

NASDAQ Futures, Inc. (NFX) Tailor Made Combinations Reference Guide

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1 INTRODUCTION

The Trading System supports the trading of Strategies also referred to as Combination Orders, which will trade in a separate Combination Order Book. The Exchange may list pre-populated, standardized Combination Orders. Users may create their own custom or tailor made combination (TMC) for combinations not already defined in the Trading System. User-defined TMCs may be initiated intraday, but some are not immediately available for trading (implementation is generally by the conclusion of the following Open Session). For both Combination Orders and Tailor Made Combination Orders, the Orders may only consist of a combination of Futures or Options. A Combination Order may not consist of a Futures and an Options contract. Combination Orders consisting solely of Call or Put Options of the same underlying and Expiry but with different strikes must include at least one buy and one sell leg. Market participants may submit Combination Orders that, if matched, will simultaneously trade the referenced single leg Instruments according to the specified strategy without execution risk. Once implemented, the TMC Orders will be visible in the Combination Order Book to the entire market and lives throughout its defined lifetime from one to ten days (or less than the originally defined period if a single leg expires). Orders and Mass Quotes are permitted in Combination Order Books. Mass Quotes will be accepted in the Combination Order Book as long as the one or two-sided Quote is limited to one (1) Instrument.

1.1 FACTS

| | |
|-------------------------------|--|
| Instruments | A TMC Order may be comprised of a minimum of two Futures or Options, but not Futures and Options, but not exceed four Instruments within the same or from different underlying Instruments. A TMC comprised of futures contracts must have a relative ratio of 1:1 between the included Instruments. An Options based TMC may have a relative ratio of up to 4:1. Inter-Commodity Spreads may be formed with a minimum of two Instruments but may not exceed four Instruments. |
| No Execution | Strategies that are TMC or pre-defined Combination Orders; all Instruments will be simultaneously executed at a net price without execution risk, for each Instrument respectively including underlying legs. |
| Price | The price for an Order shall be stated as a common net price, i.e. the premium times the ratio for the Instrument to be bought minus the premium times the ratio for the Instrument to be sold. |
| Combination Order Book | When the TMC Order is created, it will appear in a Combination Order Book which is visible to the entire market. |
| Easy to Use | Users create the TMC Order by defining the Instruments, Expiry and Contract. A User would then identify the ratio between the Instruments as well as the number of contracts and the net price. |
| Implied-In Orders | Implied-in Order prices are automatically calculated by the Trading System but are not published. When a TMC Order is entered, the Order will be matched in the Order Book utilizing Implied-In Order prices from the respective leg Order Book. |
| Implied-Out Orders | Implied-Out Orders are not generated by the Trading System. |

2 CREATING A TMC

The creation of a TMC Order Book is initiated by the Authorized Trader (User) who submits a request with the Expiry, Contract and Instrument. The Order must also specify the ratios relative to the Combination Order quantity and, for each leg, its relative side to the Combination Order (as defined or opposite). A TMC Order Book is allowed to have up to four legs and each leg is allowed a ratio relative to the order quantity. In the case of Futures TMCs, the ratio must be from one to one. TMCs comprised of options may have a ratio of 1:4. It is possible to combine different Contract Instruments (which may have different underlying contract specifications) as long as the Orders meet the former criteria. An example of a TMC Order would be an Order to buy June NFX WTI Crude Oil Penultimate Financial Futures (TQ), sell June NFX Brent Crude Financial Futures (BFQ).

2.1 FIX MESSAGE REFERENCE

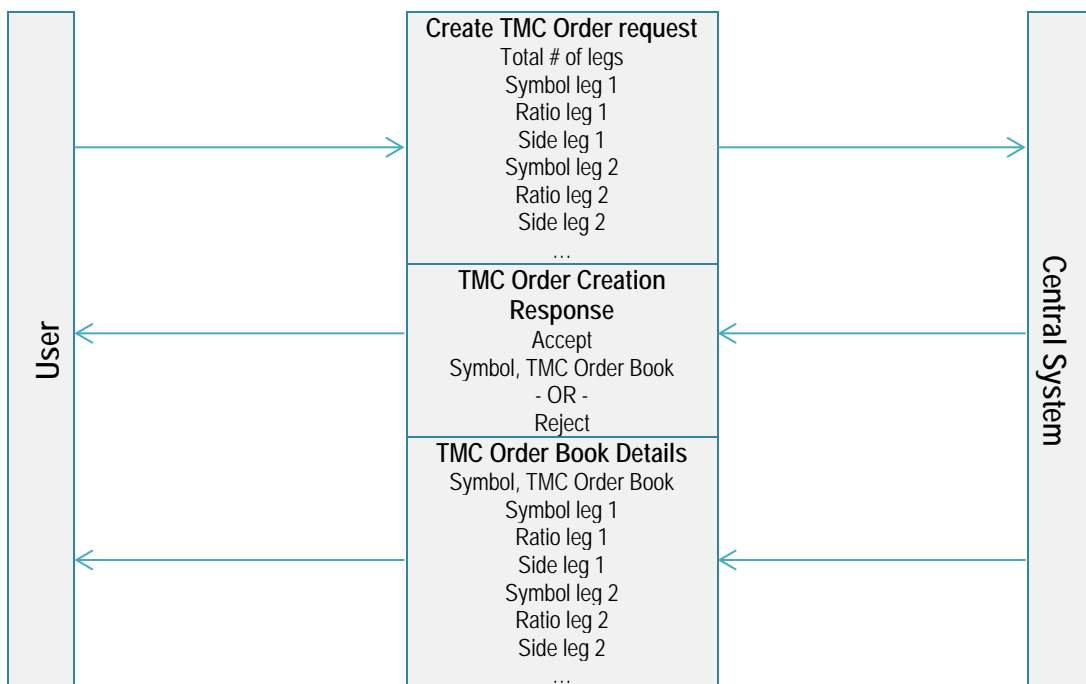
| Operation | FIX |
|------------------------|--|
| Create TMC Request | Security definition request (in), MsgType=c |
| TMC Creation Response | Security definition – registration response (out), MsgType=d |
| TMC Order Book Details | Security definition update report (out), MsgType=BP |

2.2 WORKFLOW

Requests to create a new TMC Order Book shall be submitted via the FIX interfaces during the Open Session. The Trading System evaluates such requests and either: (i) creates the TMC Order Book according to the market standard with re-sorted legs; or (ii) the Trading System would communicate that an Order Book exists, pre-defined or user-defined, meeting the submitted criteria. The Trading System will always sort legs for new TMC Order books in the following order:

1. Product type: Future before call Option before put Option;
2. Expiry: longer maturity before shorter; and
3. Price call: lower strike before higher, put: higher strike before lower.

Also, the Trading System will always create the first leg's side in the above order. A Combination Order may be displayed in a different order by the Trading System when compared to the submitted request.



2.2.1 Examples

Example 1 – Order Book created as defined using NFX Options on WTI Crude Oil Penultimate Futures – TOQ

User requests a new TMC Order Book (Options call spread) to be created.

1. TOQ December 2017 80 calls – ratio 1, side as defined
2. TOQ December 2017 85 calls – ratio 1, opposite side

The Trading System accepts the requests, creates the TMC Order Book accordingly and communicates the new Order Book and leg details.

Example 2 – TMC Order Book created with respective legs re-sorted

User requests a new TMC Order Book (Calendar Options Spread) to be created. If buying the combination:

1. TOQ December 2017 80 calls – ratio 1, side as defined
2. TOQ March 2018 80 calls – ratio 1, opposite side

The Trading System accepts the requests but creates the TMC Order Book according to market standard, and communicates the new TMC Order Book with re-sorted leg details:

1. TOQ March 2018 80 calls – ratio 1, side as defined
2. TOQ December 2017 80 calls – ratio 1, opposite side

Example 3 – TMC Order Book created reversed and with legs re-sorted

User requests a new TMC Order Book (Butterfly Options Spread) to be created.

1. TOQ December 2017 80 calls – ratio 1, opposite side
2. TOQ December 2017 90 calls – ratio 1, opposite side
3. TOQ December 2017 85 calls – ratio 2, side as defined

The Trading System accepts the requests but creates the TMC Order Book according to market standard and reverses the Orders such that the Combination Order will buy the first leg. The Trading System communicates the new reversed TMC Order Book with re-sorted leg details:

1. TOQ December 2017 80 calls – ratio 1, side as defined
2. TOQ December 2017 85 calls – ratio 2, opposite side
3. TOQ December 2017 90 calls – ratio 1, side as defined

Example 4 – TMC Order Book requested and rejected

User requests a new TMC Order Book (Futures Time Spread) to be created.

1. TQ December 2017 futures – ratio 1, side as defined
2. TQ November 2017 futures – ratio 1, opposite side

The Trading System accepts the requests but does not create the Order Book; instead it communicates the identical pre-defined Futures Time Spread Order Book.

3 TRADING A TMC

Once a TMC Order Book has been created, working Orders can be entered, modified, and deleted using the standard order entry messages via FIX. Such Orders can either be matched against opposing Orders in the TMC Order Book, or with Orders and Quotes in the respective leg Single Order Books. All legs of the respective Order will be matched according to the defined ratios.

3.1 FIX MESSAGE REFERENCE

| Operation | FIX |
|----------------------------|--|
| Add TMC Order | New Order single (in), MsgType=D |
| Modify TMC Order | Order cancel replace request (in), MsgType=G |
| Delete TMC Order | Order cancel request (in), MsgType=F |
| TMC Order & execution info | Execution report (out), MsgType=8 |

3.2 ORDER MANAGEMENT

Orders in TMC Order Books are placed and modified with the standard Order entry messages. The Order price shall be given using the net price method meaning the sum of price multiplied by ratio for all legs. For Combination Orders (bid/ask), the price of a leg (buy) shall be added, and the price of a sold leg (sell) is subtracted.

$$Combo Bid = \sum_b Qty_b \times Ratio_b - \sum_s Qty_s \times Ratio_s$$

$$Combo Ask = \sum_s Qty_s \times Ratio_s - \sum_b Qty_b \times Ratio_b$$

Where 'b' is each leg the Order is buying, and 's' is each leg the Order is selling.

That is, the Order price of a TMC Order is a **positive value** when

- The user is placing a bid and is willing to pay or;
- The user is placing an offer and wants to be paid.

The Order price of a TMC Order is a **negative value** when

- The user is placing an offer and is willing to pay or;
- The user is placing a bid and wants to be paid.

The quantity of a TMC Order will reflect the number of units at which the Combination Order will trade. One unit of a Combination Order trades one times the ratio of each leg. For example, if the TMC Order "A/2B" has been created as 1 "A" as defined, and 2 "B" opposite, then a bid Order with quantity 10 lots will if fully matched buy 10 "A", and sell 20 "B".

Only Limit Orders can be placed in TMC Order Books, and only with the time validity designated as a ~~Day~~ Order since the Order Books are removed end of the trading day.

Unlike for outright Instruments, 0.00 (zero) is a valid price on TMC Orders. Users may place Orders in TMC Order Books with an Order price of 0.00. User may not modify an existing Order to a price of 0.00. When such modification is desired, the User must cancel the existing Order and then enter the modified order with a price of 0.00.

Orders in TMC Order Books are removed with the standard order entry messages. For example, when a User submits a request to the Trading System to remove all of its existing Orders with underlying "CLQ," those Orders in TMC Order Books with CLQ as an underlying Instrument will also be removed. Where the TMC Order Book combines two different underlying Instruments (e.g. CLQ and HOQ Options), the TMC Order Book will be connected to the first ranked leg's

underlying Instrument (in this case CLQ) and include that symbol in mass-cancellations for Orders. For example, Orders with the underlying CLQ would be canceled, but not HOQ Orders.

User-designated Order and execution info messages reference the TMC Order Book symbol and/or binary code when confirming the new combination net price and/or quantity. For execution info messages, the traded leg instruments are also referenced confirming the outright prices and quantities. Trade drop copies are never sent for the TMC Order Book itself, but only for the traded legs. For reconciliation purposes, the MatchID in execution/trade info will be the same for the TMC Order and the outright symbols.

3.2.1 Implied-In Matching

Although the Trading System does not publish Implied-In Orders coming out of respective leg Order Books into the TMC Order's, Implied-In matching is supported and will be prioritized ahead of matching combination Orders within the TMC Order Book.

Example 7 – Implied-In matching

Given the TMC Order 'A/B' trading leg 'A' (side as defined) and 'B' (opposite side)

| Combo Bid | A/B | | Combo Ask |
|---------------------|-----|-----------------------------------|---------------------|
| Buy 1 A Sell 1 B | | (Ask 50 @ 7.50) Ask 100 @ 8.50 | Sell 1 A Buy 1 B |

| A | | B | |
|----------------|----------------------------------|---|---------------|
| Bid 50 @ 10.00 | Ask 50 @ 12.50 Ask 50 @ 13.75 | Bid 50 @ 5.00 (Bid 50 @ 2.50) ¹ | Ask 50 @ 6.25 |

The existing offer in 'A' and bid in 'B' creates a non-disclosed **Implied-In offer of 50 @ 7.50** in 'A/B'.

Since Implied-In matching will be prioritized, entering a bid in 'A/B of 10 @ 7.50 would simultaneously be traded against the outright Orders in 'A' and 'B' creating the below trades

| Market Data |
|----------------|
| A/B, 10 @ 7.50 |
| A, 10 @ 12.50 |
| B, 10 @ 5.00 |

Leaving the resulting Order Books

| Combo Bid | A/B | | Combo Ask |
|---------------------|-----|-----------------------------------|---------------------|
| Buy 1 A Sell 1 B | | (Ask 40 @ 7.50) Ask 100 @ 7.50 | Sell 1 A Buy 1 B |

| A | | B | |
|----------------|----------------------------------|----------------------------------|---------------|
| Bid 50 @ 10.00 | Ask 40 @ 12.50 Ask 50 @ 13.75 | Bid 40 @ 5.00 (Bid 50 @ 2.50) | Ask 50 @ 6.25 |

¹ Not published since outside allowed price deviation range

3.2.2 Matching Within TMC Order Book

When matching Orders against each other within the TMC Order Book, the Trading System calculates the individual trade prices in the leg using among others the outright BBO as reference.

Example 8 – Implied-In matching

Given the TMC Order 'A/B' trading leg 'A' (side as defined) and 'B' (opposite side)

| Combo Bid | A/B | | Combo Ask |
|---------------------|-----|--|---------------------|
| Buy 1 A Sell 1 B | | Ask 100 @ 5.00 (Ask 50 @ 7.50) | Sell 1 A Buy 1 B |

| A | | B | |
|----------------|----------------------------------|---|---------------|
| Bid 50 @ 10.00 | Ask 50 @ 11.50 Ask 50 @ 12.50 | Bid 50 @ 5.00 (Bid 50 @ 5.00) | Ask 50 @ 6.25 |

Entering a bid in 'A/B' of 25 @ 5.00 would be traded against the existing TMC Order in 'A/B' creating the below trades

| Market Data |
|----------------|
| A/B, 25 @ 5.00 |
| A, 25 @ 10.75 |
| B, 25 @ 5.75 |

Leaving the resulting Order Books

| Combo Bid | A/B | | Combo Ask |
|---------------------|-----|---|---------------------|
| Buy 1 A Sell 1 B | | Ask 75 @ 5.00 (Ask 50 @ 7.50) | Sell 1 A Buy 1 B |

| A | | B | |
|----------------|----------------------------------|---------------------------------------|---------------|
| Bid 50 @ 10.00 | Ask 50 @ 11.25 Ask 50 @ 12.50 | Bid 50 @ 5.00 Bid 50 @ 5.00 | Ask 50 @ 6.25 |

3.3 ORDER ENTRY USING "PAY/RECEIVE PRINCIPLE"

To make the TMC Order functionality efficient to use in trading front-ends, NFX recommends implementing a TMC Order entry feature/window separate from normal Order entry. Combining the creation of TMC Orders with Order entry enables the possibility for end-users to enter Orders according to the "pay/receive principle." The Pay/receive principles specifies: the respective legs to be included in the TMC Order; whether each respective leg is a buy or sell Order; and whether the User should pay or receive the net premium. The front-end determines whether a Combination Order bid or ask should be entered and also whether the net price should be positive or negative.

In practice, these results can be achieved by letting the end-User select outright Contract symbols to include in the TMC Order from a drop-down menu, adding a symbol by pressing 'buy' or 'sell'. Regardless of the Order, the User adds trading symbols, the front-end sorts the trading symbols to be included in the strategy according to the market standard. Here it should also be possible to set the ratio per respective leg as a number between one and four. It shall be possible to specify a net premium, equal to or larger than zero, and quantity for the Combination Order and the Order is then finally initiated by the User pressing either 'send pay' or 'send receive'.

The trading front-end shall submit the TMC Order to the Trading System which then creates the TMC- Order-request-message upon a user initiated 'send pay' or 'send receive' message, and awaits the TMC Order creation response and TMC Order book details messages. The TMC-Order-request-message shall contain the respective leg trading symbols sorted as outlined above with a side specified as:

| Leg Side | FIX |
|----------|----------------|
| Buy | LegSide(624)=B |
| Sell | LegSide(624)=D |

The TMC Order shall then be added in the Order Book. The symbol is communicated with the TMC Order creation response (user- or pre-defined) dependent on the TMC Order Book details message. If the respective leg info communicated back is identical to what was submitted, then:

- If user pressed 'send pay', enter bid with order price = premium
- If user pressed 'send receive', enter bid with order price = $-1 \times$ premium

Or else, if a reversed Combination Order Book has been created or is communicated, i.e. all buy legs have been switched to sell and vice versa (Trading System always creates first leg as defined), then:

- If user pressed 'send pay', enter ask with order price = $-1 \times$ premium
- If user pressed 'send receive', enter ask with order price = premium

4 REFERENCE & MARKET DATA

Public reference and market data for TMC Order Books are available with the ITCH multicast feed. Once a new TMC Order Book has been created, the market is notified by reference data updates. Existing Orders will be immediately available on the market data feed.

Empty TMC Order Books may be de-listed intra-day by an Exchange Official. In such a scenario, an Order Book details message is disseminated via FIX informing market participants about the update. New Orders will be rejected.

4.1 MESSAGE REFERENCE

| Operation | ITCH |
|--------------------------|---|
| Order Book details | Combination Order book directory, Message Type=M |
| TMC Order leg details | |
| Other (tick sizes, etc.) | Tick size table entry, Message Type=L |
| Market-by-level data | N/A |
| Market-by-order data | Add Order, Message Type=A Order executed, Message Type=E Order executed with price, Message Type=C Order replace, Message Type=U Order delete, Message Type=D |
| Trades | Trade, Message Type=P |

When a TMC Order is executed, trades are published both for the TMC Order symbol and the leg symbols.

Match within TMC Order Book

- Orders executed with price messages for the TMC Order symbol, with the printable flag set to N (to avoid double counting)
- Trade messages in the outright Order Books

Communication of TMC Order vs. outrights

- Orders executed, and/or Orders executed with price messages for the outright symbols
- Trade message for the TMC Order symbol, with the printable flag set to N (to avoid double counting)

When a TMC Order is executed, trades are published with the trading ticker message both for the TMC Order symbol and the respective leg symbols.

5 FURTHER READING

Please find protocol specifications and other technical documentation at: business.nasdaq.com/futures.



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