



## RTD Documentation

The RTD function in Excel can retrieve real-time data from a program, such as the RIT Client. In general, the syntax for an RTD command is:

=RTD("progID", server, "[Field1]", "[Field2]",...)

<b>progID</b>	In our case, the program ID is "rit2.rtd". Be sure to enclose the program ID in quotation marks.
<b>server</b>	Since the RIT client is most likely being run locally on your machine, this argument is left blank.
<b>Field1, Field2,...</b>	There can be 1 to 253 parameters that together represent a unique piece of real-time data. Below is an outline of all the most commonly used topics for RIT RTD.

### Troubleshooting

You need to be aware of the following points when working with RTD:

- Always open the application to which you are linking before opening Excel. In other words, open the RIT Client before opening your Excel file containing RTD links.
- If the application is logged off, links cannot be created or updated.
- The number of links in a spreadsheet and the power of your PC can influence the speed at which links update. However, there is theoretically no limit to the number of links that can be generated.

### To re-establish broken links

- Close all instances of Microsoft Excel
- Activate the RIT Client and make sure it is logged in
- Once you are confident that the application is running and logged in, re-activate Excel

*It is important to note that, when opened, your Excel file containing RIT RTD functions will attempt to link to an open instance of RIT. Once that initial instance of RIT is closed, Excel will not recognize any other occurrences of the application. However, if an instance of RIT is run first, Excel can be activated, closed, and re-activated without disabling RTD links.*

- When trying to use the RTD function in a specific cell, an error message may signify that the Data-Link Patch is not properly installed.
- Microsoft Excel must be in automatic calculation mode for RTD formulas to update.

## RTD LINKS FOR RIT

### Linking General Information

General information can be linked from RIT to your Excel file by using the formula =RTD("rit2.rtd", "[Field1]"). For example, to retrieve information about profit and loss, we can use the formula:

=RTD("rit2.rtd", "PL")

This links your Excel file to RIT, automatically retrieving the current profit or loss of your account and displaying this value in the specified cell.

Retrieving other general information from RIT follows the same pattern. The following table shows a summary of these commands:

Description (Result)	Sample RTD Formula
Trader ID	=RTD("rit2.rtd", "TRADERID")
Trader's P/L	=RTD("rit2.rtd", "PL")
Name	=RTD("rit2.rtd", "TRADERNAME")
Time remaining in the period	=RTD("rit2.rtd", "TIMEREMAINING")
The current period #	=RTD("rit2.rtd", "PERIOD")
Ticks in a period	=RTD("rit2.rtd", "PERIODTIME")
Ticks in a year	=RTD("rit2.rtd", "YEARTIME")
Speed simulation is currently running	=RTD("rit2.rtd", "TIMESPEED")

### Linking Market Data

Using a specified security, RTD can link information from the portfolio or Market Depth View to your Excel file.

Market Data	Sample RTD Formula	Description (Result)
All tickers	=RTD("rit2.rtd", "ALLTICKERS")	Comma-delimited list of all security tickers
All ticker info	=RTD("rit2.rtd", "ALLTICKERINFO")	Table of all security tickers and detailed info.
Last	=RTD("rit2.rtd", " <i>ticker</i> ", "LAST")	Last price of <i>ticker</i>
Bid	=RTD("rit2.rtd", " <i>ticker</i> ", "BID")	Top of the market bid for <i>ticker</i>
Ask	=RTD("rit2.rtd", " <i>ticker</i> ", "ASK")	Top of the market ask for <i>ticker</i>
Volume	=RTD("rit2.rtd", " <i>ticker</i> ", "VOLUME")	Trading Volume (# of shares traded so far)

Bid Size	=RTD("rit2.rtd" ,," <i>ticker</i> ","BSZ")	Size of the Highest Bid in the market
Ask Size	=RTD("rit2.rtd" ,," <i>ticker</i> ","ASZ")	Size of the Lowest Ask in the market
Position	=RTD("rit2.rtd" ,," <i>ticker</i> ","POSITION")	Current position
Cost	=RTD("rit2.rtd" ,," <i>ticker</i> ","COST")	Volume Weighted Average Cost
PLUNR	=RTD("rit2.rtd" ,," <i>ticker</i> ","PLUNR")	Unrealized P/L
PLREL	=RTD("rit2.rtd" ,," <i>ticker</i> ","PLREL")	Realized P/L
OPENORDERS	=RTD("rit2.rtd" ,," <i>ticker</i> ","OPENORDERS")	Unfilled individual orders to buy/sell
ALLORDERS	=RTD("rit2.rtd" ,," <i>ticker</i> ","ALLORDERS")	Fills all the individual orders to buy/sell. It works only for the first 200 orders.
LIMITORDERS	=RTD("rit2.rtd" ,," <i>ticker</i> ","LIMITORDERS")	The number of live limit orders
INTERSTATE	=RTD("rit2.rtd" ,," <i>ticker</i> ","INTERSTATE")	Only available for cases that have currency

\* *ticker* = ticker of the security you want to link, in capitals. For example:

=RTD("rit2.rtd" ,,"TAME","POSITION")

To link your Excel file to limit orders further down in the *Market Depth View* (those orders not at the top of the market) use the following syntax:

=RTD("rit2.rtd" ,,"*ticker*","*BID*",#)

where # represents the depth of the BID order in the book.

For example, to retrieve the three orders closest to the top of the market, you would use the following:

=RTD("rit2.rtd" ,,"TAME","*BID*",1)  
=RTD("rit2.rtd" ,,"TAME","*BID*",2)  
=RTD("rit2.rtd" ,,"TAME","*BID*",3)

## Note

- The formula =RTD("rit2.rtd" ,,"TAME","*BID*",1) is synonymous with =RTD("rit2.rtd" ,,"TAME","*BID*"). They will both display the bid at the top of the market.
- This syntax may only be used to link to data from the *Market Depth View*. This includes BID, BSZ, ASK, ASZ. Refer to the table below for detailed syntax examples.
- The formula =RTD("rit2.rtd" ,,"ALLTICKERINFO") displays the information in the following order: Ticker, Name, Type, Contract Size, Start Period, and Stop Period.
- The formula =RTD("rit2.rtd" ,,"*ticker*","OPENORDERS") shows the information in the following order: Order ID, Price, Volume, Open Shares (unfilled shares), VWAP, Period, Tick, Timestamp.

- The formula =RTD("rit2.rtd",,"*ticker*","ALLORDERS") displays the information in the following order: Order ID, Price, Volume, Open Shares (always 0, since individual orders get filled instantly), VWAP, Period, Tick, Timestamp. Note that Price is currently omitted in the string output, but you may refer to VWAP for the volume-weighted average (fill) price for each of your submitted orders.

Market Data	Sample RTD Formula	Description (Result)
BID	=RTD("rit2.rtd",," <i>ticker</i> ","BID",N)	The Nth bid in the book
BSZ	=RTD("rit2.rtd",," <i>ticker</i> ","BSZ",N)	The size of the Nth bid in the book
ASK	=RTD("rit2.rtd",," <i>ticker</i> ","ASK",N)	The Nth ask in the book
ASZ	=RTD("rit2.rtd",," <i>ticker</i> ","ASZ",N)	The size of the Nth ask in the book
AGBID	=RTD("rit2.rtd",," <i>ticker</i> ","AGBID",N)	The aggregate (by price) Nth bid in the book
AGBSZ	=RTD("rit2.rtd",," <i>ticker</i> ","AGBSZ",N)	The size of the aggregate (by price) Nth bid in the book
AGASK	=RTD("rit2.rtd",," <i>ticker</i> ","AGASK",N)	The aggregate (by price) N <sup>th</sup> ask in the book
AGASZ	=RTD("rit2.rtd",," <i>ticker</i> ","AGASZ",N)	The size of the aggregate (by price) N <sup>th</sup> ask in the book
MKTSELL	=RTD("rit2.rtd",," <i>ticker</i> ","MKTSELL",N)	The VWAP that would occur if you submit a market order to sell N volume
MKTBUY	=RTD("rit2.rtd",," <i>ticker</i> ","MKTBUY",N)	The VWAP that would occur if you submit a market order to buy N volume

*ticker*: ticker of the security you want to link, in capitals.

N: must be a positive integer

For example,

If I want to retrieve the 2<sup>nd</sup> highest bid (by price) for CRZY (stock ticker), I simply type in:

=RTD("rit2.rtd",,"CRZY","BID",2)

Alternatively, you can link to a cell containing the specified security ticker you want to use. This arrangement increases modularity. It allows users to easily update the security from which they are retrieving data for a series of data fields.

The corresponding syntax for each of the market data is:

Market Data	Sample RTD Formula
Position	=RTD("rit2.rtd",, <i>celladdress</i> ,"POSITION")
Bid Size	=RTD("rit2.rtd",, <i>celladdress</i> ,"BSZ")
Bid	=RTD("rit2.rtd",, <i>celladdress</i> ,"BID")
Ask	=RTD("rit2.rtd",, <i>celladdress</i> ,"ASK")
Ask Size	=RTD("rit2.rtd",, <i>celladdress</i> ,"ASZ")
Volume	=RTD("rit2.rtd",, <i>celladdress</i> ,"VOLUME")
Cost	=RTD("rit2.rtd",, <i>celladdress</i> ,"COST")

*celladdress* = address of the cell containing the **security ticker** you want to link. For example:

=RTD("rit2.rtd",,\$E\$10,"POSITION")

The symbols for market data, as well as the progID (i.e. "rit2.rtd"), can be referenced in a similar manner.

### Grabbing Ticker Specific Data Fields

RTD also allows you to grab ticker specific data fields, displaying the result in a text string. The string is semicolon delimited for rows, and comma-delimited for columns.

Market Data	Sample RTD Formula	Sample Result
Bid Book	=RTD("rit2.rtd",,"ticker","BIDBOOK")	ANON,12.23,1000;ANON,12.22,2500
Ask Book	=RTD("rit2.rtd",,"ticker","ASKBOOK")	ANON,12.25,1000;ANON,12.26,700
Open Order Book	=RTD("rit2.rtd",,"ticker","OPENORDERS")	578,9.80,500,500,0,1,201,1/1/2012 12:00:00 PM;

The Open Order Book contains a subset of trades you have submitted to the server. The trades are first organized in the Trade Blotter window of the RIT Client and given a "status". This "status" tells the trader whether their order has been filled, partially filled, live, or cancelled.

Specifically, the Open Order Book contains all active limit orders which have not yet been filled. This includes orders with the status "Live" or "Partial". Since these orders still lie in the order book, traders have the option to cancel them.

### Grabbing Position Limits and Fines

You may also use RTD to grab position limits and fines associated with each security. First, you'll need to pull the 'Risk Type' that is assigned to each security using the syntax below.

Market Data	Sample RTD Formula	Description (Result)
Risk Type	=RTD("rit2.rtd",,"ticker","RISK",N,"TYPE")	<i>N</i> refers to an index number as multiple security types can be assigned to a security. The starting value for <i>N</i> is 1, and usually 1 should work in most cases if not specified.

For example, if you put the following syntax while running the LT3 Case, it will return the name of the *risk type*, which will be "LIMIT-STOCK" in this case.

=RTD("rit2.rtd",,"CRZY","RISK",1,"TYPE")

Then, you can use this *risk type* to pull the following positions limits and fines.

Market Data	Sample RTD Formula	Description (Result)
Gross position	=RTD("rit2.rtd",,"risk type","GROSS")	Current Gross position of the risk type
Net position	=RTD("rit2.rtd",,"risk type","NET")	Current Net position of the risk type
Gross Limit	=RTD("rit2.rtd",,"risk type","GROSSLIMIT")	Gross position limit of the risk type
Net Limit	=RTD("rit2.rtd",,"risk type","NETLIMIT")	Net position limit of the risk type
Gross Fine	=RTD("rit2.rtd",,"risk type","GROSSFINE")	Gross Fine of the risk type
Net Fine	=RTD("rit2.rtd",,"risk type","NETFINE")	Net Fine of the risk type

The gross position reflects the sum of the absolute values of the long and short positions within the same risk type, while the net position reflects the sum of long and short positions such that short positions negate any long positions. Gross and net fines refer to the amount of fines associated with going over the limits.

Continuing from the above example, you may use the following syntax to pull the current Gross position.

=RTD("rit2.rtd",,"LIMIT-STOCK","GROSS")

### Linking Asset Information

Asset information can be linked from RIT to your Excel file by using the formula =RTD("rit2.rtd",,"[Field1]"). For example, to retrieve information about assets, we can use the following formula:

Market Data	Sample RTD Formula	Description (Result)
<i>Asset Tickers</i>	=RTD("rit2.rtd",,"ALLASSETTICKERS")	Comma-delimited list of all asset tickers
Asset Ticker Information	=RTD("rit2.rtd",,"ALLASSETTICKERINFO")	Table of all asset tickers and detailed information

### Linking News Information

You may also use RTD to link news information from RIT to your Excel file by using the following formula:

Market Data	Sample RTD Formula	Description (Result)
<i>News</i>	=RTD("rit2.rtd",,"NEWS", N)	N <sup>th</sup> News item, most recent last
Latest News	=RTD("rit2.rtd",,"LATESTNEWS", N)	N <sup>th</sup> News item, most recent first

## Retrieving Tender Offer information<sup>1</sup>

The RTD allows you to grab the information related to tender offers that you have received. For example, if you have received the following tender offer:



You can link the information from this tender offer in Excel using the following syntax  
`=RTD("RIT2.RTD",,"TENDERINFO",1)`

The following information will be retrieved: "11,TAME,58000,24.51,49,79". The information contained is separated by commas and is organized in the following order: "ID, Ticker, Volume, Price, tick at which the offer was received, tick at which the offer will expire". Note that the volume (58,000 shares) has a positive sign since the tender order is for you (as a liability trader) to BUY the shares from an institution which will result in a 'long' position when you accept this order.

"11" is the unique ID of the tender offer. In the RIT, each tender offer has a unique ID during an iteration of any case. In the example above, the tender had an ID equal to 11.

Let's look at another example:



When you use the same RTD link to pull the information for this tender order, the following information will be retrieved: "13,CRZY,-69000,10.48,29,60". As mentioned above, the information contained is separated by commas and is organized in the following order: "ID, Ticker, Volume, Price, tick at which the offer was received, tick at which the offer will expire". Note that the volume (69,000 shares) has a negative sign this time since the tender order is for you (as a liability trader) to SELL the shares to an institution which will result in a 'short' position when you accept this order.

Please note that in the formula `=RTD("RIT2.RTD",,"TENDERINFO",1)`, the number 1 indicates that we are pulling information about the first "live" or current tender offer that we see. If you have two offers that are awaiting response, the information for the one that you received first will be pulled by using the number 1 and the number 2 should be used for the second offer awaiting response.

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<sup>1</sup> If the RTD commands do not work, please make sure that you have the most recent version of the RTD.API Links installed on your PC. You can check this by following the instructions at Step 3 of the following link <https://inside.rotman.utoronto.ca/financelab/rit-downloads/>

Please note that the RTD link only allows Excel to retrieve information related to tender offers. It does not allow one to send information from Excel to the RIT. That is, it will not be possible to accept/decline a tender offer using the RTD link. To accept/decline the tender offers, you will need to either use the Excel VBA API commands or manually click the accept/decline button in the RIT.

## Retrieving historical information

The following RTD links allow users to retrieve historical prices of individual securities at a specific time.

Market Data	Sample RTD Formula	Condition	Description (Result)
Last value	=RTD("rit2.rtd",," <i>ticker</i> ","LASTHIST",N)	$N > 0$	Historical last value (price) at Nth tick during the current period
Last value	=RTD("rit2.rtd",," <i>ticker</i> ","LASTHIST",N)	$N \leq 0$	Historical last value (price) N ticks ago during the current period

For example, let's assume that it is now period 1, tick 35. If the value of N from the above formula is set to 15 (which is greater than 0), then the formula will return the price of the security at period 1, tick 15, which will be a static value. However, if the value of N is set to -15 (which is smaller than 0), then the formula will return the security price at period 1, tick 20 ( $=35 - 15$ ), which is 15 ticks ago from now. This also means that it will be a dynamic value, always displaying the '15-tick old' price from the current tick.

## Note

- RTD links are one-way, in other words, they cannot send information to the RIT Client but can only retrieve it. Thus, to cancel an open order, you must use the commands defined in "Cancelling an Order", Excel VBA API Documentation, Rotman School of Management.

## Appendix: Shortcut in grabbing data from RIT2.0 without typing in the RTD formula in Excel

If you don't want to type in the formulas manually, you can simply click and drag the certain information that you wish to find onto the Excel sheet.

There are two ways to retrieve the data:

1. Grab each section highlighted in blue to show the specific information on the Excel document. For example, if I want to obtain only the cost information about CRZY in real-time, I can simply drag the cost field of CRZY (Blue Circle in the Screenshot) to any blank cell on the Excel sheet.
2. Grab all data relevant to the specific security. For example, if I want to obtain all the market data for CRZY in real-time, I can simply drag the field CRZY in the Ticker column (Red Circle in the Screenshot) to the Excel sheet.

RT 2.0 Client (1.1.8/292-oc)

Portfolio Order Entry Market Depth Trade Blotter Assets Transaction Log News Trader Info Time & Sales

Charting Chat Kill Case Files Help Files Logout

Portfolio

Ticker	Type	Contr...	Position	Cost	Last	Bid	Ask	SLV	Realized...	Unrealz...	YVAP	Volume	My Volume
CRZY	STOCK	1 Shares	9,000	9.96	9.89	9.96	9.97	88,650.00	-180.00	-1,023.00	9.93	109,800	9,000
TRC	STOCK	1 Shares	0		24.94	24.94	24.96	0.00	0.00	0.00	24.98	91,100	0

**Rotman**  
INTERACTIVE TRADER

AutoSave Book1 - Excel

File Home Insert Draw Page Layout Formulas Data Review View Develop

Clipboard Font Alignment Number Styles

A4 =RTO("rt12.rtd","CRZY","COST")

	A	B	C	D	E	F	G	H	I	J
1										
2										
3										
4			9.96							
5										
6	CRZY	STOCK	1	9000	9.963667	9.89	9.96	9.97	88650	-180
7										
8										
9										
10										
11										
12										
13										
14										