



**CBOE Financial Network
Market Data Dissemination
For
CBOE Futures Exchange Products
Vendor Interface Specification**

**Version 1.4
January 15, 2010**

CFN/CFE - Vendor Interface Specification

TABLE OF CONTENTS

1.0	INTRODUCTION.....	5
2.0	GENERAL DESIGN OF DATA DISTRIBUTION NETWORK	5
3.0	TRANSMISSION CHARACTERISTICS	6
3.01	TRANSMISSION BLOCK	6
3.02	SOH AND ETX	6
3.03	US	6
3.04	BLOCK TEXT	6
3.05	BLOCK TEXT FORMAT	7
3.06	DATA FORMAT	7
3.07	CHARACTER SET	7
4.0	MESSAGE HEADER	8
4.01	MESSAGE HEADER FIELD DESCRIPTIONS	8
4.02	EXCHANGE ID	8
4.03	RESERVED	8
4.04	MESSAGE IDENTIFICATION	8
4.05	MESSAGE SEQUENCE NUMBER (MSN)	13
4.06	TIME	13
5.0	MESSAGE FORMATS	14
5.01	FUTURES LAST SALE	15
5.02	FUTURES QUOTE WITH SIZE	16
5.03	FUTURES OPEN INTEREST	17
5.04	UNDERLYING VALUE – LAST SALE	18
5.05	UNDERLYING VALUE – BID AND ASK	19
5.06	FUTURES END OF DAY SUMMARY	20
5.07	SETTLEMENT PRICE	21
5.08	OPTIONS ON FUTURES LAST SALE	22
5.09	OPTIONS ON FUTURES QUOTE WITH SIZE	23
5.10	OPTIONS ON FUTURES END OF DAY SUMMARY	24
6.0	FIELD DESCRIPTIONS	25
6.01	ASK INDEX VALUE	25
6.02	ASK QUOTE	25
6.03	ASK SIZE	26
6.04	BID INDEX VALUE	26
6.05	BID QUOTE	26
6.06	BID SIZE	26
6.07	CALL/PUT IND	27
6.08	EXPIRATION MONTH CODE	27
6.09	EXPLICIT STRIKE PRICE	27
6.10	HIGH PRICE	28
6.11	INDEX SYMBOL	28
6.12	INDEX VALUE	28
6.12	LAST PRICE	28
6.13	LOW PRICE	28
6.14	NET CHANGE	29
6.15	NET CHANGE INDICATOR	29
6.16	NUMBER OF INDICES IN GROUP	29
6.17	OPEN INTEREST VOLUME	29

CFN/CFE - Vendor Interface Specification

6.18	OPEN PRICE	29
6.19	OPTIONS ON FUTURE SYMBOL	30
6.20	PRICE AND PREMIUM PRICE	30
6.21	PRICE DENOMINATOR CODE AND PREMIUM PRICE DENOMINATOR CODE.....	30
6.22	RESERVED	31
6.23	SECURITY SYMBOL	31
6.24	SESSION INDICATOR	31
6.25	STRIKE PRICE DENOMINATOR CODE	31
6.26	UNDERLYING PRICE DENOMINATOR CODE.....	32
6.27	UNDERLYING STOCK PRICE	32
6.28	VOLUME.....	33
6.29	YEAR.....	33
7.0	ADMINISTRATIVE MESSAGES	34
7.01	ADMINISTRATIVE MESSAGE.....	34
7.02	ADMINISTRATIVE MESSAGE TEXT	34
7.03	ADMINISTRATIVE MESSAGE STANDARDS	34
7.04	LINE INTEGRITY MESSAGE.....	35
8.0	CONTROL MESSAGES	36
8.01	CONTROL MESSAGE SUMMARY	36
8.02	CONTROL MESSAGE DESCRIPTIONS	37
8.03	START OF DAY – CATEGORY H TYPE C	37
8.04	START OF SUMMARY - CATEGORY H TYPE E OR P.....	38
8.05	END OF SUMMARY - CATEGORY H TYPE F OR Q.....	38
8.06	END OF DAY - CATEGORY H TYPE J.....	39
8.07	RESET SEQUENCE NUMBER - CATEGORY H TYPE K.....	39

CFN/CFE - Vendor Interface Specification

Change Notice

Date	Version	Description of Change
Jan 15, 2010	V 1.4	2.0 removed TCP in the multicast protocol description.
Jan 09, 2006	V1.3	7.4 added description of Line Integrity Message. Updated to include the Premium Price and to remove the message identifier "d"
Dec 07, 2005	V1.3	Updated for Options on Futures (dlt) Please note: The name of the 'Expiration Date' field is being changed to 'Expiration Month Code' in version 1.3 of this document. The actual field contents and length are not changing. It is a documentation change only.
Dec 20, 2004	V1.2.1	Updated the "m" message type details.
Apr 20, 2004	V1.2.1	Added the Settlement Price ("s") message format.
Feb 24, 2004	V1.2.1	Corrected category "r" in section 5.02 to include type "T" and removed type A
Jan 26, 2004	V1.2.1	Noted the message types that are not currently used.

CFN/CFE - Vendor Interface Specification

1.0 INTRODUCTION

The Chicago Board Options Exchange (CBOE) will list futures products using CBOE*direct*®. The CBOE Futures Exchange (CFE) will have its own trading session, CFE_MAIN, to support the listing of futures. CBOE will provide dissemination services for all CBOE Futures products. Market data will be provided in the most timely fashion available. The infrastructure to support the market data distribution will be known as the CBOE Financial Network (CFN).

The CBOE will now also list Options on Futures, using CBOE*direct*® within the CFE exchange. The new trading session, COF_MAIN, will support trading Options on Futures. Market data for these products will be distributed via CFN. An Option contains a symbol, expiration month, expiration year, call/put code and strike price. Separate message categories have been defined within this document to support these products.

This document describes the required formats for communications and output messages to effectively interface with the CFN facilities.

2.0 GENERAL DESIGN OF DATA DISTRIBUTION NETWORK

CFN will utilize an IP multicast protocol for the dissemination of CFE information. CFN transmits variable length blocks having maximum lengths of 1000 characters. The length includes a Block Length Header, text and control characters. The number of messages contained in a block is variable and the end of each message is delimited by a Unit Separator character (US), except for the last record in the block, which ends with an End of Text (ETX) character.

Data available via the CFN IP multicast distribution network includes:

Real-Time Production Data

A copy of each CFE real-time production message is available from each connection to the CFN facility delivered via two distinct multicast data streams.

Pre-Launch Test Data

Prior to the official launch of CFE, markets test data will be disseminated over CFN production ports. After launch, CFE will approve new vendors for interim connections to the production feed from vendor test environments until they are prepared to move to their production environment.

Time Beacon and Retransmission facility

CFN does not anticipate implementing either of these facilities initially. The evolution of market data networks over the past several years has dramatically reduced the number of retransmission requests made by vendors. As the network and user community of CFN expands, a needs analysis will be performed to determine the importance of providing these features.

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:



|<----- 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 n	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, except Strike and Premium Price Denominator Code fields, which are Zero filled. All Alphanumeric fields are right or left justified, as required.
4. Reserved fields will be space filled.

3.07 CHARACTER SET

All transmissions are in standard 8-bit ASCII code.

CFN/CFE - Vendor Interface Specification

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:

EXCHANGE ID	Reserved	MESSAGE IDENTIFICATION	MESSAGE SEQUENCE NUMBER	TIME
1	1	2	8	6

|←----- 18 BYTES ----->|

4.01 MESSAGE HEADER FIELD DESCRIPTIONS

4.02 EXCHANGE ID

The Exchange ID field is a **1 Byte**, Alphabetic character that identifies the CFE as the initiator of the message:

CODE	VALUE
C	CBOE Futures Exchange

4.03 RESERVED

The Reserved field is a **1 Byte**, Alphanumeric character, ASCII space filled field. Field is reserved for future use.

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.

Valid Message Categories

LOWER CASE CODE	VALUE
a	Options on Futures Last Sale
f	Options on Futures End of Day Summary
k	Options on Futures quote with Size
m	Last Sale
n	Open Interest
o	End of Day Summary
r	Quote With Size
s	Settlement Price
UPPER CASE CODE	VALUE
C	ADMINISTRATIVE
H	CONTROL
Y	UNDERLYING VALUE MESSAGE

CFN/CFE - Vendor Interface Specification

MESSAGE IDENTIFICATION - Message Type (second alpha character):

The following **Message Types**, all mutually exclusive, apply to **Category “a” and “m” Last Sale** messages, except where noted.

CODE	VALUE	
Space Filled	REGULAR	Indicates that the transaction was a regular sale and was made without stated conditions
A	CANC	Transaction previously reported 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 contract.
C	CNCL	Transaction is the last reported for the particular contract and is now cancelled. (not currently used)
D	LATE	Transaction is being reported late, but is in the correct sequence; i.e., no later transactions have been reported for the particular contract.
E	CNCO	Transaction was the first one (opening) reported this day for the particular 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 contract.
G	CNOL	Transaction was the only one reported this day for the particular contract and is now to be cancelled. (not currently used)
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 contract.
J	REOP	Transaction is a reopening of a contract in which trading has been previously halted. Prefix appears solely for information; process as a regular transaction.
K	AJST	Transaction is a 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. (not currently used)
L	SPRD	Transaction represents a trade in two contract months in the same class (a buy and a sell in the same class). Prefix appears solely for information; process as a regular transaction.
M	STD L	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. (not currently used)
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. (not currently used)
O	CSTP	Cancel stopped transaction. (not currently used)
P	BWRT	Transaction represents the option portion of a buy/write (buy stock, sell call options). Prefix appears solely for information; process as a regular transaction. (not currently used)

CFN/CFE - Vendor Interface Specification

CODE	VALUE	
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. (not currently used)
R	BLKT	Block Trade
S	EXPH	Exchange Future for Physical

MESSAGE TYPE IMPACT ON OPEN/HIGH/LOW/CLOSE AND VOLUME

The following table defines the processing rules upon receipt of each **Message Type**.

MESSAGE TYPE	OPEN	HIGH	LOW	CLOSE	VOLUME
A	N/A	Yes	Yes	Yes	Decrement
B	Yes	Yes	Yes	No	Increment
C	Yes	Yes	Yes	Yes	Decrement
D	Yes	Yes	Yes	Yes	Increment
E	Yes	Yes	Yes	N/A	Decrement
F	Yes	Yes	Yes	N/A	Increment
G	Yes	Yes	Yes	Yes	Decrement
H	Yes	Yes	Yes	N/A	Increment
J	N/A	Yes	Yes	N/A	Increment
K	Yes	Yes	Yes	Yes	Increment
L	Yes	Yes	Yes	Yes	Increment
M	Yes	Yes	Yes	Yes	Increment
N	Yes	Yes	Yes	Yes	Increment
O	Yes	Yes	Yes	Yes	Decrement
P	Yes	Yes	Yes	Yes	Increment
Q	Yes	Yes	Yes	Yes	Increment
R	No	No	No	No	Increment
S	No	No	No	No	Increment

Yes indicates vendor should adjust value upon receipt of message type (assuming adjusted message impacts value).

No indicates that no adjustment is required.

CFN/CFE - Vendor Interface Specification

MESSAGE IDENTIFICATION- Message Type (second alpha character):

The **Message Type** character for **Category “C” Administrative** and **Category “n” Open Interest** messages are **Space filled**.

The following **Message Type** values apply to **Category “f” and “o” End of Day Summary** message:

CODE	VALUE
Space filled	Futures

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

CODE	VALUE
C	Start of Day
E	Start of Summary
F	End of Summary
J	End of Day
K	Reset Sequence Number
P	Options on Futures Start of Summary
Q	Options on Futures End of Summary

The following **Message Types** apply to **Category “k” and “r” Quote With Size** messages:

CODE	VALUE
Space filled	Regular Trading
F	Fast Market
R	Rotation
T	Trading Halted
I	Inactive
B	Bid from Specialist Book
O	Ask from Specialist Book
C	Both Bid and Ask 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.

CFN/CFE - Vendor Interface Specification

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

CODE	VALUE
Space filled	Index based on Last Sale
I	Index based on Bid and Ask
C	Closing Spot

Note: Additional Message Category(s) and Message Type(s) will be implemented as required. If Vendors 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 Zero 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 CFN experience a line failure and recovery, the message sequence number for the recovered line(s) is reset to a sequence number greater than the last number transmitted. A sequence reset message will be transmitted prior to resumption of data transmission and will indicate the new sequence number that the receiver should expect.

4.06 TIME

The Time (Central 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 CFN 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 and some Control messages which have unformatted text). Detailed information on each field specified in every message format is contained in alphabetical order in the **Field Descriptions** section (**section 6.0**) of this document.

CFN/CFE - Vendor Interface Specification

5.01 FUTURES LAST SALE

35 BYTES

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

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

FUTURES SYMBOL	RESERVED	EXPIRATION MONTH CODE	YEAR
6	1	1	1

|←----- 9 BYTES -----→|

RESERVED	VOLUME
9	6

|←-----15 BYTES -----→|

PRICE DENOMINATOR CODE	PRICE	SESSION INDICATOR	RESERVED
1	8	1	1

|←----- 11 BYTES -----→|

CFN/CFE - Vendor Interface Specification

5.02 FUTURES QUOTE WITH SIZE

47 BYTES

The Quote With Size message is used to report quote with size information.

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

FUTURES SYMBOL	RESERVED	EXPIRATION MONTH CODE	YEAR
6	1	1	1

|←----- 9 BYTES -----→|

RESERVED	PRICE DENOMINATOR CODE
9	1

|←----- 10 BYTES -----→|

BID QUOTE	BID SIZE	ASK QUOTE	ASK SIZE
8	5	8	5

|←----- 26 BYTES -----→|

SESSION INDICATOR	RESERVED
1	1

|←--- 2 BYTES ---→|

CFN/CFE - Vendor Interface Specification

5.03 FUTURES OPEN INTEREST

27 BYTES

The Open Interest message is used to report current contract Open Interest as reported by CFE's clearing agent. Open Interest will be disseminated for the previous day. This message is currently **not implemented**.

CATEGORY	TYPE
n	Space filled

FUTURES SYMBOL	RESERVED	EXPIRATION MONTH CODE	YEAR	RESERVED
6	1	1	1	9

|←----- 18 BYTES -----→|

OPEN INTEREST VOLUME	RESERVED
7	2

|←----- 9 BYTES -----→|

CFN/CFE - Vendor Interface Specification

5.04 UNDERLYING VALUE – LAST SALE

MAXIMUM 67 BYTES

The Underlying Value message is a variable length record and can accommodate a maximum number of 5 Index groups. Each group contains the Last Sale Index Value of a security futures narrow based index. One ticker symbol will be used for each Narrow Based Index. This message will not be used at this point for the underlying for Options on Futures.

CATEGORY	TYPE
Y	Space filled

NUMBER OF
INDICES IN
GROUP

2

|← 2BYTES →|

INDEX GROUP #1

NBI SYMBOL #1	INDEX VALUE
6	7

|←----- TOTAL OF 13 BYTES -----→|

(CAN INCLUDE UP TO 5 INDEX GROUPS)



INDEX GROUP #5

NBI SYMBOL #5	INDEX VALUE
6	7

|←----- TOTAL OF 13 BYTES -----→|

CFN/CFE - Vendor Interface Specification

5.05 UNDERLYING VALUE – BID AND ASK

MAXIMUM 107 BYTES

The Underlying Value – Bid and Ask message is a variable length record and can accommodate a maximum number of 5 Index groups. Each group contains the Bid Index Value and Ask Index Value of a stock index. One ticker symbol will be used for each Narrow Based Index. This message will not be used at this point for the Underlying for Options on Futures.

CATEGORY	TYPE
Y	I

NUMBER OF
INDICES IN
GROUP

2

|← 2 BYTES →|

INDEX GROUP #1

NBI SYMBOL #1	RESERVED	BID INDEX VALUE	ASK INDEX VALUE
6	1	7	7

|←----- TOTAL OF 21 BYTES -----→|

(CAN INCLUDE UP TO 5 INDEX GROUPS)

INDEX GROUP #5

NBI SYMBOL #5	RESERVED	BID INDEX VALUE	ASK INDEX VALUE
6	1	7	7

|←----- TOTAL OF 21 BYTES -----→|

CFN/CFE - Vendor Interface Specification

5.06 FUTURES END OF DAY SUMMARY

103 BYTES

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

CATEGORY	TYPE
0	Space filled

FUTURES SYMBOL	RESERVED	EXPIRATION MONTH CODE	YEAR	RESERVED
6	1	1	1	9

|←----- 18 BYTES -----→|

VOLUME	OPEN INTEREST VOLUME	DENOMINATOR CODE
6	7	1

|←----- 14 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 QUOTE	ASK QUOTE	RESERVED
8	1	11	8	8	2

|←----- 38 BYTES -----→|

CFN/CFE - Vendor Interface Specification

5.07 SETTLEMENT PRICE

35 BYTES

The Settlement Price message is used to report daily settlement values information for both Futures and Options on Futures products.

CATEGORY	TYPE
s	Space filled

SECURITY FUTURES SYMBOL	RESERVED	EXPIRATION MONTH CODE	YEAR
6	1	1	1

|←----- 9 BYTES -----→|

RESERVED	VOLUME
9	6

|←-----15 BYTES -----→|

PRICE DENOMINATOR CODE	PRICE	SESSION INDICATOR	RESERVED
1	8	1	1

|←----- 11 BYTES -----→|

CFN/CFE - Vendor Interface Specification

5.08 OPTIONS ON FUTURES LAST SALE

35 BYTES

The Last Sale message is used to report options on futures last sale information.

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

OPTIONS ON FUTURE SYMBOL	RESERVED	EXPIRATION MONTH CODE	YEAR
6	1	1	1
←----- 9 BYTES -----→			

CALL/PUT IND	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 -----→			

CFN/CFE - Vendor Interface Specification

5.09 OPTIONS ON FUTURES QUOTE WITH SIZE

47 BYTES

The Quote With Size message is used to report options on futures quote with size information.

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

OPTIONS ON FUTURE SYMBOL	RESERVED	EXPIRATION MONTH CODE	YEAR
6	1	1	1
←----- 9 BYTES -----→			

CALL/PUT IND	STRIKE PRICE DENOMINATOR CODE	EXPLICIT STRIKE PRICE	PREMIUM PRICE DENOMINATOR CODE
1	1	7	1
←----- 10 BYTES -----→			

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

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

CFN/CFE - Vendor Interface Specification

5.10 OPTIONS ON FUTURES END OF DAY SUMMARY

103 BYTES

The Options on Futures 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 activity occurred for an option, no End of Day Summary is generated for that option.**

CATEGORY	TYPE
f	Space filled

OPTIONS ON FUTURES SYMBOL	RESERVED	EXPIRATION MONTH CODE	YEAR	CALL/PUT IND
6	1	1	1	1

|←----- 10 BYTES -----→|

STRIKE PRICE DENOMINATOR CODE	EXPLICIT STRIKE PRICE	VOLUME	OPEN INTEREST VOLUME	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 QUOTE	ASK QUOTE	RESERVED
8	1	11	8	8	2

|←----- 38 BYTES -----→|

CFN/CFE - Vendor Interface Specification

6.0 FIELD DESCRIPTIONS

ASCII code characters are defined as follows:

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

- A -

6.01 ASK INDEX VALUE

7 Bytes, Numeric. Right Justified, Zero filled. When there is no Ask 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 Ask Index Value represents the value of the index’s calculation formula using the current ask(ed) values of the component securities.

6.02 ASK QUOTE

8 Bytes, Numeric. Right Justified, Zero filled. When there is no Ask Quote, this field is Zero filled.

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

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

When the Ask Quote field is Zero filled, it represents a “No Ask Quote” condition.

6.03 ASK SIZE

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

The Ask Size identifies the number of contracts for sale for a contract.

When the Ask Quote and the Ask Size fields are Zero filled, it represents a “No Ask Quote” condition.

- B -

6.04 BID INDEX VALUE

7 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.

6.05 BID QUOTE

8 Bytes, Numeric. Right Justified, Zero filled. When there is no Bid Quote , this field is Zero filled.

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

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

When the Bid Quote field is Zero filled, it represents a “No Bid Quote” condition.

6.06 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 a contract.

When the Bid Quote and the Bid Size fields are Zero filled, it represents a “No Bid Quote” condition.

CFN/CFE - Vendor Interface Specification

- C -

6.07 CALL/PUT IND

1 Byte, Alphabetic, indication of call or put ('c' or 'p') for Options on Futures

- E -

6.08 EXPIRATION MONTH CODE

1 Byte, Alphabetic. It indicates the expiration month for the security future.

CODE	VALUE
F	JAN
G	FEB
H	MAR
J	APR
K	MAY
M	JUN
N	JUL
Q	AUG
U	SEP
V	OCT
X	NOV
Z	DEC

6.09 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.

CFN/CFE - Vendor Interface Specification

- H -

6.10 HIGH PRICE

8 Bytes, Numeric. Right Justified, Zero filled.

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

Represents the highest price paid for a contract during the trading day.

- I -

6.11 INDEX SYMBOL

6 Bytes, Alphabetic. Left Justified, Space filled.

Identifies the unique symbol assigned to an index.

6.12 INDEX VALUE

7 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 -

6.12 LAST PRICE

8 Bytes, Numeric. Right Justified, Zero filled.

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

Represents the last price paid for a contract during the trading day.

6.13 LOW PRICE

8 Bytes, Numeric. Right Justified, Zero filled.

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

Represents the lowest price paid for a contract during the trading day.

CFN/CFE - Vendor Interface Specification

- N -

6.14 NET CHANGE

8 Bytes, Numeric. Right Justified, Zero filled.

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

Represents the change in the price of a contract from the closing price of one day to the closing price on the next day.

6.15 NET CHANGE INDICATOR

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

Represents the upward, downward or unchanged price movement in a contract's trades.

6.16 NUMBER OF INDICES IN GROUP

2 Bytes, Numeric. Right Justified, Zero filled.

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

- O -

6.17 OPEN INTEREST VOLUME

7 Bytes, Numeric. Right Justified, Zero filled.

Represents the total number of outstanding contracts that have not yet reached expiration.

6.18 OPEN PRICE

8 Bytes, Numeric. Right Justified, Zero filled.

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

Represents the first price paid for a contract during the trading day.

CFN/CFE - Vendor Interface Specification

6.19 OPTIONS ON FUTURE SYMBOL

6 Bytes, Alphabetic. Left Justified, Space filled.

Identifies the unique symbol assigned to the Option

- P -

6.20 PRICE and PREMIUM PRICE

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

The whole and decimal portion of Price information. The Price Denominator Code determines the location of the decimal point.

Represents the price of a contract, determined in the competitive marketplace, which the buyer pays to the seller for the rights conveyed by the contract.

6.21 PRICE DENOMINATOR CODE and PREMIUM PRICE DENOMINATOR CODE

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

Price Denominator <u>Code</u>	Denominator <u>Value</u>
A	10
B	100
C	1,000
D	10,000
E	100,000
F	1,000,000
G	10,000,000
I	(N/A)
H (not defined)	

CFN/CFE - Vendor Interface Specification

- R -

6.22 RESERVED

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

Fields reserved for future use.

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

- S -

6.23 SECURITY SYMBOL

6 Bytes, Alphabetic. Left Justified, Space filled.

Identifies the unique symbol assigned to the security.

6.24 SESSION INDICATOR

Reserved for Future Use

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 (not used)
Space filled	Normal session

6.25 STRIKE PRICE DENOMINATOR CODE

1 Byte, Alphanumeric, Space filled.

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

Denominator		<u>Whole</u>	Numerator 7 Byte Price Field (number of decimal places)
Code	Value		
A	10	6	1
B	100	5	2

CFN/CFE - Vendor Interface Specification

C	1,000	4	3
D	10,000	3	4
E	100,000	2	5
F	1,000,000	1	6

- U -

6.26 UNDERLYING PRICE DENOMINATOR CODE

1 Byte, Alphanumeric.

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

Underlying Price Denominator <u>Code</u>	Denominator <u>Value</u>
A	10
B	100
C	1,000
D	10,000
E	100,000
F	1,000,000
G	10,000,000
H	100,000,000

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

6.27 UNDERLYING STOCK PRICE

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

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

Represents the price of the underlying security.

- V -

6.28 VOLUME

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

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

- Y -

6.29 YEAR

1 Byte, Alphanumeric, Space filled.

Contains the last digit of the expiration year.

CFN/CFE - Vendor Interface Specification

7.0 ADMINISTRATIVE MESSAGES

7.01 Administrative Message

The length of an administrative message is variable. The total length of the entire message cannot exceed 1000 characters, including the SOH character, the Message Header, the ETX character and all characters between those characters.

7.02 Administrative Message Text

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

7.03 Administrative Message Standards

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

ADMINISTRATIVE MESSAGE (ADM)			
Field Descriptions	Bytes	Character	Details
Product Type	4	Alphabetic	SF – Security Future
Filler	1	Space	
Filler	4	Space	
Security Symbol	4	Alphabetic Left Justified Space filled	MSFT
Filler	1	Space	
Message Type	3	Alphabetic	ADM – Admin Message
Filler	1	Space	
Text	V	Alphanumeric	Market News
This message is an Administrative Message that news regarding MSFT has been disseminated.			

REQUEST FOR QUOTE (RFQ)			
Field Descriptions	Bytes	Character	Details
Product Type	4	Alphabetic	SF – Security Future
Security Symbol	6	Alphabetic Left Justified Space filled	MSFT1C
Filler	2	Space	
Message Type	3	Alphabetic	RFQ - Request for Quote

CFN/CFE - Vendor Interface Specification

Filler	1	Space	
Request Identifier	5	Alphanumeric Left Justified Space filled	RFQ1(Space)
Filler	1	Space	
Text	V	Alphanumeric	JUL 2003 500 Contracts

7.04 Line Integrity Message

During the production day a type of Administrative message, the Line Integrity message, is sent out once each minute. The text of the message is “LINE INTEGRITY TEST “. The purpose of the message is to validate that the data path remains operational in the event that no other traffic is occurring.

CFN/CFE - Vendor Interface Specification

8.0 CONTROL MESSAGES

8.01 CONTROL MESSAGE SUMMARY

Control messages perform specified system advisory and control functions.

A Control message may be originated by CFE and transmitted to CFN or to the data recipients, or may be originated by CFN on behalf of CFE for transmission to data recipients or both. The following represents all Control messages that may be originated by CFN or CFE that are sent to all lines:

MESSAGE IDENTIFICATION CATEGORY TYPE		CONTROL MESSAGE
H	C	Futures Start of Day
H	E	Futures Start of Summary
H	F	Futures End of Summary
H	J	Futures End of Day
H	K	Reset Sequence Number
H	P	Options on Futures Start of Summary
H	Q	Options on Futures End of Summary

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.

For all Control messages, the **Exchange ID** field in the **Message Header** will contain a character identifying CFE as the exchange originating the message as follows:

CODE	VALUE
C	CBOE Futures Exchange

CFE or CFN on behalf of CFE can originate Control messages as follows:

EXCHANGE ID CODE	CONTROL MESSAGE
C	Start of Day
C	Start of Summary (futures or options)

CFN/CFE - Vendor Interface Specification

C	End of Summary (futures or options)
C	End of Day
C	Reset Sequence Number

The **Reserved** field in the **Message Header** is ASCII space filled.

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 “**C,E,F,J, K, P or Q**” designating the particular **Message Type**.

In textual portions of Control messages, the Exchange Identification identifies the abbreviated name of the referenced exchange or Processor as follows:

Exchange Identification Abbreviation	EXCHANGE
AMEX	American Stock Exchange
BOX	Boston Options Exchange
CBOE	Chicago Board Options Exchange
CFE	CBOE Futures Exchange
ISE	International Securities Exchange
NYSE	New York Stock Exchange
ONE	OneChicago LLC Securities Futures Exchange
OPRA	Options Price Reporting Authority
PCX	Pacific Exchange
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 Central Time and format is Military).

8.02 CONTROL MESSAGE DESCRIPTIONS

8.03 Start of Day – Category H Type C

The Start of Day message is transmitted to data recipients at the beginning of the day to signal the start of message processing by CFN and transmission of messages to data recipients.

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

CFN/CFE - Vendor Interface Specification

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

“START OF DAY” for Type C

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

8.04 Start of Summary - Category H Type E or P

The Start of Summary message is transmitted by CFN to signal the beginning of transmission of one or more End of Day Summary messages for CFE.

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

“START OF SUMMARY – MMDD HHMM”
for Type E

example: “START OF SUMMARY – 0102 1000”

OR

“(EXCHANGE IDENTIFICATION) OPT START OF SUMMARY – MMDD HHMM”
for Type P

example: “CFE OPT START OF SUMMARY – 0102 1000”

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

8.05 End of Summary - Category H Type F or Q

The End of Summary message is transmitted by CFN to signal the end of transmission of one or more End of Day Summary messages for CFE.

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

“END OF SUMMARY – MMDD HHMM”
for Type F

example: “END OF SUMMARY – 0102 1530”

OR

CFN/CFE - Vendor Interface Specification

“(EXCHANGE IDENTIFICATION) OPT END OF SUMMARY – MMDD HHMM”
for Type Q

example: “CFE OPT END OF SUMMARY – 0102 1530”

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

8.06 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:

“END OF DAY” for Type J

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

8.07 Reset Sequence Number - Category H Type K

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

The Reset Sequence Number message will 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.