Eurex Exchange’s T7

Eurex Extended Market Data Service

Eurex Trade Prices, Settlement Prices and Open Interest Data

Manual - Production Version

Version	V4.04
Date	16. September 2016

© Eurex 2016

Deutsche Börse AG (DBAG), Clearstream Banking AG (Clearstream), Eurex Frankfurt AG, Eurex Clearing AG (Eurex Clearing) as well as Eurex Bonds GmbH (Eurex Bonds) and Eurex Repo GmbH (Eurex Repo) are corporate entities and are registered under German law. Eurex Zürich AG is a corporate entity and is registered under Swiss law. Clearstream Banking S.A. is a corporate entity and is registered under Luxembourg law. U.S. Exchange Holdings, Inc. is a corporate entity and is registered under U.S. American law. Deutsche Boerse Asia Holding Pte. Ltd., Eurex Clearing Asia Pte. Ltd. and Eurex Exchange Asia Pte. Ltd are corporate entities and are registered under Singapore law. Eurex Frankfurt AG (Eurex) is the administrating and operating institution of Eurex Deutschland. Eurex Deutschland and Eurex Zürich AG are in the following referred to as the "Eurex Exchanges".

All intellectual property, proprietary and other rights and interests in this publication and the subject matter hereof (other than certain trademarks and service marks listed below) are owned by DBAG and its affiliates and subsidiaries including, without limitation, all patent, registered design, copyright, trademark and service mark rights. While reasonable care has been taken in the preparation of this publication to provide details that are accurate and not misleading at the time of publication DBAG, Clearstream, Eurex, Eurex Clearing, Eurex Bonds, Eurex Repo as well as the Eurex Exchanges and their respective servants and agents (a) do not make any representations or warranties regarding the information contained herein, whether express or implied, including without limitation any implied warranty of merchantability or fitness for a particular purpose or any warranty with respect to the accuracy, correctness, quality, completeness or timeliness of such information, and (b) shall not be responsible or liable for any third party's use of any information contained herein under any circumstances, including, without limitation, in connection with actual trading or otherwise or for any errors or omissions contained in this publication.

This publication is published for information purposes only and shall not constitute investment advice respectively does not constitute an offer, solicitation or recommendation to acquire or dispose of any investment or to engage in any other transaction. This publication is not intended for solicitation purposes but only for use as general information. All descriptions, examples and calculations contained in this publication are for illustrative purposes only.

Eurex and Eurex Clearing offer services directly to members of the Eurex exchanges respectively to clearing members of Eurex Clearing. Those who desire to trade any products available on the Eurex market or who desire to offer and sell any such products to others or who desire to possess a clearing license of Eurex Clearing in order to participate in the clearing process provided by Eurex Clearing, should consider legal and regulatory requirements of those jurisdictions relevant to them, as well as the risks associated with such products, before doing so.

Eurex derivatives are currently not available for offer, sale or trading in the United States or by United States persons (other than EURO STOXX 50® Index Futures, EURO STOXX 50® ex Financials Index Futures, EURO STOXX® Select Dividend 30 Index Futures, EURO STOXX® Index Futures, EURO STOXX® Large/Mid/Small Index Futures, STOXX® Europe 50 Index Futures, STOXX® Europe 600 Index Futures, STOXX® Europe 600 Banks/Industrial Goods & Services/Insurance/Media/Travel & Leisure/Utilities Futures, STOXX® Europe Large/Mid/Small 200 Index Futures, Dow Jones Global Titans 50 IndexSM Futures (EUR & USD), DAX®/Mini-DAX®/MDAX®/TecDAX® Futures, SMIM® Futures, SLI Swiss Leader Index® Futures, MSCI World (FMWO, FMWP, FMWN)/Europe (FMEU, FMEP)/ Europe Value/Europe Growth/Emerging Markets (FMEM, FMEF, FMEN)/Emerging Markets Latin America/Emerging Markets EMEA/Emerging Markets Asia/China Free/India/Japan/Malaysia/South Africa/Thailand/AC Asia Pacific ex Japan Index Futures, TA-25 Index Futures, Daily Futures on TAIEX Futures, VSTOXX® Futures, Gold and Silver Futures as well as Eurex FX, property and interest rate derivatives).

Trademarks and Service Marks

Buxl®, DAX®, DivDAX®, eb.rexx®, Eurex®, Eurex Bonds®, Eurex Repo®, Eurex Strategy WizardSM, Euro GC Pooling®, FDAX®, FWB®, GC Pooling®,,GCPI®, MDAX®, ODAX®, SDAX®, TecDAX®, USD GC Pooling®, VDAX®, VDAX-NEW® and Xetra® are registered trademarks of DBAG.

All MSCI indexes are service marks and the exclusive property of MSCI Barra.

ATX®, ATX® five, CECE® and RDX® are registered trademarks of Vienna Stock Exchange AG.

IPD® UK Annual All Property Index is a registered trademark of Investment Property Databank Ltd. IPD and has been licensed for the use by Eurex for derivatives.

SLI®, SMI® and SMIM® are registered trademarks of SIX Swiss Exchange AG.

The STOXX® indexes, the data included therein and the trademarks used in the index names are the intellectual property of STOXX Limited and/or its licensors Eurex derivatives based on the STOXX® indexes are in no way sponsored, endorsed, sold or promoted by STOXX and its licensors and neither STOXX nor its licensors shall have any liability with respect thereto.

Dow Jones is a service mark of Dow Jones & Company, Inc. All derivatives based on these indexes are not sponsored, endorsed, sold or promoted by Dow Jones & Company, Inc. Dow Jones & Company, Inc. does not make any representation regarding the advisability of trading or of investing in such products.

Bloomberg Commodity IndexSM and any related sub-indexes are service marks of Bloomberg L.P.

All references to London Gold and Silver Fixing prices are used with the permission of The London Gold Market Fixing Limited as well as The London Silver Market Fixing Limited, which for the avoidance of doubt has no involvement with and accepts no responsibility whatsoever for the underlying product to which the Fixing prices may be referenced. PCS® and Property Claim Services® are registered trademarks of ISO Services, Inc.

Korea Exchange, KRX, KOSPI and KOSPI 200 are registered trademarks of Korea Exchange Inc.

Taiwan Futures Exchange and TAIFEX are registered trademarks of Taiwan Futures Exchange Corporation. Taiwan Stock Exchange, TWSE and TAIEX are the registered trademarks of Taiwan Stock Exchange Corporation.

BSE and SENSEX are trademarks/service marks of Bombay Stock Exchange (BSE) and all rights accruing from the same, statutory or otherwise, wholly vest with BSE.

Any violation of the above would constitute an offence under the laws of India and international treaties governing the same. The names of other companies and third party products may be trademarks or service marks of their respective owners.

Content

1. Introduction 4

2. Multicast addresses 6

2.1 Production multicast addresses and ports 6

2.1.1 For Real-time Service 6

2.1.2 For Replay Service 6

2.2 Simulation multicast addresses and ports 6

2.2.1 For Real-time Service 6

2.2.2 For Replay Service 6

2.3 Service availability 7

3. Data and service messages 8

3.1 Settlement prices (TID = 172) 8

3.2 Adjusted open Interest (TID = 171) 9

3.3 Eurex Trades (TID = 175) 10

3.4 Packet header (TID = 77) 12

3.5 Extended technical heartbeat (TID = 170) 13

3.6 Market Data Report Message (TID = 152) 13

4. Change log 15

1. Introduction

Eurex Exchange provides market and reference data via a set of multicast interfaces.

In addition to the Eurex Market Data Interface (Eurex MDI) for netted market data, the Eurex Enhanced Market Data Interface (Eurex EMDI) for un-netted market data, Eurex Enhanced Order Book Interface (EOBI) and the Eurex Reference Data Interface (Eurex RDI) for reference data, the Eurex Extended Market Data Service is also provided.

All interfaces distribute information via UDP multicast, following FIX 5.0 SP2 semantics and are FAST 1.1/1.2 encoded (except EOBI). Messages are in general published on two identical services (A and B) with different multicast addresses (live-live concept).

The present document describes the Eurex Extended Marked Data Service.

The Eurex Extended Market Data Service provides participants of Eurex Exchange's T7 with:

- Intraday Settlement prices and
- Open Interest data

This document lists the multicast addresses and describes the message layouts of the interface. FAST 1.1 and 1.2 templates will be provided for this Interface on the Eurex website at www.eurexchange.com.

Furthermore an additional 'Replay Service' is provided which allows users to 'recover' from loss for the following data items:

- Intraday Settlement prices,
- Open Interest data and
- Eurex trades from T7 (on-exchange and off-book trades)

The Replay service is simply a re-send of the data that was sent out before in realtime to give applications a chance to re-capture data again in its full format. There is no linkage in sequence numbers etc. between the realtime data and the replay data.

As this service is based on multicast, no individual requests are possible, instead these messages are sent out at predefined times in replay cycles which start with a heading 'start of service' message and end with a trailing 'end of service' message (MDReport message). The number of messages is provided at each start of a cycle. All replay messages are sequenced within the appropriate multicast channel. Each cycle for the replay service for the US-allowed and the US-restricted products is triggered separately. The replay service should be processed for each channel separately. There are at least two replay cycles per multicast channel per trading day. Within one replay cycle the data is replayed several times directly in a row.

Please note: The present document explains the Eurex Extended Market Service only. The other market and reference data interfaces listed above are described in the Eurex Market and Reference Data Interfaces Manual, which explains the general rules regarding FIX messages, FAST encoding and the live-live concept.

The Extended Market Data Interface described in this manual has a version number. The version number is also listed at the beginning of the FAST XML templates.
This manual relates to the interface version number 004.001.002.

2. Multicast addresses

The Settlement prices, Open Interest and Eurex trade prices will be disseminated via the following multicast addresses and port combinations in the Eurex network:

2.1 Production multicast addresses and ports

2.1.1 For Real-time Service

Service	Multicast Groups Service A	Multicast Groups Service B	Ports
Settlement prices	224.0.50.77	224.0.50.205	US-allowed products: 59000 US-restricted products: 59032
Adjusted Open Interest	224.0.50.78	224.0.50.206	

2.1.2 For Replay Service

Service	Multicast Groups Service A	Multicast Groups Service B	Ports
Settlement prices	224.0.50.77	224.0.50.205	US-allowed products: 59001 US-restricted products: 59033
Adjusted Open Interest	224.0.50.78	224.0.50.206	
Eurex trades	224.0.50.79	224.0.50.207	

2.2 Simulation multicast addresses and ports

2.2.1 For Real-time Service

Service	Multicast Groups Service A	Multicast Groups Service B	Ports
Settlement prices	224.0.50.93	224.0.50.221	US-allowed products: 59500 US-restricted products: 59532
Adjusted Open Interest	224.0.50.94	224.0.50.222	

2.2.2 For Replay Service

Service	Multicast Groups Service A	Multicast Groups Service B	Ports
Settlement prices	224.0.50.93	224.0.50.221	US-allowed products: 59501 US-restricted products: 59533
Adjusted Open Interest	224.0.50.94	224.0.50.222	
Eurex trades	224.0.50.95	224.0.50.223	

2.3 Service availability

The required bandwidth for this service will be limited to 50 kbit/second per channel. The service will be technically available at least between 7:00 CET and 22:30 CET.

The adjusted Open Interest will be available after 13:00 CET. The intraday Settlement Prices will be available as soon as they are determined by Eurex in the afternoon (different product groups have different schedules).

Replay dissemination schedule

- 2:00 pm CET Adjusted Open interest – 1st cycle
- 5:45 pm CET Eurex trades – 1st cycle
- 6:15 pm CET Settlement prices – 1st cycle
- 6:30 pm CET Adjusted Open interest – 2nd cycle
- 8:15 pm CET Eurex trades – 2nd cycle
- 10:30 pm CET Eurex trades – 3rd cycle
- 10:40 pm CET Settlement prices – 2nd cycle
- 10:55 pm CET Adjusted Open interest – 3rd cycle

3. Data and service messages

3.1 Settlement prices (TID = 172)

FIX Tag	FIX Field Name	Req'd	FAST Data Type	Description
35	MsgType	Y	string	Message type Always 'W' = MarketDataSnapshotFullRefresh
48	SecurityID	Y	Int64	Instrument ID from Eurex Exchange's T7
22	SecurityIDSource	Y	string	Source Identification Always 'M' = Marketplace-assigned Identifier
1300	MarketSegmentID	Y	uInt32	Product ID from Eurex Exchange's T7
<MDFullGrp> sequence starts				
268	NoMDEntries	Y	length	Defines the number of entries to follow.
269	> MDEntryType	Y	MDEntryType (enum)	Type of Market Data entry Always '6' = Settlement Price
270	> MDEntryPx	Y	decimal	Intraday Settlement Price
29830	> MDSecPx	N	decimal	Settlement Price in trading notation (only for Variance Futures)
273	> MDEntryTime	Y	timestamp	Time of entry
<MDFullGrp> sequence ends				

Note: The settlement prices of the previous business day are provided with the Eurex RDI in the instrument snapshot message and the Eurex RDF.

3.2 Adjusted open Interest (TID = 171)

FIX Tag	FIX Field Name	Req'd	FAST Data Type	Description
35	MsgType	Y	string	Message type Always 'W' = MarketDataSnapshotFullRefresh
48	SecurityID	Y	Int64	Instrument ID from Eurex Exchange's T7
22	SecurityIDSource	Y	string	Source Identification Always 'M' = Marketplace-assigned Identifier
1300	MarketSegmentID	Y	uInt32	Product ID from Eurex Exchange's T7
<MDFullGrp> sequence starts				
268	NoMDEntries	Y	length	Defines the number of entries to follow. Here always '1'.
269	> MDEntryType	Y	MDEntryType (enum)	Type of Market Data entry Always 'C' = Open Interest
271	> MDEntrySize	Y	uInt32	Adjusted Open Interest Quantity
273	> MDEntryTime	Y	timestamp	Time of entry
<MDFullGrp> sequence ends				

3.3 Eurex Trades (TID = 175)

For the dissemination of the trades from Eurex T7 a new template id 175 is used which closely resembles the template id 94 that is defined for EMDI/MDI trades (DepthIncremental messages), but those parts that relate to orderbook information and trade volume information were removed.

FIX Tag	FIX Field Name	Req'd	FAST Data Type	Description
35	MsgType	Y	string	Message type Always 'X' = MarketDataIncrementalRefresh
34	MsgSeqNum	Y	uInt32	The sequence number is incremented per product across all message types on a particular feed.
49	SenderCompID	Y	uInt32	Unique ID of a sender.
1300	MarketSegmentID	Y	uInt32	Product ID from Eurex Exchange's T7
<MDIncGrp> sequence starts				
268	NoMDEntries	Y	length	Defines the number of entries to follow. Here always '1'.
1024	> MDOriginType	Y	MDOriginType (enum)	Market Data origin 0 = Book / On-exchange 1 = OffBook / TES trades only
279	> MDUpdateAction	Y	MDUpdateAction (enum)	Type of Market Data update action 0 = New 1 = Change 2 = Delete
269	> MDEntryType	Y	MDEntryType (enum)	Type of Market Data entry '2' = Trade 'B' = Trade Volume
48	> SecurityID	Y	Int64	Instrument ID from Eurex Exchange's T7
22	> SecurityIDSource	Y	string	Source Identification Always 'M' = Marketplace-assigned Identifier
270	> MDEntryPx	N	decimal	Trade Price
271	> MDEntrySize	N	uInt32	Quantity or trade volume when MDEntryType = "2" or "B". TES disclosed quantity when MDOriginType is 1 (Off-Book)

273	> MDEntryTime	Y	timestamp	Time of entry
828	> TrdType	N	TrdType (enum)	Trade Type 1 = Off-book Block Trade 2 = Exchange for Physical (EFP) 12 = Exchange for Swap (EFS) 55 = Exchange Basis Facility 1000 = Vola Trade 1001 = EFP-Fin Trade 1002 = EFP-Index-Futures Trade 1004 = Block Trade At Market 1100 = Opening Auction Trade 1101 = Intraday Auction Trade 1102 = Volatility Auction Trade 1103 = Closing Auction Trade 1104 = Cross Auction Trade 1107 = IPO Auction Trade
277	> TradeCondition	N	TradeCondition (set)	Defines the type of price for MDEntryPx. U = Exchange Last R = Opening Price AX = High Price AY = Low Price AJ = Official Close Price AW = Last Auction Price k = Out of Sequence BD = Previous Closing Price a = Volume only
2445	> AggressorTime	N	timestamp	Entry time of the incoming order that triggered the trade.
2446	> AggressorSide	N	Side (enum)	Side of the incoming order which created the trade. 1 = Buy 2 = Sell
2449	> NumberOfBuyOrders	N	uInt32	Number of buy orders involved in this trade.
2450	> NumberOfSellOrders	N	uInt32	Number of sell orders involved in this trade.

28869	> RestingCxlQty	N	uInt32	Quantity of orders that are deleted due to a SMP event.
278	> MDEntryID	N	uInt32	Represents the T7 match step ID. This field is unique together with MarketSegmentID.
28873	> NonDisclosedTrade Volume	N	uInt32	Contains the TES trade volume that is not displayed during the day. Only present for MDEntryType = B (Trade Volume). Used when trade volume is finally disclosed and also for recovery.
<MDIncGrp> sequence ends				

3.4 Packet header (TID = 77)

Each datagram contains a packet header which is used for identification of datagrams and is sent on a channel basis. Each header contains the following fields:

Field Name	FAST Data Type	Description
SenderCompID	uInt32	Unique id for a sender Each multicast channel uses the same logic. Constant value: • Standard Value • Failover Value
PacketSeqNum	ByteVector	Datagram/packet sequence number Contiguous. Can be used for gap detection. Sequenced for each multicast channel itself. The PacketSeqNum's in the packet header are contiguous per SenderCompID, multicast address and port combination.
SendingTime	ByteVector	Time at which this packet left the sender (in nanoseconds since epoch).

The following table shows the structure of the block header before FAST-decoding:

1 Byte	1 Byte	1 Byte	1 Byte	4 Bytes	1 Byte	8 Bytes
PMAP	**TID**	**Sender Comp ID**	**Length**	**PacketSeqNum**	**Length**	**SendingTime**
1	2	3	4	8	9	17

3.5 Extended technical heartbeat (TID = 170)

The heartbeat message is sent periodically as a 'line active' indicator when there are no messages generated on the feed for a preconfigured period of time. Each heartbeat contains the following fields:

Field Name	FAST Data Type	Description
SenderCompID	uInt32	Unique id for a sender. Each multicast channel uses the same logic. Constant value: • Standard Value • Failover Value
LastPacketSeqNum	uInt32	Contains the last PacketSeqNum of the corresponding multicast channel.

3.6 Market Data Report Message (TID = 152)

The MDReport message is used for the Replay Service. It is sent as a wraparound bracket for distributing the product and instrument snapshots. Since the replay service is also a dissemination cycle, start and end marks are needed. Each MDReport contains the following fields:

FIX Tag	FIX Field Name	Req'd	FAST Data Type	Description
35	MsgType	Y	string	U20 - MarketDataReport
2536	MDReportCount	N	uInt32	Count of messages in the replay cycle. Only sent for MDReportEvent 3, 5, 7 and 9
369	LastMsgSeqNumProcessed	N	uInt32	
2535	MDReportEvent	Y	MDReportEvent (enum)	1 = Start of instrument reference Data (not used) 2 = End of instrument reference Data (not used) 3 = Start of off-market trades (not used) 4 = End of off-market trades (not used) 5 = Start of order book (exchange) trades 6 = End of order book (exchange) trades 7 = Start of open interest 8 = End of open interest 9 = Start of settlement prices

				10 = End of settlement prices 11 = Start of statistics reference data 12 = End of statistics reference data 13 = Start of statistics (not used) 14 = End of statistics (not used)
60	TransactTime	Y	timestamp	Transaction Time

4. Change log

No	Chapter, page	Date	Change
1.0	General	July 18, 2012	Creation of document
1.1	General	Oct. 9, 2012	Created Simulation Version of this document
			Added the description for the Replay Service
1.2	Ch. 1, Pg.5	Nov 21,2012	Updated the related xml template number
	Ch. 3.3, Pg. 10		Changed tag 1020 (TradeVolume) to optional
	Ch. 3.4, Pg. 11		Changed tag 762 (SecuritySubType) to optional
	Ch. 3.4, Pg. 12		Changed tag 1020 (TradeVolume) to optional
	Ch. 3.4, Pg. 12		Moved the <InstrmntLegGrp> sequence end
	Ch. 3.7, Pg. 14		Added tag 60 (TransactTime)
	Ch. 3.7, Pg. 14		Changed tag 369 to optional
	Ch. 3.8, Pg. 16		Changed tag 1020 (TradeVolume) to optional
2.0	Ch. 1, Pg. 4	Aug 12, 2013	Clarified relation between realtime and replay data
	Ch. 1, Pg. 5		Adjusted interface version number
	Ch. 3.3, Pg. 9		Added enum value 1 for MDUpdateAction
	Ch. 3.4, Pg. 11		Added enum value 1 for MDUpdateAction
	Ch. 3.4, Pg. 11		Corrected FAST Data Type for ProductComplex to uInt32
	Ch. 3.5, Pg. 13		Added sentence for PacketSeqNum
	Ch. 3.8, Pg. 14		Added enum value 1 and 2 for MDReportEvent
	Ch. 3.9, Pg. 17		Added Ticker Message
2.01	Ch. 3.8, Pg. 16	Nov 12, 2013	"PreviousClosingPrice" moved to the end of the TradeConditionSet bitmask flag
2.02	Ch. 3.1, 3.2, 3.3, 3.4 and 3.8	Nov 20, 2013	Changed FAST Data Type for SecurityID and LegSecurityID from uInt64 to Int64
2.03	Ch. 3.4, Pg. 11	Nov 26, 2013	Changed FAST Data Type for ProductComplex to enum
2.1.0	Ch. 1, Pg. 5	Jan 30, 2014	Updated interface version number
	Ch. 3.5, Pg. 13		Updated Template ID for Packet Header to TID=114
	Ch. 3.8, Pg. 16		Added set value 'a' for Fix tag 277 (TradeCondition)
2.1.1	Ch. 3.8, Pg. 15	Feb 14, 2014	Changed tag 270 (MDEntryPx) to optional (Volume only)
	Ch. 3.8, Pg. 16		Changed tag 278 (MDEntryID) to mandatory
2.5	Ch. 1, Pg. 5	Jul 31, 2014	Updated interface version number
	General		Renamed OTC to Off-book
	Ch. 2, Pg. 6		Removed IP addresses for Ticker Data
	Ch. 3.1, 3.2, 3.3,		Changed FAST Data Type for MDEntryType from string to

	3.4 and 3.8		enum
	Ch. 3.3, 3.4, 3.8		Removed tag 1020 (TradeVolume)
	Ch. 3.3, 3.4		Tag 269: Added MDEntryType=B
	Ch. 3.9, Pg. 17		Removed Eurex Underlying Ticker Message
2.5.1	General	Oct 13, 2014	Creation of 'Final version'
3.0	General	July 16, 2015	Created Simulation Version for Eurex T7 3.0
	Ch. 1, Pg. 5		Updated interface version number
	Ch. 3.1, Pg. 8		Added tag 29830 (MDSecPx) for Settlement Prices for Variance Futures in Trading Notation
	Ch. 3.5, Pg. 13		Updated Template ID for Packet Header to TID=76
4.0	General	June 27, 2016	Created Simulation Version for Eurex T7 4.0
	Ch. 1, Pg. 5		Updated interface version number
	Ch. 2. Pg. 6		Removed multicast addresses for off-book trade prices
	Ch. 2, Pg. 7		Removed replay schedules for off-book trades
	Ch. 3, Pg. 9		Removed Template IDs 173 and 174 for off-book trades
	Ch. 3, Pg. 15		Moved and Renamed chapter 3.8 for Template ID 175 (Trades)
	Ch. 3.3, Pg. 10		Template 175: Added FIX tags 28869 and 28873 and values for T7 4.0. Updated some FIX tags and names to latest FIX standard
	Ch. 3.4, Pg. 12		Updated Template ID for Packet Header to TID=77
4.01	Ch. 3.6, Pg.13		Replaced FIX tags 5488 and 28827 by 2536 and 2535
4.02	Ch. 3.3, Pg. 10		Added MDEntryType 'B' for dissemination of Trade Volume in Eurex Trades (TID=175)
			Changed tag 271 (MDEntrySize) and tag 278 (MDEntryID) to optional. Removed tag 5979 (RequestTime)
4.03	General	Sep 07, 2016	Created Production Version for Eurex T7 4.0
4.04	Ch. 1, Pg. 4	Sep 16, 2016	Minor updates regarding Eurex interface landscape