Consolidated Feed (PlusFeed)
Developer Supplement for
Singapore Exchange Market Data

Interactive Data

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Contents

Document History

Additions to this document from the previous version are indicated by red, underlined text. For readability, where entire paragraphs or sections have been added, only the paragraph or section head is in red, underlined text. Deletions from the previous version are ~~indicated by strikethrough text~~.

Date	Version	Author	Action
2014-10-10	04	gp	Corrected the table headings in Appendix C
2014-08-26	04	gp	Added src IDs 742 and 642 as SGX FX Quote and updated the symbology per dev. notice 1769_20140725 Added tokens for SGX FX Quote per the CDD
2014-03-24	03	GP	Removed the source IDs for 742 and 642. No longer active
2013-09-23	03	A. Watiker	Added new tokens per dev. notice 1495_20130909
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2013-03-12	03	K. Lakawicz	Updated name of securities feed as per DN 1322. Removed references to old SecuritiesBook.
2013-03-05	03	K. Lakawicz	Added new trade conditions per notice 1322 Added Depth.end.update token Added trade.cond_3 and trade.cond_5 Revised processing of INSTR.STATUS, EX.MARKER.CODE and married trades. Removed old section 6.5 on trade condition processing which no longer applies.
2012-10-23	03	G. Pinkham	Added sec 6.5 re trade condition processing
2012-10-18	03	K.Lakawicz	Added note to TRADE.TOTAL.VOLUME Added condition to CONTROL.MSG.TYPE
2012-09-04	03	A. Watiker	Added new tokens per dev. notice 1224_20120827
2012-08-27	03	G. Pinkham	Added new tokens per dev. notice 1226_20120816
2012-07-30	03	A. Watiker	Added new tokens for fixed income
2012-07-23	03	A. Watiker	Added support for combo-to-combo trades per dev. notice 1198_20120706
2012-07-16	03	A. Watiker	Added note about .EXCHANGE.ADMIN, modified trading hours
2012-06-18	03	G. Pinkham	Updated description of spreads per dev. notice 1174_20120601

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2012-04-13	03	A. Watiker	Modified reset behavior per dev. notice 1145_20120326
2012-03-19	03	A. Watiker	Modified level 2 reset behavior per dev. notice 1126_20120307
2012-01-20	03	A. Watiker	Added composite symbols per dev. notice 1081_20120118
2011-10-24	03	A. Watiker	Added new value of instrument status per dev. notice 1014_20111013
2011-10-06	03	A. Watiker	Added details about T+1 trading session. Corrected link to exchange website.
2011-08-22	03	A. Watiker	Included new exchanges per dev. notice 0949_20110708 Revised tokens per dev. notice 0989_20110801 Adding new blanking behavior per dev. notice 0993_20110805
2011-08-01	03	G. Pinkham	Revised trading hours per dev. notice 0969_20110708
2011-06-06	03	A. Watiker	Added blanking token per dev. notice 0934_20110516
2011-03-28	03	A. Watiker	Added token 1288/f92 and modified 705/f74 and 9/i per dev. not. 0880_20110309
2011-03-21	03	A. Watiker	Added token 292/f54 to <16>s per dev not. 0885_20110308
2011-01-07	03	A. Watiker	Corrected by removing token 2000 from level 1.
2010-11-04	03	G. Pinkham	Added tokens and symbology to support CBBC and ADR instruments per dev. notice 805_20101022_Singapore_SGX-ST_New_Data--CORRECTED.UPDATE1.pdf

Date	Version	Author	Action
2010-09-15	03	G. Pinkham	Added new value of TRADE.COND_1 for married trades per dev. notice 789_20100831
2010-06-10	03	G. Pinkham	Added CALCULATED.CLOSE per dev. notice 722_20100422
2010-04-12	03	G. Pinkham	Add the value 4 for Bate f79
2009-06-25	03	G. Pinkham	Corrected the index symbology for SGX-DT to agree with datafeed
2009-05-29	03	G. Pinkham	Re-revised the symbology for SGX-ST and added g78 per dev. notice 522_20090429
2009-05-15	03	G. Pinkham	Corrected information for token 856
2009-01-09	03	G. Pinkham	Revised the symbology for SGX-ST per dev. notice 522_2009-01-08
2009-01-06	03	G. Pinkham	Added SGX-DT Level 2
2008-10-21	03	G. Pinkham	Added note that f79 is not suppressible per dev. notice 460_20081016
2008-02-22	03	K. Chen	Added new fields as per developer notice #368 20080222 Changes for the Singapore Exchange Derivative Market-UPDATE
2007-11-30	03	G. Pinkham	Added new source ID (14a) for level 2 data; Added new section 6 on message processing
2006-02-24	02	G. Pinkham	Edited XpressFeed to PlusFeed; Added standard appendices with universal Bates
2005-10-24	01	K. Chen	Updated trading and reset times. Also added T+1 to symbology.

Date	Version	Author	Action
2005-09-01	01	G. Pinkham	Edited index symbology for 16s to show that all indexes use the prefix “I1:”, per notice 068_20050816.
2005-04-15	01	G. Pinkham	document completely revised

Preface

About This Document

This developer supplement is a comprehensive introduction to the available formats for representing market data from Interactive Data Real-Time Services' PlusFeed for the specified financial markets or services. PlusFeed data is accessible through either the Interactive Data Client Site Processor (CSP) or Plus Server.

Related Documents

As conditions change, some of the information in this supplement will need to be corrected or amended. Periodically, developer notices will be published on the Interactive Data Real-Time Services Developer Support website to alert users to these changes. Be sure to check the website regularly for any developer notices related to the exchanges covered by this document.

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1. Overview

This developer supplement describes the formats used by Interactive Data Real-Time Services to transmit data from the Singapore Exchange for both securities and derivatives through Real-Time Services's PlusFeed high-speed digital datafeed. The data is accessible at the customer site through either the Client Site Processor (CSP).

The Singapore Exchange sources for Real-Time Services's datafeed, the exchange IDs covered, the datafeed reset times, and the current exchange trading hours are given in this section. Subsequent sections describe:

- PlusFeed Data Structures—brief description of the three formats for receiving PlusFeed data
- Symbology— the symbols and suffixes used by Real-Time Services to report Singapore Exchange data
- Bate Codes and CTF Tokens—the codes used, by exchange ID, to identify each data element within the datafeed such as price, volume, bid, ask, etc. Also included are descriptions of units used for date, time, and volume data and an explanation of data compression for certain Bate codes.
- Sample Messages— examples of DDF messages on SGX-ST

1.1 Datafeed Sources

The Singapore Exchange provides securities trading data on its SGX Securities Market Direct (SGX-ST) datafeed. Trading data for all futures and options is provided on the SGX DerivativesQuote (SGX-DT) datafeed. PlusFeed now carries level 1 and level 2 data for both SGX-ST and SGX-DT. SGX FX Quote, a newer feed, provides foreign exchange data.

1.2 Exchange IDs Covered and Datafeed Reset Times

The following table lists the exchange IDs currently used by Real-Time Services in both DDF format (Exchange ID) and CTF format (Source ID) to report data from the Singapore Exchange. The reset times are in Singapore Time.

Exchange ID	Exchange ID Names / Mnemonics	CTF Source ID	Reset Time
<0x16>i	Singapore Exchange – Securities Trading (SGX, also SGX-ST, formerly known as SES)	713	03:00
<0x14>a	Singapore Exchange – Securities Trading, Level 2 Depth Data	641	03:00

Exchange ID	Exchange ID Names / Mnemonics	CTF Source ID	Reset Time
<0x16>s	Singapore Exchange – Derivatives Trading (SGX-DT, formerly known as SIMEX)	723	04:00 (T session only) 14:15 (T and T+1 sessions) 15:08 (T and T+1 sessions) 17:30 (T and T+1 sessions) 18:30 (T and T+1 sessions) 19:30 (T and T+1 sessions)
<16>b	Singapore Exchange - CommodityQuote Contracts Level 1	706	04:00 (T session only) 14:15 (T and T+1 sessions) 15:08 (T and T+1 sessions) 17:30 (T and T+1 sessions) 18:30 (T and T+1 sessions) 19:30 (T and T+1 sessions)
<17>f	Singapore Exchange – SGX FX Quote Level 1	742	
<12>b	Singapore Exchange – Derivatives Trading, Level 2 Depth Data	578	
<14>c	Singapore Exchange - CommodityQuote Contracts Level 2	643	
<14>b	Singapore Exchange – SGX FX Quote Level 2	642	

1.3 Trading Hours

Securities Trading - SGX-ST (DDF Exchange <0x16>i, Enum Src ID 713)

The current SGX-ST securities trading hours are given below. All times are Singapore time.

Pre-Open Routine for Ready and Unit Share Markets
From 8:30 a.m. to 8:59 a.m.

Non-Cancel for Ready and Unit Share Markets
From 8:59 a.m. to 9:00 a.m.

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Regular Trading Session for Ready, Unit Share, Buying In and Bonds Markets
From 9:00 a.m. to 5:00 p.m.

Pre-Close Routine for Ready and Unit Share Markets
From 5:00 p.m. to 5:05 p.m.

Non-Cancel for Ready and Unit Share Markets
From 5:05 p.m. to 5:06 p.m.

Because trading hours are subject to change, it is best to check the hours for the Singapore Exchange by contacting the exchange directly. The following internet link displays the SGX-ST trading schedule on the internet.

http://info.sgx.com/SGXWeb_ST.nsf/NEWDOCNAME/ST_Trading_Calendar?opendocument&sidenav=Intermediaries

Derivatives Trading - SGX-DT (DDF Exchanges <0x16>s, <16>b, <17>f, <12>b, <14>c and <14>b, Enum Src IDs 723, 706, 578, 643,)

For the derivatives market, the Singapore Exchange offers open outcry trading, electronic trading, and mutual offset trading. The exchange also offers a T+1 trading session outside of regular market hours. The hours for each type of trading depend on the contract being traded. For details, check the following internet link:

http://sgx.com/wps/portal/sgxweb/home/trading/derivatives/trading_hours_calendar

2. PlusFeed Data Structures

PlusFeed data is available from the Client Site Processor (CSP) or Plus Server in one of three formats.

- Generic Data Format
- Digital Data Format (DDF)
- ComStock Token Format (CTF)

The DDF and CTF formats provide access to all PlusFeed data on the Real-Time Services networks. The Generic format allows for retrieval of specific content from the in-memory database of the CSP.

2.1 Generic Token Format

When PlusFeed data is requested in the generic token format, the request includes generic tokens that identify the data needed. The order of the tokens in the request specifies the order in which the data is returned. The returned data has these types of components:

Component	Example	Description
Exchange ID	<0x16>i	Hexadecimal number plus lower case letter (e.g., SGX Securities)
ICL command	Get_Exch{Generic{16i}	Request for data on all instruments from an exchange (e.g., SGX Securities)
DATA1	{5EZ	Real-Time Services symbol for the instrument traded on the exchange (e.g., Adampak Limited)
DATA2	{0.1700	Ask price (to 4 decimal places)
…	…	…
DATAn	{USD}	Currency used, e.g., US dollars (USD)

The tables in subsequent sections for Bate codes used with DDF include the generic tokens available for the data from the exchanges.

2.2 Digital Data Format (DDF)

PlusFeed data in DDF format has the following components:

Component	Example	Description
Exchange ID	<0x16>i	ASCII character, represented here by a hexadecimal number, plus lower case letter (e.g., SGX Securities)
Instrument Symbol	5EZ	Real-Time Services symbol for the instrument traded on the exchange (e.g., Adampak Limited)
Multiple data elements preceded by identifying Bate codes (lower case letters)	r 1700 m252304	Ask price (to 4 decimal places) Currency used (USD coded in octal digits)

2.3 ComStock Token Format (CTF)

PlusFeed data in CTF format is a series of token=value pairs delimited by a pipe character (<0x7C>). A message in CTF format could have the following components:

Component	Example	Description
Enum.Src.ID	4=713	4 is the CTF token ID for Enum.Src.ID (exchange identifier). 713 is the value for SGX Securities.
Symbol.Ticker	5=5EZ	5 is the CTF token ID for Symbol.Ticker. 5EZ is the symbol for Adampak Limited
Multiple data elements preceded by identifying token IDs	10=0.1700 262=USD	10 is the CTF token ID for ask price. 262 is the CTF token ID for Currency. USD stands for US dollars.

3. Symbology

SGX-ST Equities and Indices Level 1 (Exchange ID 16i) & Level 2 (Exchange ID 14a)

There are four SGX-ST markets: Ready, Bonds, Buying-In, and Unit Share. In the RTS symbology, each instrument symbol carries a prefix that depends on both the instrument type and the market. The ".X" suffix for indices is no longer used.

Market	Instrument Type	RTS Prefix	Example of RTS Symbology
Ready	Common Stock	E:	E:568
	Bond	B:	
	Index	I:	
	Warrant	W:	
	Trust	E:	
	Right	E:	
	Fixed Income	B:	
Unit Share	Common Stock	E1:	E1:510
	Bond	B1:	
	Index	I1:	
	Warrant	W1:	
	Trust	E1:	
	Right	E1:	
	Fixed Income	B1:	
Buying-In	Common Stock	E2:	E2:578
	Bond	B2:	
	Index	I2:	
	Warrant	W2:	
	Trust	E2:	
	Right	E2:	
	Fixed Income	B2:	
Bonds	Bond	B3:	B3:3QTB

SGX-ST CBBCs Level 1 (Exchange ID 16i) & Level 2 (Exchange ID 14a)

Callable Bull/Bear Contracts are identified in PlusFeed with the prefix for warrants added to the symbol provided by the exchange. As indicated in the table below, the prefix can be W:, W1:, or W2: depending on the market where the contract is traded.

Market	Prefix
Ready	W:
Unit Share	W1:

Market	Prefix
Buying-In	W2:

In addition, the symbol provided by the exchange includes a “J” as the fourth character to distinguish it from a standard warrant. For example, “W:FQ7J” indicates a CBBC traded on the Ready market.

SGX-ST ADRs Level 1 (Exchange ID 16i) & Level 2 (Exchange ID 14a)

American Depositary Receipts are identified in PlusFeed with the prefix for equities added to the symbol provided by the exchange. The prefix can be E:, E1:, or E2: depending on the market where the instrument is traded. In addition, the symbol provided by the exchange includes a “D” as the fourth character to distinguish it from other equities. For example, “E:P99D” indicates an ADR traded on the Ready market.

SGX-DT Derivatives (Exchange IDs 16s, 16b)& Level 2 (Exchange IDs 12b & 14c)

The following paragraphs describe the symbology for futures, options, indexes, and spreads on SGX-DT. Tables 1 and 2 summarize the symbology for all instruments and quantities. The final paragraphs of this section give more details about the codes used for spreads.

The session indicator indicates whether the symbol contains trading and quoting for the T session, the T+1 session or both. T session symbols bear the indicator 2, T+1 session symbols bear the indicator 3 and composite symbols (representing either T and T+1 sessions, whichever is active) have no indicator. Composite symbols are only sent when the instrument appears in both the T and T+1 sessions.

Note: In PlusFeed for SGX-DT, commodity codes ED and SD always show a decimal precision of four places even when the exchange transmits a different precision.

Futures Symbology

Fn:CommCode\myy[dd]

where

F = futures contract

n	=	session indicator (2 = Electronic (T) trading, 3 = Electronic(T+1) trading, [no indicator] = Composite)
CommCode	=	Commodity code
m	=	Alphabetic month code
yy	=	Two-digit year code
[dd]	=	Two-digit day code for futures contracts that expire daily or have multiple expiration dates per month

Example of Futures Symbology

F2:ED\U07

where

F	=	Futures contract
2	=	Electronic (T) trading
ED	=	Three month Eurodollar
U	=	September
07	=	2007

Options Symbology

On:CommCode\myy\ssssssss

where

O	=	Option
n	=	session indicator (2 = Electronic (T) trading, 3 = Electronic(T+1) trading, [no indicator] = Composite)
CommCode	=	Commodity code
m	=	Alphabetic month code
yy	=	Two-digit year code
ssssssss	=	Up to eight character strike price (1 to 7 digits plus optional decimal point)

Example of Options Symbology

O2:NK\R05\11000

where

O	=	Option
2	=	Electronic (T) trading
NK	=	Nikkei option
R	=	June (put)
05	=	2005
11000	=	Strike price

Note: The option symbols CNK and PNK from the exchange will be shortened to NK in the Real-Time Services datafeed since C and P stand for Call and Put and are redundant with the month code.

Index Symbology

All index symbols are preceded by the prefix "I2:". The "2" in the prefix is not a session indicator.

I2:CommCode\Y

where

I2	=	Index
CommCode	=	Commodity code
Y	=	Literal "cash" indicator for Index

Example of Index Symbology

I2:HK\Y

where

I2	=	Index
HK	=	MSCI Hong Kong Stock Index Futures Spot Price
Y	=	Literal "cash" indicator for Index (sometimes transmitted as an X by the exchange)

Spread Symbology

Sn:XXXXXXXX

where

S	=	Spread

n	=	session indicator (2 = Electronic (T) trading, 3 = T+1 trading session, [no indicator] = Composite)
XXXXXXXX	=	Up to eight hex character spread identification (CRC32 value of full string describing the spread)

Because of the way it is generated, the eight character spread identification has no structure from which the details of the spread can be inferred. The details of the spread can only be determined by consulting the ComStock Symbol Directory on the developer website. The directory is updated daily. Go to http://developer.comstock-interactivedata.com.

Example of Spread Symbology

S2:3237FFC

where

S	=	Spread
2	=	Electronic (T) trading
3237FFC	=	CRC32 ID for full spread description: PCT = ' ',spread strategy= OT,spread type= 2,trade type= N,ratio= 1-1||F:EY\H04||F:EL\M04 **Note:** The legs of the full spread description do not include a session indicator.

Further Explanation of Spreads

The following paragraphs have been rewritten in line with the revised spread descriptions given in developer notice 1174_20120601_SGX_Improved_Spread_Description.

The symbol for each spread is Sn:XXXXXXXX where n is the session and XXXXXXXX is the result of calculating the CRC32 value of the full spread description. The full spread description has the format:

Header || leg1 || leg2 || … || leg(n – 1) || leg(n)||, Trailer

The header describes the general properties of the spread. Each leg uses the standard symbology to represent the leg details with the exception that the session indicator is not included.

Spread Example 1:

A seven- or eight-character hex identifier represents the following full description string:

spread strategy VT, ratio 1:1, ||leg1: O:EL\U12\99.75||leg2: O:EL\U12\99.375||, B/S, being traded in Composite session

The header part of this string is:

spread strategy VT, ratio 1:1,

where VT is the code for the type of strategy and the ratio 1:1 represents the ratio value of 1 for leg 1 and 1 for leg 2.

Leg 1 and leg 2 are:

O:EL\U12\99.75

O:EL\U12\99.375

Note that there is no session indicator following the 'O' for option in the legs.

The trailer in the full description is:

B/S, being traded in Composite session

where B/S is a buy-sell indicator showing the first leg is bought and the second leg is sold from the perspective of the buyer of the strategy, and the remainder is a free-form description.

Spread Example 2:

For a butterfly spread, the full description string could be the following:

spread strategy BF, ratio 1:2:1, || leg1: F:EY\U12 || leg2: F:EY\H13 || leg3: F:EY\U13||, B/S/B, being traded in Composite session

The header part of this string is:

spread strategy BF, ratio 1:2:1,

where BF is the code for butterfly and the ration 1:2:1 represents the ratio values of 1 for leg 1, 2 for leg 2, and 1 for leg 3.

Legs 1, 2, and 3 are:

F:EY\U12

F:EY\H13

F:EY\U13

The trailer in the full description is:

B/S/B, being traded in Composite session

where B/S/B indicates that in this butterfly spread the first leg is Bought, the second leg is Sold, and the third leg is Bought while buying the strategy.

To determine the full description string for each spread, you must consult the ComStock Symbol Directory, using the hex identifier. The directory is updated daily. Go to http://developer.comstock-interactivedata.com.

Summary of Symbology for SGX-DT

Table 1 summarizes the symbology for all commodities, and Table 2 explains the variables and constants used.

Table 1. Commodity Symbology by Instrument or Quantity

Instrument or Quantity	Symbology
Futures Contract	Fn:CommCode\myy[dd]
Option (Regular or electronic trading)	On:CommCode\myy\ssssssss
Spot Index	I2:CommCode\Y
Spread on commodity CommCode	Sn:XXXXXXXX

Table 2. Individual Components of the Symbology

Symbol	Description
F	Futures contract
O	Option
I2	Index
S	Spread
n	Single digit for session (, 2 = Electronic (T) trading, 3 = T+1 trading session, [no indicator] = Composite)
CommCode	Commodity code, always followed by '\'. Length is limited by total symbol length of 20 characters.
Y	Literal "cash" indicator for Index
m	Alphabetic month code
yy	Two-digit year code
[dd]	Two-digit day code for futures contracts that expire daily or multiple times per month
ssssssss	Up to eight character strike price (1 to 7 digits plus optional decimal point)
XXXXXXXX	Up to eight hex character spread identification (CRC32 value of full string describing the spread)
V	Total volume for all contract months
CTV	Total volume for all months of a call option
PTV	Total volume for all months of a put option
TV	Total volume for all months of a futures contract

Month Codes

Table 3 gives the month codes for options and futures contracts. The month codes are also used to construct each leg for spreads.

Table 3. Month Code Table

Month	Call Option	Put Option	Futures Contract
January	A	M	F
February	B	N	G
March	C	O	H
April	D	P	J
May	E	Q	K
June	F	R	M
July	G	S	N
August	H	T	Q
September	I	U	U
October	J	V	V
November	K	W	X
December	L	X	Z

Currency Codes

It is assumed that all spreads will use only one currency and that the currency code will be determined by the commodity code. Table 4 lists the currency for each commodity code.

Table 4. Commodity Codes and Associated Currencies

Commodity Code	Currency Code	Commodity
JP	JPY	MSCI Japan Index Futures
NK	JPY	NIKKEI 225
EY	JPY	Euroyen Tibor
EL	JPY	Euroyen Libor
JG	JPY	FullSize JGB
JB	JPY	Mini JGB
TW	USD	MSCI Taiwan Index
HK	USD	MSCI Hong Kong Stock Index
IN	USD	S&P CNX Nifty Index
ED	USD	EuroDollar

4. Bate Codes and Tokens

Section 4 lists the codes and tokens used by the CSP or Plus Server to transmit data from the Singapore Exchange. The subsections are:

4.1 Bate Code Descriptions

4.2 Tokens with Enumerated Values

4.4 Units and Data Compression

The table of section 4.1 describes the Bate codes and CTF tokens along with the corresponding generic token if available. Section 4.2 explains the codes and tokens that have a defined set of values (enumerated lists), for example, quote and trade conditions. Section 4.3 explains the different time units and the type of data compression used.

4.1 Bate Code Descriptions

The following table gives a token name and description for each Bate code along with an explanatory comment if appropriate. The token name does not appear in PlusFeed output but may be used in other Real-Time Services applications as a unique data identifier. The Type column gives the data type for the Bate codes only. In a few cases the data type for the CTF token differs. For example, the data type for the currency code is octal for the Bate code but is alphabetic for the corresponding CTF token. See Appendix A for an explanation of the Bate code data types.

Bate Code	Token Name	Description	Bate Type	CTF ID	Generic Token	SGX-ST 16i	SGX-ST 14a	SGX-DT 16b 16s	SGX-DT 12b 14c	SGX-FX 17f	SGX-FX 14b
a	ASK.PRICE	Best ask price	Price	10	103	✓		✓		✓	
b	BID.PRICE	Best bid price	Price	12	102	✓		✓		✓	
c	CURRENT. PRICE	Current price	Price	14	101	✓		✓		✓	
d	UPDATE. DATE	Update date (EST: yyyymmdd)	Date/ Time	267	137	✓	✓	✓	✓	✓	
e	OPEN_INT	Open interest	Integer	369	110	✓		✓		✓	
f	RECORD. PRECISION	Decimal precision; number of decimal places. This value can be 0 through 9.	Admin	209	135	✓		✓		✓	✓
f10	PCT.CHG	Today's percent net change	Integer	362	134	✓		✓		✓	
f11,0	TOP_BOOK_ MARKER	Top-of-book marker	Admin	439	N/A		✓		✓		✓
f15	ACTIVITY. DATE	Last activity date (UTC: Unix time stamp for CTF token; otherwise yyyymmdd. See sec. 4.3)	Date/ Time	15	147	✓		✓		✓	

Bate Code	Token Name	Description	Bate Type	CTF ID	Generic Token	SGX-ST 16i	SGX-ST 14a	SGX-DT 16b 16s	SGX-DT 12b 14c	SGX-FX 17f	SGX-FX 14b
f16	ACTIVITY. DATETIME	Last activity time (UTC: Unix time stamp for CTF token; otherwise hhmmss. See sec. 4.3)	Date/ Time	16	146	✓		✓		✓	
f17	PREV. TRADE.DATE	Trade Date Close (UTC: Unix time stamp for CTF token; otherwise yyyymmdd. See sec. 4.3)	Date/ Time	451	139	✓		✓		✓	
f19	TRADE. BLOCK. COUNT	Total number of block trades today. (Block = incremental volume ≥ 10,000)	Integer	440	113	✓					
f20	SETTLE. DATE	Settlement date	Date/ Time	417	144			✓		✓	
f21	PREV. ORDER.ID	Previous order ID	Integer	377	N/A		✓		✓		✓
f22	NEXT. ORDER.ID	Next order ID	Integer	376	N/A		✓		✓		✓
f23	TRADE.DATE	Last Trade Date (UTC: Unix time stamp for CTF token; otherwise yyyymmdd. See sec. 4.3)	Date/ Time	17	140	✓		✓		✓	
f24	TRADE. DATETIME	Last Trade Time (UTC: Unix time stamp for CTF token; otherwise hhmmss. See sec. 4.3)	Date/ Time	18	141	✓		✓		✓	
f26	QUOTE. DATE	Quote date (UTC: Unix time stamp for CTF token; otherwise yyyymmdd. See sec. 4.3)	Date/ Time	19	142	✓		✓		✓	
f27	QUOTE. DATETIME	Quote time (UTC: Unix time stamp for CTF token; otherwise hhmmss. See sec. 4.3)	Date/ Time	20	143	✓		✓		✓	
f28	VWAP	Volume weighted average price	Price	474	145	✓		✓		✓	
f31	LOT.SIZE	Lot size	Volume	814	N/A			✓		✓	
f36	SPECIAL. PRICE. INDICATOR	Special price indicator – provides the precision for COUPON.RATE and REDEMPTION.VALUE	Integer	1206	N/A	✓					
f42	TRADE. OFFICIAL. DATE	Official exchange trade date (UTC: Unix time stamp for CTF token; otherwise yyyymmdd. See sec. 4.3)	Date/ Time	444	N/A			✓		✓	
f43	CORRESPON DING.OPEN. PRICE	Corresponding open price in price/yield when a fixed income security is traded.	Price	3847	N/A	✓					
f44	OPTION. ACTIVE.IND	Active option indicator / expiration indicator	Admin	310	N/A			✓		✓	
f45	PRICE.UNIT. CODE	Price unit code. The code identifies the type of price that will appear in the open, high, low, and last fields for a fixed income security. See sec. 4.3.	Admin	3062	N/A	✓					
f46	TRADE. TOTAL.VALUE	Total value traded for a security for the current day up to the present time Removed at reset using TOKEN.DEL (g43/5004) Not affected by RECORD.PRECISION (f/209)	Price	460	N/A	✓					

Bate Code	Token Name	Description	Bate Type	CTF ID	Generic Token	SGX-ST 16i	SGX-ST 14a	SGX-DT 16b 16s	SGX-DT 12b 14c	SGX-FX 17f	SGX-FX 14b
f47	TRADE. BLOCK.VOL	Sum of volume for all block trades	Volume	441	115	✓					
f51	MATURITY. DATE	Maturity date (YYYYMMDD format)	Date/ Time	341	N/A	✓	✓				
f54	EXPIRATION. DATE	Expiration date	Date/ Time	292	127			✓		✓	
f55	STRIKE. PRICE	Strike price	Price	423	128			✓		✓	
f56	OFFICIAL. VWAP	VWAP provided by the exchange	Price	49	N/A			✓		✓	
f57	TRADE. OFFICIAL. CLOSE	Closing price provided by the exchange	Price	385	151			✓		✓	
f58	CALL.PRICE	The price at which the issuer may redeem a security prior to maturity	Price	3169	N/A	✓	✓				
f58	CALCULATED .CLOSE	Calculated closing price; reports the final settlement price on the expiration date of a derivative	Price	818	0218			✓		✓	
f68	EXMARKER. CODE	Ex-marker code; corporate action indicator. See table of values below.	Integer	51	N/A	✓	✓				
f70	INSTR. STATUS	Instrument status	Admin	705	N/A			✓		✓	
f72	REFRESH	Indicator for cycle/refresh message	Integer	24	N/A	✓	✓	✓	✓	✓	✓
f73,xx	DELAY_MINS	Delay minutes. xx = number of minutes data is delayed. Generated only by delayed CSPs.	Date/ Time	269	138	✓		✓		✓	
f74	INSTR. STATUS	Instrument status. See table of values below	Integer	705	N/A	✓	✓				
f76	STRIKE. DIVISOR	Strike price divisor; the number of decimal places in the strike price.	Integer	425	129	✓	✓	✓		✓	
f77	TRADE. COND.SIZE	Trade size associated with the trade condition	Volume	448	N/A	✓		✓		✓	
f78	TRADE. COND.PRICE	Trade price associated with the trade condition	Price	447	N/A	✓		✓		✓	
f79	TRADE. COND_1	Trade condition 1 (See sec. 4.2)	SCond	2500	153	✓		✓		✓	
f85	BID.DEPTH. COND	Depth bid condition, 75 = market order (no price given)	Admin	1165	N/A		✓				
f86	ASK.DEPTH. COND	Depth ask condition, 75 = market order (no price given)	Admin	1166	N/A		✓				
f88	ORDER.ID	Order ID	Integer	308	N/A		✓		✓		✓
f92	OFF.FLOOR. TRADE.PRICE	Price for married trades	Price	1288	N/A	✓					
f95	NOMINAL. VALUE	Contains the nominal value (if any) of the underlying security. Used in the bonds market to define the Bonds Nominal Value.	Price	3696	N/A	✓					
f99,0	RECORD. RESET	Individual symbol reset	Admin	416	N/A	✓	✓	✓	✓	✓	✓

Bate Code	Token Name	Description	Bate Type	CTF ID	Generic Token	SGX-ST 16i	SGX-ST 14a	SGX-DT 16b 16s	SGX-DT 12b 14c	SGX-FX 17f	SGX-FX 14b
g11	REDEMPTION .PRICE	Redemption value equalling the amount paid at maturity	Price	406	N/A	✓					
g13	TRADE.INDIC. PRICE	Equilibrium trade price: the price that an instrument would trade at when the market goes into a trading state where order matching is enabled	Price	331	N/A	✓					
g20 .	COUPON. RATE	Coupon rate of a fixed income security; it equals the amount of interest paid per year expressed as a percentage of the face value of the security. The precision is provided by SPECIAL.PRICE.INDICATOR.	Price	698	N/A	✓					
g22	COUPON. FREQUENCY	The number of times the coupon cash flow of the fixed income security is paid per year	Integer	3741	N/A	✓					
g27	CORRESPON DING.LAST. PRICE	Corresponding traded price is applicable to fixed income securities. It gives the equivalent yield price if the security is quoted in clean price and vice versa.	Price	3844	N/A	✓					
g34	CORRESPON DING.LOW. PRICE	Corresponding low price in price/yield when a fixed income security is traded	Price	3846	N/A	✓					
g35	CORRESPON DING.HIGH. PRICE	Corresponding high price in price/yield when a fixed income security is traded.	Price	3845	N/A	✓					
g41	ISSUE.DATE	Date of issuance for the fixed income security	Date/Time	812	N/A	✓					
g43	TOKEN.DEL	The value of TOKEN.DEL is the token ID of another token. When received, the CSP clears the value of the other token from its database. See the *Message Processing* below.	Integer	5004	NA	✓		✓		✓	✓
g58	FIRST. COUPON. START.DATE	First coupon payout date for a fixed income security	Date/Time	3378	N/A	✓					
g59	OFF_BOOK. TRADE.VOL	The volume reported by OFF_BOOK.TRADE.VOL is the cumulative volume of off-exchange trades for the given instrument. The value of the token updates the total volume, TRADE.VOL (22/v) for the instrument.	Integer	277	N/A				✓	✓	
g64	REASON. CODE	Sent with any trade that updates the last price. Exchange explanation of why trade updated the last price. (See sec. 4.2)	Integer	1012	N/A			✓		✓	
g78	CONTROL. MSG.TYPE	Control.Msg.Type (See sec. 4.2)	Alert	856	N/A	✓		✓		✓	
h	TRADE.HIGH	Today's high price	Price	388	104	✓		✓		✓	

Bate Code	Token Name	Description	Bate Type	CTF ID	Generic Token	SGX-ST 16i	SGX-ST 14a	SGX-DT 16b 16s	SGX-DT 12b 14c	SGX-FX 17f	SGX-FX 14b
i	TRADE.SIZE	Incremental volume	Volume	9	112	✓		✓		✓	
j	BID.SIZE	Size of best bid	Volume	13	118	✓		✓		✓	
k	ASK.SIZE	Size of best ask	Volume	11	119	✓		✓		✓	
l	TRADE.LOW	Today's low price	Price	394	105	✓		✓		✓	
m	ENUM. CURRENCY	Currency enumeration (See sec. 4.2)	Octal	270	122	✓	✓	✓	✓	✓	✓
n	CHG	Net change	Price	361	108	✓		✓		✓	
o	TRADE. OPEN	Open price	Price	400	109	✓		✓		✓	
p	BID.DEPTH. SIZE	Depth bid size	Volume	59	N/A		✓		✓		✓
q	BID.DEPTH. PRICE	Depth bid price	Price	58	N/A		✓		✓		✓
r	ASK.DEPTH. PRICE	Depth ask price	Price	60	N/A		✓		✓		✓
s	SETTLE. PRICE	Settlement price	Price	418	107			✓		✓	
t	TRADE. PRICE	Last trade price	Price	8	101	✓		✓		✓	
v	TRADE.VOL	Cumulative trade volume	Volume	22	106	✓		✓		✓	
w	YEST.TRADE. VOL	Yesterday's total cumulative volume	Volume	473	126	✓		✓		✓	
x	ASK.DEPTH. SIZE	Depth ask size	Volume	61	N/A		✓		✓		✓
y	YEST. TRADE. CLOSE	Yesterday's close price	Price	407	111	✓		✓		✓	
z121*	PQ.SETTLE. PRICE	Price qualifier for settle price	Integer	1095	N/A					✓	
z185*	RESIDUAL. MATURITY	Ex coupon period in days	Integer	1280	N/A	✓					
z193*	COUPON. RECORD. DATE	Date at which interest begins to accrue on a fixed income security	Date/Time	3735	N/A	✓					
z199*	DAY.COUNT. METHOD	Day Count Convention, (also called Day Calculation Rule, Calendar Convention or Day Count Basis), is a system used in the fixed income markets to determine the number of days between two dates. It defines the day count factor used for calculating: a) Accrued interest and b) Corresponding yield for the trade price (i.e. clean price) Values: 1 = ACTACT 3 = EU30360 5 = ACT365 6 = ACT360 7 = IG30360	Integer	3721	N/A	✓					

Bate Code	Token Name	Description	Bate Type	CTF ID	Generic Token	SGX-ST 16i	SGX-ST 14a	SGX-DT 16b 16s	SGX-DT 12b 14c	SGX-FX 17f	SGX-FX 14b
z217*	BOND.TYPE	Specifies the type of fixed income security. Values: 1 = Bill 2 = Bond 4 = Bond Floating	Integer	3008	N/A	✓					
z246*	AUCTION. STATUS. INDICATOR	Auction status (See sec. 4.2) Removed at reset using TOKEN.DEL (g43/5004)	Integer	942	N/A	✓					
z255*	HIGH. ACCURACY. VWAP	Integer representation of high accuracy VWAP	Integer	5108	N/A					✓	
z256*	VWAP. PRECISION	Precision of high accuracy VWAP	Integer	5109	N/A					✓	
z257*	END.UPDATE. FLAG	The message END.UPDATE.FLAG=0 flags the end of an update to an order book. – Applies only to warrants, indices, and certain other securities in the Ready Market and all securities in the Unit Share and Buying in Markets. See section 6.5.	Integer	3851	N/A		✓		✓		✓
z600*	CURRENCY. STRING	Currency code	String	435	N/A						✓

* These Bate codes are included for reference only. These fields are not available from the CSP in DDF mode.

4.2 Tokens with Enumerated Values

f44 Expiration Indicator (CTF Token 310, OPTION.ACTIVE.IND) for SGX-DT

The Bate code f44 takes the value 0 or 1. The value 0 indicates that the expiration is expressed in European style. The value 1 indicates that the expiration is expressed in American style.

f45 Price Unit Code (CTF Token 3062, PRICE.UNIT.CODE) for SGX-ST

Values determine the type of price that appears in the open, high, low and last fields for a fixed income security.

Value	Description
1	Price
2	Yield

Value	Description
3	Points
4	Yield Diff
5	IMM Index
6	Basis Points
7	Inverted Yield
8	Percentage of Nominal
9	Dirty Price

f68 Ex-marker Code (CTF Token 51, EXMARKER.CODE) for SGX-ST

The exchange will send only one value for EX.MARKER.CODE at a time in any given message. The values are unchanged.

Value	Description
01	Cum Dividend
02	Cum Bonus
03	Cum Rights
04	Cum All
05	Cum Offer
06	Cum Entitlement
07	Cum Interest
08	Ex Dividend
09	Ex Bonus
10	Ex Rights
11	Ex All
12	Ex Offer
13	Ex Entitlement
14	Ex Interest
15	Scripless Conversion

f70 Instrument status (CTF Token 705, INSTR.STATUS) for SGX-DT

Value	Description
0	Active
1	Suspended
4	Delisted

f74 Instrument status (CTF Token 705, INSTR.STATUS) for SGX-ST

Instrument Status will now receive only one value at a time. In addition, several values have been removed as shown by strikethroughs.

Value	Description
0	No instrument status
01	Suspended
03	Pending Listing
04	Delisted
09	Trading restricted to Buying-In market only
10	Adjust
11	Trading Halt
12	Mandatory Call Event has occurred for Callable Bull/Bear Contracts (CBBC).This event may occur as early as 6.30am.
13	Halt on instrument has been lifted.

f79 Trade Condition 1 (CTF Token 2500, TRADE.COND_1) for SGX-DT

The Bate code f79 appears in trade messages from SGX-DT (exchange IDs 16b, 16s and 17f) and currently can take one of 2 values indicating the condition of the trade. The value is represented by one or two digits following the code, for example, f79,0 for a regular trade. In CTF mode, the value follows the token, as in 2500=0. The f79 code is not suppressible; it appears in every message where it applies. The following table explains the different values of trade condition 1.

Combo-to-combo trades are reported by the exchange with a size but no price. When this type of trade is received the size is reported using TRADE.COND_SIZE and the price of the last regular trade is reported using TRADE.COND_PRICE. Combo-to-combo trades update total volume but do not update the last price.

Bate and Value	Description
f79,0	Regular trade
f79,1	Combo-to-combo trade

f79 Trade Condition 1 (CTF Token 2500, TRADE.COND_1) for SGX-ST

The Bate code f79 appears in trade messages from SGX-ST (exchange ID 16i) and currently can take one of 3 values indicating the condition of the trade. The value is represented by one or two digits following the code, for example, f79,17 for a trade in the Unit Share Market. In CTF mode, the value follows the token, as in 2500=17. The f79 code is not suppressible; it appears in every

message where it applies. The following table explains the different values of trade condition 1.

Value	Trade Conditions
0	No Condition
1	Late Trade
2	Internal Trading/Crossing
4	Bulletin Board Table
17	Off Market
22	Buy White

f62 Trade condition 3 (CTF Token 2502, TRADE.COND_3)

Value	Trade Conditions
0	No information
1	Married trade
2	All or none
4	Part of a combo match

f49 Trade condition 5 (CTF Token 2504, TRADE.COND_5)

Value	Trade Conditions
1	Matched by system automatically
3	Matched outside exchange, different brokers, trade report; married trade
5	Matched outside exchange, one broker, trade report, crossing; married trade
20	Deal made at the end of an auction

g64 Reason Code (CTF Token 1012, Reason.Code)

Value	Description
1	Sent due to refresh of data
2	Sent due to execution of deal
3	Sent due to correction of data
4	Sent due to deletion of deal
5	Sent due to exclusion of deal in trade statistics
6	Sent due to re-inclusion of deal in trade statistics
7	Sent due to reset of trade statistics

g78 Control Message Type (CTF Token 856, Control.Msg.Type)

Value	Description
3	Start of system transmission
10	End of system transmission
21	Line integrity verification
15	Trading session status: OPEN – Normal trading
16	Trading session status: CLSD – Trading closed
36	Trading session status: PREO – Pre-open period
7	Trading session status: PREC – Pre-close period
80	Trading session status: PUBL – Non-Cancel period
37	Market break

For SGX Equities, the symbol .EXCHANGE.ADMIN is used to provide this token for the entire exchange. For SGX Derivatives, this token is instead sent for each instrument individually.

m Currency Code (CTF Token 270, ENUM.CURRENCY)

In DDF mode, the currency code is represented as three pairs of octal digits with each pair standing for the position of a letter in the alphabet. If the first pair includes a leading zero, the zero is dropped. For example, the currency code for the Australian dollar is AUD. The letters are represented in octal digits as 012404, and as part of a quote message it would be transmitted in DDF mode as m12404. In CTF mode, the same information would be given by 270 = 12404, but the CSP reconverts to the alpha code.

z246 Auction Status (CTF Token 942, AUCTION.STATUS.INDICATOR) - CTF Only for SGX-ST

Bate and Value	Description
0	Not in auction
1	In auction

4.3 Units and Data Compression

Date and Time Units

All time parameters in PlusFeed are expressed in coordinated universal time (UTC), which is the standard (winter) civil time for the United Kingdom and

Ireland and is very nearly equivalent to the older Greenwich Mean Time (GMT). There is no UTC adjustment for daylight saving time.

The values of date parameters given in DDF by Bate codes such as f15, last activity date, are expressed in units of 4-digit years, months, and days and represented as yyyymmdd without spaces or other demarcation. The year used is the year of the Common Era.

The values of time parameters given in DDF by Bate codes such as f16, last activity time, are expressed in units of hours, minutes, and seconds and represented as hhmmss without spaces or other demarcation.

ACTIVITY.DATETIME, TRADE.DATETIME, CURRENT.DATETIME, and QUOTE.DATETIME in CTF use the Unix time stamp. These dates and times are represented by the number of seconds since January 1, 1970 at 00:00:00 UTC. For example, a last activity time of 15 hours, 31 minutes, and 45 seconds on 10 December 2004 would be represented in CTF by the token=value pair of 16=1102692705. CTF date and time parameters can also include milliseconds as decimal fractions. In the previous example, if the number of seconds were 45.002, the CTF token=value pair would be 16=1102692705.002.

Data Compression

The enumerated values for some Bate codes can be as many as eight characters in length. If the uncompressed value of the Bate code includes any leading zeroes, these leading zeroes will be suppressed. See the example for currency code in Section 4.2.

5. Sample Messages on SGX-ST

Quote Messages

<0x16>i C07 b12100 j1000 f3

where

<0x16>i	=	exchange ID (hex character plus letter for SGX-ST)
C07	=	symbol for Jardine C & C
b12100	=	best bid price 12.10
j1000	=	size of 1000 shares for best bid
f3	=	precision of 3 decimal places

<0x16>i C07 j5000

where

<0x16>i	=	exchange ID (hex character plus letter for SGX-ST)
C07	=	symbol for Jardine C & C
	=	best bid price of 12.10 is implied from previous quote
j5000	=	new size of 5000 shares for best bid

Trade Message

<0x16>i C07 t12100 i1000 o12100 v1000 f3

where

<0x16>i	=	exchange ID (hex character plus letter for SGX-ST)
C07	=	symbol for Jardine C & C
t12100	=	trade price of 12.10
i1000	=	trade size (incremental size) of 1000 shares
o12100	=	opening price of 12.10
v1000	=	total volume of 1000 shares for today's trades
f3	=	precision of 3 decimal places

Summary/Cycle/Refresh Messages

<0x16>i C07 f72,0 f3 c12000 h12100 l11900 n0 o11900 y12000 v56000 w539000 f23,20050328 f24,90513 f17,20050324 f19,1 f47,21000 f28,11959

<0x16>i C07 f72,0 f3 b12000 a12100 j16000 k3000 u0 m230704 f79,22 f26,20050328 f27,90521 f15,20050328 f16,90521

where

<0x16>i	=	exchange ID (hex character plus letter for SGX-ST)
C07	=	symbol for Jardine C & C
f72,0	=	refresh message indicator
f3	=	precision of 3 decimal places
c12000	=	current price of 12.00
h12100	=	today's high price of 12.10
l11900	=	today's low price of 11.90
n0	=	net change in price from yesterday's closing price
o11900	=	opening price of 11.90
y12000	=	yesterday's closing price of 12.00
v56000	=	total volume today of 56,000 shares
w539000	=	yesterday's trade volume of 539,000 shares
f23,20050328	=	last trade date of 2005 March 28
f24,90513	=	last trade time of 9:05:13 UTC
f17,20050324	=	previous trade date of 2005 March 24
f19,1	=	total number of one block trades today
f47,21000	=	volume of 21,000 shares for today's block trades
f28,11959	=	volume weighted average price of 11.959
b12000	=	best bid price of 12.00
a12100	=	best ask price of 12.10
j16000	=	size of 16,000 shares on best bid
k3000	=	size of 3,000 shares on best ask
u0	=	regular open quote
m230704	=	currency of SGD, Singapore dollars
f79,22	=	Ready Market trade
f26,20050328	=	quote date of 2005 March 28
f27,90521	=	quote time of 9:05:21 UTC
f15,20050328	=	last activity date of 2005 March 28
f16,90521	=	last activity time of 9:05:21 UTC

Reset Message

<0x16>i C07 f99,0

where

<0x16>i	=	exchange ID (hex character plus letter for SGX-ST)
C07	=	symbol for Jardine C & C
f99,0	=	reset indicator

6. Message Processing

6.1 Message Processing at Reset for SGX-ST Securities Data and SGX-DT Derivatives Data and Orderbook Processing for SGX-ST Data

At reset, some closing data is transferred to other fields that represent yesterday's values, and these values are retained for the next session. After the transfers have been made, the original closing data is set to zero or is cleared, if appropriate. Sections 6.1.1 and 6.1.2 describe the general rules for transferring and clearing this closing data. In the resetting of SGX-ST and SGX-DT data, the rules apply only to those fields that are actually used in the data.

The reset of best bid and offers for derivative data occurs after the T and the T+1 session.

6.1.1 Transfer of Closing Data

The following rules are applied at reset:

- If there is a non-zero SETTLE.PRICE, the value of SETTLE.PRICE is copied to YEST.TRADE.CLOSE. Otherwise, the value of TRADE.PRICE is copied to YEST.TRADE.CLOSE.
- The value of TRADE.VOL is copied to YEST.TRADE.VOL.

6.1.2 Removal of Closing Data

After the above closing values have been copied, the following fields are set to zero:

- TRADE.VOL (cumulative trade volume for session)
- VWAP (f28, CTF 474) (volume weighted average price calculated by Interactive Data)
- ASK.PRICE
- BID.PRICE
- ASK.SIZE
- BID.SIZE

And the following fields are cleared:

- SETTLE.PRICE (settlement price)
- CHG (net change for session)

- OPEN_INT (open interest)
- TRADE.HIGH
- TRADE.LOW
- TRADE.OPEN
- TRADE.SIZE

6.1 Message Processing for Married Trades

A “Married Trade” in SGX-ST trading system is a direct business trade that is reported by both trading parties into the system. It can either be a cross trade between two traders or two of the trader's clients.

Married trade will be shown by value 1 for TRADE.COND_1 (2500). They will also be reported by the values 3 and 5 for TRADE.COND_5 (2504). The price of the married trade will continue to be reported by OFF.FLOOR.TRADE.PRICE (1288/f92).

6.2 Message Processing at Reset for Level 2 SGX-ST Securities Data and Level 2 SGX-DT Data

At reset, Real-Time Services clears all level 2 data from the customer’s CSP. To accomplish this, a special message is broadcast for each ticker symbol with the Bate code f99 (CTF token 416) set to zero.

Reset for derivative order books occurs after both the T and the T+1 session.

6.3 Order Book Processing for Level 2 SGX-ST Securities Data

6.3.1 Add/Delete/Update Messages

The Consolidated Feed uses implied add/change/delete logic to update order books:

- A ‘new order’ message contains an order ID which is not currently present in the order book.
- A ‘modified order’ message contains an order ID which is already present in the order book and one or more updated fields.
- A ‘delete order’ message contains a bid or ask size of 0.

6.3.2 Order Book Sorting

The Consolidated Feed maintains a buy order book and a sell order book for each security for markets which use order-based depth processing. The order books are sorted first by price, next by exchange priority (if sent by the exchange), and then by order ID. The top of the buy order book is the highest current buy price, and the top of the sell order book is the lowest current sell price. If two orders have the same price and same exchange priority, the order with the earlier order ID is sorted on top.

6.3.3 Top-of-Book Indicator

If an add or delete order is received that changes the top of the order book, PlusFeed sends a message with token 439=0, indicating the new top. A cancel or delete message contains no price data and shows a volume of zero.

A modify order that changes only the size of the order retains the same order ID as the original order and will maintain its position in the book. Any change in order ID, price, or exchange priority of an order will cause a resorting of the book. Customers who do not use the above sort order can ignore token 439 as it may not correspond to the top-of-book in their ordering scheme.

To help customers keep accurate order books on their own systems, the Consolidated Feed uses both the top-of-book token (439) and a comprehensive refresh system. If an order is cancelled or executed, the Consolidated Feed sends only one explicit delete message. If the order is also at the top of the book, the message typically includes 439=0. In this case, any other orders which appear above the cancelled or executed order can be deleted.

If an add or delete order is received that changes the top of the order book, the Consolidated Feed sends a message with 439=0 indicating the new top-of-book order.

6.3.4 Refresh Message Processing

The Consolidated Feed's comprehensive refresh system uses tokens 377 and 376 (previous and next order ID) to help remove stale or corrupt orders which occur anywhere in the order book.

Each refresh message includes an order ID. If the message also includes a value for token 377, that value indicates the largest valid order ID that is less than the order ID of the refresh message. Any order with an ID between these two values will be automatically deleted by the CSP as no longer valid. Similarly, if the refresh message includes a value for 376, that value indicates the smallest valid order ID that is larger than the order ID of the refresh

message. Any order with an ID between the ID of the refresh message and the value of 376 will be automatically deleted by the CSP as no longer valid.

The automatic deletions by the CSP are carried out using token 5069, ORDER.DEL, and are similar to standard real-time deletions with order ID and zero order size and should be processed as such.

If an order ID (308) is set to zero, this represents that there are no more outstanding orders for that symbol for the given side (bid/ask).

6.4 Processing of TOKEN.DEL (5004/g43)

In CTF mode users will see the token ID of the token to be blanked followed by no value. For example, to blank the CTF token OFFICIAL.VWAP the data stream will include "|49=|". The result will be to clear the value of OFFICIAL.VWAP from the CSP database.

In DDF mode, users will see the g43 Bate code followed by the token ID of the CTF token to be cleared. For example, to blank the CTF token OFFICIAL.VWAP the data stream will include "g43,49". The result will be to clear the value of OFFICIAL.VWAP from the CSP database.

6.5 Processing of End.Update.Flag (CTF Token 3851)

The END.UPDATE.FLAG token applies to warrants, indices, and American Depositary Receipts in the Ready Market and all symbols in the Unit Share and Buying In Markets. If the Exchange provides market orders for an instrument or furnishes a full order book, END.UPDATE.FLAG is not used.

The END.UPDATE.FLAG token applies to all SGX derivative instruments.

At the end of a series of messages updating an orderbook, the end update flag indicator will be sent. The indicator (token 3851) will be sent with a value of 0 to signal the end. The flag will be sent along with a dummy order ID, 77777777.

The END.UPDATE.FLAG token is broadcast at the end of each set of updates for a given symbol. The set may include one or many updates. Clients should be careful to associate the END.UPDATE.FLAG message with the included symbol.

6.6 Processing of Trade Conditions for Singapore Derivatives (723/16s)

In the below table, a ✓ indicates that a condition can update a given field while a ✖ indicates that it cannot.

SGX-DT (723/16s)		Permitted to update								
Value of Trade. Cond_1	Description	TRADE. PRICE (8)	Trade. Size(9)	TRADE. COND. PRICE (447)	TRADE. COND. SIZE (448)	TRADE. VOL (22)	TRADE. OPEN (400)	TRADE. HIGH (388)	TRADE. LOW (394)	VWAP (474)
0	Regular Trade	✓	✓	✖	✖	✓	✓	✓	✓	✓
1	Combo to Combo Trade	✖	✖	✓	✓	✓	✖	✖	✖	✖
	Trade Cancellation	✖	✖	✖	✖	✖	✖	✖	✖	✖
	Trade Correction	✖	✖	✖	✖	✖	✖	✖	✖	✖

Appendices

A. Bate Code Data Types

The data type field in the Bate code list indicates what operation, if any, is required for data received with that Bate code.

Type	Operation
Admin	Administrative code—indicates the general conditions, e.g., f0-f9 indicates number of decimal places; f72,0 indicates cycle message
Alert	Indicator for supplemental information
Date/Time	Format date according to information in comment/description field.
Float	Apply decimal or fractional precision; note that the value may be positive or negative
Integer	No Operation.
Octal	Value of Bate code is octally encoded.
Price	Apply decimal or fractional precision.
Qcond	A 'state' is set for the instrument as a whole. This condition will apply until it is either cancelled or replaced. The values are normally listed in quote condition tables.
Scond	A 'state' is set for the current message only. See sales condition tables.
Special	Exchange-specific information.
Volume	May be necessary to multiply the value of the Bate.

B. Octal Code for ASCII Characters

For some codes and tokens, pairs of octal digits are used to represent alphabetical characters such as found in market maker IDs or currency codes. The following table gives the conversion.

Octal Digits	ASCII Character	Octal Digits	ASCII Character
00	SPACE		
01	A	41	a
02	B	42	b
03	C	43	c
04	D	44	d
05	E	45	e
06	F	46	f
07	G	47	g
10	H	50	h
11	I	51	i
12	J	52	j
13	K	53	k
14	L	54	l
15	M	55	m
16	N	56	n
17	O	57	o
20	P	60	p
21	Q	61	q
22	R	62	r
23	S	63	s
24	T	64	t
25	U	65	u
26	V	66	v
27	W	67	w
30	X	70	x
31	Y	71	y
32	Z	72	z

C. Month Codes for Options and Futures Contracts

These month codes are used in instrument symbology to identify expiration months for different types of options and futures contracts.

Month	Call Option	Put Option	Futures Contract
January	A	M	F
February	B	N	G
March	C	O	H
April	D	P	J
May	E	Q	K
June	F	R	M
July	G	S	N
August	H	T	Q
September	I	U	U
October	J	V	V
November	K	W	X
December	L	X	Z

D. Useful Websites for SGX

- Main website:
  http://www.sgx.com
- Information about SGX DerivativesQuote (SGX-DT):
  http://info.sgx.com/SGXweb_St.nsf/newdocname/SGX_DATASERVICES_DerivativesQuote?OpenDocument