u>VALUE</u>
J	No Best Bid, Quote contains Best Offer There is no Best Bid, and the quote is itself the Best Offer. No appendage is required.
K	No Best Bid, Best Offer Appendage There is no Best Bid, a new Best Offer is generated and the new Best Offer is contained in the Best Offer Appendage.
L	No Best Bid, No Best Offer There is no Best Bid, and no Best Offer. No appendage is required.
M	Best Bid Appendage, No Best Offer Change A new Best Bid is generated and the new Best Bid information is contained in the Best Bid Appendage, but the quote does not affect the Best Offer.
N	Best Bid Appendage, Quote contains Best Offer A new Best Bid is generated and the new Best Bid information is contained in the Best Bid Appendage, and the quote is the Best Offer.
O	Best Bid Appendage, Best Offer Appendage A new Best Bid is generated and the new Best Bid information is contained in the Best Bid Appendage, a new Best Offer is generated and the new Best Offer information is contained in the Best Offer Appendage.
P	Best Bid Appendage, No Best Offer A new Best Bid is generated and the new Best Bid information is contained in the Best Bid Appendage, and there is no Best Offer.

Space Indicates that the new quote did not meet the BBO requirements. This quote is not included in the BBO.

FIELD DESCRIPTIONS

- B -

7.02 BEST BID PARTICIPANT ID

1 Byte, Alphabetic. Identifies the Participant that entered the Best Bid.

7.03 BEST OFFER PARTICIPANT ID

1 Byte, Alphabetic. Identifies the Participant that entered the Best Offer.

7.04 BEST BID PREMIUM PRICE DENOMINATOR CODE

1 Byte, Alphanumeric. The Best Bid Price Denominator Code field indicates the position of the floating decimal point.

Reference Premium Price Denominator Code description for codes table.

7.05 BEST OFFER PREMIUM PRICE DENOMINATOR CODE

1 Byte, Alphanumeric. The Best Offer Price Denominator Code field indicates the position of the floating decimal point.

Reference Premium Price Denominator Code description for codes table.

FIELD DESCRIPTIONS**- B -****7.06 BEST BID PRICE**

8 Bytes, Numeric. Right Justified, Zero filled. A zero in this field represents a valid Best Bid Price, regardless of size.

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

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

Reference Appendix D for Best Bid/Offer rules.

7.07 BEST BID SIZE

5 Bytes, Numeric. Right Justified, Zero filled.

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

Reference Appendix D for Best Bid/Offer rules.

7.08 BEST OFFER PRICE

8 Bytes, Numeric. Right Justified, Zero filled.

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

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

Reference Appendix D for Best Bid/Offer rules.

FIELD DESCRIPTIONS

- B -

7.09 BEST OFFER SIZE

5 Bytes, Numeric. Right Justified, Zero filled.

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

Reference Appendix D for Best Bid/Offer rules.

7.10 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.

7.11 BID PRICE

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

For the **4 Byte** Bid Price, used for FCO's only, the first two characters represent the whole part and the last two characters (following an implied decimal point) represent the fractional part of the dollar value.

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.

- B -

7.12 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.

- D -

7.13 DECIMAL PLACEMENT INDICATOR

2 Bytes, Numeric. Right Justified, Zero filled. When there is no Decimal Placement Indicator, this field is Zero filled. It will be filled with **values 01-08**.

Represents the number of decimal places from the rightmost digit of the Foreign Currency Spot Value.

FIELD DESCRIPTIONS

- E -

7.14 EXPIRATION DATE

1 Byte, Alphabetic. It 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

7.15 EXPLICIT STRIKE PRICE

7 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.

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.

FIELD DESCRIPTIONS

- F -

7.16 FCO SYMBOL

3 Bytes, Alphabetic. Left Justified, Space filled.

Identifies the unique symbol assigned to a foreign currency spot value.

7.17 FOREIGN CURRENCY SPOT VALUE

8 Bytes, Numeric. Right Justified, Zero filled. When there is no Foreign Currency Spot Value, this field is Zero filled.

The Foreign Currency Spot Value is the whole and decimal portion of the Foreign Currency Spot Value price information with the Decimal Placement Indicator determining location of the decimal point.

Represents the foreign currency spot value.

- H -

7.18 HIGH PRICE

4 or 8 Bytes, Numeric. Right Justified, Zero filled.

For the **4 Byte** High Price, used for FCO's only, the first two characters represent the whole part and the last two characters (following an implied decimal point) represent the fractional part of the dollar value.

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.

FIELD DESCRIPTIONS

- I -

7.19 INDEX SYMBOL

3 Bytes, Alphabetic. Left Justified, Space filled.

Identifies the unique symbol assigned to an index.

7.20 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 -

7.21 LAST PRICE

4 or 8 Bytes, Numeric. Right Justified, Zero filled.

For the **4 Byte** Last Price, used for FCO's only, the first two characters represent the whole part and the last two characters (following an implied decimal point) represent the fractional part of the dollar value.

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.

FIELD DESCRIPTIONS**- L -****7.22 LOW PRICE**

4 or 8 Bytes, Numeric. Right Justified, Zero filled.

For the **4 Byte** Low Price, used for FCO's only, the first two characters represent the whole part and the last two characters (following an implied decimal point) represent the fractional part of the dollar value.

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.

- N -**7.23 NET CHANGE**

4 or 8 Bytes, Numeric. Right Justified, Zero filled.

For the **4 Byte** Net Change, used for FCO's only, the first two characters represent the whole part and the last two characters (following an implied decimal point) represent the fractional part of the dollar value.

The **8 Byte** 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.

FIELD DESCRIPTIONS

- N -

7.24 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.

7.25 NUMBER OF FOREIGN CURRENCY SPOT VALUES IN GROUP

2 Bytes, Numeric. Right Justified, Zero filled.

Represents the total number of foreign currency spot values contained in a particular message.

7.26 NUMBER OF INDICES IN GROUP

2 Bytes, Numeric. Right Justified, Zero filled.

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

- O -

7.27 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.

FIELD DESCRIPTIONS

- 0 -

7.28 OFFER PRICE

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

For the **4 Byte** Offer Price, used for FCO's only, the first two characters represent the whole part and the last two characters (following an implied decimal point) represent the fractional part of the dollar value.

The **8 Byte** 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.

7.29 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 at the Offer Price.

FIELD DESCRIPTIONS**- O -****7.30 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.

7.31 OPEN PRICE

4 or 8 Bytes, Numeric. Right Justified, Zero filled.

For the **4 Byte** Open Price, used for FCO's only, the first two characters represent the whole part and the last two characters (following an implied decimal point) represent the fractional part of the dollar value.

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.

FIELD DESCRIPTIONS

- P -

7.32 PREMIUM PRICE

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

For the **4 Byte** Premium Price, used for FCO's only, the first two characters represent the whole part and the last two characters (following an implied decimal point) represent the fractional part of the dollar value.

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.

FIELD DESCRIPTIONS**- P -****7.33 PREMIUM PRICE DENOMINATOR CODE**

1 Byte, Alphanumeric. Space filled. The Premium Price Denominator Code field indicates the position of the floating decimal point. As defined in "Premium Price", the field is right justified.

Denominator Code	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. All other Participants use Code B.

- R -**7.34 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

Note (Continued):

They do not impact their normal data processing.

FIELD DESCRIPTIONS

- S -

7.35 SECURITY SYMBOL

3 or 5 Bytes, Alphabetic. Left Justified, Space filled.

The **3 Byte** security symbol is used for FCO's only.

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

Identifies the unique symbol assigned to the underlying security.

FIELD DESCRIPTIONS**- S -****7.36 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

FIELD DESCRIPTIONS

- S -

7.37 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.

FIELD DESCRIPTIONS**- S -****7.38 STRIKE PRICE DENOMINATOR CODE****1 Byte**, Alphanumeric, Space filled.

The Strike Price Denominator Code field indicates the position of the floating decimal point. As defined in "Explicit Strike Price", field is right justified.

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

OPRA	OPTIONS PRICE REPORTING AUTHORITY
DATA RECIPIENT INTERFACE SPECIFICATION	

PARTICIPANT USAGE OF STRIKE PRICE DENOMINATOR CODE		
PARTICIPANT	RIGHT JUSTIFY	CODE USED
AMEX	Yes	Variable using code having lowest number of positions in numerator
CBOE	Yes	C
ISE	Yes	D
PCX	Yes	C
PHLX	No	Strikes under \$10 - Code F Strikes between \$10-\$99 - Code E Strikes \$100-\$999 - Code D Strikes \$1000 and over - Code C
BOX	Yes	Whole dollar strike price - Code B Not whole dollar - Code C

PARTICIPANT EXAMPLES OF 22 7/8 STRIKE PRICE		
PARTICIPANT	CODE USED	EXAMPLE
AMEX	C	0022875
CBOE	C	0022875
ISE	D	0228750
PCX	C	0022875
PHLX	E	2287500
BOX	C	0022875

FIELD DESCRIPTIONS

- U -

7.39 UNDERLYING PRICE DENOMINATOR CODE

1 Byte, Alphanumeric. Space filled.

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

Denominator Code	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 Code field.

FIELD DESCRIPTIONS

- U -

7.40 UNDERLYING STOCK PRICE

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

For the **5 Byte** Underlying Stock Price, used for FCO's only, the first three characters represent the whole part and the last two characters (following an implied decimal point) represent the fractional part of the dollar value.

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 -

7.41 VOLUME

4 or 6 Bytes, Numeric. Right Justified, Zero filled.

The **4 Byte** volume is used for FCO's only.

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 -

7.42 YEAR

1 Byte, Alphanumeric, Space filled. The field was defined alpha numeric so that the field could be space

filled during the implementation of the year field.
Zero filled could have been confused with a real year.

Contains the last digit of the expiration year.

8.0 FIELD APPEARANCES WITHIN MESSAGES

FIELD APPEARANCES WITHIN MESSAGES

FIELD NAME	MESSAGE APPEARANCE	NUMBER OF APPEARANCES / MESSAGES
- B -		
BBO Indicator (Best Bid and Best Offer Indicator)	Equity and Index Quote with Size	1
Best Bid Participant ID	Best Bid Appendage	1
Best Bid Price	Best Bid Appendage	1
Best Bid Premium Price Denominator Code	Best Bid Appendage	1
Best Bid Size	Best Bid Appendage	1
Best Offer Participant ID	Best Offer Appendage	1
Best Offer Price	Best Offer Appendage	1
Best Offer Premium Price Denominator Code	Best Offer Appendage	1
Best Offer Size	Best Offer Appendage	1

OPRA	OPTIONS PRICE REPORTING AUTHORITY
DATA RECIPIENT INTERFACE SPECIFICATION	

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 with Size	1
	Equity and Index End of Day Summary	1
	FCO Quote	1
Bid Size	Equity and Index Quote with Size	1
- D -		
Decimal Placement Indicator	Underlying Value - Spot Value	1
- E -		
Expiration Date	Equity and Index Last Sale	1
	Equity and Index Quote with Size	1
	Open Interest	
	Equity and Index End of Day Summary	1
	FCO Last Sale	
	FCO Quote	1
	FCO End of Day Summary	1

OPRA	OPTIONS PRICE REPORTING AUTHORITY
DATA RECIPIENT INTERFACE SPECIFICATION	

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
- F -		
FCO Symbol	Underlying Value - Spot Value	1
Foreign Currency Spot Value	Underlying Value - Spot Value	1
- H -		
High Price	Equity and Index End of Day Summary	1
	FCO 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
	FCO End of Day Summary	1
Low Price	Equity and Index End of Day Summary	1
	FCO End of Day Summary	1
- N -		
Net Change	Equity and Index End of Day Summary	1
	FCO End of Day Summary	1
Net Change Indicator	Equity and Index End of Day Summary	1
	FCO End of Day Summary	1
Number of Foreign Currency Spot Values in Group	Underlying Value - Spot Value	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	1
	Equity and Index End of Day Summary	1
	FCO Quote	1
Offer Size	Equity and Index Quote with Size	1
Open Interest Volume	Open Interest	1
	Equity and Index End of Day Summary	1
	FCO End of Day Summary	1
Open Price	Equity and Index End of Day Summary	1
	FCO End of Day Summary	1
- P -		
Premium Price	Equity and Index Last Sale	1
	FCO Last Sale	1
Premium Price	Equity and Index Last Sale	1
Denominator Code	Equity and Index Quote with Size	1
	Equity and Index End of Day Summary	1

FIELD APPEARANCES WITHIN MESSAGES

FIELD NAME	MESSAGE APPEARANCE	NUMBER OF APPEARANCES / MESSAGES
- R -		
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
	Best Bid Appendage	1
	Best Offer Appendage	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
	FCO Last Sale	1
	FCO Quote	1
	FCO 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
	FCO Last Sale	1
	FCO Quote	1
	FCO End of Day Summary	1
Strike Price Denominator 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

FIELD APPEARANCES WITHIN MESSAGES

FIELD NAME	MESSAGE APPEARANCE	NUMBER OF APPEARANCES / MESSAGES
- U -		
Underlying Price Denominator Code	Equity and Index End of Day Summary	1
Underlying Stock Price	Equity and Index End of Day Summary FCO End of Day Summary	1 1
- V -		
Volume	Equity and Index Last Sale Equity and Index End of Day Summary FCO Last Sale FCO End of Day Summary	1 1 1 1
- Y -		
Year	Equity and Index Last Sale Equity and Index Quote with Size Open Interest Equity and Index End of Day Summary	1 1 1 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.

FCO administrative messages are disseminated over **L1** and Equity and Index administrative messages are disseminated over **L2**.

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 Message Standards for FLEX and UCOM

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 **United Currency Options Market (UCOM)**, **FCO** and **FLEX** (equity and index options) information. The formatted text immediately follows the last character in the Message Header.

9.05 Administrative Message Standards (continued)

CURRENCY OPTIONS			
Field Descriptions	Bytes	Character	Details
Product Type	4	Alphabetic	UCOM - United Currency Options Market
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	
Security Symbol	7	Alphanumeric Left Justified Space filled	
Filler	1	Space	
RFQ Number	7	Alphanumeric Left Justified Space filled	
COMBO ID		Alphabetic	
Filler	1	Space	
Text	V	Alphanumeric	Variable text up to 428 character free form
Reserved	3	Alphanumeric	

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	3	Alphabetic 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)

Last Sale messages for equity **FLEX** have additional standards as follows:

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	3	Alphabetic Left Justified Space filled	MO(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 MO 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	3	Alphabetic Left Justified Space filled	MO(Space)
Filler	1	Space	
Message Type	3	Alphabetic	ADM - Admin Message
Filler	1	Space	
Text	V	Alphanumeric	RFQ MO1 Market Closed
This message is an Equity FLEX Administrative Message that RFQ MO1 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	3	Alphabetic 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	RFQ1(Space)
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	3	Alphabetic 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	RFQ12
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	3	Alphabetic 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	RFQ2(Space)
Filler	1	Space	
Text	V	Alphanumeric	250 @ 23.75 5NSX08
This message is an Index FLEX Last Sale for SPX Request for Quote number 2. 250 contracts traded at 23.75; clearing symbol is 5NSX08.			

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	3	Alphabetic 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	IBM2(Space)
Filler	1	Space	
Strike Price	1-9	Alphanumeric	125 1/8
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	01.02.02
Filler	1	Space	
Volume	5	Alphanumeric	500
Filler	1	Space	
Premium	1-9	Alphanumeric	3 11/16
Filler	1	Space	
Clearing Symbol	6	Alphanumeric	IIBM02
Text	V	Alphanumeric	250 @ 23.75 5NSX08
This message is an Equity FLEX Last Sale for IBM, 125-1/8 Call. American exercise, expiring 01/02/02. 500 sold at 3-11/16.			

Note: The request identifier is not present in IND message. It may not be present in ADM message. The request identifier for an Index FLEX will begin with RFQ. The request identifier for an Equity FLEX will begin with the product symbol for the security.

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 to all lines:

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 Sequence Number
H	L	Start of Open Interest
H	M	End of Open Interest

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	American Stock Exchange
B	Boston Stock Exchange
C	Chicago Board Options Exchange
I	International Securities Exchange
N	NYSE ARCA*
O	Options Price Reporting Authority
P	Pacific Exchange
Q	NASDAQ**
X	Philadelphia Stock Exchange

*-The ID for NYSE Arca changed from P to N on July 2, 2007

**-Trading starts second half of 2007

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 or X	Good Morning
A, B, C, I, N or X	Start of Summary
A, B, C, I, N or X	End of Summary
A, B, C, I, N or X	Early Market Close
A, B, C, I, N or X	End of Transaction Reporting
A, B, C, I, N or X	Good Night
O	End of Day
O	Reset Sequence Number
O	Start of Open Interest
O	End of Open Interest

10.01 CONTROL MESSAGE SUMMARY (continued)

When included in a retransmission sequence, the **Retransmission Requester** field in the **Message Header** contains the specified requester code; otherwise this field contains a Space character (indicating original message).

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-M**", designating the particular **Message Type**.

For Original and Retransmitted messages, the **Time** field in the **Message Header** will contain the original Time that the transaction was disseminated.

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

Participant/Processor Identification Abbreviation	Participant/Processor
AMEX	American Stock Exchange
BOX	Boston Stock Exchange
CBOE	Chicago Board Options Exchange
ISE	International Securities Exchange
NYSE	NYSE ARCA
OPRA	Options Price Reporting Authority
PHLX	Philadelphia Stock Exchange

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

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.

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"

The MSN field contains a number greater than the number of the last test message transmitted in the Test Cycle message transmission.

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"

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

CONTROL MESSAGE DESCRIPTIONS (continued)**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"**

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

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 that was not a retransmitted message.

CONTROL MESSAGE DESCRIPTIONS (continued)**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 that was not a retransmitted message.

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"**

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

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"**

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

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.

CONTROL MESSAGE DESCRIPTIONS (continued)**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 data recipient's responsibility to terminate their production OPRA output feeds from 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

The Reset Sequence Number message is transmitted when the sequence numbers on the line require resetting.

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.

CONTROL MESSAGE DESCRIPTIONS (continued)**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: **"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 "0" 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.

CONTROL MESSAGE DESCRIPTIONS (continued)**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"

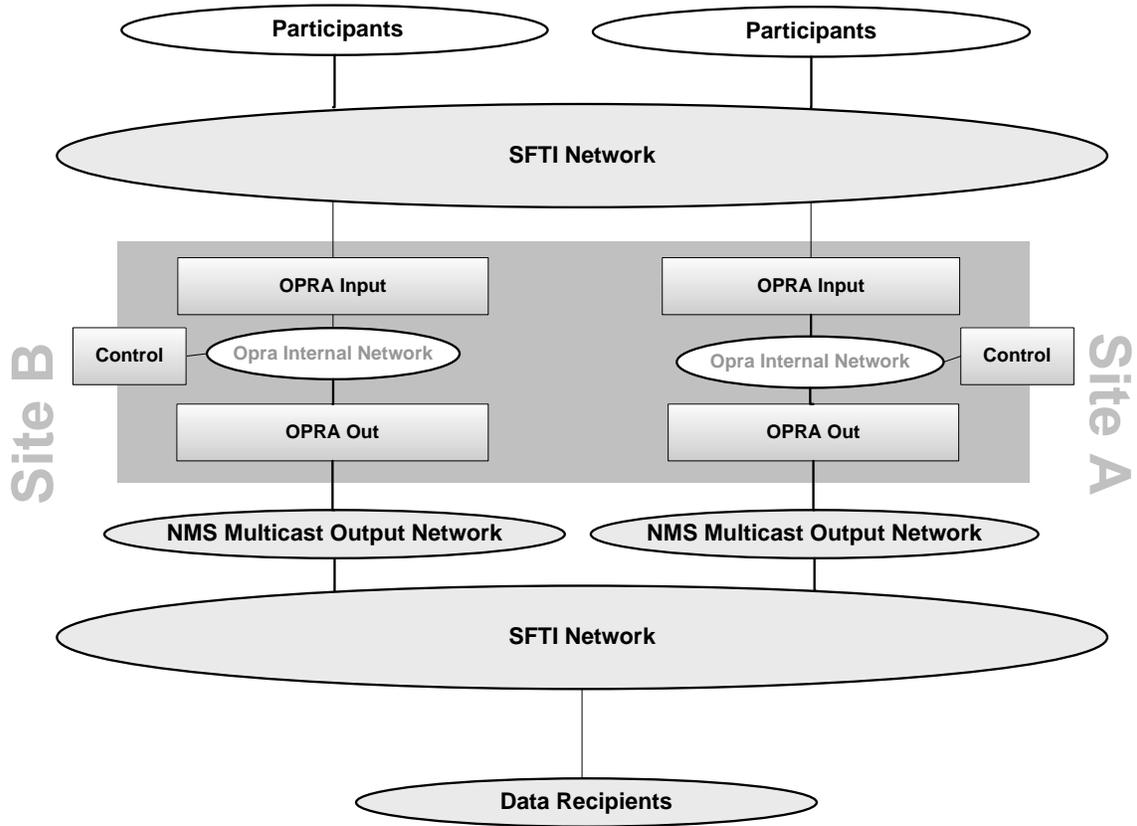
example: **"CBOE END OF OPEN INTEREST - 0102 1545"**

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

OPRA	OPTIONS PRICE REPORTING AUTHORITY
DATA RECIPIENT INTERFACE SPECIFICATION	

APPENDIX A

OPRA CONFIGURATION



APPENDIX B: OPRA TRAFFIC DISTRIBUTION

OPRA messages are disseminated over multiple IP multicast lines. Equity and index options traffic will be on OPRA 1 through 24. Foreign Currency Options (FCO's) settled by physical delivery are no longer supported. FCO's were previously supported on FCO 1. Foreign Currency Options that are cash settled are supported on the equity and index network (OPRA 1 through 24).

Traffic will be routed over the IP multicast lines as follows:

OPRA 4:

- All Equity and Index Administrative messages

ALL Lines:

- All Control messages

OPRA 1 through 24:

- For Equity and Index Last Sale, Equity and Index Quote with Size, Open Interest, Equity and Index End of Day Summary and Underlying Value messages, traffic is routed by the Security Symbol to assigned lines as follows:

Multicast Line	Symbol Distribution To August 22, 2008		Symbol Distribution From August 25, 2008	
1	A	APV	A	AOZ
2	APW	BK	AP	BMZ
3	BKA	CFC	BN	CLZ
4	CFD	CVX	CM	DHZ
5	CVY	DO	DI	EOZ
6	DOA	FAH	EP	FZZ
7	FAI	GOO	G	HFZ
8	GOP	HPQ	HG	IQZ
9	HPR	IVV	IR	KMZ
10	IVW	KQT	KN	LVZ
11	KQU	MBI	LW	MQZ
12	MBJ	MS	MR	NQZ
13	MSA	NSM	NR	PCZ
14	NSN	OVG	PD	QFZ
15	OVH	QAA	QG	QRZ
16	QAB	RCL	QS	RTZ
17	RCM	RUZ	RU	SKZ
18	RV	STR	SL	SYZ
19	STS	TRV	SZ	UOZ
20	TRW	USP	UP	VRZ
21	USQ	VSC	VS	WPZ
22	VSD	WZW	WQ	XOZ
23	WZX	YHG	XP	YMZ
24	YHH	ZZZ	YN	ZZZ

APPENDIX B: OPRA TRAFFIC DISTRIBUTION**Selectively sent to Any Line:**

- Reset Sequence Number message (dependent upon line that requires message sequence number to be reset)

Note: Data recipients are responsible for handling any symbol over any line. Redistribution of traffic will not occur intraday but can occur on a next day basis. Notification may not be sent to the data recipients regarding redistribution of traffic.

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.

<u>TIME</u>	<u>TRANSMISSION</u>
1:20 a.m.	Start all output lines
1:25 a.m.	Start of Test Cycle message (followed by Equity/Index and FCO test cycle messages)
2:05 a.m.	End of Test Cycle message
6:10 a.m.	Start of Day message on lines 1-24 (Equity/Index) and FCO Line 1
6:20 a.m.	FCO Open Interest messages
6:30 a.m.	Equity/Index Open Interest messages
7:15 - 7:30 a.m.	Equity/Index Good Morning message from Amex, BSE, CBOE, PHLX and ISE FCO Good Morning message from PHLX
7:30 a.m.	PHLX FCO trading begins
8:20 a.m.	CBOE Interest Rate Options trading begins
8:30 a.m.	Equity/Index Good Morning message from NYSE/ARCA

APPENDIX C: SCHEDULE OF DAILY OPRA MESSAGES

<u>TIME</u>	<u>TRANSMISSION</u>
9:30 a.m.	Equity/Index Options trading begins*
2:30 p.m.	FCO trading ends
3:00 p.m.	CBOE Interest Rate Options trading ends
4:00 p.m.	Equity Options trading ends
4:10 p.m.	FCO End of Day Summary message
4:15 p.m.	Index Options trading ends
4:25 - 5:10 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
5:30 p.m.	End of Day message. System brought down. (Participant's requiring additional time will be given until 6:00 p.m., at which time SIAC will then send the End of Day message).

*Some Index Options have non-standard trading hours.

APPENDIX D: BEST BID AND BEST OFFER (BBO) OVERVIEW

Best Bid and Best Offer (BBO) calculations are performed whenever a new qualifying quote is received. If it is determined that a new quote has caused a new Best Bid, a new Best Offer, or both, and the BBO information is not contained in the new quote, the appropriate Best Bid, Best Offer, or both, information is appended to the new quote. If it is determined that the new quote does **not** affect the Best Bid or the Best Offer, appendages are **not** added.

A new quote can be the entire new Best Bid and/or Best Offer quote. In addition, the Best Bid and/or Best Offer appendages can indicate a Crossed Market where the Bid price is higher than the Offer price, or a Locked Market where both the Bid and the Offer prices are the same.

OPRA generates a Best Bid and/or Best Offer based on the following criteria in this order:

Price: Participants with highest Bid and lowest Offer have overall priority. Minimum Price increments must be at least **5 cents**, higher or lower than previous. (**See Note**)

Size: Largest size takes precedence when multiple Participants submit the same Bid and/or Offer price. There are no initial minimum size requirements. **Size increments must be 10 contracts or better than previous.** (**See Note**)

Time: Earliest time takes precedence when multiple Participants submit the same Bid and/or Offer price with the same size.

Note: Price and Size criteria may change at any time in the future. All Data Recipients should plan for modifiable parameters on Price and Size requirements. In preparation for potential trading in options with premiums expressed in pennies, a quote that improves the current quote by one cent will be considered part of the OPRA BBO in January 2006.

Note: To avoid dissemination of duplicate Best Bid and/or Best Offer calculations: if a quote is received from a Participant who is currently part or all of the BBO, and the Best Bid and/or Offer are identical, then the Best Bid and/or Best Offer is not updated with a later time, and appendages are **not** added.

APPENDIX D: BEST BID AND BEST OFFER OVERVIEW (continued)**BBO Considerations (continued)**

Each quote message contains a Message Type, which describes the nature of the quote. The Message Types may be viewed as belonging to two classes:

1. Those that qualify for inclusion (eligible) in the Best Bid and/or Best Offer (BBO) calculations.
2. Those that do not qualify for inclusion (ineligible) in the Best Bid and/or Best Offer (BBO) calculations.

BBO-Eligible Message Types

Space Filled - Regular Trading

Type A - Eligible for Automation Execution

Type B - Bid from Specialist Book

Type C - Both Bid and Offer from Specialist Book

Type O - Offer From Specialist Book

BBO-Ineligible Message Types

Type F - Non-Firm Quote

Type R - Rotation

Type T - Trading Halted

APPENDIX D: BEST BID AND BEST OFFER OVERVIEW (continued)**ZERO PRICE RULES FOR BEST BID AND BEST OFFER CALCULATIONS****1. Zero Bid Price and Non Zero Offer:**

If a quote with a zero Bid Price and zero Bid Size is received by OPRA, the Bid Price is eligible to be included in the BBO calculation. The priorities are then Price and Time (i.e., if multiple Participants enter a Zero Bid Price, the one received first is the Best). A size other than zero with a zero Bid Price is not valid and the Bid is ineligible to be included in the BBO calculation. The non zero offer is included in the BBO calculation.

2. Zero Offer Price and Non Zero Bid:

If a quote with a zero Offer Price is received by OPRA, the Offer is not considered valid and is ineligible to be included in the BBO calculation. The non zero Bid is included in the BBO calculation.

3. Zero Bid Price and Zero Offer Price:

If a quote with a zero Bid Price and zero Offer Price is received by OPRA, neither the Bid Price nor the Offer Price are eligible to be included in the BBO calculation. If the entering Participant's previous quote was part or all of the BBO, the BBO is re-calculated excluding the Participant's quote. If a Bid and/or Offer size is included in a Participant's quote, the quote is not valid and is ineligible to be included in the BBO calculations.

APPENDIX D: BEST BID AND BEST OFFER OVERVIEW (continued)**ZERO PRICE RULES FOR BEST BID AND BEST OFFER CALCULATIONS****4. Kill:**

The entry of the kill command by SIAC Operations for a Participant will result in OPRA generating quotes with zero Bid and Offer prices and zero Bid and Offer sizes and no Type code for each series for which that Participant entered a valid quote.

Note: 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.

OPRA	OPTIONS PRICE REPORTING AUTHORITY
DATA RECIPIENT INTERFACE SPECIFICATION	

APPENDIX E: STRIKE PRICE TABLES

STANDARD OPRA STRIKE PRICE TABLE

CODE	STRIKE PRICE TABLE					
A	5	105	205	305	405	505
B	10	110	210	310	410	510
C	15	115	215	315	415	515
D	20	120	220	320	420	520
E	25	125	225	325	425	525
F	30	130	230	330	430	530
G	35	135	235	335	435	535
H	40	140	240	340	440	540
I	45	145	245	345	445	545
J	50	150	250	350	450	550
K	55	155	255	355	455	555
L	60	160	260	360	460	560
M	65	165	265	365	465	565
N	70	170	270	370	470	570
O	75	175	275	375	475	575
P	80	180	280	380	480	580
Q	85	185	285	385	485	585
R	90	190	290	390	490	590
S	95	195	295	395	495	595
T	100	200	300	400	500	600

Note: Although the above table ends with strike price 600, it also includes higher strike prices, e.g., CODE A - 605, 705, 805, 905, 1005, 1105, etc.

Note 2: Alphabetic characters U - Z are typically (but not always) defined as noted below. Similar to the standard OPRA Strike Prices, although this table ends with strike price 122 1/2, it also includes higher strike prices, e.g., CODE U - 127 1/2, 157 1/2, 187 1/2, 217 1/2, etc.

CODE	STRIKE PRICE TABLE			
U	7 1/2	37 1/2	67 1/2	97 1/2
V	12 1/2	42 1/2	72 1/2	102 1/2
W	17 1/2	47 1/2	77 1/2	107 1/2
X	22 1/2	52 1/2	82 1/2	112 1/2
Y	27 1/2	57 1/2	87 1/2	117 1/2
Z	32 1/2	62 1/2	92 1/2	122 1/2

OPRA	OPTIONS PRICE REPORTING AUTHORITY
DATA RECIPIENT INTERFACE SPECIFICATION	

APPENDIX E: STRIKE PRICE TABLES

**CBOE DOW JONES INDUSTRIAL AVERAGE OPTIONS
QUOTE INFORMATION**

EXERCISE PRICE CODE	EXERCISE PRICE					
A	27	53	79	105	131	157
B	28	54	80	106	132	158
C	29	55	81	107	133	159
D	30	56	82	108	134	160
E	31	57	83	109	135	161
F	32	58	84	110	136	162
G	33	59	85	111	137	163
H	34	60	86	112	138	164
I	35	61	87	113	139	165
J	36	62	88	114	140	166
K	36	63	89	115	141	167
L	38	64	90	116	142	168
M	39	65	91	117	143	169
N	40	66	92	118	144	170
O	41	67	93	119	145	171
P	42	68	94	120	146	172
Q	43	69	95	121	147	173
R	44	70	96	122	148	174
S	45	71	97	123	149	175
T	46	72	98	124	150	176
U	47	73	99	125	151	177
V	48	74	100	126	152	178
W	49	75	101	127	153	179
X	50	76	102	128	154	180
Y	51	77	103	129	155	181
Z	52	78	104	130	156	182

Note: Although the above table ends with strike price 182, it also includes higher strike prices, e.g., CODE A - 183, 209, 235, 261, 287, 313, etc.

OPRA	OPTIONS PRICE REPORTING AUTHORITY
DATA RECIPIENT INTERFACE SPECIFICATION	

APPENDIX E: STRIKE PRICE TABLES

FOREIGN CURRENCY OPTION TABLE 1

Exercise Price Code	EXERCISE PRICES																							
A	0.25	6.00	11.75	17.50	23.25	29.00	34.75	40.50	46.25	52.00	57.75	63.50	69.25	75.00	80.75	86.50	92.25	98.00	103.75	109.50	115.25	121.00	126.75	132.50
B	0.50	6.25	12.00	17.75	23.50	29.25	35.00	40.75	46.50	52.25	58.00	63.75	69.50	75.25	81.00	86.75	92.50	98.25	104.00	109.75	115.50	121.25	127.00	132.75
C	0.75	6.50	12.25	18.00	23.75	29.50	35.25	41.00	46.75	52.50	58.25	64.00	69.75	75.50	81.25	87.00	92.75	98.50	104.25	110.00	115.75	121.50	127.25	133.00
D	1.00	6.75	12.50	18.25	24.00	29.75	35.50	41.25	47.00	52.75	58.50	64.25	70.00	75.75	81.50	87.25	93.00	98.75	104.50	110.25	116.00	121.75	127.50	133.25
E	1.25	7.00	12.75	18.50	24.25	30.00	35.75	41.50	47.25	53.00	58.75	64.50	70.25	76.00	81.75	87.50	93.25	99.00	104.75	110.50	116.25	122.00	127.75	133.50
F	1.50	7.25	13.00	18.75	24.50	30.25	36.00	41.75	47.50	53.25	59.00	64.75	70.50	76.25	82.00	87.75	93.50	99.25	105.00	110.75	116.50	122.25	128.00	133.75
G	1.75	7.50	13.25	19.00	24.75	30.50	36.25	42.00	47.75	53.50	59.25	65.00	70.75	76.50	82.25	88.00	93.75	99.50	105.25	111.00	116.75	122.50	128.25	134.00
H	2.00	7.75	13.50	19.25	25.00	30.75	36.50	42.25	48.00	53.75	59.50	65.25	71.00	76.75	82.50	88.25	94.00	99.75	105.50	111.25	117.00	122.75	128.50	134.25
I	2.25	8.00	13.75	19.50	25.25	31.00	36.75	42.50	48.25	54.00	59.75	65.50	71.25	77.00	82.75	88.50	94.25	100.00	105.75	111.50	117.25	123.00	128.75	134.50
J	2.50	8.25	14.00	19.75	25.50	31.25	37.00	42.75	48.50	54.25	60.00	65.75	71.50	77.25	83.00	88.75	94.50	100.25	106.00	111.75	117.50	123.25	129.00	134.75
K	2.75	8.50	14.25	20.00	25.75	31.50	37.25	43.00	48.75	54.50	60.25	66.00	71.75	77.50	83.25	89.00	94.75	100.50	106.25	112.00	117.75	123.50	129.25	135.00
L	3.00	8.75	14.50	20.25	26.00	31.75	37.50	43.25	49.00	54.75	60.50	66.25	72.00	77.75	83.50	89.25	95.00	100.75	106.50	112.25	118.00	123.75	129.50	135.25
M	3.25	9.00	14.75	20.50	26.25	32.00	37.75	43.50	49.25	55.00	60.75	66.50	72.25	78.00	83.75	89.50	95.25	101.00	106.75	112.50	118.25	124.00	129.75	135.50
N	3.50	9.25	15.00	20.75	26.50	32.25	38.00	43.75	49.50	55.25	61.00	66.75	72.50	78.25	84.00	89.75	95.50	101.25	107.00	112.75	118.50	124.25	130.00	135.75
O	3.75	9.50	15.25	21.00	26.75	32.50	38.25	44.00	49.75	55.50	61.25	67.00	72.75	78.50	84.25	90.00	95.75	101.50	107.25	113.00	118.75	124.50	130.25	136.00
P	4.00	9.75	15.50	21.25	27.00	32.75	38.50	44.25	50.00	55.75	61.50	67.25	73.00	78.75	84.50	90.25	96.00	101.75	107.50	113.25	119.00	124.75	130.50	136.25
Q	4.25	10.00	15.75	21.50	27.25	33.00	38.75	44.50	50.25	56.00	61.75	67.50	73.25	79.00	84.75	90.50	96.25	102.00	107.75	113.50	119.25	125.00	130.75	136.50
R	4.50	10.25	16.00	21.75	27.50	33.25	39.00	44.75	50.50	56.25	62.00	67.75	73.50	79.25	85.00	90.75	96.50	102.25	108.00	113.75	119.50	125.25	131.00	136.75
S	4.75	10.50	16.25	22.00	27.75	33.50	39.25	45.00	50.75	56.50	62.25	68.00	73.75	79.50	85.25	91.00	96.75	102.50	108.25	114.00	119.75	125.50	131.25	137.00
T	5.00	10.75	16.50	22.25	28.00	33.75	39.50	45.25	51.00	56.75	62.50	68.25	74.00	79.75	85.50	91.25	97.00	102.75	108.50	114.25	120.00	125.75	131.50	137.25
U	5.25	11.00	16.75	22.50	28.25	34.00	39.75	45.50	51.25	57.00	62.75	68.50	74.25	80.00	85.75	91.50	97.25	103.00	108.75	114.50	120.25	126.00	131.75	137.50
V	5.50	11.25	17.00	22.75	28.50	34.25	40.00	45.75	51.50	57.25	63.00	68.75	74.50	80.25	86.00	91.75	97.50	103.25	109.00	114.75	120.50	126.25	132.00	137.75
W	5.75	11.50	17.25	23.00	28.75	34.50	40.25	46.00	51.75	57.50	63.25	69.00	74.75	80.50	86.25	92.00	97.75	103.50	109.25	115.00	120.75	126.50	132.25	138.00

Note: Although the above table ends with strike price 138.00, it also includes higher strike prices, e.g., CODE A - 138.25, 144.00, 149.75, 155.50, 161.25, 167.00, etc.

**APPENDIX E
STRIKE PRICE TABLES
FCO TABLE 2**

Although table 2 ends with a strike price of \$20.00 it also includes higher strike prices. e.g. A=\$20.50, \$30.50, etc

A	\$.50	\$10.50
B	\$1.00	\$11.00
C	\$1.50	\$11.50
D	\$2.00	\$12.00
E	\$2.50	\$12.50
F	\$3.00	\$13.00
G	\$3.50	\$13.50
H	\$4.00	\$14.00
I	\$4.50	\$14.50
J	\$5.00	\$15.00
K	\$5.50	\$15.50
L	\$6.00	\$16.00
M	\$6.50	\$16.50
N	\$7.00	\$17.00
O	\$7.50	\$17.50
P	\$8.00	\$18.00
Q	\$8.50	\$18.50
R	\$9.00	\$19.00
S	\$9.50	\$19.50
T	\$10.00	\$20.00

APPENDIX E

STRIKE PRICE TABLES

FCO TABLE 3

A	\$.10	\$2.10
B	\$.20	\$2.20
C	\$.30	\$2.30
D	\$.40	\$2.40
E	\$.50	\$2.50
F	\$.60	\$2.60
G	\$.70	\$2.70
H	\$.80	\$2.80
I	\$.90	\$2.90
J	\$1.00	\$3.00
K	\$1.10	\$3.10
L	\$1.20	\$3.20
M	\$1.30	\$3.30
N	\$1.40	\$3.40
O	\$1.50	\$3.50
P	\$1.60	\$3.60
Q	\$1.70	\$3.70
R	\$1.80	\$3.80
S	\$1.90	\$3.90
T	\$2.00	\$4.00

Although table 3 ends with a strike price of \$4.00 it also includes higher strike prices. e.g. A = \$4.10, \$6.10, etc.

APPENDIX F: SAMPLE TEST CYCLE MESSAGES

NOTE: All Test Cycle messages contain the Participant ID code O, meaning OPRA, the Retransmission Requester field is Space filled and the Time field reflects the Time the messages are sent over the respective line.

SAMPE TEST CYCLE MESSAGES ROUTED TO OPRA 1 THROUGH 24:

MSG ID	MESSAGE SEQUENCE #	TEXT
HA	00000000	START OF TEST CYCLE
Cspace	00000001	yyyyyyABCDEFGHJKLMNOPQRSTUVWXYZ. 123456789+-pwrs/stbco\$#&zzzzzz
aA	00000002	OXYZ U1AB0000040000100B0000004200
HL	00000003	START OF OPEN INTEREST
dspace	00000004	RZYX G1AB0000030000300000
HM	00000005	END OF OPEN INTEREST
HE	00000006	START OF SUMMARY
fspace	00000007	HYZX B1QB00052000120000070000B00005000 000052000000490000005100+00000100B0000000 5300000052500000535000
HF	00000008	END OF SUMMARY
kspace	00000009	IYXW B1KB0000065G000000990010000000 1000020000
HB	00000010	END OF TEST CYCLE

MSG ID	MESSAGE SEQUENCE #	TEXT
HA	00000000	START OF TEST CYCLE
aspace	00000001	AZYX X1AB0000040000100D0000004200
HL	00000002	START OF OPEN INTEREST
dspace	00000003	SYXZ G1AB0000040000100000
HM	00000004	END OF OPEN INTEREST
HE	00000005	START OF SUMMARY
fspace	00000006	AYXZ B1QB00052000120000070000B000050000 00052000000490000005100+00000100B00000005 300000052500000535000
HF	00000007	END OF SUMMARY
kspace	00000008	AYXW B1KB0000065G00000099001000000010 00020000
HB	00000009	END OF TEST CYCLE

OPRA	OPTIONS PRICE REPORTING AUTHORITY
DATA RECIPIENT INTERFACE SPECIFICATION	

APPENDIX F: SAMPLE TEST CYCLE MESSAGES

MSG ID	MESSAGE SEQUENCE #	TEXT
HA	00000000	START OF TEST CYCLE
aA	00000001	BXYZ U1AB0000040000100B0000004200
HL	00000002	START OF OPEN INTEREST
dspace	00000003	FZYX G1AB0000030000300000
HM	00000004	END OF OPEN INTEREST
HE	00000005	START OF SUMMARY
fspace	00000006	NYZX B1QB00052000120000070000B0000500 0000052000000490000005100+00000100B000000 05300000052500000535000
HF	00000007	END OF SUMMARY
kspace	00000008	LYXW B1KB0000065G000000990010000000 100020000
HB	00000009	END OF TEST CYCLE

MSG ID	MESSAGE SEQUENCE #	TEXT
HA	00000000	START OF TEST CYCLE
aspace	00000001	MZYX X1AB0000040000100D0000004200
HL	00000002	START OF OPEN INTEREST
dspace	00000003	MYXZ G1AB0000040000100000
HM	00000004	END OF OPEN INTEREST
HE	00000005	START OF SUMMARY
fspace	00000006	WYXZ B1QB00052000120000070000B0000500 0000052000000490000005100+00000100B000000 05300000052500000535000
HF	00000007	END OF SUMMARY
kspace	00000008	WYXW B1KB0000065G00000099001000000010 00020000
HB	00000009	END OF TEST CYCLE

OPRA	OPTIONS PRICE REPORTING AUTHORITY
DATA RECIPIENT INTERFACE SPECIFICATION	

APPENDIX F: SAMPLE TEST CYCLE MESSAGES

MSG ID	MESSAGE SEQUENCE #	TEXT
HA	00000000	START OF TEST CYCLE
aA	00000001	EXYZ U1AB0000040000100B0000004200
HL	00000002	START OF OPEN INTEREST
dspace	00000003	JZYX G1AB0000030000300000
HM	00000004	END OF OPEN INTEREST
HE	00000005	START OF SUMMARY
fspace	00000006	PYZX B1QB00052000120000070000B0000500 0000052000000490000005100+00000100B000000 05300000052500000535000
HF	00000007	END OF SUMMARY
kspace	00000008	CYXW B1KB0000065G00000099001000000010 00020000
HB	00000009	END OF TEST CYCLE

MSG ID	MESSAGE SEQUENCE #	TEXT
HA	00000000	START OF TEST CYCLE
aspace	00000001	GZYX X1AB0000040000100D0000004200
HL	00000002	START OF OPEN INTEREST
dspace	00000003	QYXZ G1AB0000040000100000
HM	00000004	END OF OPEN INTEREST
HE	00000005	START OF SUMMARY
fspace	00000006	ZYXZ B1QB00052000120000070000B0000500 0000052000000490000005100+00000100B000000 05300000052500000535000
HF	00000007	END OF SUMMARY
kspace	00000008	TYXW B1KB0000065G00000099001000000010 00020000
HB	00000009	END OF TEST CYCLE

OPRA	OPTIONS PRICE REPORTING AUTHORITY
DATA RECIPIENT INTERFACE SPECIFICATION	

APPENDIX F: SAMPLE TEST CYCLE MESSAGES

MSG ID	MESSAGE SEQUENCE #	TEXT
HA	00000000	START OF TEST CYCLE
aA	00000001	DXYZ U1AB0000040000100B0000004200
HL	00000002	START OF OPEN INTEREST
dspace	00000003	DZYX G1AB0000030000300000
HM	00000004	END OF OPEN INTEREST
HE	00000005	START OF SUMMARY
fspace	00000006	XYZX B1QB00052000120000070000B0000500 0000052000000490000005100+00000100B000000 05300000052500000535000
HF	00000007	END OF SUMMARY
kspace	00000008	YYXW B1KB0000065G00000099001000000010 00020000
HB	00000009	END OF TEST CYCLE

MSG ID	MESSAGE SEQUENCE #	TEXT
HA	00000000	START OF TEST CYCLE
aspace	00000001	UZYX X1AB0000040000100D0000004200
HL	00000002	START OF OPEN INTEREST
dspace	00000003	VYXZ G1AB0000040000100000
HM	00000004	END OF OPEN INTEREST
HE	00000005	START OF SUMMARY
fspace	00000006	KYXZ B1QB00052000120000070000B0000500 0000052000000490000005100+00000100B000000 05300000052500000535000
HF	00000007	END OF SUMMARY
kspace	00000008	VYXW B1KB0000065G00000099001000000010 00020000
HB	00000009	END OF TEST CYCLE