# BNP PARIBAS CORTEX ALTERNATIVE TRADING SYSTEM

## FREQUENTLY ASKED QUESTIONS

**GLOBAL MARKETS AMERICAS**

CORPORATE & INSTITUTIONAL BANKING

2022

**BNP PARIBAS**

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# Frequently asked questions (1/6)

| Risk Control | Description |
|---|---|
| **Max Daily Notional** | Can be configured per FIX session or across multiple sessions for a given client. Total daily notional amounts exceeding this limit will be rejected. |
| **Max Order Notional** | Order notional amounts exceeding this limit will be rejected. |
| **Max Order Quantity** | Order quantities exceeding this limit will be rejected. |
| **Clearly Erroneous / Limit Price Checks** | Limit price check for orders to prevent clearly erroneous executions. If the order limit price is a certain percentage of a threshold away from the last bid/offer of the security, the order will be rejected. Price thresholds are defined as: x < $1 - 75% $1.00 <= x < $10.00 - 50% x >= $10 - 20% |

| OATS/ACT LAST MARKET | MPID: BNPX MIC: BNPC Clearing Firm: 2174 |
|---|---|

1. **Q Does Cortex ATS support pre trade risk control checks?**
   A Yes, please see the risk controls supported by Cortex ATS.

2. **Q How does Cortex ATS match orders?**
   A Cortex ATS matches orders based on strict price/time prioritization, subject to crossing restrictions. See question 18 for an example.

3. **Q What order types does Cortex ATS support?**
   A Cortex ATS executes Market & Limit orders at or within the NBBO.

4. **Q What time in force modes does Cortex ATS support?**
   A Day & IOC

5. **Q What pegging instructions does Cortex ATS support?**
   A Market Peg (peg to the far touch), Midpoint Peg (peg to midpoint) and Primary Peg (peg to the near touch).

6. **Q Does Cortex ATS support odd lot orders?**
   A Yes, Cortex ATS supports odd lot orders. Participants may use FIX based Min Qty functionality as described in question 17.

7. **Q How does Cortex ATS handle priced limit orders?**
   A Cortex ATS must comply with Rule 612 of Regulation NMS. In other words, orders routed to Cortex ATS in securities priced >=$1 with more than 2 decimal places will be rejected. Cortex ATS will also reject orders in securities priced <$1 with more than 4 decimal places.

8. **Q How does Cortex ATS support the RegNMS Sub-Penny Rule in the Matching Engine?**
   A For orders in securities priced >= $1 USD, having strike prices with more than 2 decimal places, Cortex ATS will round the Strike Price as follows in the Matching Engine: Buys will round down to two decimal places; and Sells will round up to two decimal places.
   For orders in securities priced < $1 USD, the Strike Price is limited to 4 decimal places, Cortex ATS will round the Strike Price as follows in the Matching Engine: Buys will round down to four decimal places; and Sells will round up to four decimal places.

# Frequently asked questions (2/6)

**9.** **Q How will Cortex ATS handle the following scenario?:NBB = $12.38 | $12.39 = NBO**

| Order Details | Strike Price |
|---|---|
| Order A) Buy Near-Touch Peg Order arrives at 10:05am. | $12.38 |
| Order B) Buy Midpoint Peg Order arrives at 10:06am. | $12.385, rounded to $12.38 |

A Order B's Strike Price will be rounded in compliance to the RegNMS-Sub-Penny Rule, please refer to Question 8.

At 11:07am, Order C) arrives as a Sell Market Peg Order. Order C will cross with Order A with a cross price of $12.38, based on the strict price/time priority subject to crossing restrictions in Cortex ATS.

**10.** **Q Do you provide equal price improvement or preference the supplier/taker? Please provide an example.**
A Full price improvement will be given to the liquidity taker. The taker is defined as the last order to arrive in a cross.

| Example 1 | Example 2 | Example 3 |
|---|---|---|
| NBBO: 10.00 x 10.01<br>Order 1: Resting B 5,000 shares @ $10.00<br>Order 2: Marketable S 5,000 shares @ $10.00<br>Order 1 Execution : 5,000 @ $10.00<br>Order 2 Execution : 5,000 @ $10.00 | NBBO : 10.00 x 10.01<br>Order 1 : Resting B 1,000 shares MIDPOINT PEG<br>Order 2 : Marketable S 1,000 shares @ $10.00<br>Order 1 Execution : 1,000 @ $10.005<br>Order 2 Execution : 1,000 @ $10.005 | NBBO : 10.00 x 10.01<br>Order 1 : Resting B 3,000 shares @ $10.01<br>Order 2 : Marketable S 3,000 shares @ $10.00<br>Order 1 Execution : 3,000 @ $10.01<br>Order 2 Execution : 3,000 @ $10.01 |

**11.** **Q Does Cortex ATS match orders during a locked market?**
A By default, Cortex ATS does not allow matching during a locked market. Considering the Limit Down/Limit Up Regulation, Cortex ATS supports functionality to allow matching during 1) a locked market where the NBB = NBO or 2) matching when either the NBB = LU OR NBO = LD. The default configuration for each participant for settings 1) and 2) will be not to match. Please contact us for additional information on this feature.

**12.** **Q Does Cortex ATS support anti-internalization?**
A Yes. Please let us know if you would like additional information on this feature.

**13.** **Q Does Cortex ATS support cancel-on-disconnect?**
A Yes. This feature is applied by default.

**14.** **Q How many orders per second can Cortex ATS support?**
A Cortex ATS is designed to withstand 2,000 orders per second per FIX session before latency degradation becomes obvious.

**15. Q What is the matching engine round-trip time?**
A Including all pre-trade risk controls, the matching engine is typically about 150μs to process a new order and supply an acknowledgement.

**16. Q Does the Cortex ATS support drop copy sessions?**
A Yes. Additionally Cortex ATS can roll up all executions from multiple sessions into a single drop copy session.

**17. Q Is minimum quantity supported by Cortex ATS?How is minimum quantity interpreted and executed in Cortex ATS?**
A Yes. For example, an order to B 1000 with a MinQty= 500 can only be executed against a S order with an ordered quantity of 500 or greater. The B order will not execute against five 100 share orders on the book.

   a. Q Does Cortex ATS accept Min Qty on 'New' and 'Cxl/Replace'?
     A Yes, for both.

   b. Q What if the 'New' order does not contain 'MinQty', and subsequently the order is 'Cxl/Replace' with the 'MinQty' included?
     A The 'Cxl/Replace' will be accepted, 'MinQty'will be processed.

   c. Q What if the 'New' order does contain 'MinQty',and subsequently the order is 'Cxl/Replace' with the 'MinQty' excluded?
     A The 'Cxl/Replace' will be accepted, 'MinQty'will be excluded.

   d. Q How will Cortex ATS handle a request to 'Cancel/Replace' an order that is partially filled, where 'MinQty' > 'OrderQty'?
     A Cancel replace is accepted and MinQty is set to LeavesQuantity.

   e. Q How will Cortex ATS handle a request to 'Cancel/Replace' an order that is partially filled order, where 'MinQty' = 'Order Qty?
     A Cancel replace is accepted and MinQty is set to LeavesQuantity.

   f. Q How will Cortex ATS handle an partially filled order, when the 'LeavesQty' < 'MinQty'?
     A By default, the 'MinQty' will be reset to equal 'LeavesQty' and will cross with any opposite side order equal or greater than 'LeavesQty'. Clients can choose to have their orders cancelled back when LeavesQty becomes less than the MinQty, contact cortex.equities.amrs@bnpparibas.com to make this change.

   g. Q Can a rule be created to automatically apply a MinQty to one or more of the counterparty groups described in Q21?
     A Yes, please contact cortex.equities.amrs@bnpparibas.com to request this feature.

   h. Q If a MinQty / Counterparty rule is in place and an order also includes a MinQty parameter, which takes precedence?
     A Where the rule specifies a MinQty, it takes precedence over the MinQty parameter on the order.

**18. Q How will Cortex ATS handle orders priced outside of the LULD Bands? How will Cortex ATS handle RegNMS(NBBO) and LULD?**
A Cortex ATS will continue to accept limit orders priced outside LULD bands but will not cross outside the bands. For pegged orders, Cortex ATS will replace all current references to NBB/O with:
Adjusted NBB = Max(NBB, Limit Down)Adjusted NBO = Min(NBO, Limit Up)
This will result in the following behavior under these market conditions:

a. Normal Condition (NBB>=LD and NBO<=LU): Matching will occur as prior to LULD

b. Limit state (NBB=LU or NBO=LD): Orders will match at LU or LD, if the client has chosen to participate in a 'LU/LD locked market'. Refer to question 12.

c. Straddle – Two types of scenarios:
LU straddle (NBO>LU and NBB<LU and NBB>=LD): Orders will match at or within NB Band LU (i.e. NBO is replaced by LU)
LD straddle (NBB<LD and NBO > LD and NBO<=LU): Orders will match at or within LD and NBO (i.e. NBB is replaced by LD)

d. Super straddle (NBB<LD and NBO>LU): Orders will match between LD and LU

e. NBBO Outside bands – (NBO<LD or NBB>LU): No matching, as this scenario should not occur.

**19. Q Does Cortex ATS utilize direct market data feeds?**
A Cortex ATS uses direct exchange feeds as the primary source of NBBO for all protected quotes. The Securities Information Processor (SIP) feeds are used as a secondary source of NBBO and for regulatory status.

**20. Q Does Cortex ATS support sending liquidity flags on fills?**
A For direct Liquidity Partner connections to the ATS:
- Yes, liquidity flags are enabled by default in tag 851 (1 = Add, 2 = Remove)

**21. Q What are the general group definitions in Cortex ATS?**
1. **Principal: BNP Paribas Securities Corp.** acting as principal
2. **Agency:** Agency client flow routed to Cortex ATS via algorithms or Smart Order Routers (SOR), where the SOR determines the route to Cortex ATS or where the SOR is directed to route to Cortex ATS by an algorithm. This category also includes situations involving External Subscribers that are an Institutional Client of BNP Paribas Securities Corp. and are using a 3rd party ATS aggregation or Dark Liquidity smart order routing service and where the identity of the External Subscriber is fully disclosed to BNP Paribas Securities Corp.
*The following three counterparty types include External Subscribers directing orders to the ATS via FIX connectivity to the BDO's low-latency Direct Market Access platform or its Smart Order Router, and Liquidity Partners who route via direct FIX connectivity to the ATS.*
3. **Direct Low:** Agency orders routed directly to Cortex ATS by External Subscribers deemed by BNP Paribas Securities Corp. to have low average price reversion.
4. **Direct Medium:** Agency orders routed directly to Cortex ATS by External Subscribers deemed by BNP Paribas Securities Corp. to have medium average price reversion.
5. **Direct High:** Agency orders routed directly to Cortex ATS by External Subscribers deemed by BNP Paribas Securities Corp. to have high average price reversion.

**22. Q What counterparty matching options are available?**
A All Subscribers may opt out of interacting with counterparty group 1. Subscribers in groups 2-4 may additionally opt out of interacting with any group ranked higher than their group ranking. Subscribers in group 5 may only opt out of interacting with counterparty group 1.

**23. Q How is reversion determined?**
A Price reversion is determined by the notional weighted average midpoint to midpoint price movement after execution over a defined time interval.

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**24. Q Can I opt out of interacting with counterparties by name?**
A No, directly opting out of counterparties by name is not available.

**25. Q Are the counterparty assignments subject to review?**
A Yes, counterparty assignments are subject to periodic review. Based on changes in historical trading activity, a counterparty may be re-assigned to a different counterparty group.

**26. Q Will my counterparty assignment be disclosed to me?**
A Yes, initial counterparty assignment and any subsequent changes are disclosed to the affected counterparty.

**27. Q What are the operating hours for Cortex ATS?**
A Cortex ATS ATS will start to accept orders at 8:00. Matching occurs between 9:30am and 4:00pm. Cortex ATS will not match orders in a symbol until the symbol is open on its primary exchange.

**28. Q Are post-trade or counterparty group interaction reports available for Cortex ATS?**
A Yes, please contact cortex.equities.amrs@bnpparibas.com for information.

**29. Q Does Cortex ATS provide a real time feed to any systems?**
A Cortex ATS provides a real time feed to the Cortex Smart Order Router of the aggregate quantity available at the NBBO and the Midpoint of the NBBO. Only the aggregate quantity is provided without price. This is only available to the Cortex Smart Order Router. This is the only real time feed that Cortex ATS provides.

**30. Q How are trades in Cortex ATS reported?**
A Users receiving executions are automatically notified of fills or partial fills by Cortex ATS. If a day order expires without being fully or partially filled, the User submitting that order receives a "nothing done" report. All orders matched by Cortex ATS are reported to the Nasdaq Trade Reporting Facility ("TRF") in accordance with applicable regulations.

**31. Q: How does Cortex ATS handle trading during a regulatory halt?**
A During a regulatory halt, Cortex ATS will accept day orders but not execute trades, and will accept IOC orders but will immediately cancel them back to the User. BNP Paribas Securities Corp. retains sole discretion to suspend trading in a given symbol at any time for any reason. Symbols that are suspended from trading in the Cortex ATS are included in the Stopped Symbol List, which is maintained on the Cortex ATS public website.

**32. Q: Where can I find information regarding Cortex ATS trading volume and other statistics?**
A Cortex ATS trading volume and other trading statistics can be found online at http://globalmarkets.cib.bnpparibas/cortex-ats. These statistics include information pertaining to the use of Cortex ATS by smart order routers and BNP Paribas Securities Corp's algorithms.

**33. Q: Does Cortex ATS utilize indications of interest (IOIs) or conditional orders?**
A No, Cortex ATS does not communicate any IOIs or conditional orders based on User orders.

# Frequently asked questions (6/6)

**34.** **Q: Are any affiliates Users of Cortex ATS?**
A Yes. The firm's affiliates, BNP Paribas Arbitrage SNC, BNP Paribas Securities Asia Ltd and BNP Paribas S.A., are Users of Cortex ATS. They are offered the same access and services as unaffiliated Users.

**35.** **Q: Does BNP Paribas Securities Corp. allow for clients to colocate with Cortex ATS?**
A Cortex ATS does not support colocation with any of its clients. Cortex ATS is hosted in the NY4 Data Center in Secaucus, N.J. Cross-connections to Cortex ATS in NY4 are available to all clients by request and subsequent review and approval by BDO's Cortex ATS Working Group.

For more detailed information regarding the operation of the Cortex ATS, please see the link to our ATS-N filing at http://globalmarkets.cib.bnpparibas/cortex-ats

## CONTACT

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