

NASDAQ Options Depth at Price

Version 2.1

Options Symbology Initiative (OSI) Compliant

1. Overview

NASDAQ Options Depth at PriceSM (DAPSM) is an options direct data feed product offered by The NASDAQ Stock Market[®], which features the following data elements:

- NASDAQ Price Level Data: For NASDAQ Options Market, NASDAQ aggregates the order and quotation depth at each price point. For each price point, NASDAQ shows the aggregated number of contract available for all market participants at that price level.
- NASDAQ Last Sale Data: NASDAQ will also disseminate trade messages for option order executions that occur within the NASDAQ Options Market via DAP.
- Net Order Imbalance Data: In the minutes leading up to the NASDAQ Opening Auction event, NASDAQ disseminates the indicative clearing price and net order imbalance in the [NASDAQ Options Market](#). Because the calculation includes non-displayable as well as displayable order types, the net order imbalance indicator (NOII) is the best predictor of the Opening Auction event available to the public.
- Administrative and market event messages including:
 - Trading action messages to inform market participants when a specific security is halted or released for trading on the NASDAQ Options Market.
 - Options Directory messages to be disseminated as part of its daily pre-opening process to relay basic option symbol and contract information for those securities traded on the NASDAQ Options Market.
 - Security Open Message to be disseminated for each security as soon as the opening / closing auction process is completed to inform recipients that the option symbol denoted in the message is available for auto execution within the NASDAQ Options Market system.

2. Architecture

The DAP 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 non-control ASCII bytes. The messages that make up the DAP protocol are typically delivered using a higher level protocol that takes care of sequencing and delivery guarantees.

NASDAQ plans to offer the DAP data feed in three protocol options:

Protocol Option	Number of Outbound Channels
SoupTCP	Single outbound channel for all securities
Compressed via SoupTCP	Single outbound channel for all securities
MoldUDP	Single outbound channel for all securities

3. Data Types

All numeric fields are represented in ASCII digits and are right-justified. Padding spaces appear on the left as necessary.

Prices, except for the explicit strike price, are given in decimal format with 6 whole number places followed by 4 decimal digits. The whole number portion is padded on the left with spaces; the decimal portion is padded on the right with zeros. The decimal point is implied by position; it does not appear inside the price field.

The explicit strike price field (part of the OSI-compliant symbol identification) will be given as a 6 digit field with the decimal point placement determined by the Strike Price Denominator field (values are A through E).

Denominator Code	Whole Digits	Decimal Digits
A	5	1
B	4	2
C	3	3
D	2	4
E	1	5

The strike price denominator field will be determined by the value of the strike price:
if the strike price is <\$10 use E;
if the strike price is >=\$10 and <\$100 use D;
if the strike price is >=\$100 and <\$1000 use C;
if the strike price is >=\$1000 and <\$10000 use B;
if the strike price is >=\$10000 and <\$100000 use A;

For example, if the strike price is \$5.50, then the explicit strike price will be "550000" and the strike price denominator will be "E", representing one whole digit ("5") and 5 decimal digits ("50000").

If the strike price is \$205.75, then the explicit strike price will be "205750" and the strike price denominator will be "C", representing 3 whole digits ("205") and 3 decimal digits ("750").

Timestamp reflects the NASDAQ system time at which the outbound message was generated. NASDAQ states time as the number of milliseconds past midnight. The time zone is U.S. Eastern Time.

All alpha fields are left-justified. Padding spaces appear on the right as necessary.

4. Message Formats

NASDAQ DAP supports the following basic types of messages:

- System Events
- Administrative Data
 - Options Directory Message
 - Options Trading Action Message
 - Options Security Open Message
- NASDAQ Options market Price Levels
- NASDAQ Options Trade Updates
- NASDAQ Net Order Imbalance Indicators

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

4.1 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
Timestamp	0	8	Numeric	Time at which the system event was generated. Time is represented as number of milliseconds past midnight, Eastern Time (ET).
Message Type	8	1	"S"	System Event Message
Event Code	9	1	Alpha	Refer to System Event Codes below

SYSTEM EVENT CODES	
Code	Explanation
"O"	<i>Start of Messages.</i> This is always the first message sent in any trading day.
"S"	<i>Start of System Hours.</i> This message indicates that NASDAQ is open and ready to start accepting orders.
"Q"	<i>Start of Opening Process.</i> This message is intended to indicate that NASDAQ has started its opening auction process.
"X"	<i>Clear NOII - Opening Auction Data.</i> This message signals that firms may clear NOII cache for the regular Opening Auction.
"N"	<i>Start of Normal Hours Closing Process</i> This message is intended to indicate that NASDAQ will no longer accept any new orders or changes to existing orders for options participating in the normal hours close process.
"L"	<i>Start of Late Hours Closing Process</i> - This message is intended to indicate that NASDAQ will no longer accept any new orders or changes to existing orders for options participating in the late hours close process.
"E"	<i>End of System Hours.</i> This message indicates that NASDAQ options system is now closed.
"C"	<i>End of Messages.</i> This is always the last message sent in any trading day.

4.2 Administrative Data

4.2.1 Options Directory Message

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

OPTIONS DIRECTORY				
Name	Offset	Length	Value	Notes
Timestamp	0	8	Numeric	Time at which the directory message was generated. Refer to Data Types for field processing notes.
Message Type	8	1	"R"	Options Directory Message
Option Symbol	9	6	Alphanumeric	Denotes the options symbol used for a particular instrument. In most cases, this is also the symbol of the underlying security
Expiration Month and Put/Call	15	1	Alphabetic	Expiration Month and Put / Call indicator A-L are calls: Jan through Dec M-X are puts: Jan through Dec
Expiration Date	16	2	Numeric	Day of the Month of expiration (01-31)
Expiration Year	18	2	Numeric	Last two digits of the year of the option expiration
Strike price denominator	20	1	Alphabetic	Code to determine decimal location within the strike price (A – E) A= 5.1, B=4.2, C=3.3, D=2.4, E=1.5
Explicit strike price	21	6	Numeric	Explicit strike price
Options Closing Type	27	1	Alphabetic	Denotes which System Event is used to trigger the option closing process. "N" = Normal Hours "L" = Late Hours
Underlying Symbol	28	6	Alphanumeric	Denotes the unique symbol assigned to the underlying security within NASDAQ Single Book Execution System.

4.2.2 Options Trading Action Message

NASDAQ uses this administrative message to indicate the current trading status of an index or equity option within the NASDAQ Options Market.

Prior to the start of system hours, NASDAQ will send out a Trading Action spin. In the spin, NASDAQ will send out an Option Trading Action message with the "T" (Trading Resumption) for all options contracts that are eligible for trading at the start of the NASDAQ Options Market system hours. If an option is absent from the pre-opening Trading Action spin, firms should assume that the option is being treated as halted in the NASDAQ Options platform at the start of the system hours. Please note that options may be halted in the NASDAQ system for regulatory or operational reasons.

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

Trading Action Message				
Name	Offset	Length	Value	Notes
Timestamp	0	8	Numeric	Time at which the directory message was generated by the NASDAQ Options Market.
Message Type	8	1	"H"	Options Trading Action Message
Option Symbol	9	6	Alphanumeric	Denotes the options symbol used for a particular instrument. In most cases, this is also the symbol of the underlying security
Expiration Month and Put/Call	15	1	Alphabetic	Expiration Month and Put / Call indicator (A-L are calls, M-X are puts)
Expiration Date	16	2	Numeric	Day of the Month of expiration (01-31)
Expiration Year	18	2	Numeric	Last two digits of the year of the option expiration
Strike price denominator	20	1	Alphabetic	Code to determine decimal location within the strike price (A – E) A= 5.1, B=4.2, C=3.3, D=2.4, E=1.5
Explicit strike price	21	6	Numeric	Explicit strike price
Current Trading State	27	1	Alphabetic	Reflects the current trading state for the options security in the NASDAQ Options Market. The allowable values are: H = Halt in effect T = Trading on NASDAQ

4.2.3 Security Open Message:

NASDAQ plans to disseminate the Security Open Message for each option as soon as the opening / closing auction process is completed. Upon receipt of the open state message, firms should be advised that the option denoted in the message is now available for auto execution within the NASDAQ Options Market System. Upon receipt of the closed state message, firms should be advised that the option is no longer eligible for auto-execution within the NASDAQ Options Market System.

Security Open Message				
Name	Offset	Length	Value	Notes
Timestamp	0	8	Numeric	Time at which the directory message was generated by the NASDAQ Options Market.
Message Type	8	1	"O"	Open Message
Option Symbol	9	6	Alphanumeric	Denotes the options symbol used for a particular instrument. In most cases, this is also the symbol of the underlying security
Expiration Month and Put/Call	15	1	Alphabetic	Expiration Month and Put / Call indicator (A-L are calls, M-X are puts)
Expiration Date	16	2	Numeric	Day of the Month of expiration (01-31)
Expiration Year	18	2	Numeric	Last two digits of the year of the option expiration
Strike price denominator	20	1	Alphabetic	Code to determine decimal location within the strike price (A – E) A= 5.1, B=4.2, C=3.3, D=2.4, E=1.5
Explicit strike price	21	6	Numeric	Explicit strike price
Open State	27	1	Alphabetic	Reflects the current eligibility for auto execution of the options security in the NASDAQ Options Market. The allowable values are: Y = Open for auto execution N = Closed for auto execution

Please note that recipients should continue to process the Trading Action Spin message in order to determine if a contract is in a Halt state for the day. A security open message should **NOT** override the Trading action message indicating if an index or equity option is halted. Recipients should use both messages in tandem to indicate if the issue is halted and/or or open for auto execution.

4.3 NASDAQ Options Price Level Updates

NASDAQ disseminates a price level message whenever the aggregated position at a price level changes. Price levels will be generated whenever a contract is entered, canceled or executed for a certain price point.

When a firm receives the initial message for a given price point, it should add the price level to its display.

When a firm receives subsequent messages for a given price point, it should update the display to reflect the update.

When a firm sees the number of contracts fall to zero, it should remove the price level from display.

Price Level Updates				
Name	Offset	Length	Value	Notes
Timestamp	0	8	Numeric	Time that the DAP quote update was generated by the NASDAQ Options Market system
Message Type	8	1	"U"	DAP Quote Update
Market Side	9	1	Alpha	Denotes the side of the market associated with the update "B" = bid update "S" = offer/ask update
Option Symbol	10	6	Alphanumeric	Denotes the options symbol used for a particular instrument. In most cases, this is also the symbol of the underlying security
Expiration Month and Put/Call	16	1	Alphabetic	Expiration Month and Put / Call indicator (A-L are calls, M-X are puts)
Expiration Date	17	2	Numeric	Day of the Month of expiration (01-31)
Expiration Year	19	2	Numeric	Last two digits of the year of the option expiration
Strike price denominator	21	1	Alphabetic	Code to determine decimal location within the strike price (A – E) A= 5.1, B=4.2, C=3.3, D=2.4, E=1.5
Explicit strike price	22	6	Numeric	Explicit strike price
NASDAQ Quote Price	28	10	Price	Reflects the best price in the NASDAQ Options Market for the stated market side at the current time. Refer to Data Types for field processing notes.
NASDAQ Size	38	5	Numeric	Reflects the aggregated number of contracts in the NASDAQ Options Market being displayed at the DAP Quote Price.

4.4 Options Trade Report

The Options Trade Report message will be used to relay NASDAQ execution system transactions that are reported during the current business day. Please note that NASDAQ only reports one-side of a trade execution on the feed and other data feed products.

Options Last Sale Messages should be included in NASDAQ time-and-sales displays as well as volume and other market statistics.

Options Trade Report				
Name	Offset	Length	Value	Notes
Timestamp	0	8	Numeric	Time that the trade report message was generated by the NASDAQ Options Market system
Message Type	8	1	"T"	DAP Trade Report
Option Symbol	9	6	Alphanumeric	Denotes the options symbol used for a particular instrument. In most cases, this is also the symbol of the underlying security
Expiration Month and Put/Call	15	1	Alphabetic	Expiration Month and Put / Call indicator (A-L are calls, M-X are puts)
Expiration Date	16	2	Numeric	Day of the Month of expiration (01-31)
Expiration Year	18	2	Numeric	Last two digits of the year of the option expiration
Strike price denominator	20	1	Alphabetic	Code to determine decimal location within the strike price (A – E) A= 5.1, B=4.2, C=3.3, D=2.4, E=1.5
Explicit strike price	21	6	Numeric	Explicit strike price
Trade Control Number	27	10	Alphanumeric	Indicates the NASDAQ internal control number associated with the given options trade transaction.
NASDAQ Premium Price	37	10	Price	Reflects the transaction price for the option contract in the NASDAQ Options Market at the time of execution.
NASDAQ Transaction Volume	47	6	Numeric	Reflects the current number of contracts traded for an option in one trade by DAP.

4.5 Options Broken Trade Report

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

OPTIONS Broken Trade Report				
Name	Offset	Length	Value	Notes
Timestamp	0	8	Numeric	Time that that the options trade was broken in the NASDAQ Options Market system.
Message Type	8	1	"X"	DAP Broken Trade Report
Option Symbol	9	6	Alphanumeric	Denotes the options symbol used for a particular instrument. In most cases, this is also the symbol of the underlying security

Expiration Month and Put/Call	15	1	Alphabetic	Expiration Month and Put / Call indicator (A-L are calls, M-X are puts)
Expiration Date	16	2	Numeric	Day of the Month of expiration (01-31)
Expiration Year	18	2	Numeric	Last two digits of the year of the option expiration
Strike price denominator	20	1	Alphabetic	Code to determine decimal location within the strike price (A – E) A= 5.1, B=4.2, C=3.3, D=2.4, E=1.5
Explicit strike price	21	6	Numeric	Explicit strike price
Original Trade Control Number	27	10	Alphanumeric	Indicates the internal control number associated with the given trade transaction in the NASDAQ Options Market system.
Original NASDAQ Premium Price	37	10	Price	Reported NASDAQ Premium Price of an option contract in the original trade report message on DAP.
Original NASDAQ Transaction Volume	47	6	Numeric	Reported number of contracts in the original trade report message on DAP.

4.6 Net Order Imbalance Indicator (NOII)

NASDAQ disseminates NOII data at 5-second intervals in the minutes leading up to the NASDAQ Auction events. Please note that as of December 6, 2010 the closing auction and all associated messages will be discontinued.

- For the NASDAQ Opening Auction, NASDAQ will begin the dissemination of NOII messages for a put or a call option two minutes prior to the start of opening process event.
- For the NASDAQ Closing Auction, NASDAQ will begin the dissemination of NOII messages for a put or a call option ten minutes prior to the start of the associated closing process event.

NOII MESSAGE				
Name	Offset	Length	Value	Notes
Timestamp	0	8	Numeric	Time at which the NOII message was generated
Message Type	8	1	"I"	NOII Message
Option Symbol	9	6	Alphanumeric	Denotes the options symbol used for a particular instrument. In most cases, this is also the symbol of the underlying security
Expiration Month and Put/Call	15	1	Alphabetic	Expiration Month and Put / Call indicator (A-L are calls, M-X are puts)
Expiration Date	16	2	Numeric	Day of the Month of expiration (01-31)
Expiration Year	18	2	Numeric	Last two digits of the year of the option expiration
Strike price denominator	20	1	Alphabetic	Code to determine decimal location within the strike price (A – E) A= 5.1, B=4.2, C=3.3, D=2.4, E=1.5
Explicit strike price	21	6	Numeric	Explicit strike price
Paired Contracts	27	9	Numeric	Indicates the total number of contracts that are eligible to be matched at the Current Reference Price.
Imbalance Contracts	36	9	Numeric	Number of contracts not paired at the Current Reference Price.
Imbalance Direction	45	1	Alphabetic	Indicates the market side of the imbalance "B" = buy imbalance "S" = sell imbalance "N" = no imbalance "O" = insufficient orders to calculate
Far Price	46	10	Numeric/ Price	A hypothetical auction-clearing price for cross orders only. Refer to Appendix D for processing notes.
Near Price	56	10	Numeric/ Price	A hypothetical auction-clearing price for cross orders as well as continuous orders.
Current Reference Price	66	10	Numeric/ Price	Indicates price at which the NOII contracts are being calculated.
Cross Type	76	1	Alphabetic	Denotes the type of NASDAQ cross for

NOII MESSAGE				
Name	Offset	Length	Value	Notes
				which the NOII message is being generated "O" = Open Cross "C" = Close Cross
Price Variation Indicator	77	1	Alphanumeric	This field indicates the absolute value of the percentage of deviation of the Near Indicative Clearing Price to the nearest Current Reference Price. "L" = Less than 1% "1" = 1 to 1.99% "2" = 2 to 2.99% "3" = 3 to 3.99% "4" = 4 to 4.99% "5" = 5 to 5.99% "6" = 6 to 6.99% "7" = 7 to 7.99% "8" = 8 to 8.99% "9" = 9 to 9.99% "A" = 10 to 19.99% "B" = 20 to 29.99% "C" = 30% or greater Space = Cannot be calculated

5. Support

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

Appendix A

Documentation Revision Control Log

November 30, 2007: Options DAP 1.0

NASDAQ released the initial Options DAP specification document to the public.

December 27, 2007: Options DAP 1.1

Added the system event code value of "X" Clear NOII - Opening Auction Data. This message signals that firms may clear NOII cache for the regular Opening Auction.

NASDAQ released the initial Options DAP specification document to the public.

Replaced the reference of shares with contracts throughout the document.

February 1, 2010: Options DAP 1.11-OSI

Update to clarify how the strike price denominator is determined.

March 31, 2009: Options DAP 1.1-OSI renamed as version 2.0

Update to reflect changes for Options Symbology Initiative Compliance.

November 5, 2010: Options DAP 2.1

Update to reflect the discontinuation of the closing cross and associated messages as of December 6, 2010.