

Introduction

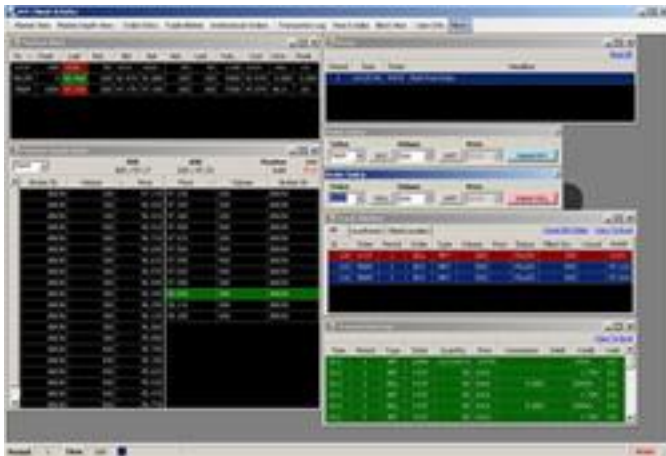
Welcome to Rotman Interactive Trader (RIT). This document begins assuming that you have installed and run the Rotman Interactive Trader client application (RIT Client). If you have not reached this step yet, please visit our website at <http://rit.rotman.utoronto.ca> and follow the instructions listed under Tour/Demo.

This document will provide a step-by-step tutorial of the RIT Client interface, as well as teach you how to effectively trade the *Microstructure 2 – Liquidity* case.

In-Depth View: RIT Client

Trading Interface

The RIT Client has been designed with a completely customizable modular interface. Each module has its own distinct functions and will allow you to observe different types of data available to the market (i.e. prices or news). Upon logging into the server, you will either see a layout with multiple modules on it (left), or an empty layout (right). RIT saves the layout of the trader's screen whenever the program is closed. If someone has run RIT on your computer before you, you will most likely see their layout.



Example of a previous trader's layout



Example of an empty layout

For learning purposes, it is best to start with an empty layout. You can either individually close each module by clicking the X in the upper right corner of each module, or you can click the "Clear Interface" button located in the upper-right-hand corner of the RIT Client.

Trading Modules – Menu

The top bar of the RIT Client is your main navigation menu. It will let you open up the different instances of modules that are available in RIT. Keep in mind that you can have multiple copies of the same module open at the same time. (i.e. you can have two news windows open by clicking on the News button twice.)



This section will walk you the functions performed and data presented by each module.

Market View

The market view allows you to get a snapshot of the entire market and your positions in each security.

| Ticker | Position | Last | Bid Size | Bid | Ask | Ask Size | Last Size | Volume | Cost | Unrealized P/L | Realized P/L |
|--------|----------|--------|----------|--------|--------|----------|-----------|--------|--------|----------------|--------------|
| CRZY | 850 | 10.610 | 1600 | 10.330 | 10.420 | 600 | 2100 | 455050 | 10.070 | 221.000 | -8.500 |
| TAME | 300 | 26.570 | 1300 | 26.130 | 26.370 | 1300 | 800 | 185800 | 25.030 | 330.000 | -6.000 |

- All securities in a case are listed in the Market View.
- Securities are represented by “Ticker” symbols. A ticker is an alphanumeric short form of a longer security name. i.e. Home Depot’s stock ticker is “HD”, a 6 Month Treasury bill is “TB6M”.
- “Position” indicates how many shares of a particular security you currently hold, or how many shares you are short. A positive quantity indicates a long position and a negative quantity indicates a short position.
- “Last” is the price of the last transaction. A green background indicates that the last transaction was higher than the previous trade (up tick). A red background indicates the opposite (down tick).
- “Last size” is the quantity of shares traded in the last transaction.
- “Bid” shows the highest price a market participant is willing to pay for the security, whereas the “Ask” is the lowest price a market participant is willing to sell the security for. Bid and ask sizes tell you how many shares, in aggregate, are available at the current best bid and ask.
- “Volume” is the cumulative number of shares traded.
- “Cost” is the volume weighted average price of your current position. If you purchased 500 shares of CRZY stock at \$10.00 and 500 at the \$11.00, your cost for these 1000 thousand shares of CRZY would be \$10.50. If you have a short position, it is the average selling price of those shares.
- Unrealized P/L (Profit or Loss) is how much you would make or lose from your current position if you were to close out the entire position at the best bid(for long positions) or ask(for short positions), excluding commissions.
- Realized P/L is how much money you have made or lost on the positions that you have already closed. Trading commissions paid on trades are automatically marked as a loss in the Realized P/L column.

Market Depth View

The Market Depth View (MDV) allows you to see the central limit order book for the security. It summarizes the demand and supply of the market, and creates an environment where traders can see the bids and asks of a security and act upon that information.

| TAME | | BID | | ASK | | Position | |
|-----------|--------|-------------|--------|-------------|-----------|------------|----------|
| | | 800 x 24.79 | | 700 x 25.54 | | Last 25.54 | |
| Broker ID | Volume | Price | Price | Volume | Broker ID | Position | Position |
| ANON | 800 | 24.790 | 25.490 | 0 | ANON | -3400 | 25.54 |
| ANON | 1400 | 24.770 | 25.540 | 700 | ANON | | |
| Kevin | 5000 | 24.750 | 25.550 | 1500 | ANON | | |
| ANON | 1500 | 24.730 | 25.630 | 2100 | ANON | | |
| ANON | 1600 | 24.660 | 25.740 | 1000 | ANON | | |
| ANON | 1300 | 24.660 | 25.770 | 1800 | ANON | | |
| ANON | 1700 | 24.620 | 25.790 | 1300 | ANON | | |
| ANON | 1100 | 24.620 | 25.800 | 3400 | Kevin | | |
| ANON | 1900 | 24.540 | 26.070 | 1100 | ANON | | |
| ANON | 1000 | 24.480 | 26.260 | 1000 | ANON | | |
| ANON | 1200 | 24.440 | 26.260 | 1200 | ANON | | |
| ANON | 1200 | 24.370 | 26.620 | 700 | ANON | | |
| ANON | 1200 | 24.320 | | | | | |
| ANON | 1100 | 24.040 | | | | | |
| ANON | 1400 | 23.990 | | | | | |
| ANON | 1500 | 23.960 | | | | | |

- The MDV has two sections to it – BID and ASK. Every active market has participants willing to buy and sell shares. Bids, on the left side of the screen displays participants advertising their willingness to purchase shares whereas the asks, on the right side of the screen displays participants advertising their willingness to sell shares.
- A bid is an order to buy a certain volume of securities at a specific price. Each horizontal line on the left side of the order book is a bid. As you can see from the screenshot, Broker ANON submitted a bid to buy 800 shares of TAME at \$24.79. Nothing will happen to this bid until the stock price moves to that level, i.e., someone is willing to sell the stock at \$24.79. Once someone sells 800 shares of TAME to ANON (“hit ANON’s bid”), we say the order is filled and it will disappear from the order book.
- Each line under ASK is called an ask. An ask is an order to sell a number of shares at a specific price. Right now, the cheapest ask belongs to Trader ANON. They are willing to sell 700 shares at a price of \$25.54 per share. Note that there is an ask of \$25.49 per share with a quantity of 0. This means there was shares willing to be sold at 25.49, but somebody has purchased them (hit ANON’s ask). Bids and asks that are hit will flash red and stay on the screen for ¼ of a second before disappearing.
- Note that the bids are ranked in descending order and the asks in ascending order. This is so that the best bid (highest bid) and best ask (lowest ask) are always shown at the top of the order book. If you need to buy or sell some shares immediately, you can look at the top few lines to see the price(s) that you can transact shares at. The difference between the best bid and best ask is called the bid ask spread.
- If you want to buy shares but are unwilling to pay the price of the best ask, an alternative method is to submit a bid. This will insert your order into the limit order book and broadcast the order to all traders via their MDV’s. In this example, trader Kevin has submitted a bid for 5000 shares and is willing to pay \$24.75 per share. He has also submitted an ask to sell 3400 shares at \$25.80 per share.
- A valuable piece of information the MDV provides is the liquidity of the market. Liquidity can be described as the degree to which a large number of shares can be transacted with a minimum impact on price. A practical way of assessing liquidity is to see how close the bids and asks (in terms of price) are, and how many shares are available at each price level.

- The MDV is colour-coded so that users can easily identify what is happening. Any new order that is placed into the limit order book will flash green for $\frac{1}{4}$ of a second, any order that is transacted against flashes red for $\frac{1}{4}$ of a second, and any limit order in the book that belongs to you will be highlighted in blue.
- Note that your position, the number of shares you own or are short, is listed in the top right hand corner of the market depth view for your convenience. This corresponds to the “Position” field also displayed in your Market View.

Order Entry

The order entry screens allow you to specify trade parameters before submitting your trading orders to the trading server. Your order will either transact with existing orders in the limit order book (you submitted a market order), or be added to the orders listed in the limit order book (you submitted a limit order). For every order, you will need to specify the security that you wish to trade by selecting its ticker. Then, click on the “BUY” button (toggle) to switch between BUY and SELL, and input the number of shares you would like to transact. There are two types of orders you can use – a market order or a limit order. This is controlled by the LMT/MKT toggle. Lastly, if you are submitting a limit order, you will need to specify a price. Changing parameters on the order entry screen will not submit an order. The only time an order will be submitted to the limit order book is when you click “Submit BUY” or “Submit SELL”. The picture below depicts two order entry windows.

- When you submit a market order, it transacts at the current best bids or asks, taking into account the liquidity of the market. If you submit a market order to buy 5000 TAME shares (please see MDV on page 3), you will buy 700 shares @ \$25.54, 1500 @ \$25.55, 2100 @ \$25.63, and finally 700 @ 25.74. The benefit of the market order is that your trade goes through immediately. To execute a market order, first click on the “LMT” toggle once. It should become MKT. Note that you cannot specify a price for a market order because your order will be filled at the best prices available in the limit order book. Then click on “Submit BUY” or “Submit SELL” to transmit the order to the server. Your position should change immediately.
- A limit order is used to execute a trade at a specific price. There is no guarantee the order will be filled. To submit a limit order to sell 3400 shares of TAME at \$25.80, set the volume to 3400 shares and set the price to \$25.80, set the MKT/LMT toggle to LMT, and then press “Submit SELL.” If your limit buy order is below the best ask or your limit sell above best bid, you will see your order added to the market depth view. Otherwise, it will be treated as a market order.
- The volume and price control buttons change the values by 100 shares and 1 cent respectively. You can hold CTRL down while clicking the control buttons to alter the values by 1000 shares and 10 cents at a time. Alternatively, you can type directly into the fields.

The image shows two screenshots of the 'Order Entry' window. The top window is for a BUY order for TAME with a volume of 5000 and the order type set to MKT, with a price of 24.80. The bottom window is for a SELL order for TAME with a volume of 3400 and the order type set to LMT, with a price of 25.80.

Market Depth View Order Entry

Alternatively, you are able to place trades within the Market Depth View. The process is described below. There are two main icons on the menu that are related to this function.



- **Market Depth Shortcut Trade Parameters** icon is located on the top right side of your screen (orange box). Once selected, a box should appear which allows you to set two fields: Quantity (order size) and Offset value of the entries. The quantity set will be the standard order size of all your ask and bid orders entered by clicking within the Market Depth View. You can also set a specific offset value. When placing an order by clicking, this will increase the best bid, and decreases the best ask by the chosen amount (usually \$0.01).
- The Market Depth Shortcut Trade feature must also be activated by selecting the “lightening” icon (green box). This will turn on the feature and allow you to place orders by clicking within the Market Depth View. To disable the feature, simply deselect the icon. Please note that this icon will need to be selected to turn on the feature following every case as it is reset to prevent accidental error by users.



To Place a Limit Order:

Left click on any Bid: This places a higher bid than the order selected by the offset value for the quantity parameter. (e.g. Click on a bid at \$10.00 and it will place a bid for 2000 shares at \$10.01)

Alt + Left click on your bid: Cancels the selected pending limit order.

Vice versa for asks.

To Place a Market Order:

Right click (on either side): A market order is placed for the inputted Quantity parameter.(e.g. Right click anywhere on the ask side and you will be purchasing 2000 shares at the market.)

Shift + Right Click (on either side): you will purchase or sell to all the orders up to the selected order. This is referred to as placing a “swipe order”.

(e.g. Shift Right-Click the 10th order on the ask side of the market and it will purchase all of the orders up to and including the selected order.)

Trade Blotter

The trade blotter organizes all of the trades that you have submitted to the server. You can see the status of current limit orders (and cancel them), as well as review your trading history.



The screenshot shows a window titled "Trade Blotter" with a table of trades. The table has columns: ID, Ticker, Period, Order, Type, Volume, Price, Status, Filled Qty., Cancel, and VWAP. The rows are color-coded: blue for buy orders and red for sell orders. The status column shows "PARTIAL", "LIVE", "FILLED", and "CANCEL...". The "Cancel" column has "C" for cancelable orders. The "VWAP" column shows the volume-weighted average price for each order.

| ID | Ticker | Period | Order | Type | Volume | Price | Status | Filled Qty. | Cancel | VWAP |
|------|--------|--------|-------|------|--------|--------|-----------|-------------|--------|--------|
| 1928 | TAME | 1 | BUY | LMT | 15000 | 25.000 | PARTIAL | 7300 | C | 25.000 |
| 1873 | CRZY | 1 | SELL | LMT | 8000 | 10.500 | LIVE | 0 | C | 0.000 |
| 1855 | CRZY | 1 | SELL | MKT | 800 | | FILLED | 800 | | 9.950 |
| 1840 | TAME | 1 | BUY | MKT | 500 | | FILLED | 500 | | 24.948 |
| 1765 | TAME | 1 | BUY | LMT | 5000 | 21.000 | CANCEL... | 0 | | 0.000 |

- A blue line indicates a buy order whereas a red line indicates a sell order. The most important column is "status." This tells the trader whether your order has been filled, partially filled, live, or canceled. A market order is always filled instantly. "Live" status means that it is a limit order that has not yet been filled. "Partial" means part of the limit order has been filled. "Filled quantity" indicates how many shares have been filled. Both filled and canceled orders are non-actionable, however, traders have the option to cancel a live or partial order by clicking on the "C" under column "Cancel." Canceling a partial order only cancels the unfilled portion. You cannot modify existing orders.
- VWAP, volume weighted average price, is the total cost of the order divided by the numbers of shares transacted. The VWAP of a market order depends on the liquidity of the market.
- For your convenience, orders are separated under different tabs. Click on "Live/Partial" button to see your active orders. Click on "Filled/Cancelled" to see your trade history.
- Clicking on the "Copy to Excel" link will copy the entire table into your copy/paste buffer. You can then go into Excel and paste the data for future analysis.

Institutional Orders

In cases such as Microstructure 2 where institutional orders are enabled, traders will occasionally receive a pop-up window advertising a trade that an institution (typically a large mutual fund manager) would like to make with you.

The institutional orders are typically for large blocks of shares, (15000+ shares). The institution trades in blocks because they would rather guarantee a single price for the entire block of shares than accumulate shares slowly and risk an adverse price movement. As such, they contact individual traders and offer to purchase or sell an entire block of shares at a price that is typically better than the market price. That is, they are willing to pay more than the current market price for shares, or they will sell their shares for less than the current market price. The difference between the market price and the price that they are willing to pay is typically called a "liquidity spread".

- In this scenario, TAME was trading for \$25.20 (bid) x \$25.25 (ask). The institution is willing to purchase shares from the trader at \$25.64, providing a \$0.39 spread on the trade (they are paying 39 cents more than what market participants are currently willing to sell shares for. They are also paying a commission of \$535.45 to the trader for accepting the trade.
- If the trader declines the trade, the trade will be randomly re-routed to another trader that is logged into the system. This will continue for up to 3 times before the trade is discarded completely.
- If the trader accepts the trade, 18500 shares are removed from the trader's account, and cash in total of $18500 * \$25.64 + \535.45 (commission) is added to the trader's account. Essentially, if the trader can repurchase 18500 shares from the open market at an average price of less than \$25.64, they will make money. The commission provides a small cushion for losses the trader may incur and also covers some of the transaction costs associated with actually transacting the shares.
- Although institution orders may seem like obvious sources of profits, in reality they are not. It is true that in this case the institution is willing to pay \$25.64 per share while there are market participants readily willing to sell shares at \$25.25 (the current lowest ask price). However, what really matters is the liquidity of the market. In most situations. There will not be 18,500 shares available to be purchased at \$25.25 (Refer to the earlier market order example on page 4 where an order to purchase 5000 shares transacted at 4 different price levels). What's important is being able to purchase the entire 18,500 shares for an average price less than \$25.64.
- Traders can review their historic institutional orders either in their trade blotter or their institutional order window.



Advanced institutional orders & manual crossing:

By default, institutional orders will automatically show up on the trader's screen as a pop-up window. If the trader enables the "Advanced Institutional Orders", the orders will go directly to the "Pending" tab of the institutional order blotter instead of being a pop-up. Also for Microstructure 2, orders are automatically transacted as soon as they are accepted. For more advanced trading cases, orders that have been accepted do not automatically transact, they are sent to the institutional order window. From there, the trader must manually cross (transact) the order at their discretion within a certain time interval. This option adds variety to trading as traders can strategically signal the market by crossing their blocks of shares before, during, or after they have finished trading the stock.

Transaction Log

The transaction log displays all of the credits and debits affecting the cash in your trading account.



| Time | Period | Type | Ticker | Quantity | Price | Commission | Debit | Credit | Cash |
|----------|--------|------|--------|-----------|--------|------------|------------|-----------|-------------|
| 12:20:14 | 1 | INT | CASH | 534741.76 | 0.050 | | | 72.478 | 534814.240 |
| 12:20:02 | 1 | SELL | TAME | 800 | 25.250 | 16.000 | | 20184.000 | 534741.760 |
| 12:19:54 | 1 | INT | CASH | 514488.03 | 0.050 | | | 69.732 | 514557.760 |
| 12:19:35 | 1 | COMM | TAME | 20200 | 24.430 | | | 777.480 | 514488.030 |
| 12:19:35 | 1 | BUY | TAME | 20200 | 24.430 | 404.000 | 493890.000 | | 513710.550 |
| 12:19:34 | 1 | INT | CASH | 1007464 | 0.050 | | | 136.549 | 1007600.550 |

Under the type heading, INT refers to interest payments, Sell/Buy refers to transactions, Comm refers to commission payments made to you (when you accept an institutional order). Regular trading fees (charged to you for trading) are included in the debit/credit with the trade.

Time and Sales

The time and sales window displays all of the trades that have occurred for a security. It updates in real time. The identifier refers to the buyer and seller of each transaction (buyer/seller).



| Time | Period | Last | Volume | Identifier | Value |
|----------|--------|--------|--------|------------|-----------|
| 12:25:38 | 1 | 24.640 | 200 | ANON/Kevin | 4928.000 |
| 12:25:38 | 1 | 24.660 | 300 | ANON/Kevin | 7398.000 |
| 12:25:37 | 1 | 24.660 | 500 | ANON/ANON | 12330.000 |
| 12:25:37 | 1 | 24.770 | 900 | ANON/ANON | 22293.000 |
| 12:25:36 | 1 | 24.980 | 500 | Kevin/ANON | 12490.000 |
| 12:25:36 | 1 | 24.750 | 100 | ANON/ANON | 2475.000 |

Block View

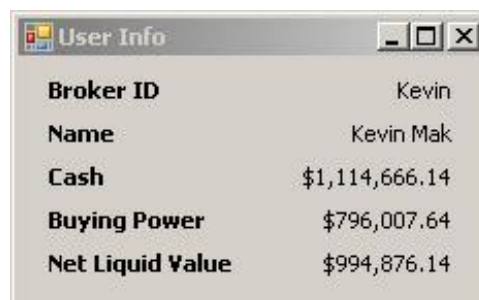
The block view displays all of the blocks that have been transacted. It does not identify whether the broker was purchasing or selling the block.



| Time | Period | Ticker | Volume | Broker | Price |
|----------|--------|--------|--------|--------|--------|
| 12:27:49 | 1 | TAME | 17900 | Kevin | 25.720 |
| 12:27:48 | 1 | TAME | 19500 | Kevin | 25.260 |
| 12:19:35 | 1 | TAME | 20200 | Kevin | 24.430 |

User Info

The user info module shows your cash, buying power, and net liquid value. Buying power is based on margin requirements. For more information on this calculation, please refer to the RIT margin document. Net liquid value is the value of your portfolio if you were to close out all of your positions at the current best bid or ask.



| | |
|-------------------------|----------------|
| Broker ID | Kevin |
| Name | Kevin Mak |
| Cash | \$1,114,666.14 |
| Buying Power | \$796,007.64 |
| Net Liquid Value | \$994,876.14 |

Putting it all together to trade Microstructure 2

The premise of the Microstructure 2 trading case is relatively simple. There are two stocks that have random unpredictable price movement. Since you cannot predict or forecast the direction of the stocks, attempting to make money by speculating on the price moving up and down is generally an unprofitable strategy due to transaction costs. However, the case has many generous institutions that are quite willing to pay you for taking some risk that they would rather avoid. Taking on this risk should generate profits for you, the trader.

Typically, you should wait until you receive your first institutional order. Upon receiving the order, you should compare the price that the institution wants to trade at with the price in the current market. You have up to a minute to make your decision as to whether to accept or decline the order.

Keep in mind if the institution wants to buy shares, you are agreeing *to sell* shares to them at the block trade price. Since you are agreeing to sell the shares, you will want to be selling the shares only if they are willing to pay *more* than the current market price (ask). Likewise, if the institution wants to sell shares, you are agreeing to *buy* shares from them at the block trade price. You will want to be buying shares only if they will sell them for less than the market price (bid). The fact that the institution is buying, which means you are selling, or vice versa, often confuses inexperienced traders.

Evaluating the size of the spread is the fastest and easiest level of analysis that you can do when you receive an institutional order. The next step is to look at the limit order book (via the Market Depth View) for the stock that you are analyzing and quickly calculate (generally you would just estimate) what the volume weighted average price would be if you were to buy or sell this entire block of shares at the market. If the institution is willing to pay \$26.50 for 25,000 shares, and you realize that if you were to sell the shares to the institution, and could then place a market order to buy 25,000 shares and realize an average price of \$26.25 per share, the trade is definitely profitable because there is nearly a guaranteed profit of \$6250 from the trade, plus commissions ($(\$26.50 - \$26.25) \times 25,000 = \$6250$). In reality, you will most likely realize that your VWAP calculation of a market order is often extremely close to the institutional order price, or it shows a loss. Just because there isn't a guaranteed profit in the trade, does not mean it isn't a lucrative trade. There are still two other issues to consider. First of all, the trading commission can often be large enough to offset the calculated losses. Second, and more importantly, large market orders are typically an inefficient way to trade large volumes of shares. Remember that the market order for the entire block volume will guarantee you the profit that you have calculated. However, it is usually more efficient to break the block into smaller sizes, and trade those as a combination of market and limit orders. This will often result in a smaller market impact and you will realize a price that is better than just trading the entire block at the market.

The decision of whether to use one market order to sell 25,000 shares or 5 limit orders to sell 5000 shares (submit one order, wait for it to complete, then submit another, and then another) is quite subjective and beyond the confines of this document to answer. The concept is that sometimes when a market is very liquid, large market orders are effective ways to trade large amounts of stock. However, when markets are not very liquid, limit orders may be more effective. The key idea is to use this trading case to try different strategies and to see what works for you in different scenarios.