



MEMX USER MANUAL

Version 1.0

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Table of Contents

<i>Introduction</i>	3
<i>Trading System</i>	3
<i>Data Centers and Co-Location</i>	4
<i>Connectivity and Access</i>	4
<i>Risk Controls</i>	5
<i>Hours of Trading and Market Sessions</i>	5
<i>Order Types and Modifiers</i>	6
<i>Priority of Orders</i>	7
<i>Routing to Away Markets</i>	8
<i>Data Products</i>	8
<i>Contact MEMX</i>	8

Introduction

This document provides information about MEMX LLC (“MEMX,” the “System,” or the “Exchange”) and MEMX Execution Services LLC (“MEMX Execution Services”), which is the outbound routing broker for the Exchange. The Exchange and MEMX Execution Services are each subsidiaries of MEMX Holdings LLC.

The MEMX User Manual summarizes various operations and rules of the Exchange. MEMX’s complete and official Rulebook is available at <https://memx.com>. In the event of a conflict between the User Manual and the information set forth in the official Rulebook, the Rulebook shall prevail. Information contained in this document is subject to change at any time.

Trading System

The Exchange is a fully automated electronic limit order book for orders to buy and sell National Market System (“NMS”) securities with a continuous matching function. The Exchange also offers routing functionality through MEMX Execution Services with connectivity to all venues displaying Protected Quotations, as defined by Regulation NMS. Members of the Exchange and their Sponsored Participants (collectively, “Users”) connect to the System via FIX and binary order entry protocols in order to electronically send orders to buy and sell securities traded on the Exchange. Users may also send orders through a Service Bureau.

The Exchange was built with a focus on performance, reliability and security. The System is distributed across a network of servers to maximize throughput and determinism, minimize latency and bottlenecks, provide high availability and fault tolerance, and allow for simplified scalability. Additional servers can be added to easily expand system functionality and capacity as required in accordance with the MEMX Capacity Management Plan. Further, security has been architected and designed into the System as a primary concern to effectively manage access, authorization and authentication to Exchange services.

At the core of the System is the matching engine, which compares the limit price of an incoming order with the price of resting (i.e., booked) Limit or Pegged orders on the MEMX Book and the price of other markets’ displayed quotes. If the order is immediately marketable against the MEMX Book, and there is interest available on the MEMX Book at a price equal to or better than the consolidated quote, an immediate match is made and communicated back to Users. If another market is displaying a better quote, the order will be handled depending on the User’s instructions (e.g., forwarded to the other market to attempt to fill the order, posted to the MEMX Book, canceled). The priority of how orders are ranked on the MEMX Book is discussed in more detail below and described in Rule 11.9 of the Exchange Rulebook.

Users or their clearing firms may request drop copies of their executions.

Data Centers and Co-Location

MEMX's primary trading platform is located in a third party data center facility in New Jersey. It is accessible to Members, Sponsored Participants, Service Bureaus, Data Recipients (collectively "Participants") and Extranet Providers.

MEMX's secondary data center is located in a third party data center facility in Chicago, IL. Connectivity to the MEMX secondary data center, while not a mandatory requirement for all Participants, is recommended to minimize service disruption in the event of an issue at the primary trading platform data center.

MEMX offers co-location services in both the primary and secondary data centers. This provides participants with the fairest and fastest access to Exchange services, reduced network complexity, and flexible power and connectivity options. Connectivity to the Exchange in the primary data center for both order entry and market data dissemination is equalized for all co-located participants in the New Jersey location. Participants will be able to connect to order entry systems and receive market data in both the primary and secondary data centers.

MEMX provides redundant physical network connectivity in both the primary and secondary data centers. This diverse set of network connections, the "A" and "B" feeds, provide high availability and fault tolerance to all co-located participants. To achieve this resiliency, MEMX requires participants to connect to both the "A" and "B" feeds.

All data centers the Exchange uses are, at a minimum, Tier 3 compliant and provide a high level of security and availability through redundant and reliable environmental control systems (redundant power supplies, on-site backup generators, cooling systems, etc.). Data center personnel are available 24/7 to maintain and service the System.

Connectivity and Access

MEMX supports the following connectivity methods in both its primary and secondary data centers:

- **Co-Location Cross-Connect:** Participants may request a cross-connect from the Participant's point-of-presence to MEMX.
- **Extranet Providers:** Participants may connect to MEMX via an approved Extranet Provider.
- **Private-Line Ethernet:** Participants may connect via telecommunications carriers providing a circuit extension from a location outside the Exchange's primary or secondary data center.

Participants are responsible for choosing and implementing connectivity to the primary and secondary data center.

For more detailed information and instructions on how to connect to MEMX, please refer to the [MEMX Connectivity Manual](#).

Users are permitted to electronically access the order entry facilities of the Exchange using FIX and binary protocols, with a common schema used for both. Message framing and encoding is also standardized and unified across protocols. MEMO (MEMber Orders), the native binary protocol for order entry, is an application layer message standard used to facilitate the electronic communication of information between the Exchange and its participants. MEMO allows participants to submit, modify, and cancel orders, receive acknowledgements and execution reports, and be notified of exchange trading status. Refer to the [MEMO Protocol Specification](#) for more details. The Exchange also supports order entry via the FIX Classic protocol. Please refer to the [MEMX FIX Specification](#) for more details.

Risk Controls

Both the FIX and MEMO order entry facilities contain an integrated pre-trade risk management service that processes all incoming order information against a mandatory set of risk controls designed to help prevent erroneous orders from passing through to the matching engine for execution. These controls are dynamically configurable by Exchange participants and can be assigned to an individual session, i.e., a single FIX or MEMO session, or an aggregated set of sessions. Refer to the [MEMX Risk Management Specification](#) for a list of risk controls and detailed information on how to configure and apply these controls.

MEMX supports the canceling of an order via any active Participant session, FIX or MEMO, regardless of the session that the original order was transmitted on. Additionally, this flexibility allows the Exchange to offer a batch cancel function, via any active session, which can be used by a Participant to cancel all or a subset of its orders in one or more symbols with a single command to the Exchange. Participants can use this facility as a “purge port” or for other mass cancel type functions.

Hours of Trading and Market Sessions

Orders may be entered into the System during Exchange operating hours (from 6:00 a.m. until 8:00 p.m. Eastern Time). Orders entered during the Early Order Entry Session (between 6:00 a.m. and 7:00 a.m. Eastern Time) are not eligible for execution until the Pre-Market Session (commencing at 7:00 a.m. Eastern Time) or Market Session (commencing at 9:30 a.m. Eastern Time), depending on the Time-in-Force selected by the User. The Exchange will not accept the following orders prior to the start of the Pre-Market Session: Orders with a Post Only instruction, ISOs, Market Orders with a TIF instruction other than RHO, orders with a Minimum Execution Quantity instruction that also include a TIF instruction of RHO, and all orders with a TIF instruction of IOC or FOK. At the commencement of the Pre-Market Session, orders entered during the Early Order Entry Session (other than orders with a TIF instruction of RHO), will be handled in time sequence, beginning with the order with the oldest time stamp, and will be placed on the MEMX Book, routed, cancelled, or executed in accordance with the terms of the order.

Session	Start and End Time (all times are Eastern Time)
Early Order Entry Session	6:00 a.m. to 7:00 a.m.
Pre-Market Session	7:00 a.m. to 9:30 a.m.

Market Session	9:30 a.m. to 4:00 p.m.
Post-Market Session	4:00 p.m. to 8:00 p.m.

Order Types and Modifiers

As summarized in the table below, MEMX accepts the following order types: Market orders, Limit orders, and Pegged orders (including Midpoint Peg and Primary Peg with offsets). Orders may be submitted in round lots, mixed lots, or odd lots. By default, orders are limited to a maximum of 1,000,000 shares or \$30,000,000.00.

Order types may be designated with a variety of modifiers such as Intermarket Sweep Orders (ISOs), Reserve Quantity (with Fixed or Random Replenishment), Non-Displayed, Minimum Execution Quantity (only executes against a single order), Post Only, Book Only, Re-Pricing (Display-Price Sliding to comply with Rule 610(d) of Reg NMS and Rule 201 of Reg SHO). Several Time-in-Force (TIF) instructions are available determining the period(s) of time during which an order is available for potential execution, including the following:

- Immediate-Or-Cancel (IOC). Execute in whole or in part, else the order will be canceled
- Fill-Or-Kill (FOK): An IOC order where the entire size must be filled, else the order will be canceled
- Day: Available for trading starting with the Pre-Market Session and, if not executed, expires at the end of the Market Session
- Good-Til-Time (GTT): Expires at the earlier of a specified expire time or end of the Post-Market Session
- Regular Hours Only (RHO): Order designated for execution only during Regular Trading Hours, which includes the Opening Process and Re-Opening Process following a halt, suspension or pause

Order Type	Trading Hours	Time-In-Force	Size	Routing/Posting	Display	Reserve	ISO	Re-Pricing
Market	9:30 a.m. through 4:00 p.m. ET	IOC, FOK, Day, RHO	Odd/Round/Mixed Lot, Min Quantity	Route, Book Only	N/A	N/A	N/A	N/A
Limit	7:00 a.m. through 8:00 p.m. ET	IOC, FOK, Day, GTT, RHO	Odd/Round/Mixed Lot, Min Quantity	Route, Book Only, Post Only	Display, Non-Display	Random and Fixed Replenish	ISO	Display Price Sliding
Pegged (Midpoint, Primary)	7:00 a.m. through 8:00 p.m. ET	IOC, FOK, Day, GTT, RHO	Odd/Round/Mixed Lot, Min Quantity	Book Only, Post Only	Non-Display	N/A	N/A	N/A

Refer to Chapter 11 of the Exchange Rulebook, [MEMX Rulebook](#), for detailed information regarding order types, modifiers and TIF instructions.

Opening Process

At the beginning of the Market Session, the System will perform an Opening Process which is a series of matching computations (the Opening Match) performed for each symbol traded on the Exchange as described in more detail below. Users wishing to participate in the Opening Process include a TIF of RHO when submitting orders. Orders participating in the Opening Process cannot be modified or canceled while the Opening Match is being computed. The price of the Opening Process will be the midpoint of the NBBO. The Opening Process matches eligible buy and sell orders that are executable at the midpoint of the NBBO, processed in time sequence, beginning with the order with the oldest time stamp. Matches will occur until there is no remaining volume or there is an imbalance of orders.

If the conditions to establish the price of the Opening Process do not occur by 9:45:00 a.m. Eastern Time, orders will be handled in time sequence, beginning with the order with the oldest time stamp, and will be placed on the MEMX Book, routed, cancelled, or executed in accordance with the terms of the order.

All Self Trade Prevention (STP) modifiers, as defined in the MEMX Rulebook, will be ignored as it relates to executions occurring during the Opening Match. An imbalance of orders on the buy side or sell side may result in orders that are not executed in whole or in part. Such orders may, in whole or in part, be placed on the MEMX Book, cancelled, executed, or routed to other away Trading Centers in accordance with the MEMX Rulebook. If no matches can be made, the Opening Process will conclude with all orders that participated in the Opening Process being placed in the MEMX Book, cancelled, executed, or routed to away Trading Centers in accordance with the MEMX Rulebook.

Priority of Orders

Orders are ranked and maintained in the MEMX Book based on the Price/Time priority as follows:

- Price. The highest-priced order to buy (lowest-priced order to sell) has priority over all other orders to buy (sell) in all cases.
- Time. The following priority rules apply:
 - A. Except as provided in (B) and (C) below, the System ranks equally priced trading interest within the System in time priority in the following order:
 1. The portion of a Limit Order with a Displayed instruction;
 2. Limit Orders with a Non-Displayed instruction;
 3. Pegged Orders; and
 4. Reserve Quantity of Limit Orders.
 - B. At the Midpoint of the NBBO. The System ranks trading interest priced at the midpoint of the NBBO within the System in time priority in the following order:
 1. Limit Orders to which the Display-Price Sliding instruction has been applied;

2. Limit Orders with a Non-Displayed instruction;
 3. Pegged Orders; and
 4. Reserve Quantity of Limit Orders.
- C. Where buy (sell) orders are using instructions that cause them to be re-ranked by the System upon clearance of a Locking Quotation, the System re-ranks and displays such orders at the Locking Price in time priority in the following order:
1. Limit Orders to which the ISO instruction has been applied that also contain a TIF instruction of Day when such orders establish a new NBBO at the Locked Price; and
 2. Limit Orders with the Display-Price Sliding instruction.
- D. For purposes of (A) and (B) above, orders re-ranked subject to the Re-Pricing instruction to comply with Rule 201 of Regulation SHO maintain the same priority as Limit Orders at that price.

Routing to Away Markets

Users have the option to use the Exchange's affiliated broker-dealer, MEMX Execution Services LLC, to route orders to markets other than the Exchange. Book Only and Post Only orders are not routed to other markets. A proprietary process is used to determine the System routing table, which determines the order in which the System routes orders to specific trading venues. MEMX Execution Services performs a variety of automated risk checks, including erroneous and duplicate orders checks, before routing to other markets, in compliance with Rule 15c3-5. A combination of direct exchange feeds and CQS/UQDF data feeds from the Securities Information Processors are used for the handling, execution and routing of orders.

Data Products

As described in the MEMX Rules, MEMX offers several MEMOIR (MEMber Order Information Record) data products:

- MEMOIR Depth (Depth of Book and Last Sale Feed)
- MEMOIR Top (Top of Book Quote and Last Sale Feed)
- MEMOIR Last Sale (Last Sale Feed)
- MEMOIR Historical Data (Prior day versions of MEMIOR Depth, Top, and Last Sale)

The Exchange's real-time market data is electronically available directly from MEMX through the use of APIs defined in the Exchange's specifications or via a range of market data vendors. Additional information about data products, agreements and specifications are available on the Exchange's [website](#).

Contact MEMX

Website

www.memx.com

Main Telephone Number	201.331.7900
Client Relationship Services (CRS)	[TBD number] and [TBD email address]
Trading Services	[TBD number] and [TBD email address]
Technical Operations Center	[TBD number] and [TBD email address]
Market Data Services	[TBD number] and [TBD email address]
Regulation/Compliance	[TBD number] and [TBD email address]
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REVISION HISTORY

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