ASX Trade24

Developer's Guide

Markets and Functionalities

Table of Contents

1. Overview

ASX Trade24 is the ASX's proprietary trading platform that supports ASX 24 markets and products. ASX Trade24 operates on a 24/6 basis, offering debt, equity index and commodity products and a full suite of trading/order management functionalities.

The *ASX Trade24 Administrator's Guide* provides Participant administrators with information on the full suite of ASX Trade24 non-trading functionalities and access methodology.

The *ASX Trade24 Developer's Guide – FIX Specification* contains the relevant technical details which allow third party applications to connect and interact with ASX Trade24.

The *ASX Trade24 Developer's Guide – Markets & Functionalities* provides information on the functionality and behaviour of ASX Trade24.

The *ASX Trade24 ITCH Message Specifications* contains the relevant technical details which allow third party applications to connect and interact with ASX Trade24.

Developers should utilise these documents in tandem during the design, validation and implementation stages of Application Program Interface (API) deployment.

1.1. Support

The ASX Customer Technical Support team operates a "service desk" style support centre for the customers of the ASX. ASX Customer Technical Support provides support coverage from 6am Monday to 8am Saturday (AEST).

Any questions in relation to ASX Trade24 should be directed to ASX Customer Technical Support:

Email: cts@asx.com.au
Tel (Dom): 1800 663 053
Tel (Int): +612 9227 0372

2. ASX Trade24 - Market Behaviour

2.1. Trading Day Cycle

ASX Trade24 operates the SFE and NZFOE markets on a 24/6 basis, with the first product pre-opening at 6:20am Monday morning and last product close at 8am Saturday morning.

A typical Trading Day Cycle consists of two trading sessions (Night and Day) forming a single Trading Day. The Night Session always precedes the Day Session such that the Night Session for the Friday Trading Day starts Thursday afternoon.

Using the following days of the week as an example:

Note:
All times are in Australian Eastern Standard Time (AEST).
Closing times may vary during Australian Eastern Daylight Savings Time (AEDT).

THURSDAY

The Friday Trading day for the SFE Market starts at 4:58pm Thursday Night (IR pre-open) and will end at 4:30pm on Friday afternoon.

Thursday from 4:58:00 PM

Pre-Opening Phase - A period of ten (10) minutes prior to the Open in respect of a particular Futures Contract or Option Contract during which bids and offers may be entered into the system. Trades are executed at a common price on the Open.

Thursday from 5:07:30 PM

Levelling Phase - The final thirty (30) seconds of the ***Pre-Opening Phase*** during which a common opening price is determined.

Thursday from 5:08:00 PM

Open - The commencement of Open Trading in a particular Futures Contract or Option Contract.

FRIDAY

Friday 7:00:00 AM

Pre-Price Discovery - Night Session Closes and appropriate orders are purged in preparation for the Price Discovery phase.

Friday from 8:20:00 AM

Price Discovery Phase - A second Pre-Opening Phase.

Friday from 8:29:30 AM

Levelling Phase - The final thirty (30) seconds of the Pre-Opening Phase when a common opening price is determined.

Friday from 8:30:00 AM

Open - The commencement of Open Trading in a particular Futures Contract or Option Contract.

Friday 4:30:00 PM

Close - The completion of trading in ASX Trade24. Trading Date in a particular Futures Contract or Option Contract, or such other time as is designated by the Board.

Friday from 4:30:00 PM

Start of the Settlement Period: +/- 5 - 15 minutes

Friday from 4:42:30 PM

End Lock - Appropriate orders are purged in preparation for the new trading date.

2.2. Supported Order Types

ASX Trade24 supports the following order types (values as per tag 40 of the FIX Spec). Please review the order type behaviour described below in conjunction with the Purge/Retain functionality prior to implementation.

2.2.1. Execution Order Types

1 = Limit (LIM) – LIM is a single session order (expires after one session). During Open phase, bid prices cannot be entered above the best ask price and vice versa. Backwardation is possible during the Pre-Open/Price Discovery phase where an open price is being determined.

2 = Timed Order (TIM) – TIM is a LIM order which expires at a designated expiry time or by the Close of the contract.

3 = Fill or Kill (FOK) – FOK is a LIM order with a life of twenty seconds. Partial fill of a FOK order is possible with any remaining quantity cancelled at expiry

8 = Good Till Cancel (GTC) - GTC is a multi-session LIM order which expires with contract expiry.

10 = Market Limit Order (MLM) – MLM is a single session order that allows order entry up to the allowed Market Depth of each contract (see *Appendix 3.1*). MLM is not valid during the Pre-opening phase and inter-spread contracts.

2.2.2. Memo Order Types

4 = Market (MKT)

5 = Market If Touched (MIT)

6 = Stop Order (STP)

7 = Stop Limit (STM)

9 = Discretionary (DSC)

Memo order types behave like LIM orders and are used as identifiers only.

2.3. Purge/Retain Functionality

ASX Trade24 requires each order to be tagged as Purge (P) or Retain (R) via tag 18 of the new order message. The Order Purge functionality allows Participants to determine the behaviour of working orders during technical disruptions to trading access and GTC orders over the weekend system maintenance period.

A technical disruption to trading access is defined as a loss of connectivity between ASX Trade24 and the ASX 24 Gateway.

Possible scenarios include:

- ASX 24 Gateway failure (software/hardware)
- Communication circuit/equipment failure between ASX Trade24 and the ASX 24 Gateway
- ASX Trade24 host outage

The Order Purge functionality will not be triggered by disruptions to connectivity between the ASX 24 Gateway and the Participant application.

In the event of a technical disruption, all working orders set to Purge will be cancelled by ASX Trade24 host and all working orders set to Retain will remain working in the respective markets. Participants/developers need to understand and implement the Purge/Retain functionality based on how they wish their orders to be managed in the event of a technical disruption.

As per the behaviour of this functionality, GTC orders set to Retain will expire upon contract expiry, execution or cancellation, whereas those set to Purge will be cancelled over the weekend system maintenance period.

2.4. Custom Market

The custom market allows traders to enter strategy orders of up to six legs with any combination of futures and options contracts. The custom market facilitates the entry of complex options and futures strategies (i.e. straddles, strangles, call/put spreads, strips, butterflies etc.).

2.4.1. Custom Market Matching Algorithm

1. ASX Trade24 will firstly attempt to match a custom order against existing custom orders.
2. If the order is unable to trade in the custom market or is partially filled, the system will attempt to trade the order (or partial order) in the outright market(s), maintaining the correct ratio assignment. If the remaining volume of the order cannot be fully filled immediately, it will be retained as a standing order in the custom market.
3. Every time a resting custom market order is hit, the system will attempt to trade the remaining volume in the outright market. Partially filled orders will again be retained in the custom market
4. A custom order can only be matched against another custom order if the volume ratio and prices of each of the legs are the same.

2.4.2. Custom Market Orders – General Rules

- As per normal order entry, custom market orders can be set to retain or purge, tagged or non-tagged, shared or non-shared
- Custom market orders can **NOT** be entered during Pre-Open or Price Discovery
- Custom market orders do **NOT** support the following order types; GTC or MLM
- Custom market orders that mirror existing futures/option/spread market listed on ASX Trade24 (i.e. XT-YT Inter-Commodity spread) should not be entered
- Custom market orders can have a maximum of six legs
- The volume ratio for the separate strategy legs must be set to the lowest common denominator (see example below)
- If the contract of a leg of a custom market order is subject to ASIC's Market Integrity Rules (MIR), then that leg will be validated based on the rules and may result in the entire order being rejected (see Volatility Controls).

2.4.3. Custom Market - Trading Procedures

Creating a new Custom Market strategy:

- Request the exact strategy by sending a Custom Market RFQ (CRFQ) via User Text before entering the order, regardless of whether the order has been lodged.
- Enter the custom market order and ensure that the volume ratio is at the lowest common denominator. The maximum volume ratio is 50 except when the order is a ratio strategy and the smaller leg must be equal to or less than 50.

Joining an established Custom Market strategy:

- Does not require CRFQ message.
- Those first to join, improve or create the opposite side of a Custom Market must maintain the leg(s) with the lowest delta.

Procedure when joining an established two-way Custom Market strategy:

- Does not require CRFQ message.
- As the fixed leg/legs are already established, improvements to the market should be made to the variable leg.

Changes to BASIS, DELTA or CONSTANT LEG:

- Same as creating a new strategy.
- The strategy must be requested via the message function stating the exact changes.
- For an altered strategy to trade, it must represent an improvement to the original strategy.

- Altered Custom Market strategies that result in an identical strategy with an identical total premium will be disallowed as they represent queue jumping.
- Rules regarding the creation of the fixed and variable legs remain the same. For more information, please refer to ASX 24 Operating rules:

http://www.asx.com.au/compliance/rules_guidance/asx_24_operating_rules.htm

2.4.4. Volume Ratios in the Custom Market

A custom market order must have the ratios for each of its legs set to the lowest common denominator.

Example:

Attempts to enter the following order in the custom market:

Volume: 5 lots

Leg 1:	IRM1	Volume Ratio:	4	Price: At market
Leg 2:	IRU1	Volume Ratio:	6	Price: At market
Leg 3:	IRZ1	Volume Ratio:	8	Price: At market

Warning:
This order will be rejected.

The correct volume / ratio convention are as follow:

Volume: 10 lots

Leg 1:	IRM1	Volume Ratio:	2	Price: At market
Leg 2:	IRU1	Volume Ratio:	3	Price: At market
Leg 3:	IRZ1	Volume Ratio:	4	Price: At market

The following fills are generated when this order trade:

Leg 1:	IRM1	20	(2 x 10)
Leg 2:	IRU1	30	(3 x 10)
Leg 3:	IRZ1	40	(4 x 10)

2.4.5. CRFQ Example

CRFQ message conventions allow users to extract custom order information based on the below standardised format:

- Messages are alphabetical including expiry month
- Call information precede Put information
- Option strikes arranged in ascending order
- The volume ratios are at the lowest common denominator
- Total volume for the order is not included
- +/- sign designate bought/sold
- single space after the end of the contract code before the next +/- sign
- 60 Characters max, single space after the end of the contract code before the next +/- sign

Examples:

CRFQ +11APM2 -25APM235250C +25APM236000C

CRFQ +13YTM294000C -12YTM294250C -12YTM295000C +13YTM295250C

2.5. Maximum Price Change

Maximum Price Change limits are part of the suite of non-trading functionalities that allows Participants to control trading activity. Maximum Price Change functionality validates each new order / order modification against the valid range based on the anchor price and the predetermined limit. This section provides information on how to calculate the anchor price when applied to Maximum Price Change limits.

2.5.1. Futures and Options

The anchor price for outright Futures and Options contract (in order of priority) is:

- Last Traded Price
- Prior day Settle Value

Example:

YTZ1 Last Traded Price = 93.585

Max Price Change Limit YT Futures = 100

Price range = 93.485 (93.585 – 0.100) < > 93.685 (93.585 + 0.100)

VWM07250C Prior Settle Price = 280.1

Max Price Change Limit VW Options = 300

Price range = 250.1 (280.1 – 30.0) < > 310.1 (280.1 + 30.0)

2.5.2. Spreads

The anchor price for spread contract can be calculated by:

Outright Near Price (Last Trade/Prior Settle) – Outright Far Price (Last Trade/Price Settle)

Example:

APZ0H1

APZ0 – Last Traded Price = 4500.0

APH1 – Prior Settle Price = 4600.0 (assuming no Last Traded Price)

Max Price Change Limit - AP Spread = 600

Anchor Price = -100.0 (4500.0 - 4600.0)

Price range = -160.0 (-100.0 – 60.0) < > -40.0 (-100.0 + 60.0)

2.6. Shared Order Group Functionality

The Shared Order Group (SOG) functionality allows designated users to access shared orders of the specific SOG ID. Users receive all shared order execution reports relevant to its designated SOG(s).

For more information on the SOG functionality please refer to *ASX Trade24 Administrator's Guide*

2.6.1. Shared Group Usage Sample

ASX Trade24 Gateways can be configured to utilise the shared group functionality to allow multiple Gateways within the same Firm to share Trade/Order books. Shared orders are displayed in the trader book of every user authorised to participate in a particular SOG. An order flagged as Not Shared is available only to the sender/owner of the order.

Example:

User 1 belongs to SOG 1 and 2
User 2 belongs to SOG 2
User 3 belongs to SOG 2 and 3

Users 1, 2 and 3 can all see orders marked as shared using the Shared Group ID 2.

All users within the SOG can modify/cancel shared orders which would also transfer the ownership of the shared order to the intervening user.

2.6.2. SOG FAQ

- Shared order has ClOrdID (tag 11) set to 0 for all non-owner execution report
- Trade/Order download by SOG member will include Trade/Order of all permitted groups
- Order shared/not-shared status cannot be changed
- Shared orders will be accepted only if the SOG is permitted on the gateway
- Where SOG has not been permitted, shared order is rejected with message "New – Outside Trading Limit"
- SOG can be between 1 – 50
- Shared orders require flags 5030=S & 5029=<SOG>
- User can take "ownership" of a shared order by amending/cancelling the order
- Non-owner amendments of shared orders requires the User to have access to the same Trading Rights, Accounts and Limits
- All Users within the SOG can cancel shared orders

2.7. Message per Second

ASX Trade24 gateways are throttled to send 12 messages per second to the host. Any additional messages in excess of the throttle are processed and buffered at the gateway until the next second.

Message is defined as any FIX message sent to the gateway.

A second is the physical duration of one second i.e. 00:00:00 – 00:00:01

2.8. Spread Markets

2.8.1. Intra Commodity Spreads

Intra spreads allow trading between listed months of a specific contract on a price differential basis.

Implied Prices:

ASX Trade24 generates implied (IN and OUT) prices for intra-spreads. An Implied IN price is a spread price generated from two outright prices, implied or otherwise, in different contract months. An Implied OUT price is an outright price in one contract month generated from an outright price, implied or otherwise in a different contract month and a spread price, implied or otherwise, between the two contract months.

Intra spread pricing:

Intra spreads allow trading between listed months of a specific contract on a price differential basis. The price differential is calculated by taking the FAR month price from the NEAR month price. The near month of an intra-spread is defined as the month with the closest expiry date.

Note:
NEAR – FAR = PRICE DIFFERENTIAL

Example 1:

IRH9 futures market price 94500 • IRM9 futures market price 94300

The IRH9M9 intra spread market price differential is +200 points

Example 2:

IRH9 futures market price 94000 • IRM9 futures market price 94230

The IRH9M9 intra spread market price differential is -230 points

Trading intra spread orders:

- **BUY** the APZ7H8 intra spread; you are buying the **NEAR** month, APZ7, and selling the **FAR** month, APH8.
- **SELL** the IRH8M8 intra spread; you are selling the **NEAR** month, IRH8, and buying the **FAR** month, IRM8.

Intra Spreads – General Rules:

- As per normal order entry, intra spread orders can be set to retain or purge, tagged or non-tagged, shared or non-shared
- Intra spread orders can **NOT** be entered during Pre-Open or Price Discovery
- Intra spread orders do **NOT** support a GTC order type
- Intra spread orders support all other order types, including MLM orders
- The ratio on intra spread orders will always be 1:1
- Spread orders will maintain the same FIFO priority as outright futures orders.
- Implied prices generated, implied IN or implied OUT, will maintain FIFO priority for the volume based on the newest real orders that imply the price.
- If the underlying contracts of an intra-spread are subject to ASIC's Market Integrity Rules (MIR), then the intra-spread order will be validated based on the rules in Volatility Controls.

2.8.2. Inter Commodity Spreads

Inter commodity spreads allow trading between separate instruments listed on ASX Trade24 using spread differential pricing. To trade inter commodity spreads the dominate leg of the spread needs to be established to determine which leg you are buying or selling.

Implied Prices:

ASX Trade24 generates implied IN prices and does not generate implied OUT prices for inter spreads. An Implied IN price is created where there is enough volume in the outright market to satisfy the spread ratio.

Implied OUT prices are calculated internally by the matching engine for the purposes of matching. As such, the implied OUT prices are considered "shadow prices", but they can be calculated based on the market prices that are distributed.

Dominant Leg:

When trading the inter-commodity spread:

- Buying the spread means buying the 2nd leg (dominant contract) and selling the 1st leg.
- Selling the spread means selling the 2nd leg (dominant contract) and buying the 1st leg.

The dominant leg is determined by three factors:

1. The contract with the shorter expiry. The inter-spread XTM8YTM81028 - YT has a shorter expiry time of three years while XT is 10 years; thus YT is the dominant leg. Using the inter-spread YTM8IRM81820 - IR has the shorter expiry of three months while YT is three years, thus IR is the dominant leg.
2. The contract which will supersede an existing contract. In some cases spreads have been created to allow easier 'rolling' from soon to be de-listed contracts to their 'replacement' contracts. Currently, there are no such spreads listed on ASX Trade24.
3. The contract that is more established and/or traded. A wool inter-commodity spread (FW-GW or BW-GW) will always have GW as the dominant leg.

Ratios:

Inter-spreads are listed in the following way: CCMY (Contract Month Year - Leg 1) CCMY (Contract Month Year - Leg 2) Ratio (Leg 1) Ratio (Leg 2). The ratio assigned to the 1st leg is generally static (does not change), while the ratio for the second leg is calculated by the Exchange on a daily basis.

Examples:

- When selling 4 lots of the **XT**M8**YT**M8**1027** inter-commodity spreads. You are selling a total of 108 lots of the YT and buying 40 lots of the XT contract.
- When buying 8 lots of the **YT**M8**IR**M8**1820** inter-commodity spreads. You are buying 160 lots of the IR contract and selling 144 lots of the YT contract.

Pricing of Inter-Spreads:

The inter-spread market uses spread differential pricing. Differential pricing is based on the dominant (or 2nd leg) contract price minus the price of the 1st leg. The price differential can be a positive or a negative figure. A positive spread price indicates the dominant contract is priced higher than the 1st leg and vice versa.

Examples:

- XTM8 outright futures are offered at 94.055 and YTM8 outright futures are bid at 94.720. The XTM8YTM81027 spread would be trading at a positive (+) price differential of 0.665. The price 0.665 is the difference between YTM8 94.720 and XTM8 94.055

- XTM8 outright futures are bid at 94.450 and YTM8 outright futures are offered at 94.200. The XTM8YTM81027 spread would be trading at a negative (-) price differential of 0.250. The price -0.250 is the difference between YTM8 94.200 and XTM8 94.450

Inter Spreads - General Rules:

- As per normal order entry, inter spread orders can be set to retain or purge, tagged or non-tagged, shared or non-shared
- Inter-commodity spread orders can **NOT** be entered during Pre-Open or Price Discovery
- Inter-commodity spread orders do **NOT** support GTC and MLM order types
- Inter-commodity spread orders will maintain the same FIFO priority as outright futures orders.
- If either or both underlying contracts of an inter-commodity spread are subject to ASIC's Market Integrity Rules (MIR), the inter-spread order will be validated based on the rules in Volatility Controls.

Basis price for intra and inter spread trades:

When spread order trade against other spread orders, ASX Trade24 generate the resultant legs based on the concept of basis price.

Basis price is determined (in order of priority) by:

1. The midpoint of the bid and ask of the **dominant/near** contract.
2. The midpoint of the bid and ask in the **secondary/far** contract,
3. Any bid or ask in the **dominant/near** contract,
4. Any bid or ask in the **secondary/far** contract,
5. The AOT price, if defined and the **dominant/near** underlying contract is subject to MIR,
6. The AOT price, if defined and the **secondary/far** underlying contract is subject to MIR,
7. Prior settlement price of the **dominant/near** contract.

Table 1: Sample of Inter-Commodity spreads listed on ASX TRADE24

Spread	Ratio*	Market	Dominant Leg
XT-YT	10:30	Sydney only	YT
XX-XT	14:10	Sydney only	XT
YT-IR	18:20	Sydney only	IR
GN-BN	1:1	Sydney only	BN
GQ-BQ	1:1	Sydney only	BQ
GS-BS	1:1	Sydney only	BS
GV-BV	1:1	Sydney only	BV
TN-TY	10:30	New Zealand only	TY

Note:
*Ratios are indicative only and may vary.

2.9. Volatility Controls

From May 2014 ASX introduced a range of volatility controls to equity futures contracts traded on ASX Trade24. The volatility controls were introduced to meet ASIC Market Integrity Rules. The controls include ETR, AOT and Regulatory Halt and apply to the following index contracts:

- ASX SPI 200™ index futures (AP)
- S&P/ASX 200 Resources index futures (AR)
- S&P/ASX 200 Financials-x-A-REIT index futures (AF)
- S&P/ASX 200 A-REIT index futures (AA)

2.9.1. Extreme Trade Range (ETR)

The Extreme Trade Range (ETR) sets the upper and lower price boundaries for a contract in a given trading session. The ETR will be set 5% from the ETR/AOT reference price. The ASX 24 Operating Procedures contain further information on ETR ranges.

2.9.2. Anomalous Order Threshold (AOT)

The Anomalous Order Threshold (AOT) prevents aggressive orders from entering the market outside the allowed range. The range is based on a dynamic reference price (refer to the ASX 24 Operating Procedures). The AOT range is set 0.5% from the ETR/AOT reference price. The ETR/AOT reference price is a moving average and is recalculated at regular intervals.

Custom Market

For custom market orders the price is an outright price for each leg, if the AOT is set for a certain leg then the price of leg must be AOT-Lower >= price <= AOT-Upper for that leg. If any leg, where AOT is enforced, fails the price limit check, then the entire custom order will be rejected. For legs that aren't subject to the AOT price limits, then normal validation rules will apply.

Spread Orders

Intra- and Inter-spread orders will apply price limits in a similar manner as outright orders. Given that spread orders are differentials, the price limits are based on the difference between the near and far AOT limits set for each leg (see chart below for more detail).

The basic premise for spread price validation is to limit the ask or bid spread price such that it can't generate an implied outright price that exceeds the price limit rules. Since spreads are differential prices it is impossible to completely limit the ability to suppress all cases, so there is some levity allowed for spread orders.

For intra-spreads, if the AOT is not defined, then normal price validation rules will apply.

For inter-spread orders, like custom market orders, there can be one leg subject to AOT price limits and the second not (and vice versa), in this case if the AOT price limit fails on one or both legs, then the entire order is rejected.

Spread-to-Spread Trades

If there is no ask or bid price to base a trade leg price upon and the AOT is defined, for either leg, the trade price will be based on the AOT instead of the prior day settlement price.

For spread-to-spread trading, provided the spread price is within the price limits for the aggressive spread order, the trade prices of the other underlying contracts can be outside the AOT price limits. This is to avoid trade leg price adjustments where forcing all legs to be within the AOT could distort the price by not reflecting the movement of the market.

Table 2: Price limit checks for the spread order type

Condition IF AOT set AND	Reject Spread BID Order IF
No Near Ask AND No Far Bid	Spread Bid price > (Near AOT-UR) – (Far AOT-LR)
Near Ask defined	Underlying Near Ask < Near AOT-Lower OR Underlying Near Ask – Spread bid price < Far AOT-Lower
Far Bid defined	1. Underlying Far Bid > Far AOT-UR 2. OR Underlying Far Bid + Spread bid price > Near AOT-Upper
Condition IF AOT set AND	**Reject Spread ASK Order IF**
No Near Bid AND No Far Ask	Spread Ask price < (Near AOT-Lower) – (Far AOT-Upper)
Near Bid defined	Underlying Near Bid > Near AOT-Upper

	OR Underlying Near Bid – Spread Ask price > Far AOT-Upper
Far Ask is defined	Underlying Far Ask < Far AOT-Lower OR Underlying Far Ask + Spread Ask price < Near AOT-Lower

2.9.3. Regulatory Halt

A Regulatory Halt Session State is applied to reset the ETR/AOT reference price in the event of erroneous trading. In the event of any Regulatory Halt, any spread orders and custom orders related to the halted product will be purged.

2.10. Packs and Bundles

Packs and Bundles are products on the Australian 90 Day Bank Bill Futures contracts. Packs are based on four consecutive 90 Day Bank Bill Futures contracts and Bundles are based on either 8 or 12 consecutive 90 Day Bank Bill Futures contracts.

Prices for Packs and Bundles are quoted as an average of the respective underlying leg prices.

There is no pricing interaction with the underlying outright 90 Day Bank Bill Futures, i.e. implied IN or implied OUT pricing will not be distributed and there will be no internal implied pricing generated for matching.

Executing a Pack or Bundle product results in an allocation in 4, 8 or 12 underlying Bank Bill Futures contracts. The Pack or Bundle itself is not cleared, instead the underlying Bank Bill Futures contracts will be priced and allocated for clearing purposes.

The matching engine will distribute an execution report of the executed Pack or Bundle and a text message for each allocated underlying outright leg to the participant's party to the trade.

2.10.1. Leg Trade Price

The prior day settlement prices of the underlying futures contract will be used as a starting point and adjusted by a price adjustment factor to achieve an implied Pack or Bundle price which approximates the price of the executed underlying futures contracts.

Price adjustments will be made via a consistent proportional price movement from the prior day settlement prices with the exception that the underlying futures contract with the longest dated expiry will be further adjusted to achieve the Pack or Bundle price.

2.10.2. Leg Price Confirmation Notices

When a Pack or Bundle is matched, the matching engine will report the trade of the Pack or Bundle with the pricing and volume as derived from the orders matched, and a subsequent set of text messages detailing the outright contract, pricing and volume for each leg of the Pack or Bundle.

Each participant party to the trade will receive the following FIX messages:

1. A FIX Execution Report (35=8) indicating the Pack or Bundle, the price and the volume matched.
2. A FIX User Text Message (35=U, 5001=16) with the following tags set:
    a. 5049 will be set to "PCKSVR" indicating this is Packs and Bundles text message
    b. 5050 will be set to the message formatted as follows:

[Exchange] **Deal** [Trade number] [Time] [Contract] **@** [Pack Price] **Leg** [Number]:[Leg Contract] [Volume] **Lots** [Leg Price] **Deal:**[Generated Deal #] [Buy/Sell indicator]

Where,

- Exchange – Is 'SFE'
- Trade Number – The original trade number Pack or Bundle deal as reported by the matching engine
- Date and Time – As generated by the pricing module in format YYYYMMDDHHMMSS
- Contract – Pack or Bundle product code

- Pack Price – The executed Pack or Bundle price (decimal adjusted)
- Number – The leg index (for packs: 1-4, for bundles:1-8 or 1-12)
- Leg Contract – The underlying contract code
- Volume – Number of lots matched
- Leg Price – Price of the leg as calculated by the pricing module (price is decimal adjusted)
- Generated Deal # – The deal number from the pricing module
- Buy/Sell indicator

Note:
The ITCH24 will report the Pack or Bundle as an anonymous trade; However, the text messages will only be distributed to the owner of each side of the trade, i.e. the buyer will receive the buy notices, and the seller will receive the sell notices.

Sample message contents are as follow:

For Packs

```
8=FIX.4.0!...!5001=16!5048=0!5049=PCKSVR!5050=SFE Deal 50000 20140929161039
WPH5 @ 96.900 Leg 1:IRH5 1000 Lots @ 97.420 Deal:750041 B!10=xxx
```

For the remaining 3 text messages, tag 5050 will contain the following:

```
SFE Deal 50000 20140929161039 WPH5 @ 96.900 Leg 2:IRM5 1000 Lots @ 97.110
Deal:750042 B
SFE Deal 50000 20140929161039 WPH5 @ 96.900 Leg 3:IRU5 1000 Lots @ 96.740
Deal:750043 B
SFE Deal 50000 20140929161039 WPH5 @ 96.900 Leg 4:IRZ5 1000 Lots @ 96.330
Deal:750044 B
```

For Bundles

```
8=FIX.4.0!...!5001=16!5048=0!5049=PCKSVR!5050=SFE Deal 51000 20140929161039
RBH5 @ 95.620 Leg 1:IRH5 1000 Lots @ 96.620 Deal:750061 S!10=xxx
```

For the remaining 7 text messages, tag 5050 will contain the following:

```
SFE Deal 51000 20140929173500 RBH5 @ 95.62 Leg 2:IRM5 1000 Lots @ 95.81
Deal:750062 S
SFE Deal 51000 20140929173500 RBH5 @ 95.62 Leg 3:IRU5 1000 Lots @ 95.71
Deal:750063 S
…
SFE Deal 51000 20140929173500 RBH5 @ 95.62 Leg 8:IRU6 1000 Lots @ 95.47
Deal:750068 S
```

Note:
It is possible to receive other FIX messages between the original Pack or Bundle execution report and the corresponding FIX text messages.

3. Appendix

3.1. Depth of Market / MLM

AA	Commodity Future	Market Depth:	5
AP	Commodity Future	Market Depth:	5
AF	Commodity Future	Market Depth:	5
AR	Commodity Future	Market Depth:	5
BB	Commodity Future	Market Depth:	3
BN	Commodity Future	Market Depth:	3
BQ	Commodity Future	Market Depth:	3
BS	Commodity Future	Market Depth:	3
BV	Commodity Future	Market Depth:	3
BW	Commodity Future	Market Depth:	3
CT	Commodity Future	Market Depth:	3
CX	Commodity Future	Market Depth:	5
CY	Commodity Future	Market Depth:	1
CZ	Commodity Future	Market Depth:	1
DN	Commodity Future	Market Depth:	3
DQ	Commodity Future	Market Depth:	3
DS	Commodity Future	Market Depth:	3
DV	Commodity Future	Market Depth:	3
EA	Commodity Future	Market Depth:	5
EB	Commodity Future	Market Depth:	3
EE	Commodity Future	Market Depth:	5
EF	Commodity Future	Market Depth:	3
ED	Commodity Future	Market Depth:	3
EH	Commodity Future	Market Depth:	3
EC	Commodity Future	Market Depth:	3
EG	Commodity Future	Market Depth:	3
EN	Commodity Future	Market Depth:	3
EQ	Commodity Future	Market Depth:	3
ES	Commodity Future	Market Depth:	3
EV	Commodity Future	Market Depth:	3
GN	Commodity Future	Market Depth:	5
GQ	Commodity Future	Market Depth:	5
GS	Commodity Future	Market Depth:	5
GV	Commodity Future	Market Depth:	5
GX	Commodity Future	Market Depth:	5
GY	Commodity Future	Market Depth:	1
HN	Commodity Future	Market Depth:	3
HQ	Commodity Future	Market Depth:	3
HS	Commodity Future	Market Depth:	3
HV	Commodity Future	Market Depth:	3
IB	Commodity Future	Market Depth:	5
IR	Commodity Future	Market Depth:	3
IS	Commodity Future	Market Depth:	5
OI	Commodity Future	Market Depth:	5
PN	Commodity Future	Market Depth:	3
PQ	Commodity Future	Market Depth:	3
PS	Commodity Future	Market Depth:	3
PV	Commodity Future	Market Depth:	3
RN	Commodity Future	Market Depth:	1
RQ	Commodity Future	Market Depth:	1
RS	Commodity Future	Market Depth:	1
RV	Commodity Future	Market Depth:	1
SE	Commodity Future	Market Depth:	3
TN	Commodity Future	Market Depth:	3
TY	Commodity Future	Market Depth:	3
UA	Commodity Future	Market Depth:	5
UB	Commodity Future	Market Depth:	3
US	Commodity Future	Market Depth:	3
VC	Commodity Future	Market Depth:	3
VI	Commodity Future	Market Depth:	5
VW	Commodity Future	Market Depth:	3
WK	Commodity Future	Market Depth:	3
XS	Commodity Future	Market Depth:	5
XT	Commodity Future	Market Depth:	5
XX	Commodity Future	Market Depth:	5
YT**	Commodity Future	Market Depth:	3
YS	Commodity Future	Market Depth:	5
ZO	Commodity Future	Market Depth:	5

Note:
There is no market depth set on options or inter spread contracts.
Intra spreads have the same market depth as the underlying future.

** The depth of the YT contract can vary between 3 levels when the Minimum Price Movement (MPM) is 0.01 and 5 levels when the MPM is 0.005. Please refer to the contract specification for more details in the MPM.

3.2. Fractional Indicator Table

Exchange	Commodity Name	Commodity Code	Futures Fractional Indicator	Options Fractional Indicator
SFE	S&P/ASX 200 A-REIT Index Future	AA	1	-
SFE	S&P/ASX 200 Financials-x-A-REIT Index Future	AF	1	-
SFE	S&P 200 Share Price Index	AP	1	1
SFE	S&P/ASX 200 Resources Index Future	AR	1	-
SFE	ASX Mini SPI 200 Index Futures	AM	2	2
SFE	ASX Electricity Base Load Quarterly Futures NSW	BN	2	2
SFE	ASX Electricity Base Load Quarterly Futures QLD	BQ	2	2
SFE	ASX Electricity Base Load Quarterly Futures SA	BS	2	2
SFE	ASX Electricity Base Load Quarterly Futures VIC	BV	2	2
SFE	ASX Electricity Peak Load Strip Futures NSW	DN	2	-
SFE	ASX Electricity Peak Load Strip Futures QLD	DQ	2	-
SFE	ASX Electricity Peak Load Strip Futures SA	DS	2	-
SFE	ASX Electricity Peak Load Strip Futures VIC	DV	2	-
SFE	ASX Electricity Base Load Monthly Futures NSW	EN	2	-
SFE	Renewable Energy Certificate (REC)	EO	2	2
SFE	ASX Electricity Base Load Monthly Futures QLD	EQ	2	-
SFE	ASX Electricity Base Load Monthly Futures SA	ES	2	-
SFE	ASX Electricity Base Load Monthly Futures VIC	EV	2	-
SFE	ASX Electricity Base Load $300 Cap Quarterly Futures NSW	GN	2	-
SFE	ASX Electricity Base Load $300 Cap Quarterly Futures QLD	GQ	2	-
SFE	ASX Electricity Base Load $300 Cap Quarterly Futures SA	GS	2	-
SFE	ASX Electricity Base Load $300 Cap Quarterly Futures VIC	GV	2	-
SFE	Victorian Wholesale Gas Futures	GX	2	-
SFE	Victorian Wholesale Gas Strip Futures	GY	2	-
SFE	ASX Electricity Base Load Strip Futures NSW	HN	2	2
SFE	ASX Electricity Base Load Strip Futures QLD	HQ	2	2
SFE	ASX Electricity Base Load Strip Futures SA	HS	2	2
SFE	ASX Electricity Base Load Strip Futures VIC	HV	2	2
SFE	30 Day Inter Bank Cash Rate	IB	3	3
SFE	90 Day Bank Bills	IR	3	3
SFE	30 Day Inter Bank Cash Rate Strip	IS	3	-
SFE	3 Month Overnight Index Swap	OI	3	-
SFE	ASX Electricity Peak Load Quarterly Futures NSW	PN	2	2
SFE	ASX Electricity Peak Load Quarterly Futures QLD	PQ	2	2
SFE	ASX Electricity Peak Load Quarterly Futures SA	PS	2	2
SFE	ASX Electricity Peak Load Quarterly Futures VIC	PV	2	2

Exchange	Commodity Name	Commodity Code	Futures Fractional Indicator	Options Fractional Indicator
SFE	ASX Electricity Base Load $300 Cap Strip Futures NSW	RN	2	-
SFE	ASX Electricity Base Load $300 Cap Strip Futures QLD	RQ	2	-
SFE	ASX Electricity Base Load $300 Cap Strip Futures SA	RS	2	-
SFE	ASX Electricity Base Load $300 Cap Strip Futures VIC	RV	2	-
SFE	AU/US 10 yr Bond Spread Futures	UA	2	-
SFE	Eastern Australian Feed Barley	UB	2	2
SFE	Australian Sorghum	US	2	2
SFE	Eastern Australian Canola	VC	2	2
SFE	S&P/ASX 200 VIX Future	VI	3	-
SFE	NSW Wheat	VW	2	2
SFE	WA Wheat	WK	2	2
SFE	Eastern Australian Wheat	WM	2	2
SFE	10-Year Bonds Intra Day Option	XD	-	3
SFE	10-Year Bonds Overnight Option	XO	-	3
SFE	10-Year Interest Rate Swap	XS	3	-
SFE	10-Year Bonds 6% Coupon	XT	4	3
SFE	20-Year Bonds 4% Coupon	XX	4	-
SFE	3-Year Bonds Intra Day Option	YD	-	3
SFE	3-Year Bonds Overnight Option	YO	-	3
SFE	3-Year Interest Rate Swap	YS	3	-
SFE	3-Year Bonds 6% Coupon	YT	3	3
NZFOE	90 Day Bank Bill	BB	2	2
NZFOE	ASX NZ Electricity Base Load Quarterly Futures (Otahuhu)	EA	2	2
NZFOE	ASX NZ Electricity Base Load Strip Futures (Otahuhu)	EB	2	2
NZFOE	ASX NZ Electricity Base Load Quarterly Futures (Benmore)	EE	2	2
NZFOE	ASX NZ Electricity Base Load Strip Futures (Benmore)	EF	2	2
NZFOE	10-Yr Govt Stock	TN	2	2
NZFOE	3-Yr Govt Stock	TY	2	2
NZFOE	30 Day Bank Bill	ZO	3	-
NZFOE	ASX NZ Electricity Base Load Monthly Futures (Otahuhu)	ED	2	2
NZFOE	ASX NZ Electricity Base Load Monthly Futures (Benmore)	EH	2	2
NZFOE	ASX NZ Electricity Peak Load Quarterly Futures (Otahuhu)	EC	2	2
NZFOE	ASX NZ Electricity Peak Load Quarterly Futures (Benmore)	EG	2	2

3.3. Packs and Bundles Table

Exchange	Commodity Name	Commodity Code	Underling Futures Code	Underling Contract Months
SFE	White Pack on 90 Day Bank Bill Futures	WP	IR	Spot, 2nd, 3rd, 4th
SFE	Red Pack on 90 Day Bank Bill Futures	RP	IR	5th, 6th, 7th, 8th
SFE	Green Pack on 90 Day Bank Bill Futures	GP	IR	9th, 10th, 11th, 12th
SFE	2nd Year Bundle on 90 Day Bank Bill Futures	RB	IR	Spot, 2nd to 8th
SFE	3rd Year Bundle on 90 Day Bank Bill Futures	GB	IR	Spot, 2nd to 12th

3.4. Change History

Date	Version	Author	Notes
1 Oct 2014	1.0	DH	Expanded explanation for AOT, Packs & Bundles, Added AA commodity to Fractional Indicator and Depth of Market Table Added AA to Volatility Control products
14 Jan 2015	1.1	NH	Amended XT Fractional Indicator
27 Aug 2015	1.1.2	NH	Added XX Contract
20 June 2016	1.1.3	RA	Added WM Fractional Indicator Corrected EA and EE Options Fractional Indicator