Forwards & NDFs
FIX MarketData Specification (FIX Bookfeed)

Programming Reference

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1 Symbology

1.1. Tenors

The following tenors are supported:

Tenor	Short Code
Spot	SP
Overnight	ON
1 Week	1W
2 Weeks	2W
3 Weeks	3W
1 Month	1M
2 Months	2M
3 Months	3M
6 Months	6M
9 Months	9M
1 Year	1Y
Near IMM Date	IMM1
2nd IMM Date	IMM2
3rd IMM Date	IMM3
4th IMM Date	IMM4
BMF Bovespa Nearest Month	BMF1

1.2. Forwards & NDFs

Forwards contracts are generally defined as *Currency_Tenor*. The *Currency* is in full *CCY1CCY2* format. Only tenor values from the above section are acceptable.

Cboe FX does not support any other naming convention for forwards contracts. Valid and invalid examples are provided below for reference:

Contract (SecurityID)	Validity	Comments
EURUSD_1M	**Valid**	
EURUSD1M	**Invalid**	The contract should always include the underscore character to delimit the underlying instrument and tenor.
EURUSD_2Y	**Invalid**	The tenor is not a Cboe FX supported tenor.
6EH6	**Invalid**	Cboe FX does not support CME codes.

2 Technical Introduction

The Cboe FX ECN is an e-financial marketplace where buyers and sellers worldwide can trade foreign exchange directly and anonymously, gain price improvements, and lower their overall trading costs. The Cboe FX BookFeed gateway provides an interface to access the Cboe FX ECN via an industry standard protocol, FIX, which has been adopted by financial institutions around the world.

There are two HSFX FIX Gateways that Cboe FX supports, one for orders and the other the BookFeed for market data. A client who wishes to receive streaming rates as well as routing orders to the Cboe FX marketplace will need to establish two network connections.

This document detail how to consume marketdata via FIX.

2.1. Network Connectivity

Customers should consult the latest copy of the Cboe FX connectivity manual on the Cboe FX website:

http://www.hotspotfx.com/pdfs/BATS_Hotspot_Connectivity_Manual.pdf

2.2. Cert and Production Environments

Cboe FX supports two environments; Certification (Cert) and Production. After network connectivity has been established, the client will receive FIX session and logon information. The following is an example of the information for establishing a FIX session in the Cert environment:

Session Information

Connection Information	*Description*	**Example**
IP address	The IP of Cboe FX's FIX Gateway	209.191.250.26
Port number	The Port of Cboe FX's FIX Gateway	8001
SenderCompID	Cboe FX assigned value used to identify the firm sending the message	DATA_FIX_<companyid>
TargetCompID	Cboe FX assigned value used to identify the firm receiving the message	HSFX-FIX-BRIDGE
User ID	User ID used for the logon message.	cboefxcollatid
Password	Password used for the logon message	cboefx

Cboe FX's production support staff is responsible for generating a user id and password for the Cert environment. For production, the prime broker or HSFX's Liquidity department will create and distribute these fields directly to the client. Please see Logon message for more details.

2.3. Message Types

The HSFX FIX Gateway Market Data interface accepts the following inbound message types:

- Logon (MsgType = ‘A’)
- Security List Request Message (MsgType = ‘x’)
- Market Data Request (MsgType = ‘V’)
- Heartbeat – response to Test Request – must echo the value in tag 112(MsgType = ‘0’)
- Reject – this message can be sent by the client to report a session level rule violation (MsgType = ‘3’)
- Resend (MsgType = ‘2’)

Other message types will be ignored; hence, a reject message will not be sent back to the client application.

The HSFX FIX Gateway Market Data interface sends the following outbound message types:

- Logon Response (MsgType = ‘A’)
- Market Data - Snapshot/Full Refresh (MsgType = ‘W’)
- Security List message (MsgType = ‘y’)
- Test Request – the response from the client must echo the value of the Test Request ID field (tag 112) (MsgType = ‘1’)
- Reject – this message is sent by the FIX Gateway to report a session level rule violation (MsgType = ‘3’)
- Sequence Reset (MsgType = ’4’), as a response to Resend.

Any message type not discussed in subsequent sections conforms to the FIX 4.4 standard.

2.4. Custom FIX Fields

Hotspot FIX messages include custom fields. These fields have been highlighted for convenience throughout the spec.

2.5. Data Types Used In All FIX Messages

Type	Format	Example
Int	Integer	99999
Data	Raw data with no format or content restrictions. Data fields are always immediately preceded by a length field.	
Float	Numeric digits with optional decimal point and sign character.	-2000.00000000000 -2000 -2000.
Qty	Quantity: see float	5000000.00
Price	Price: see float	1.56343
Price Offset	Price Offset: see float	
Amt	Amount: see float	
Char	Character	‘A’
Boolean	Single Character ‘Y’ or ‘N’	
String	Case Sensitive Alphanumeric characters with no terminating character	
UTC Date/Time	GMT Date/Time: YYYYMMDD-HH:MM:SS	20010101-22:30:00
UTC Date	GMT Date: YYYYMMDD	20010101
UTC Time	GMT Time: HH:MM:SS	22:30:00

2.6. General FIX Message Structure

The Standard Header and Standard Trailer are required on all FIX messages. MsgType (tag #35) is part of the header.

Standard Header

TAG	FieldName	Contents	Comments
8	BeginString	FIX.4.4(.X)	Protocol Version,
9	BodyLength	99999	Length of Message Body
35	MsgType	Accepted Message Types	0 – HeartBeat A – Logon V – MarketData request W – Snapshot/Full refresh X – Incremental refresh
34	MsgSeqNum		Message Sequence Number (Resets to 1 at the start of each trading day)
49	SenderCompID	BIGFUND SMALLFUND HSFX	Sender Company ID (MMID of message sender)
56	TargetCompID	BIGFUND SMALLFUND HSFX	Target Company ID (MMID of message receiver)
52	SendingTime		GMT Date/Time Message was sent

Standard Trailer

TAG	FieldName	Contents	Comments
10	CheckSum		Integer byte count of message length without the CheckSum field

3 Administrative Messages

3.1. Logon [From Client]

The logon message must be the first message sent by the client application to initiate a FIX session. Upon receipt of the logon message, HSFX FIX Gateway authenticates the client's session by validating the sender comp ID and username contained in the message. The FIX Gateway responds with a type 'A' message of its own, indicating to the client that the connection has been established.

There are two ways to pass the username and password to the HSFX FIX Gateway. By default, HSFX will look for username and password in the RawData field tag 96; if the RawData is not present, the FIX session will use the Username (tag 553) and Password (tag 554) fields to authenticate the FIX session. Either tags 95/96 must be present or tags 553/554.

TAG	FieldName	Contents	Comments
35	MsgType	Char	'A'
553	Username	String	Cboe FX username (or Cboe FX collat)
554	Password	String	Password for id in tag#553
98	EncryptMethod	Integer	None
108	HeartBtInt	Integer	Client Hearbeat Interval (In seconds) - clients should use a 30 second Heartbeat Interval.
95	RawDataLength	Length	Length of raw data field
96	RawData	Data	In the format of username:passowrd Required if fields #553 and #554 are null

3.2. Logon Response [From Cboe FX]

TAG	FieldName	Contents	Comments
35	MsgType	Char	'A'
98	EncryptMethod	Integer	None
108	HeartBtInt	Integer	This is the echoed heartbeat interval from the client logon.

3.3. Resend [From Client]

A Sequence Reset message is sent back as a response to the Resend request. However, no market data will be sent back.

TAG	FieldName	Contents	Comments
123	GapFillFlag	Boolean	Y
36	NewSeqNo	Integer	New sequence number

4 Forwards & NDFs Message Types and Message Flow

No market data request message is required when the client establishes a FIX market data connection.

The first message sent by Cboe FX is always a security list message which contains the list of tradable instruments with an associated price precision.

4.1. Security List Request Message [From Client]

This message allows a client to request a list of valid instruments from Cboe FX. This message may be sent at any time during an active market data session. To request multiple securities, clients must either set SecurityListRequestType=4 or send multiple SecurityListRequestMessages.

If SecurityListRequestType (559) = 0, then Symbol (55) must be specified and the resulting SecurityListMessage will contain all securities with the same underlying instrument. If SecurityID (48) is specified, only that security will be present in the resulting SecurityListMessage.

TAG	FieldName	Contents	Comments
35	MsgType	Char	'x'
320	SecurityReqID	String	Unique request ID.
559	SecurityListRequestType	Integer	0 = Symbol 4 = All Securities
9010	ProductComplex*	Integer	If blank, all product categories are searched: 1 = FX Forward 3 = FX NDF
9011	MarketID	Integer	1 = HotspotUS
55	Symbol*	String	Underlying instrument symbol in terms of CCY1/CCY2. Example: EUR/USD Required if SecurityListReqeustType (559) = 0
48	SecurityID*	String	Instrument, as CCY1CCY2_Tenor. Example: EURUSD_1M

* = Optional.

4.2. Security List Message [From Cboe FX]

This message contains all valid instruments from Cboe FX. Cboe FX will always send this message after a logon of any market data session.

Note: While the market data session is active, Cboe FX may send an asynchronous Security List Message to update specific products.

TAG	FieldName		Contents	Comments
35	MsgType		Char	'y'
320*	SecurityReqID		String	SecurityReqId sent by client in Security List Request Message. **If the message is asynchronous from Cboe FX, this tag will not be populated.**
322	SecurityResponseID		String	Unique identifier of the Security List Message.
560	SecurityRequestResult		Integer	0 = Valid Request 1 = Invalid Request 2 = No Instruments Matching 3 = Not Authorized 4 = <Instrument> Data Unavailable 5 = Request for Instrument Data Unsupported
393*	TotNoRelatedSym		Integer	Used to indicate if the total number of securities being returned for this request. Used in the event that message fragmentation is required.
9011	MarketID		Integer	Always 1. 1 = HotspotUS
146	NoRelatedSym		Integer	Specifies number of instruments being returned in the message. The instruments match the search parameters of the original Security List Request message.
>>	55	Symbol	String	Underlying instrument symbol in terms of *CCY1/CCY2*. Example: EUR/USD
>>	48	SecurityID	String	Instrument, as *CCY1CCY2_Tenor*. Example: EURUSD_1M
>>	22	SecurityIDSource	Integer	This field is always 8. 8 = Exchange
>>	167	SecurityType	String	[FORWARD, NDF]
>>	15	Currency	String	Currency of the Notional Amount.
>>	110	MinQty	Qty	Minimum quantity for order size.
>>	64	SettlDate	UTC Date	YYYYMMDD settlement date of instrument.
>>	969	MinPriceIncrement	Price	Minimum Tick Size.
>>	120	SettlCurrency*	String	Required if SettlMethod (9008) is Cash (2).
>>	9008	SettlMethod	Integer	Settlement method. 1 = Physical 2 = Cash
>>	9009	PriceQuoteMethod	Integer	Indicates the quote should be in terms of an outright. 1 = Outright
>>	9010	ProductComplex	Integer	1 = FX Forward 3 = FX NDF
>>	9020	FixingDate*	UTC Date	YYYYMMDD fixing date of instrument. **Provided only for NDFs.**
>>	9021	FixingSource*	String	Fixing source. **Provided only for NDFs.**

4.3. Market Data Request [From Client]

A successful Market Data Request returns a Market Data Snapshot message for each requested instrument, and each contains one or more Market Data Entries. The MDEntryType field (tag 269) in the 'V' message is ignored (subscription to the currency means the client will receive bid/offer/ticker information). The number of instruments in the 'V' message is specified in tag 146.

We categorize market data update messages into "Book" and "Ticker". Ticker updates provide only the last traded price with a quantity equal to '0' (for better preservation of anonymity). Book data provides bids and offers for up to the top 10 levels of the book.

Market depth (tag 264) is limited to a max of 10. A client may choose 1 (top of book), or any intermediary value up to and including 10. This setting affects all instruments.

If a client doesn't send any Market Data Request (type 'V') messages, then by default they are subscribed to all instruments and tenors for either the top of the book or the top 4 levels, depending on which FIX gateway the client connects to.

The very first Market Data Request message from client after logon will automatically unsubscribe the client from all instruments, before the requested pairs in this message are processed. Subsequent Market Data Request messages during the same FIX session will enable the client to subscribe to or unsubscribe from the instruments that are specified in these individual messages, with no effect on previous subscriptions.

Forwards Conventions

Symbol: The foreign exchange Symbol field (tag 55) is defined by the format:

- "CCY1/CCY2", e.g. "GBP/USD", where CCY1 and CCY2 are ISO currency codes.

SecurityID: The specific contract for the forwards symbol (tag 48) is defined by the format:

- "CCY1CCY2_Tenor", e.g. "GBPUSD_1M", where CCY1 and CCY2 are ISO currency codes, and the Tenor is defined in the Symbology section of this document

If a client chooses to send only Symbol (tag 55), they will receive all matching tenors for their currency pair. A client who wishes to receive market data for only one tenor should send SecurityID (tag 48) and Symbol (tag 55).

Clients who send a NoRelatedSym (tag 146) of 0 will receive market data for all forwards instruments for all tenors.

TAG	FieldName		Contents	Comments
35	MsgType		Char	'V'
262	MDReqIDt		String	client request Id
263	SubscriptionReqType		Char	1 for subscribe, 2 for unsubscribe
264	MarketDepth		Integer	1 (Top of Book) or 10 for max depth, affect all instruments
267	NoMDEntryTypes		Integer	Ignored
269	MDEntryType		Char	Ignored
9010	ProductComplex		Integer	1 = FX Forward 3 = FX NDF
146	NoRelatedSym		Integer	Number of instruments in the message.
>>	55	Symbol	String	Underlying instrument symbol in terms of *CCY1/CCY2*. Example: EUR/USD
>>	48	SecurityID	String	Instrument, as *CCY1CCY2_Tenor*. Example: EURUSD_1M
>>	22	SecurityIDSource	Integer	This field is always 8. 8 = Exchange

4.4. Market Data Snapshot [From Cboe FX]

The Market Data Snapshot message is used to provide book and ticker information (in separate 'W' messages) to the client. The MDEntryDate (tag 272) and MDEntryTime (Tag 273) fields specify the transaction time. The TickDirection (tag 274) field indicates whether the trade was a buy or sell ('0' – bought, '2' – sold) in a ticker message. The bought or sold status indicates the action of the aggressor in the trade. The NumberOfOrders field (tag 346) indicates the number of orders at each price level in the non ticker messages.

Market Book Update

TAG	FieldName		Contents	Comments
35	MsgType		Char	'W'
55	Symbol		String	Underlying instrument symbol in terms of *CCY1/CCY2*. Example: EUR/USD
48	SecurityID		String	Instrument, as *CCY1CCY2_Tenor*. Example: EURUSD_1M
22	SecurityIDSource		Integer	This field is always 8. 8 = Exchange
268	NoMDEntries		Integer	Number of prices in the message.
>>	269	MDEntryType	Char	This group repeats NoMDEntries times. Tag 269 can only be '0' or '1' for non-ticker market update messages.
>>	270	MDEntryPx	Double	
>>	271	MDEntrySize	Double	
>>	346	NumberOfOrders	Integer	

Market Ticker Update

TAG	FieldName		Contents	Comments
35	MsgType		Char	'W'
55	Symbol		String	Underlying instrument symbol in terms of *CCY1/CCY2*. Example: EUR/USD
48	SecurityID		String	Instrument, as *CCY1CCY2_Tenor*. Example: EURUSD_1M
22	SecurityIDSource		Integer	This field is always 8. 8 = Exchange
268	NoMDEntries		Integer	Number of prices in the message.
>>	269	MDEntryType	Char	This group repeats NoMDEntries times. Tag 269 can only be '2' for ticker market update messages. Tag 271 is always 0.0 for ticker messages. Tag 274 is '0' when bought and '2' when sold. MDEntryDate denotes trade date, which is defined as 5pm previous day to 5pm current calendar day in New York time. MDEntryTime denotes New York time.
>>	270	MDEntryPx	Double	
>>	271	MDEntrySize	Double	
>>	272	MDEntryDate	UTCDate	
>>	273	MDEntryTime	UTCTimeOnly	
>>	274	TickDirection	Char	

For Cboe FX NDFs, the ticker update message is delayed until the execution is reported to the relevant Swap Data Repository (SDR). It is possible that a ticker update can be significantly delayed due to SDR acknowledgement latency.

5 Revision History

Date	Version	Editor	Comments
2017/03/27	1.1.1	ruherek	Incorrect FIX version in document. Corrected to FIX4.4
2017/03/21	1.1.0	ruherek	- Remove Swaps from document - Update tag 167 to be NDFs for NDFs - Change Product Complex tag 9030 to support NDFs - Clarify ticker for NDFs - Add BMF Tenor
2016/07/26	1.0.4	ruherek	Clarify FixingDate and FixingSource fields are only available on NDF products.
2016/07/25	1.0.3	ruherek	Change market data request messages to have MarketDepth (264) be consistent with section descriptions (10 for max depth).
2016/07/15	1.0.2	ruherek	Update symbol to have a slash '/' between CCY1 and CCY2.
2016/05/11	1.0.1	wliu	Modifications to Security List Message and Security List Request Message.
2016/02/10	1.0.0	ruherek	Initial spec.