Top of Market

Version 4.00

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1. Overview

The NASDAQ Futures Exchange Top of Market data feed is a direct data feed product that features the following data elements:

- **Best Bid and Offer Quotations:** The NASDAQ Futures system will calculate and disseminate its best bid and offer position, with aggregated size, based on displayable order and quote interest in the NASDAQ Futures system. For bandwidth efficiency reasons, the feed will display Quotes as two sided if the bid and ask sides change, one sided if only one side changes.

- **Last Sale Data:** The NASDAQ Futures system will also disseminate trade messages (including electronically reported Block and EFRP trades) via this feed. Broken Trades are reported in the event that an NASDAQ trade transaction is broken on the same business day that it is reported.

- **Administrative and market event messages including:**

    - Timestamp messages to indicate the time of following messages on the stream.

    - Product Directory messages to be disseminated to relay basic symbol and contract information for products traded on the NASDAQ Futures market.

    - Trading action messages to inform NASDAQ Futures market participants when a specific symbol is halted or released for trading on NASDAQ Futures.

2. Architecture

The NASDAQ Futures Top feed will be made up of a series of sequenced messages. Each message is variable in length based on the message type and is composed of binary and alphanumeric data. The messages that make up this protocol are typically delivered using a higher level protocol that takes care of sequencing and delivery guarantees. NASDAQ Futures Top is an outbound market data feed only. The NASDAQ Futures Top protocol does not support order or quote entry.

The NASDAQ Futures system offers the NASDAQ Futures Top data feed in two protocol options:

Protocol Option	***Number of Outbound Channels***
SoupBinTCPv3.00	Multiple output channels, each channel supporting a subset of securities, the range defined by first letter of underlying
MoldUDP64v1.00	Multiple output channels, each channel supporting a subset of securities, the range defined by first letter of underlying

The feed is composed of 2 groups of Multicast or Soup channels: the "Q" Group, for Quote related information; and the "T" Group, for Trade related information.

Both the primary ("A feed") and secondary ("B feed") will be hosted by servers co-located with the trading system and will have identical performance characteristics. In fact the "A" and "B" feeds are logically identical: Mold or Soup messages will have the same Mold or Soup sequence numbers across all the streams.

Please note that NASDAQ Futures provides local redundancy in the NY Metro Area ("A" and "B" feeds), while using the Mid-Atlantic Region ("C" feed) for disaster recovery in the event order entry is switched from the NY Metro Area.

A complete set of alternate connection parameters are available for each Multicast Channel and TCP Connection in the event of a failure in any of the primary connections.

3. Data Types

All Alpha or Alphanumeric fields are left justified and padded on the right with spaces.

All Integer fields are unsigned big-endian (network byte order) binary encoded numbers unless otherwise specified. Integers may be 1, 2, 4 or 8 bytes long.

Prices are 4 byte or 8 byte Integer fields. When a 4 byte price is converted to a decimal format, prices are in fixed point format with 6 whole number places followed by 4 decimal digits. When an 8 byte price is converted to a decimal format, prices are in fixed point format with 10 whole number places followed by 8 decimal digits.

Time is expressed as two Integers, the number of seconds past midnight and a fractional (nanoseconds) portion.

4. Message Formats

This feed supports five basic types of messages:

- Time Events
- System Events
- Administrative Data and Market Events
- Best bid and offer updates
- Trade reports

Within the system event and administrative types, the NASDAQ Futures system may support multiple message formats as outlined below.

4.1. Timestamp Message

For bandwidth efficiency reasons, the timestamp for a message is divided into two pieces: the seconds portion and sub-seconds portion. The seconds portion of the timestamp appears in the Timestamp Message, any message on the stream following this message has this seconds portion of time until the next timestamp message. The format is as follows:

TIMESTAMP MESSAGE				
Name	***Offset***	***Length***	***Value***	***Notes***
Message Type	0	1	Alpha	"T" = Timestamp Message
Seconds	1	4	Integer	Number of seconds since midnight. All messages between this Timestamp Message and the next Timestamp Message will have this value of seconds in their timestamp.

This message is transmitted in both the "Q" and "T" groups.

4.2. System Event Message

The system event message type is used to signal a market or data feed handler event.
The format is as follows:

SYSTEM EVENT MESSAGE				
Name	***Offset***	***Length***	***Value***	***Notes***
Message Type	0	1	Alpha	"S" = System Event Message
Nanoseconds	1	4	Integer	The sub-second portion of the time, in nanoseconds (0-999999999). The second portion of the time is obtained from the most recent timestamp message.
Event Code	5	1	Alpha	Refer to System Event Codes below
Version	6	1	Integer	Version of this interface. Currently set to 4.
Sub-version	7	1	Integer	Sub-version of this interface. Currently set to 0.

SYSTEM EVENT CODES		
Code	***Explanation***	***When (typically)***
"O"	*Start of Messages.* This is always the first message sent in any trading day.	After ~6:00am
"S"	*Start of System Hours.* This message indicates that the NASDAQ Futures system is open.	7:00am
"E"	*End of System Hours.* This message indicates that the NASDAQ Futures system is now closed.	~5:30pm
"C"	*End of Messages*. This is always the last message sent in any trading day.	~5:35pm

This message is transmitted in both the "Q" and "T" groups.

4.3 Administrative Data

4.3.1 Directory Message

At the start of each trading day, NASDAQ Futures disseminates symbol directory messages for all active symbols in the NASDAQ Futures system.

DIRECTORY				
Name	***Offset***	***Length***	***Value***	***Notes***
Message Type	0	1	Alpha	"R" = Directory Message
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Product Type	5	1	Alpha	"F" = Future "O" = Option
Product ID	6	4	Integer	Product ID assigned daily, valid for trading day. Unique only when combined with Product Type
Symbol	10	6	Alphanumeric	Denotes the future or option symbol.
Expiration Date	16	4	Integer	option expiration in CCYYMMDD format
Explicit Strike Price	20	8	Integer	Explicit strike price. Refer to Data Types for field processing notes. Applicable for Product Type="O"
Option Type	28	1	Alpha	"C" = Call option "P" = Put option Applicable for Product Type="O"
Issue Symbol	29	13	Alphanumeric	Denotes the unique underlying issue symbol for the symbol, E.g., NAU
Tradable	42	1	Alpha	Denotes whether or not this symbol is tradable at NASDAQ Futures. The allowable values are: "Y" = symbol tradable "N" = symbol is not tradable
MPV	43	8	Integer	Minimum Price Variation for this symbol. All prices must be a multiple of this price.
Symbol Start Time	51	4	Integer	Timestamp in seconds when the symbol Starts trading
Symbol End Time	55	4	Integer	Timestamp in seconds when the symbol Ends trading
Issue Type	59	1	Byte	Provides Issue Type D=Commodity C=Currency I=Index F=ETF M=Metal E=Energy
Exec Algo	60	1	Byte	Execution Algorithm P=Price/Time R=Pro rata

Symbol Directory Notes:

1) **IMPORTANT:** The unique key for each product is the combination of the product type and the product ID. Product IDs are NOT unique across different product types.

2) The product directory messages are sent once per symbol, typically before the "Start of System Hours" System Event. Should it be necessary, intra-day updates to this message will be sent as they occur.
3) If a Trading Symbol is removed from the system intra-day, a new directory message will be sent with "Tradable" field set to "N". Any Orders/Quotes sent for this removed symbol will be rejected. All existing orders/quotes for this symbol will be purged.
4) NASDAQ Futures validates incoming orders/quotes prices against the MPV.
5) The symbol directory message is transmitted in both the "Q" and "T" groups.

4.3.2. Trading Action Message

The NASDAQ Futures system uses this administrative message to indicate the current trading status of a symbol within the NASDAQ Futures market.

Upon receipt of the Directory Message, the issue is initially in a trading state. The Trading Action Message is used to alter the trading state of the issue.

After the start of system hours, the options system will use the Trading Action message to relay changes in trading status for an individual security. Messages will be sent when an issue is halted or is released for trading.

Trading Action Message				
Name	***Offset***	***Length***	***Value***	***Notes***
Message Type	0	1	Alpha	"H" = Trading Action
Nanoseconds	1	4	Integer	The sub-second portion of the time, in nanoseconds (0-999999999). The second portion of the time is obtained from the most recent timestamp message.
Product Type	5	1	Alpha	"F" = Future "O" = Option
Product ID	6	4	Integer	Product ID assigned daily, valid for trading day. Unique only when combined with Product Type
Current Trading State	10	1	Alpha	Reflects the current trading state for the NASDAQ Futures symbol in the NASDAQ Futures market. The allowable values are: "H" = Halt in effect "T" = Trading on the NASDAQ Futures system B = Buy Side Trading Suspended –i.e. Buy orders are not executable) S = Sell Side Trading Suspended –i.e. Sell orders are not executable)

This message is transmitted in both the "Q" and "T" groups.

4.3.3. Symbol Status Message

The NASDAQ Futures uses this administrative message to indicate when a symbol is open and available for order entry and auto execution or when the option has closed and is no longer available for order entry or auto execution.

Symbol Status Message				
Name	***Offset***	***Length***	***Value***	***Notes***
Message Type	0	1	Alpha	"O" = Symbol Status
Nanoseconds	1	4	Integer	The sub-second portion of the time, in nanoseconds (0-999999999). The second portion of the time is obtained from the most recent timestamp message.
Product Type	5	1	Alpha	"F" = Future "O" = Option
Product ID	6	4	Integer	Product ID assigned daily, valid for trading day. Unique only when combined with Product Type
Open State	10	1	Alpha	Reflects the current eligibility for auto execution of the symbol. The allowable values are: Y = Open for auto execution N = Closed for auto execution S = Start of Order Entry E = End of Order Entry

This message is transmitted in both the "Q" and "T" groups.

Note: Recipients should continue to process the Trading Action message in order to determine if a symbol is in a Halt state for the day. A symbol open message should ***NOT*** override the Trading action message indicating if a symbol is halted. Recipients should use both messages in tandem to indicate if the symbol is halted and/or or open for auto execution.

4.4. Best Bid AND Ask Update – Short Form

The NASDAQ Futures system will continuously calculate its best bid and offer position for active symbols on NASDAQ Futures during the trading day. Whenever the best bid and ask position changes on both sides, the NASDAQ Futures system will send its best bid and ask update via the data feed for the affected symbol. A change in bid or ask implies a change in price and/or size. The quote will reflect the highest price displayable in the NASDAQ Futures system for buy orders/quotes and the lowest price displayable in the NASDAQ Futures system for sell orders/quotes.

If only one side of the quote changes, Best Bid OR Ask Update message will be sent for bandwidth efficiency reasons.

The Quote Condition applies to both the bid and ask sides. A quote condition of non-firm designates a quote bid or offer or both as non-executable.

There are two forms of the Best Bid AND Ask Update, the Short Form disseminates Prices using a 4 byte Integer field. Note that 4 byte Prices have four decimals. There is no loss in price precision when the short form message is used. The sizes are in 2 byte integer fields.

BEST BID AND ASK UPDATE – SHORT FORM				
Name	***Offset***	***Length***	***Value***	***Notes***
Message Type	0	1	Alpha	"q" = Short Form Best Bid AND Ask Update
Nanoseconds	1	4	Integer	The sub-second portion of the time, in nanoseconds (0-999999999). The second portion of the time is obtained from the most recent timestamp message.
Product Type	5	1	Alpha	"F" = Future "O" = Option
Product ID	6	4	Integer	Product ID assigned daily, valid for trading day. Unique only when combined with Product Type
Quote Condition	10	1	Alpha	<space> = regular quote/autox eligible "F" = Non-firm quote on both bid/ask sides "R" = Rotational quote – reserved for future use "X" = Ask side not firm, bid side firm "Y" = Bid side not firm, ask side firm
Bid Price	11	4	Integer	Best bid price. **NOTE:** When converted to a decimal format, this price is in fixed point format with 6 whole number places followed by 4 decimal digits.
Bid Size	15	2	Integer	Aggregated number of contracts currently displayed on the NASDAQ Futures bid
Ask Price	17	4	Integer	Best ask price. **NOTE:** When converted to a decimal format, this price is in fixed point format with 6 whole number places followed by 4 decimal digits.
Ask Size	21	2	Integer	Aggregated number of contracts currently displayed on the NASDAQ Futures ask.

This message is transmitted in the "Q" group only.

4.4.1. Best Bid AND Ask Update – Long Form

This message is the same as the Best Bid AND Ask Update Message – Short Form described above except that Prices are 8 byte Integers, the price having 8 implied decimal places. The Sizes are 4 byte integers.

BEST BID AND ASK UPDATE – LONG FORM				
Name	***Offset***	***Length***	***Value***	***Notes***
Message Type	0	1	Alpha	"Q" = Best Bid AND Ask Update
Nanoseconds	1	4	Integer	The sub-second portion of the time, in nanoseconds (0-999999999). The second portion of the time is obtained from the most recent timestamp message.
Product Type	5	1	Alpha	"F" = Future "O" = Option
Product ID	6	4	Integer	Product ID assigned daily, valid for trading day. Unique only when combined with Prodct_Type
Quote Condition	10	1	Alpha	<space> = regular quote/autox eligible "F" = Non-firm quote on both bid/ask sides Price is not executable. "R" = Rotational quote – reserved for future use "X" = Ask side not firm, bid side firm "Y" = Bid side not firm, ask side firm
Bid Price	11	8	Integer	Best bid price. **NOTE:** When converted to a decimal format, this price is in fixed point format with 10 whole number places followed by 8 decimal digits.
Bid Size	19	4	Integer	Aggregated number of contracts currently displayed on the NASDAQ Futures bid.
Ask Price	23	8	Integer	Best ask price. **NOTE:** When converted to a decimal format, this price is in fixed point format with 10 whole number places followed by 8 decimal digits.
Ask Size	31	4	Integer	Aggregated number of contracts currently displayed on the NASDAQ Futures ask.

This message is transmitted in the "Q" group only.

4.5. Best Bid OR Ask Update – Short Form

The NASDAQ Futures system will continuously calculate its best bid and offer position for active symbols on the NASDAQ Futures market during the trading day. Whenever the best bid or ask position changes on one side but not the other side, the NASDAQ Futures system will send its best bid or ask update via this feed for the affected symbol. A change in bid or ask implies a change in price and/or size. The quote will reflect the highest price displayable in the NASDAQ Futures system for buy orders/quotes and the lowest price displayable in the NASDAQ Futures system for sell orders/quotes.

For the bid or ask update received, the data feed recipient firm should adjust the quotation bid or ask side *only* for the market side indicated in the message. Implicitly the opposite side has the same price and size as previously displayed.

If *both* bid and ask change as *one update*, the Best Bid AND Ask Update message will be sent, displaying both sides of the quote simultaneously.

The Quote Condition applies to both the bid and ask sides. A quote condition of non-firm designates a quote bid, offer or both as non-executable.

There are two forms of the Best Bid OR Ask Update, the Short Form disseminates Prices using a 4 byte Integer field. Note that 4 byte Prices have four decimals. There is no loss in price precision when the short form message is used. The Sizes are 2 byte integers.

BEST BID OR ASK UPDATE – SHORT FORM				
Name	***Offset***	***Length***	***Value***	***Notes***
Message Type	0	1	Alpha	Short Form Best Bid OR Ask Update: "b" = Quote update bid side "a" = Quote update ask side
Nanoseconds	1	4	Integer	The sub-second portion of the time, in nanoseconds (0-999999999). The second portion of the time is obtained from the most recent timestamp message.
Product Type	5	1	Alpha	"F" = Future "O" = Option
Product ID	6	4	Integer	Product ID assigned daily, valid for trading day. Unique only when combined with Product Type
Quote Condition	10	1	Alpha	<space> = regular quote/autox eligible "F" = Non-firm quote on both bid/ask sides "R" = Rotational quote – reserved for future use "X" = Ask side not firm, bid side firm "Y" = Bid side not firm, ask side firm
Price	11	4	Integer	Best bid or ask price, the side determined by Message Type. **NOTE:** When converted to a decimal format, this price is in fixed point format with 6 whole number places followed by 4 decimal digits.
Size	15	2	Integer	Aggregated number of contracts currently displayed on the NASDAQ Futures bid or ask.

This message is transmitted in the "Q" group only.

4.5.1. Best Bid OR Ask Update – Long Form

This message is the same as the Best Bid OR Ask Update Message – Short Form described above except that Prices are 8 byte Integers, the price having 8 implied decimal places. The Sizes are 4 byte integers.

BEST BID OR ASK UPDATE – LONG FORM				
Name	***Offset***	***Length***	***Value***	***Notes***
Message Type	0	1	Alpha	Long Form Best Bid OR Ask Update: "B" = Quote update bid side "A" = Quote update ask side
Nanoseconds	1	4	Integer	The sub-second portion of the time, in nanoseconds (0-999999999). The second portion of the time is obtained from the most recent timestamp message.
Product Type	5	1	Alpha	"F" = Future "O" = Option
Product ID	6	4	Integer	Product ID assigned daily, valid for trading day. Unique only when combined with Product Type
Quote Condition	10	1	Alpha	<space> = regular quote/autox eligible "F" = Non-firm quote on both bid/ask sides "R" = Rotational quote – Reserved for future use. "X" = Ask side not firm, bid side firm "Y" = Bid side not firm, ask side firm
Price	11	8	Integer	Best bid or ask price, the side determined by Message Type. **NOTE:** When converted to a decimal format, this price is in fixed point format with 10 whole number places followed by 8 decimal digits.
Size	19	4	Integer	Aggregated number of contracts currently displayed on the NASDAQ Futures bid or ask.

This message is transmitted in the "Q" group only.

4.6. Trade Report

The Trade Report message will be used to relay executions that occur during the current business day. This message is also used to reflect manual trades, and electronically reported Block and EFRP trades.

Trade Report messages should be included in time-and-sales displays as well as volume and other market statistics. Block and EFRP trades should not update last sale prices.

Trade Report				
Name	***Offset***	***Length***	***Value***	***Notes***
Message Type	0	1	Alpha	"P" = Trade Report
Nanoseconds	1	4	Integer	The sub-second portion of the time, in nanoseconds (0-999999999). The second portion of the time is obtained from the most recent timestamp message.
Product Type	5	1	Alpha	"F" = Future "O" = Option
Product ID	6	4	Integer	Product ID assigned daily, valid for trading day. Unique only when combined with Product Type
Cross ID	10	4	Integer	Indicates the internal control number (cross id) associated with the given trade.
Trade Condition	14	1	Alpha	Please refer to Appendix A for trade condition code.
Price	15	8	Integer	Reflects the transaction (premium) price. **NOTE:** When converted to a decimal format, this price is in fixed point format with 10 whole number places followed by 8 decimal digits.
Volume	23	4	Integer	Number of contracts traded.

This message is transmitted in the "T" group only.

4.6.1. Broken Trade Report

The following message is used in the event that a trade is broken on the same business day that it is reported.

Broken Trade Report				
Name	***Offset***	***Length***	***Value***	***Notes***
Message Type	0	1	Alpha	"X" = Broken Trade Report
Nanoseconds	1	4	Integer	The sub-second portion of the time, in nanoseconds (0-999999999). The second portion of the time is obtained from the most recent timestamp message.
Product Type	5	1	Alpha	"F" = Future "O" = Option
Product ID	6	4	Integer	Product ID assigned daily, valid for trading day. Unique only when combined with Prodct_Type
Original Cross ID	10	4	Integer	Indicates the original internal control number (cross id) associated with the given trade transaction in the NASDAQ Futures market system.
Original Price	14	8	Integer	Reported Transaction (premium) Price in the original trade report message. **NOTE:** When converted to a decimal format, this price is in fixed point format with 10 whole number places followed by 8 decimal digits.
Original Volume	22	4	Integer	Reported number of contracts in the original trade report message.

This message is transmitted in the "T" group only.

4.7. *Summary Messages*

4.7.1. *End of Day Summary*

End Of Day Summary				
Name	***Offset***	***Length***	***Value***	***Notes***
Message Type	0	1	Alpha	"M" = End Of Day Summary Message Identifier
Timestamp	1	4	Integer	Nanoseconds portion of timestamp
Product Type	5	1	Alpha	"F" = Future "O" = Option
Product ID	6	4	Integer	Product ID assigned daily, valid for trading day. Unique only when combined with Product Type
High Price	10	8	Integer	High Trade Price for the day **NOTE:** When converted to a decimal format, this price is in fixed point format with 10 whole number places followed by 8 decimal digits.
Low Price	26	8	Integer	Low Trade Price for the day. Block Trades, EFRP are not included in the last sale. **NOTE:** When converted to a decimal format, this price is in fixed point format with 10 whole number places followed by 8 decimal digits.
Last Sale Price	34	8	Integer	Last Trade Price for the day **NOTE:** When converted to a decimal format, this price is in fixed point format with 10 whole number places followed by 8 decimal digits.
Daily Settlement Value	42	8	Integer	Daily Settlement Value
Final Settlement Value	50	8	Integer	Final Settlement Value
Market Direction First	51	1	Byte	"+" = First sale of the day is higher than previous day's last sale "-" = First sale of the day is lower than previous day's last sale "=" First sale of the day is same as the previous day's last sale " " = not applicable. There is no current-day last sale.
Market Direction Second to Last	52	1	Byte	"+" = last sale of the day is higher than next previous sale "-" = last sale of the day is lower than next previous sale "=" Last sale of the day is same as the next previous sale " " = not applicable. There is no current-day last sale.
Market	53	1	Byte	"+" = Last sale of the day is higher than

Direction Last Sale				previous day's last sale "-" = Last sale of the day is lower than previous day's last sale "=" Last sale of the day is same as the previous day's last sale " " = not applicable. There is no current-day last sale.
Cumulative Volume	54	8	Integer	Total Volume traded for the Day

This message is transmitted in both the "Q" and "T" groups.

5. Support

- For general product support for data feeds, please contact Market Data Distribution at 301.978.5307 or dataproducts@nasdaqomx.com
- For technical support for data feeds, please contact Systems Engineering at devsupport@nasdaq.com.

Appendix A – Trade Condition Code

Code	Description	
Space Filled	REGULAR	Indicates that the transaction was a regular automated system match.
"L"	Regular Late	Regular automated system match that was reported late.
"B"	Block	Block Trade – trade meeting minimum size for block status as defined in the contract specifications in the NASDAQ Futures rule book.
"E"	EFP	Exchange for Physical (EFP)
"R"	EFR	Exchange for Risk (EFR)
"O"	EOO	Exchange of Options for Options (EOO)
"U"	Block As Of	As Of Block Trade
"V"	EFP As Of	As Of Exchange for Physical (EFP) Trade
"W"	EFR As Of	As Of Exchange for Risk (EFR) Trade
"X"	EOO As Of	As Of Exchange of Options for Options (EOO) Trade

Appendix B – Document Revision Control Log

May 6, 2013

- Initial release for NASDAQ Futures System