API Reference Guide

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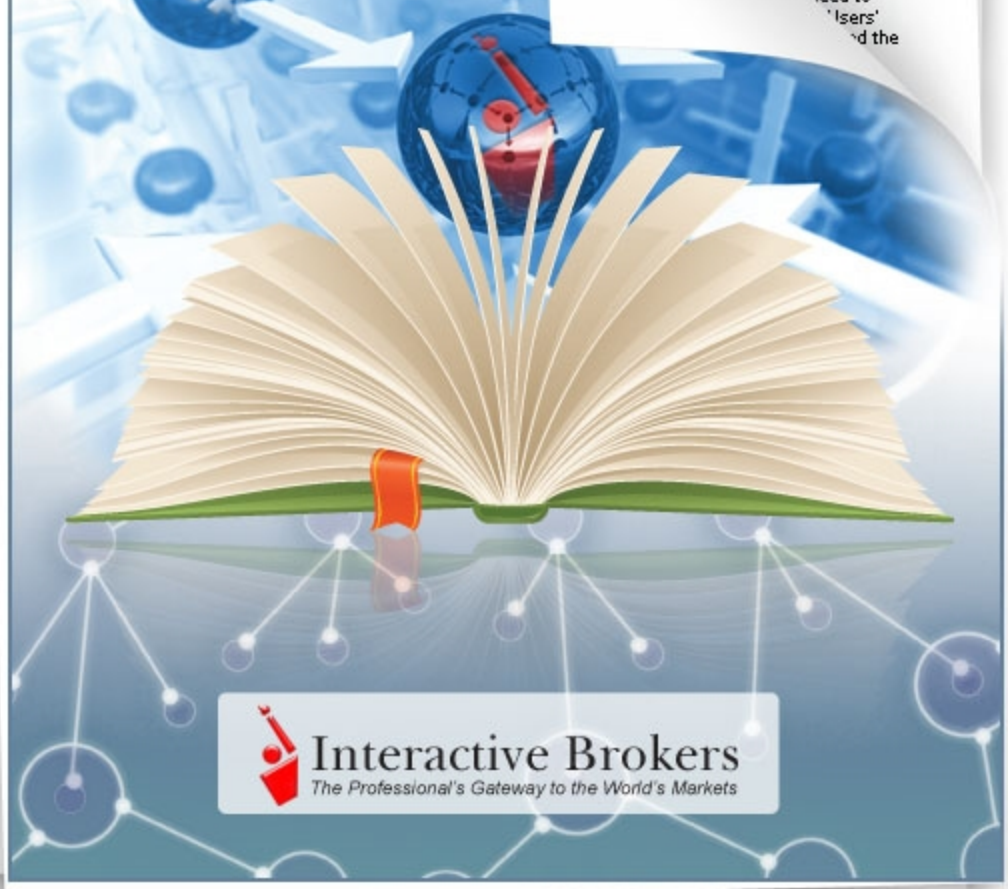


Interactive Brokers

The Professional's Gateway to the World's Markets

API Reference Guide

April 2015

Updated through API Release 9.72

Any symbols displayed within these pages are for illustrative purposes only, and are not intended to portray any recommendation.

Contents

1

Overview

This chapter provides an overview of the APIs (Application Programming Interfaces) available, including the following topics:

About the APIs

We provide several APIs which you can use to link to our system and trade your IB account. The API allows you to connect through either the TWS or the IB Gateway.

- Connecting through the TWS requires that you have the application running, but also allows you to test and confirm that your API orders are working correctly.
- Connecting through the IB Gateway allows you to use the API without a large GUI application running, but does not provide an interface for you to test and confirm API activity.

Regardless of the connection method you use, the API allows you to:

To view syntax for specific functionality, see the DDE for Excel, ActiveX, C++, Java or C# topics in this guide. Customers with no programming expertise should begin with the DDE for Excel section, which uses an everyday Excel® spreadsheet to link to TWS via the API.

> **Note:** API topics are written for experienced programmers and provide little guidance for non-technical users.

To develop and test your API program, we recommend that you use the sample application and connect via TWS. Once you are satisfied that the API works as designed, you can use the GUI-less IB Gateway to connect, if you desire.

> **Note:** A variety of useful troubleshooting tips and other answers to common questions can be found in the Frequently Asked Questions section of this guide.

Installing the API Software

To install the API software

1. Download the latest API software from the IB website:
2. From the IB website menu, click **Trading Technology > API Solutions.**
3. Cick **IB API**, then click the **API Software** button.
4. In the popup window, read the license agreement then click **I Agree**.
5. Click the button corresponding to the Windows- or Mac/UNIX-based production or beta API version you want to install.
6. Save the installation file to your computer.
7. Run the downloaded installation program to install the API software on your computer.

Run the API through TWS

To run the API through TWS, you must always have your system running and it must be configured to use any of the API components.

To enable API connection through TWS

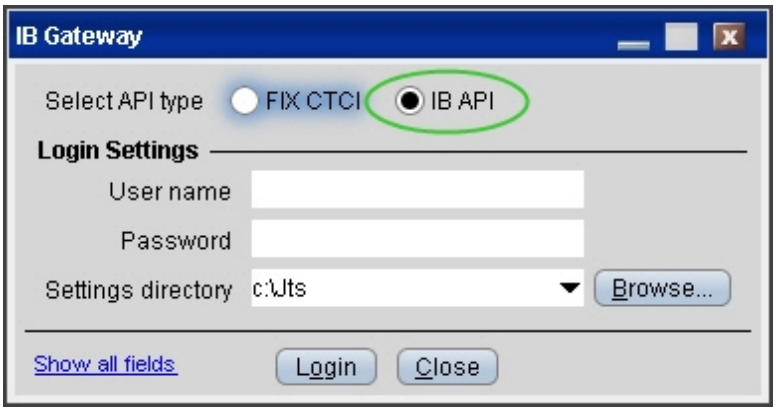
1. Log into TWS.
2. On the **Edit** menu, select *Global Configuration*.
3. Select *API* in the left pane, then click *Settings*.
4. In the right pane, click the check box for *Enable ActiveX and Socket Clients (*ActiveX, C++ and Java API connections), and/or *Enable DDE Clients* (for DDE for Excel API connections only) to configure TWS for the appropriate API connection. You must have these settings enabled to connect to the API through TWS.

   Note: Multiple API clients with different client IDs can access a single instance of TWS on the same computer. With the exception of DDE for Excel, the API application does not need to be running on the same computer as TWS.

For a complete description of all Trader Workstation's API settings, see the TWS Users' Guide.

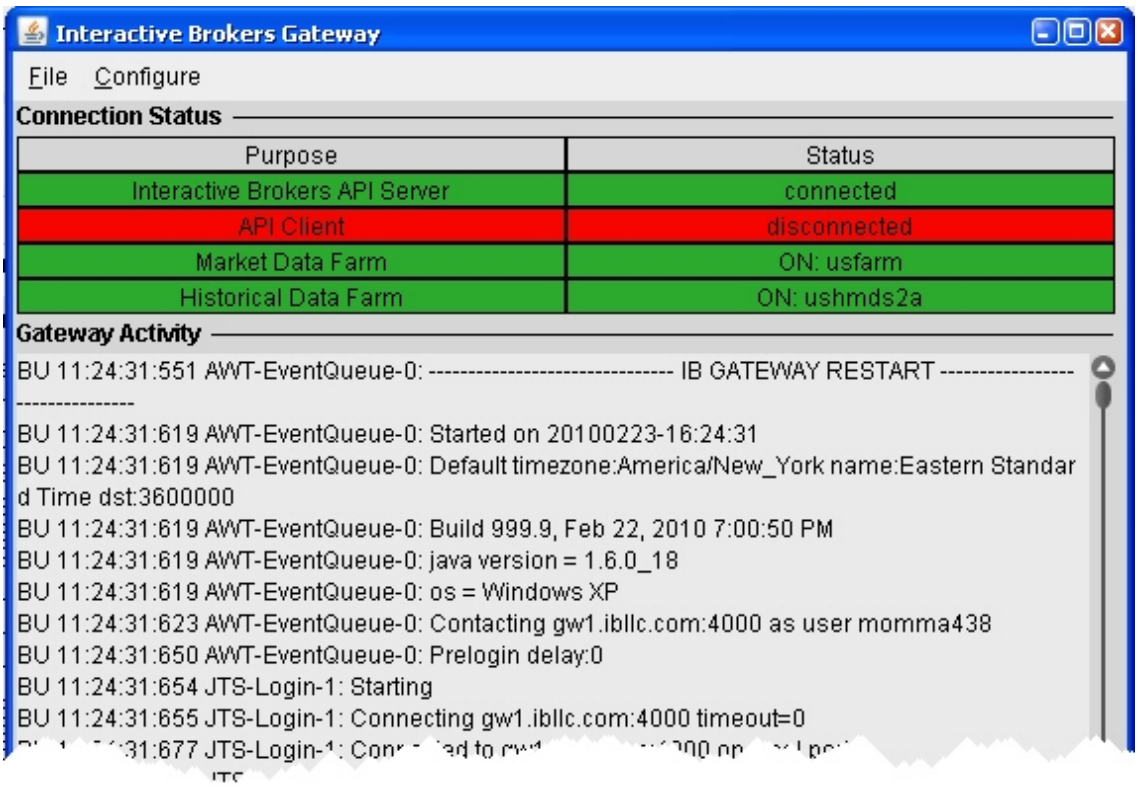
Run the API through the IB Gateway

The IB Gateway provides a low-resource alternative to TWS for connecting to the IB trading system via the API. The gateway uses approximately 40% fewer system resources than TWS. However, the gateway is GUI-less, which means that you cannot view the API activity as you can when running TWS.



To log into the IB Gateway

1. From the **Login** menu on the IB web site, select *IB Gateway*.
2. Select the API radio button.
3. Log in using your IB username and password, just as you would when logging into TWS.
4. Click **Login**. The Interactive Brokers Gateway box opens, displaying the connection status and gateway activity.



You must have the IB Gateway running while connected to the API.

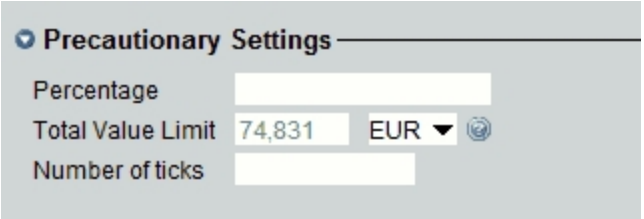
Recommendations

Before you use our TWS API to create your own customized trading application, you should consider the following important recommendations:

- Placing Orders by Conid - When you place an order by conid, you must provide the conid AND the exchange. If you provide extra fields when placing an order by conid, the order may not work.
- Order IDs - Each order you place must have a unique Order ID. We recommend that you increment your own Order IDs to avoid conflicts between orders placed from your API application. To resolve issues with Order IDs, click the **Reset API order ID sequence** button on the API - Settings panel in TWS Global Configuration.
- Please test your API application with an IB Paper Trading account to catch and avoid any errors. You can request a Paper Trading account from Account Management.
- While the API supports up to eight simultaneous API connections using the same login to a single running TWS, we recommend that you avoid this scenario. If possible, use a single API connection for your application to avoid performance overhead.

API Orders and TWS Precautionary Settings

By default, Trader Workstation includes precautionary settings as part of its Order Presets on the TWS Configuration page. Precautionary settings are safety checks and include percentage, size limit, total value and number of ticks. They can be modified in TWS for most instrument types (stocks, options, and so on) or for specific tickers.

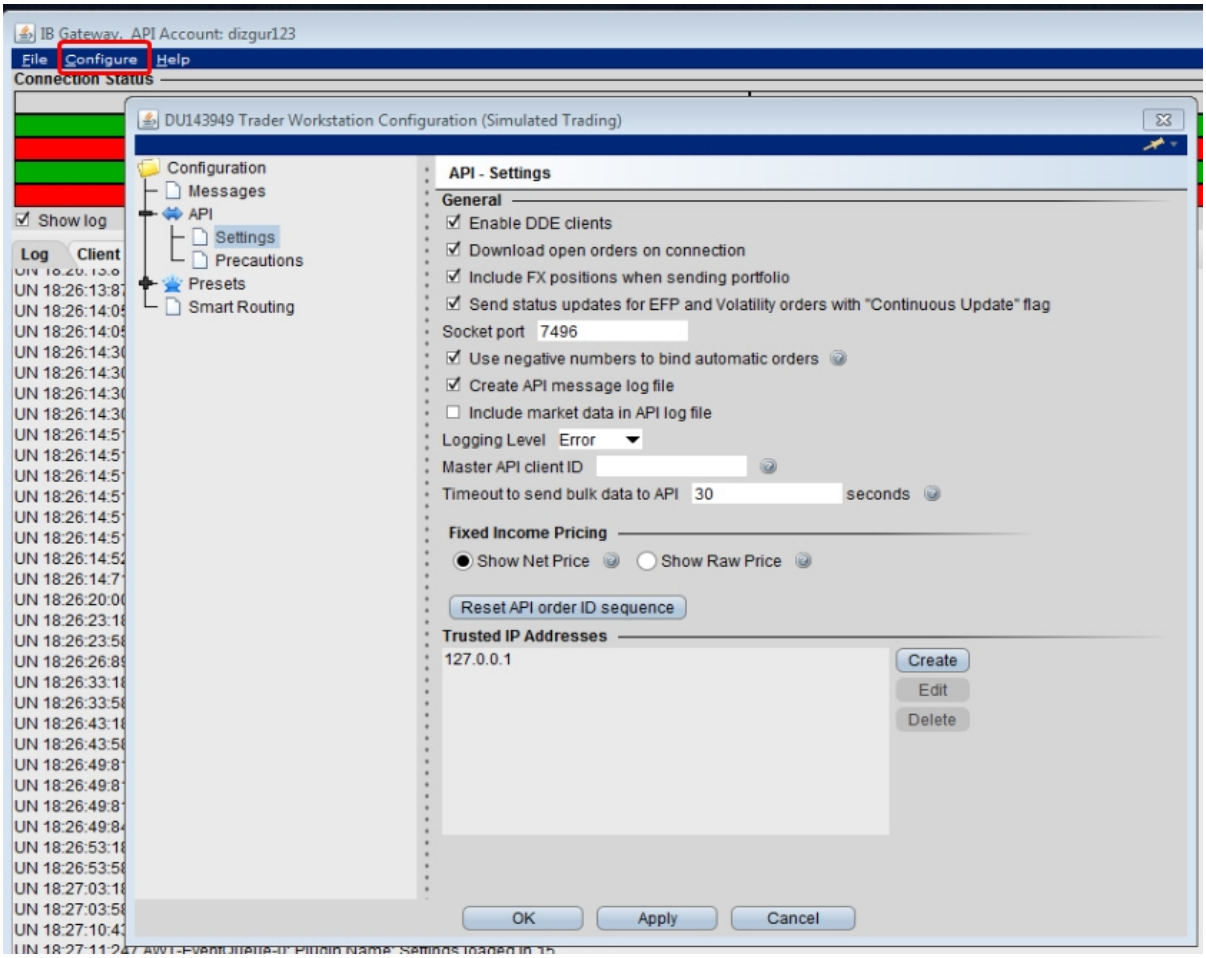


If your API order violates these settings, you will receive an error message. For example, the default precautionary setting for order size is 500. If you place an order for 1000 shares of stock, you will receive an error message indicating that the size specified violates the constraints specified in the default order settings. TWS precautionary settings apply to API orders placed from ALL API technologies.

You can override the precautionary settings by doing one of the following:

In TWS:

- On the Configure menu, select *API* then *All API Settings*. Select the *Bypass Order Precautions for API Orders* check box, then click **OK**. All of your API orders will ignore the precautionary settings in TWS.
- In the Order Presets, enter higher precautionary setting limits for the desired instrument types and or tickers. On the Configure menu, select *Order* then select *Order Presets*. Select the instrument type or ticker on the left, enter the desired limits in the Precautionary Settings section of the page, then click **OK**.



In the IB Gateway:

- From the Configure menu, select *Settings*. Select the *Bypass Order Precautions for API Orders* checkbox and click **OK**. All of your API orders will ignore the precautionary settings you had set via a TWS session.

API Order IDs

When you place a new order using the API, the order id number must be greater than the previously used numbers. For example, if you place an order with an Order ID of 11, the next order you place should have an Order ID of at least 12. So when you place a new order, the order id must be greater than the previously used order id number.

New Order Example

In this example, a user is going to place two orders for IBM stock. The first order is a BUY order for 200 shares and set the limit price to $85.25. The second order will be an order to sell 100 shares with the limit price set to $84.25.

In this example, the first order is tagged with an Order ID of 1:

```
.placeOrder(1, IBM, BUY, $85.25, 200…)
```

Now, user can place a second order. This order is assigned an Order ID of 2:

```
.placeOrder(2, IBM, SELL, $84.25, 100…)
```

Modified Order Example

To modify an order using the API, resubmit the order you want to modify using the same order id, but with the price or quantity modified as required. Only certain fields such as price or quantity can be altered using this method. If you want to change the order type or action, you will have to cancel the order and submit a new order.

In this example, a user initially decides to buy 100 shares and sets the limit price to $85.25. Then, customer wants to modify the same order and change the limit price to $86.25. Note that the first order is assigned an Order ID of 3:

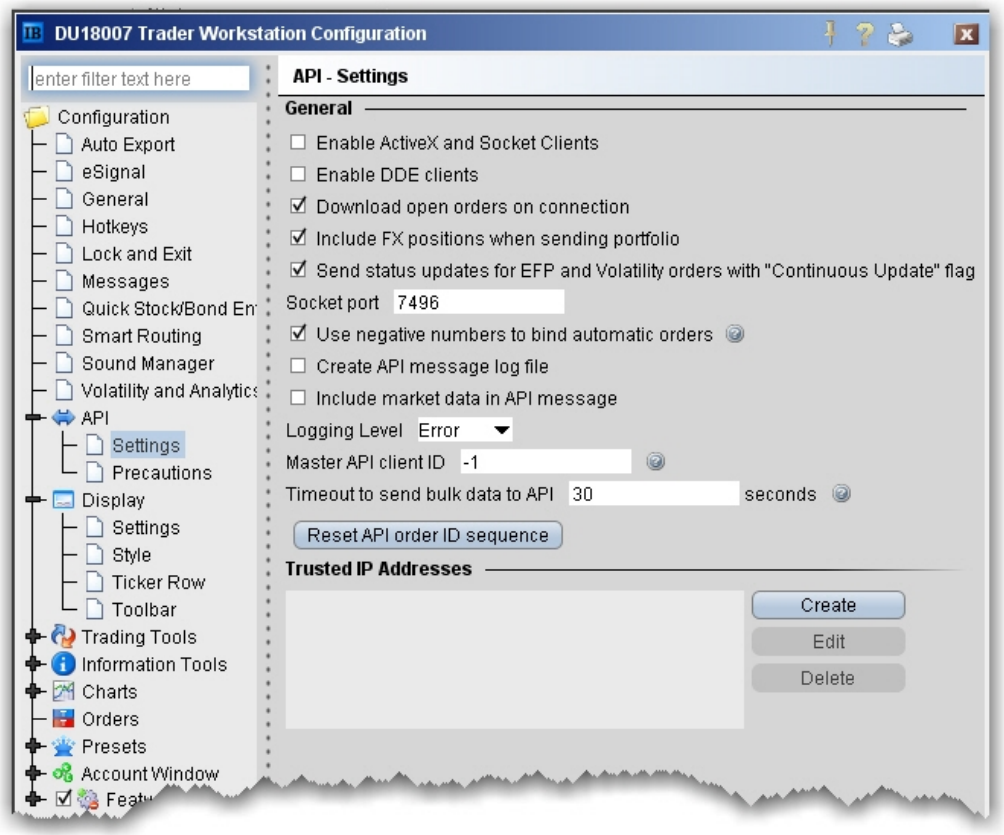
```
.placeOrder(3, IBM, BUY, $85.25, 100…)
```

You can now modify the limit price for this order by calling the same .placeOrder method and using the same Order ID of 3, with the limit price modified to $86.25

```
.placeOrder(3, IBM, BUY, $86.25, 100…)
```

Trader Workstation API Settings

In addition to configuring Trader Workstation (TWS) to communicate with the API, there are a number of other API-related settings in TWS that you can configure.



To configure API settings in TWS

1. In TWS, select the **Edit** menu, then select *Global Configuration*.
2. Click *API* in the left pane, and select *Settings*.
3. Configure the API settings as required. These are described below.

> **Note:** With the exception of DDE, the API application does not need to be running on the same computer on which the application is running.

General

- **Enable Active X and Socket Clients** - Check to enable integration using ActiveX or socket clients including Java and C++.
- **Enable DDE clients** - Check to enable integration with TWS with TWS through DDE.
- **Download open orders on connection** - uncheck if you do not want to download all open orders when you connect to your API.

- **Include FX positions when sending portfolio** - If you have the Include FX Positions feature activated, all FX positions will be included when portfolio updates are sent the to API client. Uncheck this box if you don't want FX positions sent to the API client when the portfolio updates are sent.
- **Send status updates for EFP and Volatility orders with "Continuous Update" flag** - If you have Continuous Update activated for EFP or Volatility orders, all updates are sent to the API client by default. Uncheck if you don't want these updates sent from TWS to the API client.
- **Use negative numbers to bind automatic orders** - if checked, all orders that are automatically bound to an API client via the reqOpenOrders or reqAutoOpenOrders calls or via system-generated orders (i.e. volatility hedging orders) will be assigned negative API order IDs. Otherwise, these orders will be assigned incremental API order IDs. Volatility hedging orders will have the order ID “parent API order ID + 1” when possible.
- **Create API message log file** - check to create a message log file. Use the Logging Level selector to define the level of detail in the log.
- **Include market data in API message** - shows market data in the API log file.
- **Socket port** - Enter a socket port number which allows you to access multiple instances of TWS or IB Gateway running on a single host. By assigning a unique socket port number to each TWS or IB Gateway instance, a single ActiveX or socket API client will be able to access each of these instances. This does not apply to DDE clients.
- **Logging Level** - Set the level of log detail for the API text log. System gives the most general level of logging; Detail gives the most detailed level. Note that Detail uses more computing resources and may result in a decrease in performance.
- **Master API client ID** - The API client with the specified client ID will receive all orders, even those placed by other API clients. This differs from the Client ID of “0” which will receive all orders sent from the TWS GUI.
- **Timeout to send bulk data to API** - define the time in seconds that TWS will wait before disconnecting the API client if data cannot be sent quickly enough.

Trusted IP Addresses

If you connect to the API through a trusted IP address, the connection is not questioned. Otherwise, you will get a verification message asking if you are sure you want to make the connection.

- Click **Create** to add a new trusted IP address to the list.
- Click **Edit** to modify the selected address.
- Click **Delete** to remove the selected address.

Uninstalling and Re-installing the TWS API Software on Windows

If you encounter problems running the TWS API software on the Windows platform, you can uninstall and re-install the API software.

> **Note:** This procedure is usually only necessary when troubleshooting the most extreme API problems.

To uninstall and re-install the TWS API software on Windows

1. Open the Windows Control Panel, then open *Add or Remove Programs*.
2. Select *TWS Interoperability Components* from the list of installed programs, then click **Change/Remove**.
3. Select *Automatic*, then click **Next** to uninstall the TWS API software.
4. In the Windows Explorer, delete the file *TwsSocketClient.dll* from the *Windows\system32* folder.
5. Reboot your computer.
6. Re-install the TWS API software.

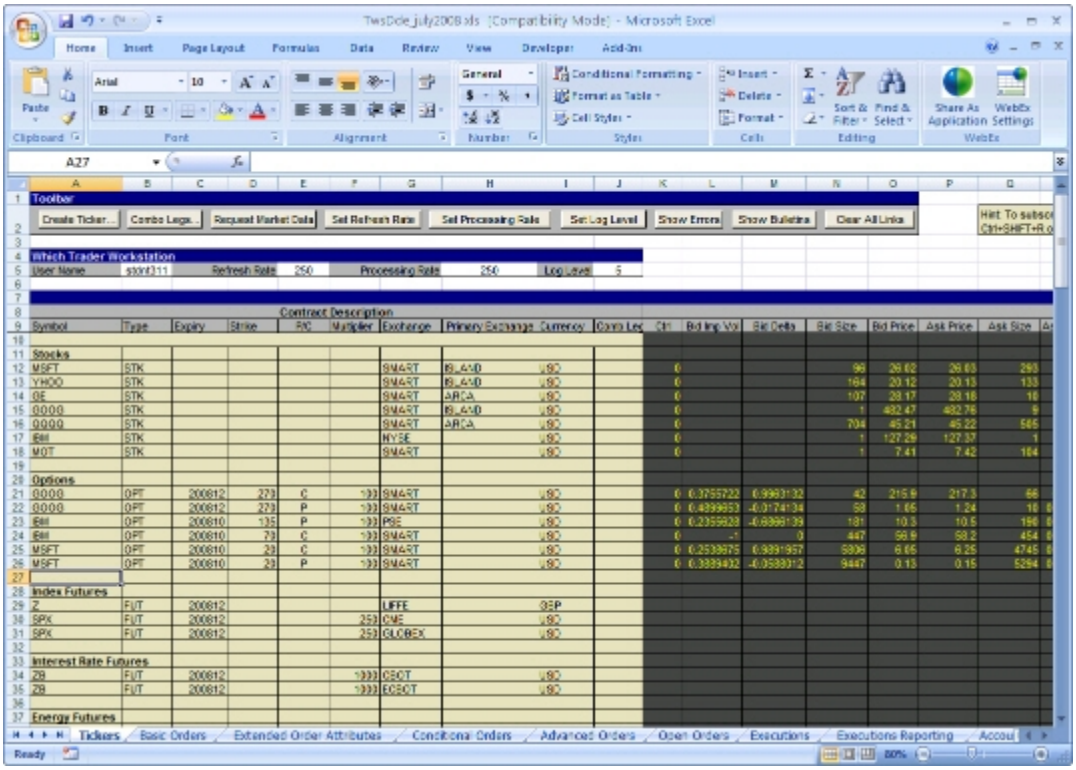
2

DDE for Excel

This chapter describes the DDE for Excel API, including the following topics:

DDE is an acronym for Dynamic Data Exchange, a Microsoft-created communication method that allows multiple applications that are running simultaneously to exchange data and commands. We use this protocol to link Excel with your running version of TWS or the IB Gateway, allowing you to view real-time market data (including market depth) manage orders and monitor your executions and account information using an Excel spreadsheet.

The following figure shows the Tickers page in the Excel DDE API sample spreadsheet.



Tutorial: Requesting Real-Time Market Data

The Dynamic Data Exchange (DDE) protocol is a method of inter-process communication developed by Microsoft. DDE makes it possible for TWS to communicate with other applications such as MS Excel.

One of the most common inquiries we receive at Interactive Brokers is how to export data from TWS into Excel. Since TWS does not have functionality to export intraday, we often direct customers to the TWS API and its Excel worksheets in particular. You need to be aware that the distributed DDE for Excel API worksheets are not tools to be used on a daily basis. All of our sample applications are merely demonstrations of the API capabilities aimed at experienced programmers who will in turn use them as a reference to develop more complex and robust systems.

This document is a brief tutorial that explains how retrieve market data through MS Excel via the TWS DDE for Excel API. All of the VBA code included in this tutorial is kept to a minimum and is intended to be illustrative.

Interactive Brokers does not offer any programming assistance. We therefore strongly advise interested customers to use the TWS DDE for Excel API to become familiar with the technologies involved, such as the DDE protocol and VBA.

This Market Data Tutorial is presented as follows:

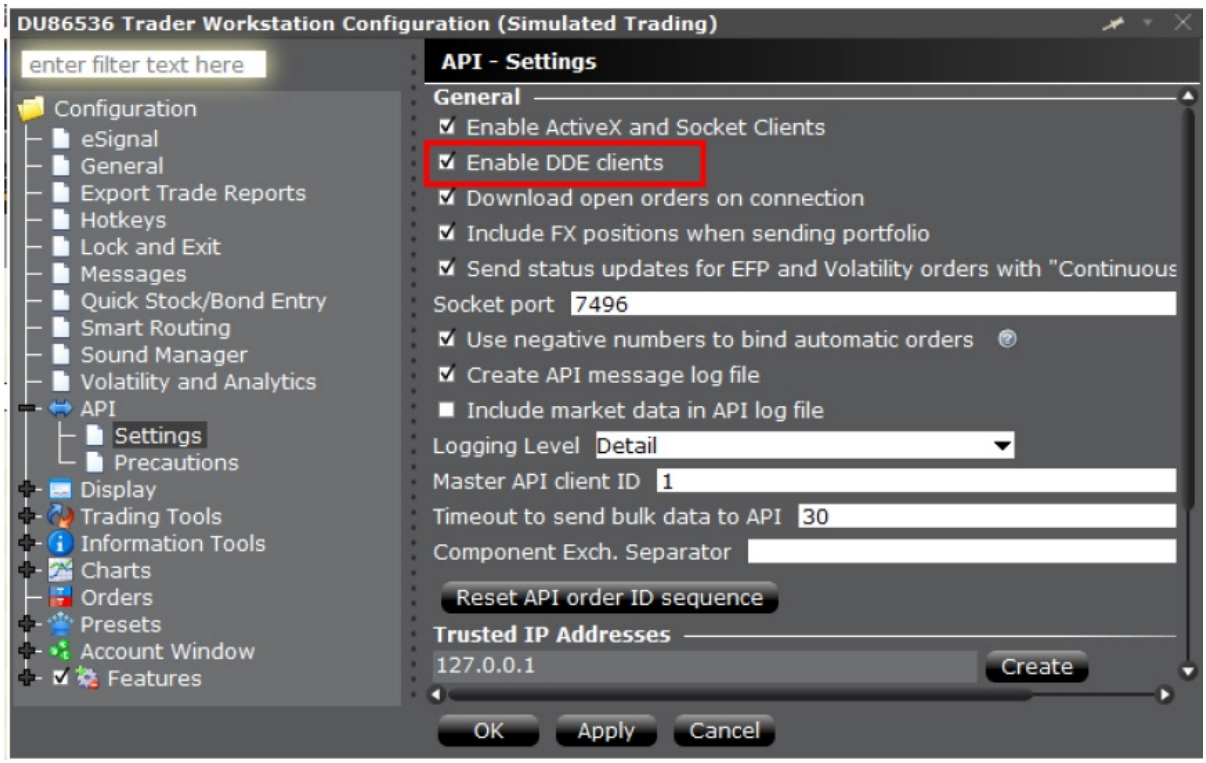
1. What You Will Need
2. Prepare the Request
3. Request the Data
4. Understand the DDE Formulas
5. Obtain the Last Available Error
6. Define Other Instruments
7. Request Other Data Values

Tutorial: Requesting Real-Time Market Data - What You Will Need

This tutorial has been developed using Excel 2010 and the 9.72 version of the TWS API components.

Before you continue with this tutorial, you will need to do the following:

1. Download TWS API Version 9.72 from http://interactivebrokers.github.io/, and then install the API.
2. Log into TWS, which must be up and running while you are using the DDE for Excel API. Enable DDE client connectivity by clicking **Edit > Global Configuration > API > Settings**, and then check the **Enable DDE clients** box as shown below.



3. Open a new, blank spreadsheet in Excel. You do not have to use the DDE for Excel sample spreadsheet for this tutorial.

Tutorial: Requesting Real-Time Market Data

1. Prepare the Request

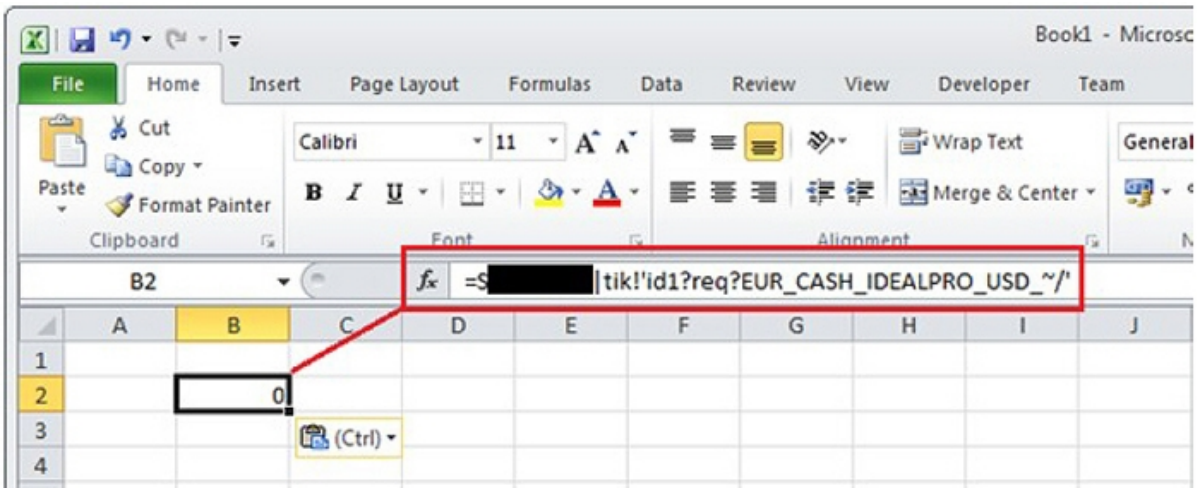
You can view market data for multiple products that update in real time within Excel itself. Requests via the DDE for Excel API are nothing but Excel formulas (DDE data links), each formula serving a very specific purpose. Market Data retrieval requires at least two different DDE links: one to start the market data subscription and one to receive the specific tick type.

The formula to start the request must provide TWS with enough information so that TWS can unambiguously identify which instrument you want. As a first example, we will request FX market data (EUR.USD). Copy and paste the following formula (DDE link) into a cell in your new, blank Excel spreadsheet:

=S**sample123**|tik!'id1?req?EUR_CASH_IDEALPRO_USD_~/'

In the example above, **sample123** is simply a placeholder for your username. Replace **sample 123** with the username you used to log into TWS. This applies to all subsequent DDE links described in this tutorial.

When you copy the formula into any cell of an Excel spreadsheet, the cell should automatically display **0**.



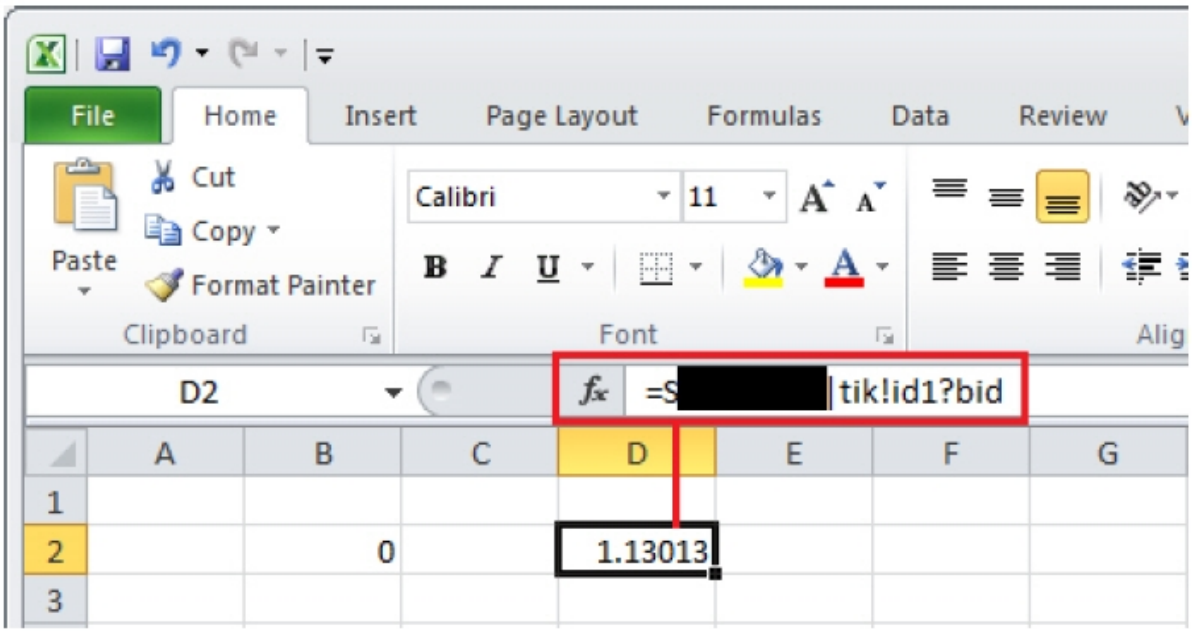
After you have done this, TWS will be aware that a DDE link is requesting EUR.USD data.

Tutorial: Requesting Real-Time Market Data
2. Request the Data

Once TWS recognizes our DDE link trying to pull EUR.USD data, we can read it. We are currently interested in knowing the bid price of the EUR.USD FX pair. Therefore, we need to use the formula:

=Ssample123|tik!id1?bid

Paste the above formula into the same Excel spreadsheet to see the result:



The value displayed on cell D2 is the exact same value the TWS displays for the EUR.USD bid price and will keep updating as long as the request is active.

Tutorial: Requesting Real-Time Market Data
3. Understand the Formulas

As described in the previous steps of this tutorial, the first formula asks TWS to open a DDE channel through which we can obtain EUR.USD data, while the second one pulls the bid price for EUR.USD.

The Request

The requesting formula must contain all necessary elements so that TWS can unambiguously identify the desired contract. In this case:

=S[twsuser]|tik!'id[reqestId]?req?[symbol]_[sectype]_[exchange]_[currency]_~/'

Where:

Attribute	Description
twsuser	The username with which you logged into TWS.
requestId	The request's unique identifier (any positive integer).
symbol	The contract's symbol (EUR).
sectype	The kind of contract (CASH).
exchange	The exchange from which we want to pull the data (IDEALPRO).
currency	The contract's currency (USD).

Example

=Ssample123|tik!'id1?req?EUR_CASH_IDEALPRO_USD_~/'

The Bid Price Retrieval

Once the request is made, the price is received by passing in the exact same ID used in the request formula:

=S[twsuser]|tik!id[requestId]?bid

Where

Attribute	Description
twsuser	The username with which you logged into TWS.
requestId	The same number used in the request's identifier.

Example

=Ssample123|tik!id1?bid

Tutorial: Requesting Real-Time Market Data
4. Obtain the Last Available Error

Unfortunately things do not always work as expected. The slightest error in the DDE link or the contract description that you provide will prevent you from receiving the market data from TWS. The first and most obvious step in solving this problem is to make sure that your DDE links are correct and contain no spelling errors or typographical errors such as unwanted spaces or characters.

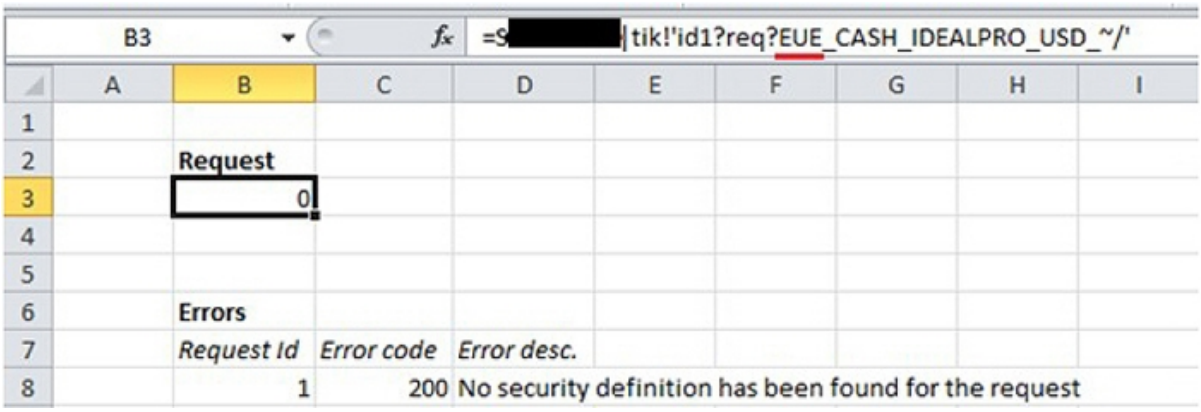
If the formula is correct but you are still not able to see any data, you can ask the TWS about any errors generated in response to your request. In most cases, TWS will be able to point us in the right direction.

TWS can only remember the most recent error. This is very important to remember because your Excel spreadsheet will often have many active requests with multiple possibilities for errors. Be sure that all previous requests are working as expected before creating a new one. This will help identify any problem.

There are three formulas that you need to use. Enter each formula into its own cell in your Excel worksheet:

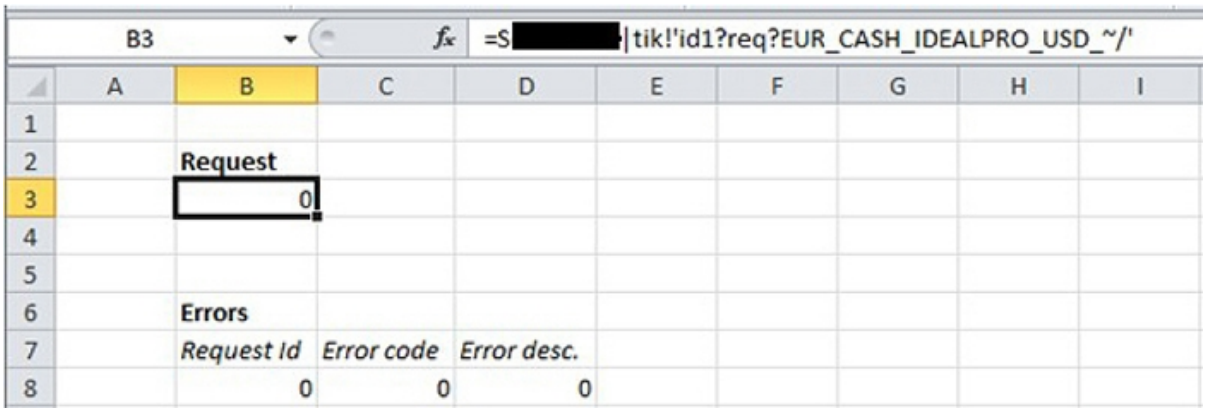
Formula	Description
=S[twsuser]|err!id	Obtains the failed request's unique ID.
=S[twsuser]|err!errorCode	The error code.
=S[twsuser]|err!errorMsg	The description of the error.

Let's look at an example. In the following figure, the real time data request formula's symbol has been intentionally modified to EUE instead of EUR. We've entered the three error formulas into three separate cells. We will receive an error for that request (the request ID is 1), along with the error code and description (No security definition has been found for the request). This error means that the contract for which we are requesting data cannot be found. In other words, the description of the contract in the DDE link is wrong.



	A	B	C	D	E	F	G	H	I
1									
2		Request							
3		0							
4									
5									
6		Errors							
7		*Request Id*	*Error code*	*Error desc.*					
8		1	200	No security definition has been found for the request					

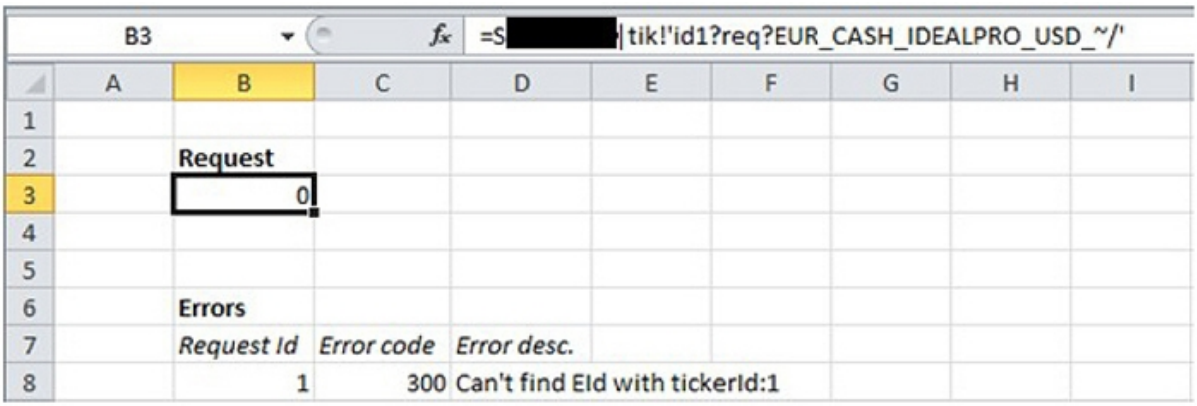
Once you know what caused the error, you should clear the error formulas first, and then correct the original DDE link. When you do this, you will notice that the error formulas will return a 0 value:



	A	B	C	D	E	F	G	H	I
1									
2		Request							
3		0							
4									
5									
6		Errors							
7		*Request Id*	*Error code*	*Error desc.*					
8		0	0	0					

Why is it important to first clear the error formula before correcting our request?

We mentioned earlier on that TWS will hold the last available error message of the last failed request. This implies that TWS will remember that, as in our example, the request identified with id X, has an error associated to it. It is very tempting to simply correct the typo in our request. However, this will create an “orphan” error in TWS and this "Can't find EId" error will also be sent to your Excel worksheet, as shown in the following image. This orphan error is basically TWS saying “I cannot find an error for this request.”



You might think that you can easily ignore this error. Imagine, however, that you have many DDE links in your Excel worksheet and one of them resulted in a "no security definition has been found" error. Later, another link in your sheet causes the "Can't find EId" error to appear. You will only be able to see the last error, which is not really telling you much about why your Excel worksheet is not working as you expect. While this logic applies to all errors, this last error can be particularly misleading.

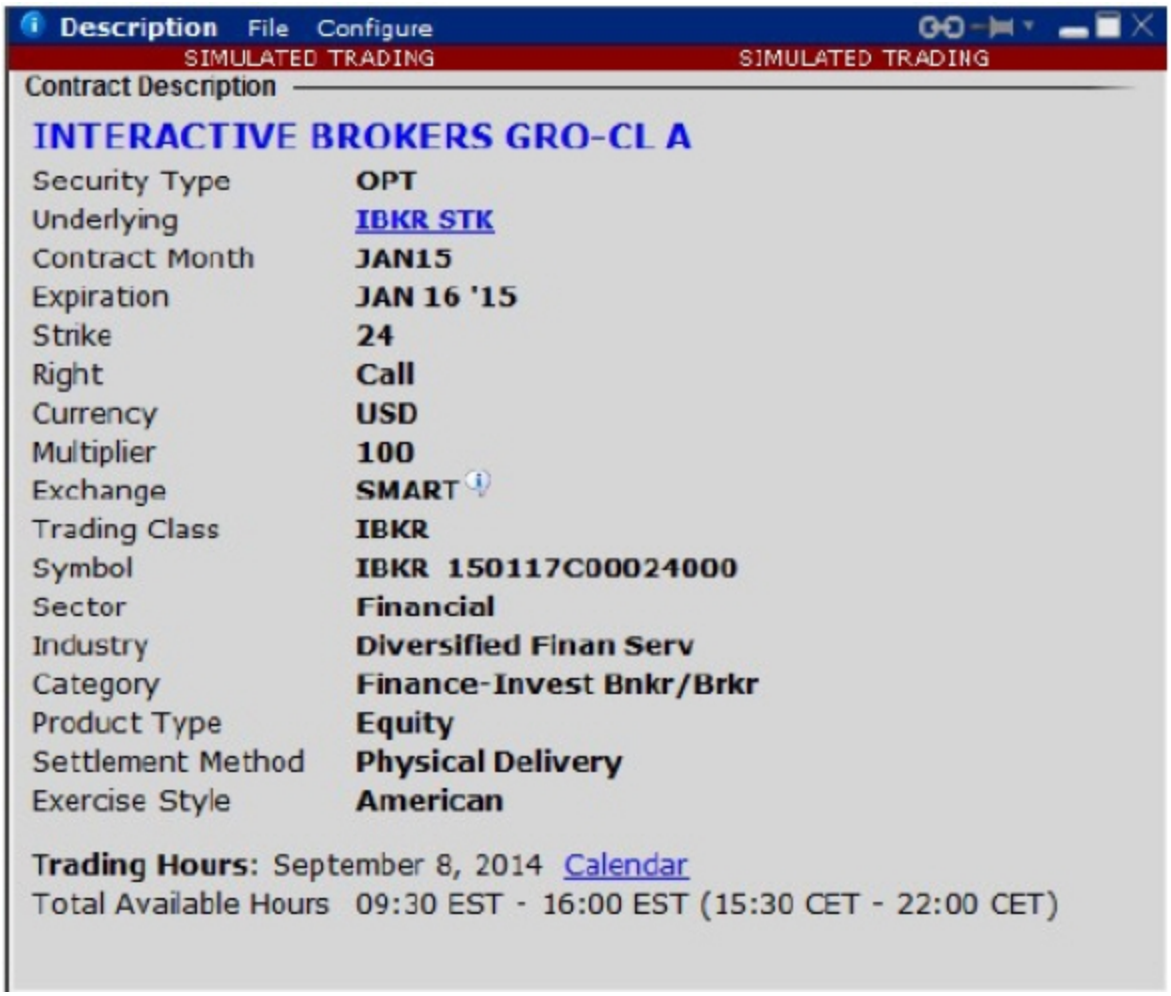
REMEMBER: Be sure that all of your previous requests are working as expected before moving to the next one.

Tutorial: Requesting Real-Time Market Data
5. Define Other Instruments

The TWS DDE for Excel API lets you retrieve data for any instrument available in TWS. So far we have been using the simplest instrument of all: CASH. Using slight variations of the same formula, you can define any security type available in TWS.

How to Find the Definition of a Contract

The best way of finding a contract's description is often in TWS itself. In TWS, you can easily check a contract's description by right-clicking the contract and then selecting **Contract Info > Description**. The Contract Description window in TWS looks like this:


Description File Configure
SIMULATED TRADING
SIMULATED TRADING
Contract Description
INTERACTIVE BROKERS GRO-CL A
Security Type OPT
Underlying IBKR STK
Contract Month JAN15
Expiration JAN 16 '15
Strike 24
Right Call
Currency USD
Multiplier 100
Exchange SMART
Trading Class IBKR
Symbol IBKR 150117C00024000
Sector Financial
Industry Diversified Finan Serv
Category Finance-Invest Bnkr/Brkr
Product Type Equity
Settlement Method Physical Delivery
Exercise Style American
Trading Hours: September 8, 2014 Calendar
Total Available Hours 09:30 EST - 16:00 EST (15:30 CET - 22:00 CET)

Formulas for Different Security Types

The syntax for all different types of products is shown below:

FX Pairs

Formula

=S[twsuser]|tik!'id[reqId]?req?[symbol]_[SecType]_[exchange]_[currency]_~/'

Example

=Ssample123|tik!'id1?req?EUR_CASH_IDEALPRO_USD_~/'

STK

Formula

=S[twsuser]|tik!'id[reqId]?req?[symbol]_[SecType]_[exchange]_[currency]_~/'

Example

=Ssample123|tik!'id2?req?MSFT_STK_SMART_USD_~/'

FUT

> **Note:** For futures, we can use a slight variation on the formula (req2 instead of req1). This allows us to define FUT contracts using the future contract's own symbol instead of its underlying symbol. Using the future's symbol lets you correctly define the contract without having to specify its multiplier or its expiration date.

FUT using the contract's local symbol

Formula

=S[twsuser]|tik!'id[reqId]?req2?[symbol]_[SecType]_[exchange]_[currency]_~/'

Example

=Ssample123|tik!'id3?req2?ESU5_FUT_GLOBEX_USD_~/'

FUT using underlying's symbol, multiplier and expiration date

Formula

=S[twsuser]|tik!'id[reqId]?req?[underlying_symbol]_[SecType]_[expiry]_[multiplier]_[exchange]_[currency]_~_~/'

Example

=Ssample123|tik!'id3?req?ES_FUT_201503_50_GLOBEX_USD_~_~/'

OPT

Formula

=S[twsuser]|tik!'id[reqId]?req?[underlying_symbol]_[SecType]_[expiry]_[strike]_[P/C]_[multiplier]_[exchange]_[currency]_~_~/'

Example

=Ssample123|tik!'id4?req?DBK_OPT_20160617_28_C_100_DTB_EUR_~_~/'

FOP

Formula

=S[twsuser]|tik!'id[reqId]?req?[underlying_symbol]_[SecType]_[expiry]_[strike]_[P/C]_[multiplier]_[exchange]_[currency]_~_[tradingClass]/'

Example

=Ssample123|tik!'id5?req?EUR_FOP_20150605_1.33_C_125000_GLOBEX_USD_~_XT/'

IND

Formula

=S[twsuser]|tik!'id[reqId]?req?[symbol]_[SecType]_[exchange]_[currency]_~/'

Example

=Ssample123|tik!'id6?req?ES_IND_GLOBEX_USD_~/'

BAG

Formula

=S[twsuser]|tik!'id[reqId]?req?[symbol]_[SecType]_[exchange]_[currency]_CMBLGS_[num of legs]_[legId]_[legQuantity]_[legAction]_[legExchange]_[legPrice]...CMBLGS_~/'

Example

=Ssample123|tik!'id7?req?

USD_BAG_SMART_USD_CMBLGS_2_109385219_1_BUY_SMART_0_9408_1_SELL_SMART_0_CMBLGS_~/'

Tutorial: Requesting Real-Time Market Data
6. Request Other Data Values

So far we have only shown you how to retrieve the bid price for a contract but many other data values are available.

[twsuser] = your username
[requestId] = The ID assigned to the requesting formula

Standard Tick Types

=S[twsuser]|tik!id[requestId]?bidSize

=S[twsuser]|tik!id[requestId]?bid

=S[twsuser]|tik!id[requestId]?ask

=S[twsuser]|tik!id[requestId]?askSize

=S[twsuser]|tik!id[requestId]?last

=S[twsuser]|tik!id[requestId]?lastSize

=S[twsuser]|tik!id[requestId]?high

=S[twsuser]|tik!id[requestId]?low

=S[twsuser]|tik!id[requestId]?volume

=S[twsuser]|tik!id[requestId]?close

Option Contract-Specific Ticks

=S[twsuser]|tik!id[requestId]?bidImpliedVol

=S[twsuser]|tik!id[requestId]?bidDelta

=S[twsuser]|tik!id[requestId]?askImpliedVol

=S[twsuser]|tik!id[requestId]?askDelta

=S[twsuser]|tik!id[requestId]?lastImpliedVol

=S[twsuser]|tik!id[requestId]?lastDelta

=S[twsuser]|tik!id[requestId]?modelVolatility

=S[twsuser]|tik!id[requestId]?modelDelta

=S[twsuser]|tik!id[requestId]?modelPrice

=S[twsuser]|tik!id[requestId]?pvDividend

=S[twsuser]|tik!id[requestId]?modelGamma

=S[twsuser]|tik!id[requestId]?modelVega

=S[twsuser]|tik!id[requestId]?modelTheta

=S[twsuser]|tik!id[requestId]?modelUndPrice

Tutorial: Requesting Historical Data

In the previous tutorial, we showed you how to request real time quotes from TWS using the DDE TWS API. In this tutorial, we will show you how to request historical data from TWS, although the process for doing so is slightly more complicated. You will need to add some simple Visual Basic (VBA) code to your Excel worksheet to obtain the data.

This Historical Data Tutorial is presented as follows:

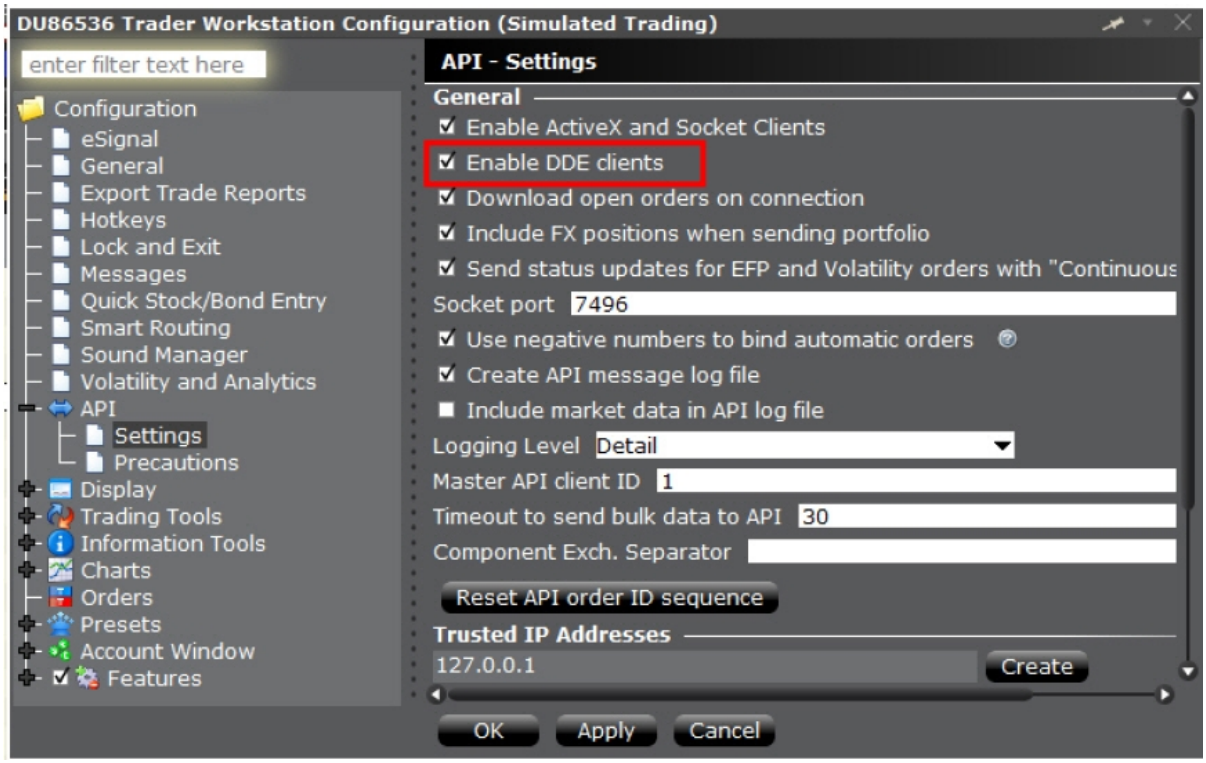
1. What You Will Need
2. Prepare the Request
3. Request the Data - Add a Button
4. Request the Data - Add the Code
5. Request Duration and Bar Size
6. Examples

Tutorial: Requesting Real-Time Market Data - What You Will Need

This tutorial has been developed using Excel 2010 and the 9.72 version of the TWS API components.

Before you continue with this tutorial, you will need to do the following:

1. Download TWS API Version 9.72 from http://interactivebrokers.github.io/, and then install the API.
2. Log into TWS, which must be up and running while you are using the DDE for Excel API. Enable DDE client connectivity by clicking **Edit > Global Configuration > API > Settings**, and then check the **Enable DDE clients** box as shown below.



3. Open a new, blank spreadsheet in Excel. You do not have to use the DDE for Excel sample spreadsheet for this tutorial.

Tutorial: Requesting Historical Data

1. Prepare the Request

Just as with real time data, historical data requests need first to ask the TWS to "prepare" the data we are interested in. The TWS needs to know not only the specific instrument but also:

- The ending date and time from which we want to collect the data, formatted as:
  - yyyymmdd hh:mm:ss
- The time duration comprising the data from the ending date going back in time.
- The bar size (IB provides historical data in open, high, low and close bar data format).
- The type of data (i.e. MIDPOINT, TRADES, etc.).
- Whether we want data generated during regular trading session or not.
- The date format in which each bar's time and date will be presented.

The formula to be used for historical data requests is:

=[twsuser]|hist!'id[requestId]?req?[symbol]_[type]_[exchange]_[currency]_~/[yyyymmdd]singleSpace[HH]singleColon[mm]singleColon[ss]_[duration amount]singleSpace[duration unit]_[bar size]_[rth only?]_[what to show]_[date format]'

Attribute	Description
twsuser	The username with which you logged into TWS.
requestId	The request's unique identifier (any positive integer).
symbol	The instrument's symbol.
type	The type of instrument.
exchange	The instrument's exchange.
currency	The instrument's currency (USD).
Yyyymmdd HH:mm:ss	End date for the historical data query.
duration amount	The number of time units for the duration time.
duration unit	The duration's time unit.
bar size	The bar size.
rth only	Set to **1** to obtain only data generated during regular trading hours (RTH), or set to **0** to get all data generated during and outside of of RTH.
what to show	The type of data: MIDPOINT, TRADES, BID, ASK, etc.
data format	Set to **1** to format the resulting bars' date as **yyyymmss hh:mm:ss**. Set to **2** to express the resulting bars' time as the number of seconds since 1970.

How to Handle Spaces and Colons in the Formula

Our DDE links cannot contain certain special characters such as spaces or colons, but you will need to use these characters in your DDE formula. To overcome this limitation, we have provided keywords that you can use in place of the actual special character: singleSpace and singleColon. For example, if you want to specify an end date and time such as March 2, 2015 at 23:59:59 in the format specified above, you would then enter:

20150302 23:59:59

This translates into:

20150302**singleSpace**23**singleColon**59**singleColon**59

This applies to all cases in which you need spaces or colons in the DDE formula. This is particularly important when describing futures or options contracts because you can then use their local symbols, which often include spaces. For example, the DBK futures contract expiring on May 2015 has a local symbol **DBKG MAY 15** which you would provide as:

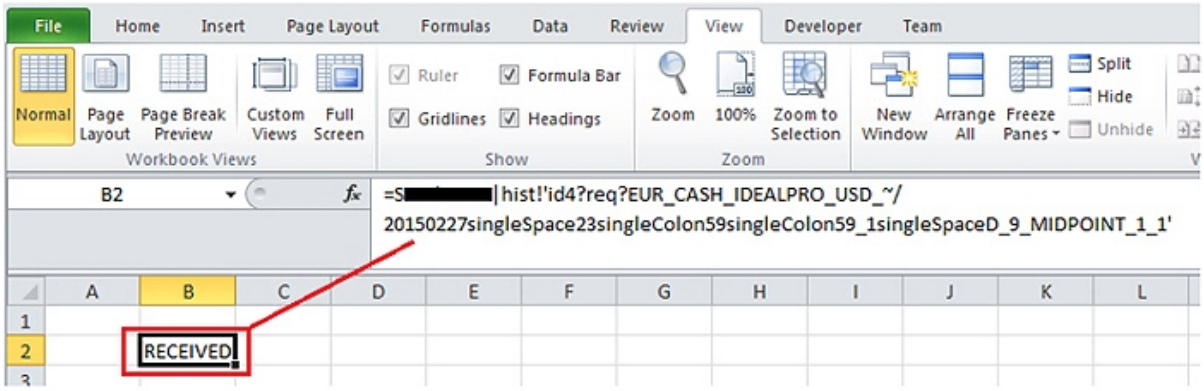
DBKGsingleSpaceMAYsingleSpace15

Enter the Historical Data Request

Let's continue with our historical data request. As an example, try to pull MIDPOINT historical data for the EUR.USD currency pair prior to February 27th 2015 at 23:59:59 in thirty minutes bars (9), for a duration of one day (1 D). The correct formula for this request is:

=Ssample123|hist!'id4?req?EUR_CASH_IDEALPRO_USD_~/20150227singleSpace23singleColon59singleColon59_1singleSpaceD_9_MIDPOINT_1_1'

Copy the above formula into an empty cell in your Excel worksheet. Notice that the cell displays PROCESSING, which, if everything proceeds without error, will change into RECEIVED":



At this point, you have just told TWS that you want our EUR.USD historical data and TWS replied that the data has been received from the server and is ready to be viewed.

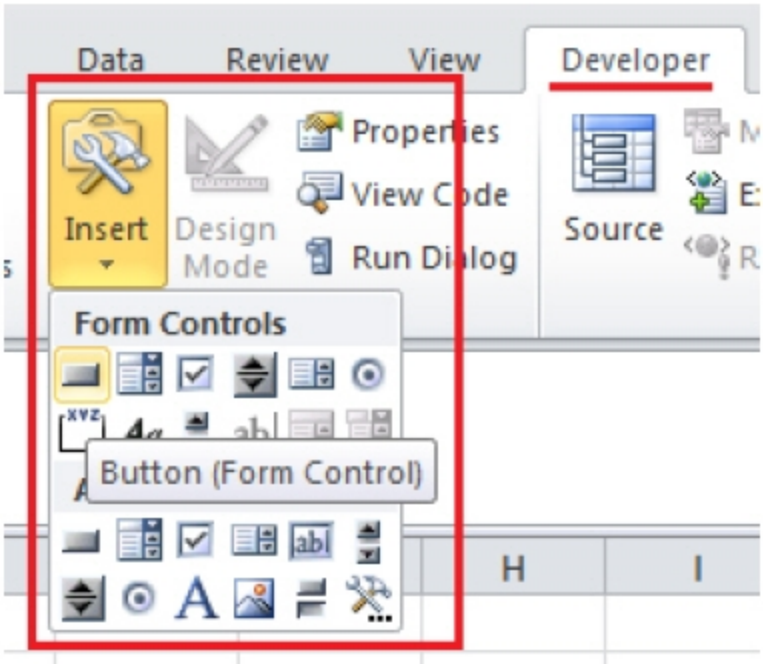
This is where the process becomes slightly complicated because, unlike real time market data, where each incoming price is obtained using a very specific formula, you will not fetch each bar one by one with a formula (this is quite fortunate since we could be expecting hundreds of bars!). Instead, you will read all the bars together using a single DDE request and then display them in your worksheet with the help of some VBA code. For purposes of simplicity, we will keep the coding to minimum.

In the next steps, we will briefly describe how to add a button to a spreadsheet for the sake of completeness but remember that it is out of the scope of IB's support to provide any assistance on using Excel.

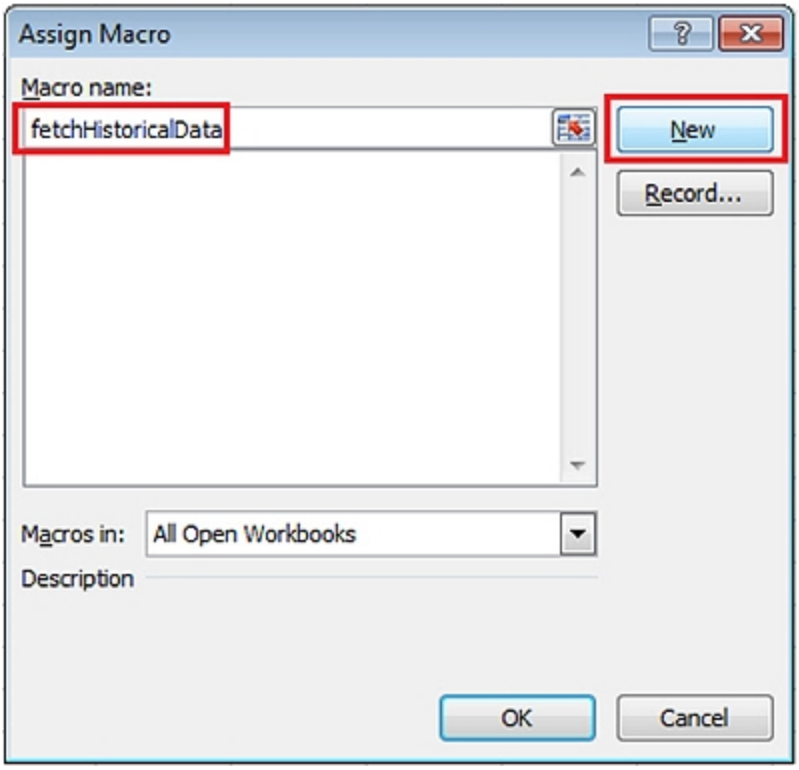
Tutorial: Requesting Historical Data
2. Request the Data - Add a Button

In this step, you will add a button to your blank worksheet which, once the TWS has replied to your historical data request with the "RECEIVED" status, will help you manually invoke the VBA routines which pull the historical data from TWS.

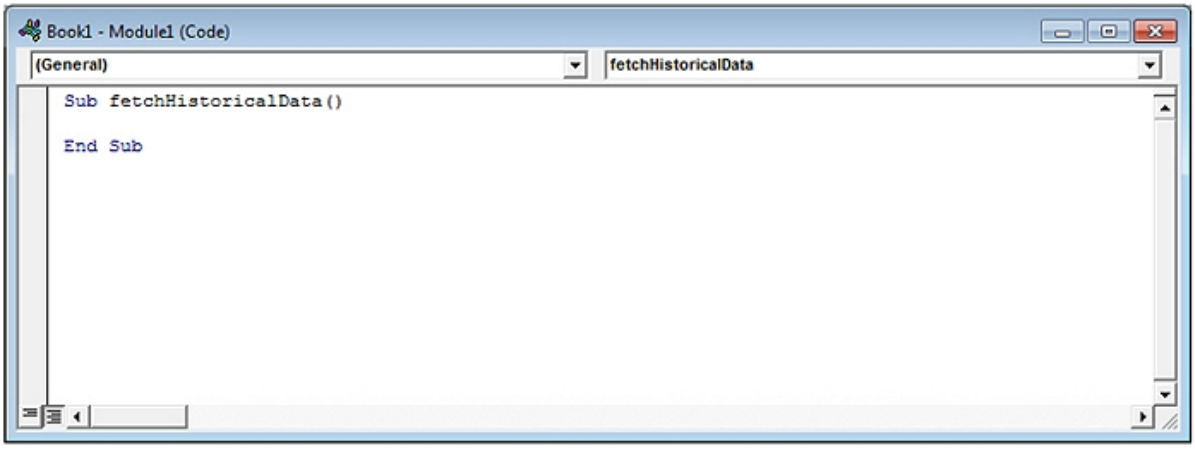
First, open the Developer tab in Excel and click on the Button form control:



Next, click anywhere in your spreadsheet to place the button. The Assign Macro dialog opens; this is where you associate a VBA macro with your button. Name your function **fetchHistoricalData** and then click the New button in the dialog.



Excel automatically opens the VBA editor, which displays the skeleton of the newly-created macro.



In the next step, you will add the code to the macro you just created.

Tutorial: Requesting Historical Data
3. Request the Data - Add the Code

Here are the routines which will finally obtain the data from the TWS:

```
Sub fetchHistoricalData()
    'This variable will store the incoming data
```

```
    Dim TheArray() As Variant
    'Fetch the data from the TWS...
    '(Replace sample123 with your own TWS username!)
    TheArray = getData("Ssample123", "hist", "id4?result")
    '... and pass the result into another function which will populate the sheet
    Call populate(TheArray)
End Sub
--------------------------------------------------------------------------------
'This function triggers a DDE request and returns its response
Function getData(serverName, topic, request)
    Dim chan As Integer
    'Initiate the DDE channel
    chan = Application.DDEInitiate(serverName, topic)
    'Perform the request
    getData = Application.DDERequest(chan, request)
    'Terminate the channel
    Application.DDETerminate chan
End Function
--------------------------------------------------------------------------------
'Populate our blank sheet with the incoming data
Sub populate(ByRef TheArray() As Variant)
'Watch out for empty possible errors and handle properly.
On Error GoTo ErrHandler
    For i = 1 To UBound(TheArray)
        Range("F" & i + 1).Value = TheArray(i, 1)
        Range("G" & i + 1).Value = TheArray(i, 2)
        Range("H" & i + 1).Value = TheArray(i, 3)
        Range("I" & i + 1).Value = TheArray(i, 4)
        Range("J" & i + 1).Value = TheArray(i, 5)
        Range("K" & i + 1).Value = TheArray(i, 6)
        Range("L" & i + 1).Value = TheArray(i, 7)
        Range("M" & i + 1).Value = TheArray(i, 8)
        Range("N" & i + 1).Value = TheArray(i, 9)
    Next
ErrHandler:
    Exit Sub
End Sub
```

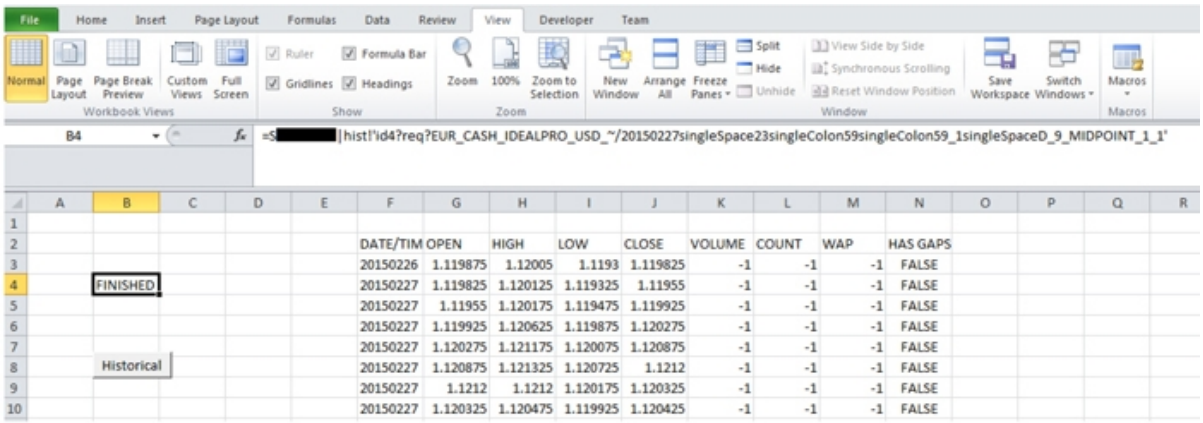
The fetchHistoricalData method invokes the getData function passing in:

- The DDE server name, which is your TWS username prefixed with a capital S
- The DDE “topic” for historical data: “hist”

- A third parameter which is just the remaining fragment of the DDE link: id[requestId]?result

The third parameter contains the request ID you used in the requesting formula (4). Remember this same procedure from the previous tutorial when you requested real time data. Your request/retrieve formulas both need to include the exact same ID.

If you correctly entered the code into your macro in the VBA editor as shown above, your Excel worksheet should look very similar to the image below. (Note that we have changed the button label to **Historical** from its default value).

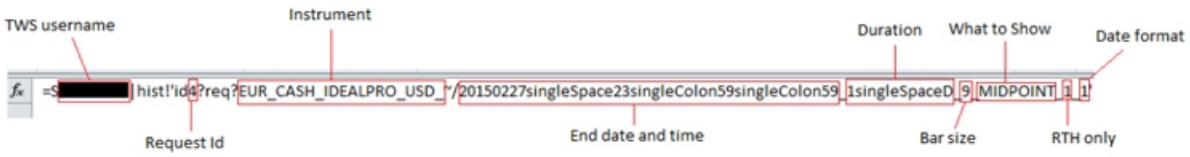


Just after the data is retrieved from TWS, the requesting formula will change its output to FINISHED.

It is very important for to wait until the request formula's output changes from PROCESSING to RECEIVED before you try to pull the actual data from TWS. If the cell displays PROCESSING for too long, then it is very likely there was an error in your request. If this happens, make use of the error retrieval formulas explained in the Market Data tutorial.

Tutorial: Requesting Historical Data
4. Request Duration and Bar Size

In the example in the previous step, you pulled midpoint historical data for EUR.USD from TWS.



Most of the formula's components are self-explanatory with the exception of duration and bar sizes, which require very specific codes (shown below), and the What to Show parameter, which can be MIDPOINT, TRADES, BID, ASK, BID_ASK, HISTORICAL_VOLATILITY or OPTION_IMPLIED_VOLATILITY.

Duration

Time Unit	Formula Abbreviation
Seconds	S

Time Unit	Formula Abbreviation
Day	D
Week	W
Month	M
Year	Y

Bar Sizes

Bar Size	Formula Parameter
1 second	1
5 seconds	2
15 seconds	3
30 seconds	4
1 minute	5
2 minutes	6
5 minutes	7
15 minutes	8
30 minutes	9
1 hour	10
1 day	11

Tutorial: Requesting Historical Data
5. Examples

For your reference, we've included examples of historical data request formulas for a variety of different contract types.

Stocks

Yahoo MIDPOINT data, all available trading hours, 300 seconds in 30 seconds bars ending on August 1, 2014 at 23:59:59 with date expressed in milliseconds.

=Ssample123|hist!'id3?req?YHOO_STK_ISLAND_USD_~/20140801singleSpace23singleColon59singleColon59_300singleSpaceS_4_MIDPOINT_0_2'

Futures

Swiss Market Index (SMI) September 2015 Future (local symbol FSMI SEP 15) Bid/Ask combined data, all available trading hours, two days in 30 minutes bars ending on February 27, 2015.

=Ssample123|hist!'id5?req2?FSMIsingleSpaceSEPsingleSpace15_FUT_SOFFEX_CHF_~/20150227singleSpace23singleColon59singleColon59_2singleSpaceD_9_BID_ASK_1_1'

30 years Treasury bond expiring March 2015 (local symbol ZB SEP 15 – note the three spaces between ZB and SEP), data generated only during regular trading hours, TRADES data for 1 month in day bars.

=Ssample123|hist!'id6?req2?ZBsingleSpacesingleSpacesingleSpaceSEPsingleSpace15_FUT_ECBOT_USD_~/20150227singleSpace23singleColon59singleColon59_1singleSpaceM_11_ASK_0_1'

Options

Deutsche Bank CALL option expiring June 17, 2016 midpoint data in day bars during one month.

=Ssample123|hist!'id1?req?DBK_OPT_20160617_28_C_100_DTB_EUR_~_~/20150227singleSpace23singleColon59singleColon59_1singleSpaceM_11_MIDPOINT_1_1'

Interactive Brokers PUT option expiring September 18, 2015 one week of Bid/Ask combined data in hourly bars.

=Ssample123|hist!'id2?req?IBKR_OPT_20150918_32_P_100_SMART_USD_~_~/20150227singleSpace23singleColon59singleColon59_1singleSpaceW_10_BID_ASK_1_1'

Futures on Options

Euro/Dollar FOP expiring on May 8, 2015.

=Ssample123|hist!'id9?req?EUR_FOP_20150508_1.2_C_125000_GLOBEX_USD_~_6E/20150227singleSpace23singleColon59singleColon59_1singleSpaceM_10_TRADES_1_1'

Getting Started with the DDE for Excel API

We have created a sample DDE-linked Excel spreadsheet, TwsDde.xls, that you can use with your TWS to create a custom Excel application. It's easy to get started with the DDE for Excel API:

- Download the API components and sample Excel spreadsheet.
- Ensure that the DDE clients are enabled, either in Trader Workstation or IB Gateway, as described here here, or that the IB Gateway is running.
- Open the spreadsheet and start using the DDE for Excel API.

The sample spreadsheet currently comprises several pages complete with sample data and action buttons that make it easy for you to get market data, send orders and view your activity.

Download the API Components and Spreadsheet

We recommending using the sample Excel spreadsheet that we provide as a starting point toward creating your own DDE for Excel API. Follow the steps below to download the sample spreadsheet.

To install the sample DDE Spreadsheet

1. Download the latest API software from the IB website:
2. From the IB website menu, click **Trading Technology > API Solutions.**
3. Cick **IB API**, then click the **API Software** button.
4. In the popup window, read the license agreement then click **I Agree**.
5. Click the button corresponding to the Windows-based production, beta or previous API version you want to install.

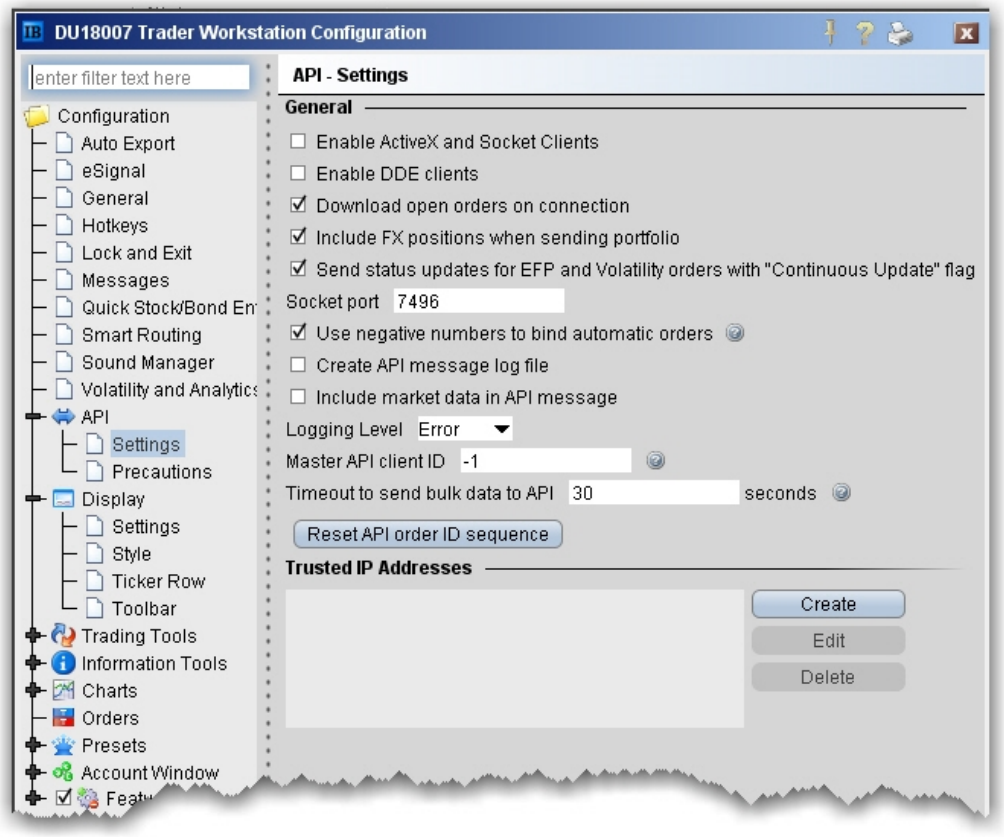
   Note: Windows users can download the beta test version of the API by using the Windows Beta column, or revert to the previous production version by selecting Downgrade to Previous Version.

6. Save the installation program to your computer, and if desired, select a different directory. Click **Save**. Note that the API installation file is named for the API version; for example, *TWS API 9.70*.
7. Close any versions of TWS, the IB Gateway and Excel that you have running.
8. Locate the API installation program you just saved to your computer, then double-click the file to begin the API installation.
9. Follow the instructions in the installation wizard. By default, the sample DDE spreadsheet is located in the **samples\Excel** folder in your API installation folder.

   Note: Before you can use the spreadsheet, you must have TWS running and configured to support the DDE API. You can also run the sample against the IB Gateway but we recommend you start by running TWS.

Configure Trader Workstation to Support API Components

You must have your system running to use any of the API components.



To configure the application to support accessing its functionality via the API

1. On the **Edit** menu select *Global Configuration*.
2. Click *API* in the left pane, and select *Settings*.
3. On the right panel, check *Enable DDE clients* to enable integration with TWS with TWS through DDE. Download sample programs from the Software page on the IB website.
4. Set the rest of the API parameters as required. For details, see Trader Workstation API Settings.

Note: Not more than one API application can simultaneously access a single instance. With the exception of DDE, the API application does not need to be running on the same computer on which the application is running.

Open the Sample Spreadsheet

After you have downloaded the sample spreadsheet and configured the application to allow the DDE for Excel API to link to it, open the spreadsheet and save it as your personal file.

To open the sample spreadsheet

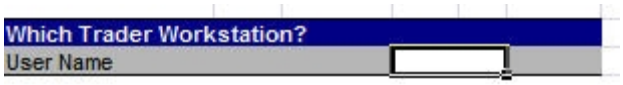
1. Go to the API installation folder in which the Excel API sample spreadsheet was installed (**samples\Excel** in your API Installation folder), and double-click **TwsDde.xls**.
2. In the macro warning message box, click **Enable Macros**. If you receive a message asking if you want to link to information in another worksheet, click **Yes**.

   Note: To use the spreadsheet macros, your Excel macro security must be set to Medium or Low. If you cannot open the spreadsheet or if the macros don't work, you need to modify your macro security level.

   In Microsoft Excel 2007, click the Microsoft Office Button, click **Excel Options**, and then click **Trust Center** in the Excel Options window. In the Trust Center, click *Macro Settings*, then change your settings as required.

   In previous versions of Excel, select *Macro* from the **Tools** menu, and then select *Security*. Set security to Medium or Low.

3. In the *User Name* field in the *Which Trader Workstation?* area, type your account user name. Note that you must type your User Name on each page of the worksheet to properly connect.



We recommend using this spreadsheet as the starting point for your API application. This means that when new features are added, you will need to cut and paste your information from your Excel spreadsheet to the newly released sample spreadsheet, then save the application under a different filename.

Using the DDE for Excel Sample Spreadsheet

The DDE for Excel API sample spreadsheet, TwsDde.xls, includes the following pages (tabs):

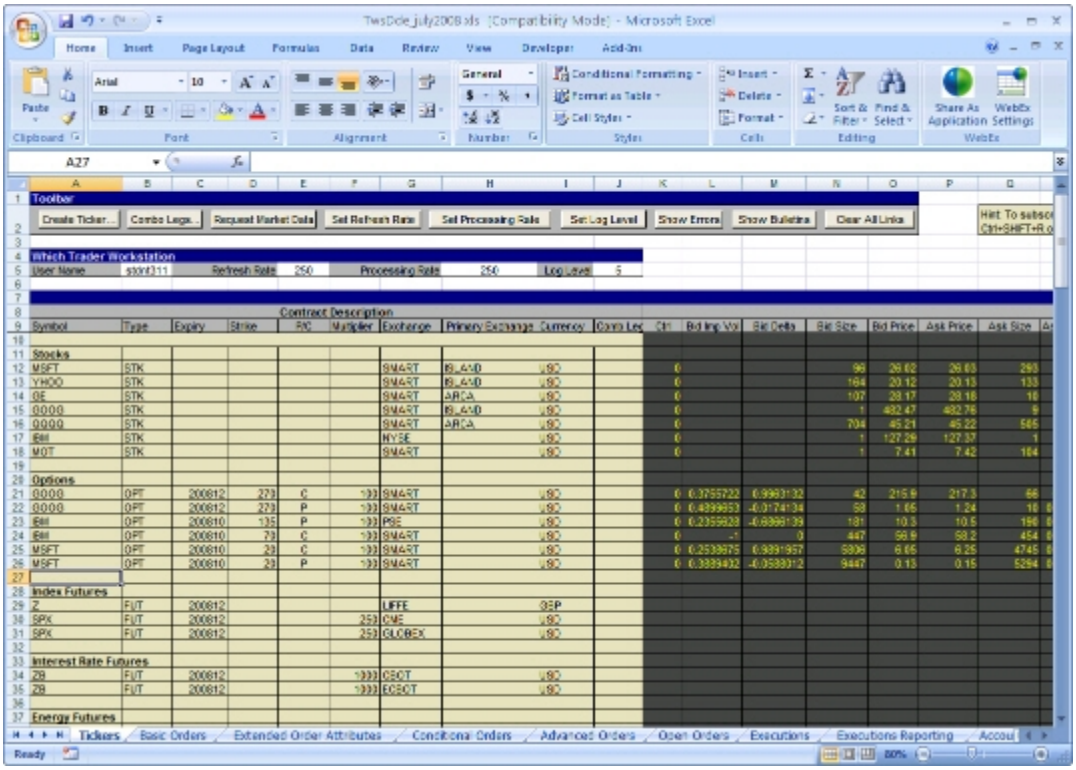
Page	Description
Tickers	Lets you set up your ticker lines and request market data. You can view market data for all asset types including EFPs and combination orders.
Basic Orders	Lets you send and modify orders, and set up combination orders and EFPs.
Extended Order Attributes	Used in conjunction with the Basic Orders, Advanced Orders, Conditional Orders and Advisors pages, this page lets you change the time in force, create Hidden or Iceberg orders and apply many other order attributes.
Conditional Orders	Lets you create an order whose submission is contingent on other conditions being met, for example an order based on a prior fill.
Open Orders	Shows you transmitted orders that are still working, including those that have been accepted by the IB system, and those that are working at an exchange.
Advanced Orders	Lets you send and modify advanced orders types that require the use of extended order attributes, such as Bracket, Scale and Trailing Stop Limit orders.
Executions	Lets you view all execution reports, and includes a filtering box so you can limit your results.
Executions Reporting	Linked to the Executions page, this page lets you run four different types of execution reports.
Account	Provides up to date account information.
Portfolio	Displays all your current positions.
Historical Data	Request historical data for an instrument based on data you enter in a query.
Market Scanner	Subscribe to TWS market scanners.
Contract Details	Lets you collect contract-specific information you will need for other actions, including the conid and supported order types for a contract
Bond Contract Details	Lets you collect bond contract-specific information you will need for other actions, including bond coupon and maturity date.
Market Depth	Lets you view market depth for selected quotes.
Advisors	Lets Financial Advisors send and modify FA orders.

Note: Two additional pages, Old Style Executions and Old Style Account-Portfolio, represent functionality that has been replaced by other pages in the spreadsheet (Executions, Account and Portfolio pages). While these older pages are still included in the TswDde.xls sample spreadsheet, they are no longer documented in this API Users' Guide and you should not use them.

Tickers Page

Use the Tickers page to:

- Create market data (ticker) lines.
- Request market data.



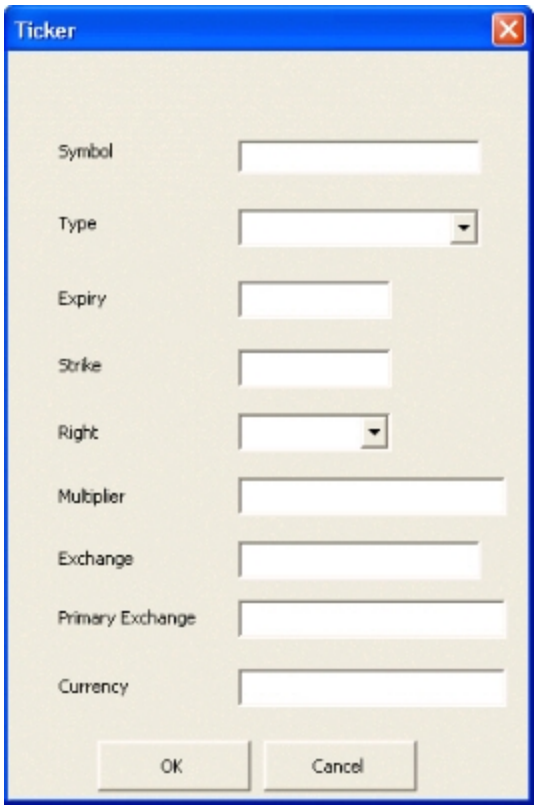
Using the Tickers Page

Note: Ensure that TWS is running, and that you have entered your user name in the *User Name* field in the *Which Trader Workstation?* section of all pages in the Excel spreadsheet to properly connect to TWS.

To create a ticker using the Create Ticker button

1. Click the **Tickers** tab at the bottom of the spreadsheet.
2. Click the line number to the left of a blank row to select the row. You must have a blank row selected to create a ticker line.
3. Click the **Create Ticker** button on the toolbar and enter information in the Tickers box.
4. Click **OK**.

For stocks, you only need to specify the *Symbol*, *Type*, *Exchange* (usually SMART), and *Currency*.



To create a ticker on the spreadsheet

1. Select a blank cell in the *Symbol* column and enter a symbol.
2. Tab through the all contract description fields and enter data where necessary, for example if you are entering a stock ticker, you don't need values in the Expiry, Strike, P/C and Multiplier fields.

The *Exchange* field accepts the following values: SMART (for smart order routing), and any valid exchange acronym.

To request market data for a ticker

1. Select the ticker row for which you want to request market data by clicking the row number.
2. Press **Ctrl+R**, or click **Request Market Data** on the toolbar.

   To get market data for a group of tickers, select multiple ticker rows while holding down the **Shift** key, then click **Request Market Data** multiple times until all rows are showing data.

To set the refresh rate

The refresh rate determines how often the DDE link to TWS is refreshed.

TWS market data updates every 300 milliseconds by default, so setting the refresh rate to 250 will get every tick to the spreadsheet.

To set the processing rate

The server processing rate affects the speed at which the DDE handles requests between TWS and the spreadsheet.

The allowed range is 100 ms- 2000 ms, inclusive.

To set the level of detail for logging of API client requests

1. In the *Log Level* field in the *Which Trader Workstation?* area, enter the desired log level value (1 =SYSTEM, 2=ERROR, 3=WARNING, 4=INFORMATION, 5=DETAIL).
2. Move your cursor out of the *Log Level* field, then click the **Set Log Level** button.

To remove all DDE links to TWS

The **Clear All Links** button on the Tickers page lets you remove all DDE links from the TwsDde.xls spreadsheet to TWS that the Visual Basic for Applications (VBA) code provided with the spreadsheet could create. You typically use this button when you are preparing to save the spreadsheet.

Clicking this button cancels all market data, historical data, market scanner subscriptions, and other data requests. If you add your own links to existing or new pages, update the *clearAllLinks* macro to clear those links as well. Each page in the spreadsheet contains its own *clearLinks* macro; these are all called by the *clearAllLinks* macro.

> **Note:** Clearing all links does NOT cancel orders.

Tickers Page Toolbar Buttons

The toolbar on the Tickers page includes the buttons described below.

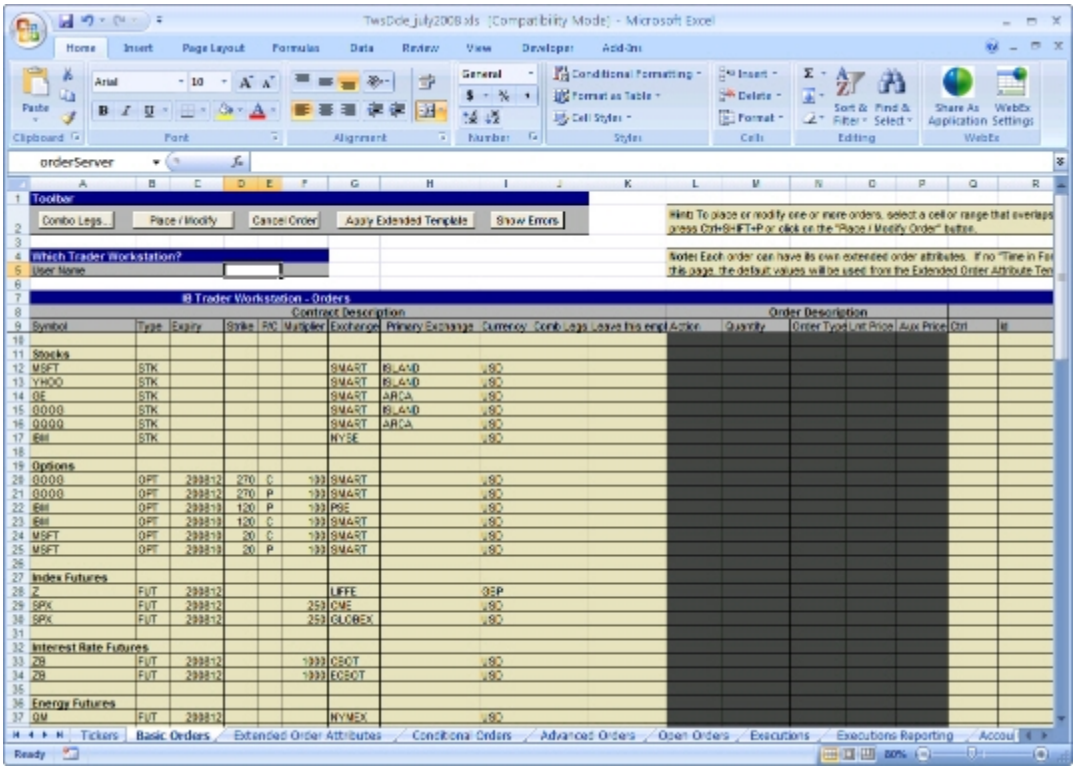
Button	Description
Create Ticker	Opens the Ticker box. Enter information to create a market data line.
Combo Legs	Opens the Combination Legs box. Enter contract details to create legs of a combination order one by one.
Request Market Data	Select a line and click to get market data for the selected contract.
Set Refresh Rate	The Refresh Rate value is in milliseconds, and determines how often the DDE link to TWS is refreshed. The default refresh rate is 1000 (updates every 1 second), and the allowed range is 100ms to 2000ms, inclusive. Note that the TWS market data updates every 300 milliseconds. This means the default "every 1 second" rate will only show 30% of the ticks. A Refresh Rate of 250 will get every tick to the spreadsheet.
Set Processing Rate	Set the TWS/DDE server message processing rate (also in milliseconds) to affect the speed at which DDE will handle requests between the spreadsheet and TWS. The allowed range is 100ms to 2000ms, inclusive.

Button	Description
Set Log Level	This specifies the level of log entry detail used when processing API requests. Valid values include: 1 = SYSTEM 2 = ERROR 3 = WARNING 4 = INFORMATION 5 = DETAIL
Show Errors	Jumps to the Error Code field and shows the most recent error code.
Show Bulletins	Opens the News Bulletins message. If you subscribe to bulletins, news will appear in the RED box in the upper right corner of the spreadsheet.
Clear All Links	Clears all DDE links to the TWS.

Basic Orders Page

Use the Basic Orders page to:

- Create an order.
- Create a "basket" of orders.
- Modify and cancel orders.
- Create combination orders.



Placing Orders

This topic describes how to place the following types of orders on the Orders page:

- Simple orders
- Basket orders
- Modified orders

> **Note:** Ensure that TWS is running, and that you have entered your user name in the *User Name* field in the *Which Trader Workstation?* section of all pages in the Excel spreadsheet to properly connect to TWS.

To place an order

1. Click the **Basic Orders** tab at the bottom of the spreadsheet.
2. Define a contract by typing a symbol in a blank *Symbol* field, then entering information in the relevant contract description fields.
3. Select a contract and set up the order using the *Order Description* fields.

   You must define the *Action* (Buy, Sell or Short Sell), *Quantity*, *Order Type*, *Limit Price* (unless it's a market order) and if necessary, the *Aux. Price* for order types that require it.
4. If desired, apply extended order attributes by clicking the **Apply Extended Template** button on the toolbar. This applies all attributes you have defined on the Extended Order Attributes page.
5. Click the **Place/Modify Order** button in the *Toolbar* section of the page.

To place a "basket" of orders

1. Click the **Basic Orders** tab at the bottom of the spreadsheet.
2. Define a contract by typing a symbol in a blank *Symbol* field, then entering information in the relevant contract description fields.
3. Select a contract and set up the order using fields in the *Order Description* section.
4. Repeat Steps 1 and 2 for additional orders.
5. Select a group of orders.
   - To select a group of contiguous orders, highlight the first order, hold down the **Shift** key, then highlight the last order of the group.
   - To select a group of non-contiguous orders, hold the **Ctrl** key down as you select each order.
6. Click the **Place/Modify Order** button.

To modify an order (or group of orders)

1. On the Basic Orders page, change any necessary parameters in an order or group of orders.
2. Select the order or a group of orders.
   - To select a group of contiguous orders, highlight the first order, hold down the **Shift** key, then highlight the last order of the group.
   - To select a group of non-contiguous orders, hold the **Ctrl** key down as you select each order.
3. Click the **Place/Modify Order** button.

Note: You cannot modify orders in the DDE for Excel API that were submitted from TWS .This is because the DDE for Excel API uses its own created order ID to modify the orders, not the global customer order ID. All orders created in TWS have an internal order ID of 0. If you try to modify an order in the DDE for Excel API with id = "id0" you will get the error "duplicate order ID".

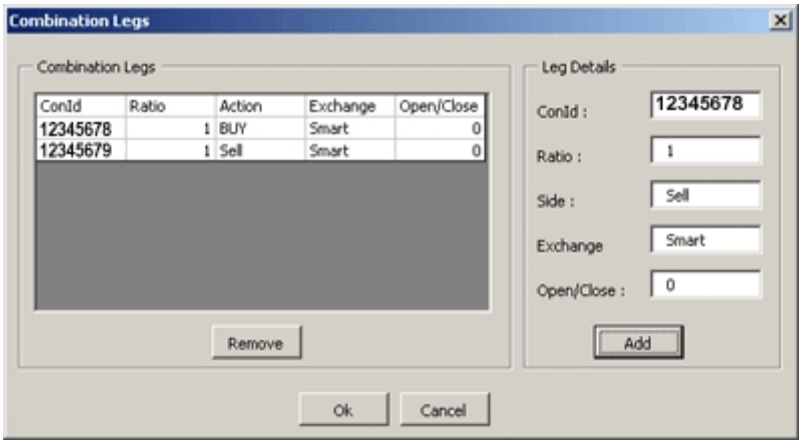
Placing a Combination Order

A combination order is a special type of order that is constructed of many separate legs but executed as a single transaction.

For example, to buy a calendar spread, you would:

- Buy 1 OPT JUL03 17.5 CALL (100)
- Sell 1 OPT AUG03 17.5 CALL (100)

The following example walks you through the process of placing a hypothetical calendar spread order for XYZ on ISE.



To create a calendar spread order

1. Use the Contract Details page to get the contract id for both of the leg definitions.
   - The conid for XYZ option JUL08 17.5 CALL on ISE is "12345678".
   - The conid for XYZ option AUG08 17.5 CALL on ISE is "12345679".
2. Click the **Basic Orders** tab to build the combo leg definitions. Click the **Combo Legs** button on the Basic Orders page toolbar and enter leg information. Your leg information is translated into the format:

   [CMBLGS]_[NumOfLegs]_[Combo Leg Definitions]_[CMBLGS]

   where:

   - [CMBLGS] is the delimiter used to identify the start and end of the leg definitions
   - [NumOfLegs] is the number of leg definitions
   - [Combo Leg Definitions] defines N leg definitions, and each leg definition consists of [conid]_[ratio]_[action]_[exchange]_[openClose], so the resulting combo substring looks as follows:

     CMBLGS_2_17496957_1_BUY_EMPTY_0_15910089_1_SELL_EMPTY_0_CMBLGS
3. The combination leg definitions must occur before the extended order attributes. The full place order DDE request string will look like this:

   =acctName|ord!id12345?place?BUY_1_XYZ_BAG_ISE_LMT_1_CMBLGS_2_12345678_1_BUY_EMPTY_0_12345679_1_SELL_EMPTY_0_CMBLGS_DAY_EMPTY_0_O_0_EMPTY_0_EMPTY_0_0_0EMPTY_0_0

   If the order legs do not constitute a valid combination, one of the following errors will be returned:

   - 312 = The combo details are invalid.
   - 313 = The combo details for '<leg number>' are invalid.
   - 314 = Security type 'BAG' requires combo leg details.
   - 315 = Stock combo legs are restricted to SMART exchange.

   Note: 1. The exchange for the leg definition must match that of the combination order. The exception is for a STK leg definition, which must specify the SMART exchange.

2. The openClose leg definition value is always 'SAME' (i.e.0) for retail accounts. For institutional accounts, the value may be any of the following: (SAME, OPEN, CLOSE).

Supported Order Types

The order types currently supported through the DDE for Excel API are:

- Limit (LMT)
- Market (MKT)
- Limit if Touched (LIT)
- Market if Touched (MIT)
- Market on Close (MOC)
- Limit on Close (LOC)
- Pegged to Market (PEGMKT)
- Relative (REL)
- Stop (STP)
- Stop Limit (STPLMT)
- Trailing Stop (TRAIL)
- Trailing Stop Limit (TRAILLIMIT)
- Volume-Weighted Average Price (VWAP)
- Volatility orders (VOL)

Basic Orders Page Toolbar Buttons

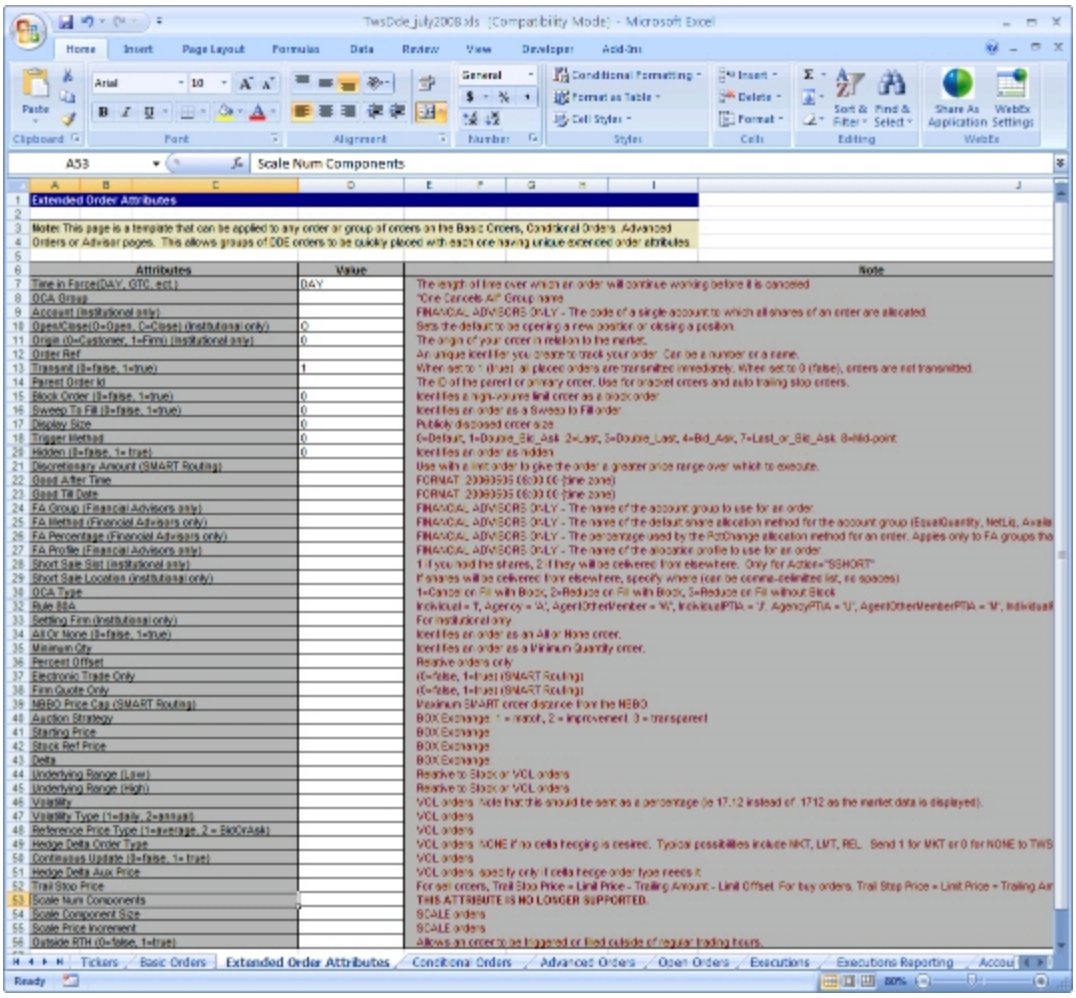
The toolbar on the Basic Orders page includes the following buttons:

Button	Description
Combo Legs	Opens the Combination Legs box. Enter contract details to create legs of a combination order one by one.
Place/Modify Orders	After you have completed the Order Description fields, and defined any extended attributes, click to create an order for the selected contract.
Cancel Order	This button cancels the order(s) you have highlighted.
Apply Extended Template	Applies the current values on the Extended Order Attributes page to the highlighted order row.
Show Errors	Jumps to the Error Code field and shows the error code.

Extended Order Attributes Page

The Extended Order Attributes page includes all of the optional attributes you can use when you send an order, such as setting a display size to create an iceberg order, adding orders to an OCA group, and setting the transmit date for a Good

After Time order. Once you define the attributes on this page, you can apply them to a single order or selected group of orders using the **Apply Extended Template** button, which occurs on both the Orders page and the Conditional Orders page. The attributes populate the extended order attributes fields that follow the *Order Status* fields to the far right of the page.



Manually Program Extended Order Attributes

Observe the following guidelines when you manually assign an attribute:

- When appended to orderDescription, the number and order of attributes cannot be changed.
- For any attribute that is not defined, use the value 'EMPTY' or {}. Since a string length is limited to 255 characters, we recommend using the open/close curly braces {}.
- A place order message for a simple stock limit day order looks as follows, with the primary exchange "Supersoes" separating the extended attributes:

  =psmith12|ord!'id1814454745?place?BUY_1_MSFT_STK_SMART_USD_LMT_26_{}_DAY_{}_{}_O_0_{}_1_{}_0_0_0_0_0_0_{}_{}_{}_{}_{}_{}_{}_{}_SUPERSOES_{}_{}_{}_{}_{}_{}_{}_{}_{}_{}_{}_{}_{}_{}_{}_{}_1_2_3_4_5'

Apply Extended Order Attributes to Individual Orders and Groups of Orders

Normally, values that you enter on the Extended Order Attributes page apply to all subsequent orders. However, you also can apply selected attributes to an individual order or a group of orders on the Orders page.

> **Note:** You can also use this procedure to apply extended order attributes to orders on the Conditional Orders page.

To apply extended order attributes to individual orders or a group of orders

1. Enter the value or values on the Extended Order Attributes page that you want to apply to an individual order or group of orders.
2. On the Orders page, select the order or group of orders.
3. Click the **Apply Extended Template** button.

   The extended order attributes are applied to the order(s) and the values you entered on the Extended Order Attributes page are added to the corresponding fields in the *Extended Order Attributes* section of the Orders page.

   When you place the order or group of orders, the extended order attribute values you entered are applied to the order.

   For example, you might want to assign a unique Order Ref number to a group or basket of orders. To do this, you would enter the number for the Order Ref attribute on the Extended Order Attributes page, then select all the orders in the group on the Orders page and click Apply Extended Template.

4. Delete the value of the extended order attributes you used for the order from the Extended Order Attributes page. These values will still apply to all subsequent orders that you place from the DDE for Excel API spreadsheet unless you remove the value.

Extended Order Attributes

The following table shows the available extended order attributes.

Attribute	Valid Values
timeInForce	DAY GTC OPG IOC GTD FOK DTC
ocaGroup	String that identifies an OCA (One Cancels All) group
account	String (for institutions)
open/close	O, C (for institutions)
origin	0, 1 (for institutions)
orderRef	String

Attribute	Valid Values
transmit	Specifies whether the order is transmitted immediately (set to 1) or not (set to 0). This parameter can be useful for example when working with basket orders. First, prepare a basket of orders (untransmitted), then when ready, set the value of the transmit parameter of each order to 1 to transmit the basket for execution.
parentId	String (the order ID used for the parent order, use for bracket and auto trailing stop orders)
blockOrder	0 (not a block order) 1 (this is a block order)
sweepToFill	0 (not a sweep-to-fill order) 1 (this is a sweep-to-fill order)
displaySize	Publicly disclosed order size for iceberg orders. The value is a number that should be stored as a String.
triggerMethod	Specifies how simulated Stop, Stop-Limit, and Trailing Stop orders are triggered: • O - the default value. The "double bid/ask" method will be used for orders for OTC stocks and US options. All other orders will use the "last" method. • 1 - use "double bid/ask" method, where stop orders are triggered based on two consecutive bid or ask prices. • 2 - "last" method, where stop orders are triggered based on the last price. • 3 - "double-last" method, where stop orders are triggered based on last two prices. • 4 – “bid-ask” method. For a buy order, a single occurrence of the bid price must be at or above the trigger price. For a sell order, a single occurrence of the ask price must be at or below the trigger price. • 7 – “last-or-bid-ask” method. For a buy order, a single bid price or the last price must be at or above the trigger price. For a sell order, a single ask price or the last price must be at or below the trigger price. • 8 – “mid-point” method, where the midpoint must be at or above (for a buy) or at or below (for a sell) the trigger price, and the spread between the bid and ask must be less than 0.1% of the midpoint. For a complete description of Trigger Methods, see Modify the Trigger Method in the Trader Workstation Users' Guide.

Attribute	Valid Values
hidden	0 1 (order not visible when viewing market depth)
Discretionary Amount (SMART Routing)	Used in conjunction with a limit order to give the order a greater price range over which to execute.
Good After Time	Enter the date and time after which the order will become active. Use the format YYYYMMDD hh:mm:ss TMZ, where TMZ is optional three-letter time zone identifier. Allowed timezones are listed here.
Good 'Till Date	The order continues working until the close of market on the date you enter. Use the format YYYYMMDD. To specify a time of day to close the order, enter the time using the format HH:MM:SS. Specify the time zone using a valid three-letter acronym.
FA Group	For Advisor accounts only. The name of the Financial Advisor group to which the trade will be allocated to. Use an empty String if not applicable.
FA Method	For Advisor accounts only. The share allocation method. • EqualQuantity • NetLiq • AvailableEquity • PctChange
FA Percentage	For Advisor accounts only. The share allocation percentage.
FA Profile	For Advisor accounts only. The name of the Share Allocation profile.
Short Sale Slot	For institutions only. Valid values are 1 (broker holds shares) and 2 (shares come from elsewhere).
Short Sale Location	Institutional accounts only. Indicates the location where the shares to short should originate. Used only when Short Sale Slot is set to 2 (which means that the shares to short are held elsewhere and not with Interactive Brokers).

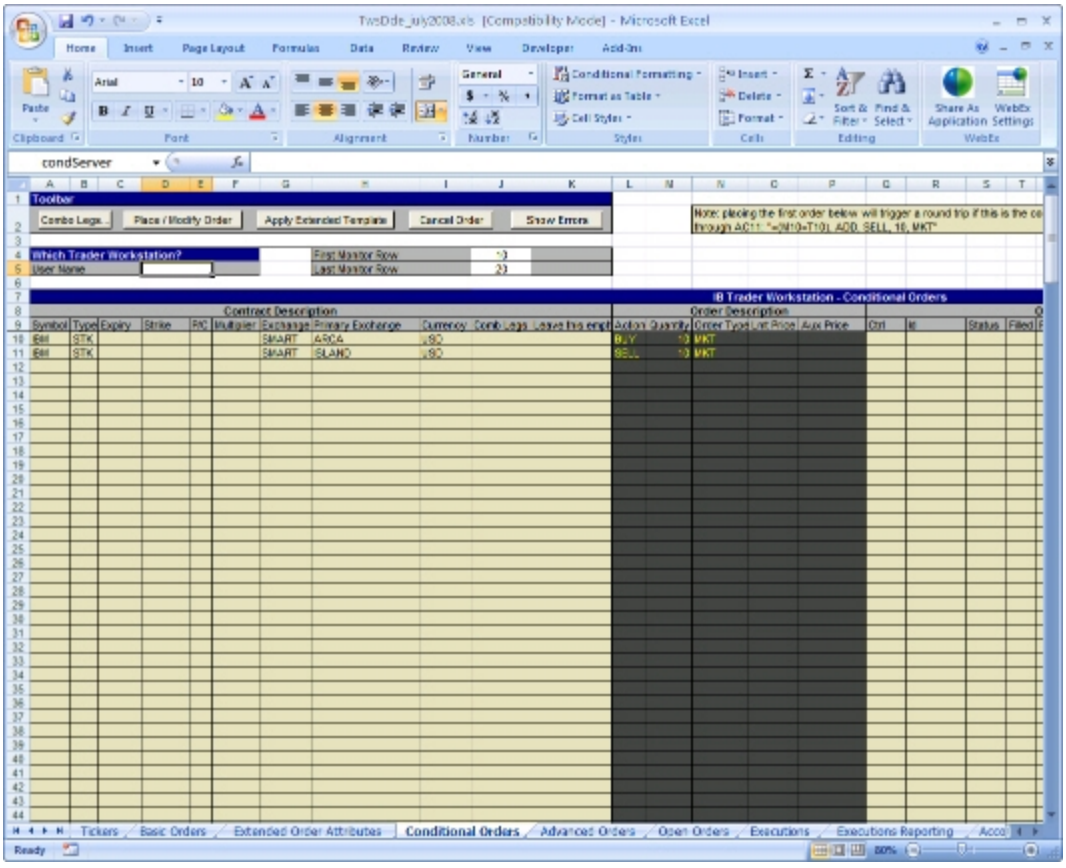
Attribute	Valid Values
OCA Type	Tells how to handle remaining orders in an OCA group when one order or part of an order executes. Valid values include: • 1 = Cancel all remaining orders with block • 2 = Remaining orders are proportionately reduced in size with block • 3 = Remaining orders are proportionately reduced in size with no block If you use a value, "with block" gives your order has overfill protection. This means that only one order in the group will be routed at a time to remove the possibility of an overfill.
Rule 80A	• Individual = 'I' • Agency = 'A', • AgentOtherMember = 'W' • IndividualPTIA = 'J' • AgencyPTIA = 'U' • AgentOtherMemberPTIA = 'M' • IndividualPT = 'K' • AgencyPT = 'Y' • AgentOtherMemberPT = 'N'
Settling Firm	Institutions only. Indicates the firm that will settle the trade.
All or None	Indicates whether or not the order will remain at the exchange (or in the IB system) until the entire quantity is available to be executed. 0 = false 1 = true
Minimum Qty	Identifies the order as a minimum quantity order.
Percent Offset	The percent offset for relative orders.
Electronic Trade Only	Indicates whether to exclude exchanges whose quotes are not automatically executable. If this option is selected, IB will use its best efforts to determine which exchanges' quotes are immediately automatically executable, and which exchanges' quotes would require manual (human) handling, and IB will route only to those exchanges offering automatic execution. Please note that while IB will use its best efforts, it is not always possible to determine whether quote is automatically executable. 0 = false 1 = true
Firm Quote Only	0 = false 1 = true

Attribute	Valid Values
NBBO Price Cap	Maximum SMART order distance from the NBBO. Can be used only if either the Electronic Trade Only or Firm Quote Only extended order attribute is set to 1.
Auction Strategy	match = 1 improvement = 2 transparent = 3 For BOX exchange only.
Starting Price	The starting price. For BOX orders only.
Stock Ref Price	Used for VOL orders to compute the limit price sent to an exchange (whether or not Continuous Update is used), and for price range monitoring. Also used for price improvement option orders.
Delta	The stock delta. For BOX orders only.
Underlying Range (Low)	The lower value for the acceptable underlying stock price range. For price improvement option orders on BOX and VOL orders with dynamic management.
Underlying Range (High)	The upper value for the acceptable underlying stock price range. For price improvement option orders on BOX and VOL orders with dynamic management.
Volatility	The option price in volatility, as calculated by TWS' Option Analytics. This value is expressed as a percent and is used to calculate the limit price sent to the exchange.
Volatility Type	1 = daily 2 = annual
Reference Price Type	1 = average (NBBO midpoint) 2 = BidOrAsk
Hedge Delta Order Type	Enter an accepted order type such as: MKT, LMT, REL or MTL.
Continuous Update	For volatility orders only. Indicates whether the price should be automatically updated as the underlying stock price moves. 0 = false 1 = true
Hedge Delta Aux Price	Enter the Aux Price for Hedge Delta order types that require one.
Trail Stop Price	Used for Trailing Stop Limit orders only. This is the stop trigger price for TRAILLMT orders.
Scale Component Size	Used for Scale orders only, this value defines the order size of the each order component.

Attribute	Valid Values
Scale Price Increment	Used for Scale orders only, this value is used to calculate the per-unit price of each component in the order. This cannot be a negative number.
Outside RTH	Indicates whether the order should be allowed to execute outside of regular trading hours of the trading venue where the contract is listed. 0 = false 1 = true

Conditional Orders Page

Use the Conditional Orders page to create an order whose submission is contingent on other conditions being met, for example, an order based on a prior fill or a change in the bid or ask price. To see the Condition Statement fields, use the scroll bar on the bottom of the page to scroll to the right.



Setting Up Conditional Orders

Note: Ensure that TWS is running, and that you have entered your user name in the *User Name* field in the *Which Trader Workstation?* section of all pages in the Excel spreadsheet to properly connect to TWS.

To set up a conditional order

1. On the **Conditional Orders** page, first create the order you want transmitted when a condition is met by defining the contract in the *Contract Description* fields, and then using the *Order Description* area to set up the order parameters.

   Note: Leave the *Order Description* fields blank if you plan to enter **ADD** in the *ADD/MOD* field (see Step 3 below), because once the condition is TRUE, the *Order Description* fields will be overwritten.

2. In the *Condition Statements* area, use the *Statement* field to set the criteria which must be met to trigger the order. When the Statement = TRUE, your order will be submitted.

   The sample spreadsheet includes a pair of orders, with the second orders transmission depending on the first order being completely filled. In this case, the Statement field trigger is that the value in cell T10 (the *Filled* field) must be equal to the value in M10 (the order *Quantity* field).

3. Type **ADD** in the *ADD/MOD* field because you are creating a one-time order.

4. Define the remaining order parameters just as you did in the *Order Description* area.

IB Trader Workstation - Conditional Orders

ption				Order Description									Order
Primary Exchange	Currency	Comb Legs	Leave this empty	Action	Quantity	Order Type	Lmt Price	Aux Price	Ctr	Id	St	Filled	Remainin
ARCA	USD			BUY	10	MKT			0	id1	Fil	10	0
ISLAND	USD			SELL	10	MKT			0	id1	Fil	10	0
	usd			buy	200	lmt	81.00						

5. Complete the necessary fields on the **Conditional Orders** page according to the syntax in the following table.

Field	Description
Statement	An Excel function which returns a true or false. When true, the order will be submitted; when false, nothing happens.
ADD/MOD	Use ADD for a one-time order. Use MOD to continue checking and modifying the order until it is completely filled. This is the field that activates a conditional order, and orders will be activated only with the "ADD" or "MOD" tags. If you use ADD, leave the *Order Description* fields blank because once the condition is TRUE, the Order Description fields will be overwritten.
Action	BUY SELL
Quantity	Enter the quantity of the order.
Order Type	Refer to list of supported order types.
Lmt Price	The limit price for Limit and Stop Limit order types.

Field	Description
Aux. Price	The stop-election price for Stop and Stop Limit order types, or the offset for relative orders.

All of the fields described above may be variables that depend on other cells, so any type of conditional order may be created.

Conditional Order Examples

If-Filled order

An if-filled order is an order that executes if a prior order executes. To create an if-filled order with the condition "If a Buy order fully executes, enter a sell limit order at a price of $50.00":

Field	Value
Statement	Filled cell = 100
ADD/MOD	ADD
Action	SELL
Quantity	100
Order Type	LMT
Lmt Price	50
Aux. Price	empty

Price-change order

A price-change order will be triggered if a specific bid or ask price is greater than, less than or equal to a specific price. To create a price change order with the condition "If the bid price drops below 81.20, submit a buy limit order for 200 shares with a limit price of $81.10:

Field	Value
Statement	On the **Tickers** page, put your cursor in the bid price field you want to use, then copy the value that appears in the formula bar (“=” entry field) at the top of the spreadsheet. This value looks something like this: =username|tik!id4?bid where "4" identifies the bid price for a specific contract. Paste this in the formula bar ("=" entry field) for the Statement, and add your qualifier, "=" ">" or "<" followed by the price. In this example, the formula would be: =username|tik!id4?bid<81.20
ADD/MOD	ADD
Action	BUY

Field	Value
Quantity	200
Order Type	LMT
Lmt Price	81.10
Aux. Price	Not used in this example.

To modify an order (or basket of orders)

1. Select the order or a group of orders.
   - To select a group of contiguous orders, highlight the first order, hold down the **Shift** key, then highlight the last order of the group.
   - To select a group of non-contiguous orders, hold the **Ctrl** key down as you select each order.
1. Click the **Place/Modify Order** button.
2. Change any necessary parameters, then click the **Place/Modify Order** button.

Conditional Orders Page Toolbar Buttons

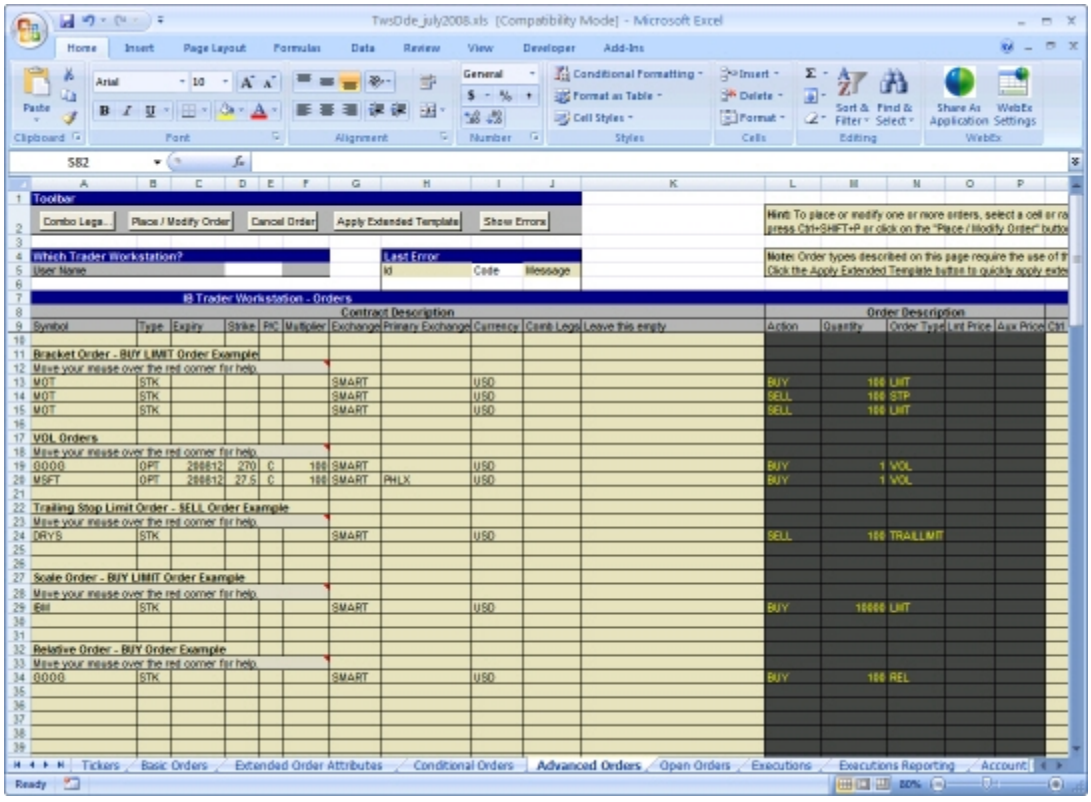
The toolbar on the Conditional Orders page includes the following buttons:

Button	Description
Combo Legs	Opens the Combination Legs box. Enter contract details to create legs of a combination order one by one.
Place/Modify Order	After you have completed the Order Description fields, and defined any extended attributes, click to create an order for the selected contract.
Apply Extended Template	Applies all attributes on the Extended Order Attributes page to the selected order(s).
Cancel Order	This button cancels the order(s) you have highlighted.
Show Errors	Jumps to the Error Code field and shows the error code.

Advanced Orders Page

Use the Advanced Orders page to create complex orders that require the use of extended order attributes, including:

- Bracket orders
- VOL orders
- Trailing Stop Limit Orders
- Scale Orders
- Relative Orders



For more information about using extended order attributes for individual orders or groups of orders, see Apply Extended Order Attributes to Individual Orders and Groups of Orders

Placing a Bracket Order

Bracket orders in the DDE for Excel sample spreadsheet require the use of the extended order attributes *Transmit* and *Parent Order Id*. You must turn *Transmit* off until the order is completely set up, and you must identify the first order in the bracket as the Parent Order.

To place a Buy-Limit bracket order

1. Click the **Advanced Orders** tab at the bottom of the spreadsheet.
2. Enter the contract descriptions and order descriptions for all three orders on three contiguous rows:
   - The first order should be a BUY LMT order.
   - The second order should be a SELL STP order.
   - The third order should be a SELL LMT order.
2. Click the **Extended Order Attributes** tab. Change the value for *Transmit* to **0** (row 13 on the Extended Order Attributes page).

   This ensures that your orders are not transmitted until you have completed the order setup.

3. Click the **Advanced Orders** tab, highlight the first order in the bracket order, then click the **Place/Modify Order** button.

The order is not executed, but the system generates an Order ID.

4. Copy the Order ID for the first order, omitting the "id" prefix, then click the **Extended Order Attributes** tab and paste the Order ID into the *Value* field for *Parent Order Id* (row 14). This value will be applied to all subsequent orders until you remove it from the Extended Order Attributes page.

   The first order of the bracket order is now the primary order.

5. Click the **Advanced Orders** tab, highlight the second order, then click the **Place/Modify Order** button.

   The order is not executed but is now associated with the primary order by means of the Parent Order Id extended order attribute.

6. Click the **Extended Order Attributes** tab and change the value for *Transmit* back to **1** (row 13).
7. Click the **Advanced Orders** tab, highlight the third order in the bracket order, then click the **Place/Modify Order** button. The entire bracket order is transmitted.
8. When you are done placing your bracket order, go to the **Extended Order Attributes** page and delete the *Parent Order Id* value you entered. If you do not, this value will be applied to all subsequent orders that you place in the spreadsheet.

Placing a Volatility Order

In the DDE for Excel sample spreadsheet, you place volatility (VOL) orders by entering values for the following extended order attributes:

- Volatility
- Volatility Type
- Reference Price Type
- Continuous Update
- Underlying Range (Low) - optional
- Underlying Range (High) - optional
- Hedge Delta Order Type - optional
- Hedge Delta Aux Price - optional

To place a VOL order

1. Click the **Advanced Orders** tab at the bottom of the spreadsheet.
2. Define a contract by typing a symbol in a blank *Symbol* field, then entering information in the relevant contract description fields.
3. Select a contract and set up the order using the *Order Description* fields.
   - Enter **VOL** in the *Order Type* field.
4. Click the **Extended Order Attributes** tab. Enter values in the *Value* field for the following extended order attributes:
   - *Volatility* - This value represents the volatility to use in calculating a limit price for the option. Enter this value as a percentage, not as the market data is displayed. For example, enter 17.12 instead of .1712.

- *Volatility Type* - Enter 1 for daily volatility or 2 for annual volatility.
- *Reference Price Type* - This value is used to compute the limit price sent to an exchange and for stock range price monitoring. Enter 1 to use the average of the best bid and ask; or 2 to use NBB (bid) when buying a call or selling a put, or the NBO (ask) when selling a call or buying a put.
- *Continuous Update* - Enter 1 to automatically update the option price as the underlying stock price (or futures price, for index options) moves. Enter 0 if you do not want to use this feature.

5. On the **Extended Order Attributes** page, enter values in the *Value* field for the following optional extended order attributes:
   - *Underlying Range (Low)* - Enter a low-end acceptable stock price relative to the selected option order. If the price of the underlying instrument falls below the lower stock range price, the option order will be canceled.
   - *Underlying Range (High)* - Enter a high-end acceptable stock price relative to the selected option order. If the price of the underlying instrument rises above the higher stock range price, the option order will be canceled.
   - *Hedge Delta Order Type* - Enter LMT, MKT or REL. Enter NONE if you do not want to use delta hedging.
   - *Hedge Delta Aux Price* - If you have entered LMT or REL as the Hedge Delta Order Type, enter the price as the value for this attribute.
6. Click the **Advanced Orders** tab, then highlight the order row.
7. Click the **Apply Extended Template** button. The values you entered for the extended order attributes are applied to the order row and displayed in the *Extended Order Attributes* section of the page.
8. With the order row highlighted, click the **Place/Modify Order** button.
9. When you are done placing VOL orders, go to the **Extended Order Attributes** page and delete the VOL order values you entered. If you do not, these values will be applied to all subsequent orders that you place in the spreadsheet.

Placing a Trailing Stop Limit Order

In TWS, there are four values that make up a trailing stop limit order:

- trailing amount
- stop price
- limit price
- limit offset

In the DDE for Excel API spreadsheet, you enter the trailing amount, stop price and limit price. There is no field or extended order attribute for the limit offset value. You must include the limit offset in the stop price (the *Trail Stop Price* extended order attribute).

To create a Trailing Stop Limit Order

1. Click the **Advanced Orders** tab at the bottom of the spreadsheet.
2. Define a contract by typing a symbol in a blank *Symbol* field, then entering information in the relevant contract description fields.
3. Select a contract and set up the order using the *Order Description* fields.

- Enter **BUY** or **SELL** in the *Action* field.
- Enter the limit price in the *Lmt Price* field.
- Enter **TRAILLIMIT** in the *Order Type* field.
- Enter the trailing amount in the *Aux Price* field.

4. Click the **Extended Order Attributes** tab. Specify the trailing stop price as an extended order attribute. Type this value in the Trail Stop Price *Value* field.

   The Trail Stop Price value must include the limit offset.

   - For a sell order:
     Trail Stop Price = Limit Price - Trailing Amount - Limit Offset
   - For a buy order:
     Trail Stop Price = Limit Price + Trailing Amount + Limit Offset

5. On the **Advanced Orders** page, select the order row and click the **Apply Extended Template** button. The *Trail Stop Price* value is applied to the selected order and displayed in the *Trail Stop Price* field in the *Extended Order Attributes* section of the page.
6. Click the **Place/Modify Order** button.
7. When you are done placing your order, go to the **Extended Order Attributes** page and delete the *Trail Stop Price* value you entered. If you do not, this value will be applied to all subsequent orders that you place in the spreadsheet.

Placing a Scale Order

In the DDE for Excel sample spreadsheet, you place scale orders by entering values for the following extended order attributes:

To place a scale order

1. Click the **Advanced Orders** tab at the bottom of the spreadsheet.
2. Define a contract by typing a symbol in a blank *Symbol* field, then entering information in the relevant contract description fields.
3. Select a contract and set up the order using the *Order Description* fields. The order type should be LMT or REL.
4. Click the **Extended Order Attributes** tab. Enter values in the *Value* field for the following extended order attributes:

   - *Scale Component Size* - Enter the size of the first, or initial, order component. For example, if you submit a 10,000-share order with a Scale Component Size value of 1000, the first component will be fore 1000 shares.
   - *Scale Price Increment* - Enter the amount used to calculate the per-unit price of each component in the scale ladder. This cannot be a negative number.

   Note: As of API Release 9.41, the *Scale Num Components* not supported.

3. On the **Advanced Orders** page, select the order row and click the **Apply Extended Template** button. The scale order values are applied to the selected order and displayed in the *Extended Order Attributes* section of the page.
4. Click the **Place/Modify Order** button.

5. When you are done placing your order, go to the **Extended Order Attributes** page and delete the scale order values you entered. If you do not, these values will be applied to all subsequent orders that you place in the spreadsheet.

Placing a Relative Order

In the DDE for Excel sample spreadsheet, you place relative orders by entering a value for the *Percent Offset* extended order attribute.

To place a relative order

1. Click the **Advanced Orders** tab at the bottom of the spreadsheet.
2. Define a contract by typing a symbol in a blank *Symbol* field, then entering information in the relevant contract description fields.
3. Select a contract and set up the order using the *Order Description* fields.
   - Enter **REL** as the order type.
   - Enter the price cap in the *Lmt Price* cell.
4. Click the **Extended Order Attributes** tab. Enter a percentage in decimal form in the *Value* field for the *Percent Offset* extended order attribute.
5. On the **Advanced Orders** page, select the order row and click the **Apply Extended Template** button. The percent offset value is applied to the selected order and displayed in the *Extended Order Attributes* section of the page.
6. Click the **Place/Modify Order** button.
7. When you are done placing your order, go to the **Extended Order Attributes** page and delete the *Percent Offset* value you entered. If you do not, this value will be applied to all subsequent orders that you place in the spreadsheet.

Advanced Orders Page Toolbar Buttons

The toolbar on the Advanced Orders page includes the following buttons:

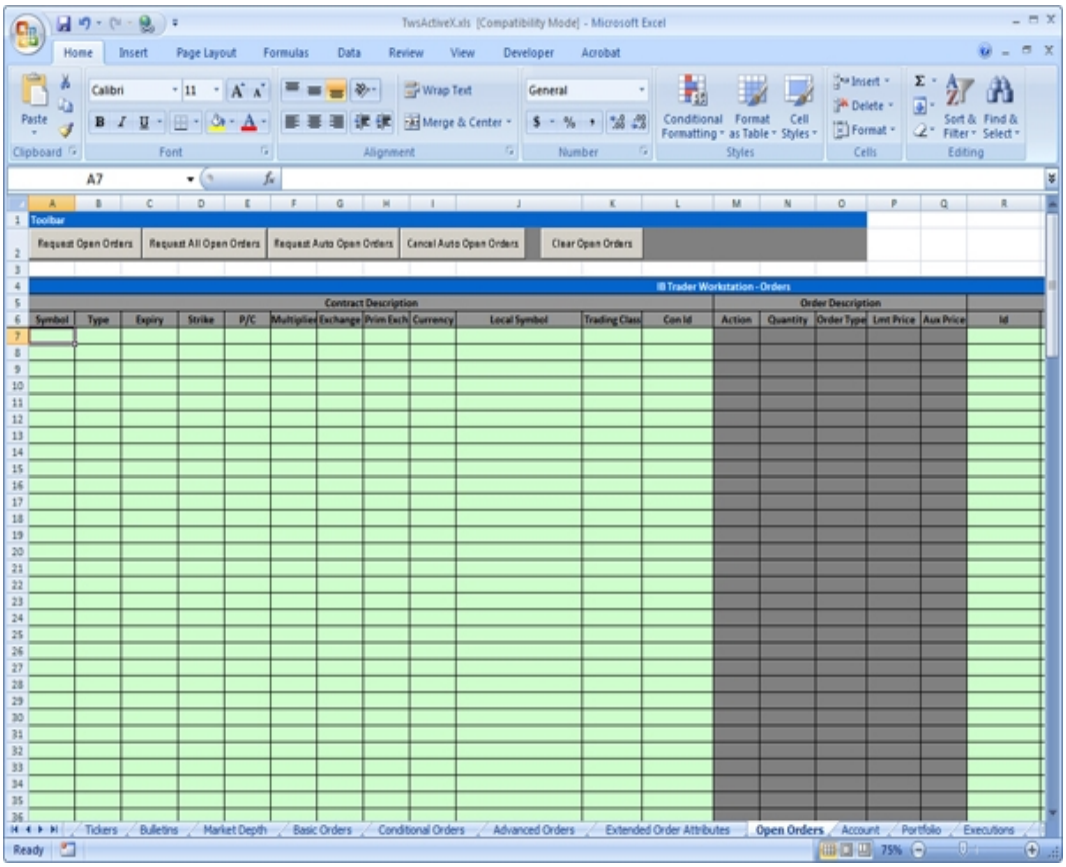
Button	Description
Combo Legs	Opens the Combination Legs box. Enter contract details to create legs of a combination order one by one.
Place/Modify Orders	After you have completed the Order Description fields, and defined any extended attributes, click to create an order for the selected contract.
Cancel Order	This button cancels the order(s) you have highlighted.
Apply Extended Template	Applies the current values on the Extended Order Attributes page to the highlighted order row.
Show Errors	Jumps to the Error Code field and shows the error code.

Open Orders Page

The Open Orders page shows you all transmitted orders, including those that have been accepted by the IB system, and those that are working at an exchange. Once you have subscribed, the page is updated each time you submit a new order,

either through the API or in TWS.

Once an order executes, it remains on the Open Orders page for 30 seconds, with the Status value changed to FILLED. Then the filled order is cleared and you can see it on the Executions page if you subscribed to real-time executions.



Viewing Open Orders

> **Note:** Ensure that TWS is running, and that you have entered your user name in the *User Name* field in the *Which Trader Workstation?* section of all pages in the Excel spreadsheet to properly connect to TWS.

To view open orders:

1. Click the **Open Orders** tab at the bottom of the spreadsheet.
2. Click **Subscribe to Open Orders** on the toolbar.

   All of your open orders are displayed on the page, including orders you enter in the Excel API spreadsheet and in TWS.

   Orders that fill remain on the page for 30 seconds with a value of *Fill* in the *Status* field.

To remove open orders

1. Click the **Cancel Open Orders Subscription** button on the toolbar.
2. Click the **Clear Open Orders** button.

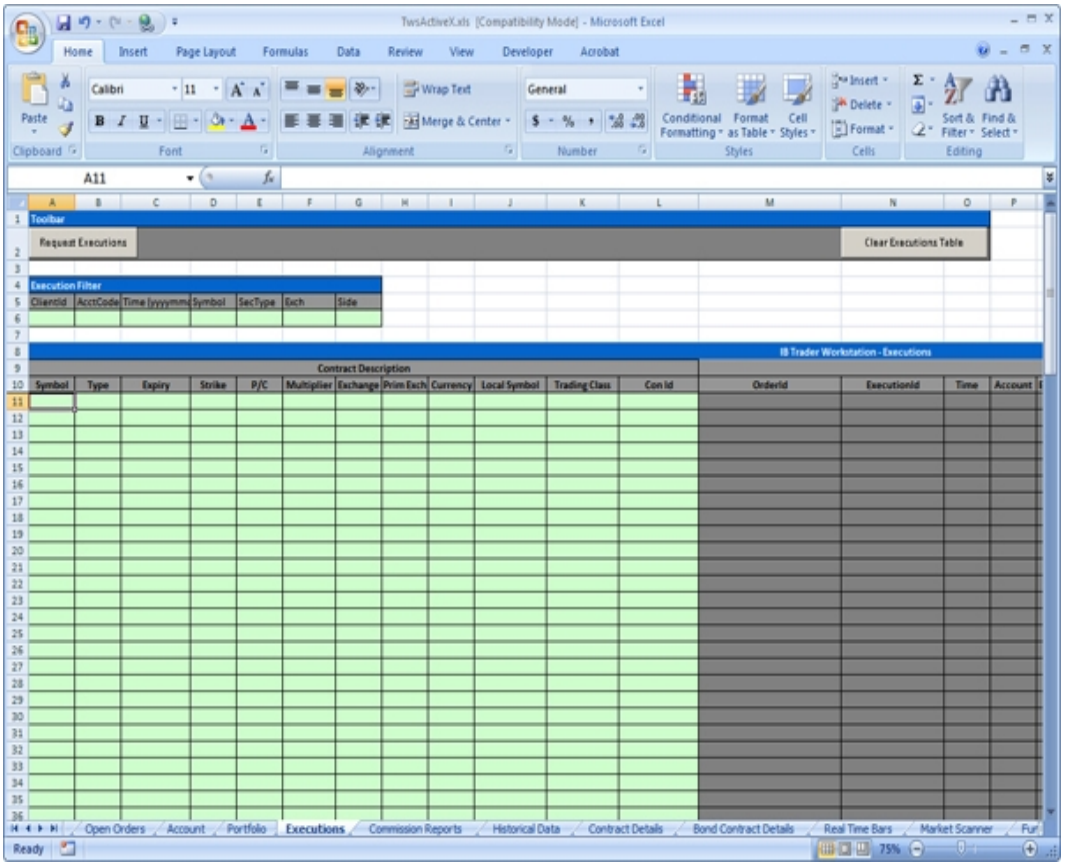
Open Orders Tab Toolbar Buttons

The toolbar on the Open Orders page includes the following buttons:

Button	Description
Subscribe to Open Orders	Once you enter a valid user name, clicking this button queries TWS and returns all open orders. Once you subscribe to open orders, this page updates each time there is a new open order.
Cancel Open Orders Subscription	Cancels the open orders subscription. The page will no longer show your open orders.
Clear Open Orders	Removes all open orders from the page.
Show Errors	Jumps to the Error Code field and shows the error code.

Executions Page

When you subscribe to executions, the Executions page displays information about all completed trades (also called "execution reports").



Viewing Executions

Note: Ensure that TWS is running, and that you have entered your user name in the *User Name* field in the *Which Trader Workstation?* section of all pages in the Excel spreadsheet to properly connect to TWS.

To view executions

1. Click the Executions tab at the bottom of the spreadsheet.
2. Click the **Subscribe to Executions** button in the toolbar.

To remove execution reports

1. Click the **Cancel Executions Subscription** button on the toolbar.
2. Click the **Clear Executions** button.

Executions Page Toolbar Buttons

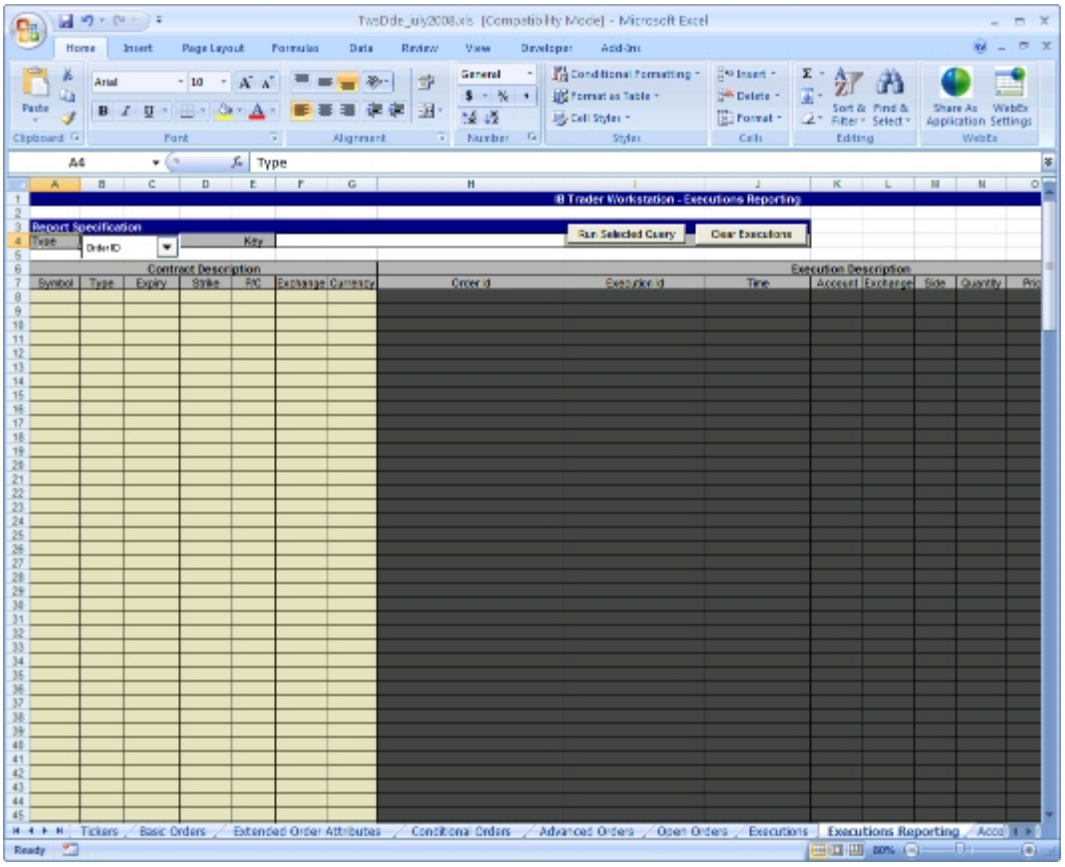
The toolbar on the Executions page includes the following buttons:

Button	Description
Subscribe to Executions	After you have entered a valid user name, this button queries TWS and returns information about all valid executions. After you subscribe to executions, this page updates each time an order executes.
Cancel Executions Subscription	Click to cancel the execution subscription.
Clear Executions	Removes all execution reports from the page.
Show Errors	Jumps to the Error Code field and shows the error code.

Executions Reporting Page

Once you have subscribed to executions on the Executions page, you can use the Executions Reporting page to run reports based on an Order ID, Order Reference number, VOL order key, or strategy

From a programming point of view, the Executions Reporting page is a practical example of how you can extract array subscription data from the named ranges into which the data is put when it is received, and how such data can be used in your own custom DDE for Excel API applications.



Running Execution Reports

Note: Ensure that TWS is running, and that you have entered your user name in the *User Name* field in the *Which Trader Workstation?* section of all pages in the Excel spreadsheet to properly connect to TWS.

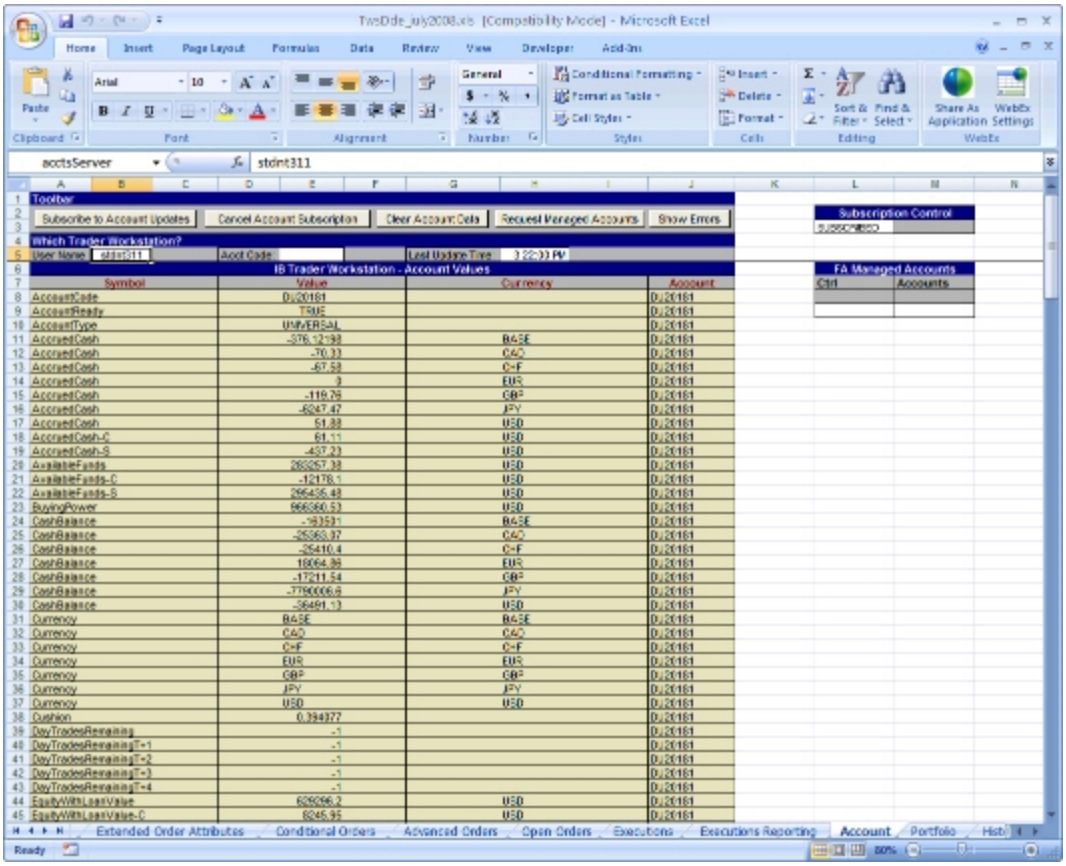
To run execution reports

1. On the Executions page, click the **Subscribe to Executions** button on the toolbar.
2. Click the **Executions Reporting** tab at the bottom of the worksheet.
3. In the *Type* field select from:
   - *Order ID* - finds all executions resulting from orders with a specified PermID.
   - *Order Ref* - finds all executions resulting from orders with a given order reference; for example executions from a specific basket order.
   - *VOL order* - finds all executions resulting from specific volatility order, including any hedge delta executions.
   - *Strategy* - in the *Key* field, enter a value to define the Type you selected. For example, if you selected *Order ID* as the type, enter a specific order ID in the *Key* field.

Account Page

Use the Account page to:

- View account details including your current Equity with Loan Value and Available funds.
- View list of advisor-managed account codes.
- View your current portfolio.



Using the Account Page

Note: Ensure that TWS is running, and that you have entered your user name in the *User Name* field in the *Which Trader Workstation?* section of all pages in the Excel spreadsheet to properly connect to TWS.

To view account information

1. Click the **Account** tab at the bottom of the spreadsheet.
2. Click the **Subscribe to Account Updates** button on the toolbar.

To remove account information

1. Click the **Cancel Account Subscription** button.
2. Click the **Clear Account Data** button.

To request the list of Financial Advisor (FA) managed account codes

1. Click the **Account** tab at the bottom of the spreadsheet.
2. Click the **Request Managed Accounts** button.

To request details of a Financial Advisor (FA) managed account

1. Click the **Account** tab at the bottom of the spreadsheet.
2. In the *Account Code* field in the *Which Trader Workstation?* area, type the account code for which you want details.
3. Click the **Request Managed Accounts** button.

Account Page Toolbar Buttons

The toolbar on the Account page includes the following buttons.

Button	Description
Subscribe to Account Updates	Each click gives you data for a specific account value. All blank lines that precede the Account Portfolio section will hold data. Continue to click until all lines are populated.
Cancel Account Subscription	Click this button one time for each position you hold. When you get a line of "0's" you know you have downloaded all current positions. These values continue to update in real-time.
Clear Account Data	Clears all information from the page. You must first cancel your subscription before you can clear the data.
Request Managed Accounts	For advisor accounts, click this button one time for each account.
Show Errors	Jumps to the Error Code field and shows the error code.

Account Page Values

The Account page displays the following values:

Field	Description	Notes
Account Code	The account number.	
Account Ready	For internal use only.	
Account Type	Identifies the IB account type.	
Accrued Cash	Reflects the current month's accrued debit and credit interest to date, updated daily.	At the beginning of each month, the past month's accrual is added to the cash balance and this field is zeroed out.

Field	Description	Notes
Available Funds	For securities: Equity with Loan Value - Initial margin For commodities: Net Liquidation Value - Initial margin	
Buying Power	Cash Account: (Minimum (Equity with Loan Value, Previous Day Equity with Loan Value)-Initial Margin) Standard Margin Account: Available Funds*4	
Cash Balance	For securities: Settled cash + sales at the time of trade For commodities: Settled cash + sales at the time of trade + futures PNL	
Currency	Shows the currency types that are listed in the Market Value area.	
Cushion	Shows your current margin cushion.	
Day Trades Remaining	Number of day trades left for pattern day trader period.	
Day Trades Remaining T+1, T+2, T+3, T+4	The number of day trades you have left for a 4-day pattern day-trader.	
Equity With Loan Value	For Securities: Cash Account: Settled Cash Margin Account: Total cash value + stock value + bond value + (non-U.S. & Canada securities options value) For Commodities: Cash Account: Total cash value + commodities option value - futures maintenance margin requirement + minimum (0, futures PNL) Margin Account: Total cash value + commodities option value - futures maintenance margin requirement	
Excess Liquidity	Equity with Loan Value - Maintenance margin	
Exchange Rate	The exchange rate of the currency to your base currency.	

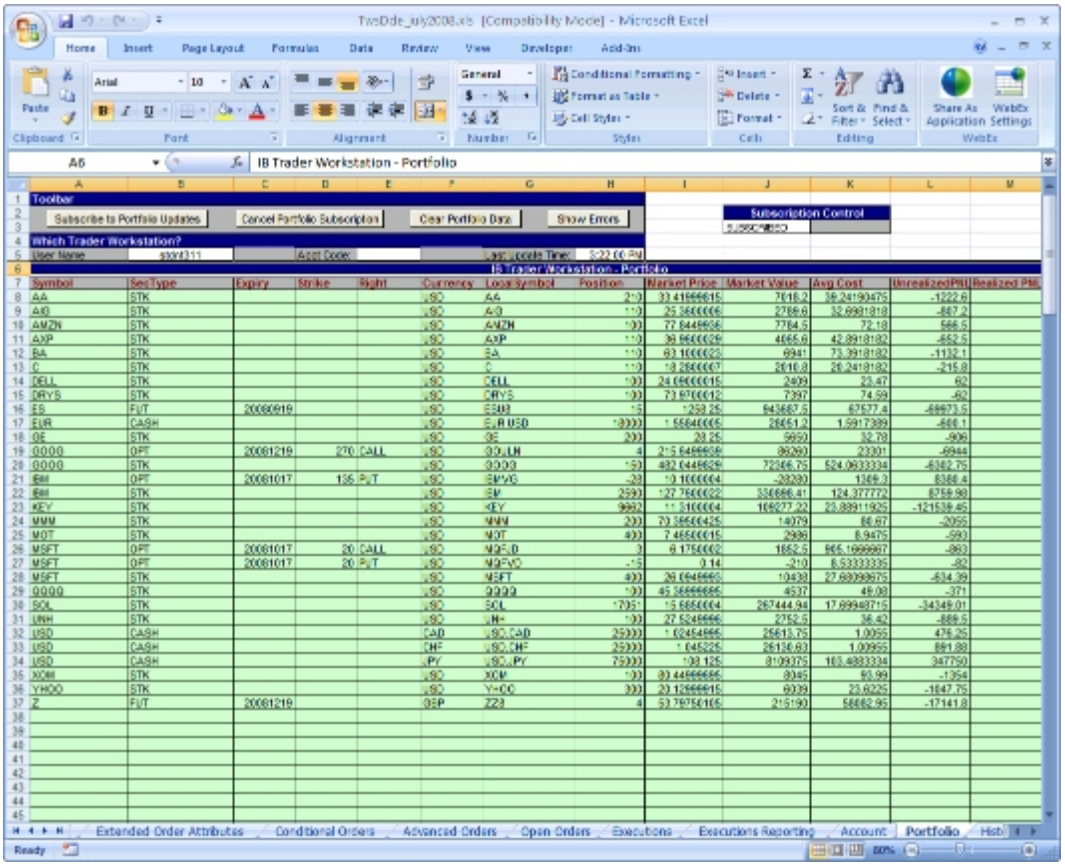
Field	Description	Notes
Full Available Funds	For securities: Equity with Loan Value - Initial margin For commodities: Net Liquidation Value - Initial margin	
Full Excess Liquidity	Equity with Loan Value - Maintenance margin	
Full Init Margin Req	Overnight initial margin requirement in the base currency of the account.	
Full Maint Margin Req	Maintenance margin requirement as of next period's margin change in the base currency of the account.	
Future Option Value	Real-time mark-to-market value of futures options.	
Futures PNL	Real-time change in futures value since last settlement.	
Gross Position Value	Long Stock Value + Short Stock Value + Long Option Value + Short Option Value.	
Init Margin Req	Initial margin requirement in the base currency of the account.	
Leverage	For Securities: Gross Position value / Net Liquidation value For Commodities: Net Liquidation value - Initial margin	
Look Ahead Available Funds	For Securities: Equity with loan value - look ahead initial margin. For Commodities: Net Liquidation value - look ahead initial margin.	
Look Ahead Excess Liquidity	Equity with loan value - look ahead maintenance margin.	
Look Ahead Init Margin Req	Initial margin requirement as of next period's margin change in the base currency of the account.	
Look Ahead Maint Margin Req	Maintenance margin requirement as of next period's margin change in the base currency of the account.	
Maint Margin Req	Maintenance margin requirement in the base currency of the account.	

Field	Description	Notes
Net Liquidation	For Securities: Total cash value + stock value + securities options value + bond value For Commodities: Total cash value + commodities options value	
Net Liquidation by Currency	Same as above for individual currencies.	
Option Market Value	Real-time mark-to-market value of securities options.	
PNL	The difference between the current market value of your open positions and the average cost, or Value - Average Cost.	
Previous Day Equity with Loan Value	Marginable Equity with Loan Value as of 16:00 ET the previous day, only applicable to securities.	
Realized PnL	Shows your profit on closed positions, which is the difference between your entry execution cost and exit execution cost, or (execution price + commissions to open the positions) - (execution price + commissions to close the position).	
Reg T Equity	Initial margin requirements calculated under US Regulation T rules.	
Reg T Margin	For Securities: Cash Account : Settled Cash Margin Account : Total cash value + stock value + bond value + (non-U.S. & Canada securities options value) For Commodities: Cash Account : Total cash value + commodities option value - futures maintenance margin requirement + minimum (0, futures PNL) Margin Account : Total cash value - futures maintenance margin requirement	

Field	Description	Notes
SMA	Max ((EWL - US initial margin requirements) *, (Prior Day SMA +/- change in day's cash +/- US initial margin requirements** for trades made during the day.)) *calculated end of day under US Stock rules, regardless of country of trading. **at the time of the trade	Only applicable for securities.
Stock Market Value	Real-time mark-to-market value of stock	
Total Cash Balance	Cash recognized at the time of trade + futures PNL	
Total Cash Value	Total cash value of stock, commodities and securities	

Portfolio Page

The Portfolio page displays all of your current positions. This page communicates with TWS and updates the values every three minutes, which you can see in the *Last Update Time* field in the *Which Trader Workstation?* area of the page.



Viewing Your Portfolio

Note: Ensure that TWS is running, and that you have entered your user name in the *User Name* field in the *Which Trader Workstation?* section of all pages in the Excel spreadsheet to properly connect to TWS.

To view your portfolio

1. Click the **Portfolio** tab at the bottom of the worksheet.
2. Click the **Subscribe to Portfolio Updates** button.

To remove portfolio information

1. Click the **Cancel Portfolio Subscription** button.
2. Click the **Clear Portfolio Data** button.

Portfolio Page Toolbar Buttons

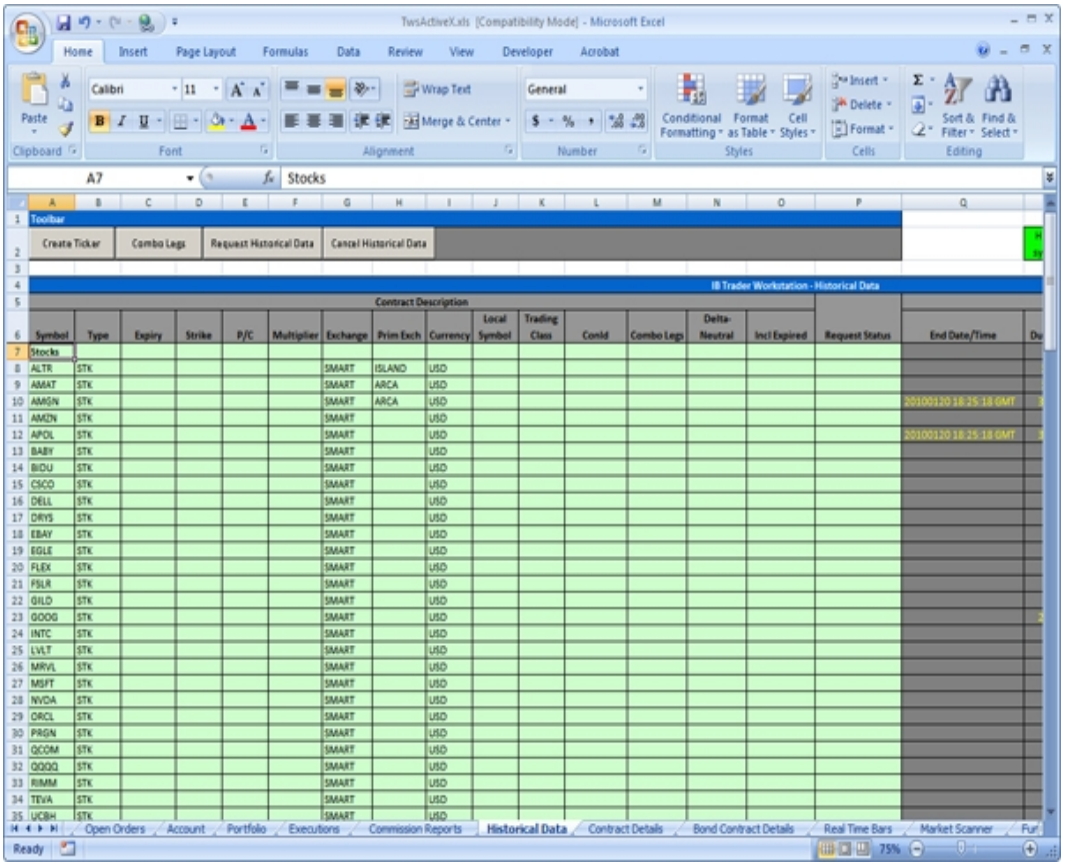
The toolbar on the Portfolio page includes the following buttons.

Button	Description
Subscribe to Portfolio Updates	Click to view all current portfolio data.

Button	Description
Cancel Portfolio Subscription	Cancels the connection to TWS that updates your portfolio information.
Clear Portfolio Data	Removes all data from the page. You must cancel your subscription before you can clear all data.
Show Errors	Jumps to the Error Code field and shows the error code.

Historical Data Page

Use the Historical Data page to request historical data for an instrument based on data you enter in query fields. The query results display on a separate worksheet page and creates a new page for the results if the page doesn't currently exist. Note that since the query returns in a named range of cells, you can write VBA macros to perform computations on it, and you can chart and sort the data in Excel.



Note: For information about historical data request limitations, see Historical Data Limitations.

Viewing Historical Data

Note: Ensure that TWS is running, and that you have entered your user name in the *User Name* field in the *Which Trader Workstation?* section of all pages in the Excel spreadsheet

to properly connect to TWS.

To request historical data

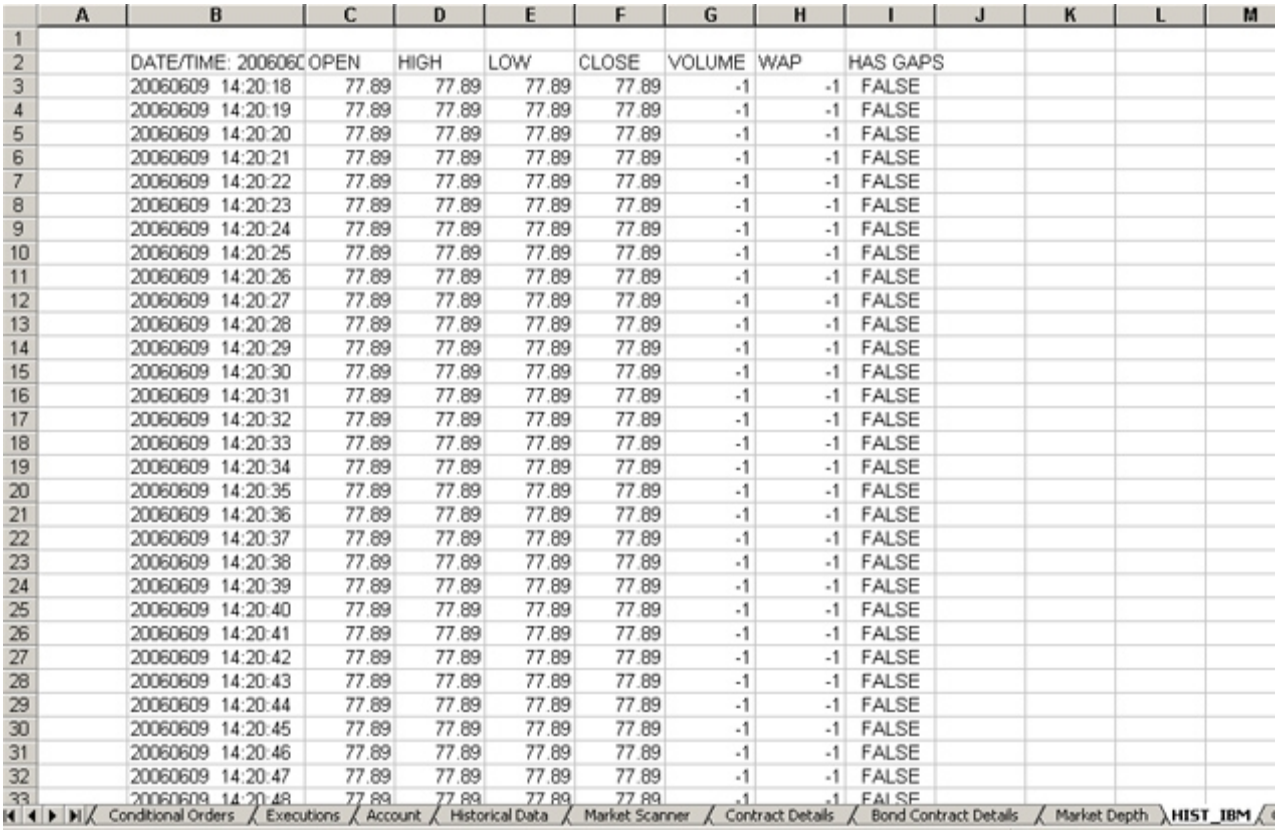
1. Click the **Historical Data** tab at the bottom of the spreadsheet.
2. Create a ticker by filling in the fields in the *Contract Description* section of the page, or by clicking the **Create Ticker** button on the toolbar and entering the required information in the Ticker box.
3. Enter the parameters of your query in the *Query Specification* fields. For complete descriptions of the query fields, Historical Data Page Query Specification Fields.
4. Select the line, then click the **Request Historical Data** button. When the *Ctrl* field displays "Finished," the results are displayed on the specified page.

To request historical data for expired contracts

1. On the Historical Data page, create a ticker by filling in the fields in the *Contract Description* section of the page, or by clicking the **Create Ticker** button on the toolbar and entering the required information in the Ticker box.
2. Enter the parameters of your query in the *Query Specification* fields.
3. In the *Expired* field in the Query Specification section, enter **TRUE**.
4. Select the line, then click the **Request Historical Data** button. When the *Ctrl* field displays "Finished," the results are displayed on the specified page.

Note: Historical data queries on expired contracts are limited to the last year of the life of the contract.

The following figure shows a typical historical data results page.



	A	B	C	D	E	F	G	H	I	J	K	L	M
1													
2		DATE/TIME: 200606(	OPEN	HIGH	LOW	CLOSE	VOLUME	WAP	HAS GAPS				
3		20060609 14:20:18	77.89	77.89	77.89	77.89	-1	-1	FALSE				
4		20060609 14:20:19	77.89	77.89	77.89	77.89	-1	-1	FALSE				
5		20060609 14:20:20	77.89	77.89	77.89	77.89	-1	-1	FALSE				
6		20060609 14:20:21	77.89	77.89	77.89	77.89	-1	-1	FALSE				
7		20060609 14:20:22	77.89	77.89	77.89	77.89	-1	-1	FALSE				
8		20060609 14:20:23	77.89	77.89	77.89	77.89	-1	-1	FALSE				
9		20060609 14:20:24	77.89	77.89	77.89	77.89	-1	-1	FALSE				
10		20060609 14:20:25	77.89	77.89	77.89	77.89	-1	-1	FALSE				
11		20060609 14:20:26	77.89	77.89	77.89	77.89	-1	-1	FALSE				
12		20060609 14:20:27	77.89	77.89	77.89	77.89	-1	-1	FALSE				
13		20060609 14:20:28	77.89	77.89	77.89	77.89	-1	-1	FALSE				
14		20060609 14:20:29	77.89	77.89	77.89	77.89	-1	-1	FALSE				
15		20060609 14:20:30	77.89	77.89	77.89	77.89	-1	-1	FALSE				
16		20060609 14:20:31	77.89	77.89	77.89	77.89	-1	-1	FALSE				
17		20060609 14:20:32	77.89	77.89	77.89	77.89	-1	-1	FALSE				
18		20060609 14:20:33	77.89	77.89	77.89	77.89	-1	-1	FALSE				
19		20060609 14:20:34	77.89	77.89	77.89	77.89	-1	-1	FALSE				
20		20060609 14:20:35	77.89	77.89	77.89	77.89	-1	-1	FALSE				
21		20060609 14:20:36	77.89	77.89	77.89	77.89	-1	-1	FALSE				
22		20060609 14:20:37	77.89	77.89	77.89	77.89	-1	-1	FALSE				
23		20060609 14:20:38	77.89	77.89	77.89	77.89	-1	-1	FALSE				
24		20060609 14:20:39	77.89	77.89	77.89	77.89	-1	-1	FALSE				
25		20060609 14:20:40	77.89	77.89	77.89	77.89	-1	-1	FALSE				
26		20060609 14:20:41	77.89	77.89	77.89	77.89	-1	-1	FALSE				
27		20060609 14:20:42	77.89	77.89	77.89	77.89	-1	-1	FALSE				
28		20060609 14:20:43	77.89	77.89	77.89	77.89	-1	-1	FALSE				
29		20060609 14:20:44	77.89	77.89	77.89	77.89	-1	-1	FALSE				
30		20060609 14:20:45	77.89	77.89	77.89	77.89	-1	-1	FALSE				
31		20060609 14:20:46	77.89	77.89	77.89	77.89	-1	-1	FALSE				
32		20060609 14:20:47	77.89	77.89	77.89	77.89	-1	-1	FALSE				
33		20060609 14:20:48	77.89	77.89	77.89	77.89	-1	-1	FALSE				

Conditional Orders | Executions | Account | Historical Data | Market Scanner | Contract Details | Bond Contract Details | Market Depth | HIST_IBM

Historical Data Page Toolbar Buttons

The toolbar on the Historical Data page includes the following buttons.

Button	Description
Create Ticker	Opens the Ticker box. Enter information to create a market data line.
Combo Legs	Opens the Combination Legs box. Enter contract details to create legs of a combination order one by one.
Request Historical Data	Submits your historical data query to TWS and displays the results on a separate worksheet page.
Cancel Historical Data	Cancels the historical data request.
Show Errors	Jumps to the Error Code field and shows the error code.

Historical Data Page Query Specification Fields

Historical Data queries include the following fields:

Parameter	Description
End Date/Time	Use the format yyyymmdd {space}hh:mm:ss{space}*tmz* where the time zone is allowed (optionally)after a space at the end.
Duration	This is the time span the request will cover, and is specified using the format *integer* {space} *unit*, where valid units are: • S (seconds) • D (days) • W (weeks) • Y (years) This unit is currently limited to one. If no unit is specified, seconds are used.
Bar Size	Specifies the size of the bars that will be returned. The following bar sizes may be used, and are specified using the parametric value: **Bar Size String - Integer Value** • 1 second - 1 • 5 seconds - 2 • 15 seconds - 3 • 30 seconds - 4 • 1 minutes - 5 • 2 minutes - 6 • 3 minutes - 16 • 5 minutes - 7 • 15 minutes - 8 • 30 minutes - 9 • 1 hour - 10 • 1 day - 11 On the query return page, each "bar" is represented by a line in the spread-sheet. If you specify a duration of 300 seconds, and a bar size of "1" (one second) your return will include 300 lines, and the value in each line is equal to one second, or is a one-second bar. Note that you can use either the Integer value of the Bar Size String or the Integer Value to define the bar sizes.

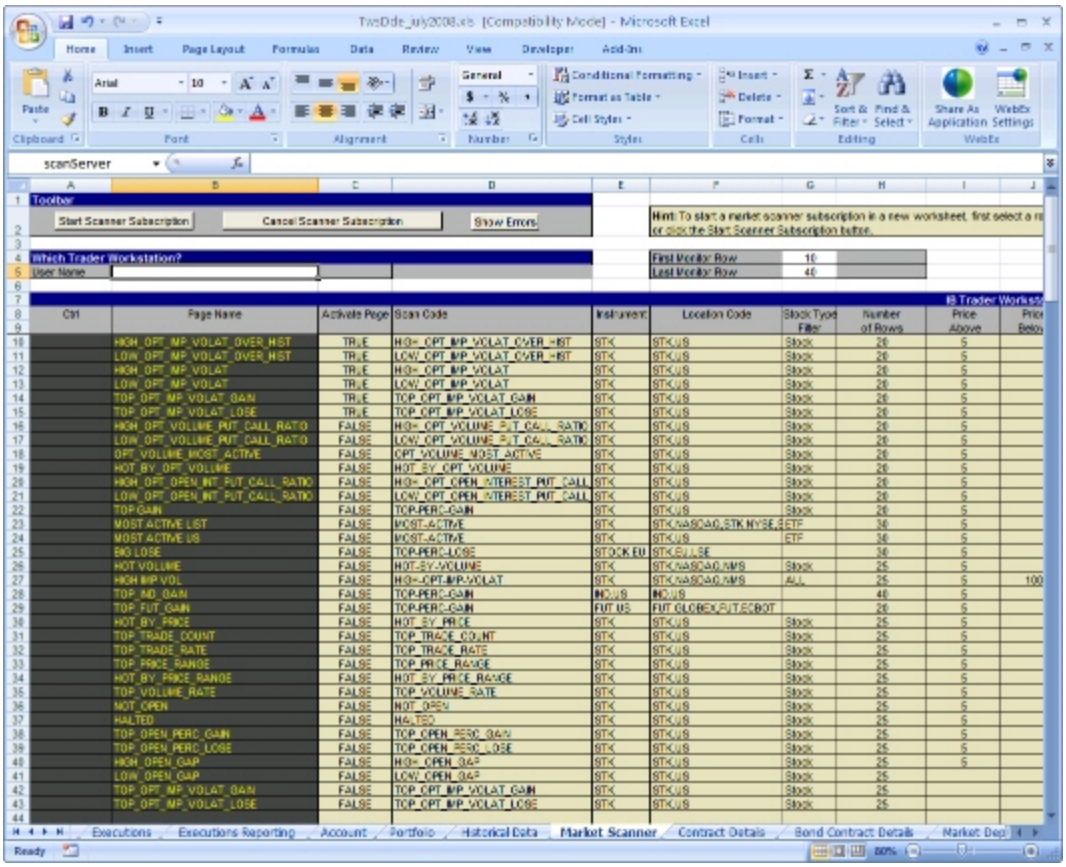
Parameter	Description
What to Show	Determines the nature of the data extracted. Valid values include: • TRADES • MIDPOINT • BID • ASK • BID_ASK • HISTORICAL_VOLATILITY • OPTION_IMPLIED_VOLATILITY All but the Bid/Ask data contain the *start time*, *open*, *high*, *low*, *close*, *volume* and *weighted average price* during the time slice queried. For the Bid/Ask query, the *open* and *close* values are the time-weighted average bid and the time-weighted average offer, respectively. These bars are identical to the TWS charts' candlestick bars.
RTH Only	Regular Trading Hours only. Valid values include: • 0 - all data available during the time span requested is returned, including time intervals when the market in question was outside of regular trading hours. • 1 - only data within the regular trading hours for the product requested is returned, even if the time span falls partially or completely outside.
Date Format Style	Valid values include: • 1 - dates that apply to bars are returned in the format yyyymmdd {space}{space}hh:mm:dd (the same format used when reporting executions). • 2 - the dates are returned as an integer specifying the number of seconds since 1/1/1970 GMT.
Page Name	The name of the results page. This appears in the tab for the results page at the bottom of the worksheet.
Expired	Valid values: TRUE, FALSE If TRUE, the data query can be done on an expired futures contract, limited to the last year of a contract's life.

For a request with a duration of 300 seconds and a bar of one second, the query return looks like this (the scroll bar on the right side of the page allows you to scroll down and see all 300 bars).

Note that the new page is added to the right of the existing tabs on the worksheet.

Market Scanner Page

Use the Market Scanner page to subscribe to TWS market scanners. These scanners allow you to define criteria and set filters that return the top *x* number of underlyings which meet all scan criteria. The scan is continually updated in real time.



Starting a Market Scanner Subscription

> **Note:** Ensure that TWS is running, and that you have entered your user name in the *User Name* field in the *Which Trader Workstation?* section of all pages in the Excel spreadsheet to properly connect to TWS.

To start a scanner subscription

1. Click the **Market Scanner** tab at the bottom of the spreadsheet.
2. Highlight an existing scanner row, or enter information for a different market scanner:
   a. Type the name of the scan results page in the Page Name field.
   b. Type **TRUE** or **FALSE** in the *Activate Page* field.

      Setting these field to TRUE forces the scan results page to pop to the front of your application every time it updates. To stop this behavior, set the value of this field to FALSE.

c. Type values for the rest of the scan parameters in the lightly shaded section of the page.

3. Click the **Start Scanner Subscription** button in the toolbar. A new page for the scanner is created and is displayed after the subscription is processed.

Market Scanner Parameters

The following table describes the market scanner parameters that make up a scanner subscription.

Parameter	Description
Page name	The name that will be given to the new page that is created with the scanner data.
Activate Page?	If set to true, the new scanner page will display on top of the worksheet every time the scan results update. This could be as often as every minute.
Scan Code	The type of scan.
Instrument	The instrument type used in the scan.
Location code	The market used (i.e. US Stocks) for the scan.
Stock type filter	Allows you to specify just stocks, just ETFs, or both.
Number of rows	The number of rows of data to return in the results.
Price Above	Filters out returns with prices below the named price. Can be left empty.
Price Below	Filters out returns with prices above the named price. Can be left empty.
Average volume above	Filters out returns with an average volume below the named price. Can be left empty.
Average Option Volume Above	Filters out returns with an average option volume below the named price. Can be left empty.
Market Cap Above	Filters out returns with a market capitalization value below the named price. Can be left empty.
Market Cap Below	Filters out returns with a market capitalization value above the named price. Can be left empty.
Moody Rating Above	Filters out returns with a Moody rating below the named price. Can be left empty.
Moody Rating Below	Filters out returns with a Moody rating above the named price. Can be left empty.
S & P Rating Above	Filters out returns with an S&P rating below the named price. Can be left empty.
S & P Rating Below	Filters out returns with an S&P rating above the named price. Can be left empty.
Maturity Date Above	Filters out returns with a maturity date below the named price. Can be left empty.

Parameter	Description
Maturity Date Below	Filters out returns with a maturity date above the named price. Can be left empty.
Coupon Rate Above	Filters out returns with a coupon rate below the named price. Can be left empty.
Coupon Rate Below	Filters out returns with a coupon rate above the named price. Can be left empty.
Exclude Convertible	Filters out convertible bonds. Can be left empty.
Scanner Settings Pairs	For example "Annual/True" used on the Top Option Implied Vol% Gainers would instruct the scan to return annualized volatilities. Delimit setting pairs by slashes.

Market Scanner Page Toolbar Buttons

The toolbar on the Market Scanner page includes the following buttons.

Button	Description
Start Scanner Subscription	Creates and displays a new page for results of the selected market scanner.
Cancel Scanner Subscription	Cancels the market scanner.
Show Errors	Jumps to the Error Code field and shows the error code.

Available Market Scanners

The following table shows the available market scanners in the DDE for Excel API spreadsheet.

Note: To get more detailed market scan results than are available in the DDE for Excel API spreadsheet, run the Market Scanners in TWS.

Market Scanner (Scan Code)	Description
Low Opt Volume P/C Ratio (LOW_OPT_VOL_PUT_CALL_RATIO)*	Put option volumes are divided by call option volumes and the top underlying symbols with the lowest ratios are displayed.
High Option Imp Vol Over Historical (HIGH_OPT_IMP_VOLAT_OVER_HIST)*	Shows the top underlying contracts (stocks or indices) with the largest divergence between implied and historical volatilities.
Low Option Imp Vol Over Historical (LOW_OPT_IMP_VOLAT_OVER_HIST)*	Shows the top underlying contracts (stocks or indices) with the smallest divergence between implied and historical volatilities.

Market Scanner (Scan Code)	Description
Highest Option Imp Vol (HIGH_OPT_IMP_VOLAT)*	Shows the top underlying contracts (stocks or indices) with the highest vega-weighted implied volatility of near-the-money options with an expiration date in the next two months.
Top Option Imp Vol % Gainers (TOP_OPT_IMP_VOLAT_GAIN)*	Shows the top underlying contracts (stocks or indices) with the largest percent gain between current implied volatility and yesterday's closing value of the 15 minute average of implied volatility.
Top Option Imp Vol % Losers (TOP_OPT_IMP_VOLAT_LOSE)*	Shows the top underlying contracts (stocks or indices) with the largest percent loss between current implied volatility and yesterday's closing value of the 15 minute average of implied volatility.
High Opt Volume P/C Ratio (HIGH_OPT_VOLUME_PUT_CALL_RATIO)	Put option volumes are divided by call option volumes and the top underlying symbols with the highest ratios are displayed.
Low Opt Volume P/C Ratio (LOW_OPT_VOLUME_PUT_CALL_RATIO)	Put option volumes are divided by call option volumes and the top underlying symbols with the lowest ratios are displayed.
Most Active by Opt Volume (OPT_VOLUME_MOST_ACTIVE)	Displays the most active contracts sorted descending by options volume.
Hot by Option Volume (HOT_BY_OPT_VOLUME)	Shows the top underlying contracts for highest options volume over a 10-day average.
High Option Open Interest P/C Ratio (HIGH_OPT_OPEN_INTEREST_PUT_CALL_RATIO)	Returns the top 50 contracts with the **highest** put/call ratio of outstanding option contracts.
Low Option Open Interest P/C Ratio (LOW_OPT_OPEN_INTEREST_PUT_CALL_RATIO)	Returns the top 50 contracts with the **lowest** put/call ratio of outstanding option contracts.
Top % Gainers (TOP_PERC_GAIN)	Contracts whose last trade price shows the highest percent increase from the previous night's closing price.
Most Active (MOST_ACTIVE)	Contracts with the highest trading volume today, based on units used by TWS (lots for US stocks; contract for derivatives and non-US stocks). The sample spreadsheet includes two Most Active scans: Most Active List, which displays the most active contracts in the NASDAQ, NYSE and AMEX markets, and Most Active US, which displays the most active stocks in the United States.

Market Scanner (Scan Code)	Description
Top % Losers (TOP_PERC_LOSE)	Contracts whose last trade price shows the lowest percent increase from the previous night's closing price.
Hot Contracts by Volume (HOT_BY_VOLUME)	Contracts where: • today's Volume/avgDailyVolume is highest. • avgDailyVolume is a 30-day exponential moving average of the contract's daily volume.
Top % Futures Gainers (TOP_PERC_GAIN)	Futures whose last trade price shows the highest percent increase from the previous night's closing price.
Hot Contracts by Price (HOT_BY_PRICE)	Contracts where: • (lastTradePrice-prevClose)/avgDailyChange is highest in absolute value (positive or negative). • The avgDailyChange is defined as an exponential moving average of the contract's (dailyClose-dailyOpen)
Top Trade Count (TOP_TRADE_COUNT)	The top trade count during the day.
Top Trade Rate (TOP_TRADE_RATE)	Contracts with the highest number of trades in the past 60 seconds (regardless of the sizes of those trades).
Top Price Range (TOP_PRICE_RANGE)	The largest difference between today's high and low, or yesterday's close if outside of today's range.
Hot by Price Range (HOT_BY_PRICE_RANGE)	The largest price range (from Top Price Range calculation) over the volatility.
Top Volume Rate (TOP_VOLUME_RATE)	The top volume rate per minute.
Lowest Option Imp Vol (LOW_OPT_IMP_VOLAT)	Shows the top underlying contracts (stocks or indices) with the lowest vega-weighted implied volatility of near-the-money options with an expiration date in the next two months.
Most Active by Opt Open Interest (OPT_OPEN_INTEREST_MOST_ACTIVE)	Returns the top 50 underlying contracts with the (highest number of outstanding call contracts) + (highest number of outstanding put contracts)
Not Open (NOT_OPEN)	Contracts that have not traded today.

Market Scanner (Scan Code)	Description
Halted (HALTED)	Contracts for which trading has been halted.
Top % Gainers Since Open (TOP_OPEN_PERC_GAIN)	Shows contracts with the highest percent price INCREASE between the last trade and opening prices.
Top % Losers Since Open (TOP_OPEN_PERC_LOSE)	Shows contracts with the highest percent price DECREASE between the last trade and opening prices.
Top Close-to-Open % Gainers (HIGH_OPEN_GAP)	Shows contracts with the highest percent price INCREASE between the previous close and today's opening prices.
Top Close-to-Open % Losers (LOW_OPEN_GAP)	Shows contracts with the highest percent price DECREASE between the previous close and today's opening prices.
Lowest Option Imp Vol (LOW_OPT_IMP_VOLAT)*	Shows the top underlying contracts (stocks or indices) with the lowest vega-weighted implied volatility of near-the-money options with an expiration date in the next two months.
Top Option Imp Vol % Gainers (TOP_OPT_IMP_VOLAT_GAIN)*	Shows the top underlying contracts (stocks or indices) with the largest percent gain between current implied volatility and yesterday's closing value of the 15 minute average of implied volatility.
Top Option Imp Vol % Losers (TOP_OPT_IMP_VOLAT_LOSE)*	Shows the top underlying contracts (stocks or indices) with the largest percent loss between current implied volatility and yesterday's closing value of the 15 minute average of implied volatility.
13-Week High (HIGH_VS_13W_HL)	The highest price for the past 13 weeks.
13-Week Low (LOW_VS_13W_HL)	The lowest price for the past 13 weeks.
26-Week High (HIGH_VS_26W_HL)	The highest price for the past 26 weeks.
26-Week Low (LOW_VS_26W_HL)	The lowest price for the past 26 weeks.
52-Week High (HIGH_VS_52W_HL)	The highest price for the past 52 weeks.
52-Week Low (LOW_VS_52W_HL)	The lowest price for the past 52 weeks.

Market Scanner (Scan Code)	Description
EFP - High Synth Bid Rev Yield (HIGH_SYNTH_BID_REV_NAT_ YIELD)	Highlights the highest synthetic EFP interest rates available. These rates are computed by taking the price differential between the SSF and the underlying stock and netting dividends to calculate an annualized synthetic implied interest rate over the period of the SSF. The High rates may present an investment opportunity.
EFP - Low Synth Bid Rev Yield (LOW_SYNTH_BID_REV_NAT_ YIELD)	Highlights the lowest synthetic EFP interest rates available. These rates are computed by taking the price differential between the SSF and the underlying stock and netting dividends to calculate an annualized synthetic implied interest rate over the period of the SSF. The Low rates may present a borrowing opportunity.

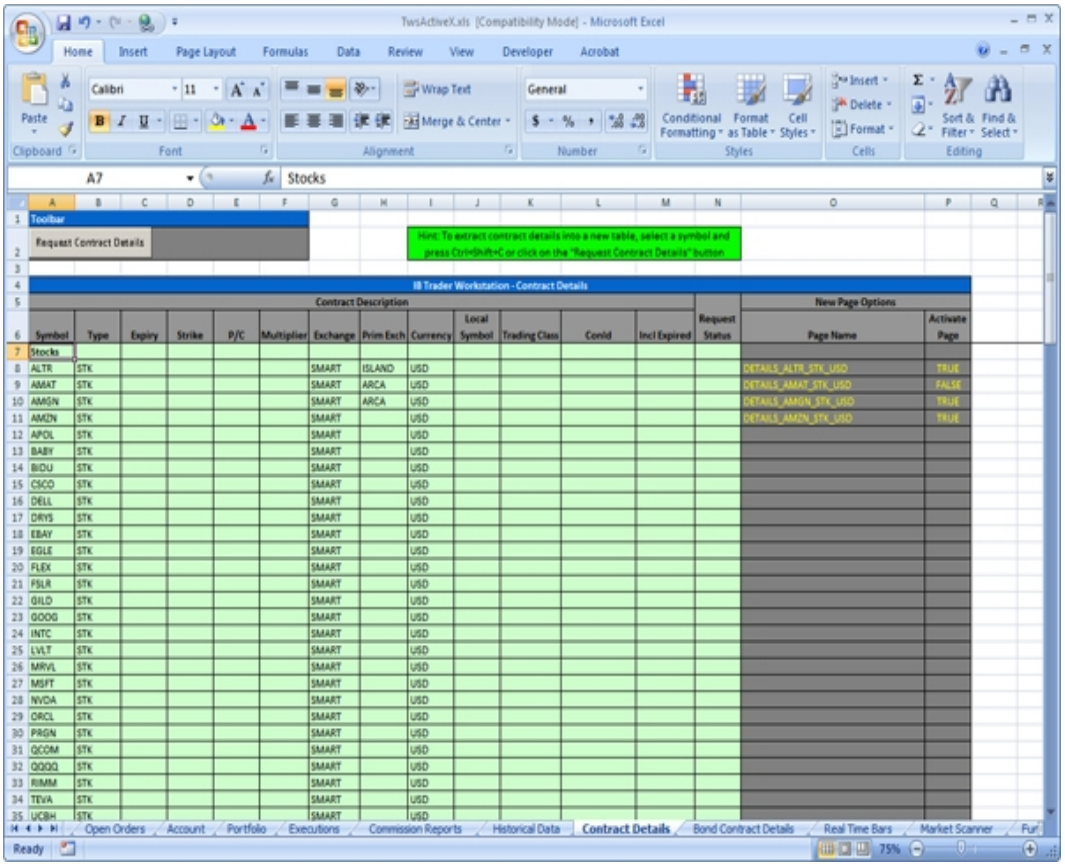
* 30-day (V30) Implied Volatilities:

  Implied volatility is calculated using a 100-step binary tree for American style options, and a Black-Scholes model for European style options. Interest rates are calculated using the settlement prices from the day's Eurodollar futures contracts, and dividends are based on historical payouts.

  The IB 30-day volatility is the at-market volatility estimated for a maturity thirty calendar days forward of the current trading day. It is based on option prices from two consecutive expiration months. The first expiration month is that which has at least eight calendar days to run. The implied volatility is estimated for the eight options on the four closest to market strikes in each expiry. The implied volatilities are fit to a parabola as a function of the strike price for each expiry. The at-the-market implied volatility for an expiry is then taken to be the value of the fit parabola at the expected future price for the expiry. A linear interpolation (or extrapolation, as required) of the 30-day variance based on the squares of the at-market volatilities is performed. V30 is then the square root of the estimated variance. If there is no first expiration month with less than sixty calendar days to run, we do not calculate a V30.

Contract Details Page

Use the Contract Details page to request contract-specific information such as supported order types, valid exchanges, the contract ID, and so on.



Requesting Contract Details

Note: Ensure that TWS is running, and that you have entered your user name in the *User Name* field in the *Which Trader Workstation?* section of all pages in the Excel spreadsheet to properly connect to TWS.

To request details for a contract

1. Click the **Contract Details** tab at the bottom of the spreadsheet to open the Contract Details page.
2. Select or enter the ticker symbol for which you want to request contract details.
3. To request contract details for an expired contract, type **TRUE** in the *Expired* field.
4. Click the **Request Contract Details** button on the toolbar.

Contract Details Page Toolbar Buttons

The toolbar on the Contract Details page includes the following buttons:

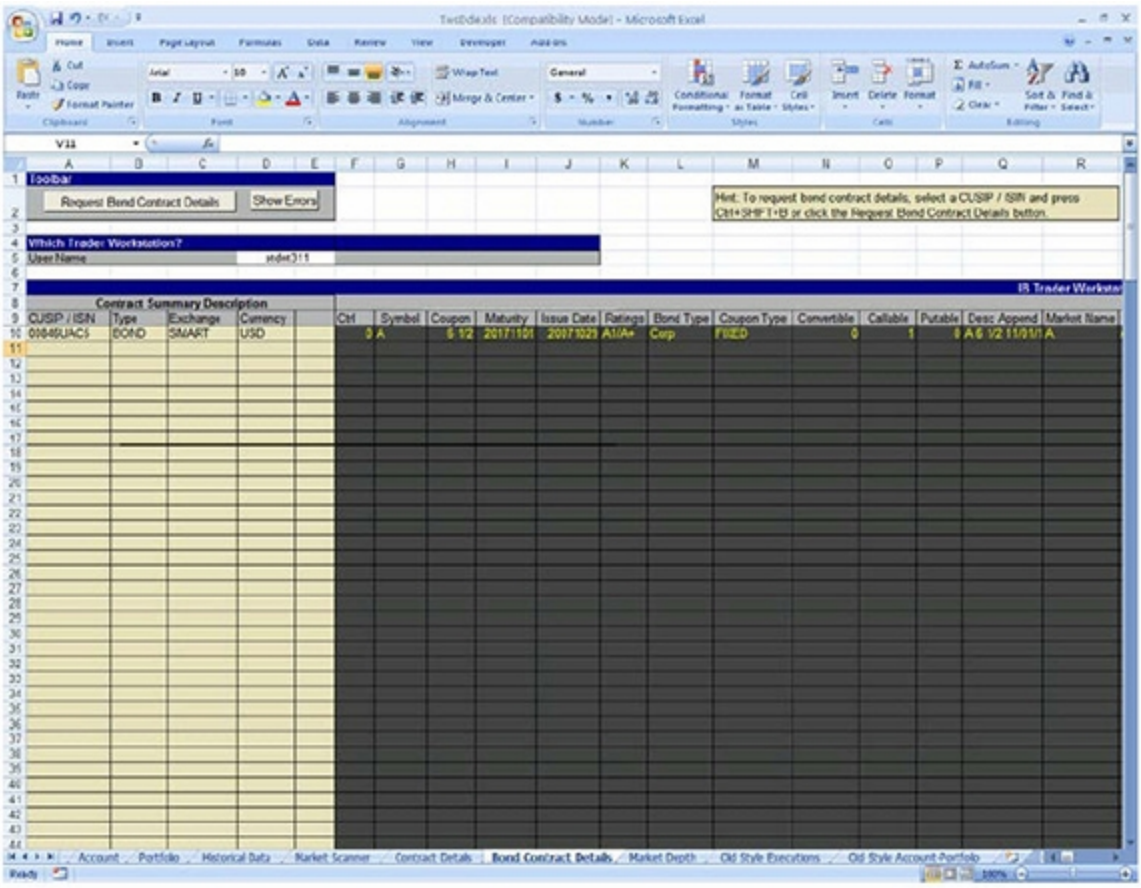
Button	Description
Request Contract Details	Returns information on the selected contract.
Show Errors	Jumps to the Error Code field and shows the error code.

Bond Contract Details Page

Use the Bond Contract Details page to request contract-specific information for bonds, including the coupon, ratings, bond type, maturity date, and so on.

Note: Beginning with TWS Version 921, some bond contract data will be suppressed and will not be available from the API. All bond contract data will continue to be available from Trader Workstation, but only the following bond contract data will be available from the API:

- Contract ID
- Minimum Tick
- CUSIP (if you have subscribed to the CUSIP service)
- Rating (if you have subscribed to ratings)



Requesting Bond Contract Details

Note: Ensure that TWS is running, and that you have entered your user name in the *User Name* field in the *Which Trader Workstation?* section of all pages in the Excel spreadsheet to properly connect to TWS.

To request details for a bond contract

1. Click the **Bond Contract Details** tab at the bottom of the spreadsheet.
2. Enter the ticker symbol for which you want to request contract details.
3. Click the **Request Bond Contract Details** button on the toolbar.

Note: Beginning with TWS Version 921, some bond contract data will be suppressed and will not be available from the API. All bond contract data will continue to be available from Trader Workstation, but only the following bond contract data will be available from the API:

- Contract ID
- Minimum Tick
- CUSIP (if you have subscribed to the CUSIP service)
- Rating (if you have subscribed to ratings)

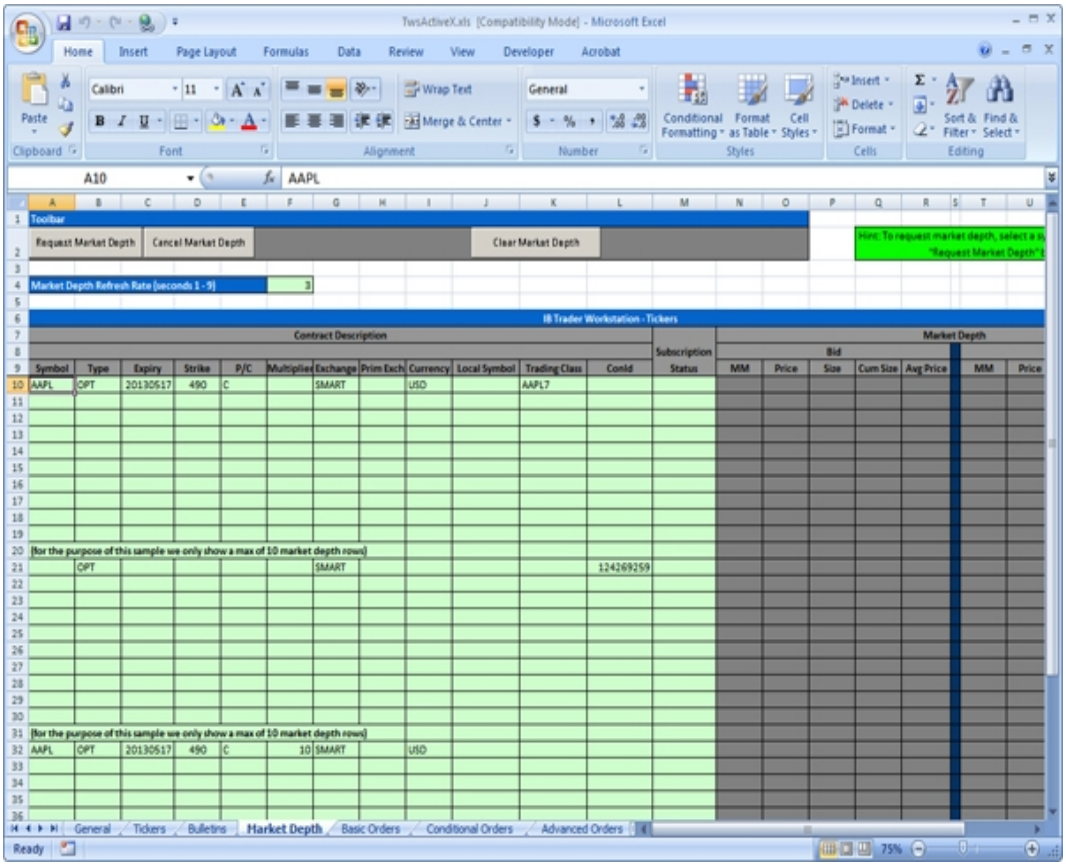
Bond Contract Details Page Toolbar Buttons

The toolbar on the Bond Contract Details page includes the following buttons:

Button	Description
Request Bond Contract Details	Gets bond information data for the selected contract.
Show Errors	Jumps to the Error Code field and shows the error code.

Market Depth Page

Use the Market Depth page to view market depth for selected contracts. You can also view market depth for NYSE-listed products through the Open Book Market Data Subscription, and NASDAQ-listed products through the TotalView Market Data Subscriptions, if you have signed up for those subscriptions.



Using the Market Depth Page

Note: Ensure that TWS is running, and that you have entered your user name in the *User Name* field in the *Which Trader Workstation?* section of all pages in the Excel spreadsheet to properly connect to TWS.

To request market depth for a contract

1. Click the **Market Depth** tab at the bottom of the spreadsheet to open the Market Depth page.
2. Select the ticker symbol for which you want to request the market depth, or enter a new ticker on a blank line.
3. Click the **Request Market Depth** button on the toolbar.

To reset the market data refresh rate for tickers and market depth

1. Click the **Tickers** or **Market Depth** tab at the bottom of the spreadsheet.
2. Type the desired market data refresh rate in milliseconds in the *Refresh Rate* field in the *Which Trader Workstation?* area.
3. Move your cursor out of the *Refresh Rate* field.
4. Click the **Set Refresh Rate** button on the toolbar.

To display more lines of market depth

You can edit the Request Market Depth macro to show more than the default 10 lines.

1. From the Market Depth page, press **Alt+F11**.

   The Visual Basic Editor (VBE) opens and displays the code for the Market Depth page.

2. In the Declarations section at the top of the code window for the page, change the number value in **numDisplayRows = 10** to a higher/lower value, then click the **Save** button on the VBE toolbar.
3. Close the Visual Basic Editor.

Market Depth Page Toolbar Buttons

The toolbar on the Market Depth page includes the following buttons:

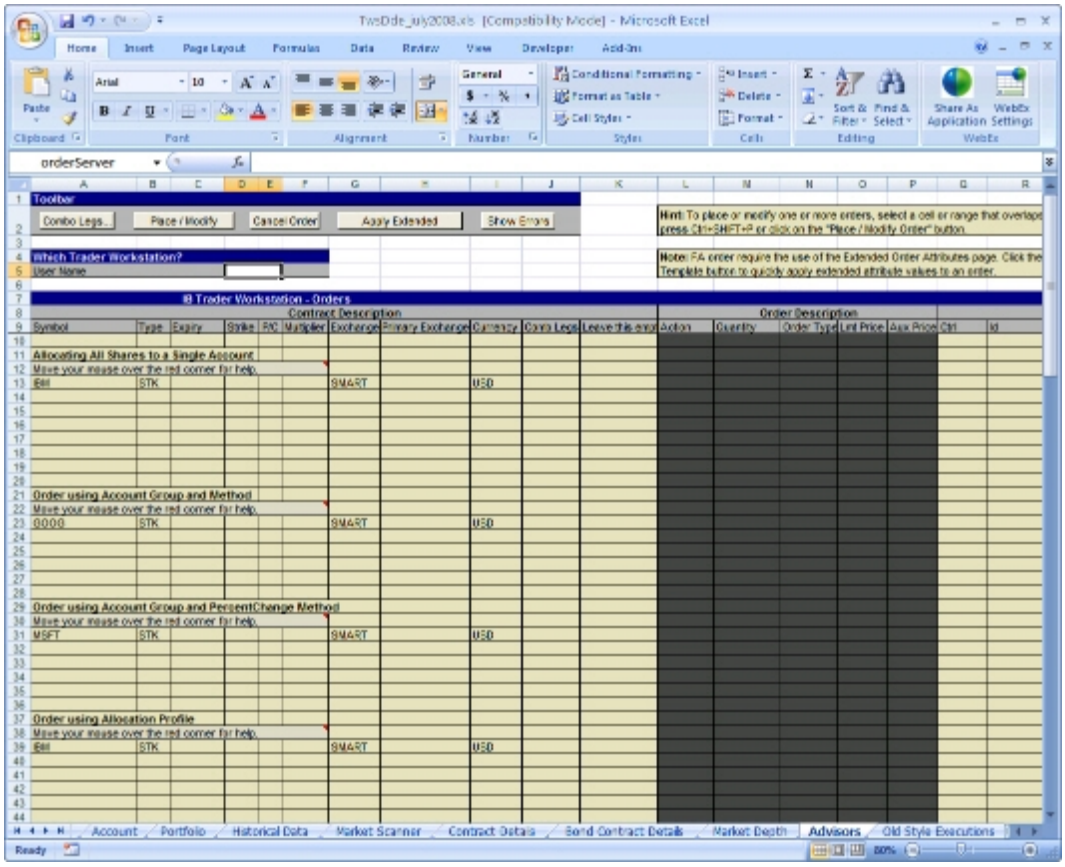
Button	Description
Request Market Depth	View bid/ask depth prices for the selected contract.
Cancel Market Depth	Cancel market depth for the selected contract.
Set Refresh Rate	Resets the refresh rate (in milliseconds) for market data.
Show Errors	Jumps to the Error Code field and shows the error code.

Advisors Page

If you are a Financial Advisor and manage multiple accounts, use the Advisors page to create FA orders that:

- allocate shares to a single managed account
- use FA account groups and methods

- use allocation profiles



Note: You must set up your managed accounts, account groups, methods and allocation profiles in TWS before you can place FA orders in the DDE for Excel API sample spreadsheet.

Allocating Shares to a Single Account

You can use the **Advisors** page to set up an order and allocate all shares in the order to a single account.

To allocate shares to a single account:

1. Create an account group in TWS.
2. Click the **Advisors** tab at the bottom of the spreadsheet.
3. Enter the contract information in the *Contract Description* cells, then enter the order information in the *Order Description* cells.
4. Click the **Extended Order Attributes** tab. Enter the account code in the *Value* cell for the *Account (Institutional only)* extended order attribute.
5. Click the **Advisors** tab.
6. Highlight the order row, then click the **Apply Extended** button to apply the *Account* order attribute value to the order. The *Account* value is applied to the selected order and displayed in the *Extended Order Attributes* section of the page.

7. Click the **Place/Modify Order** button.
8. When you are done allocating shares to the account, delete the *Account* value from the **Extended Order Attributes** page. If you do not delete this value, it will be applied to all subsequent orders placed from the DDE for Excel API spreadsheet.

Placing an Order using an FA Account Group and Method

You can also use the **Advisors** page to set up an order using an FA account group and FA method.

To place an order using an FA account group and FA method:

1. Create the FA account group(s) and FA method(s) in TWS.
2. Click the **Advisors** tab at the bottom of the spreadsheet.
3. Enter the contract information in the *Contract Description* cells, then enter the order information in the *Order Description* cells.
4. Click the **Extended Order Attributes** tab. Enter values for the following extended order attributes:
   - FA Group - Enter the name of the account group.
   - FA Method - Enter the name of the allocation method to use for this order.
   - FA Percentage - Enter the percentage used by the PctChange allocation method to use for this order. This attribute applies only to FA groups that use this method.
5. Click the **Advisors** tab.
6. Highlight the order row, then click the **Apply Extended** button to apply the extended order attribute values to the order. The values for *FA Group*, *FA Method* and *FA Percentage* are applied to the selected order and displayed in the *Extended Order Attributes* section of the page.
7. Click the **Place/Modify Order** button.
8. When you are done allocating shares to the account, delete the values you entered on the **Extended Order Attributes** page. If you do not delete these values, they will be applied to all subsequent orders placed from the DDE for Excel API spreadsheet.

Placing an Order using an Allocation Profile

You can also use the **Advisors** page to set up an order using an FA allocation profile.

To place an order using an FA allocation profile:

1. Create the FA allocation profile in TWS.
2. Click the **Advisors** tab at the bottom of the spreadsheet.
3. Enter the contract information in the *Contract Description* cells, then enter the order information in the *Order Description* cells.
4. Click the **Extended Order Attributes** tab. Enter the name of the allocation profile in the *Value* field for the *FA Profile* extended order attribute.
5. Click the **Advisors** tab.

6. Highlight the order row, then click the **Apply Extended** button to apply the extended order attribute value to the order. The value for *FA Profile* is applied to the selected order and displayed in the *Extended Order Attributes* section of the page.
7. Click the **Place/Modify Order** button.
8. When you are done allocating shares to the account, delete the *FA Profile* value you entered on the **Extended Order Attributes** page. If you do not delete this value, it will be applied to all subsequent orders placed from the DDE for Excel API spreadsheet.

Advisors Page Toolbar Buttons

The toolbar on the Basic Orders page includes the following buttons:

Button	Description
Combo Legs	Opens the Combination Legs box. Enter contract details to create legs of a combination order one by one.
Place/Modify Orders	After you have completed the Order Description fields, and defined any extended attributes, click to create an order for the selected contract.
Cancel Order	This button cancels the order(s) you have highlighted.
Apply Extended	Applies the current values on the Extended Order Attributes page to the highlighted order row.
Show Errors	Jumps to the Error Code field and shows the error code.

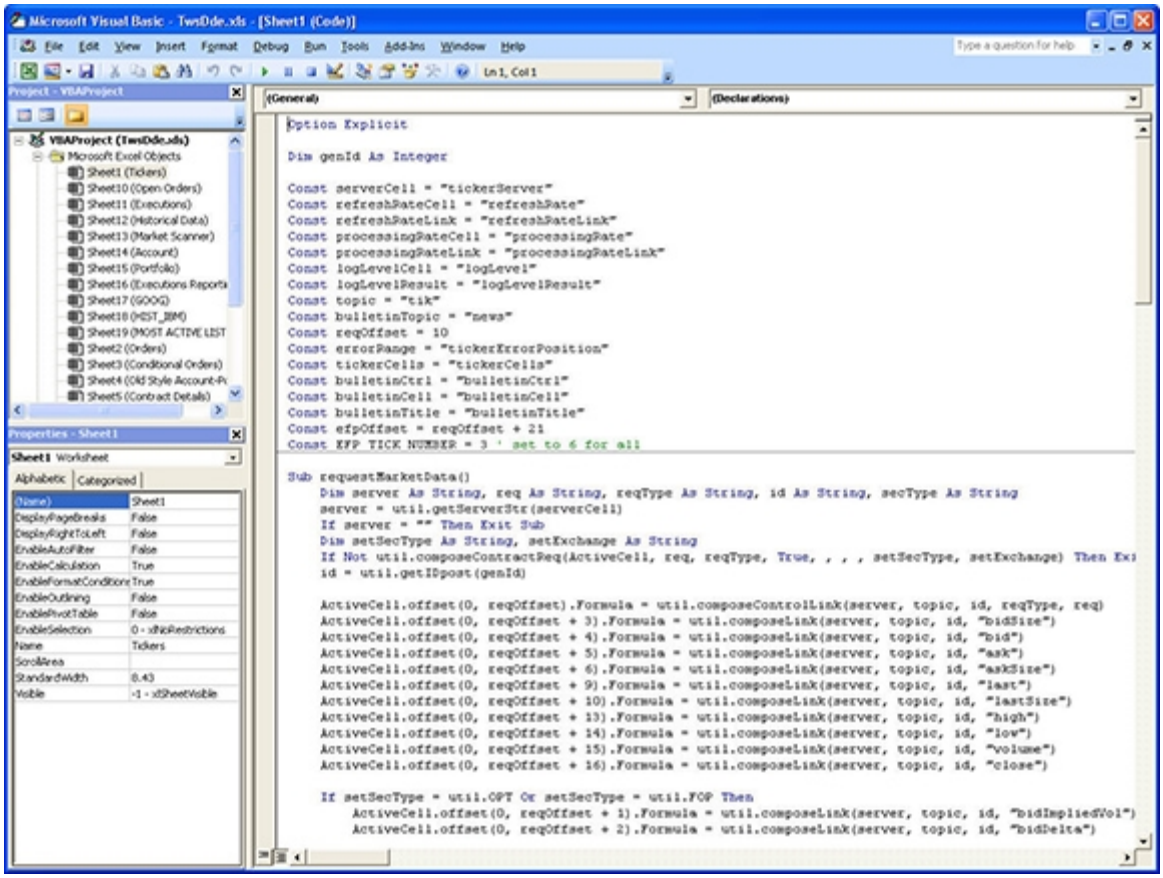
DDE for Excel API Reference

This section provides a variety of reference information about the DDE for Excel API, including the following topics:

- Viewing the Code
- Modules
- Named Ranges
- Macros
- DDE Syntax for Excel

Viewing the Code

To view the Visual Basic code behind the DDE for Excel API spreadsheet, press **Alt+F11** from any page. The Visual Basic Editor opens:



The Visual Basic Editor contains three main components:

- Project Explorer
- Properties Window

- Code Window

The Project Explorer contains a list of objects used in the spreadsheet. These object correspond to the pages in the spreadsheet; to view the code for a particular page, double-click the page's corresponding object in the Project Explorer.

Modules

The Visual Basic code includes the following modules (visible in the VBE Project Explorer):

- ArrayQueries
- ErrorDisplay
- Orders
- util

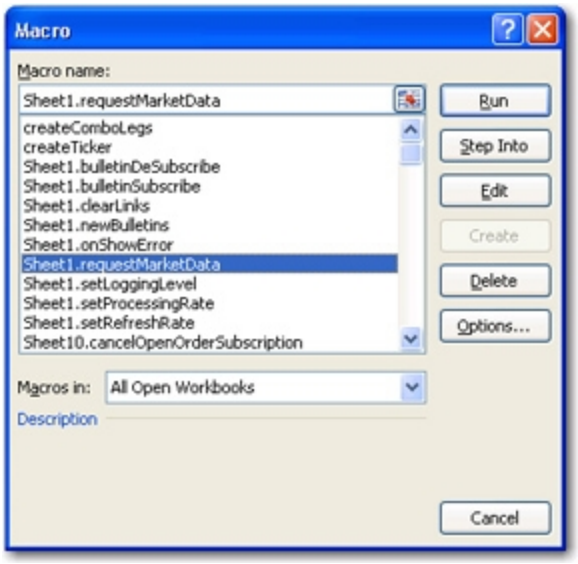
The util module contains many pre-defined constants that you can use when you program your own DDE API application. Using these constants instead of hard-coded values will make your application more robust and easier to maintain. Specifically, the following util functions are particularly useful in building new Visual Basic functionality:

- composeLink – put together a link that receives data, such as a market data bid size, option model volatility, or execution id.
- composeControlLink – put together a link that causes operations to occur, such as subscribing to market data, placing orders, or subscribing to the market scanner.
- composeContractReq – Read a contract description out of a page like Tickers or Orders, and build the DDE string representing it.

Macros

The DDE API sample spreadsheet uses Microsoft Excel macros extensively. Each toolbar button on every page in the spreadsheet runs a macro when you click it. For example, when you click the Request Market Data button on the Tickers page, you are actually running a macro called requestMarketData.

You can see all the macros used in the sample spreadsheet by opening the Excel Macro dialog. From there you can choose to edit the macro, which opens macro code in the Visual Basic Editor.



Note: You must enable macros when you open Excel or none of the macros in the spreadsheet will function.

For information about recording, editing and viewing macros, refer to your Microsoft Excel documentation.

Named Ranges

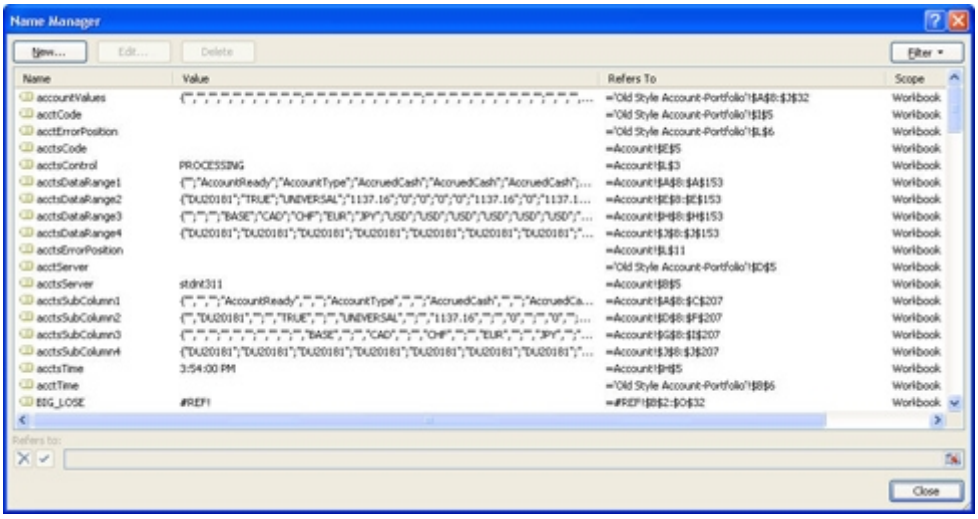
Named ranges are a Microsoft Excel feature that lets you assign meaningful names to a single cell or a range of cells in Microsoft Excel. The TwsDde.xls sample spreadsheet used named ranges extensively.

Named ranges help you to move data around on worksheets without breaking existing logic. It also makes important data available to your own custom macros and worksheets.

You can view all the named ranges used in the spreadsheet by doing the following, depending on which version of Excel you are using:

- In Excel 2007, you can see a complete list of all named ranges used in the spreadsheet by clicking **Formulas** then clicking **Name Manager**. The Name Manager displays every named range used in the spreadsheet, the value of the range, and the page and range of cells covered by the range.
- In earlier versions of Excel, you can view the named ranges by selecting **Name > Define** from the Tools menu. You can also download a free Name Manager from Microsoft that has additional functionality for these earlier versions of Excel.

The following screen shows the Name Manager for the DDE for Excel API sample spreadsheet:



DDE Syntax for Excel

The table below defines possible cell values for DDE-supported functionality. The basic syntax, which appears in the Excel formula bar (the "=" field at the top of the spreadsheet) when you put your cursor in a cell, is:

=server|topic!id?reqType?field2

or

=server|error!error (for an optional tag that will display errors)

where:

Description	Server	Topic	id	reqType	field2
Place an order	server	ord	idn	place	orderDescription
Modify an order	server	ord	idn	modify	orderModification
Cancel an order	server	ord	idn	cancel	
Check order status	server	ord	idn	status	
Request open orders	server	ord	idn	open	
Request executions	server	ord	idn	executed	
Check shares filled in order	server	ord	idn	sharesFilled	
Check shares remaining in order	server	ord	idn	sharesRemaining	
Execution (average) price	server	ord	idn	price	
Underlying	server	ord	idn	symbol	
Security type	server	ord	idn	secType	Refer to Note 6
Expiry	server	ord	idn	expiry	Refer to Note 7

Description	Server	Topic	id	reqType	field2
Strike	server	ord	idn	strike	Refer to Note 8
Right	server	ord	idn	right	Refer to Note 8
Specify contract multiplier for options and futures	server	ord	idn	multiplier	Refer to Note 8
Order destination	server	ord	idn	exchange	
Currency	server	ord	idn	currency	
Order side	server	ord	idn	side	
Order quantity	server	ord	idn	size	
Order type	server	ord	idn	orderType	
Limit price	server	ord	idn	limitPrice	
Auxiliary price	server	ord	idn	auxPrice	
Local symbol	server	ord	idn	localSymbol	
Last fill price	server	ord	idn	lastFillPrice	
Create ticker	server	tik	idn	req	
Bid implied volatility	server	tik	idn	bidImpliedVol	
Bid delta	server	tik	idn	bidDelta	
Request bid size	server	tik	idn	bidSize	
Request bid price	server	tik	idn	bid	
Request ask price	server	tik	idn	ask	
Request ask size	server	tik	idn	askSize	
Ask implied volatility	server	tik	idn	askImpliedVol	
Ask delta	server	tik	idn	askDelta	
Request last price	server	tik	idn	last	
Request last size	server	tik	idn	lastSize	
Last implied volatility	server	tik	idn	lastImpliedVol	
Last delta	server	tik	idn	lastDelta	
Request today's high price	server	tik	idn	high	
Request today's low price	server	tik	idn	low	
Request today's volume size	server	tik	idn	volume	
Request last close price	server	tik	idn	close	

Description	Server	Topic	id	reqType	field2
Request implied volatility calculated by the TWS option modeler	server	tik	idn	modelVolatility	
Request option delta calculated by the TWS option modeler	server	tik	idn	modelDelta	
Request the model price	server	tik	idn	modelPrice	
Request present value of dividends expected on the options underlier	server	tik	idn	pvDividend	
Request number of hold days until the expiry of the EFP	server	tik	idn	holdDays	
Request expiration date of the single stock future	server	tik	idn	futureExpiry	
Request dividends expected until the expiration of the single stock future	server	tik	idn	dividendsToExpiry	
Request annualized basis points	server	tik	idn	basisPoints	
Request annualized basis points in per-centage form	server	tik	idn	formattedBasis Points	
Request implied futures price	server	tik	idn	impliedFuture	
Request the dividend impact on the annualized basis points interest rate	server	tik	idn	dividendImpact	
Account statement control key	server	acct	idn	acctv	Account code (for Advisor-managed accounts only)
Request one account value string	server	acct	idn	key	
Account value	server	acct	idn	value	
Account currency	server	acct	idn	keyCurrency	
Account portfolio control key	server	acct	idn	acctp	Account code (for Advisor-managed accounts only)
Account portfolio underlying symbol	server	acct	idn	symbol	

Description	Server	Topic	id	reqType	field2
Account portfolio security type	server	acct	idn	secType	
Account portfolio expiry	server	acct	idn	expiry	
Account portfolio strike price	server	acct	idn	strike	
Account portfolio right	server	acct	idn	right	
Account portfolio currency	server	acct	idn	currency	
Account portfolio local symbol	server	acct	idn	localSymbol	
Account portfolio market price	server	acct	idn	marketPrice	
Account portfolio market value	server	acct	idn	marketValue	
Account portfolio average cost	server	acct	idn	avgCost	
Account portfolio realized PNL	server	acct	idn	realizedPNL	
Account portfolio unrealized PNL	server	acct	idn	unrealizedPNL	
Request contract details	server	contract	idn	req	contractDescription
Valid order types	server	contract	idn	orderTypes	
Valid exchanges	server	contract	idn	validExchanges	
Contract identifier	server	contract	idn	conid	
Minimum tick	server	contract	idn	minTick	
Order multiplier	server	contract	idn	multiplier	
Market name	server	contract	idn	marketName	
Trading class	server	contract	idn	tradingClass	
Execution order id	server	exec	idn	orderId	
Underlying	server	exec	idn	symbol	
Security type	server	exec	idn	secType	
Expiry	server	exec	idn	expiry	
Strike	server	exec	idn	strike	
Right	server	exec	idn	right	
Order destination	server	exec	idn	exchange	
Currency	server	exec	idn	currency	
Local symbol	server	exec	idn	localSymbol	

Description	Server	Topic	id	reqType	field2
Execution id	server	exec	idn	execId	
Execution time	server	exec	idn	time	
Account number	server	exec	idn	acctnNumber	
Exchange where executed	server	exec	idn	eExchange	
Side	server	exec	idn	side	
Number of shares filled in order	server	exec	idn	shares	
Execution (average) price	server	exec	idn	price	
Order ID	server	exec	idn	permId	
Identifies position as one to be liquidated last	server	exec	idn	liquidation	
Request execution details	server	exec	idn	Req	executionFilter
Request list of Advisor-managed accounts	server	FAaccts	idn	Req	
List of Advisor-managed accounts	server	FAaccts	idn	Value	
Request market depth	server	mktDepth	idn	req	contractDescripton? num_display_rows Refer to note (1) below.
Market maker	server	mktDepth	idn	mktMaker	rowId_side Refer to note (2) below.
Order price	server	mktDepth	idn	price	rowId_side Refer to note (2) below.
Order size	server	mktDepth	idn	size	rowId_side Refer to note (2) below.
Market data refresh rate	server	refreshRate	idn	millisec	Number of milliseconds
Subscribe to news bulletins	server	news	sub	0	Refer to note 3 below
News bulletin message ID	server	news	newsID		
News bulletin message type	server	news	newsType		Refer to note 4 below
News bulletin message text	server	news	msg		

Description	Server	Topic	id	reqType	field2
Exchange from which news bulletins originated	server	news	exchange		
Set the server log level	server	logLevel	<log_ level>		Refer to note 5 below.

Where orderDescription = symbol_secType_exchange_Currency_~/side_quantity_orderType_lmtPrice_~{extended order attribute}

For more information

- Using DDE Syntax to Request Market Data

Using DDE Syntax to Request Market Data

When using our DDE for Excel API to request market data, we recommend the following guidelines:

- Save your own copy of our DDE-linked Excel spreadsheet, TwsDde.xls or create your own blank Excel spreadsheet.
- Add a blank sheet to your saved copy o f TwsDde.xls or to your own blank Excel spreadsheet.

The following procedure demonstrates how to use DDE syntax to request and receive market data on a blank Excel spreadsheet. The *request string* tells TWS that you want to request market data for a specific symbol. The *receiving strings* display the appropriate market data.

How to request AAPL market data from a blank Excel worksheet

1. Log into TWS.
2. On your blank Excel sheet, type the following request string in any cell:

   `=Sdemo123|tik!'id1?req?AAPL_STK_SMART_USD_~/'`

   Where "**demo123**" in "Sdemo123" represents *your* actual username.
3. Type the following three receiving strings in three separate cells to receive the last price, volume and closing price of AAPL stock:

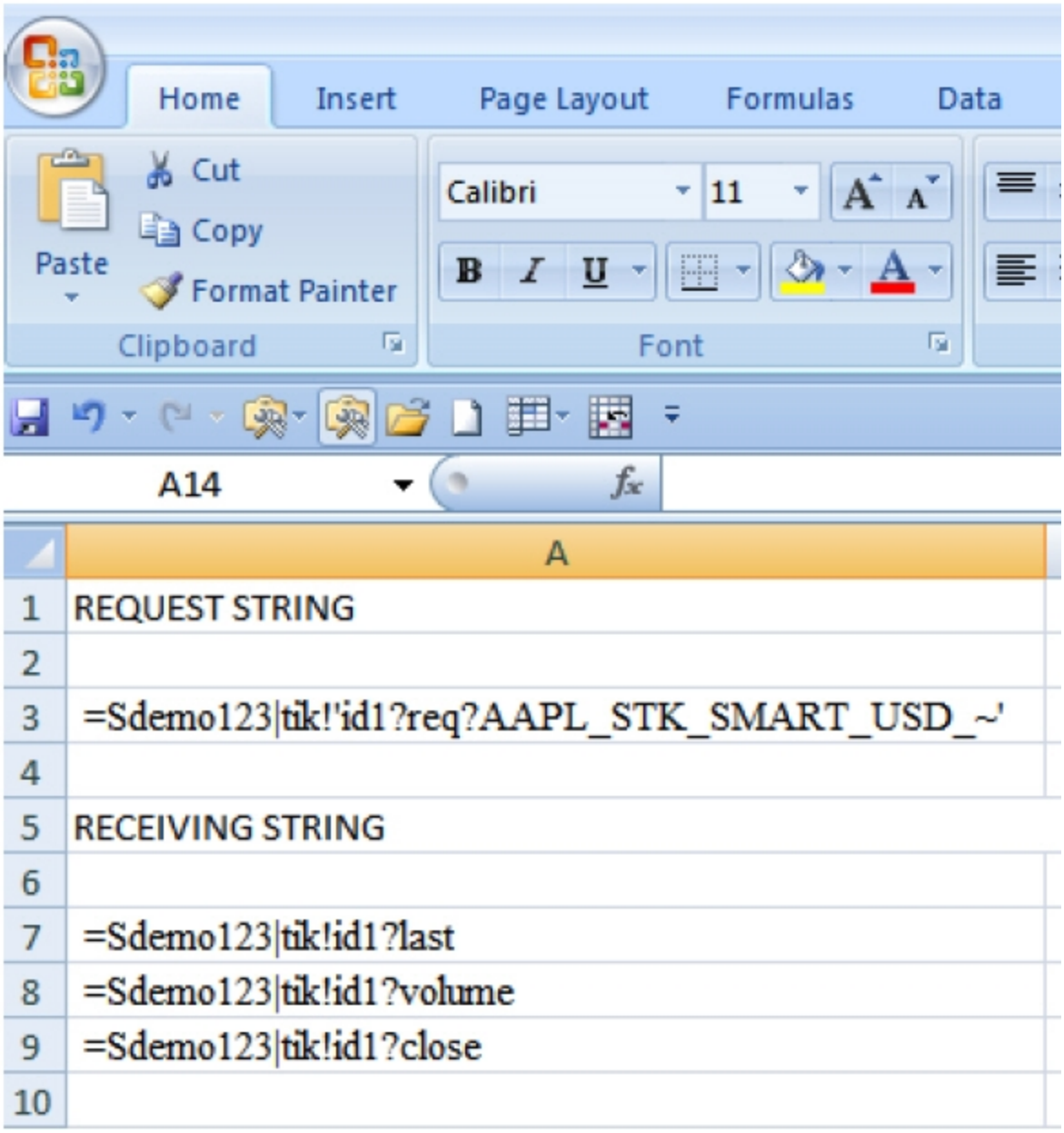
   `=Sdemo123|tik!id1?last`

   `=Sdemo123|tik!id1?volume`

   `=Sdemo123|tik!id1?close`

   Note the following:

   - Your username is identical in all three strings.
   - The ID number (id in the strings above) must be identical in both the request and receiving strings. In this case, the ID number is assigned to **1** (**`=Sdemo123|tik!id1?last`**). If the ID number is not the same in both the request and receiving strings, then all the related strings are going to receive zeros.



If you have entered the strings correctly, you have properly configured TWS to accept communication from the DDE for Excel API, and the stock is trading, then your Excel sheet should look like the screen shown below. The request string will displays 0 and the receiving links will display the values for the last price, volume and closing price for AAPL stock.

	A	B
1	REQUEST STRING	
2		
3	0	
4		
5	RECEIVING STRING	
6		
7	531.21	
8	183344	
9	518.83	
10		

3

Active X

This chapter describes the ActiveX API, including the following topics:

- Linking to the Application using ActiveX
- Registering Third-Party ActiveX Controls
- Running the ActiveX API on 64-bit Windows XP Systems
- ActiveX Methods
- ActiveX Events
- ActiveX COM Objects
- ActiveX Properties
- Placing a Combination Order

> **Note:** Beginning with API Version 9.71, the ActiveX component code based was migrated to the C# API, and the ActiveX API source code is located in the **source/CSharpClient** folder in the API installation directory.

The API software also includes an ActiveX for Excel sample spreadsheet, which duplicates most of the functionality of the DDE for Excel sample spreadsheet but is based on the ActiveX control, Tws.ocx. See ActiveX for Excel for details.

Linking to the Application using ActiveX

Before you can use third-party ActiveX controls, you must register them with Visual Basic.

To link using the ActiveX control and VB, VBA or C#

1. Drop the application control onto a form or dialog box.
2. Call the following methods:
   - Call the connect() method to connect to the running application.
   - Call the methods you need to perform whatever operations you require, such as the reqMktData() method to request market data.
3. Call the placeOrder() method to place an order. Orders using extended attributes require that ActiveX properties representing them be set first.
4. Handle the following events:
   - Handle the nextValidId() event to receive the next available valid order ID. Increment the ID by one for successive orders.
   - Handle the tickPrice() and tickSize() events to receive the market data.
   - Handle the orderStatus() event to receive status information about orders.
   - Handle the error() event to receive error information.
   - Handle the connectionClosed() event to be notified in case the application stops communicating with the ActiveX control.

Registering Third-Party ActiveX Controls

To use a third-party ActiveX control in Visual Basic it must be registered first.

To register the ActiveX control with Visual Basic, follow these instructions:

1. From the **Components** menu in your VB project, select the TWS ActiveX control (**Tws.ocx**, located in the **bin/ActiveX** folder in your API Installation folder).
2. Click **Apply**.
3. Verify that the TWS control appears in the toolbar with all standard controls.

Running the ActiveX API on 64-bit Windows XP Systems

To run the ActiveX API on 64-bit Windows XP systems, do the following:

1. Install Microsoft Visual C++ 2005 SP1 Redistributable Package (x86).
2. Install Microsoft Visual J# 2.0 Redistributable Package.
3. Download and install the API software.

ActiveX Methods

ActiveX methods allow your application to call functions and request information from TWS.

Connection and Server

connect()
disconnect()
reqCurrentTime()
setServerLogLevel()

Market Data

reqMktDataEx()
cancelMktData()
calculateImpliedVolatility()
cancelCalculateImpliedVolatility()
calculateOptionPrice()
cancelCalculateOptionPrice()
reqMarketDataType()

Orders

placeOrderEx()
cancelOrder()
reqOpenOrders()
reqAllOpenOrders()
reqAutoOpenOrders()
reqIds()
exerciseOptionsEx()
reqGlobalCancel()

Executions

reqExecutionsEx()

Contract Details

reqContractDetailsEx()

Market Depth

reqMktDepthEx()
cancelMktDepth()

Account and Portfolio

reqAccountUpdates()
reqAccountSummary()
cancelAccountSummary()
reqPositions()
cancelPositions()

News Bulletins

reqNewsBulletins()
cancelNewsBulletins()

Financial Advisors

reqManagedAccts()
requestFA()
replaceFA()

Historical Data

reqHistoricalDataEx()
cancelHistoricalData()

Market Scanners

reqScannerParameters()
reqScannerSubscriptionEx()
cancelScannerSubscription()

Real Time Bars

reqRealTimeBarsEx()
cancelRealTimeBars()

Factory Methods

createComboLegList()
createContract()
createExecutionFilter()
createOrder()
createScannerSubscription()
createTagValueList()
createUnderComp()

Fundamental Data

reqFundamentalData()
cancelFundamentalData()

Display Groups

queryDisplayGroups()
subscribeToGroupEvents()
updateDisplayGroups()
unsubscribeFromGroupEvents()

connect()

Call this method to connect to the host application.

Public Overridable Sub connect(ByVal host as String, ByVal port as Integer, ByVal clientID as Integer

Parameter	Type	Description
host	String	The host name or IP address of the machine where TWS is running. Leave blank to connect to the local host.
port	Integer	Must match the port specified in TWS on the Configure>API>Socket Port field.
clientID	Integer	A number used to identify this client connection. All orders placed/modified from this client will be associated with this client identifier. Note: Each client MUST connect with a unique clientId.

disconnect()

Call this method to terminate the connections the host application. Calling this method does not cancel orders that have already been sent.

Public Overridable Sub disconnect()

reqCurrentTime()

Returns the current system time on the server side.

Public Overridable Sub reqCurrentTime()

setServerLogLevel()

Public Overridable Sub setServerLogLevel(ByVal logLevel As Integer)

Parameter	Type	Description
logLevel	Integer	Specifies the level of log entry detail used by the server when processing API requests. Valid values include: • 1 = SYSTEM • 2 = ERROR • 3 = WARNING • 4 = INFORMATION • 5 = DETAIL

The default level is ERROR. See API Logging for more details.

reqMktDataEx()

Call this method to request market data. The market data will be returned by the tickPrice(), tickSize(), tickOptionComputation(), tickGeneric(), tickString() and tickEFP() events in dispinterface_DTwsEvents.

Public Overridable Sub reqMktDataEx(ByVal tickerId As Integer, ByVal contract As TWSLib.IContract, ByVal genericTicks As String, ByVal snapshot As Integer, ITagValueList* mktDataOptions)

Parameter	Type	Description
tickerId	Integer	The ticker id. Must be a unique value. When the market data returns, it will be identified by this tag. This is also used when canceling the market data.
contract	IContract	This object contains a description of the contract for which market data is being requested.
genericTicks	String	A comma delimited list of generic tick types. For more information about tick types, see Generic Tick Types.
snapshot	Integer	Check to return a single snapshot of market data and have the market data subscription cancel. Do not enter any genericTicklist values if you use snapshot.
mktDataOptions	ITagValueList	For internal use only. Use default value XYZ.

cancelMktData()

After calling this method, market data for the specified id will stop flowing.

Public Overridable Sub cancelMktData(ByVal id As Integer)

Parameter	Type	Description
id	Integer	The ID that was specified in the call to reqMktData().

calculateImpliedVolatility()

Call this function to calculate volatility for a supplied option price and underlying price.

Public Overridable Sub calculateImpliedVolatility(ByVal reqId As Integer, ByVal contract As TWSLib.IContract, ByVal optionPrice As Double, ByVal underPrice As Double)

Parameter	Type	Description
reqId	Integer	The ticker ID.
contract	IContract	Describes the contract.
optionPrice	Double	The price of the option.

Parameter	Type	Description
underPrice	Double	Price of the underlying.

cancelCalculateImpliedVolatility()

Call this function to cancel a request to calculate volatility for a supplied option price and underlying price.

Public Overridable Sub calculateImpliedVolatility(ByVal reqId As Integer)

Parameter	Type	Description
reqId	Integer	The ticker id.

calculateOptionPrice()

Call this function to calculate option price and greek values for a supplied volatility and underlying price.

Public Overridable Sub calculateOptionPrice(ByVal reqId As Integer, ByVal contract As TWSLib.IContract, ByVal volatility As Double, ByVal underPrice As Double)

Parameter	Type	Description
reqId	Integer	The ticker ID.
contract	IContract	Describes the contract.
volatility	Double	The volatility.
underPrice	Double	Price of the underlying.

cancelCalculateOptionPrice()

Call this function to cancel a request to calculate option price and greek values for a supplied volatility and underlying price.

Public Overridable Sub calculateOptionPrice(ByVal reqId As Integer)

Parameter	Type	Description
reqId	Integer	The ticker id.

reqMarketDataType()

The API can receive frozen market data from Trader Workstation. Frozen market data is the last data recorded in our system. During normal trading hours, the API receives real-time market data. If you use this function, you are telling TWS to automatically switch to frozen market data after the close. Then, before the opening of the next trading day, market data will automatically switch back to real-time market data.

Public Overridable Sub reqMarketDataType(type As Integer)

Parameter	Type	Description
type	Integer	1 for real-time streaming market data or 2 for frozen market data.

placeOrderEx()

Call this method to place an order. The order status will be returned by the orderStatus() event in dispinterface_ DTwsEvents.

Public Overridable Sub placeOrderEx(ByVal orderId As Integer, ByVal contract As TWSLib.IContract, ByVal order As TWSLib.IOrder)

Parameter	Type	Description
orderId	Integer	The order Id. You must specify a unique value. When the order status returns, it will be identified by this tag. This tag is also used when canceling the order.
contract	IContract	This object contains attributes used to describe the contract.
order	IOrder	This object contains the details of the order. Note: Each client MUST connect with a unique clientId.

cancelOrder()

Call this method to cancel an order.

Public Overridable Sub cancelOrder(ByVal id As Integer)

Parameter	Type	Description
id	Integer	The order ID that was specified previously in the call to placeOrder()

reqOpenOrders()

Call this method to request the open orders that were placed from this client. Each open order will be fed back through the openOrderEx() events.

> **Note:** The client with a clientId of 0 will also receive the application-owned open orders. These orders will be associated with the client and a new orderId will be generated. This association will persist over multiple API and application sessions.

Public Overridable Sub reqOpenOrders()

reqAllOpenOrders()

Call this method to request the open orders that were placed from all clients and also from the application.Each open order will be fed back through the orderStatus() event.

> **Note:** No association is made between the returned orders and the requesting client

Public Overridable Sub reqAllOpenOrders()

reqAutoOpenOrders()

Call this method to request that newly created application orders be implicitly associated with the client. When a new application order is created, the order will be associated with the client, and fed back through the orderStatus() event.

Note: This request can only be made from a client with a clientId of 0.

Public Overridable Sub reqAutoOpenOrders(ByVal bAutoBind As Integer)

Parameter	Type	Description
bAutoBind	Integer	If set to TRUE, newly created application orders will be implicitly associated with the client. If set to FALSE, no association will be made.

reqIds()

Call this function to request the next valid ID that can be used when placing an order. After calling this method, the nextValidId() event will be triggered, and the id returned is that next valid ID. That ID will reflect any autobinding that has occurred (which generates new IDs and increments the next valid ID therein).

Public Overridable Sub reqIds(ByVal numIds As Integer)

Parameter	Type	Description
numIds	Integer	Set to 1.

exerciseOptionsEx()

Call this method to exercise options.

Note: SMART is now an allowed exchange in exerciseOptionsEx() calls.

Public Overridable Sub exerciseOptionsEx(ByVal tickerId As Integer, ByVal contract As TWSLib.IContract, ByVal exerciseAction As Integer, ByVal exerciseQuantity As Integer, ByVal account As String, ByVal override As Integer)

Parameter	Type	Description
tickerId	Integer	The Id for the exercise request
contract	IContract	This structure contains a description of the contract for which market data is being requested.
exerciseAction	Integer	This can have two values: 1 = exercise 2 = lapse
exerciseQuantity	Integer	The number of contracts to be exercised
account	String	For institutional orders. Specifies the IB account.

Parameter	Type	Description
override	Integer	Specifies whether your setting will override the system's natural action. For example, if your action is "exercise" and the option is not in-the-money, by natural action the option would not exercise. If you have override set to "yes" the natural action would be overridden and the out-of-the money option would be exercised. Values are: 0 = do not override 1 = override

reqGlobalCancel()

Use this method to cancel all open orders globally. It cancels both API and TWS open orders.

If the order was created in TWS, it also gets canceled. If the order was initiated in the API, it also gets canceled.

Public Overridable Sub reqGlobalCancel()

reqExecutionsEx()

When this method is called, the execution reports that meet the filter criteria are downloaded to the client via the execDetailsEx() event in dispinterface_DTwsEvents. To view executions beyond the past 24 hours, open the Trade Log in TWS and, while the Trade Log is displayed, request the executions again from the API.

Public Overridable Sub reqExecutionsEx(ByVal reqId As Integer, ByVal filter As TWSLib.IExecutionFilter)

Parameter	Type	Description
reqID	Integer	The ID of the data request. Ensures that responses are matched to requests if several requests are in process.
filter	IExecutionFilter	The filter criteria used to determine which execution reports are returned.

reqContractDetailsEx()

Call this method to download all details for a particular contract. The contract details will be received via the contractDetailsEx() callback in dispinterface_DTwsEvents.

Public Overridable Sub reqContractDetailsEx(ByVal reqId As Integer, ByVal contract As TWSLib.IContract)

Parameter	Type	Description
reqId	Integer	The ID of the data request. Ensures that responses are matched to requests if several requests are in process.
contract	IContract	This object contains a description of the contract for which market data is being requested.

reqMktDepthEx()

Call this method to request market depth for a specific contract. The market depth will be returned by the updateMktDepth() and updateMktDepthL2() events.

Public Overridable Sub reqMktDepthEx(ByVal tickerId As Integer, ByVal contract As TWSLib.IContract, ByVal numRows As Integer, ITagValueList* mktDepthDataOptions)

Parameter	Type	Description
tickerId	Integer	The ticker Id. Must be a unique value. When the market depth data returns, it will be identified by this tag. This is also used when canceling the market depth.
contract	IContract	This object contains a description of the contract for which market data is being requested.
numRows	Integer	Specifies the number of market depth rows to return.
mktDepthDataOptions	ITagValueList	For internal use only. Use default value XYZ.

cancelMktDepth()

After calling this method, market depth for the specified id will stop flowing.

Public Overridable Sub cancelMktDepth(ByVal id As Integer)

Parameter	Type	Description
id	Integer	The ID that was specified in the call to reqMktDepth() or reqMktDepth2().

reqAccountUpdates()

Call this method to request account updates. The account data will be fed back through the updateAccountTime(), updateAccountValue() and updatePortfolioEx() events.

Public Overridable Sub reqAccountUpdates(ByVal subscribe As Integer, ByVal acctCode As String)

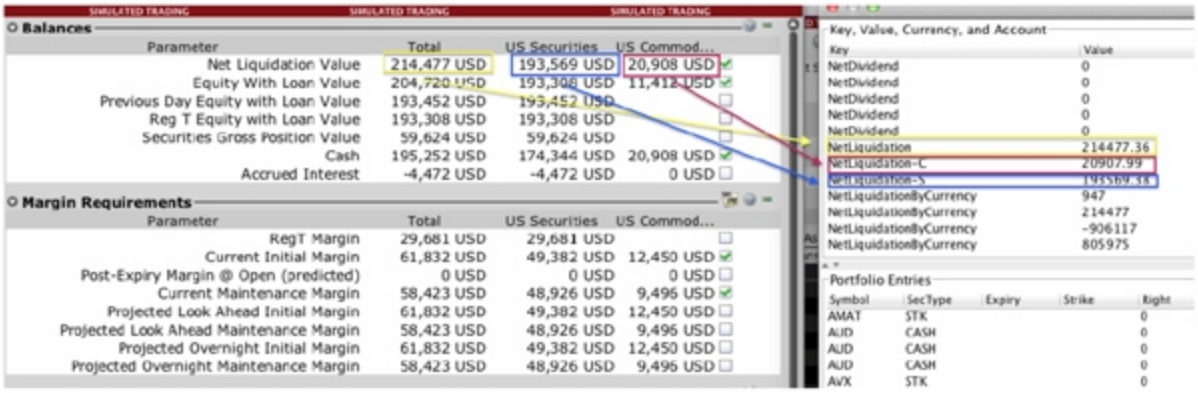
Parameter	Type	Description
subscribe	Integer	If set to 1, the client will start receiving account and portfolio updates. If set to 0, the client will stop receiving this information.
acctCode	String	The account code for which to receive account and portfolio updates.

To identify API Account keys:

The API's updateAccountValue() event handler delivers all of the account information.

- Strings or keys with a suffix of **–C**, such as AvailableFunds-C, EquityForInitial-C, NetLiquidation-C, correspond to Commodities in the TWS Account Window.
- Keys with a suffix of **–S**, such as EquityForMaintenance-S, FullAvailableFunds-S or NetLiquidation-S, correspond to Securities in the TWS Account Window.
- Keys without any suffix correspond to Totals in the TWS Account Window.

The image below is an actual example of how to compare TWS's Account Window and the API's account data. In this particular case, we try to link three specific keys NetLiquidation, NetLiquidation-C, and NetLiquidation-S to the TWS Account Window.



For more information about the information presented in the TWS Account Window, see https://institutions.interactivebrokers.com/en/software/tws/usersguidebook/realtimeactivitymonitoring/the_account_window.htm

reqAccountSummary()

Call this method to request and keep up to date the data that appears on the TWS Account Window Summary tab. The data is returned by accountSummary().

reqAccountSummary() only allows two concurrent requests. If you use reqAccountSummary() to request more than two concurrent account summaries, you will receive an error: **322|Error processing request**. To resolve this error, unsubscribe from one reqAccountSummary() request and then resubmit the request.

> **Note:** This request can only be made when connected to an FA managed account.

Public Overridable Sub reqAccountSummary(ByVal messageType As Integer, ByVal version As Integer, ByVal reqId As Integer, ByVal groupName As String, tags As String)

Parameter	Type	Description
messageType	Integer	Set this to 62.
version	Integer	Set this to 1.
reqId	Integer	

Parameter	Type	Description
groupName	String	Set to *All* to return account summary data for all accounts, or set to a specific Advisor Account Group name that has already been created in TWS Global Configuration.

Parameter	Type	Description
tags	String	A comma-separated list of account tags. Available tags are: • *AccountType* • *NetLiquidation* • *TotalCashValue* — Total cash including futures pnl • *SettledCash* — For cash accounts, this is the same as TotalCashValue • *AccruedCash* — Net accrued interest • *BuyingPower* — The maximum amount of marginable US stocks the account can buy • *EquityWithLoanValue* — Cash + stocks + bonds + mutual funds • *PreviousDayEquityWithLoanValue* • *GrossPositionValue* — The sum of the absolute value of all stock and equity option positions • *RegTEquity* • *RegTMargin* • *SMA* — Special Memorandum Account • *InitMarginReq* • *MaintMarginReq* • *AvailableFunds* • *ExcessLiquidity* • *Cushion* — Excess liquidity as a percentage of net liquidation value • *FullInitMarginReq* • *FullMaintMarginReq* • *FullAvailableFunds* • *FullExcessLiquidity* • *LookAheadNextChange* — Time when look-ahead values take effect • *LookAheadInitMarginReq* • *LookAheadMaintMarginReq* • *LookAheadAvailableFunds* • *LookAheadExcessLiquidity* • *HighestSeverity* — A measure of how close the account is to liquidation

Parameter	Type	Description
		• *DayTradesRemaining* — The Number of Open/Close trades a user could put on before Pattern Day Trading is detected. A value of "-1" means that the user can put on unlimited day trades. • *Leverage* — GrossPositionValue / NetLiquidation

cancelAccountSummary()

Cancels the request for Account Window Summary tab data.

Note: This request can only be made when connected to an FA managed account.

Public Overridable Sub cancelAccountSummary(ByVal messageId As Integer, ByVal version As Integer, ByVal reqId As Integer)

Parameter	Type	Description
messageId	Integer	Set this to 63.
version	Integer	Set this to 1.
reqId	Integer	The ID of the data request being canceled.

reqPositions()

Requests real-time position data for all accounts.

Public Overridable Sub reqPositions(ByVal messageId As Integer, ByVal version As Integer)

Parameter	Type	Description
messageId	Integer	Set this to 62
version	Integer	Set this to 1.

cancelPositions()

Cancels real-time position updates.

Public Overridable Sub cancelPositions(ByVal messageId As Integer, ByVal version As Integer)

Parameter	Type	Description
messageId	Integer	Set this to 64.
version	Integer	Set this to 1.

reqNewsBulletins()

Call this method to start receiving news bulletins. Each bulletin will be returned by the updateNewsBulletin() event.

Public Overridable Sub reqNewsBulletins(ByVal allDaysMsgs As Integer)

Parameter	Type	Description
allDaysMsgs	Integer	If set to TRUE, returns all the existing bulletins for the current day and any new ones. If set to FALSE, will only return new bulletins.

cancelNewsBulletins()

Call this method to stop receiving news bulletins.

Public Overridable Sub cancelNewsBulletins()

reqManagedAccts()

Call this method to request the list of managed accounts. The list will be returned by the managedAccounts() event.

> **Note:** This request can only be made when connected to a Financial Advisor account.

Public Overridable Sub reqManagedAccts()

requestFA()

Call this method to request FA configuration information from the server. The data returns in an XML string via the receiveFA() event.

Public Overridable Sub requestFA(ByVal faDataType As Integer)

Parameter	Type	Description
faDataType	Integer	Specifies the type of Financial Advisor configuration data being requested. Valid values include: • 1 = GROUPS • 2 = PROFILE • 3 =ACCOUNT ALIASES

replaceFA()

Call this method to modify FA configuration information from the API. Note that this can also be done manually.

Public Overridable Sub replaceFA(ByVal faDataType As Integer, ByVal cxml As String)

Parameter	Type	Description
faDataType	Integer	Specifies the type of Financial Advisor configuration data being modified via the API. Valid values include:
cxml	String	The XML string containing the new FA configuration information.

reqHistoricalDataEx()

Call this method to start receiving historical data results through the historicalData() event.

Public Overridable Sub reqHistoricalDataEx(ByVal tickerId As Integer, ByVal contract As TWSLib.IContract, ByVal endDateTime As String, ByVal duration As String, ByVal barSize As String, ByVal whatToShow As String, ByVal useRTH As Integer, ByVal formatDate As Integer, ITagValueList* chartOptions)

Parameter	Type	Description
tickerId	Integer	The Id for the request. Must be a unique value. When the data is received, it will be identified by this Id. This is also used when canceling the historical data request.
contract	IContract	This structure contains a description of the contract for which market data is being requested.
endDateTime	String	Use the format yyyymmdd hh:mm:ss tmz, where the time zone is allowed (optionally) after a space at the end.
durationStr	String	This is the time span the request will cover, and is specified using the format: <integer> <unit>, i.e., 1 D, where valid units are: • S (seconds) • D (days) • W (weeks) • M (months) • Y (years) **Note:** If no unit is specified, seconds are used. Also, note "years" is currently limited to one.

Parameter	Type	Description
barSize	String	The size of the bars that will be returned (within IB/TWS limits). Valid values include: **Bar Size** • 1 sec • 5 secs • 15 secs • 30 secs • 1 min • 2 mins • 3 mins • 5 mins • 15 mins • 30 mins • 1 hour • 1 day
whatToShow	String	Determines the nature of data being extracted. Valid values include: • TRADES • MIDPOINT • BID • ASK • BID_ASK • HISTORICAL_VOLATILITY • OPTION_IMPLIED_VOLATILITY
useRTH	Integer	Determines whether to return all data available during the requested time span, or only data that falls within regular trading hours. Valid values include: • 0 - all data is returned even where the market in question was outside of its regular trading hours. • 1 - only data within the regular trading hours is returned, even if the requested time span falls partially or completely outside of the RTH.

Parameter	Type	Description
formatDate	Integer	Determines the date format applied to returned bars. Valid values include: • 1 - dates applying to bars returned in the format: yyyymmdd{space}{space}hh:mm:dd • 2 - dates are returned as a long integer specifying the number of seconds since 1/1/1970 GMT.
chartOptions	ITagValueList	For internal use only. Use default value XYZ.

Note: For information about historical data request limitations, see Historical Data Limitations.

cancelHistoricalData()

Used if an internet disconnect has occurred or the results of a query are otherwise delayed and the application is no longer interested in receiving the data.

Public Overridable Sub cancelHistoricalData(ByVal tickerId As Integer)

Parameter	Type	Description
tickerId	Integer	The ticker ID. Must be a unique value.

reqScannerParameters()

Requests an XML string that describes all possible scanner queries.

Public Overridable Sub reqScannerParameters()

reqScannerSubscriptionEx()

Call the reqScannerSubscriptionEX() method to start receiving market scanner results through the scannerDataEx() event.

Public Overridable Sub reqScannerSubscriptionEx(ByVal tickerId As Integer, ByVal subscription As TWSLib.IScannerSubscription, ITagValueList* scannerDataOptions)

Parameter	Type	Description
tickerId	Integer	The Id for the subscription. Must be a unique value. When the subscription data is received, it will be identified by this Id. This is also used when canceling the scanner.
subscription	IScannerSubscription	Summary of the scanner subscription parameters including filters.

Parameter	Type	Description
scannerDataOptions	ITagValueList	For internal use only. Use default value XYZ.

cancelScannerSubscription()

Public Overridable Sub cancelScannerSubscription(ByVal tickerId As Integer)

Parameter	Type	Description
tickerId	Integer	The ticker ID. Must be a unique value.

reqRealTimeBarsEx()

Call the reqRealTimeBarsEx() method to start receiving real time bar results through the realtimeBar() event.

Public Overridable Sub reqRealTimeBarsEx(ByVal tickerId As Integer, ByVal contract As TWSLib.IContract, ByVal barSize As Integer, ByVal whatToShow As String, ByVal useRTH As Integer, ITagValueList* realTimeBarOptions)

Parameter	Type	Description
tickerId	Integer	The Id for the request. Must be a unique value. When the data is received, it will be identified by this Id. This is also used when canceling the historical data request.
contract	IContract	This structure contains a description of the contract for which market data is being requested.
barSize	Integer	Currently only 5 second bars are supported, if any other value is used, an exception will be thrown.
whatToShow	String	Determines the nature of the data extracted. Valid values include: • TRADES • BID • ASK • MIDPOINT

Parameter	Type	Description
useRTH	Integer	Regular Trading Hours only. Valid values include: • 0 = all data available during the time span requested is returned, including time intervals when the market in question was outside of regular trading hours. • 1 = only data within the regular trading hours for the product requested is returned, even if the time span falls partially or completely outside.
realTimeBarOptions	ITagValueList	For internal use only. Use default value XYZ.

cancelRealTimeBars()

Used if an Internet disconnect has occurred or the results of a query are otherwise delayed and the application is no longer interested in receiving the data.

Public Overridable Sub cancelRealTimeBars(ByVal tickerId As Integer)

Parameter	Type	Description
tickerId	Integer	The ticker ID. Must be a unique value.

createComboLegList()

This factory method is used to create an IComboLegList COM object.

Public Overridable Sub createComboLegList() As TWSLib.IComboLegList

You must use the factory "create" methods to create the COM objects in this section. For example, the createComboLegList() method creates an IComboLeg object. The IComboLeg object contains the definition of the leg list.

createContract()

This factory method is used to create an IContract COM object.

Public Overridable Sub createContract() As TWSLib.IContract

You must use the factory "create" methods to create the COM objects described in this chapter. The createContract() method creates an IContract object, which contains a description of the contract for which market data is being requested.

createExecutionFilter()

This factory method is used to create an IExecutionFilter COM object.

Public Overridable Sub createExecutionFilter() As TWSLib.IExecutionFilter

You must use the factory "create" methods to create the COM objects described in this chapter. The createExecutionFilter() method creates an IExecutionFilter object, which contains the filter criteria used to determine which execution reports are returned.

createOrder()

This factory method is used to create an IOrder COM object.

Public Overridable Sub createOrder() As TWSLib.IOrder

You must use the factory "create" methods to create the COM objects described in this chapter. The createOrder() method creates an IOrder object, which contains the details of an order.

createScannerSubscription()

This factory method is used to create an IScannerSubscription COM object.

Public Overridable Sub createScannerSubscription() As TWSLib.IScannerSubscription

You must use the factory "create" methods to create the COM objects described in this chapter. The createScannerSubscription() method creates an IScannerSubscription object, which contains a summary of the scanner subscription parameters.

createTagValueList

This factory method is used to create ITagValueList and ITagValue objects.

Public Overridable Function createTagValueList() As TWSLib.ITagValueList

You must use the factory "create" methods to create the COM objects described in this chapter.

createUnderComp()

This factory method is used to create an IUnderComp COM object.

Public Overridable Sub createUnderComp() As TWSLib.IScannerSubscription

You must use the factory "create" methods to create the COM objects described in this chapter. The createUnderComp() method creates an IUnderComp object, which is used to define a Delta-Neutral Combo contract.

reqFundamentalData()

Call this method to receive Reuters global fundamental data for stocks. There must be a subscription to Reuters Fundamental set up in Account Management before you can receive this data.

reqFundamentalData() can handle *conid* specified in the Contract object, but not *tradingClass* or *multiplier*. This is because reqFundamentalData() is used only for stocks and stocks do not have a multiplier and trading class.

Public Overridable Sub reqFundamentalData(ByVal reqId As Integer, ByVal contract As TWSLib.IContract, ByVal reportType As String)

Parameter	Type	Description
reqId	Integer	The ID of the data request.

Parameter	Type	Description
contract	IContract	This structure contains a description of the contract for which Reuters Fundamental data is being requested.
reportType	String	One of the following XML reports: • ReportSnapshot (company overview) • ReportsFinSummary (financial summary) • ReportRatios (financial ratios) • ReportsFinStatements (financial statements) • RESC (analyst estimates) • CalendarReport (company calendar)

cancelFundamentalData()

Call this method to stop receiving Reuters global fundamental data.

Public Overridable Sub cancelFundamentalData(ByVal reqId As Integer)

Parameter	Type	Description
reqId	Integer	The ID of the data request.

queryDisplayGroups()

void queryDisplayGroups(reqId As Integer)

Parameter	Type	Description
reqId	Integer	The unique number that will be associated with the response

subscribeToGroupEvents()

subscribeToGroupEvents(requestId As Integer, groupId As Integer)

Parameter	Type	Description
reqId	Integer	The unique number associated with the notification.
groupId	Integer	The ID of the group, currently it is a number from 1 to 7. This is the display group subscription request sent by the API to TWS.

updateDisplayGroup()

updateDisplayGroup(requestId As Integer, contractInfo As String)

Parameter	Type	Description
requestId	Integer	The requestId specified in subscribeToGroupEvents().
contractInfo	String	The encoded value that uniquely represents the contract in IB. Possible values include: • none = empty selection • contractID@exchange – any non-combination contract. Examples: 8314@SMART for IBM SMART; 8314@ARCA for IBM @ARCA. • combo = if any combo is selected.

unsubscribeFromGroupEvents()

unsubscribeFromGroupEvents(requestId As Integer)

Parameter	Type	Description
reqId	Integer	The requestId specified in subscribeToGroupEvents().

ActiveX Events

ActiveX events receive information from the system and make it available to an application. This section defines the ActiveX events you can receive via the DTwsEvents interface.

Connection and Server

connectionClosed()
currentTime()
errMsg()

Market Data

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tickSize()
tickOptionComputation()
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Orders

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Account and Portfolio

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updateNewsBulletin()

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Market Depth

updateMktDepth()
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Financial Advisors

managedAccounts()
receiveFA()

Historical Data

historicalData()

Market Scanners

scannerParameters()
scannerDataEx()
scannerDataEnd()

Real Time Bars

realtimebar()

Fundamental Data

fundamentalData()

Display Groups

displayGroupList()
displayGroupUpdated()

connectionClosed()

This event is triggered when TWS closes the sockets connection with the ActiveX control, or when TWS is shut down.

Sub connectionClosed()

currentTime()

This method receives the current system time on the server side.

Sub currentTime(ByVal time As Integer)

Parameter	Typle	Description
time	Integer	The current system time on the server side.,

errMsg()

This event is called when there is an error with the communication or when TWS wants to send a message to the client.

Sub errMsg(ByVal id As Integer, ByVal errorCode As Integer, ByVal errorMsg As String)

Parameter	Type	Description
id	Integer	This is the orderId or tickerId of the request that generated the error
errorCode	Integer	Error codes are documented in the Error Codes topic.
errorString	String	This is the textual description of the error, also documented in the Error Codes topic.

tickPrice()

This function is called when the market data changes. Prices are updated immediately with no delay.

Sub tickPrice(ByVal id As Integer, ByVal tickType As Integer, ByVal price As Double, ByVal canAutoExecute As Integer)

Parameter	Type	Description
id	Integer	The ticker ID that was specified previously in the call to reqMktData()
tickType	Integer	Specifies the type of price. Possible values are: • 1 = bid • 2 = ask • 4 = last • 6 = high • 7 = low • 9 = close

Parameter	Type	Description
price	Double	The bid, ask or last price, the daily high, daily low or last day close, depending on tickType value.
canAutoExecute	Integer	Specifies whether the price tick is available for automatic execution. Possible values are: • 0 = not eligible for automatic execution • 1 = eligible for automatic execution

tickSize()

This function is called when the market data changes. Sizes are updated immediately with no delay.

Sub tickSize(ByVal id As Integer, ByVal tickType As Integer, ByVal size As Integer)

Parameter	Type	Description
id	Integer	The ticker ID that was specified previously in the call to reqMktData()
tickType	Integer	Specifies the type of price. Possible values are:
size	Integer	The bid size, ask size, last size or trading volume, depending on the tickType value.

tickOptionComputation()

Sub tickOptionComputation(ByVal id As Integer, ByVal tickType As Integer, ByVal impliedVol As Double, ByVal delta As Double, ByVal optPrice As Double, ByVal pvDividend As Double, ByVal gamma As Double, ByVal vega As Double, ByVal theta As Double, ByVal undPrice As Double)

Parameter	Type	Description
id	Integer	The ticker ID that was specified previously in the call to reqMktData()
tickType	Integer	Specifies the type of tick. Possible values are: • 10 = Bid • 11 = Ask • 12 = Last
ImpliedVol	Double	The implied volatility calculated by the TWS option modeler, using the specified ticktype value.
delta	Double	The option delta calculated by the TWS option modeler.
optPrice	Double	The option price.

Parameter	Type	Description
pvDivdend	Double	The present value of dividends expected on the options underlier.
gamma	Double	The option gamma value.
vega	Double	The option vega value.
theta	Double	The option theta value.
undPrice	Double	The price of the underlying.

tickGeneric()

This method is called when the market data changes. Values are updated immediately with no delay.

Sub tickGeneric(ByVal id As Integer, ByVal tickType As Integer, ByVal value As Double)

Parameter	Type	Description
tickerId	Integer	The ticker Id that was specified previously in the call to reqMktData()
tickType	Integer	Specifies the type of tick. Pass the field value into TickType.getField(int tickType) to retrieve the field description. For example, a field value of 46 will map to shortable, etc.
value	Double	The value of the specified field.

tickString()

This method is called when the market data changes. Values are updated immediately with no delay.

Sub tickString(ByVal id As Integer, ByVal tickType As Integer, ByVal value As String)

Parameter	Type	Description
tickerId	Integer	The ticker Id that was specified previously in the call to reqMktData()
tickType	Integer	Specifies the type of tick. Pass the field value into TickType.getField(int tickType) to retrieve the field description. For example, a field value of 45 will map to lastTimestamp, etc.
value	String	The value of the specified field.

tickEFP()

This method is called when the market data changes. Values are updated immediately with no delay.

Sub tickEFP(ByVal tickerId As Integer, ByVal field As Integer, ByVal basisPoints As Double, ByVal formattedBasisPoints As String, ByVal totalDividends As Double, ByVal holdDays As Integer, ByVal futureExpiry As String, ByVal dividendImpact As Double, ByVal dividendsToExpiry As Double))

Parameter	Type	Description
tickerId	Integer	The ticker Id that was specified previously in the call to reqMktData().
field	Integer	Specifies the type of price. Pass the field value into TickType.getField(int tickType) to retrieve the field description. For example, a field value of 38 will map to bidEFP, etc.
basisPoints	Double	Annualized basis points, which is representative of the financing rate that can be directly compared to broker rates.
formattedBasis Points	String	Annualized basis points as a formatted string that depicts them in percentage form.
totalDividends	Double	The total expected dividends.
holdDays	Integer	The number of hold days until the expiry of the EFP.
futureExpiry	String	The expiration date of the single stock future.
dividendImpact	Double	The dividend impact upon the annualized basis points interest rate.
dividendsToExpiry	Double	The dividends expected until the expiration of the single stock future.

tickSnapshotEnd()

This is called when a snapshot market data subscription has been fully handled and there is nothing more to wait for. This also covers the timeout case.

Sub tickSnapshotEnd(ByVal reqId As Integer)

Parameter	Type	Descrption
reqID	Integer	Id of the data request.

marketDataType()

TWS sends a marketDataType (type) callback to the API, where type is set to Frozen or RealTime, to announce that market data has been switched between frozen and real-time. This notification occurs only when market data switches between real-time and frozen. The marketDataType( ) callback accepts a reqId parameter and is sent per every subscription because different contracts can generally trade on a different schedule.

Sub marketDataType(ByVal reqId As Integer, type As Integer)

Parameter	Type	Description
reqId	Integer	Id of the data request
type	Integer	1 for real-time streaming market data or 2 for frozen market data..

orderStatus()

This event is called whenever the status of an order changes. It is also fired after reconnecting if the client has any open orders.

Sub orderStatus(ByVal id As Integer, ByVal status As String, ByVal filled As Integer, ByVal remaining As Integer, ByVal avgFillPrice As Double, ByVal permId As Integer, ByVal parentId As Integer, ByVal lastFillPrice As Double, ByVal clientId As Integer, ByVal whyHeld As String)

Note: It is possible that orderStatus() may return duplicate messages. It is essential that you filter the message accordingly.

Parameter	Type	Description
id	Integer	The order ID that was specified previously in the call to placeOrder()
status	String	The order status. Possible values include: • PendingSubmit - indicates that you have transmitted the order, but have not yet received confirmation that it has been accepted by the order destination. • PendingCancel - indicates that you have sent a request to cancel the order but have not yet received cancel confirmation from the order destination. At this point, your order is not confirmed canceled. You may still receive an execution while your cancellation request is pending. PendingSubmit and PendingCancel order statuses are not sent by the system and should be explicitly set by the API developer when an order is canceled. • PreSubmitted - indicates that a simulated order type has been accepted by the system and that this order has yet to be elected. The order is held in the system until the election criteria are met. At that time the order is transmitted to the order destination as specified. • Submitted - indicates that your order has been accepted at the order destination and is working. • Cancelled - indicates that the balance of your order has been confirmed canceled by the system. This could occur unexpectedly when the destination has rejected your order. • Filled - indicates that he order has been completely filled. • Inactive - indicates that the order has been accepted by the system (simulated orders) or an exchange (native orders) but that currently the order is inactive due to system, exchange or other issues.
filled	Integer	Specifies the number of shares that have been executed. For more information about partial fills, see Order Status for Partial Fills.

Parameter	Type	Description
remaining	Integer	Specifies the number of shares still outstanding.
avgFillPrice	Double	The average price of the shares that have been executed. This parameter is valid only if the **filled** parameter value is greater than zero. Otherwise, the price parameter will be zero.
permId	Integer	The id used to identify orders. Remains the same over sessions.
parentId	Integer	The order ID of the parent order, used for bracket and auto trailing stop orders.
lastFillPrice	Double	The last price of the shares that have been executed. Valid only if the filled parameter value is greater than zero. Otherwise, the price parameter will be zero.
clientId	Integer	- The ID of the client who placed the order. Note that application orders have a fixed clientId and orderId of 0 that distinguishes them from API orders.
whyHeld	String	Identifies an order held when TWS is trying to locate shares for a short sell.

openOrderEx()

This method is called to feed in open orders.

Sub openOrderEx(ByVal orderId As Integer, ByVal contract As TWSLib.IContract, ByVal order As TWSLib.IOrder, ByVal orderState As TWSLib.IOrderState)

Parameter	Type	Description
orderId	Integer	The order Id assigned by TWS. Used to cancel or update the order.
contract	IContract	The Contract class attributes describe the contract.
order	IOrder	The Order class attributes define the details of the order.
orderState	IOrderState	The orderState attributes include margin and commissions fields for both pre and post trade data.

openOrderEnd()

This is called at the end of a given request for open orders.

void openOrderEnd()

nextValidId()

This event is called after a successful connection to TWS.

Sub nextValidId(ByVal id As Integer)

Parameter	Type	Description
id	Integer	The next available order ID received from TWS upon connection. Increment all successive orders by one based on this ID.

permId()

This event is always received after an order Status event. It gives the permId for the specified order id. The permId will remain the same from session to session.

Sub permId(ByVal id As Integer, ByVal permId As Integer)

Parameter	Type	Description
id	Integer	The next available order ID received from TWS upon connection. Increment all successive orders by one based on this ID.
permId	Integer	This id will remain the same from session to session

deltaNeutralValidation()

Upon accepting a Delta-Neutral RFQ(request for quote), the server sends a deltaNeutralValidation() message with the UnderComp structure. If the delta and price fields are empty in the original request, the confirmation will contain the current values from the server. These values are locked when the RFQ is processed and remain locked until the RFQ is canceled.

void deltaNeutralValidation(LONG reqId, IUnderComp* underComp)

Parameter	Type	Description
reqID	LONG	The Id of the data request.
underComp	IUnderComp	Underlying component

updateAccountValue()

This event updates a single account value.

Sub updateAccountValue(ByVal key As String, ByVal value As String, ByVal curency As String, ByVal accountName As String)

Parameter	Type	Description
key	String	A string that indicates one type of account value. Below are some of the keys sent by TWS. • Account Type • Account Code • Available Funds • Buying Power • CashBalance - Account cash balance • Currency - Currency string • updatePortfolioEx DayTradesRemaining - Number of day trades left • EquityWithLoanValue - Equity with Loan Value • Excess Liquidity • Full Available Funds • Full Excess Liquidity • Full Init Margin Req • Full Maint Margin Req • Future Option Value • Futures PNL • Gross Position Value • InitMarginReq - Current initial margin requirement • Leverage • Look Ahead Available Funds • Look Ahead Next Change • Look Ahead Excess Liquidity • Look Ahead Margin Req • Look Ahead Maint Margin Req • LongOptionValue - Long option value • MaintMarginReq - Current maintenance margin • NetLiquidation - Net liquidation value • OptionMarketValue - Option market value • Realized PNL • Settled Cash • ShortOptionValue - Short option value

Parameter	Type	Description
		• StockMarketValue - Stock market value • Total Cash Balance • Total Cash Value • UnalteredInitMarginReq - Overnight initial margin requirement • UnalteredMaintMarginReq - Overnight maintenance margin requirement • Unrealized PNL
value	String	The value associated with the key.
curency	String	Defines the currency of the value, if the value is a monetary amount.
account	String	states the account the message applies to. Useful for Financial Advisor sub-account messages.

updatePortfolioEx()

This callback is made in response to the reqAccountUpdates() method.

Sub updatePortfolioEx(ByVal contract As TWSLib.IContract, ByVal position As Integer, ByVal marketPrice As Double, ByVal marketValue As Double, ByVal averageCost As Double, ByVal unrealizedPNL As Double, ByVal realizedPNL As Double, ByVal accountName As String)

Parameter	Type	Description
contract	IContract	This object contains a description of the contract which is being traded. The exchange field in a contract is not set for portfolio update.
position	Integer	This integer indicates the position on the contract. If the position is 0, it means the position has just cleared.
marketPrice	Double	The unit price of the instrument.
marketValue	Double	The total market value of the instrument.
averageCost	Double	The average cost per share is calculated by dividing your cost (execution price + commission) by the quantity of your position.
unrealizedPNL	Double	The difference between the current market value of your open positions and the average cost, or Value - Average Cost.
realizedPNL	Double	Shows your profit on closed positions, which is the difference between your entry execution cost (execution price + commissions to open the position) and exit execution cost ((execution price + commissions to close the position)
accountName	String	The name of the account to which the message applies. Useful for Financial Advisor sub-account messages.

updateAccountTime()

This event sends the time at which the account values and portfolio market prices were calculated.

Sub updateAccountTime(ByVal timeStamp As String)

Parameter	Type	Description
timeStamp	String	This indicates the last update time of the account information.

accountDownloadEnd()

This event is called after a batch updateAccountValue() and updatePortfolioEx() is sent.

Sub accountDownloadEnd(ByVal accountName As String)

Parameter	Type	Description
accountName	String	The name of the account.

accountSummary()

Returns the data from the TWS Account Window Summary tab in response to reqAccountSummary().

Sub accountSummary(ByVal messageType As Integer, ByVal version As Integer, ByVal requestId As Integer, ByVal account As String, tag As String, value As String, currency As String)

Parameter	Type	Description
messageType	Integer	Set to 62.
version	Integer	Set to 1.
requestId	Integer	The ID of the data request.
account	String	The account ID.

Parameter	Type	Description
tag	String	The tag from the data request. Available tags are: • *AccountType* • *TotalCashValue* — Total cash including futures pnl • *SettledCash* — For cash accounts, this is the same as TotalCashValue • *AccruedCash* — Net accrued interest • *BuyingPower* — The maximum amount of marginable US stocks the account can buy • *EquityWithLoanValue* — Cash + stocks + bonds + mutual funds • *PreviousEquityWithLoanValue* • *GrossPositionValue* — The sum of the absolute value of all stock and equity option positions • *RegTEquity* • *RegTMargin* • *SMA* — Special Memorandum Account • *InitMarginReq* • *MaintMarginReq* • *AvailableFunds* • *ExcessLiquidity* • *Cushion* — Excess liquidity as a percentage of net liquidation value • *FullInitMarginReq* • *FullMaintMarginReq* • *FullAvailableFunds* • *FullExcessLiquidity* • *LookAheadNextChange* — Time when look-ahead values take effect • *LookAheadInitMarginReq* • *LookAheadMaintMarginReq* • *LookAheadAvailableFunds* • *LookAheadExcessLiquidity* • *HighestSeverity* — A measure of how close the account is to liquidation • *DayTradesRemaining* — The Number of Open/Close trades a user could put on before Pattern Day Trading is detected. A value of "-1"

Parameter	Type	Description
		means that the user can put on unlimited day trades. • *Leverage* — GrossPositionValue / NetLiquidation
value	String	The value of the tag.
currency	String	The currency of the tag.

accountSummaryEnd

This method is called once all account summary data for a given request are received.

Sub accountSummaryEnd(ByVal reqId As Integer)

Parameter	Type	Descrption
reqId	Integer	The ID of the data request.

position()

This event returns real-time positions for all accounts in response to the reqPositions() method.

Sub position(ByVal messageId As Integer, ByVal version As Integer, ByVal account as String, ByVal conid As Integer, ByVal underlying As String, ByVal securityType As String, ByVal expiry As String, ByVal strike As String, ByVal right As String, ByVal multiplier As String, ByVal exchange As String, ByVal currency As String, By Val ibLocalSymbol As String, ByVal position As double)

Parameter	Type	Description
messageId	Integer	Set to 62.
version	Integer	Set to 1.
account	String	The account.
conid	Integer	Unique contract identifier.
underlying	String	The symbol of the underlying asset.
securityType	String	The security type.
expiry	String	The expiration date.
strike	String	The strike price.
right	String	Put or call.
multiplier	String	The multiplier.
exchange	String	The exchange.
currency	String	The currency.
ibLocalSymbol	String	The local symbol.
position	double	The position.

positionEnd()

This is called once all position data for a given request are received and functions as an end marker for the position() data.

Sub positionEnd(ByVal reqId As Integer)

Parameter	Type	Descrption
reqId	Integer	The ID of the data request.

updateNewsBulletin()

This event is triggered for each new bulletin if the client has subscribed (i.e. by calling the reqNewsBulletins() method).

Sub updateNewsBulletin(ByVal msgId As Short, ByVal msgType As Short, ByVal message As String, ByVal origExchange As String)

Parameter	Type	Description
msgId	Short	The bulletin ID, increments for each new bulletin.
msgType	Short	Specifies the type of bulletin. Valid values include: • 1 = Regular IB news bulletin • 2 = Exchange no longer available for trading. • 3 = Exchange is available for trading.
message	String	The bulletins message text.
origExchange	String	The exchange from which this message originated.

contractDetailsEx()

This event is called only in response to the reqContractDetailsEx() method having been called.

Sub contractDetailsEx(ByVal reqId As Integer, ByVal contractDetails As TWSLib.IContractDetails

Parameter	Type	Description
reqId	Integer	The ID of the data request. Ensures that responses are matched to requests if several requests are in process.
contractDetails	IContractDetails	This object contains a full description of the contract being looked up.

contractDetailsEnd()

This method is called once all contract details for a given request are received. This helps to define the end of an option chain.

Sub contractDetailsEnd(ByVal reqId As Integer)

Parameter	Type	Description
reqID	Integer	Id of the data request.

bondContractDetails()

Beginning with TWS Version 921, some bond contract data is suppressed and is not be available from the API. All bond contract data continues to be available from Trader Workstation, but only the following bond contract data is available from the API:

- Contract ID
- Minimum Tick
- CUSIP (if you have subscribed to the CUSIP service)
- Rating (if you have subscribed to ratings)

Sub bondContractDetails(ByVal symbol As String, ByVal secType As String, ByVal cusip As String, ByVal coupon As Double, ByVal maturity As String, ByVal issueDate As String, ByVal ratings As String, ByVal bondType As String, ByVal couponType As String, ByVal convertible As Integer, ByVal callable As Integer, ByVal putable As Integer, ByVal descAppend As String, ByVal exchange As String, ByVal curency As String, ByVal marketName As String, ByVal tradingClass As String, ByVal conId As Integer, ByVal minTick As Double, ByVal orderTypes As String, ByVal validExchanges As String, ByVal nextOptionDate As String, ByVal nextOptionType As String, ByVal nextOptionPartial As Integer, ByVal notes As String)

Parameter	Type	Description
symbol	String	The bond symbol.
secType	String	BOND
cusip	String	The nine-character bond CUSIP, or 12 character SEDOL.
coupon	Double	The interest rate used to calculate the amount you will receive in interest payments over the course of the year.
maturity	String	The date on which the issuer must repay the face value of the bond.
issueDate	String	he date on which the bond was issued.
ratings	String	Identifies the credit rating of the issuer. A higher credit rating generally indicates a less risky investment. Bond ratings are from Moody's and S&P respectively.
bondType	String	The type of the bond, such as "Corp" for corporate.
couponType	String	The type of the coupon, such as "FIXED."
convertible	Integer	Values are: True or False. If true, the bond can be converted to stock under certain conditions.
callable	Integer	Values are: True or False. If true, the bond can be called by the issuer under certain conditions.
putable	Integer	Values are: True or False. If true, the bond can be sold back to the issuer under certain conditions.
descAppend	String	Description string containing further descriptive information about the bond.
exchange	String	The exchange on which the BOND trades.

Parameter	Type	Description
curency	String	The currency in which the bond trades.
marketName	String	The market name for this contract.
tradingClass	String	The trading class name for this contract.
conId	Integer	The IB contract ID of the bond.
minTick	Double	The minimum price increment of the bond.
orderTypes	String	The order types that apply to this bond.
validExchanges	String	A comma-delimited string of exchanges on which this bond trades.
nextOptionDate	String	Next option date. Applies only to bonds with embedded options.
nextOptionType	String	Next option type. Applies only to bonds with embedded options.
nextOptionPartial	Integer	Next option partial. Applies only to bonds with embedded options (is the next option full or partial?).
notes	String	Bond notes, if populated for the bond in IB's database.

execDetailsEx()

This event is called when the reqExecutionsEx() method is invoked, or when an order is filled.

Sub execDetailsEx(ByVal reqId As Integer, ByVal contract As TWSLib.IContract, ByVal execution As TWSLib.IExecution)

Parameter	Type	Description
orderId	Integer	The order Id that was specified previously in the call to placeOrderEx().
contract	IContract	This object contains a full description of the contract that was executed.
execution	IExecution	This structure contains addition order execution details.

execDetailsEnd()

This method is called once all executions have been sent to a client in response to reqExecutionsEx()

Sub execDetailsEnd(ByVal reqId As Integer)

Parameter	Type	Description
reqID	Integer	Id of the data request.

commissionReport()

The commissionReport() callback is triggered as follows:

- Immediately after a trade execution
- By calling reqExecutionsEx().

Sub commissionReport(ByVal commissionReport As TWSLib.ICommissionReport)

Parameter	Type	Description
commissionReport	ICommissionReport	The structure that contains commission details.

updateMktDepth()

This function is called when the market depth changes.

Sub updateMktDepth(ByVal id As Integer, ByVal position As Integer, ByVal operation As Integer, ByVal side As Integer, ByVal price As Double, ByVal size As Integer)

Parameter	Type	Description
id	Integer	The ticker ID that was specified previously in the call to reqMktDepth()
position	Integer	Specifies the row ID of this market depth entry.
operation	Integer	Identifies how this order should be applied to the market depth. Valid values are: • 0 = insert (insert this new order into the row identified by 'position')· • 1 = update (update the existing order in the row identified by 'position')· • 2 = delete (delete the existing order at the row identified by 'position')
side	Integer	The side of the book to which this order belongs. Valid values are: • 0 = ask • 1 = bid
price	Double	The order price.
size	Integer	The order size.

updateMktDepthL2()

This function is called when the Level II market depth changes.

Sub updateMktDepthL2(ByVal id As Integer, ByVal position As Integer, ByVal marketMaker As String, ByVal operation As Integer, ByVal side As Integer, ByVal price As Double, ByVal size As Integer)

Parameter	Type	Description
id	Integer	The ticker ID that was specified previously in the call to reqMktDepth()
position	Integer	Specifies the row id of this market depth entry.
marketMaker	String	Specifies the exchange hosting this order.
operation	Integer	Identifies the how this order should be applied to the market depth. Valid values are: • 0 = insert (insert this new order into the row identified by 'position')· • 1 = update (update the existing order in the row identified by 'position')· • 2 = delete (delete the existing order at the row identified by 'position')
side	Integer	Identifies the side of the book that this order belongs to. Valid values are: • 0 = ask • 1 = bid
price	Double	The order price.
size	Integer	The order size.

managedAccounts()

This event is fired when a successful connection is made to an account. It is also fired when the reqManagedAccts() method is invoked.

Sub managedAccounts(ByVal accountsList As String)

Parameter	Type	Description
accountsList	String	The comma delimited list of FA-managed accounts.

receiveFA()

This event receives previously requested FA configuration information from TWS.

Sub receiveFA(ByVal faDataType As Integer, ByVal cxml As String)

Parameter	Type	Description
faDataType	Integer	Specifies the type of Financial Advisor configuration data being received from TWS. Valid values include: • 1 = GROUPS • 2 = PROFILE • 3 =ACCOUNT ALIASES
cxml	String	The XML string containing the previously requested FA configuration information.

historicalData()

This event receives requested historical data from TWS.

Sub historicalData(ByVal reqId As Integer, ByVal date As String, ByVal open As Double, ByVal high As Double, ByVal low As Double, ByVal close As Double, ByVal volume As Integer, ByVal barCount As Integer, ByVal WAP As Double, ByVal hasGaps As Integer)

Parameter	Type	Description
reqId	integer	The ticker ID of the request to which this bar is responding.
date	String	The date-time stamp of the start of the bar. The format is determined by the reqHistoricalData() formatDate parameter.
open	Double	The bar opening price.
high	Double	The high price during the time covered by the bar.
low	Double	The low price during the time covered by the bar.
close	Double	The bar closing price.
barCount	Integer	The bar count.
volume	Integer	The volume during the time covered by the bar.
WAP	Double	The weighted average price during the time covered by the bar.
hasGaps	Integer	Identifies whether or not there are gaps in the data.

scannerParameters()

Sub scannerParameters(ByVal xml As String)

Parameter	Type	Description
xml	String	An XML document that describes the valid parameters that a scanner parameter can have.

scannerDataEx()

This event receives the requested market scanner data results.

Sub scannerDataEx(ByVal reqId As Integer, ByVal rank As Integer, ByVal contractDetails As TWSLib.IContractDetails, ByVal distance As String, ByVal benchmark As String, ByVal projection As String, ByVal legsStr As String)

Parameter	Type	Description
reqId	Integer	The ID of the request to which this row is responding.
rank	Integer	The ranking within the response of this bar.
contractDetails	IContractDetails	This object contains a full description of the contract.
distance	String	Varies based on query.
benchmark	String	Varies based on query.
projection	String	Varies based on query.
legsStr	String	Describes combo legs when scan is returning EFP.

scannerDataEnd()

This function is called when the snapshot is received and marks the end of one scan.

Sub scannerDataEnd(ByVal reqId As Integer)

Parameter	Type	Description
reqId	Integer	The ID of the market data snapshot request being closed by this parameter.

realtimeBar()

This method receives the real-time bars data results.

Sub realtimeBar(ByVal tickerId As Integer, ByVal time As Integer, ByVal open As Double, ByVal high As Double, ByVal low As Double, ByVal close As Double, ByVal volume As Integer, ByVal WAP As Double, ByVal Count As Integer)

Parameter	Type	Description
reqId	Integer	The ticker Id of the request to which this bar is responding.
time	Integer	The date-time stamp of the start of the bar. The format is determined by the reqHistoricalData() formatDate parameter.
open	Double	The bar opening price.
high	Double	The high price during the time covered by the bar.
low	Double	The low price during the time covered by the bar.
close	Double	The bar closing price.
volume	Integer	The volume during the time covered by the bar.
wap	Double	The weighted average price during the time covered by the bar.
count	Integer	When TRADES historical data is returned, represents the number of trades that occurred during the time period the bar covers.

fundamentalData()

This method is called to receive Reuters global fundamental market data. There must be a subscription to Reuters Fundamental set up in Account Management before you can receive this data.

Sub fundamentalData(ByVal reqId As Integer, ByVal data As String)

Parameter	Type	Description
reqId	Integer	The ID of the data request.
data	String	One of these XML reports: • Company overview • Financial summary • Financial ratios • Financial statements • Analyst estimates • Company calendar

displayGroupList()

This callback is a one-time response to queryDisplayGroups().

displayGroupList(requestId As Integer, groups As String)

Parameter	Type	Description
requestId	Integer	The requestId specified in queryDisplayGroups().
groups	String	A list of integers representing visible group ID separated by the "|" character, and sorted by most used group first. This list will not change during TWS session (in other words, user cannot add a new group; sorting can change though). Example: "3|1|2"

displayGroupUpdated()

This is sent by TWS to the API client once after receiving the subscription request subscribeToGroupEvents(), and will be sent again if the selected contract in the subscribed display group has changed.

displayGroupList(requestId As Integer, contractInfo As String)

Parameter	Type	Description
requestId	Integer	The requestId specified in subscribeToGroupEvents().
contractInfo	String	The encoded value that uniquely represents the contract in IB. Possible values include: • none = empty selection • contractID@exchange – any non-combination contract. Examples: 8314@SMART for IBM SMART; 8314@ARCA for IBM @ARCA. • combo = if any combo is selected.

ActiveX COM Objects

The tables below define properties for the following objects:

- **IExecution**
- **IExecutionFilter**
- **ICommissionReport**
- **IContract**
- **IContractDetails**
- **IComboLeg**
- **IComboLegList**
- **IOrder**
- **IOrderState**
- **IScannerSubscription**
- **ITagValueList**
- **ITagValue**
- **IUnderComp**

You must use the factory "create" methods to create the COM objects in this section. Once a COM object has been created by a factory method, the COM object is tied to a corresponding TWS COM object (an instance of the COM object). Do not try to pass a COM object to another instance of a TWS COM object.

IExecution

Attribute	Description
acctNumber() As String	The customer account number.
avgPrice() As Double	Average price. Used in regular trades, combo trades and legs of the combo. Does not include commissions.
clientId() As Integer	The id of the client that placed the order. **Note:** TWS orders have a fixed client id of "0."
cumQty() As Integer	Cumulative quantity. Used in regular trades, combo trades and legs of the combo.
exchange() As String	Exchange that executed the order.
execId() As String	Unique order execution id.
liquidation() As Integer	Identifies the position as one to be liquidated last should the need arise.

Attribute	Description
orderId() As Integer	The order id. **Note:** TWS orders have a fixed order id of "0."
permId() As Integer	The TWS id used to identify orders, remains the same over TWS sessions.
price() As Double	The order execution price, not including commissions.
shares() As Integer	The number of shares filled.
side() As String	Specifies if the transaction was a sale or a purchase. Valid values are: • BOT • SLD
time() As String	The order execution time.
evRule() As String	Contains the Economic Value Rule name and the respective optional argument. The two values should be separated by a colon. For example, aussieBond:YearsToExpiration=3. When the optional argument is not present, the first value will be followed by a colon.
evMultiplier As Double	Tells you approximately how much the market value of a contract would change if the price were to change by 1. It cannot be used to get market value by multiplying the price by the approximate multiplier.

IExecutionFilter

Attribute	Description
acctCode() As String	Filter the results of the reqExecutionsEx() method based on an account code. Note: this is only relevant for Financial Advisor (FA) accounts.
clientId() As Integer	Filter the results of the reqExecutionsEx() method based on the clientId.
exchange() As String	Filter the results of the reqExecutionsEx() method based on the order exchange.
secType() String	Filter the results of the reqExecutionsEx() method based on the order security type. **Note:** Refer to the Contract object for the list of valid security types.

Attribute	Description
side() As String	Filter the results of the reqExecutionsEx() method based on the order action. **Note:** Refer to the Order object for the list of valid order actions.
symbol() As String	Filter the results of the reqExecutionsEx() method based on the order symbol.
time() As String	Filter the results of the reqExecutionsEx() method based on execution reports received after the specified time. The format for timeFilter is "yyyymmdd-hh:mm:ss"

ICommissionReport

Attribute	Description
commission() As Double	The commission amount.
currency() As String	The currency.
execId() As String	Unique order execution id.
realizedPNL() As Double	The amount of realized Profit and Loss.
yield() As Double	The yield.
yieldRedemptionDate() As Double	Takes the YYYYMMDD format.

IContract

Attribute	Description
comboLegs() As Object	Dynamic memory structure used to store the leg definitions for this contract.
comboLegsDescrip() As String	Description for combo legs
conId() As Integer	The unique contract identifier.
currency() As String	Specifies the currency. Ambiguities may require that this field be specified, for example, when SMART is the exchange and IBM is being requested (IBM can trade in GBP or USD). Given the existence of this kind of ambiguity, it is a good idea to always specify the currency.
exchange() As String	The order destination, such as Smart.
expiry() As String	The expiration date. Use the format YYYYMM.

Attribute	Description
includeExpired() As Integer	If set to true, contract details requests and historical data queries can be performed pertaining to expired contracts. Note: Historical data queries on expired contracts are limited to the last year of the contracts life, and are initially only supported for expired futures contracts,
localSymbol() As String	This is the local exchange symbol of the underlying asset.
multiplier() As String	Allows you to specify a future or option contract multiplier. This is only necessary when multiple possibilities exist.
primaryExch() As String	Identifies the listing exchange for the contract (do not list SMART).
right() As String	Specifies a Put or Call. Valid values are: P, PUT, C, CALL.
secId as String	Unique identifier for the secIdType.
secIdType As String	Security identifier, when querying contract details or when placing orders. Supported identifiers are: • ISIN (Example: Apple: US0378331005) • CUSIP (Example: Apple: 037833100) • SEDOL (Consists of 6-AN + check digit. Example: BAE: 0263494) • RIC (Consists of exchange-independent RIC Root and a suffix identifying the exchange. Exa
secType() As String	This is the security type. Valid values are: • STK • OPT • FUT • IND • FOP • CASH • BAG • NEWS
strike() As Double	The strike price.
symbol() As String	This is the symbol of the underlying asset.

Attribute	Description
tradingClass() As String	The trading class name for this contract.

IContractDetails

Attribute	Description
category() As String	The industry category of the underlying. For example, InvestmentSvc.
contractMonth() As String	The contract month. Typically the contract month of the underlying for a futures contract.
industry() As String	The industry classification of the underlying/product. For example, Financial.
liquidHours() As String	The liquid trading hours of the product. For example, 20090507:0930-1600;20090508:CLOSED.
longName() As String	The descriptive name of the asset.
marketName() String	The market name for this contract.
minTick() As Double	The minimum price tick.
orderTypes() As String	The list of valid order types for this contract.
priceMagnifier() Integer	Allows execution and strike prices to be reported consistently with market data, historical data and the order price, i.e. Z on LIFFE is reported in index points and not GBP.
ratings() As String	Identifies the credit rating of the issuer. A higher credit rating generally indicates a less risky investment. Bond ratings are from Moody's and S&P respectively.
secIdList() As Object	A list of contract identifiers that the customer is allowed to view (CUSIP, ISIN, etc.)
subcategory() As String	The industry subcategory of the underlying. For example, Brokerage.
summary() As Object	A contract summary.
timeZoneId() As String	The ID of the time zone for the trading hours of the product. For example, EST.
tradingHours() As String	The trading hours of the product. For example, 20090507:0700-1830,1830-2330;20090508:CLOSED.
underConId() As String	The underlying contract ID.
validExchanges() As String	The list of exchanges this contract is traded on.

Attribute	Description
evRule() As String	Contains the Economic Value Rule name and the respective optional argument. The two values should be separated by a colon. For example, aussieBond:YearsToExpiration=3. When the optional argument is not present, the first value will be followed by a colon.
evMultiplier As Double	Tells you approximately how much the market value of a contract would change if the price were to change by 1. It cannot be used to get market value by multiplying the price by the approximate multiplier.
Bond Values	
bondType() As String	The type of bond, such as "CORP."
callable() As Integer	Values are True or False. If true, the bond can be called by the issuer under certain conditions.
convertible() As Integer	Values are True or False. If true, the bond can be converted to stock under certain conditions.
coupon() As Double	The interest rate used to calculate the amount you will receive in interest payments over the course of the year.
couponType() As String	The type of bond coupon, such as "FIXED."
cusip() As String	The nine-character bond CUSIP or the 12-character SEDOL.
descAppend() As String	A description string containing further descriptive information about the bond.
issueDate() As String	The date the bond was issued.
maturity() As String	The date on which the issuer must repay the face value of the bond.
nextOptionDate)_ As String	Applies to bonds with embedded options.
nextOptionPartial() As Integer	Applies to bonds with embedded options.
nextOptionType() As String	Applies to bonds with embedded options.
notes() As String	If populated for the bond in IB's database
putable() As Integer	Values are True or False. If true, the bond can be sold back to the issuer under certain conditions.

IComboLeg

Attribute	Description
action() As String	The side (buy or sell) for the leg you are constructing.
conId() As Integer	The unique contract identifier specifying the security.

Attribute	Description
exchange() As String	The exchange to which the complete combination order will be routed.
openClose() As Integer	Specifies whether the order is an open or close order. Valid values are: • 0 - Same as the parent security. This is the only option for retail customers. • 1 - Open. This value is only valid for institutional customers. • 2 - Close. This value is only valid for institutional customers. • Unknown - (3)
ratio() As Integer	Select the relative number of contracts for the leg you are constructing. To help determine the ratio for a specific combination order, refer to the Interactive Analytics section of the User's Guide.
For Short Sale Stock Legs	
designatedLocation() As String	If shortSaleSlot == 2, the designatedLocation must be specified. Otherwise leave blank or orders will be rejected.
shortSaleSlot() Integer	For institutional customers only. • 0 - inapplicable (i.e. retail customer or not short leg) • 1 - clearing broker • 2 - third party. If this value is used, you must enter a designated location.

IComboLegList

Attribute	Description
Add() As Object	Adds combo legs to a combo leg list.
Count() As Integer	Leg count.
Item(Integer) As Object	Get leg by index.

IOrder

Attribute	Description
Order Identifiers	
clientId() As Integer	The id of the client that placed this order.
orderId() As Integer	The id for this order.

Attribute	Description
permId() As Integer	The TWS id used to identify orders, remains the same over TWS sessions.
Main Order Fields	
action() As String	Identifies the side. Valid values are: BUY, SELL, SSHORT
auxPrice() As Double	This is the STOP price for stop-limit orders, and the offset amount for relative orders. In all other cases, specify zero.
lmtPrice() As Double	This is the LIMIT price, used for limit, stop-limit and relative orders. In all other cases specify zero. For relative orders with no limit price, also specify zero.
orderType() As String	Identifies the order type. For more information about supported order types, see Supported Order Types.
totalQuantity() As Integer	The order quantity.
Extended Order Fields	
allOrNone() As Integer	0 = no, 1 = yes
blockOrder() As Integer	Specifies that the order is an ISE Block order.
displaySize() As Integer	The publicly disclosed order size, used when placing Iceberg orders.
goodAfterTime() As String	The trade's "Good After Time," format "YYYYMMDD hh:mm:ss (optional time zone)" Use an empty String if not applicable.
goodTillDate() As String	You must enter GTD as the time in force to use this string. The trade's "Good Till Date," format "YYYYMMDD hh:mm:ss (optional time zone)" Use an empty String if not applicable.
hidden() As Integer	Specifies that the order will not be visible when viewing the market depth. This option only applies to orders routed to the ISLAND exchange.
minQty() As Integer	Identifies a minimum quantity order type.
ocaGroup() As String	Identifies an OCA (one cancels all) group.

Attribute	Description
ocaType() As Integer	Tells how to handle remaining orders in an OCA group when one order or part of an order executes. Valid values include: • 1 = Cancel all remaining orders with block • 2 = Remaining orders are proportionately reduced in size with block • 3 = Remaining orders are proportionately reduced in size with no block If you use a value "with block" gives your order has overfill protection. This means that only one order in the group will be routed at a time to remove the possibility of an overfill.
orderRef() As String	The order reference. Intended for institutional customers only, although all customers may use it to identify the API client that sent the order when multiple API clients are running.
outsideRth() As Integer	Specifies whether orders can trigger or fill outside of regular trading hours or not.
overridePercentageConstraints() As Integer	Precautionary constraints are defined on the TWS Presets page, and help ensure tha tyour price and size order values are reasonable. Orders sent from the API are also validated against these safety constraints, and may be rejected if any constraint is violated. To override validation, set this parameter's value to True. Valid values include: • 0 = False • 1 = True
parentId() As Integer	The order ID of the parent order, used for bracket and auto trailing stop orders.
percentOffset() As Double	The percent offset amount for relative orders.

Attribute	Description
rule80A() As String	Values include: • Individual = 'I' • Agency = 'A', • AgentOtherMember = 'W' • IndividualPTIA = 'J' • AgencyPTIA = 'U' • AgentOtherMemberPTIA = 'M' • IndividualPT = 'K' • AgencyPT = 'Y' • AgentOtherMemberPT = 'N'
sweepToFill() As Integer	Specifies if the order is a Sweep-to-Fill order.
tif() As String	The time in force. Valid values are: DAY, GTC, IOC, GTD.
transmit() As Integer	Specifies whether the order will be transmitted by TWS.
triggerMethod() As Integer	Specifies how Simulated Stop, Stop-Limit and Trailing Stop orders are triggered. Valid values are: • 0 - The default value. The "double bid/ask" function will be used for orders for OTC stocks and US options. All other orders will used the "last" function. • 1 - use "double bid/ask" function, where stop orders are triggered based on two consecutive bid or ask prices. • 2 - "last" function, where stop orders are triggered based on the last price. • 3 double last function. • 4 bid/ask function. • 7 last or bid/ask function. • 8 mid-point function.
trailStopPrice() As Double	For TRAILLIMIT orders only

Attribute	Description
trailingPercent() As Double	Specify the trailing amount of a trailing stop order as a percentage. Observe the following guidelines when using the trailingPercent field: • This field is mutually exclusive with the existing trailing amount. That is, the API client can send one or the other but not both. • This field is read AFTER the stop price (barrier price) as follows: deltaNeutralAuxPrice stopPrice trailingPercent scale order attributes • The field will also be sent to the API in the openOrder message if the API client version is >= 56. It is sent after the stopPrice field as follows: stopPrice trailingPct basisPoint
activeStartTime As String	For GTC orders.
activeStopTime As String	For GTC orders.
Financial Advisor Fields	
faGroup() As String	The Financial Advisor group the trade will be allocated to -- use an empty String if not applicable.
faMethod() As String	The Financial Advisor allocation function the trade will be allocated with -- use an empty String if not applicable.
faPercentage() As String	The Financial Advisor percentage concerning the trade's allocation -- use an empty String if not applicable.
faProfile() As String	The Financial Advisor allocation profile the trade will be allocated to -- use an empty String if not applicable.
Institutional (non-cleared) Only	
designatedLocation() As String	Used only when shortSaleSlot = 2.
openClose() As String	For institutional customers only. Valid values are O, C.

Attribute	Description
origin() As Integer	The order origin. For institutional customers only. Valid values are 0 = customer, 1 = firm
shortSaleSlot() As Integer	Valid values are 1 or 2.
SMART Routing Only	
discretionaryAmt() As Double	The amount off the limit price allowed for discretionary orders.
eTradeOnly() As Integer	Trade with electronic quotes. 0 = no, 1 = yes
firmQuoteOnly() As Integer	Trade with firm quotes. 0 = no, 1 = yes
nbboPriceCap() As Double	Maximum smart order distance from the NBBO.
optOutSmartRouting() As Integer	Use to opt out of default SmartRouting for orders routed directly to ASX. This attribute defaults to false unless explicitly set to true. When set to false, orders routed directly to ASX will NOT use SmartRouting. When set to true, orders routed directly to ASX orders WILL use SmartRouting.
notHeld() As Integer	For IBDARK orders only. Orders routed to IBDARK are tagged as “post only” and are held in IB's order book, where incoming SmartRouted orders from other IB customers are eligible to trade against them.
BOX or VOL Orders Only	
auctionStrategy() As Integer	Values include: • match = 1 • improvement = 2 • transparent = 3 For orders on BOX only.
BOX Exchange Orders Only	
delta() As Double	The stock delta. For orders on BOX only.
startingPrice() As Double	The auction starting price. For orders on BOX only.
stockRefPrice() As Double	The stock reference price. The reference price is used for VOL orders to compute the limit price sent to an exchange (whether or not Continuous Update is selected), and for price range monitoring.
Pegged-to-Stock and VOL Orders Only	

Attribute	Description
stockRangeLower() As Double	The lower value for the acceptable underlying stock price range. For price improvement option orders on BOX and VOL orders with dynamic management.
stockRangeUpper() As Double	The upper value for the acceptable underlying stock price range. For price improvement option orders on BOX and VOL orders with dynamic management.
Volatility Orders Only	
continuousUpdate() As Integer	VOL orders only. Specifies whether TWS will automatically update the limit price of the order as the underlying price moves.
deltaNeutralOrderType() As String	VOL orders only. Enter an order type to instruct TWS to submit a delta neutral trade on full or partial execution of the VOL order. For no hedge delta order to be sent, specify NONE.
deltaNeutralAuxPrice() As Integer	VOL orders only. Use this field to enter a value if the value in the *deltaNeutralOrderType* field is an order type that requires an Aux price, such as a REL order.
referencePriceType() As Integer	VOL orders only. Specifies how you want TWS to calculate the limit price for options, and for stock range price monitoring. Valid values include: • 1 = Average of NBBO • 2 = NBB or the NBO depending on the action and right.
volatility() As Double	The option price in volatility, as calculated by TWS' Option Analytics. This value is expressed as a percent and is used to calculate the limit price sent to the exchange.
volatilityType() As Integer	Values include: • 1 = Daily volatility • 2 = Annual volatility
deltaNeutralOpenClose() As String	Specifies whether the order is an Open or a Close order and is used when the hedge involves a CFD and the order is clearing away.

Attribute	Description
deltaNeutralShortSale () As Integer	Used when the hedge involves a stock and indicates whether or not it is sold short.
deltaNeutralShortSaleSlot() As Integer	Has a value of 1 (the clearing broker holds shares) or 2 (delivered from a third party). If you use 2, then you must specify a deltaNeutralDesignatedLocation.
deltaNeutralDesignatedLocation() As String	Used only when deltaNeutralShortSaleSlot = 2.
Combo Orders Only	
basisPoints() As Double	For EFP orders only
basisPointsType() As Integer	For EFP orders only
Scale Orders Only	
scaleAutoReset() As Integer	For extended Scale orders.
scaleInitFillQty() As Integer	For extended Scale orders.
scaleInitLevelSize() As Integer	For Scale orders: Defines the size of the first, or initial, order component.
scaleInitPosition() As Integer	For extended Scale orders.
scalePriceIncrement() As Double	For Scale orders: Defines the price increment between scale components. This field is required.
scalePriceAdjustInterval() As Integer	For extended Scale orders.
scalePriceAdjustValue() As Double	For extended Scale orders.
scaleProfitOffset() As Double	For extended Scale orders.
scaleRandomPercent() As Integer	For extended Scale orders.
scaleSubsLevelSize() As Integer	For Scale orders: Defines the order size of the subsequent scale order components. Used in conjunction with scaleInitLevelSize().
scaleTable As String	Manual table for Scale orders.
Hedge Orders Only	

Attribute	Description
hedgeParam() As String	Beta = x for Beta hedge orders, ratio = y for Pair hedge order
hedgeType() As String	For hedge orders. Possible values are: • D = Delta • B = Beta • F = FX • P = Pair
Clearing Information	
account() As String	The account. For institutional customers only.
clearingAccount() As String	For IBExecution customers: Specifies the true beneficiary of the order. This value is required for FUT/FOP orders for reporting to the exchange.
clearingIntent() As String	For IBExecution customers: Valid values are: IB, Away, and PTA (post trade allocation).
settlingFirm() As String	Institutional only.
Algo Orders Only	
algoStrategy() As String	For information about API Algo orders, see IBAlgo Parameters.
algoParams() As Object	Support for IBAlgo parameters.
algoId As String	Identifies an order generated by algorithmic trading.
What If	
whatIf() As Integer	Use to request pre-trade commissions and margin information. If set to true, margin and commissions data is received back via the OrderState() object for the openOrder() callback.
Smart Combo Routing	
smartComboRoutingParams() As Object	Support for Smart combo routing.
Order Combo Legs	

Attribute	Description
OrderComboLegs() As Object	Holds attributes for all legs in a combo order.
Solicited Orders	
bool solicited	True = solicited (orders initiated by a broker through the brokers research and design) False = unsolicited (those instigated by a broker's customer either through their actions or by the broker at their direction)
Internal use only	
TagValueListSPtr orderMiscOptions	For internal use only. Use the default value XYZ.

OrderComboLeg

Attribute	Description
double price	Order-specific leg price.

IOrderState

Attribute	Description
commission() As Double	Shows the commission amount on the order.
commissionCurrency() As String	Shows the currency of the commission value.
equityWithLoan() As String	Shows the impact the order would have on your equity with loan value.
initMargin() As String	Shows the impact the order would have on your initial margin.
maintMargin() As String	Shows the impact the order would have on your maintenance margin.
maxCommission() As Double	Used in conjunction with the minCommission field, this defines the highest end of the possible range into which the actual order commission will fall.
minCommission() As Double	Used in conjunction with the maxCommission field, this defines the lowest end of the possible range into which the actual order commission will fall.
status() As String	Displays the order status.
warningText() As String	Displays a warning message if warranted.

IScannerSubscription

Attribute	Description
averageOptionVolumeAbove () As Integer	Can leave empty.
couponRateAbove() As String	Filter out contracts with a coupon rate lower than this value. Can be left blank.
couponRateBelow() As String	Filter out contracts with a coupon rate higher than this value. Can be left blank.
excludeConvertible() As Integer	Filter out convertible bonds. Can be left blank.
instrument() As String	Defines the instrument type for the scan.
locations() As String	The location.
marketCapAbove() As Double	Filter out contracts with a market cap lower than this value. Can be left blank.
marketCapBelow() As Double	Filter out contracts with a market cap above this value. Can be left blank.
maturityDateAbove() As String	Filter out contracts with a maturity date earlier than this value. Can be left blank.
maturityDateBelow() As String	Filter out contracts with a maturity date later than this value. Can be left blank.
moodyRatingAbove() As String	Filter out contracts with a Moody rating below this value. Can be left blank.
moodyRatingBelow() As String	Filter out contracts with a Moody rating above this value. Can be left blank.
numberOfRows() As Integer	Defines the number of rows of data to return for a query.
priceAbove() As Double	Filter out contracts with a price lower than this value. Can be left blank.
priceBelow() As Double	Filter out contracts with a price higher than this value. Can be left blank.
scanCode() As String	Can be left blank.
scannerSettingPairs() As String	Can leave empty. For example, a pairing "Annual, true" used on the "top Option Implied Vol % Gainers" scan would return annualized volatilities.
spRatingAbove() As String	Filter out contracts with an S&P rating below this value. Can be left blank.
spRatingBelow() As String	Filter out contracts with an S&P rating above this value. Can be left blank.

Attribute	Description
stockTypeFilter() As String	Valid values are: • CORP = Corporation • ADR = American Depositary Receipt • ETF = Exchange Traded Fund • REIT = Real Estate Investment Trust • CEF = Closed End Fund
volumeAbove() As Integer	Filter out contracts with a volume lower than this value. Can be left blank.

ITagValueList

Attribute	Description
Count() As Integer	The number of tag-value pairs (IBAlgo parameters).
Item(Integer) As Object	A tag-value pair (IBAlgo parameter). For more information, see IBAlgo Parameters.

ITagValue

Attribute	Description
tag() As String	An IBAlgo order parameter. For more information, see IBAlgo Parameters.
value() As String	The value of the IBAlgo parameter.

IUnderComp

Attribute	Description
conId() As Integer	The unique contract identifier specifying the security. Used for Delta-Neutral Combo contracts.
delta() As Double	The underlying stock or future delta. Used for Delta-Neutral Combo contracts.
price() As Double	The price of the underlying. Used for Delta-Neutral Combo contracts.

ActiveX Properties

The table below defines properties you can use when connecting to a server using ActiveX.

Property	Description
String TwsConnectionTime	Connection time.
long serverVersion	Server Version.

Placing a Combination Order

A combination order is a special type of order that is constructed of many separate legs but executed as a single transaction. Submit combo orders such as calendar spreads, conversions and straddles using the BAG security type (defined in the Contract object). The key to implementing a successful API combination order using the API is to knowing how to place the same order using Trader Workstation. If you are familiar with placing combination orders in TWS, then it will be easier to place the same order using the API, because the API only imitates the behavior of TWS.

Example

In this example, a customer places a BUY order on a calendar spread for GOOG. To buy one calendar spread means:

Leg 1: Sell 1 GOOG OPT SEP 18 '09 150.0 CALL (100)

Leg 2: Buy 1 GOOG OPT JAN 21 '11 150.0 CALL (100)

Here is a summary of the steps required to place a combo order using the API:

- Obtain the contract id (conId) for each leg. Get this number by invoking the reqContractDetailsEx() method.
- Include each leg on the IComboLeg COM object by populating the related fields.
- Implement the placeOrderEx() method with the IContract and IOrder COM objects.

To place this combo order

1. Get the Contract IDs for both leg definitions:

```
'First Leg
Dim con1 As TWSLib.IContract
con1 = Tws1.createContract

con1.symbol = "GOOG"
con1.secType = "OPT"
con1.expiry = "200909"
con1.strike = 150.0
con1.right = "C"
con1.multiplier = "100"
con1.exchange = "SMART"
con1.currency = "USD"

Tws1.reqContractDetailsEx(1, con1)

'Second Leg
Dim con2 As TWSLib.IContract
con2 = Tws1.createContract

con2.symbol = "GOOG"
con2.secType = "OPT"
con2.expiry = "201101"
con2.strike = 150.0
con2.right = "C"
con2.multiplier = "100"
con2.exchange = "SMART"
```

```
con2.currency = "USD"

Tws1.reqContractDetailsEx(2, con2)

'All conId numbers are delivered by the ContractDetail()

Private Sub Tws1_contractDetailsEx(ByVal sender As Object, ByVal e As
AxTWSLib._DTwsEvents_contractDetailsExEvent) Handles Tws1.contractDetailsEx

Dim contractDetails As TWSLib.IContractDetails
contractDetails = e.contractDetails

Dim contract As TWSLib.IContract
contract = contractDetails.summary

'reqId = 1 is corresponding to the first request or first leg
'reqId = 2 is corresponding to the second request or second leg

If e.reqId = 1 Then
leg1 = contract.conId 'to obtain conId for the first leg
End If

If e.reqId = 2 Then
leg2 = contract.conId 'to obtain conId for the second leg
End If

End Sub
```

2. Once the program has acquired the conId value for each leg, include it in the ComboLeg object:

```
TWSLib.IComboLegList
addAllLegs = Tws1.createComboLegList

'First Combo leg
Dim Leg1 As TWSLib.IComboLeg
Leg1 = addAllLegs.Add()

Leg1.conId = leg1_conId
Leg1.ratio = 1
Leg1.action = "SELL"
Leg1.exchange = "SMART"
Leg1.openClose = 0
Leg1.shortSaleSlot = 0
Leg1.designatedLocation = ""

' Second Combo leg
Dim Leg2 As TWSLib.IComboLeg
Leg2 = addAllLegs.Add()

Leg1.conId = leg2_conId
Leg1.ratio = 1
Leg1.action = "BUY"
Leg1.exchange = "SMART"
Leg1.openClose = 0
```

```
Leg1.shortSaleSlot = 0
Leg1.designatedLocation = ""
```

3. Invoke the placeOrder() method with the appropriate contract and order objects:

```
Dim contract As TWSLib.IContract
contract = Tws1.createContract

contract.symbol = "USD"
contract.secType = "BAG"
contract.exchange = "SMART"
contract.currency = "USD"
contract.comboLegs = addAllLegs

Dim order As TWSLib.IOrder
order = Tws1.createOrder

order.action = "BUY"
order.totalQuantity = 1
order.orderType = "MKT"

Tws1.placeOrderEx(OrderId, contract, order)
```

4

C++

This chapter describes the C++ API, including the following topics:

Note: Beginning with API Version 9.72, the C++ MFC implementation has been deprecated. If you are running API Version 9.72 or higher and want to use the C++ API, you must use the POSIX implementation.

Tutorial: Build a C++ API Sample Application

This tutorial provides a step-by-step guide to using C++ to build a sample application which retrieves market data from Trader Workstation (TWS). You will build an application that connects to TWS, requests some forex market data and displays it on the screen.

> **Note:** Please note, as of API 9.72, the MFC based C++ client is deprecated. The present tutorial is valid only for versions 9.71 and below.

The Tutorial includes these steps:

1. Create the Project
2. Prepare the User Interface
3. Add the API Source Files
4. Implement the EWrapper Interface
5. Connect to TWS
6. Display Information from TWS
7. Request Market Data

> **Note:** All the code provided with this example is "as is" and for illustrative purposes only.

For this tutorial, we are using Interactive Brokers C++ API (v. 9.71) and displaying it in an MFC-based application using Microsoft Visual Studio 2010 Professional Edition.

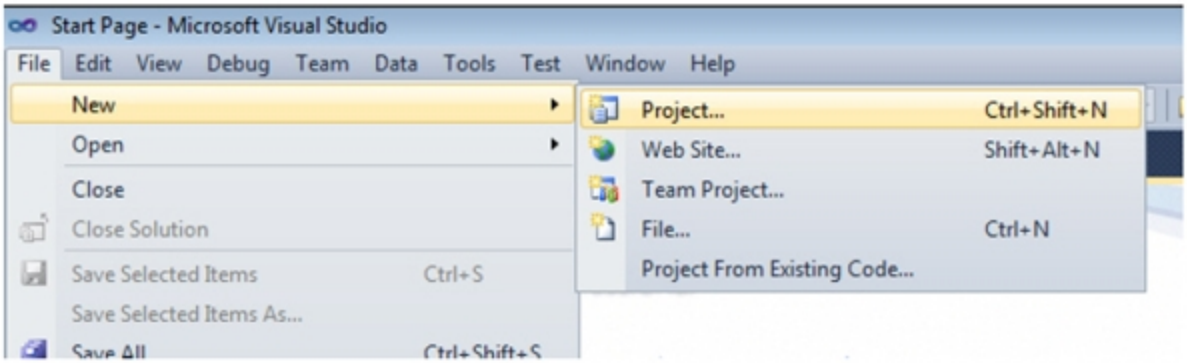
For your convenience, you can request the full sample solution resulting from this tutorial by contacting our API Support team at **api@interactivebrokers.com**.

C++ Tutorial: 1. Create the Project

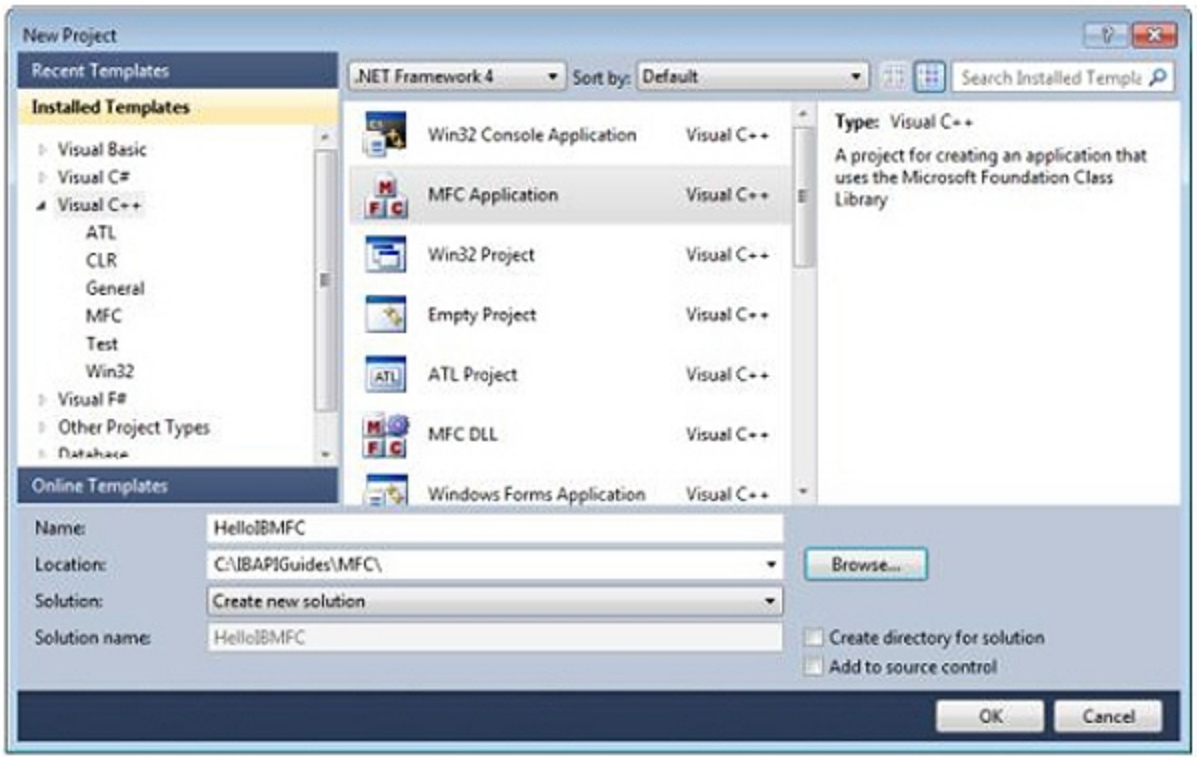
In this first part of the tutorial, you will create new project in Visual Studio.

To create a new project in Microsoft Visual Studio 2010 Professional Edition

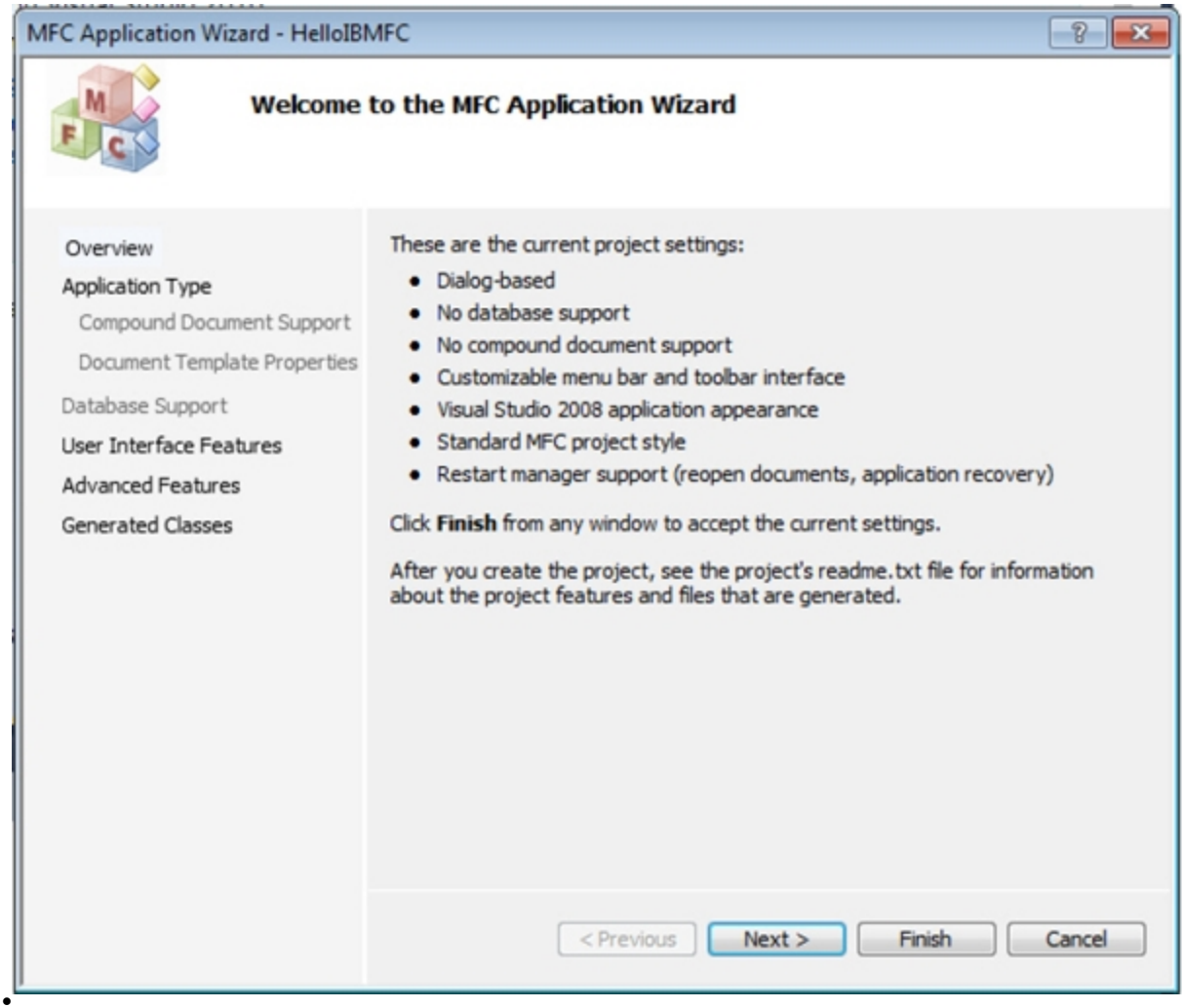
1. Open Microsoft Visual Studio 2010 Professional Edition, then click **File > New > Project**.



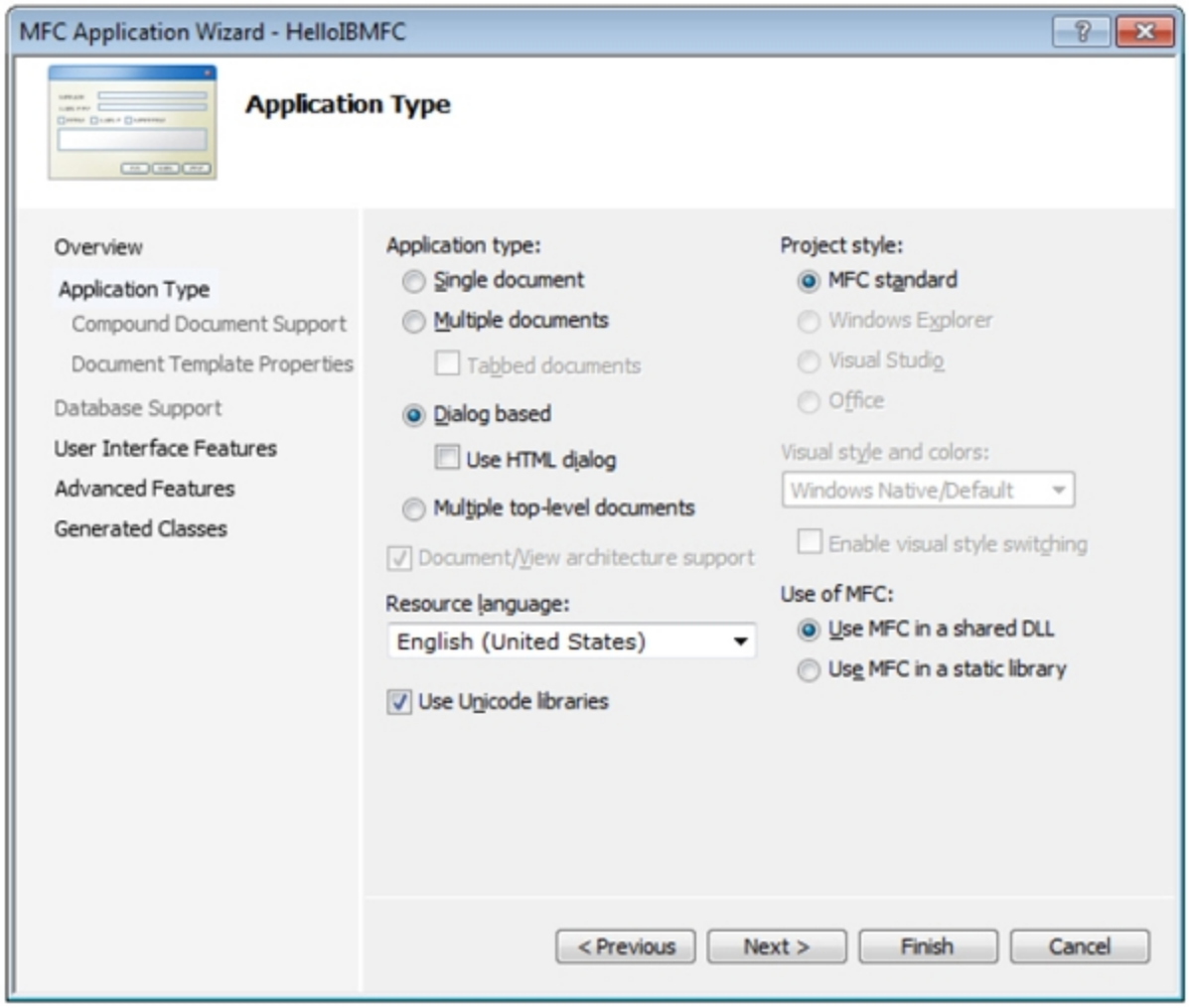
2. In New Project dialog, select *Visual C++* from the list of Installed Templates on the left, then select MFC Application.
3. Type **HelloIBMFC** as the project name in the Name field, then click the **Browse** button and choose a location for the project on your computer.
4. Click **OK**.



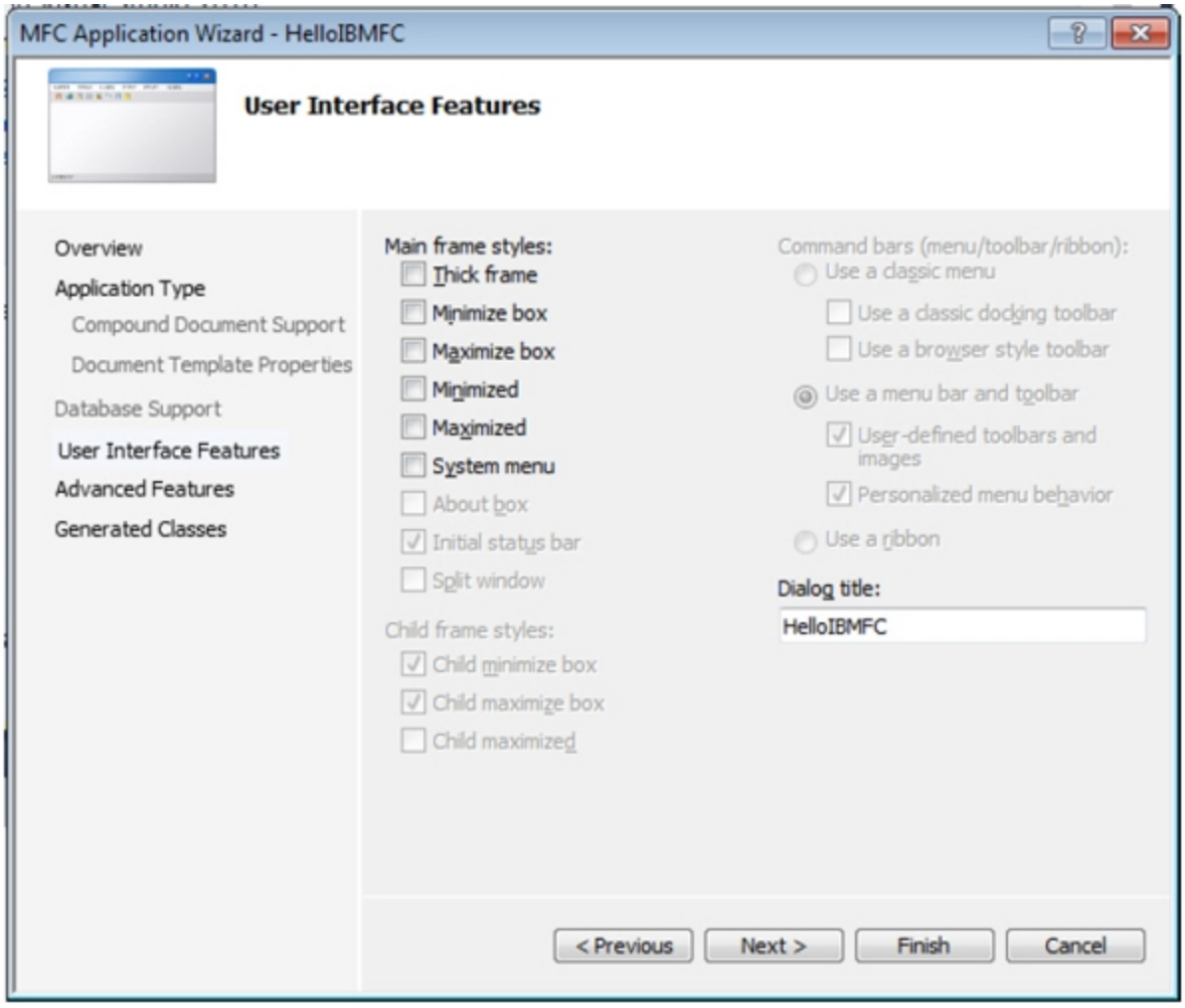
The MFC Application Wizard starts.



5. Click **Next**.
6. The next screen in the wizard lets you choose the kind of application you want to create. For this tutorial, make the following selections:
   - Application Type = Dialog based
   - Project style = MFC standard
   - Use of MFC = Use MFC as a shared DLL.



7. Click **Next**.
8. The next screen in the wizard lets you choose some additional User Interface options. For this tutorial, disable all of these options by deselecting all check boxes, then click **Finish**.



9. The result will be our empty project showing an application with a single dialog. This simple user interface will be the shell of your sample application.

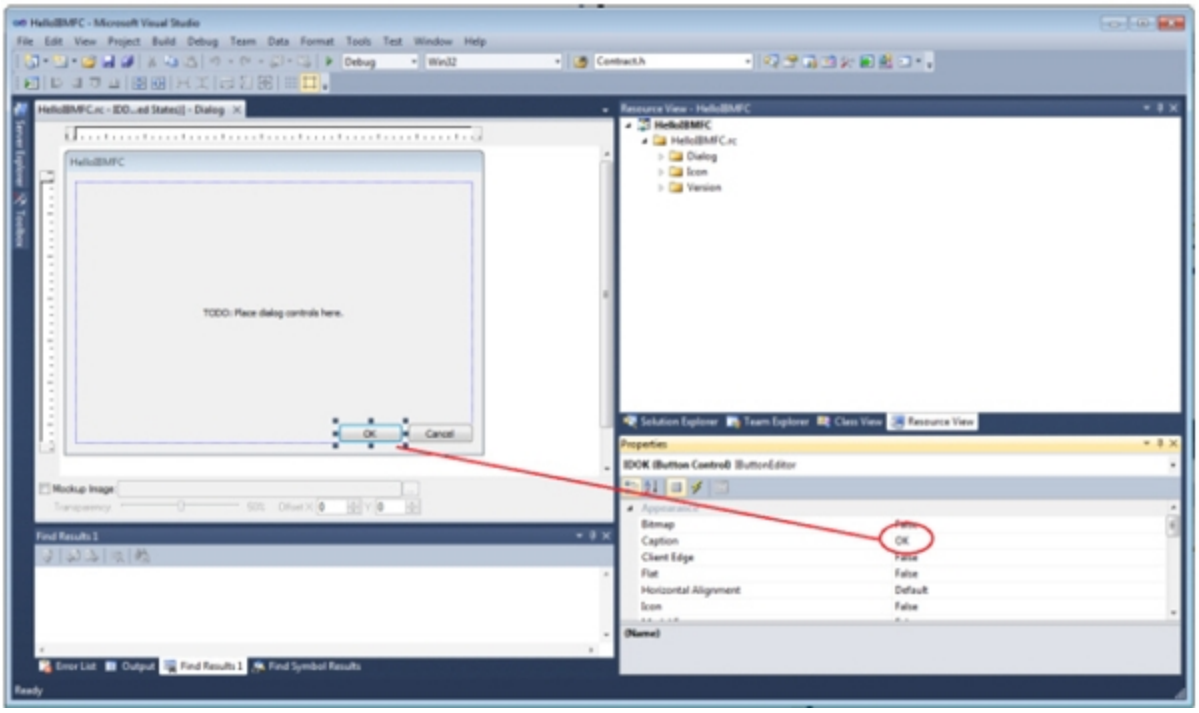
Continue to the next step in this tutorial, 2. Prepare the User Interface.

C++ Tutorial: 2. Prepare the User Interface

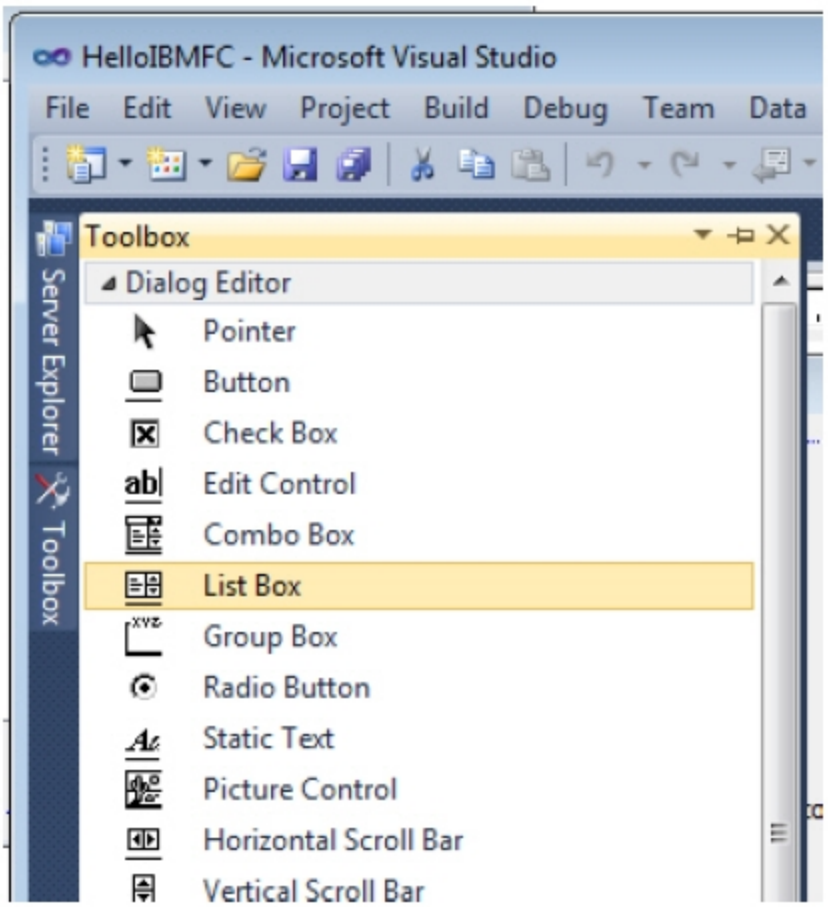
In this part of the tutorial, you will modify the user interface of your application.

To prepare the user interface

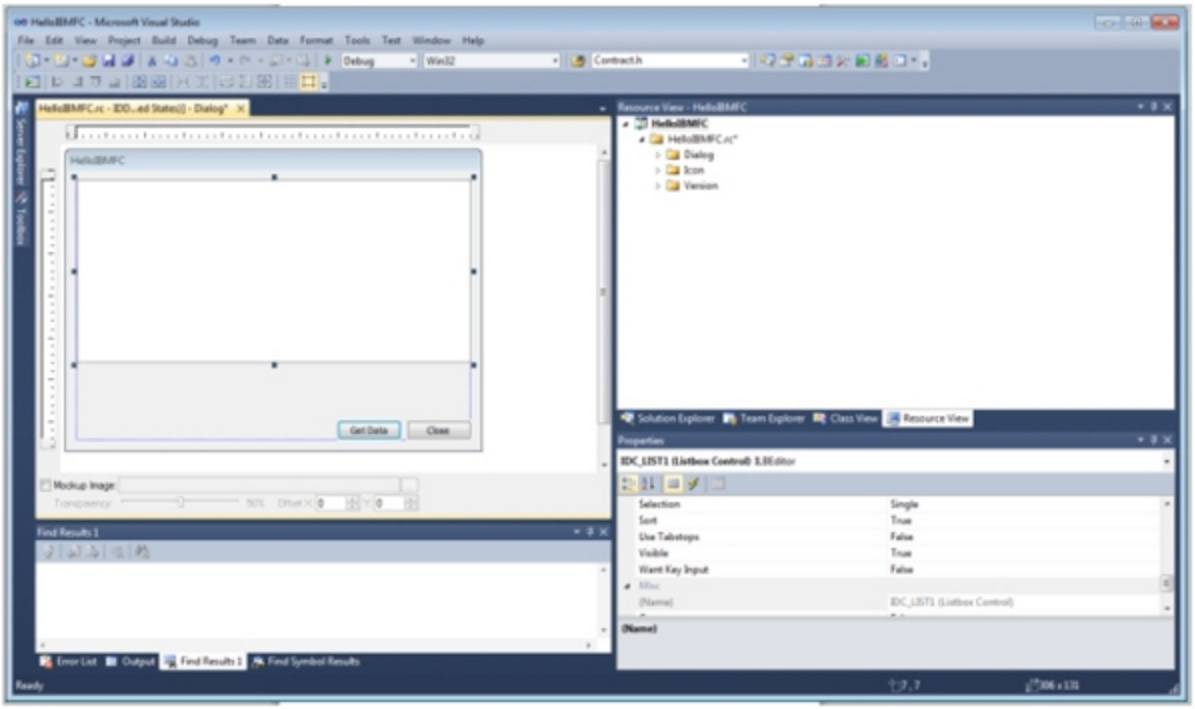
1. So far in this tutorial, you have created a simple dialog box that contains two buttons, labeled OK and Cancel. Change the captions to **Get Data** and **Close** as follows:
   - Click each button, then type the new label as the value of *Caption* in the Properties section of the Resource View, shown below:



2. Next, you need to add an area in which to display market data. To do this, open the Toolbox either by using the toolbox tab on the left side of the screen or by selecting **View > Toolbox** from the menu.



3. In the Toolbox dialog, select the **List Box** component, then drag and drop the component into the application's dialog and resize it so that it resembles the image below.



4. Save the project.

Continue to the next step in this tutorial, 3. Add the API Source Files.

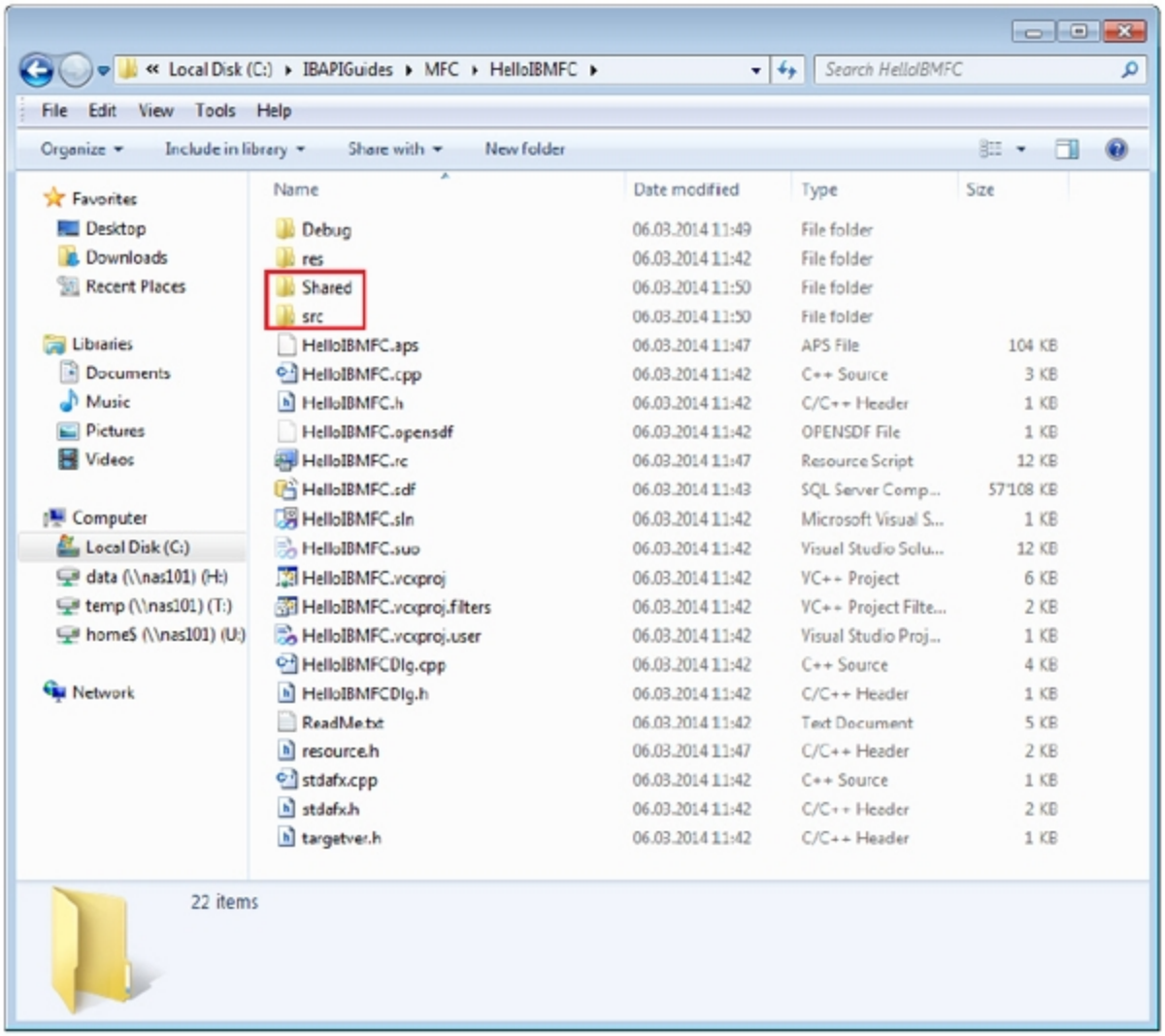
C++ Tutorial: 3. Add the API Source Files

In this part of the tutorial, you will add the API source files to your project.

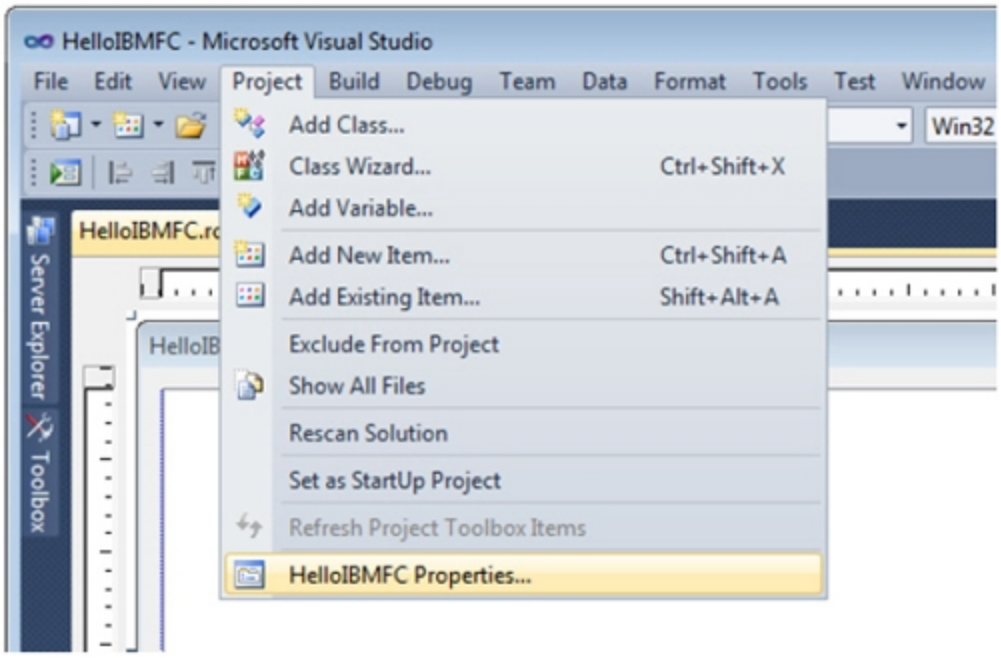
To add the API source files

1. Find and copy the *Shared* and *src* directories from the *source/CppClient* directory in the API installation directory to your application directory.

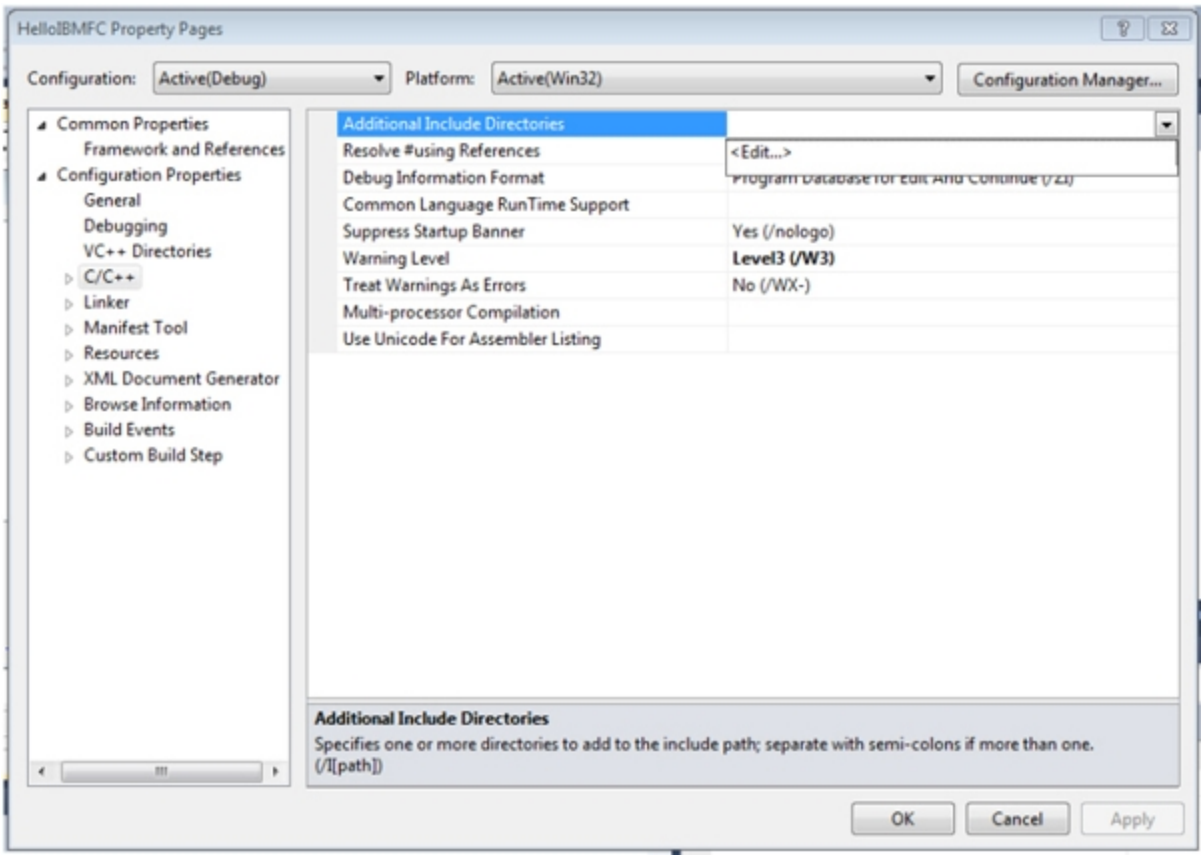
   When you view the contents of your application directory after copying the directories, it should look something like this:



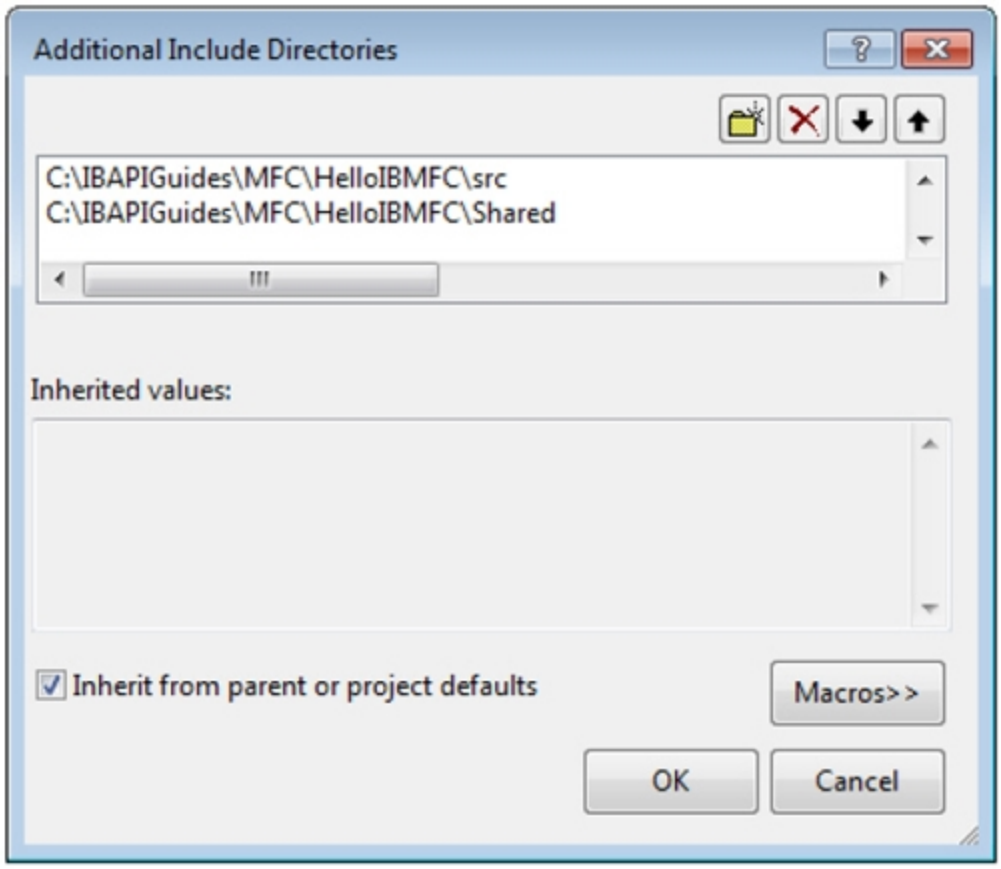
2. Next, you need to tell Visual Studio to include both directories in your project. Open the Property Pages for your project by selecting **Project -> HelloIBMFC Properties** from the Visual Studio menu.



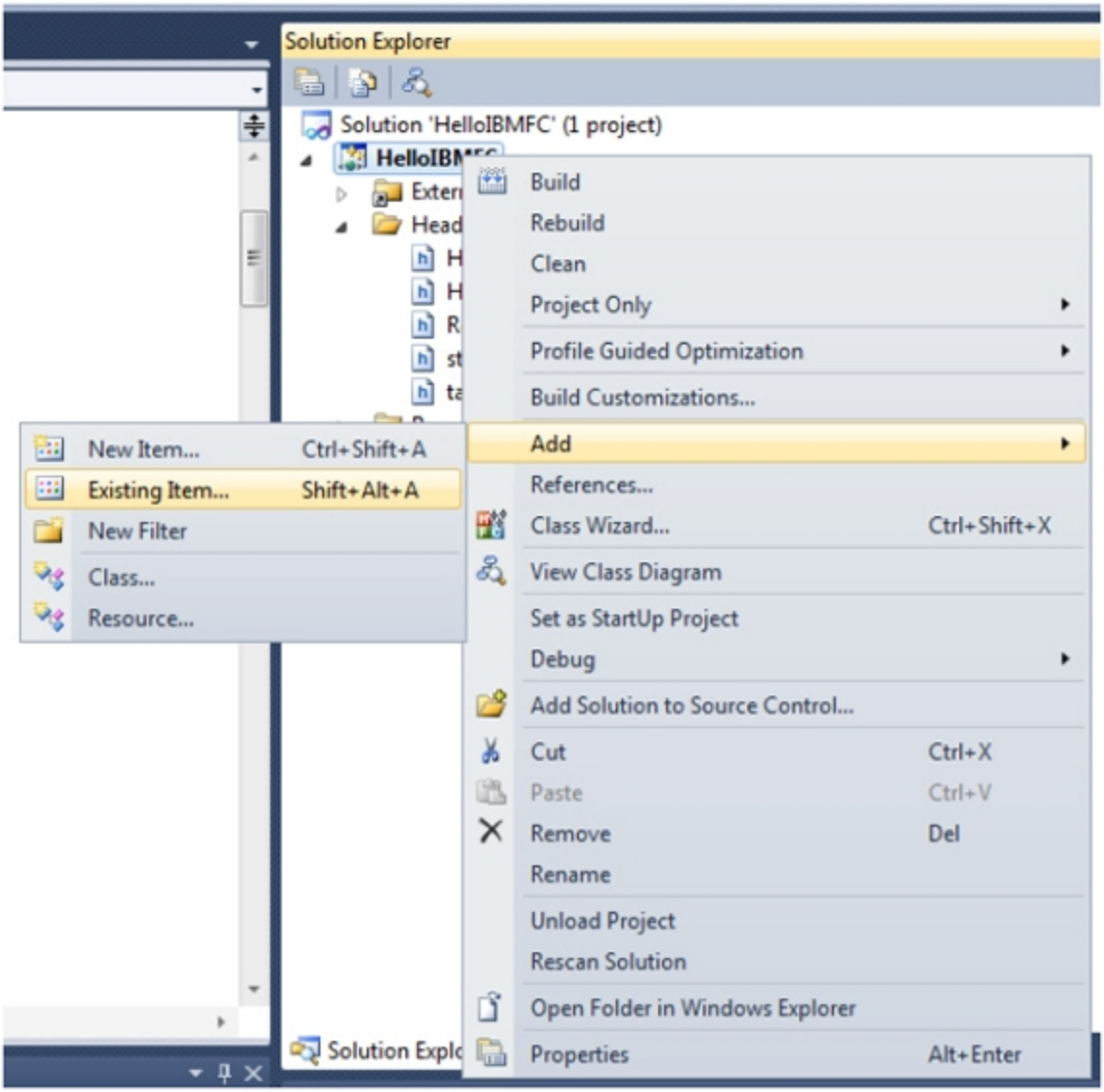
3. In the Properties dialog, navigate to **Configuration Properties > C/C++ > Additional Include Directories > Edit**.



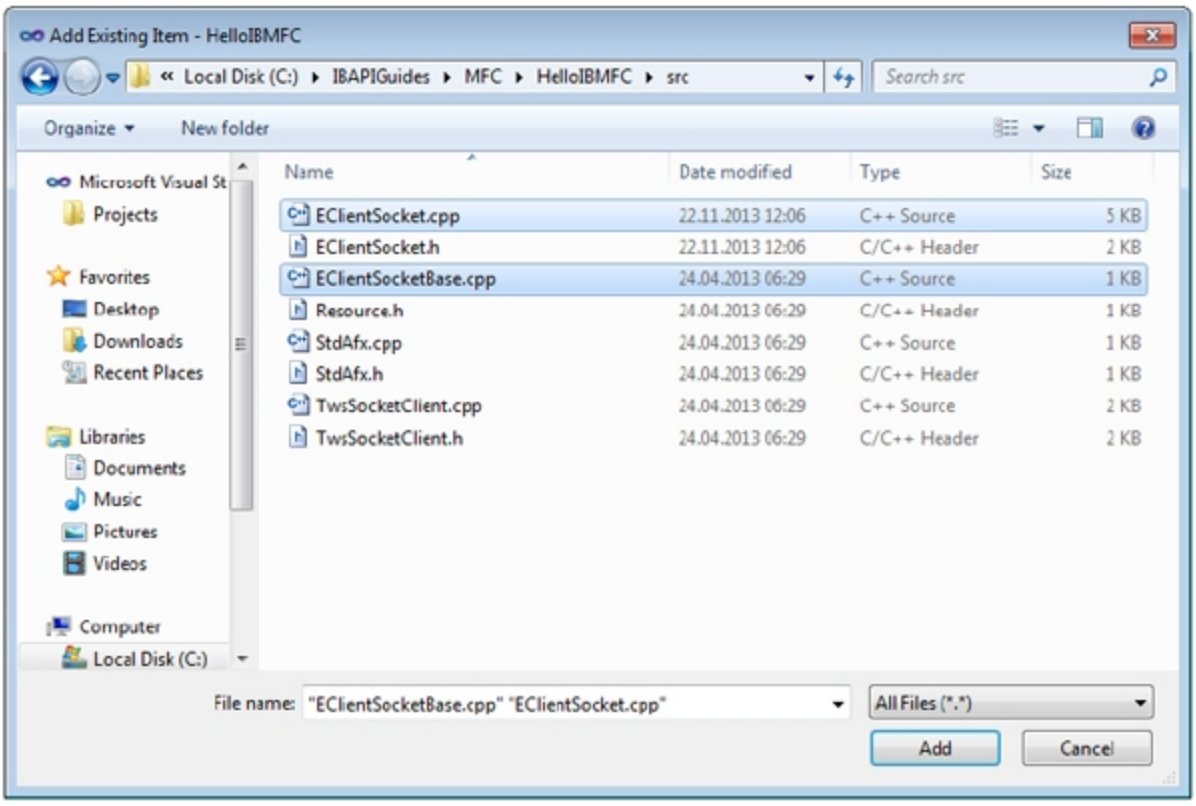
4. Add the *Shared* and *src* directories that you just copied to your application directory earlier.



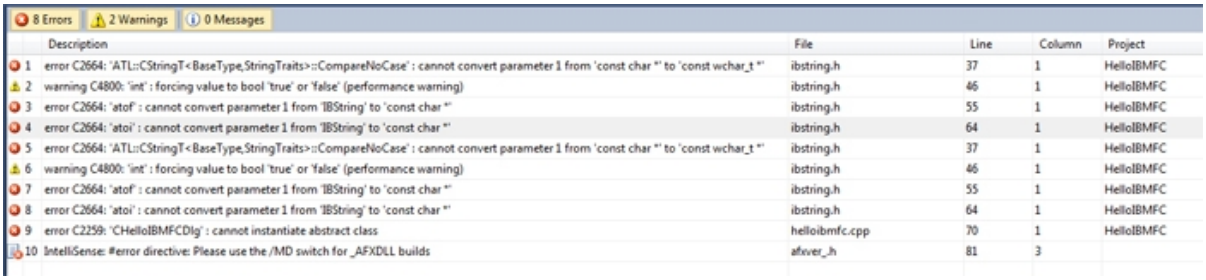
5. Click **OK**, and then save the project.
6. Finally, before you can start coding, you need to add the client socket's implementation classes to the project. In the Solution Explorer, right-click the project and select **Add -> Existing Item** from the popup menu.



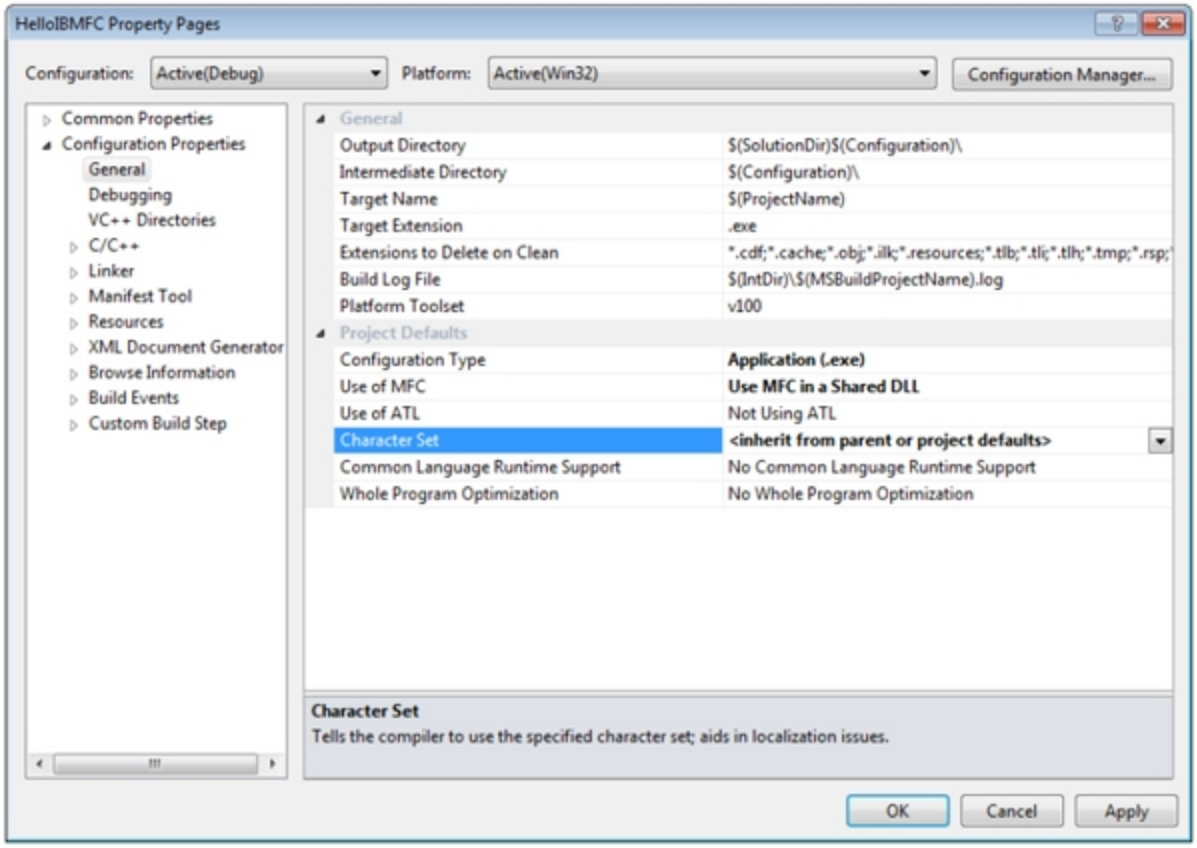
7. Navigate to the previously copied *src* directory and select the files **EClientSocket.cpp** and **EClientSocketBase.cpp**, then click **Add**.



If you were to try to compile and run the project at this stage, it might show the following errors:



8. To prevent these errors, open the Property Pages by selecting **Project -> HelloIBMFC Properties** from the Visual Studio menu, then change the Character Set to **<inherit from parent or project defaults>** as shown below.



9. Save the project.

Continue to the next step in this tutorial, 4. Implement the EWrapper Interface.

C++ Tutorial: 4. Implement the EWrapper Interface

Now we are ready for coding. The IB API needs to implement the EWrapper virtual class (interface). For this example we will implement it in the application's dialog class (CHelloIBMFCDlg) by inheriting from it.

To implement the EWrapper interface

1. In the dialog's header file (HelloIBMFCDlg.h), include the EWrapper.h header file.
2. Inherit the EWrapper class.

The completed code for this step in the tutorial is shown below.

```
#include "EWrapper.h"

// CHelloIBMFCDlg dialog
class CHelloIBMFCDlg : public CDialogEx, public EWrapper
{
```

HelloIBMFCDlg.h

3. Save all files.

Continue to the next step in this tutorial, 5. Connect to TWS.

C++ Tutorial: 5. Connect to TWS

Another key component of Interactive Broker's API is the EClient class, which provides the methods used to communicate to the TWS. In this step of the tutorial, you will add the code required to connect your application to TWS.

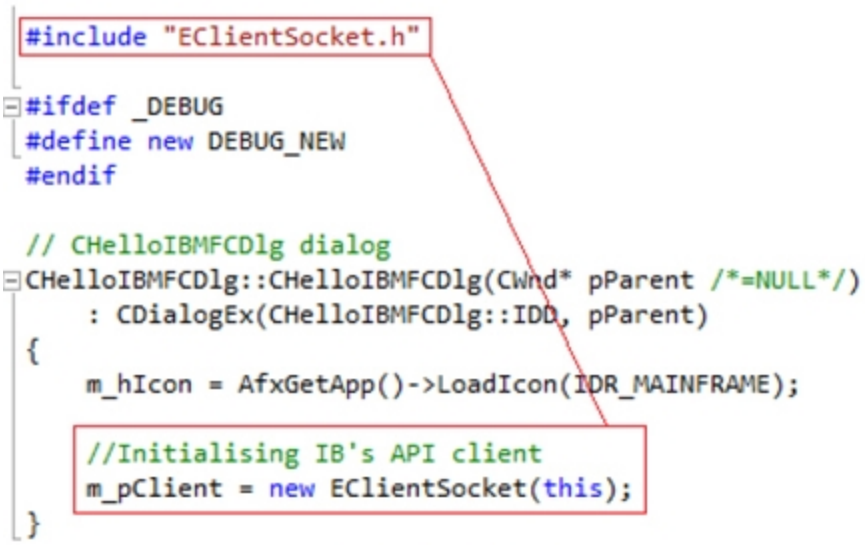
To add the code required to connect to TWS

1. The EClient class provides the methods that you will use to communicate with TWS. In the HelloIBMFCDlg.h file, instantiate the EClient class as a member variable of the HelloIBMFCDlg class, taking care to also declare the EClient class, as shown below.

```
#include "EWrapper.h"

//Declaration of IB's API EClient class
class EClient;

// CHelloIBMFCDlg dialog
class CHelloIBMFCDlg : public CDialogEx, public EWrapper
{
// Construction
public:
    CHelloIBMFCDlg(CWnd* pParent = NULL);   // standard constructor

// Dialog Data
    enum { IDD = IDD_HELLOIBMFC_DIALOG };

    protected:
        virtual void DoDataExchange(CDataExchange* pDX);    // DDX/DDV support

        //This member variable will be our entry point to IB's API
        EClient *m_pClient;
```

HelloIBMFCDlg.h

2. In the HelloIBMFCDlg.cpp file, initialize this variable on the class constructor (CHelloIBMFCDlg::CHelloIBMFCDlg). Don't forget to include EClientSocket's header.



```
#include "EClientSocket.h"

#ifdef _DEBUG
#define new DEBUG_NEW
#endif

// CHelloIBMFCDlg dialog
CHelloIBMFCDlg::CHelloIBMFCDlg(CWnd* pParent /*=NULL*/)
    : CDialogEx(CHelloIBMFCDlg::IDD, pParent)
{
    m_hIcon = AfxGetApp()->LoadIcon(IDR_MAINFRAME);

    //Initialising IB's API client
    m_pClient = new EClientSocket(this);
}
```

HelloIBMFCDlg.cpp

3. Now you are finally ready to connect to TWS. In Visual Studio's Resource View, open the Design dialog, then double-click the **Get Data** button. This automatically adds the *OnBnClickedOK()* method to the dialog class. Now add the connectivity code to the *OnBnClickedOk()* method as shown below.

```
void CHelloIBMFCDlg::OnBnClickedOk()
{
    m_pClient->eConnect("127.0.0.1", 7496, 1);
}
```

HelloIBMFCDlg.cpp

4. Save all files.

   This is all the code you need to connect to the TWS or IB Gateway. When you click the **Get Data** button, your application will connect to TWS and receive some events, most importantly, the next valid order id, which we will display in the next step.

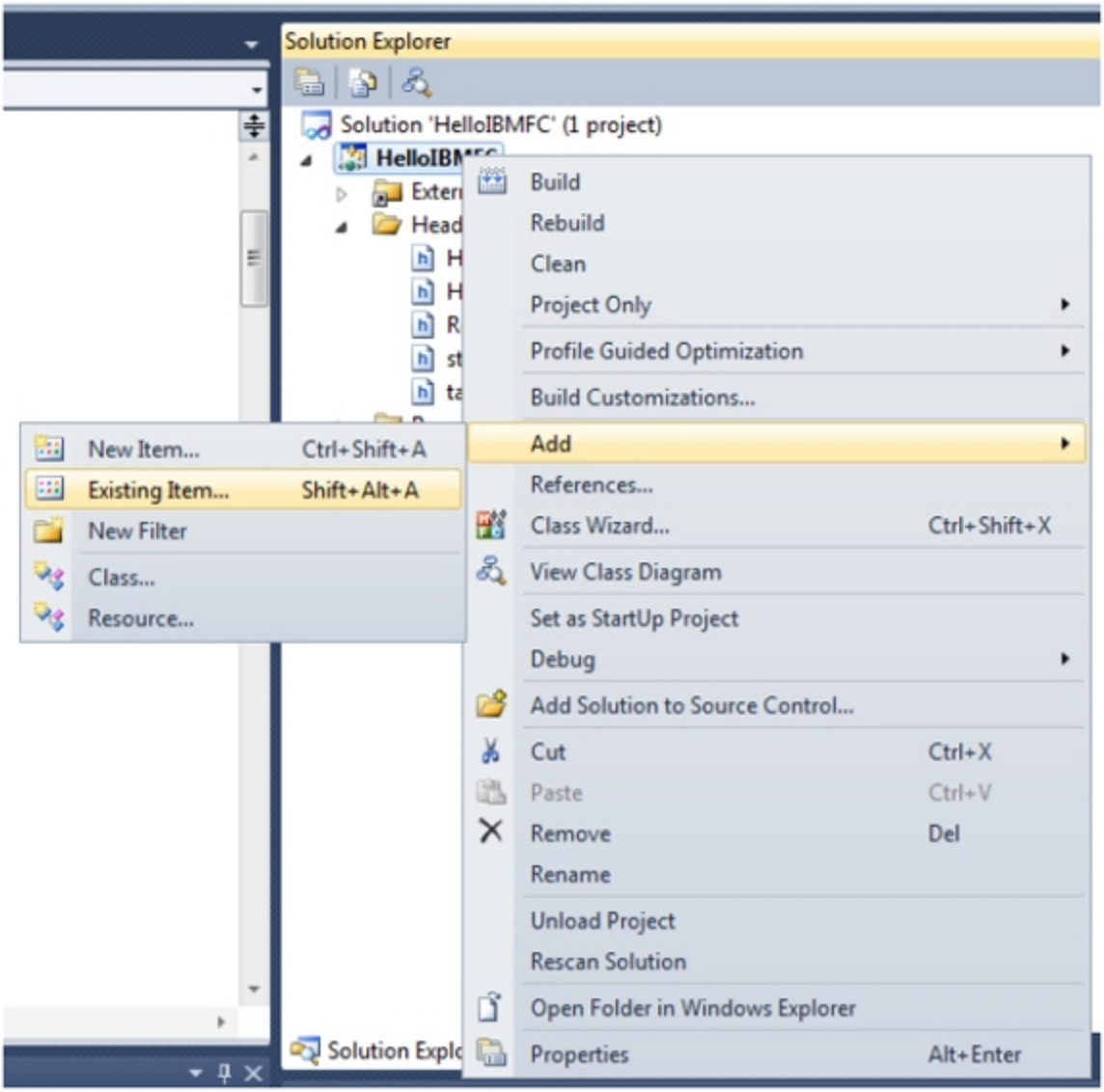
   Continue to the next step in this tutorial, 6. Display Information from TWS.

C++ Tutorial: 6. Display Information from TWS

When you started modifying our user interface, you added a List Box component. In this step, you will make use of it with the help of the CHScrollListBox.cpp file, located in the API's *Shared* directory. This class is nothing but an extension of the CListBox MFC class and contains some useful methods.

To display information from TWS

1. Right-click the **HelloIBMFC** project in the Solution Explorer, then click **Add > Existing Item** from the menu.



2. Navigate to the API's *Shared* directory and select the file **HScrollListBox.cpp**, then click **Add**.
3. In the file HelloIBMFCDlg.h, add a CHScrollListBox member variable to our main dialog just as we did with the EClient class:

```
#include "EWrapper.h"

#include "HScrollListBox.h"

//Declaration of IB's API EClient class
class EClient;

// CHelloIBMFCDlg dialog
class CHelloIBMFCDlg : public CDialogEx, public EWrapper
{
// Construction
public:
    CHelloIBMFCDlg(CWnd* pParent = NULL);   // standard constructor

// Dialog Data
    enum { IDD = IDD_HELLOIBMFC_DIALOG };

    protected:
        virtual void DoDataExchange(CDataExchange* pDX);    // DDX/DDV support

        //This member variable will be our entry point to IB's API
        EClient *m_pClient;

        //Through this variable we will print the incoming data to the UI
        CHScrollListBox m_ticks;
```

HelloIBMFCDlg.h

4. In the HelloIBMFCDlg.cpp file, link the CHScrollListBox member variable to the GUI's List Box component via the MFC wizard's auto-generated DoDataExchange method's implementation:

```
#ifdef _DEBUG
#define new DEBUG_NEW
#endif

// CHelloIBMFCDlg dialog
CHelloIBMFCDlg::CHelloIBMFCDlg(CWnd* pParent /*=NULL*/)
    : CDialogEx(CHelloIBMFCDlg::IDD, pParent)
{
    m_hIcon = AfxGetApp()->LoadIcon(IDR_MAINFRAME);

    //Initialising IB's API client
    m_pClient = new EClientSocket(this);
}

void CHelloIBMFCDlg::DoDataExchange(CDataExchange* pDX)
{
    CDialogEx::DoDataExchange(pDX);

    DDX_Control(pDX, IDC_LIST1, m_ticks);
}
```

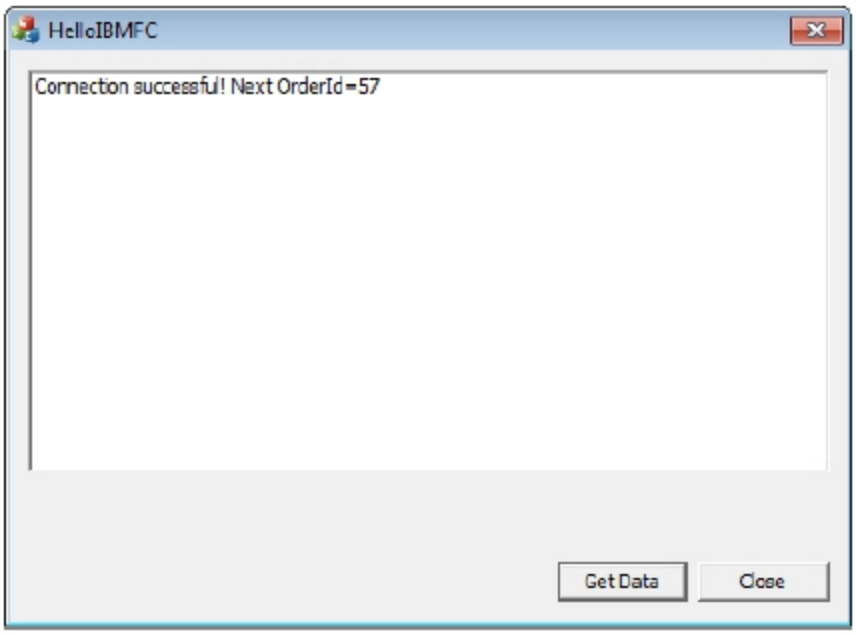
HelloIBMFCGlg.cpp

5. When the client application connects to the TWS, it receives the next valid order id on its nextValidId() method, so in the same file, you can use this same method to send the event to the GUI:

```
void CHelloIBMFCDlg::nextValidId( OrderId orderId)
{
    CString str;
    str.Format("Connection successful! Next OrderId=%i", orderId);
    int i = m_ticks.AddString(str);
    int top = i - 5 < 0 ? 0 : i-5;
    m_ticks.SetTopIndex(top);
}
```

HelloIBMFCDlg.cpp

6. Save all files.
7. Compile and run the project. The dialog you created in Step 2 of this tutorial will open.
8. Click the **Get Data** button. You will see the message telling us that the connection is successful and the next valid order id:



Continue to the last step in this tutorial, 6. Request Market Data.

C++ Tutorial: 7. Request Market Data

In this final step of the tutorial, you will add the code required to request market data from TWS.

To request market data from TWS

1. In the file HelloIBMFCDlg.h, add a Contract member variable:

```
#include "EWrapper.h"

#include "HScrollListBox.h"

#include "Contract.h"

//Declaration of IB's API EClient class
class EClient;

// CHelloIBMFCDlg dialog
class CHelloIBMFCDlg : public CDialogEx, public EWrapper
{
// Construction
public:
    CHelloIBMFCDlg(CWnd* pParent = NULL);   // standard constructor

// Dialog Data
    enum { IDD = IDD_HELLOIBMFC_DIALOG };

    protected:
        virtual void DoDataExchange(CDataExchange* pDX);    // DDX/DDV support

        //This member variable will be our entry point to IB's API
        EClient *m_pClient;

        //Through this variable we will print the incoming data to the UI
        CHScrollListBox m_ticks;

        //Contract object through which we will request some market data.
        Contract m_contract;
```

HelloIBMFCDlg.h

2. In the file HelloIBMFCDlg.cpp, initialize the contract in HelloIBMFC's constructor (CHelloIBMFCDlg::CHelloIBMFCDlg):

```
CHelloIBMFCDlg::CHelloIBMFCDlg(CWnd* pParent /*=NULL*/)
    : CDialogEx(CHelloIBMFCDlg::IDD, pParent)
{
    m_hIcon = AfxGetApp()->LoadIcon(IDR_MAINFRAME);

    //Initialising IB's API client
    m_pClient = new EClientSocket(this);

    //Initialising our contract
    m_contract.symbol = "EUR";
    m_contract.secType = "CASH";
    m_contract.currency = "GBP";
    m_contract.exchange = "IDEALPRO";
}
```

HelloIBMFCDlg.cpp

3. In the same file, trigger the request upon reception of the next valid id:

```
void CHelloIBMFCDlg::nextValidId( OrderId orderId)
{
    CString str;
    str.Format("Connection successful! Next OrderId=%i", orderId);
    int i = m_ticks.AddString(str);
    int top = i - 5 < 0 ? 0 : i-5;
    m_ticks.SetTopIndex(top);

    //By now we know for sure we are connected, hence we can request the data
    m_pClient->reqMktData(1, m_contract, "", false, m_mktDataOptions);
}
```

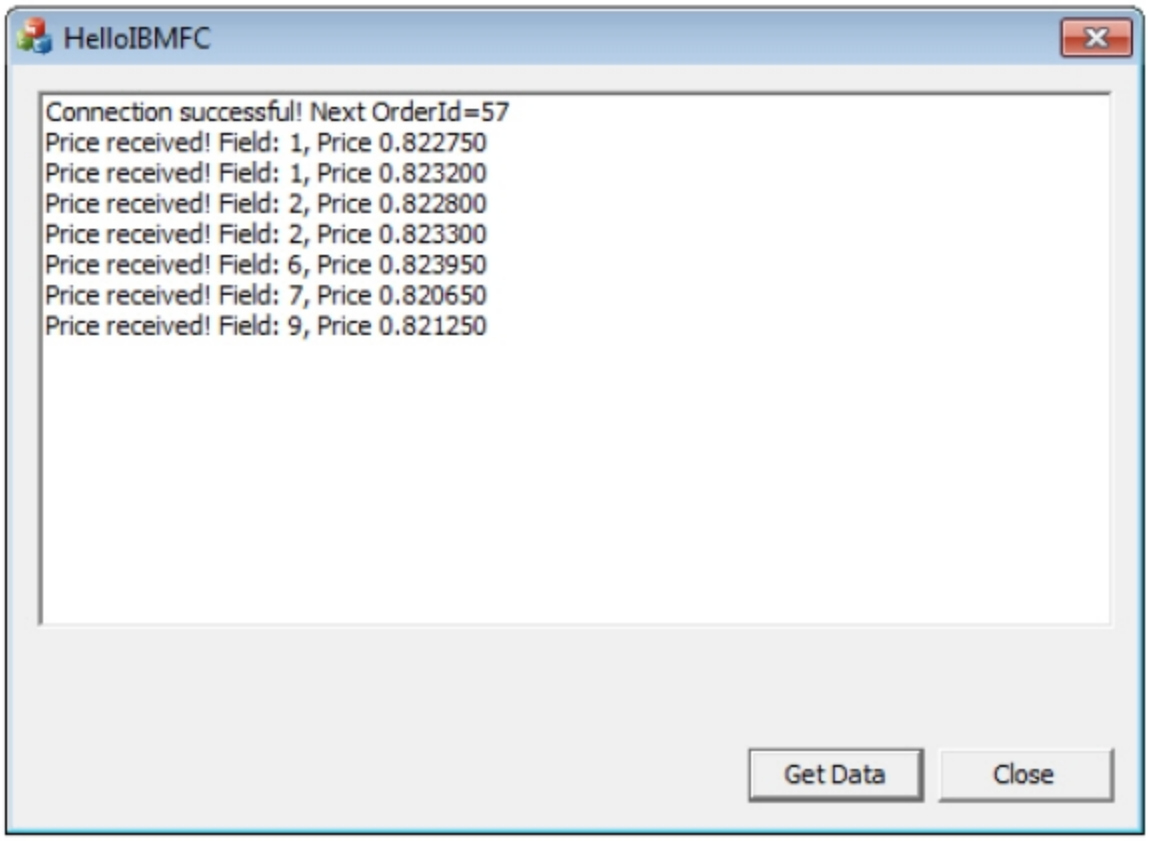
HelloIBMFCDlg.cpp

4. In the same file, add the code that will display some results:

```
void CHelloIBMFCDlg::tickPrice( TickerId tickerId, TickType field, double price, int canAutoExecute)
{
    CString str;
    str.Format("Price received! Field: %i, Price %f", field, price);
    int i = m_ticks.AddString(str);
    int top = i - 5 < 0 ? 0 : i-5;
    m_ticks.SetTopIndex(top);
}
```

HelloIBMFCDlg.cpp

5. Save all files.
6. Now the application is able to receive and display the market data. Compile and run the application.



For your convenience, you can request the full sample solution resulting from this tutorial by contacting our API Support team at **api@interactivebrokers.com**.

Class EClientSocket Functions

The list below define the class EClientSocket functions you can use when connecting to TWS. The list of functions includes:

EClientSocket()

This is the constructor.

EClientSocket(EWrapper *ptr)

Parameter	Description
ptr	The pointer to an object that was derived from the EWrapper base class.

eConnect()

This function must be called before any other. There is no feedback for a successful connection, but a subsequent attempt to connect will return the message "Already connected."

bool eConnect(const char *host, UINT port, int clientId=0)

Parameter	Type	Description
host	const	The host name or IP address of the machine where TWS is running. Leave blank to connect to the local host.
port	UINT	Must match the port specified in TWS on the Configure>API>*Socket Port* field.
clientId	int	A number used to identify this client connection. All orders placed/modified from this client will be associated with this client identifier. Note: Each client MUST connect with a unique clientId.

eDisconnect()

Call this function to terminate the connections with TWS. Calling this function does not cancel orders that have already been sent.

void eDisconnect()

Parameter	Description
ptr	The pointer to an object that was derived from the EWrapper base class.

isConnected()

Call this function to check if there is a connection with TWS

void isConnected()

reqCurrentTime()

Returns the current system time on the server side.

void reqCurrentTime()

serverVersion()

Returns the version of the TWS instance to which the API application is connected.

serverVersion()

setLogLevel()

The default detail level is ERROR. For more details, see API Logging.

void setLogLevel(int logLevel)

Parameter	Type	Description
logLevel	int	Specifies the level of log entry detail used by the server (TWS) when processing API requests. Valid values include: • 1 = SYSTEM • 2 = ERROR • 3 = WARNING • 4 = INFORMATION • 5 = DETAIL

TwsConnectionTime()

Returns the time the API application made a connection to TWS.

TwsConnectionTime()

checkMessages()

This function should be called frequently (every 1 second) to check for messages received from TWS.

void checkMessages()

reqMktData()

Call this function to request market data. The market data will be returned by the tickPrice and tickSize events.

void reqMktData(TickerId id, const Contract &contract, IBString &genericTicks, bool snapshot, const TagValueListSPtr& mktDataOptiosn)

Parameter	Type	Description
id	TickerId	The ticker id. Must be a unique value. When the market data returns, it will be identified by this tag. This is also used when canceling the market data.
contract	Contract	This structure contains a description of the contract for which market data is being requested.

Parameter	Type	Description
genericTicks	IBString	A comma delimited list of generic tick types. Tick types can be found in the Generic Tick Types page.
snapshot	bool	Check to return a single snapshot of market data and have the market data subscription cancel. Do not enter any genericTicklist values if you use snapshot.
mktDataOptions	TagValueListSPtr	For internal use only. Use default value XYZ.

cancelMktData()

After calling this function, market data for the specified id will stop flowing.

void cancelMktData(TickerId id)

Parameter	Type	Description
id	TickerId	The ID that was specified in the call to reqMktData().

calculateImpliedVolatility()

Call this function to calculate volatility for a supplied option price and underlying price.

void calculateImpliedVolatility(TickerId reqId, Contract &contract, double optionPrice, double underPrice)

Parameter	Type	Description
reqId	TickerId (long)	The ticker id.
contract	Contract	Describes the contract.
optionPrice	double	The price of the option.
underPrice	double	Price of the underlying.

cancelCalculateImpliedVolatility()

Call this function to cancel a request to calculate volatility for a supplied option price and underlying price.

calculateImpliedVolatility(TickerId reqId)

Parameter	Type	Description
id	TickerId	The ticker ID.

calculateOptionPrice()

Call this function to calculate option price and greek values for a supplied volatility and underlying price.

void calculateOptionPrice(TickerId reqId, const Contract &contract, double volatility, double underPrice)

Parameter	Type	Description
reqId	TickerId	The ticker ID.
contract	Contract	Describes the contract.
volatility	double	The volatility.
underPrice	double	Price of the underlying.

cancelCalculateOptionPrice()

Call this function to cancel a request to calculate the option price and greek values for a supplied volatility and underlying price.

cancelCalculateOptionPrice(TickerId reqId)

Parameter	Type	Description
reqId	TickerId	The ticker id.

reqMarketDataType()

The API can receive frozen market data from Trader Workstation. Frozen market data is the last data recorded in our system. During normal trading hours, the API receives real-time market data. If you use this function, you are telling TWS to automatically switch to frozen market data after the close. Then, before the opening of the next trading day, market data will automatically switch back to real-time market data.

reqMarketDataType(int marketDataType)

Parameter	Type	Description
marketDataType	int	1 for real-time streaming market data or 2 for frozen market data.

placeOrder()

Call this function to place an order. The order status will be returned by the orderStatus event.

void placeOrder(OrderId id, const Contract &contract, const Order &order)

Parameter	Type	Description
id	OrderId	The order id. You must specify a unique value. When the order status returns, it will be identified by this tag. This tag is also used when canceling the order.

Parameter	Type	Description
contract	Contract	This structure contains a description of the contract which is being traded.
order	Order	This structure contains the details of the order. Note: Each client MUST connect with a unique clientId.

cancelOrder()

Call this function to cancel an order.

void cancelOrder(OrderId id)

Parameter	Type	Description
id	OrderId	The order ID that was specified previously in the call to placeOrder()

reqOpenOrders()

Call this function to request the open orders that were placed from this client. Each open order will be fed back through the openOrder() and orderStatus() functions on the EWrapper.

void reqOpenOrders()

> **Note:** The client with a clientId of 0 will also receive the TWS-owned open orders. These orders will be associated with the client and a new orderId will be generated. This association will persist over multiple API and TWS sessions.

reqAllOpenOrders()

Call this function to request the open orders placed from all clients and also from TWS. Each open order will be fed back through the openOrder() and orderStatus() functions on the EWrapper.

void reqAllOpenOrders()

> **Note:** No association is made between the returned orders and the requesting client.

reqAutoOpenOrders()

Call this function to request that newly created TWS orders be implicitly associated with the client. When a new TWS order is created, the order will be associated with the client, and fed back through the openOrder() and orderStatus() functions on the EWrapper.

reqAutoOpenOrders (bool bAutoBind)

> **Note:** This request can only be made from a client with clientId of 0.

Parameter	Type	Description
bAutoBind	bool	If set to TRUE, newly created TWS orders will be implicitly associated with the client. If set to FALSE, no association will be made.

reqIDs()

Call this function to request from TWS the next valid ID that can be used when placing an order. After calling this function, the nextValidId() event will be triggered, and the id returned is that next valid ID. That ID will reflect any auto-binding that has occurred (which generates new IDs and increments the next valid ID therein).

void reqIds(int numIds)

Parameter	Type	Description
numIds	int	The number of ids you want to reserve.

exerciseOptions()

void exerciseOptions(TickerId id, const Contract &contract, int exerciseAction, int exerciseQuantity, const IBString &account, int override)

Parameter	Type	Description
id	TickerId	The ticker id. Must be a unique value.
contract	Contract	This structure contains a description of the contract for which market depth data is being requested.
exerciseAction	int	Specifies whether you want the option to lapse or be exercised. Values are 1 = exercise, 2 = lapse.
exerciseQuantity	int	The quantity you want to exercise.
account	IBString	Account
override	int	Specifies whether your setting will override the system's natural action. For example, if your action is "exercise" and the option is not in-the-money, by natural action the option would not exercise. If you have override set to "yes" the natural action would be overridden and the out-of-the money option would be exercised. Values are: 0 = no, 1 = yes.

reqGlobalCancel()

Use this function to cancel all open orders globally. It cancels both API and TWS open orders.

If the order was created in TWS, it also gets canceled. If the order was initiated in the API, it also gets canceled.

void reqGlobalCancel()

reqAccountUpdates()

Call this function to start getting account values, portfolio, and last update time information.

void reqAccountUpdates(bool subscribe, const IBString& acctCode)

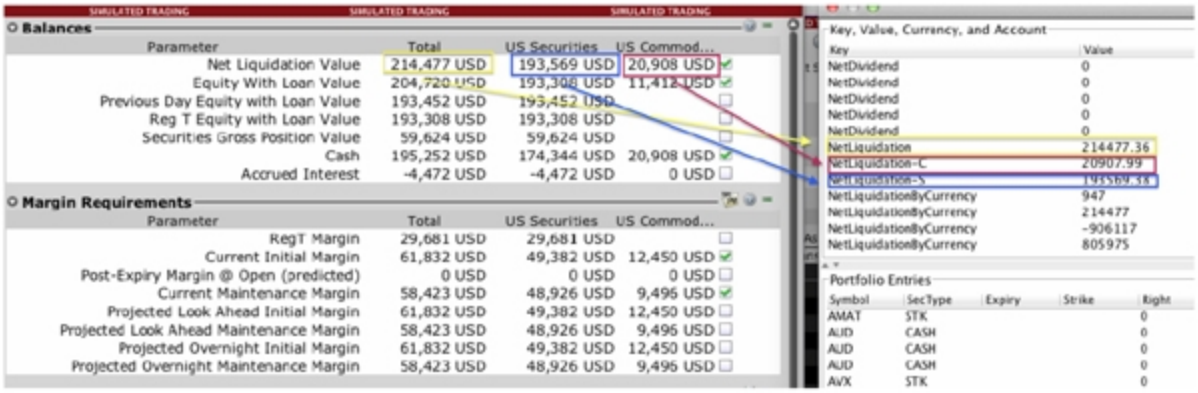
Parameter	Type	Description
subscribe	bool	If set to TRUE, the client will start receiving account and portfolio updates. If set to FALSE, the client will stop receiving this information.
acctCode	IBString	The account code for which to receive account and portfolio updates.

To identify API Account keys:

The API's updateAccountValue() event handler delivers all of the account information.

- Strings or keys with a suffix of **–C**, such as AvailableFunds-C, EquityForInitial-C, NetLiquidation-C, correspond to Commodities in the TWS Account Window.
- Keys with a suffix of **–S**, such as EquityForMaintenance-S, FullAvailableFunds-S or NetLiquidation-S, correspond to Securities in the TWS Account Window.
- Keys without any suffix correspond to Totals in the TWS Account Window.

The image below is an actual example of how to compare TWS's Account Window and the API's account data. In this particular case, we try to link three specific keys NetLiquidation, NetLiquidation-C, and NetLiquidation-S to the TWS Account Window.



For more information about the information presented in the TWS Account Window, see https://institutions.interactivebrokers.com/en/software/tws/usersguidebook/realtimeactivitymonitoring/the_account_window.htm

reqAccountSummary()

Call this method to request and keep up to date the data that appears on the TWS Account Window Summary tab. The data is returned by accountSummary().

reqAccountSummary() only allows two concurrent requests. If you use reqAccountSummary() to request more than two concurrent account summaries, you will receive an error: **322|Error processing request**. To resolve this error, unsubscribe from one reqAccountSummary() request and then resubmit the request.

> **Note:** This request can only be made when connected to an FA managed account.

void reqAccountSummary(int reqID, const IBString& groupName, const IBString& tags)

Parameter	Type	Description
reqId	int	The ID of the data request. Ensures that responses are matched to requests if several requests are in process.
groupName	IBString	Set to *All* to return account summary data for all accounts, or set to a specific Advisor Account Group name that has already been created in TWS Global Configuration.

Parameter	Type	Description
tags	IBString	A comma-separated list of account tags. Available tags are: • *AccountType* • *NetLiquidation*, • *TotalCashValue* — Total cash including futures pnl • *SettledCash* — For cash accounts, this is the same as TotalCashValue • *AccruedCash* — Net accrued interest • *BuyingPower* — The maximum amount of marginable US stocks the account can buy • *EquityWithLoanValue* — Cash + stocks + bonds + mutual funds • *PreviousDayEquityWithLoanValue*, • *GrossPositionValue* — The sum of the absolute value of all stock and equity option positions • *RegTEquity*, • *RegTMargin*, • *SMA* — Special Memorandum Account • *InitMarginReq*, • *MaintMarginReq*, • *AvailableFunds*, • *ExcessLiquidity*, • *Cushion* — Excess liquidity as a percentage of net liquidation value • *FullInitMarginReq*, • *FullMaintMarginReq*, • *FullAvailableFunds*, • *FullExcessLiquidity*, • *LookAheadNextChange* — Time when look-ahead values take effect • *LookAheadInitMarginReq*, • *LookAheadMaintMarginReq*, • *LookAheadAvailableFunds*, • *LookAheadExcessLiquidity*,

Parameter	Type	Description
		• *HighestSeverity* — A measure of how close the account is to liquidation • *DayTradesRemaining* — The Number of Open/Close trades a user could put on before Pattern Day Trading is detected. A value of "-1" means that the user can put on unlimited day trades. • *Leverage* — GrossPositionValue / NetLiquidation

cancelAccountSummary()

Cancels the request for Account Window Summary tab data.

void cancelAccountSummary(int reqId)

Parameter	Type	Description
reqId	int	The ID of the data request being canceled.

reqPositions()

Requests real-time position data for all accounts.

void reqPositions()

cancelPositions()

Cancels real-time position updates.

void cancelPositions()

reqExecutions()

When this function is called, the execution reports that meet the filter criteria are downloaded to the client via the execDetails() function. To view executions beyond the past 24 hours, open the Trade Log in TWS and, while the Trade Log is displayed, request the executions again from the API.

void reqExecutions(int reqID, const ExecutionFilter& filter)

Parameter	Type	Description
reqId	int	The ID of the data request. Ensures that responses are matched to requests if several requests are in process.
filter	ExecutionFilter	This object contains attributes that describe the filter criteria used to determine which execution reports are returned.

reqContractDetails()

Call this function to download all details for a particular underlying. The contract details will be received via the contractDetails() function on the EWrapper.

void reqContractDetails (int reqId, const Contract &contract)

Parameter	Type	Description
reqId	int	The ID of the data request. Ensures that responses are matched to requests if several requests are in process.
Contract	Contract	The summary description of the contract being looked up.

reqMktDepth()

Call this function to request market depth for a specific contract. The market depth will be returned by the updateMktDepth() and updateMktDepthL2() events.

void reqMktDepth (TickerID id, const Contract &contract, int numRows, const TagValueListSPtr& mktDepthOptions)

Parameter	Type	Description
id	TickerId	The ticker id. Must be a unique value. When the market depth data returns, it will be identified by this tag. This is also used when canceling the market depth
contract	Contact	This structure contains a description of the contract for which market depth data is being requested.
numRows	int	Specifies the number of market depth rows to display.
mktDepthOptions	TagValueListSPtr	For internal use only. Use default value XYZ.

cancelMktDepth()

After calling this function, market depth data for the specified id will stop flowing.

void cancelMktDepth (TickerId id)

Parameter	Type	Description
id	TickerId	The ID that was specified in the call to reqMktDepth().

reqNewsBulletins()

Call this function to start receiving news bulletins. Each bulletin will be returned by the updatedNewsBulletin() event.

void reqNewsBulletins(bool allMsgs)

Parameter	Type	Description
allMsgs	bool	If set to TRUE, returns all the existing bulletins for the current day and any new ones. If set to FALSE, will only return new bulletins.

cancelNewsBulletins()

Call this function to stop receiving news bulletins.

void cancelNewsBulletins()

reqManagedAccts()

Call this function to request the list of managed accounts. The list will be returned by the managedAccounts() function on the EWrapper.

> **Note:** This request can only be made when connected to a FA managed account.

void reqManagedAccts()

requestFA()

Call this function to request FA configuration information from TWS. The data returns in an XML string via a "receiveFA" ActiveX event.

requestFA(faDataType faDataType)

Parameter	Type	Description
faDataType	faDataType	Specifies the type of Financial Advisor configuration data being requested. Valid values include: • 1 = GROUPS • 2 = PROFILE • 3 = ACCOUNT ALIASES

replaceFA()

Call this function to modify FA configuration information from the API. Note that this can also be done manually in TWS itself.

replaceFA(faDataType faDataType, const IBString& cxml)

Parameter	Type	Description
faDataType	faDataType	Specifies the type of Financial Advisor configuration data being modified via the API. Valid values include: • 1 = GROUPS • 2 = PROFILE • 3 =ACCOUNT ALIASES
cxml	IBString	The XML string containing the new FA configuration information.

reqHistoricalData()

void reqHistoricalData (TickerId id, const Contract &contract, const IBString &endDateTime, const IBString &durationStr, const IBString &barSizeSetting, const IBString &whatToShow, int useRTH, int formatDate, const TagValueListSPtr& chartOptions)

Parameter	Type	Description
id	TickerId	The id of the request. Must be a unique value. When the market data returns, it will be identified by this tag. This is also used when canceling the market data.
contract	Contract	This object contains a description of the contract for which market data is being requested.
endDateTime	IBString	Defines a query end date and time at any point during the past 6 mos. Valid values include any date/time within the past six months in the format: yyyymmdd HH:mm:ss ttt where "ttt" is the optional time zone.
durationStr	IBString	Set the query duration up to one week, using a time unit of seconds, days or weeks. Valid values include any integer followed by a space and then S (seconds), D (days) or W (week). If no unit is specified, seconds is used.

Parameter	Type	Description
barSizeSetting	IBString	Specifies the size of the bars that will be returned (within IB/TWS limits). Valid values include: • 1 sec • 5 secs • 15 secs • 30 secs • 1 min • 2 mins • 3 mins • 5 mins • 15 mins • 30 mins • 1 hour • 1 day
whatToShow	IBString	Determines the nature of data being extracted. Valid values include: • TRADES • MIDPOINT • BID • ASK • BID_ASK • HISTORICAL_VOLATILITY • OPTION_IMPLIED_VOLATILITY
useRTH	int	Determines whether to return all data available during the requested time span, or only data that falls within regular trading hours. Valid values include: • 0 - all data is returned even where the market in question was outside of its regular trading hours. • 1 - only data within the regular trading hours is returned, even if the requested time span falls partially or completely outside of the RTH.

Parameter	Type	Description
formatDate	int	Determines the date format applied to returned bars. Valid values include: • 1 - dates applying to bars returned in the format: yyyymmdd{space}{space}hh:mm:dd • 2 - dates are returned as a long integer specifying the number of seconds since 1/1/1970 GMT.
chartOptions	TagValueListSPtr	For internal use only. Use default value XYZ.

For a information about historical data request limitations, see Historical Data Limitations.

cancelHistoricalData()

Used if an internet disconnect has occurred or the results of a query are otherwise delayed and the application is no longer interested in receiving the data.

void cancelHistoricalData (TickerId tickerId)

Parameter	Type	Description
tickerId	TickerId	The ticker ID. Must be a unique value.

reqScannerParameters()

Requests an XML string that describes all possible scanner queries.

void reqScannerParameters()

reqScannerSubscription()

void reqScannerSubscription(int tickerId, const ScannerSubscription &subscription, const TagValueListSPtr& scannerSubscriptionsOptions)

Parameter	Type	Description
tickerId	int	The ticker ID. Must be a unique value.
ScannerSubscription	ScannerSubscription	This structure contains possible parameters used to filter results.

Parameter	Type	Description
scannerSubscriptionOptions	TagValueListSPtr	For internal use only. Use default value XYZ.

cancelScannerSubscription()

void cancelScannerSubscription(int tickerId)

Parameter	Type	Description
tickerId	int	The ticker ID. Must be a unique value.

reqRealTimeBars()

Call the reqRealTimeBars() function to start receiving real time bar results through the realtimeBar() EWrapper function.

void reqRealTimeBars(TickerId id, Contract contract, int barSize, const IBString &whatToShow, bool useRTH, const TagValueListSPtr& realTimeBarsOptions)

Parameter	Type	Description
id	TickerId	The Id for the request. Must be a unique value. When the data is received, it will be identified by this Id. This is also used when canceling the request.
contract	Contract	This object contains a description of the contract for which real time bars are being requested
barSize	int	Currently only 5 second bars are supported, if any other value is used, an exception will be thrown.
whatToShow	IBString	Determines the nature of the data extracted. Valid values include: • TRADES • BID • ASK • MIDPOINT

Parameter	Type	Description
useRTH	bool	Regular Trading Hours only. Valid values include: • 0 = all data available during the time span requested is returned, including time intervals when the market in question was outside of regular trading hours. • 1 = only data within the regular trading hours for the product requested is returned, even if the time time span falls partially or completely outside.
realTimeBarOptions	TagValueListSPtr	For internal use only. Use default value XYZ.

cancelRealTimeBars()

Call the cancelRealTimeBars() function to stop receiving real time bar results.

void cancelRealTimeBars (TickerId tickerId)

Parameter	Type	Description
tickerId	TickerId	The Id that was specified in the call to reqRealTimeBars().

reqFundamentalData()

Call this function to receive Reuters global fundamental data for stocks. There must be a subscription to Reuters Fundamental set up in Account Management before you can receive this data.

reqFundamentalData() can handle *conid* specified in the Contract object, but not *tradingClass* or *multiplier*. This is because reqFundamentalData() is used only for stocks and stocks do not have a multiplier and trading class.

void reqFundamentalData(TickerId reqId, const Contract &contract, const IBString& reportType)

Parameter	Type	Description
reqId	TickerId	The ID of the data request. Ensures that responses are matched to requests if several requests are in process.
contract	Contract	This structure contains a description of the contract for which Reuters Fundamental data is being requested.

Parameter	Type	Description
reportType	IBString	One of the following XML reports: • ReportSnapshot (company overview) • ReportsFinSummary (financial summary) • ReportRatios (financial ratios) • ReportsFinStatements (financial statements) • RESC (analyst estimates) • CalendarReport (company calendar)

cancelFundamentalData()

Call this function to stop receiving Reuters global fundamental data.

void cancelFundamentalData(TickerId reqId)

Parameter	Type	Description
reqId	TickerId	The ID of the data request.

queryDisplayGroups()

queryDisplayGroups(int reqId)

Parameter	Type	Description
reqId	int	The unique number that will be associated with the response

subscribeToGroupEvents()

subscribeToGroupEvents(int reqId, int groupId)

Parameter	Type	Description
reqId	int	The unique number associated with the notification.
groupId	int	The ID of the group, currently it is a number from 1 to 7. This is the display group subscription request sent by the API to TWS.

updateDisplayGroup()

updateDisplayGroup(int reqId, const IBString& contractInfo)

Parameter	Type	Description
reqId	int	The requestId specified in subscribeToGroupEvents().
contractInfo	IBString	The encoded value that uniquely represents the contract in IB. Possible values include: • none = empty selection • contractID@exchange – any non-combination contract. Examples: 8314@SMART for IBM SMART; 8314@ARCA for IBM @ARCA. • combo = if any combo is selected.

unsubscribeFromGroupEvents()

unsubscribeFromGroupEvents(int reqId)

Parameter	Type	Description
reqId	int	The requestId specified in subscribeToGroupEvents().

Class EWrapper Functions

The tables below define the class EWrapper functions you can use when connecting to TWS. These functions receive events from TWS. The list of functions includes:

Connection and Server

winError()
error()
connectionClosed()
currentTime()

Market Data

tickPrice()
tickSize()
tickOptionComputation()
tickGeneric()
tickString()
tickEFP()
tickSnapshotEnd()
marketDataType()

Orders

orderStatus()
openOrder()
openOrderEnd()
nextValidId()
deltaNeutralValidation()

Account and Portfolio

updateAccountValue()
updatePortfolio()
updateAccountTime()
accountDownloadEnd()
accountSummary()
accountSummaryEnd()
position()
positionEnd()

News Bulletins

updateNewsBulletin()

Contract Details

contractDetails()
contractDetailsEnd()
bondContractDetails()

Executions

execDetails()
execDetailsEnd()
commissionReport()

Market Depth

updateMktDepth()
updateMktDepthL2()

Financial Advisors

managedAccounts()
receiveFA()

Historical Data

historicalData()

Market Scanners

scannerParameters()
scannerData()
scannerDataEnd()

Real Time Bars

realtimeBar()

Fundamental Data

fundamentalData()

Display Groups

displayGroupList()
displayGroupUpdated()

winError()

This event is called when there is an error on the client side.

virtual void winError(const IBString &str, int lastError)

Parameter	Type	Description
str	IBString	This is the error message text.
lastError	int	The error code returned by GetLastError().

error()

This event is called when there is an error with the communication or when TWS wants to send a message to the client.

virtual void error(const int id, const int errorCode, const IBString errorString)

Parameter	Type	Description
Parameter		**Description**
id	int	This is the orderId or tickerId of the request that generated the error.
errorCode	int	Error codes are documented in the API Message Codes topic.
errorString	IBString	This is the textual description of the error, also documented in the Error Codes topic.

connectionClosed()

This function is called when TWS closes the sockets connection with the ActiveX control, or when TWS is shut down.

virtual void connectionClosed()

currentTime()

This function receives the current system time on the server side.

virtual void currentTime(long time)

Parameter	Type	Description
time	long	The current system time on the server side.

tickPrice()

This function is called when the market data changes. Prices are updated immediately with no delay.

virtual void tickPrice(TickerId TickerId, TickType tickType, double price, int canAutoExecute)

Parameter	Type	Description
id	TickerId	The ticker ID that was specified previously in the call to reqMktData()
tickType	TickeType	Specifies the type of price. Possible values are: • 1 = bid • 2 = ask • 4 = last • 6 = high • 7 = low • 9 = close
price	double	The bid, ask or last price, the daily high, daily low or last day close, depending on tickType value.
canAutoExecute	int	Specifies whether the price tick is available for automatic execution. Possible values are: • 0 = not eligible for automatic execution • 1 = eligible for automatic execution

tickSize()

This function is called when the market data changes. Sizes are updated immediately with no delay.

virtual void tickSize(TickerId TickerId, TickType tickType, int size)

Parameter	Type	Description
id	TickerId	The ticker ID that was specified previously in the call to reqMktData()
tickType	TickType	Specifies the type of size. Possible values are: • 0 = bid size • 3 = ask size • 5 = last size • 8 = volume
size	int	Could be the bid size, ask size, last size or trading volume, depending on the tickType value.

tickOptionComputation()

This function is called when the market in an option or its underlier moves. TWS's option model volatilities, prices, and deltas, along with the present value of dividends expected on that options underlier are received.

virtual void tickOptionComputation(TickerID tickerId, TickType tickType, double impliedVol, double delta, double optPrice, double pvDividend, double gamma, double vega, double theta, double undPrice)

Parameter	Type	Description
id	TickerId	The ticker ID that was specified previously in the call to reqMktData()
tickType	TickType	Specifies the type of tick. Possible values are: • 10 = Bid • 11 = Ask • 12 = Last
impliedVol	double	The implied volatility calculated by the TWS option modeler, using the specified ticktype value.
delta	double	The option delta value.
optPrice	double	The option price.
pvDividend	double	The present value of dividends expected on the options underlying instrument.
gamma	double	The option gamma value.
vega	double	The option vega value.
theta	double	The option theta value.
undPrice	double	The price of the underlying.

tickGeneric()

This function is called when the market data changes. Values are updated immediately with no delay.

virtual void tickGeneric(TickerId tickerId, TickType tickType, double value)

Parameter	Type	Description
tickerId	TickerId	The ticker Id that was specified previously in the call to reqMktData().
tickType	TickType	Specifies the type of price. Pass the field value into TickType.getField(int tickType) to retrieve the field description. For example, a field value of 46 will map to shortable, etc.
value	double	The value of the specified field.

tickString()

This function is called when the market data changes. Values are updated immediately with no delay.

virtual void tickString(TickerId tickerId, TickType tickType, const IBString& value)

Parameter	Type	Description
tickerId	TickerId	The ticker Id that was specified previously in the call to reqMktData().
field	TickType	Specifies the type of price. Pass the field value into TickType.getField(int tickType) to retrieve the field description. For example, a field value of 45 will map to lastTimestamp, etc.
value	IBString	The value of the specified field.

tickEFP()

This function is called when the market data changes. Values are updated immediately with no delay.

virtual void tickEFP(TickerId tickerId, TickType tickType, double basisPoints, const IBString& formattedBasisPoints, double totalDividends, int holdDays, const IBString& futureExpiry, double dividendImpact, double dividendsToExpiry)

Parameter	Type	Description
tickerId	TickerId	The ticker Id that was specified previously in the call to reqMktData()
field	TickType	Specifies the type of price. Pass the field value into TickType.getField(int tickType) to retrieve the field description. For example, a field value of 38 will map to bidEFP, etc.
basisPoints	double	Annualized basis points, which is representative of the financing rate that can be directly compared to broker rates.
formattedBasisPoints	IBString	Annualized basis points as a formatted string that depicts them in percentage form.
impliedFuture	double	Implied futures price.
holdDays	int	Number of hold days until the expiry of the EFP.
futureExpiry	IBString	Expiration date of the single stock future.
dividendImpact	double	The dividend impact upon the annualized basis points interest rate.
dividendsToExpiry	double	The dividends expected until the expiration of the single stock future.

tickSnapshotEnd()

This is called when a snapshot market data subscription has been fully handled and there is nothing more to wait for. This also covers the timeout case.

virtual void tickSnapshotEnd(int reqId)

Parameter	Type	Description
reqID	int	Id of the data request.

marketDataType()

TWS sends a marketDataType(type) callback to the API, where type is set to Frozen or RealTime, to announce that market data has been switched between frozen and real-time. This notification occurs only when market data switches between real-time and frozen. The marketDataType( ) callback accepts a reqId parameter and is sent per every subscription because different contracts can generally trade on a different schedule.

virtual void marketDataType(TickerId reqId, int marketDataType)

Parameter	Type	Description
reqId	TickerId	ID of the data request
marketDataType	int	1 for real-time streaming market data or 2 for frozen market data..

orderStatus()

This event is called whenever the status of an order changes. It is also fired after reconnecting to TWS if the client has any open orders.

virtual void orderStatus(OrderId orderId, const IBString &status, int filled, int remaining, double avgFillPrice, int permId, int parentId, double lastFillPrice, int clientId, const IBString& whyHeld)

Note: It is possible that orderStatus() may return duplicate messages. It is essential that you filter the message accordingly.

Parameter	Type	Description
id	OrderId	The order ID that was specified previously in the call to placeOrder()

Parameter	Type	Description
status	IBString	The order status. Possible values include: • PendingSubmit - indicates that you have transmitted the order, but have not yet received confirmation that it has been accepted by the order destination. **NOTE**: This order status is not sent by TWS and should be explicitly set by the API developer when an order is submitted. • PendingCancel - indicates that you have sent a request to cancel the order but have not yet received cancel confirmation from the order destination. At this point, your order is not confirmed canceled. You may still receive an execution while your cancellation request is pending. **NOTE**: This order status is not sent by TWS and should be explicitly set by the API developer when an order is canceled. • PreSubmitted - indicates that a simulated order type has been accepted by the IB system and that this order has yet to be elected. The order is held in the IB system until the election criteria are met. At that time the order is transmitted to the order destination as specified. • Submitted - indicates that your order has been accepted at the order destination and is working. • Cancelled - indicates that the balance of your order has been confirmed canceled by the IB system. This could occur unexpectedly when IB or the destination has rejected your order. • Filled - indicates that the order has been completely filled. • Inactive - indicates that the order has been accepted by the system (simulated orders) or an exchange (native orders) but that currently the order is inactive due to system, exchange or other issues.
filled	int	Specifies the number of shares that have been executed. For more information about partial fills, see Order Status for Partial Fills.
remaining	int	Specifies the number of shares still outstanding.
avgFillPrice	double	The average price of the shares that have been executed. This parameter is valid only if the **filled** parameter value is greater than zero. Otherwise, the price parameter will be zero.
permId	int	The TWS id used to identify orders. Remains the same over TWS sessions.

Parameter	Type	Description
parentId	int	The order ID of the parent order, used for bracket and auto trailing stop orders.
lastFilledPrice	double	The last price of the shares that have been executed. This parameter is valid only if the filled parameter value is greater than zero. Otherwise, the price parameter will be zero.
clientId	int	The ID of the client (or TWS) that placed the order. Note that TWS orders have a fixed clientId and orderId of 0 that distinguishes them from API orders.
whyHeld	IBString	This field is used to identify an order held when TWS is trying to locate shares for a short sell. The value used to indicate this is 'locate'.

openOrder()

This function is called to feed in open orders.

virtual void openOrder(OrderId orderId, const Contract&, const Order&, const OrderState&)

For more information, see Extended Order Attributes.

Parameter	Type	Description
orderID	OrderId	The order ID assigned by TWS. Use to cancel or update the order.
contract	Contract	The Contract class attributes describe the contract.
order	Order	The Order class gives the details of the open order.
orderState	OrderState	The orderState class includes attributes used for both pre and post trade margin and commission data.

openOrderEnd()

This is called at the end of a given request for open orders.

void openOrderEnd()

nextValidId()

This function is called after a successful connection to TWS.

virtual void nextValidId(OrderId orderId)

Parameter	Type	Description
orderId	OrderId	The next available order ID received from TWS upon connection. Increment all successive orders by one based on this ID.

deltaNeutralValidation()

Upon accepting a Delta-Neutral RFQ(request for quote), the server sends a deltaNeutralValidation() message with the UnderComp structure. If the delta and price fields are empty in the original request, the confirmation will contain the current values from the server. These values are locked when the RFQ is processed and remain locked until the RFQ is canceled.

void deltaNeutralValidation(int reqId, const UnderComp& underComp)

Parameter	Type	Description
reqID	int	The Id of the data request.
underComp	UnderComp	Underlying component.

updateAccountValue()

This function is called only when ReqAccountUpdates on EClientSocket object has been called.

virtual void updateAccountValue(const IBString& key, const IBString& value, const IBString& currency, const IBString& accountName)

Parameter	Type	Description
key	IBString	A string that indicates one type of account value. Below is a set of keys sent by TWS. • CashBalance - Account cash balance • Currency - Currency string • DayTradesRemaining - Number of day trades left • EquityWithLoanValue - Equity with Loan Value • InitMarginReq - Current initial margin requirement • LongOptionValue - Long option value • MaintMarginReq - Current maintenance margin • NetLiquidation - Net liquidation value • OptionMarketValue - Option market value • ShortOptionValue - Short option value • StockMarketValue - Stock market value • UnalteredInitMarginReq - Overnight initial margin requirement • UnalteredMaintMarginReq - Overnight maintenance margin requirement
value	IBString	The value associated with the key.
currency	IBString	Defines the currency type, in case the value is a currency type.
account	IBString	States the account to which the message applies. Useful for Financial Advisor sub-account messages.

updatePortfolio()

This function is called only when reqAccountUpdates on EClientSocket object has been called.

virtual void updatePortfolio(const Contract& contract, int position, double marketPrice, double marketValue, double averageCost, double unrealizedPNL, double realizedPNL, const IBString& accountName)

Parameter	Type	Description
contract	Contract	This structure contains a description of the contract which is being traded. The exchange field in a contract is not set for portfolio update.
position	int	This integer indicates the position on the contract. If the position is 0, it means the position has just cleared.
marketPrice	double	Unit price of the instrument.
marketValue	double	The total market value of the instrument.
averageCost	double	The average cost per share is calculated by dividing your cost (execution price + commission) by the quantity of your position.
unrealizedPNL	double	The difference between the current market value of your open positions and the average cost, or Value - Average Cost.
realizedPNL	double	Shows your profit on closed positions, which is the difference between your entry execution cost (execution price + commissions to open the position) and exit execution cost ((execution price + commissions to close the position)
accountName	IBString	States the account to which the message applies. Useful for Financial Advisor sub-account messages.

updateAccountTime()

This function is called only when reqAccountUpdates on EClientSocket object has been called.

virtual void updateAccountTime(const IBString& timeStamp)

Parameter	Type	Description
timeStamp	IBString	This indicates the last update time of the account information.

accountDownloadEnd()

This is called after a batch updateAccountValue() and updatePortfolio() is sent.

virtual void accountDownloadEnd(const IBString& accountName)

Parameter	Type	Description
accountName	IBString	The name of the account.

accountSummary()

Returns the data from the TWS Account Window Summary tab in response to reqAccountSummary().

virtual void accountSummary(int reqID, const IBString& account, const IBString& tag, const IBString& value, const IBString& currency)

Parameter	Type	Description
reqId	int	The ID of the data request.
account	IBString	The account ID.

Parameter	Type	Description
tag	IBString	The tag from the data request. Available tags are: • *AccountType* • *TotalCashValue* — Total cash including futures pnl • *SettledCash* — For cash accounts, this is the same as TotalCashValue • *AccruedCash* — Net accrued interest • *BuyingPower* — The maximum amount of marginable US stocks the account can buy • *EquityWithLoanValue* — Cash + stocks + bonds + mutual funds • *PreviousEquityWithLoanValue* • *GrossPositionValue* — The sum of the absolute value of all stock and equity option positions • *RegTEquity* • *RegTMargin* • *SMA* — Special Memorandum Account • *InitMarginReq* • *MaintMarginReq* • *AvailableFunds* • *ExcessLiquidity* • *Cushion* — Excess liquidity as a percentage of net liquidation value • *FullInitMarginReq* • *FullMaintMarginReq* • *FullAvailableFunds* • *FullExcessLiquidity* • *LookAheadNextChange* — Time when look-ahead values take effect • *LookAheadInitMarginReq* • *LookAheadMaintMarginReq* • *LookAheadAvailableFunds* • *LookAheadExcessLiquidity* • *HighestSeverity* — A measure of how close the account is to

Parameter	Type	Description
		liquidation • *DayTradesRemaining* — The Number of Open/Close trades a user could put on before Pattern Day Trading is detected. A value of "-1" means that the user can put on unlimited day trades. • *Leverage* — GrossPositionValue / NetLiquidation
value	IBString	The value of the tag.
currency	IBString	The currency of the tag.

accountSummaryEnd

This method is called once all account summary data for a given request are received.

virtual void accountSummaryEnd(int reqId)

Parameter	Type	Description
reqId	int	The ID of the data request.

position()

This event returns real-time positions for all accounts in response to the reqPositions() method.

virtual void position(const IBString& account, const Contract& contract, int position)

Parameter	Type	Description
account	IBString	The account.
contract	Contract	The exchange.
position	int	The position.

positionEnd()

This is called once all position data for a given request are received and functions as an end marker for the position() data.

virtual void positionEnd()

updateNewsBulletin()

This event is triggered for each new bulletin if the client has subscribed (i.e. by calling the reqNewsBulletins() function.

virtual void updateNewsBulletin(int msgId, int msgType, const IBString& message, const IBString& origExch

Parameter	Type	Description
msgId	int	The bulletin ID, incrementing for each new bulletin.

Parameter	Type	Description
msgType	int	Specifies the type of bulletin. Valid values include: • 1 = Regular news bulletin • · 2 = Exchange no longer available for trading • · 3 = Exchange is available for trading
message	IBString	The bulletin's message text.
origExch	IBString	The exchange from which this message originated.

contractDetails()

This function is called only when reqContractDetails function on the EClientSocket object has been called.

virtual void contractDetails(int reqId, const ContractDetails &contractDetails)

Parameter	Type	Description
reqId	int	The ID of the data request. Ensures that responses are matched to requests if several requests are in process.
contractDetails	ContractDetails	This structure contains a full description of the contract being looked up.

contractDetailsEnd()

This function is called once all contract details for a given request are received. This helps to define the end of an option chain.

void contractDetailsEnd(int reqId)

Parameter	Type	Description
reqID	int	The ID of the data request.

bondContractDetails()

This function is called only when reqContractDetails function on the EClientSocket object has been called for bonds.

virtual void bondContractDetails(int reqId, const ContractDetails& contractDetails)

Parameter	Type	Description
reqId	int	The ID of the data request.
contractDetails	ContractDetails	This structure contains a description of the contract which is being traded. The exchange field in a contract is not set for portfolio update.

execDetails()

This event is fired when the reqExecutions() functions is invoked, or when an order is filled.

virtual void execDetails(int reqId, const Contract& contract, const Execution& execution)

Parameter	Type	Description
reqId	int	The ID of the data request.
contract	Contract	This structure contains a full description of the contract that was executed.
execution	Execution	This structure contains addition order execution details.

execDetailsEnd()

This function is called once all executions have been sent to a client in response to reqExecutions().

virtual void execDetailsEnd(int reqId)

Parameter	Type	Description
reqID	int	The Id of the data request.

commissionReport()

The commissionReport() callback is triggered as follows:

- Immediately after a trade execution
- By calling reqExecutions().

virtual void commissionReport(const CommissionReport &commissionReport)

Parameter	Type	Description
commissionReport	CommissionReport	The structure that contains commission details.

updateMktDepth()

This function is called when the market depth changes.

virtual void updateMktDepth(TickerId id, int position, int operation, int side, double price, int size)

Parameter	Type	Description
id	TickerId	The ticker ID that was specified previously in the call to reqMktDepth()
position	int	Specifies the row id of this market depth entry.

Parameter	Type	Description
operation	int	Identifies the how this order should be applied to the market depth. Valid values are: • 0 = insert (insert this new order into the row identified by 'position')· • 1 = update (update the existing order in the row identified by 'position')· • 2 = delete (delete the existing order at the row identified by 'position')
side	int	Identifies the side of the book that this order belongs to. Valid values are: • 0 = ask • 1 = bid
price	double	The order price.
size	int	The order size.

updateMktDepthL2()

This function is called when the Level II market depth changes.

virtual void updateMktDepthL2(TickerId id, int position, IBString marketMaker, int operation, int side, double price, int size)

Parameter	Type	Description
id	TickerId	The ticker ID that was specified previously in the call to reqMktDepth()
position	int	Specifies the row id of this market depth entry.
marketMaker	IBString	Specifies the exchange hosting this order.
operation	int	Identifies the how this order should be applied to the market depth. Valid values are: • 0 = insert (insert this new order into the row identified by 'position')· • 1 = update (update the existing order in the row identified by 'position')· • 2 = delete (delete the existing order at the row identified by 'position')

Parameter	Type	Description
side	int	Identifies the side of the book that this order belongs to. Valid values are: • 0 = ask • 1 = bid
price	double	The order price.
size	int	The order size.

managedAccounts()

This function is called when a successful connection is made to an account. It is also called when the reqManagedAccts() function is invoked.

virtual void managedAccounts(const IBString& accountsList)

Parameter	Type	Description
accountsList	IBString	The comma delimited list of FA managed accounts.

receiveFA()

This event receives previously requested FA configuration information from TWS.

virtual receiveFA(faDataType pFaDataType, IBString cxml)

Parameter	Type	Description
pFaDataType	faDataType	Specifies the type of Financial Advisor configuration data being received from TWS. Valid values include: • 1 = GROUPS • 2 = PROFILE • 3 =ACCOUNT ALIASES
cxml	IBString	The XML string containing the previously requested FA configuration information.

historicalData()

This function receives the requested historical data results.

virtual void historicalData(TickerId reqId, const IBString& date, double open, double high, double low, double close, int volume, int barCount, double WAP, int hasGaps)

Parameter	Type	Description
reqId	TickerId	The ticker ID of the request to which this bar is responding.
date	IBString	The date-time stamp of the start of the bar. The format is determined by the reqHistoricalData() formatDate parameter.

Parameter	Type	Description
open	double	The bar opening price.
high	double	The high price during the time covered by the bar.
low	double	The low price during the time covered by the bar.
close	double	The bar closing price.
volume	int	The volume during the time covered by the bar.
barCount	int	When TRADES historical data is returned, represents the number of trades that occurred during the time period the bar covers.
WAP	double	The weighted average price during the time covered by the bar.
hasGaps	int	Reports whether or not there are gaps in the data.

scannerParameters()

This function receives an XML document that describes the valid parameters that a scanner subscription can have.

virtual void scannerParameters(const IBString &xml)

Parameter	Type	Description
xml	IBString	An XML document that describes the valid parameters for queries.

scannerData()

This function receives the requested market scanner data results.

virtual void scannerData(int reqId, int rank, const ContractDetails &contractDetails, IBString &distance, IBString &benchmark, IBString &projection, IBString &legsStr)

Parameter	Type	Description
reqId	int	The ticker ID of the request to which this row is responding.
rank	int	The ranking within the response of this bar.
contractDetails	ContractDetails	This object contains a full description of the contract.
distance	IBString	Varies based on query.
benchmark	IBString	Varies based on query.
projection	IBString	Varies based on query.
legsStr	IBString	Describes combo legs when scan is returning EFP.

scannerDataEnd()

This function is called when the snapshot is received and marks the end of one scan.

virtual void scannerDataEnd(int reqId)

Parameter	Type	Description
reqId	int	The ID of the market scanner request being closed by this parameter.

realtimeBar()

This function receives the real-time bars data results.

virtual void realtimeBar(TickerId reqId, long time, double open, double high, double low, double close, long volume, double wap, int count)

Parameter	Type	Description
reqId	TickerId	The ticker Id of the request to which this bar is responding.
time	long	The date-time stamp of the start of the bar. The format is determined by the reqHistoricalData() formatDate parameter.
open	double	The bar opening price.
high	double	The high price during the time covered by the bar.
low	double	The low price during the time covered by the bar.
close	double	The bar closing price.
volume	long	The volume during the time covered by the bar.
wap	double	The weighted average price during the time covered by the bar.
count	int	When TRADES historical data is returned, represents the number of trades that occurred during the time period the bar covers.

fundamentalData()

This function is called to receive Reuters global fundamental market data. There must be a subscription to Reuters Fundamental set up in Account Management before you can receive this data.

virtual void fundamentalData(TickerId reqId, IBString& data)

Parameter	Type	Description
reqId	TickerId	The ID of the data request.
data	IBString	One of these XML reports: • Company overview • Financial summary • Financial ratios • Financial statements • Analyst estimates • Company calendar

displayGroupList()

This callback is a one-time response to queryDisplayGroups().

displayGroupList(int reqId As Integer, const IBString& groups)

Parameter	Type	Description
reqtId	int	The requestId specified in queryDisplayGroups().
groups	IBString	A list of integers representing visible group ID separated by the "|" character, and sorted by most used group first. This list will not change during TWS session (in other words, user cannot add a new group; sorting can change though). Example: "3|1|2"

displayGroupUpdated()

This is sent by TWS to the API client once after receiving the subscription request subscribeToGroupEvents(), and will be sent again if the selected contract in the subscribed display group has changed.

displayGroupList(int reqId, const IBString contractInfo)

Parameter	Type	Description
requestId	int	The requestId specified in subscribeToGroupEvents().
contractInfo	IBString	The encoded value that uniquely represents the contract in IB. Possible values include: • none = empty selection • contractID@exchange – any non-combination contract. Examples: 8314@SMART for IBM SMART; 8314@ARCA for IBM @ARCA. • combo = if any combo is selected.

SocketClient Properties

The tables below define properties for the Execution, Contract and Order classes, and classes that are closely related to them.

Execution

Attribute	Description
IBString execId	Unique order execution id.
IBString time	The order execution time.
IBString acctNumber	The customer account number.
IBString exchange	Exchange that executed the order.
IBString side	Specifies if the transaction was a sale or a purchase. Valid values are: • BOT • SLD
int shares	The number of shares filled.
double price	The order execution price, not including commissions.
int permId	The TWS id used to identify orders, remains the same over TWS sessions.
long clientId	The id of the client that placed the order. **Note:** TWS orders have a fixed client id of 0.
long orderId	The order id. **Note:** TWS orders have a fixed order id of 0.

Attribute	Description
int liquidation	Identifies the position as one to be liquidated last should the need arise.
int cumQty	Cumulative quantity. Used in regular trades, combo trades and legs of the combo.
double avgPrice	Average price. Used in regular trades, combo trades and legs of the combo. Does not include commissions.
IBString evRule	Contains the Economic Value Rule name and the respective optional argument. The two values should be separated by a colon. For example, aussieBond:YearsToExpiration=3. When the optional argument is not present, the first value will be followed by a colon.
double evMultiplier	Tells you approximately how much the market value of a contract would change if the price were to change by 1. It cannot be used to get market value by multiplying the price by the approximate multiplier.

ExecutionFilter

Attribute	Description
IBString acctCode	Filter the results of the reqExecutions() function based on an account code. Note: this is only relevant for FA managed accounts.
IBString exchange	Filter the results of the reqExecutions() function based on the order exchange.
IBString secType	Filter the results of the reqExecutions() function based on the order security type. Note: Refer to the Contract struct for the list of valid security types.
IBString side	Filter the results of the reqExecutions() function based on the order action. Note: Refer to the Order struct for the list of valid order actions.
IBString symbol	Filter the results of the reqExecutions() function based on the order symbol.
IBString time	Filter the results of the reqExecutions() function based on execution reports received after the specified time. The format for timeFilter is "yyyymmdd-hh:mm:ss"
long clientId	Filter the results of the reqExecutions() function based on the clientId.

Contract

Attribute	Description
vector<ComboLeg> comboLegs	Dynamic memory structure used to store the leg definitions for this contract.
IBString comboLegsDescrip	Description for combo legs.
int conId	The unique contract identifier.
IBString currency	Specifies the currency. Ambiguities may require that this field be specified, for example, when SMART is the exchange and IBM is being requested (IBM can trade in GBP or USD). Given the existence of this kind of ambiguity, it is a good idea to always specify the currency.
IBString exchange	The order destination, such as Smart.
IBString expiry	The expiration date. Use the format YYYYMM.
bool includeExpired	If set to true, contract details requests and historical data queries can be performed pertaining to expired contracts. **Note:** Historical data queries on expired contracts are limited to the last year of the contracts life, and are initially only supported for expired futures contracts.
IBString localSymbol	This is the local exchange symbol of the underlying asset.
IBString multiplier	Allows you to specify a futures or options multiplier. This is only necessary when multiple possibilities exist.;
IBString primaryExchange	To clarify any ambiguity for Smart-routed contracts, include the primary exchange, along with the Smart designation, for the destination.
IBString right	Specifies a Put or Call. Valid values are: P, PUT, C, CALL.
IBString secId	Unique identifier for the secIdType.

Attribute	Description
IBString secIdType	Security identifier, when querying contract details or when placing orders. Supported identifiers are: • ISIN (Example: Apple: US0378331005) • CUSIP (Example: Apple: 037833100) • SEDOL (Consists of 6-AN + check digit. Example: BAE: 0263494) • RIC (Consists of exchange-independent RIC Root and a suffix identifying the exchange. Example: AAPL.O for Apple on NASDAQ.)
IBString secType	This is the security type. Valid values are: • STK • OPT • FUT • IND • FOP • CASH • BAG • NEWS
double strike	The strike price.
IBString symbol	This is the symbol of the underlying asset.
IBString tradingClass	The trading class name for this contract.

ContractDetails

Attribute	Description
bool callable	For Bonds. Values are True or False. If true, the bond can be called by the issuer under certain conditions.
IBString category	The industry category of the underlying. For example, InvestmentSvc.
IBString contractMonth	The contract month. Typically the contract month of the underlying for a futures contract.
bool convertible	For Bonds. Values are True or False. If true, the bond can be converted to stock under certain conditions.

Attribute	Description
double coupon	For Bonds. The interest rate used to calculate the amount you will receive in interest payments over the course of the year.
IBString industry	The industry classification of the underlying/product. For example, Financial.
IBString liquidHours	The liquid trading hours of the product. For example, 20090507:0930-1600;20090508:CLOSED.
IBString longName	The descriptive name of the asset.
IBString marketName	The market name for this contract.
double minTick	The minimum price tick.
Bool nextOptionPartial	For Bonds, relevant if the bond has embedded options, i.e., is the next option full or partial?
IBString orderTypes	The list of valid order type for this contract
long priceMagnifier	Allows execution and strike prices to be reported consistently with market data, historical data and the order price, i.e. Z on LIFFE is reported in index points and not GBP.
bool putable	For Bonds. Values are True or False. If true, the bond can be sold back to the issuer under certain conditions.
TagValueListSPtr secIdList()	A list of contract identifiers that the customer is allowed to view (CUSIP, ISIN, etc.)
IBString subcategory	The industry subcategory of the underlying. For example, Brokerage.
Contract summary	A contract structure.
IBString tradingHours	The trading hours of the product. For example, 20090507:0700-1830,1830-2330;20090508:CLOSED.
IBString timeZoneId	The ID of the time zone for the trading hours of the product. For example, EST.
IBString underConId	The underlying contract ID.
IBString evRule	Contains the Economic Value Rule name and the respective optional argument. The two values should be separated by a colon. For example, aussieBond:YearsToExpiration=3. When the optional argument is not present, the first value will be followed by a colon.

Attribute	Description
double evMultiplier	Tells you approximately how much the market value of a contract would change if the price were to change by 1. It cannot be used to get market value by multiplying the price by the approximate multiplier.
Bond Values	
IBString bondType	For Bonds. The type of bond, such as "CORP."
IBString couponType	For Bonds. The type of bond coupon, such as "FIXED."
IBString cusip	For Bonds. The nine-character bond CUSIP or the 12-character SEDOL.
IBString descAppend	For Bonds. A description string containing further descriptive information about the bond.
IBString issueDate	For Bonds. The date the bond was issued.
IBString maturity	For Bonds. The date on which the issuer must repay the face value of the bond.
IBString nextOptionDate	For Bonds, relevant if the bond has embedded options.
IBString nextOptionType	For Bonds, relevant if the bond has embedded options.
IBString notes	For Bonds, if populated for the bond in IB's database
IBString ratings	For Bonds. Identifies the credit rating of the issuer. A higher credit rating generally indicates a less risky investment. Bond ratings are from Moody's and S&P respectively.
IBString validExchanges	The list of exchanges on which this contract is traded.

ComboLeg

Attribute	Description
IBString action	The side (buy or sell) for the leg you are constructing.
long conId	The unique contract identifier specifying the security.
IBString designatedLocation	If shortSaleSlot == 2, the designatedLocation must be specified. Otherwise leave blank or orders will be rejected.
IBString exchange	The exchange to which the complete combination order will be routed.

Attribute	Description
long openClose	Specifies whether the order is an open or close order. Valid values are: • Same - (0) same as the parent security. This is the only option for retail customers. • Open - (1) only valid for institutional customers. • Close - (2) only valid for institutional customers. • Unknown
long ratio	Select the relative number of contracts for the leg you are constructing. To help determine the ratio for a specific combination order, refer to the Interactive Analytics section of the User's Guide.
int shortSaleSlot	For institutional customers only. • 0 - inapplicable (i.e. retail customer or not short leg) • 1 - clearing broker • 2 - third party. If this value is used, you must enter a designated location.

Order

Attribute	Description
Order Identifiers	
long clientId	The id of the client that placed this order.
long orderId	The id for this order.
long permId	The TWS id used to identify orders, remains the same over TWS sessions.
Main Order Fields	
IBString action	Identifies the side. Valid values are: BUY, SELL, SSHORT
double auxPrice	This is the STOP price for stop-limit orders, and the offset amount for relative orders. In all other cases, specify zero.
double lmtPrice	This is the LIMIT price, used for limit, stop-limit and relative orders. In all other cases specify zero. For relative orders with no limit price, also specify zero.
IBString orderType	Identifies the order type. For more information about supported order types, see Supported Order Types.
long totalQuantity	The order quantity.
Extended Order Fields	

Attribute	Description
bool allOrNone	0 = no, 1 = yes
bool blockOrder	If set to true, specifies that the order is an ISE Block order.
int displaySize	The publicly disclosed order size, used when placing Iceberg orders.
IBString goodAfterTime	The trade's "Good After Time," format "YYYYMMDD hh:mm:ss (optional time zone)" Use an empty String if not applicable.
IBString goodTillDate	You must enter GTD as the time in force to use this string. The trade's "Good Till Date," format "YYYYMMDD hh:mm:ss (optional time zone)" Use an empty String if not applicable.
boolean hidden	If set to true, the order will not be visible when viewing the market depth. This option only applies to orders routed to the ISLAND exchange.
int minQty	Identifies a minimum quantity order type.
IBString ocaGroup	Identifies an OCA (one cancels all) group.
int ocaType	Tells how to handle remaining orders in an OCA group when one order or part of an order executes. Valid values include: • 1 = Cancel all remaining orders with block • 2 = Remaining orders are proportionately reduced in size with block • 3 = Remaining orders are proportionately reduced in size with no block If you use a value "with block" gives your order has overfill protection. This means that only one order in the group will be routed at a time to remove the possibility of an overfill.
IBString orderRef	The order reference. Intended for institutional customers only, although all customers may use it to identify the API client that sent the order when multiple API clients are running.
boolean outsideRth()	If set to true, allows orders to also trigger or fill outside of regular trading hours.
bool overridePercentageConstraints	Precautionary constraints are defined on the TWS Presets page, and help ensure tha tyour price and size order values are reasonable. Orders sent from the API are also validated against these safety constraints, and may be rejected if any constraint is violated. To override validation, set this parameter's value to True. Valid values include: • 0 = False • 1 = True

Attribute	Description
long parentId	The order ID of the parent order, used for bracket and auto trailing stop orders.
double percentOffset	The percent offset amount for relative orders.
IBString rule80A	Values include: • Individual = 'I' • Agency = 'A', • AgentOtherMember = 'W' • IndividualPTIA = 'J' • AgencyPTIA = 'U' • AgentOtherMemberPTIA = 'M' • IndividualPT = 'K' • AgencyPT = 'Y' • AgentOtherMemberPT = 'N'
IBString tif	The time in force. Valid values are: DAY, GTC, IOC, GTD.
bool sweepToFill	If set to true, specifies that the order is a Sweep-to-Fill order.
double trailingPercent	Specify the trailing amount of a trailing stop order as a percentage. Observe the following guidelines when using the trailingPercent field: • This field is mutually exclusive with the existing trailing amount. That is, the API client can send one or the other but not both. • This field is read AFTER the stop price (barrier price) as follows: deltaNeutralAuxPrice stopPrice trailingPercent scale order attributes • The field will also be sent to the API in the openOrder message if the API client version is >= 56. It is sent after the stopPrice field as follows: stopPrice trailingPct basisPoint
double trailStopPrice	For TRAILLIMIT orders only
bool transmit	Specifies whether the order will be transmitted by TWS. If set to false, the order will be created at TWS but will not be sent.

Attribute	Description
int triggerfunction	Specifies how Simulated Stop, Stop-Limit and Trailing Stop orders are triggered. Valid values are: • 0 - The default value. The "double bid/ask" function will be used for orders for OTC stocks and US options. All other orders will used the "last" function. • 1 - use "double bid/ask" function, where stop orders are triggered based on two consecutive bid or ask prices. • 2 - "last" function, where stop orders are triggered based on the last price. • 3 double last function. • 4 bid/ask function. • 7 last or bid/ask function. • 8 mid-point function.

Attribute	Description
IBString activeStartTime	For GTC orders.
IBString activeStopTime	For GTC orders.
Financial Advisor Fields	
IBString faGroup	The Financial Advisor group the trade will be allocated to -- use an empty String if not applicable.
IBString faMethod	The Financial Advisor allocation function the trade will be allocated with -- use an empty String if not applicable.
IBString faPercentage	The Financial Advisor percentage concerning the trade's allocation -- use an empty String if not applicable.
IBString faProfile	The Financial Advisor allocation profile the trade will be allocated to -- use an empty String if not applicable.
Institutional (non-cleared) Only	
IBString designatedLocation	Used only when shortSaleSlot = 2.
IBString openClose	For institutional customers only. Valid values are O, C.
int origin	The order origin. For institutional customers only. Valid values are 0 = customer, 1 = firm
int shortSaleSlot	Valid values are 1 or 2.
SMART Routing Only	
double discretionaryAmt	The amount off the limit price allowed for discretionary orders.
bool eTradeOnly	Trade with electronic quotes. 0 = no, 1 = yes

Attribute	Description
bool firmQuoteOnly	Trade with firm quotes. 0 = no, 1 = yes
double nbboPriceCap	Maximum smart order distance from the NBBO.
bool optOutSmartRouting	Use to opt out of default SmartRouting for orders routed directly to ASX. This attribute defaults to false unless explicitly set to true. When set to false, orders routed directly to ASX will NOT use SmartRouting. When set to true, orders routed directly to ASX orders WILL use SmartRouting.
BOX or VOL Orders Only	
int auctionStrategy	Values include: • match = 1 • improvement = 2 • transparent = 3 For orders on BOX only.
BOX Exchange Orders Only	
double delta	The stock delta. For orders on BOX only.
double startingPrice	The auction starting price. For orders on BOX only.
double stockRefPrice	The stock reference price. The reference price is used for VOL orders to compute the limit price sent to an exchange (whether or not Continuous Update is selected), and for price range monitoring.
Pegged-to-Stock and VOL Orders Only	
double stockRangeLower	The lower value for the acceptable underlying stock price range. For price improvement option orders on BOX and VOL orders with dynamic management.
double stockRangeUpper	The upper value for the acceptable underlying stock price range. For price improvement option orders on BOX and VOL orders with dynamic management.
Volatility Orders Only	
bool continuousUpdate	VOL orders only. Specifies whether TWS will automatically update the limit price of the order as the underlying price moves.
int deltaNeutralAuxPrice	VOL orders only. Use this field to enter a value if the value in the *deltaNeutralOrderType* field is an order type that requires an Aux price, such as a REL order.
IBString deltaNeutralOrderType	VOL orders only. Enter an order type to instruct TWS to submit a delta neutral trade on full or partial execution of the VOL order. For no hedge delta order to be sent, specify NONE.

Attribute	Description
int referencePriceType	VOL orders only. Specifies how you want TWS to calculate the limit price for options, and for stock range price monitoring. Valid values include: • 1 = Average of NBBO • 2 = NBB or the NBO depending on the action and right.
double volatility	The option price in volatility, as calculated by TWS' Option Analytics. This value is expressed as a percent and is used to calculate the limit price sent to the exchange.
int volatilityType	Values include: • 1 = Daily volatility • 2 = Annual volatility
IBString deltaNeutralOpenClose	Specifies whether the order is an Open or a Close order and is used when the hedge involves a CFD and the order is clearing away.
bool deltaNeutralShortSale	Used when the hedge involves a stock and indicates whether or not it is sold short.
int deltaNeutralShortSaleSlot	Has a value of 1 (the clearing broker holds shares) or 2 (delivered from a third party). If you use 2, then you must specify a deltaNeutralDesignatedLocation.
IBString deltaNeutralDesignatedLocation	Used only when deltaNeutralShortSaleSlot = 2.
Combo Orders Only	
double basisPoints	For EFP orders only
int basisPointsType	For EFP orders only
Scale Orders Only	
bool scaleAutoReset()	For extended Scale orders.
int scaleInitFillQty()	For extended Scale orders.
int scaleInitLevelSize	For Scale orders: Defines the size of the first, or initial, order component.
int scaleInitPosition()	For extended Scale orders.

Attribute	Description
int scalePriceAdjustInterval()	For extended Scale orders.
double scalePriceAdjustValue()	For extended Scale orders.
double scalePriceIncrement	For Scale orders: Defines the price increment between scale components. This field is required.
double scaleProfitOffset()	For extended Scale orders.
bool scaleRandomPercent()	For extended Scale orders.
int scaleSubsLevelSize	For Scale orders: Defines the order size of the subsequent scale order components. Used in conjunction with scaleInitLevelSize().
IBString scaleTable	Manual table for Scale orders.
Hedge Orders Only	
IBString hedgeParam	Beta = x for Beta hedge orders, ratio = y for Pair hedge order
IBString hedgeType	For hedge orders. Possible values are: • D = Delta • B = Beta • F = FX • P = Pair
Clearing Information	
IBString account	The account. For institutional customers only.
IBString clearingAccount	For IBExecution customers: Specifies the true beneficiary of the order. This value is required for FUT/FOP orders for reporting to the exchange.
IBString clearingIntent	For IBExecution customers: Valid values are: IB, Away, and PTA (post trade allocation).
IBString settlingFirm	Institutional only.
Algo Orders Only	
IBString algoStrategy	For information about API Algo orders, see IBAlgo Parameters.
Vector<TagValue> algoParams	Support for IBAlgo parameters.

Attribute	Description
IBString algoId	Identifies an order generated by algorithmic trading.
What If	
bool whatIf	Use to request pre-trade commissions and margin information. If set to true, margin and commissions data is received back via the OrderState() object for the openOrder() callback.
Order Combo Legs	
Vector<TagValue> OrderComboLegs	Holds attributes for all legs in a combo order.
Solicited Orders	
bool solicited	True = solicited (orders initiated by a broker through the brokers research and design) False = unsolicited (those instigated by a broker's customer either through their actions or by the broker at their direction)
Not Held	
bool m_notHeld	For IBDARK orders only. Orders routed to IBDARK are tagged as "post only" and are held in IB's order book, where incoming SmartRouted orders from other IB customers are eligible to trade against them.
Internal use only	
TagValueListSPtr orderMiscOptions	For internal use only. Use the default value XYZ.

OrderState

Attribute	Description
double commission	Shows the commission amount on the order.
IBString commissionCurrency	Shows the currency of the commission value.
IBString equityWithLoan	Shows the impact the order would have on your equity with loan value.
IBString initMargin	Shows the impact the order would have on your initial margin.

Attribute	Description
IBString maintMargin	Shows the impact the order would have on your maintenance margin.
double maxCommission	Used in conjunction with the minCommission field, this defines the highest end of the possible range into which the actual order commission will fall.
double minCommission	Used in conjunction with the maxCommission field, this defines the lowest end of the possible range into which the actual order commission will fall.
IBString status	Displays the order status.
IBString warningText	Displays a warning message if warranted.

ScannerSubscription

Attribute	Description
double abovePrice	Filter out contracts with a price lower than this value. Can be left blank.
int aboveVolume	Filter out contracts with a volume lower than this value. Can be left blank.
int averageOptionVolumeAbove	Can leave empty.
double belowPrice	Filter out contracts with a price higher than this value. Can be left blank.
double couponRateAbove	Filter out contracts with a coupon rate lower than this value. Can be left blank.
double couponRateBelow	Filter out contracts with a coupon rate higher than this value. Can be left blank.
IBString excludeConvertible	Filter out convertible bonds. Can be left blank.
IBString instrument	Defines the instrument type for the scan.
IBString locationCode	The location.
double marketCapAbove	Filter out contracts with a market cap lower than this value. Can be left blank.
double marketCapBelow	Filter out contracts with a market cap above this value. Can be left blank.
IBString maturityDateAbove	Filter out contracts with a maturity date earlier than this value. Can be left blank.
IBString maturityDateBelow	Filter out contracts with a maturity date later than this value. Can be left blank.

Attribute	Description
IBString moodyRatingAbove	Filter out contracts with a Moody rating below this value. Can be left blank.
IBString moodyRatingBelow	Filter out contracts with a Moody rating above this value. Can be left blank.
int numberOfRows	Defines the number of rows of data to return for a query.
IBString scanCode	Can be left blank.
IBString scannerSettingPairs	Can leave empty. For example, a pairing "Annual, true" used on the "top Option Implied Vol % Gainers" scan would return annualized volatilities.
IBString spRatingAbove	Filter out contracts with an S&P rating below this value. Can be left blank.
IBString spRatingBelow	Filter out contracts with an S&P rating above this value. Can be left blank.
IBString stockTypeFilter	Valid values are: • CORP = Corporation • ADR = American Depositary Receipt • ETF = Exchange Traded Fund • REIT = Real Estate Investment Trust • CEF = Closed End Fund

UnderComp

Attribute	Description
int conId	The unique contract identifier specifying the security. Used for Delta-Neutral Combo contracts.
double delta	The underlying stock or future delta. Used for Delta-Neutral Combo contracts.
double price	The price of the underlying. Used for Delta-Neutral Combo contracts.

CommissionReport

Attribute	Description
double commission	The commission amount.
IBString currency()	The currency.
IBString execId()	Unique order execution id.
double realizedPNL()	The amount of realized Profit and Loss.

Attribute	Description
double yield()	The yield.
int yieldRedemptionDate()	Takes the YYYYMMDD format.

Placing a Combination Order

A combination order is a special type of order that is constructed of many separate legs but executed as a single transaction. Submit combo orders such as calendar spreads, conversions and straddles using the BAG security type (defined in the *Contract* object). The key to implementing a successful API combination order using the API is to knowing how to place the same order using Trader Workstation. If you are familiar with placing combination orders in TWS, then it will be easier to place the same order using the API, because the API only imitates the behavior of TWS.

Example

In this example, a customer places a BUY order for a CLK9 futures contract and a SELL order for a CLM9 futures contract. In this procedure, the customer must invoke reqContractDetails() to obtain the conId for both CLK9 and CLM9 contracts.

Leg 1: Buy 1 CLK9 futures contract

Leg 2: Sell 1 CLM9 futures contract

Here is a summary of the steps required to place a combo order using the API:

- Obtain the contract id (conId) for each leg. Get this number by invoking the reqContractDetails() method.
- Include each leg on the ComboLeg object by populating the related fields.
- Implement the placeOrder() method with the Contract and Order socket client properties.

To place this combo order

1. Get the Contract IDs for both leg definitions. Request 1 is assigned to CLK9 and Request 2 is assigned to CLM9.

```
con1.localSymbol = "CLK9";
con1.secType = "FUT";
con1.exchange = "NYMEX";
con1.currency = "USD";

m_client->reqContractDetails(1, con1->getContract()); // request 1

con2.m_localSymbol = "CLM9";
con2.m_secType = "FUT";
con2.m_exchange = "NYMEX";
con2.m_currency = "USD";

m_client->reqContractDetails(2, con2->getContract()); // request 2
```

   The conId values are delivered by the following event. If reqId is equal to 1, then the conid is for the CLK9 contract. If reqId is equal to 2, then the conId is for CLM9.

```
::contractDetails( int reqId, const ContractDetails &contractDetails)
{

// to obtain conId for CLK9
if (reqId == 1)
…
```

```
// to obtain conid for CLM9
if (reqId == 2)
...
}
```

2. Assign all the related values for combo orders and combine them:

```
leg1.conId = Leg1_conId;
leg1.ratio = 1;
leg1.action = "BUY";
leg1.exchange = "NYMEX";
leg1.openClose = 0;
leg1.shortSaleSlot = 0;
leg1.designatedLocation = "";

leg2.conId = Leg2_conId;
leg2.ratio = 1;
leg2.action = "SELL";
leg2.exchange = "NYMEX";
leg2.openClose = 0;
leg2.shortSaleSlot = 0;
leg2.designatedLocation = "";
```

3. Invoke the placeOrder() method with the appropriate contract and order objects. As shown below, it includes the addAllLegs declaration in the contract object.

```
contract.symbol = "USD"; // abitrary value only combo orders
contract.secType = "BAG"; // BAG is the security type for COMBO order
contract.exchange = "NYMEX";
contract.currency = "USD";
contract.comboLegs = addAllLegs;  //including combo order in contract object

order.m_action = "BUY";
order.m_totalQuantity = 1;
order.m_orderType = "MKT";

m_client->placeOrder(Orderid, contract->getContract(), order->getOrder());
```

5

Java

This chapter describes the Java API, including the following topics:

Running the Java Test Client Sample Program

You can access the IB trading system via TWS or the IB Gateway through a Java application using the socket client component. Before you can connect to TWS, you must:

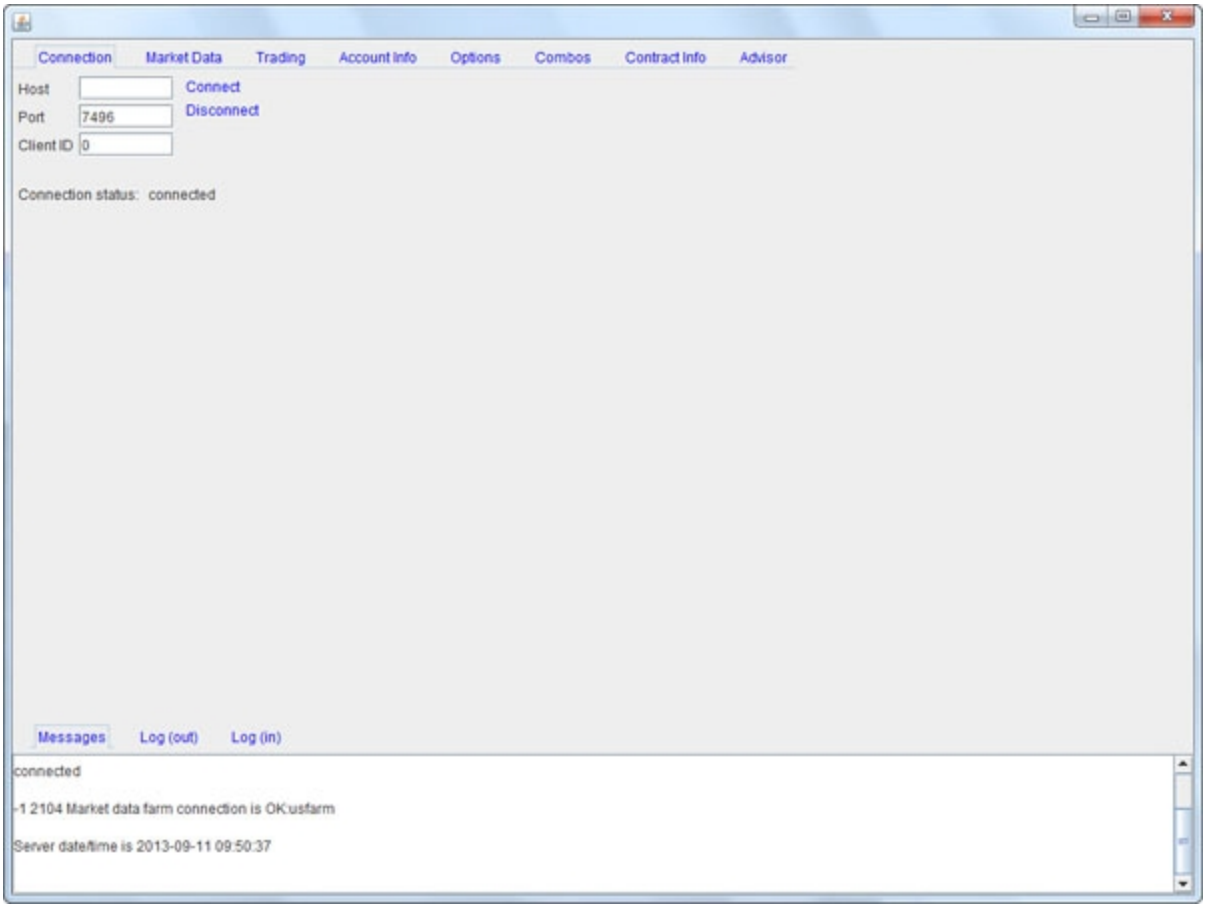
To run the Java Test Client sample program on Windows

1. From Windows Explorer, navigate to the *samples\Java* folder in your API installation folder.
2. Run the file *run.bat*. It may be necessary to edit this file for your system.

To run the Java Test Client sample program from a new project in NetBeans

1. Open NetBeans and click *New Project* to start the wizard.
2. In the Projects area, select *Java Application* and click **Next**.
3. In the **New Java Application** window, name your project, choose a location, and uncheck the check box for *Create Main Class*.
4. Click **Finish**.
5. To set up Java to use the API, right-click the project you just created, then select **Properties**.
6. From the source category click *Add Folder*.
7. Navigate to the folder where the TWS API is installed. The folders you want to add are called *source\JavaClient\com* and *samples\Java\apidemo*. Click **OK**.
8. Press **F6** to run the sample java project. When the message says "Project Samplejavacode does not have main class set" select *apidemo* and click **OK**.

   The Java Test Client's sample application window is pictured below.


Connection
Market Data
Trading
Account Info
Options
Combos
Contract Info
Advisor
Host
Port
7496
Client ID
0
Connect
Disconnect
Connection status: connected
Messages
Log (out)
Log (in)
connected
-1 2104 Market data farm connection is OK:usfarm
Server date/time is 2013-09-11 09:50:37

Running the Java Test Client Program with Eclipse

This section describes how to run the Java Test Client Program with the Eclipse IDE. The following steps assume that you have already downloaded and installed the TWS API software.

> **Note:** This procedure assumes that you are using Eclipse Helios 3.6.2, but other versions of Eclipse should also work.

To run the Java Test Client Program with Eclipse

1. Download the Eclipse IDE from http://www.eclipse.org/downloads/.
   - Download the Windows 32-bit or Windows 64-bit version, depending on your operating system.
   - The download process will suggest the most appropriate mirror for your download automatically. Click on the link and save the zip file to your computer.
2. Unzip the downloaded Eclipse file.
3. Launch the Eclipse IDE by running the file **eclipse.exe**, which will be unzipped to the eclipse directory.
4. Start a new project:
   a. To start a new project in Eclipse, select **File > New > Java Project**.
   b. Type the project name. For this example, name the project *My API Program*.
   c. Type or browse for the project o
   d. Optionally, change various settings such as JRE.
   e. Click **Finish**.
6. Import the TWS API source files:
   a. Expand the project you just created in the Package Explorer panel on the left.
   b. Right-click the **src** folder, then select **New > Package**.
   c. Enter **com.ib** as the package com, then click **Finish**.
   d. Right-click the package **com.ib** in the Package Explorer panel, then select **Import**.
   e. Select **General > File System**, then click **Next**.
   f. Click **Browse…** , then locate the folder where the API is installed (typically source\JavaClient\com). Select the **ib** folder (for example, C:\TWS API 9.70\source\JavaClient\com\ib), then click **OK**.
   g. Put a check mark on the **ib** folder, then click **Finish**.
8. Import the Java sample test client files:
   a. Expand the project you just created in the Package Explorer panel on the left.
   b. Right-click the **src** folder, then select **New > Package**.

c. Enter **apidemo**as the package com, then click **Finish**.

d. Right-click the package **apidemo**in the Package Explorer panel, then select **Import**.

e. Select **General > File System**, then click **Next**.

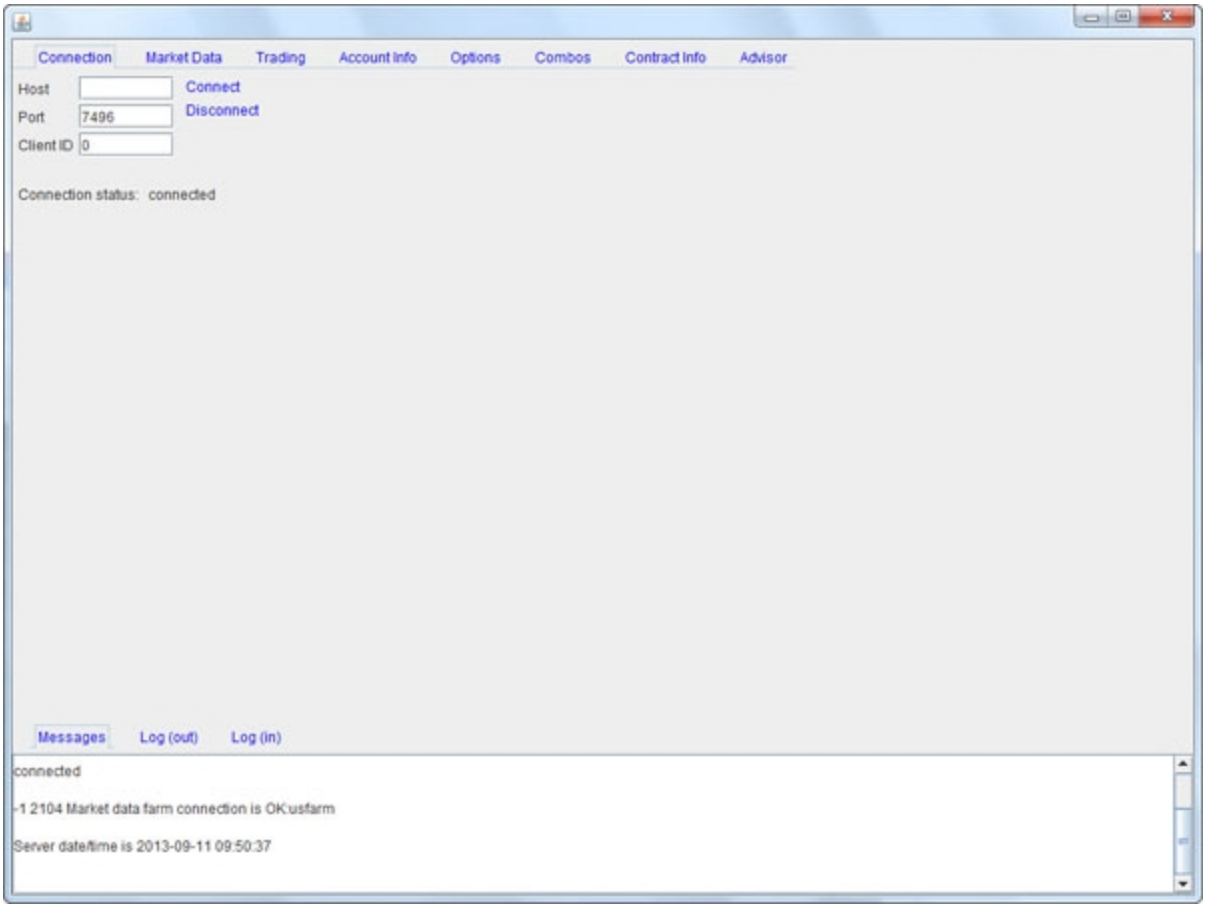
f. Click **Browse…** , then locate the folder where the Java Test Client is installed (typically samples\Java\). Select the **apidemo**folder (for example, C:\TWS API 9.70\samples\Java\apidemo), then click **OK**.

g. Put a check mark on the **apidemo** folder, then click **Finish**.

8. Run the sample test client:

a. Right-click the **apidemo** package and select **Run As… > Java Application**.

b. This is what you should see and you are ready to create your own customized program:



Java EClientSocket Methods

This section describes the class EClientSocket methods you use when connecting to TWS. The list of methods includes:

EClientSocket()

This is the constructor.

EClientSocket(AnyWrapper anyWrapper)

Parameter	Type	Description
anyWrapper	AnyWrapper	The reference to an object that was derived from the AnyWrapper base interface. Note EWrapper extends AnyWrapper.

eConnect()

This function must be called before any other. There is no feedback for a successful connection, but a subsequent attempt to connect will return the message "Already connected."

void eConnect(String host, int port, int clientId)

Parameter	Type	Description
host	String	The host name or IP address of the machine where TWS is running. Leave blank to connect to the local host.
port	int	Must match the port specified in TWS on the Configure>API>*Socket Port* field.
clientId	int	A number used to identify this client connection. All orders placed/-modified from this client will be associated with this client identifier. **Note:** Note: Each client MUST connect with a unique clientId.

eDisconnect()

Call this method to terminate the connections with TWS. Calling this method does not cancel orders that have already been sent.

void eDisconnect()

isConnected()

Call this method to check if there is a connection with TWS.

void isConnected()

setServerLogLevel()

The default level is ERROR. Refer to the API logging page for more details.

void setServerLogLevel(int logLevel)

Parameter	Type	Description
logLevel	int	Specifies the level of log entry detail used by the server (TWS) when processing API requests. Valid values include: • 1 = SYSTEM • 2 = ERROR • 3 = WARNING • 4 = INFORMATION • 5 = DETAIL

reqCurrentTime()

Returns the current system time on the server side via the currentTime() EWrapper method.

void reqCurrentTime()

serverVersion()

Returns the version of the TWS instance to which the API application is connected.

void serverVersion()

TwsConnectionTime()

Returns the time the API application made a connection to TWS.

void TwsConnectionTime ()

reqMktData()

Call this method to request market data. The market data will be returned by the tickPrice(), tickSize(), tickOptionComputation(), tickGeneric(), tickString() and tickEFP() methods.

void reqMktData(int tickerId, Contract contract, String genericTicklist, boolean snapshot, Lis<TagValue> mktDataOptions)

Parameter	Type	Description
tickerId	int	The ticker id. Must be a unique value. When the market data returns, it will be identified by this tag. This is also used when canceling the market data.
contract	Contract	This class contains attributes used to describe the contract.
genericTicklist	String	A comma delimited list of generic tick types. Tick types can be found in the Generic Tick Types page.
snapshot	boolean	Check to return a single snapshot of market data and have the market data subscription cancel. Do not enter any genericTicklist values if you use snapshot.

Parameter	Type	Description
mktDataOptions	List<TagValue>	For internal use only. Use default value XYZ.

cancelMktData()

After calling this method, market data for the specified Id will stop flowing.

void cancelMktData(int tickerId)

Parameter	Type	Description
tickerId	int	The Id that was specified in the call to reqMktData().

calculateImpliedVolatility()

Call this function to calculate volatility for a supplied option price and underlying price.

calculateImpliedVolatility(int reqId, Contract optionContract, double optionPrice, double underPrice)

Parameter	Type	Description
reqId	int	The ticker id.
optionContract	Contract	Describes the contract.
optionPrice	double	The price of the option.
underPrice	double	Price of the underlying.

cancelCalculateImpliedVolatility()

Call this function to cancel a request to calculate volatility for a supplied option price and underlying price.

calculateImpliedVolatility(int reqId)

Parameter	Type	Description
reqId	int	The ticker id.

calculateOptionPrice()

Call this function to calculate option price and greek values for a supplied volatility and underlying price.

void calculateOptionPrice(int reqId, Contract contract, double volatility, double underPrice)

Parameter	Type	Description
conid	int	The ticker ID.
contract	Contract	Describes the contract.
volatility	double	The volatility.
underPrice	double	Price of the underlying.

cancelCalculateOptionPrice()

Call this function to cancel a request to calculate the option price and greek values for a supplied volatility and underlying price.

cancelCalculateOptionPrice(int reqId)

Parameter	Type	Description
reqId	int	The ticker id.

reqMarketDataType()

The API can receive frozen market data from Trader Workstation. Frozen market data is the last data recorded in our system. During normal trading hours, the API receives real-time market data. If you use this function, you are telling TWS to automatically switch to frozen market data after the close. Then, before the opening of the next trading day, market data will automatically switch back to real-time market data.

reqMarketDataType(int type)

Parameter	Type	Description
type	int	1 for real-time streaming market data or 2 for frozen market data.

placeOrder()

void placeOrder(int id, Contract contract, Order order)

Parameter	Type	Description
id	int	The order Id. You must specify a unique value. When the order status returns, it will be identified by this tag. This tag is also used when canceling the order.
contract	Contract	This class contains attributes used to describe the contract.
order	Order	This structure contains the details of the order. Note: Each client MUST connect with a unique clientId.

cancelOrder()

Call this method to cancel an order.

void cancelOrder(int id)

Parameter	Type	Description
id	int	The order Id that was specified previously in the call to placeOrder()

reqOpenOrders()

Call this method to request any open orders that were placed from this API client. Each open order will be fed back through the openOrder() and orderStatus() methods on the EWrapper.

> **Note:** The client with a clientId of "0" will also receive the TWS-owned open orders. These orders will be associated with the client and a new orderId will be generated. This association will persist over multiple API and TWS sessions.

void reqOpenOrders()

reqAllOpenOrders

Call this method to request all open orders that were placed from all API clients linked to one TWS, and also from the TWS. Note that you can run up to 8 API clients from a single TWS. Each open order will be fed back through the openOrder() and orderStatus() methods on the EWrapper.

> **Note:** No association is made between the returned orders and the requesting client.

void reqAllOpenOrders()

reqAutoOpenOrders()

Call this method to request that newly created TWS orders be implicitly associated with the client. When a new TWS order is created, the order will be associated with the client and automatically fed back through the openOrder() and orderStatus() methods on the EWrapper.

> **Note:** TWS orders can only be bound to clients with a clientId of 0.

void reqAutoOpenOrders(boolean bAutoBind)

Parameter	Type	Description
bAutoBind	boolean	If set to TRUE, newly created TWS orders will be implicitly associated with the client. If set to FALSE, no association will be made.

reqIDs()

Call this function to request the next valid ID that can be used when placing an order. After calling this method, the nextValidId() event will be triggered, and the id returned is that next valid ID. That ID will reflect any autobinding that has occurred (which generates new IDs and increments the next valid ID therein).

Public synchronized Void reqIds (int numIds)

Parameter	Type	Description
numIds	int	Set to 1.

exerciseOptions()

Call the exerciseOptions() method to exercise options.

Note: SMART is not an allowed exchange in exerciseOptions() calls, and TWS does a request for the position in question whenever any API initiated exercise or lapse is attempted.

void exerciseOptions(int tickerId, Contract contract, int exerciseAction, int exerciseQuantity, String account, int override)

Parameter	Type	Description
tickerId	int	The Id for the exercise request
contract	Contract	This class contains attributes used to describe the contract.
exerciseAction	int	Specifies whether to exercise the specified option or let the option lapse. Valid values are: • 1 = exercise • 2 = lapse
exerciseQuantity	int	The number of contracts to be exercised
account	String	For institutional orders. Specifies the IB account.
override	int	Specifies whether your setting will override the system's natural action. For example, if your action is "exercise" and the option is not in-the-money, by natural action the option would not exercise. If you have override set to "yes" the natural action would be overridden and the out-of-the money option would be exercised. Values are: • 0 = do not override • 1 = override

reqGlobalCancel()

Use this method to cancel all open orders globally. It cancels both API and TWS open orders.

If the order was created in TWS, it also gets canceled. If the order was initiated in the API, it also gets canceled.

void reqGlobalCancel()

reqAccountUpdates()

Call this function to start getting account values, portfolio, and last update time information. The account data will be fed back through the updateAccountTime(), updateAccountValue() and updatePortfolio() EWrapper methods.

void reqAccountUpdates (boolean subscribe, String acctCode)

Parameter	Type	Description
subscribe	boolean	If set to TRUE, the client will start receiving account and portfolio updates. If set to FALSE, the client will stop receiving this information.
acctCode	String	The account code for which to receive account and portfolio updates.

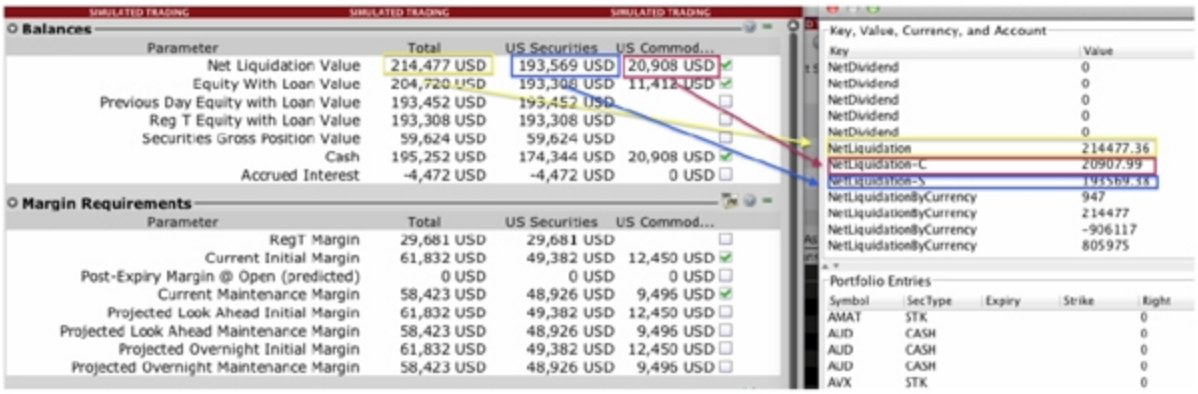
The account information resulting from the invocation of reqAccountUpdates() is the same information that appears in Trader Workstation's Account Window. When trying to determine the definition of each variable or key within the API account data, it is essential that you use the TWS Account Window as guidance.

To identify API Account keys:

The API's updateAccountValue() event handler delivers all of the account information.

- Strings or keys with a suffix of **–C**, such as AvailableFunds-C, EquityForInitial-C, NetLiquidation-C, correspond to Commodities in the TWS Account Window.
- Keys with a suffix of **–S**, such as EquityForMaintenance-S, FullAvailableFunds-S or NetLiquidation-S, correspond to Securities in the TWS Account Window.
- Keys without any suffix correspond to Totals in the TWS Account Window.

The image below is an actual example of how to compare TWS's Account Window and the API's account data. In this particular case, we try to link three specific keys NetLiquidation, NetLiquidation-C, and NetLiquidation-S to the TWS Account Window.



For more information about the information presented in the TWS Account Window, see https://institutions.interactivebrokers.com/en/software/tws/usersguidebook/realtimeactivitymonitoring/the_account_window.htm

reqAccountSummary()

Call this method to request and keep up to date the data that appears on the TWS Account Window Summary tab. The data is returned by accountSummary().

reqAccountSummary() only allows two concurrent requests. If you use reqAccountSummary() to request more than two concurrent account summaries, you will receive an error: **322|Error processing request**. To resolve this error, unsubscribe from one reqAccountSummary() request and then resubmit the request.

> **Note:** This request can only be made when connected to a Financial Advisor (FA) account.

void reqAccountSummary(int reqId, String group, String tags)

Parameter	Type	Description
reqId	int	The ID of the data request. Ensures that responses are matched to requests if several requests are in process.
group	String	Set to *All* to return account summary data for all accounts, or set to a specific Advisor Account Group name that has already been created in TWS Global Configuration.

Parameter	Type	Description
tags	String	A comma-separated list of account tags. Available tags are: • *AccountType* • *NetLiquidation*, • *TotalCashValue* — Total cash including futures pnl • *SettledCash* — For cash accounts, this is the same as TotalCashValue • *AccruedCash* — Net accrued interest • *BuyingPower* — The maximum amount of marginable US stocks the account can buy • *EquityWithLoanValue* — Cash + stocks + bonds + mutual funds • *PreviousDayEquityWithLoanValue*, • *GrossPositionValue* — The sum of the absolute value of all stock and equity option positions • *RegTEquity*, • *RegTMargin*, • *SMA* — Special Memorandum Account • *InitMarginReq*, • *MaintMarginReq*, • *AvailableFunds*, • *ExcessLiquidity*, • *Cushion* — Excess liquidity as a percentage of net liquidation value • *FullInitMarginReq*, • *FullMaintMarginReq*, • *FullAvailableFunds*, • *FullExcessLiquidity*, • *LookAheadNextChange* — Time when look-ahead values take effect • *LookAheadInitMarginReq*, • *LookAheadMaintMarginReq*, • *LookAheadAvailableFunds*, • *LookAheadExcessLiquidity*, • *HighestSeverity* — A measure of how close the account is to liquidation • *DayTradesRemaining* — The Number of Open/Close trades a user

Parameter	Type	Description
		could put on before Pattern Day Trading is detected. A value of "-1" means that the user can put on unlimited day trades. • *Leverage* — GrossPositionValue / NetLiquidation

cancelAccountSummary()

Cancels the request for Account Window Summary tab data.

void cancelAccountSummary(int messageId, int version As Integer, int reqId As Integer)

Parameter	Type	Description
messageId	Integer	Set this to 63.
version	Integer	Set this to 1.
reqId	Integer	The ID of the data request being canceled.

reqPositions()

Requests real-time position data for all accounts.

void reqPositions()

cancelPositions()

Cancels real-time position updates.

void cancelPositions()

reqExecutions()

When this method is called, the execution reports from the last 24 hours that meet the filter criteria are downloaded to the client via the execDetails() method. To view executions beyond the past 24 hours, open the Trade Log in TWS and, while the Trade Log is displayed, request the executions again from the API.

void reqExecutions(ExecutionFilter filter)

Parameter	Type	Description
filter	ExecutionFilter	The filter criteria used to determine which execution reports are returned.

reqContractDetails()

Call this method to download all details for a particular contract. The contract details will be received via the contractDetails() method on the EWrapper.

void reqContractDetails (int reqId, Contract contract)

Parameter	Type	Description
reqId	int	The ID of the data request. Ensures that responses are matched to requests if several requests are in process.
contract	Contract	This class contains attributes used to describe the contract.

reqMktDepth()

Call this method to request market depth for a specific contract. The market depth will be returned by the updateMktDepth() and updateMktDepthL2() methods.

void reqMktDepth(int tickerId, Contract contract, int numRows, Vector<TagValue> mktDepthOptions)

Parameter	Type	Description
tickerId	int	The ticker Id. Must be a unique value. When the market depth data returns, it will be identified by this tag. This is also used when canceling the market depth.
contract	Contract	This class contains attributes used to describe the contract.
numRows	int	Specifies the number of market depth rows to return.
mktDepthOptions	Vector<TagValue>	For internal use only. Use default value XYZ.

cancelMktDepth()

After calling this method, market depth data for the specified Id will stop flowing.

void cancelMktDepth(int TickerId)

Parameter	Type	Description
tickerId	int	The Id that was specified in the call to reqMktDepth().

reqNewsBulletins()

Call this method to start receiving news bulletins. Each bulletin will be returned by the updateNewsBulletin() method.

void reqNewsBulletins(boolean allMsgs)

Parameter	Type	Description
allMsgs	boolean	If set to TRUE, returns all the existing bulletins for the current day and any new ones. IF set to FALSE, will only return new bulletins.

cancelNewsBulletins()

Call this method to stop receiving news bulletins.

void cancelNewsBulletins()

reqManagedAccts()

Call this method to request the list of managed accounts. The list will be returned by the managedAccounts() method on the EWrapper.

> **Note:** This request can only be made when connected to a Financial Advisor (FA) account

void reqManagedAccts()

requestFA()

Call this method to request FA configuration information from TWS. The data returns in an XML string via the receiveFA() method.

void requestFA(int faDataType)

Parameter	Type	Description
faDataType	int	Specifies the type of Financial Advisor configuration data being requested. Valid values include: • 1 = GROUPS • 2 = PROFILE • 3 = ACCOUNT ALIASES

replaceFA()

Call this method to request new FA configuration information from TWS. The data returns in an XML string via a "receiveFA" method.

void replaceFA(int faDataType, String xml)

Parameter	Type	Description
faDataType	int	Specifies the type of Financial Advisor configuration data being requested. Valid values include: • 1 = GROUPS • 2 = PROFILE • 3 = ACCOUNT ALIASES
xml	String	The XML string containing the new FA configuration information.

reqAccountSummary()

Call this method to request and keep up to date the data that appears on the TWS Account Window Summary tab. The data is returned by accountSummary().

reqAccountSummary() only allows two concurrent requests. If you use reqAccountSummary() to request more than two concurrent account summaries, you will receive an error: **322|Error processing request**. To resolve this error, unsubscribe from one reqAccountSummary() request and then resubmit the request.

Note: This request can only be made when connected to a Financial Advisor (FA) account.

void reqAccountSummary(int reqId, String group, String tags)

Parameter	Type	Description
reqId	int	The ID of the data request. Ensures that responses are matched to requests if several requests are in process.
group	String	Set to *All* to return account summary data for all accounts, or set to a specific Advisor Account Group name that has already been created in TWS Global Configuration.

Parameter	Type	Description
tags	String	A comma-separated list of account tags. Available tags are: • *AccountType* • *NetLiquidation*, • *TotalCashValue* — Total cash including futures pnl • *SettledCash* — For cash accounts, this is the same as TotalCashValue • *AccruedCash* — Net accrued interest • *BuyingPower* — The maximum amount of marginable US stocks the account can buy • *EquityWithLoanValue* — Cash + stocks + bonds + mutual funds • *PreviousDayEquityWithLoanValue*, • *GrossPositionValue* — The sum of the absolute value of all stock and equity option positions • *RegTEquity*, • *RegTMargin*, • *SMA* — Special Memorandum Account • *InitMarginReq*, • *MaintMarginReq*, • *AvailableFunds*, • *ExcessLiquidity*, • *Cushion* — Excess liquidity as a percentage of net liquidation value • *FullInitMarginReq*, • *FullMaintMarginReq*, • *FullAvailableFunds*, • *FullExcessLiquidity*, • *LookAheadNextChange* — Time when look-ahead values take effect • *LookAheadInitMarginReq*, • *LookAheadMaintMarginReq*, • *LookAheadAvailableFunds*, • *LookAheadExcessLiquidity*, • *HighestSeverity* — A measure of how close the account is to liquidation • *DayTradesRemaining* — The Number of Open/Close trades a user

Parameter	Type	Description
		could put on before Pattern Day Trading is detected. A value of "-1" means that the user can put on unlimited day trades. • *Leverage* — GrossPositionValue / NetLiquidation

cancelAccountSummary()

Cancels the request for Account Window Summary tab data.

void cancelAccountSummary(int messageId, int version As Integer, int reqId As Integer)

Parameter	Type	Description
messageId	Integer	Set this to 63.
version	Integer	Set this to 1.
reqId	Integer	The ID of the data request being canceled.

reqPositions()

Requests real-time position data for all accounts.

void reqPositions()

cancelPositions()

Cancels real-time position updates.

void cancelPositions()

reqScannerParameters()

Call the reqScannerParameters() method to receive an XML document that describes the valid parameters that a scanner subscription can have.

void reqScannerParameters()

reqScannerSubscription()

Call the reqScannerSubscription() method to start receiving market scanner results through the scannerData() EWrapper method.

void reqScannerSubscription(int tickerId, ScannerSubscription subscription, Vector<TagValue> scannerSubscriptionOptions)

Parameter	Type	Description
tickerId	int	The Id for the subscription. Must be a unique value. When the subscription data is received, it will be identified by this Id. This is also used when canceling the scanner.

Parameter	Type	Description
subscription	ScannerSubscription	Summary of the scanner subscription parameters including filters.
scannerSubscriptionOptions	Vector<TagValue>	For internal use only. Use default value XYZ.

cancelScannerSubscription()

Call the cancelScannerSubscription() method to stop receiving market scanner results.

void cancelScannerSubscription(int tickerId)

Parameter	Description
tickerId	The Id that was specified in the call to reqScannerSubscription().

reqHistoricalData()

Call the reqHistoricalData() method to start receiving historical data results through the historicalData() EWrapper method.

void reqHistoricalData (int id, Contract contract, String endDateTime, String durationStr, String barSizeSetting, String whatToShow, int useRTH, int formatDate, List<TagValue> chartOptions)

Parameter	Type	Description
tickerId	int	The Id for the request. Must be a unique value. When the data is received, it will be identified by this Id. This is also used when canceling the historical data request.
contract	Contract	This class contains attributes used to describe the contract.
endDateTime	String	Use the format yyyymmdd hh:mm:ss tmz, where the time zone is allowed (optionally) after a space at the end.

Parameter	Type	Description
durationStr	String	This is the time span the request will cover, and is specified using the format: <integer> <unit>, i.e., 1 D, where valid units are: • " S (seconds) • " D (days) • " W (weeks) • " M (months) • " Y (years) If no unit is specified, seconds are used. Also, note "years" is currently limited to one.
barSizeSetting	String	Specifies the size of the bars that will be returned (within IB/TWS limits). Valid bar size values include: • 1 sec • 5 secs • 15 secs • 30 secs • 1 min • 2 mins • 3 mins • 5 mins • 15 mins • 30 mins • 1 hour • 1 day
whatToShow	String	Determines the nature of data being extracted. Valid values include: • TRADES • MIDPOINT • BID • ASK • BID_ASK • HISTORICAL_VOLATILITY • OPTION_IMPLIED_VOLATILITY

Parameter	Type	Description
useRTH	int	Determines whether to return all data available during the requested time span, or only data that falls within regular trading hours. Valid values include: • 0 - all data is returned even where the market in question was outside of its regular trading hours. • 1 - only data within the regular trading hours is returned, even if the requested time span falls partially or completely outside of the RTH.
formatDate	int	Determines the date format applied to returned bars. Valid values include: • 1 - dates applying to bars returned in the format: yyyymmdd{space}{space}hh:mm:dd • 2 - dates are returned as a long integer specifying the number of seconds since 1/1/1970 GMT.
chartOptions	List<TagValue>	For internal use only. Use default value XYZ.

Note: For more information about historical data request limitations, see Historical Data Limitations.

cancelHistoricalData()

Call the cancelHistoricalData() method to stop receiving historical data results.

void cancelHistoricalData (int tickerId)

Parameter	Type	Description
tickerId	int	The Id that was specified in the call to reqHistoricalData().

reqRealTimeBars()

Call the reqRealTimeBars() method to start receiving real time bar results through the realtimeBar() EWrapper method.

void reqRealTimeBars(int tickerId, Contract contract, int barSize, String whatToShow, boolean useRTH, Vector<TagValue> realTimeBarOptions)

Parameter	Type	Description
tickerId	int	The Id for the request. Must be a unique value. When the data is received, it will be identified by this Id. This is also used when canceling the historical data request.

Parameter	Type	Description
contract	Contract	This class contains attributes used to describe the contract.
barSize	int	Currently only 5 second bars are supported, if any other value is used, an exception will be thrown.
whatToShow	String	Determines the nature of the data extracted. Valid values include: • TRADES • BID • ASK • MIDPOINT
useRTH	boolean	Regular Trading Hours only. Valid values include: • 0 = all data available during the time span requested is returned, including time intervals when the market in question was outside of regular trading hours. • 1 = only data within the regular trading hours for the product requested is returned, even if the time time span falls partially or completely outside.
realTimeBarOptions	Vector<TagValue>	For internal use only. Use default value XYZ.

cancelRealTimeBars()

Call this method to stop receiving real time bar results.

void cancelRealTimeBars (int tickerId)

Parameter	Type	Description
tickerId	int	The Id that was specified in the call to reqRealTimeBars().

reqFundamentalData()

Call this method to receive Reuters global fundamental data for stocks. There must be a subscription to Reuters Fundamental set up in Account Management before you can receive this data.

reqFundamentalData() can handle *conid* specified in the Contract object, but not *tradingClass* or *multiplier*. This is because reqFundamentalData() is used only for stocks and stocks do not have a multiplier and trading class.

void reqFundamentalData(int reqId, Contract contract, String reportType)

Parameter	Type	Description
reqId	int	The ID of the data request. Ensures that responses are matched to requests if several requests are in process.
contract	Contract	This structure contains a description of the contract for which Reuters Fundamental data is being requested.
reportType	String	One of the following XML reports: • ReportSnapshot (company overview) • ReportsFinSummary (financial summary) • ReportRatios (financial ratios) • ReportsFinStatements (financial statements) • RESC (analyst estimates) • CalendarReport (company calendar)

cancelFundamentalData()

Call this method to stop receiving Reuters global fundamental data.

void cancelFundamentalData(int reqId)

Parameter	Type	Description
reqId	int	The ID of the data request.

queryDisplayGroups()

queryDisplayGroups(int reqId)

Parameter	Type	Description
reqId	int	The unique number that will be associated with the response

subscribeToGroupEvents()

subscribeToGroupEvents(int reqId, int groupId)

Parameter	Type	Description
reqId	int	The unique number associated with the notification.
groupId	int	The ID of the group, currently it is a number from 1 to 7. This is the display group subscription request sent by the API to TWS.

updateDisplayGroup()

updateDisplayGroup(int reqId, const String contractInfo)

Parameter	Type	Description
reqId	int	The requestId specified in subscribeToGroupEvents().
contractInfo	String	The encoded value that uniquely represents the contract in IB. Possible values include: • none = empty selection • contractID@exchange – any non-combination contract. Examples: 8314@SMART for IBM SMART; 8314@ARCA for IBM @ARCA. • combo = if any combo is selected.

unsubscribeFromGroupEvents()

unsubscribeFromGroupEvents(int reqId)

Parameter	Type	Description
reqId	int	The requestId specified in subscribeToGroupEvents().

Java EWrapper Methods

This section describes the class EWrapper methods you can use when connecting to TWS. The list of methods includes:

Connection and Server

currentTime()
error()
connectionClosed()

Market Data

tickPrice()
tickSize()
tickOptionComputation()
tickGeneric()
tickString()
tickEFP()
tickSnapshotEnd()
marketDataType()

Orders

orderStatus()
openOrder()
openOrderEnd()
nextValidId()
deltaNeutralValidation()

Account and Portfolio

updateAccountValue()
updatePortfolio()
updateAccountTime()
accountDownloadEnd()
accountSummary()
accountSummaryEnd()
position()
positionEnd()

Contract Details

contractDetails()
contractDetailsEnd()
bondContractDetails()

Executions

execDetails()
execDetailsEnd()
commissionReport()

Market Depth

updateMktDepth()
updateMktDepthL2()

News Bulletins

updateNewsBulletin(

Financial Advisors

managedAccounts()
receiveFA()

Historical Data

historicalData()

Market Scanners

scannerParameters()
scannerData()
scannerDataEnd()

Real Time Bars

realtimeBar()

Fundamental Data

fundamentalData()

Display Groups

displayGroupList()
displayGroupUpdated()

currentTime()

This method receives the current system time on the server side.

void currentTime(long time)

Parameter	Type	Description
time	long	The current system time on the server side

error()

This method is called when there is an error with the communication or when TWS wants to send a message to the client.

void error(int id, int errorCode, String errorString)

Parameter	Type	Description
id	int	This is the orderId or tickerId of the request that generated the error.
errorCode	int	For information on error codes, see Error Codes.
errorString	String	The textual description of the error.

This method is called when an exception occurs while handling a request.

void error(Exception e)

Parameter	Type	Description
e	Exception	The exception that occurred

This method is called when TWS wants to send an error message to the client. (V1).

void error(String str)

Parameter	Type	Description
str	String	This is the textual description of the error

connectionClosed()

This method is called when TWS closes the sockets connection, or when TWS is shut down.

void connectionClosed()

tickPrice()

This method is called when the market data changes. Prices are updated immediately with no delay.

void tickPrice(int tickerId, int field, double price, int canAutoExecute)

Parameter	Type	Description
tickerId	int	The ticker Id that was specified previously in the call to reqMktData()
field	int	Specifies the type of price. Pass the field value into TickType.getField(int tickType) to retrieve the field description. For example, a field value of 1 will map to bidPrice, a field value of 2 will map to askPrice, etc. • 1 = bid • 2 = ask • 4 = last • 6 = high • 7 = low • 9 = close
price	double	Specifies the price for the specified field
canAutoExecute	int	Specifies whether the price tick is available for automatic execution. Possible values are: • 0 = not eligible for automatic execution • 1 = eligible for automatic execution

tickSize()

This method is called when the market data changes. Sizes are updated immediately with no delay.

void tickSize(int tickerId, int field, int size)

Parameter	Type	Description
tickerId	int	The ticker Id that was specified previously in the call to reqMktData()

Parameter	Type	Description
field	int	Specifies the type of price. Pass the field value into TickType.getField(int tickType) to retrieve the field description. For example, a field value of 0 will map to bidSize, a field value of 3 will map to askSize, etc. • 0 = bid size • 3 = ask size • 5 = last size • 8 = volume
size	int	Specifies the size for the specified field

tickOptionComputation()

This method is called when the market in an option or its underlier moves. TWS's option model volatilities, prices, and deltas, along with the present value of dividends expected on that options underlier are received.

void tickOptionComputation(int tickerId, int field, double impliedVol, double delta, double optPrice, double pvDividend, double gamma, double vega, double theta, double undPrice)

Parameter	Type	Description
tickerId	int	The ticker Id that was specified previously in the call to reqMktData()
field	int	Specifies the type of option computation. Pass the field value into TickType.getField(int tickType) to retrieve the field description. For example, a field value of 13 will map to modelOptComp, etc. • 10 = Bid • 11 = Ask • 12 = Last
impliedVol	double	The implied volatility calculated by the TWS option modeler, using the specified ticktype value.
delta	double	The option delta value.
optPrice	double	The option price.
pvDividend	double	The present value of dividends expected on the options underlier
gamma	double	The option gamma value.
vega	double	The option vega value.
theta	double	The option theta value.
undPrice	double	The price of the underlying.

tickGeneric()

This method is called when the market data changes. Values are updated immediately with no delay.

void tickGeneric(int tickerId, int tickType, double value)

Parameter	Type	Description
tickerId	int	The ticker Id that was specified previously in the call to reqMktData()
tickType	int	Specifies the type of price. Pass the field value into TickType.getField(int tickType) to retrieve the field description. For example, a field value of 46 will map to shortable, etc.
value	double	The value of the specified field

tickString()

This method is called when the market data changes. Values are updated immediately with no delay.

void tickString(int tickerId, int tickType, String value)

Parameter	Type	Description
tickerId	int	The ticker Id that was specified previously in the call to reqMktData()
field	int	Specifies the type of price. Pass the field value into TickType.getField(int tickType) to retrieve the field description. For example, a field value of 45 will map to lastTimestamp, etc.
value	String	The value of the specified field

tickEFP()

This method is called when the market data changes. Values are updated immediately with no delay.

void tickEFP(int tickerId, int tickType, double basisPoints, String formattedBasisPoints, double impliedFuture, int holdDays, String futureExpiry, double dividendImpact, double dividendsToExpiry)

Parameter	Type	Description
tickerId	int	The ticker Id that was specified previously in the call to reqMktData()
field	int	Specifies the type of price. Pass the field value into TickType.getField(int tickType) to retrieve the field description. For example, a field value of 38 will map to bidEFP, etc.
basisPoints	double	Annualized basis points, which is representative of the financing rate that can be directly compared to broker rates

Parameter	Type	Description
formattedBasisPoints	String	Annualized basis points as a formatted string that depicts them in percentage form
impliedFuture	double	Implied futures price
holdDays	int	The number of hold days until the expiry of the EFP
futureExpiry	String	The expiration date of the single stock future
dividendImpact	double	The dividend impact upon the annualized basis points interest rate
dividendsToExpiry	double	The dividends expected until the expiration of the single stock future

tickSnapshotEnd()

This is called when a snapshot market data subscription has been fully handled and there is nothing more to wait for. This also covers the timeout case.

void tickSnapshotEnd(int reqId)

Parameter	Type	Description
reqID	int	Id of the data request.

marketDataType()

TWS sends a marketDataType(type) callback to the API, where type is set to Frozen or RealTime, to announce that market data has been switched between frozen and real-time. This notification occurs only when market data switches between real-time and frozen. The marketDataType( ) callback accepts a reqId parameter and is sent per every subscription because different contracts can generally trade on a different schedule.

void marketDataType(int reqId, int marketDataType)

Parameter	Type	Description
int reqId	int	Id of the data request
marketDataType	int	1 for real-time streaming market data or 2 for frozen market data..

orderStatus()

This method is called whenever the status of an order changes. It is also fired after reconnecting to TWS if the client has any open orders.

void orderStatus(int orderId, String status, int filled, int remaining, double avgFillPrice, int permId, int parentId, double lastFillPrice, int clientId, String whyHeld)

Note: It is possible that orderStatus() may return duplicate messages. It is essential that you filter the message accordingly.

Parameter	Type	Description
id	int	The order Id that was specified previously in the call to placeOrder()
status	String	The order status. Possible values include: • PendingSubmit - indicates that you have transmitted the order, but have not yet received confirmation that it has been accepted by the order destination. NOTE: This order status is not sent by TWS and should be explicitly set by the API developer when an order is submitted. • PendingCancel - indicates that you have sent a request to cancel the order but have not yet received cancel confirmation from the order destination. At this point, your order is not confirmed canceled. You may still receive an execution while your cancellation request is pending. NOTE: This order status is not sent by TWS and should be explicitly set by the API developer when an order is canceled. • PreSubmitted - indicates that a simulated order type has been accepted by the IB system and that this order has yet to be elected. The order is held in the IB system until the election criteria are met. At that time the order is transmitted to the order destination as specified . • Submitted - indicates that your order has been accepted at the order destination and is working. • Cancelled - indicates that the balance of your order has been confirmed canceled by the IB system. This could occur unexpectedly when IB or the destination has rejected your order. • Filled - indicates that the order has been completely filled. • Inactive - indicates that the order has been accepted by the system (simulated orders) or an exchange (native orders) but that currently the order is inactive due to system, exchange or other issues.
filled	int	Specifies the number of shares that have been executed. For more information about partial fills, see Order Status for Partial Fills.
remaining	int	Specifies the number of shares still outstanding.
avgFillPrice	double	The average price of the shares that have been executed. This parameter is valid only if the **filled** parameter value is greater than zero. Otherwise, the price parameter will be zero.
permId	int	The TWS id used to identify orders. Remains the same over TWS sessions.

Parameter	Type	Description
parentId	int	The order ID of the parent order, used for bracket and auto trailing stop orders.
lastFilledPrice	double	The last price of the shares that have been executed. This parameter is valid only if the filled parameter value is greater than zero. Otherwise, the price parameter will be zero.
clientId	int	The ID of the client (or TWS) that placed the order. Note that TWS orders have a fixed clientId and orderId of 0 that distinguishes them from API orders.
whyHeld	String	This field is used to identify an order held when TWS is trying to locate shares for a short sell. The value used to indicate this is 'locate'.

openOrder()

This method is called to feed in open orders.

void openOrder(int orderId, Contract contract, Order order, OrderState orderState)

Parameter	Type	Description
orderId	int	The order Id assigned by TWS. Used to cancel or update the order.
contract	Contract	The Contract class attributes describe the contract.
order	Order	The Order class attributes define the details of the order.
orderState	OrderState	The orderState attributes include margin and commissions fields for both pre and post trade data.

openOrderEnd()

This is called at the end of a given request for open orders.

void openOrderEnd()

nextValidId()

This method is called after a successful connection to TWS.

void nextValidId(int orderId)

Parameter	Type	Description
orderId	int	The next available order Id received from TWS upon connection. Increment all successive orders by one based on this Id.

deltaNeutralValidation()

Upon accepting a Delta-Neutral RFQ(request for quote), the server sends a deltaNeutralValidation() message with the UnderComp structure. If the delta and price fields are empty in the original request, the confirmation will contain the current values from the server. These values are locked when the RFQ is processed and remain locked until the RFQ is canceled.

void deltaNeutralValidation(int reqId, UnderComp underComp)

Parameter	Type	Description
reqID	int	The Id of the data request.
underComp	UnderComp	Underlying component.

updateAccountValue()

This method is called only when reqAccountUpdates() method on the EClientSocket object has been called.

void updateAccountValue(String key, String value, String currency, String accountName)

Parameter	Type	Description
key	String	A string that indicates one type of account value. There is a long list of possible keys that can be sent, here are just a few examples: • CashBalance - account cash balance • DayTradesRemaining - number of day trades left • EquityWithLoanValue - equity with Loan Value • InitMarginReq - current initial margin requirement • MaintMarginReq - current maintenance margin • NetLiquidation - net liquidation value
value	String	The value associated with the key.
currency	String	Defines the currency type, in case the value is a currency type.
account	String	States the account the message applies to. Useful for Financial Advisor sub-account messages.

updatePortfolio()

This method is called only when reqAccountUpdates() method on the EClientSocket object has been called.

void updatePortfolio(Contract contract, int position, double marketPrice, double marketValue, double averageCost, double unrealizedPNL, double realizedPNL, String accountName)

Parameter	Type	Description
contract	Contract	This structure contains a description of the contract which is being traded. The exchange field in a contract is not set for portfolio update.
position	int	This integer indicates the position on the contract. If the position is 0, it means the position has just cleared.
marketPrice	double	The unit price of the instrument.
marketValue	double	The total market value of the instrument.
averageCost	double	The average cost per share is calculated by dividing your cost (execution price + commission) by the quantity of your position.
unrealizedPNL	double	The difference between the current market value of your open positions and the average cost, or Value - Average Cost.
realizedPNL	double	Shows your profit on closed positions, which is the difference between your entry execution cost (execution price + commissions to open the position) and exit execution cost ((execution price + commissions to close the position)
accountName	String	The name of the account to which the message applies. Useful for Financial Advisor sub-account messages.

updateAccountTime()

This method is called only when reqAccountUpdates() method on the EClientSocket object has been called.

void updateAccountTime(String timeStamp)

Parameter	Type	Description
timeStamp	String	This indicates the last update time of the account information

accountDownloadEnd()

This event is called after a batch updateAccountValue() and updatePortfolio() is sent.

void accountDownloadEnd(String accountName)

Parameter	Type	Description
accountName	String	The name of the account.

accountSummary()

Returns the data from the TWS Account Window Summary tab in response to reqAccountSummary().

void accountSummary(int reqId, String account, String tag, String value, String currency)

Parameter	Type	Description
reqId	int	The ID of the data request.
account	String	The account ID.

Parameter	Type	Description
tag	String	The tag from the data request. Available tags are: • *AccountType* • *TotalCashValue* — Total cash including futures pnl • *SettledCash* — For cash accounts, this is the same as TotalCashValue • *AccruedCash* — Net accrued interest • *BuyingPower* — The maximum amount of marginable US stocks the account can buy • *EquityWithLoanValue* — Cash + stocks + bonds + mutual funds • *PreviousEquityWithLoanValue* • *GrossPositionValue* — The sum of the absolute value of all stock and equity option positions • *RegTEquity* • *RegTMargin* • *SMA* — Special Memorandum Account • *InitMarginReq* • *MaintMarginReq* • *AvailableFunds* • *ExcessLiquidity* • *Cushion* — Excess liquidity as a percentage of net liquidation value • *FullInitMarginReq* • *FullMaintMarginReq* • *FullAvailableFunds* • *FullExcessLiquidity* • *LookAheadNextChange* — Time when look-ahead values take effect • *LookAheadInitMarginReq* • *LookAheadMaintMarginReq* • *LookAheadAvailableFunds* • *LookAheadExcessLiquidity* • *HighestSeverity* — A measure of how close the account

Parameter	Type	Description
		is to liquidation • *DayTradesRemaining* — The Number of Open/Close trades a user could put on before Pattern Day Trading is detected. A value of "-1" means that the user can put on unlimited day trades. • *Leverage* — GrossPositionValue / NetLiquidation
value	String	The value of the tag.
currency	String	The currency of the tag.

accountSummaryEnd

This method is called once all account summary data for a given request are received.

void accountSummaryEnd(int reqId)

Parameter	Type	Descrption
reqId	int	The ID of the data request.

position()

This event returns real-time positions for all accounts in response to the reqPositions() method.

void position(String account, Contract contract, int pos)

Parameter	Type	Description
account	String	The account.
contract	Contract	This structure contains a full description of the contract that was executed.
pos	double	The position.

positionEnd()

This is called once all position data for a given request are received and functions as an end marker for the position() data.

void positionEnd()

contractDetails()

This method is called only when reqContractDetails method on the EClientSocket object has been called.

void contractDetails(int ReqId, ContractDetails contractDetails)

Parameter	Type	Description
reqID	int	The ID of the data request. Ensures that responses are matched to requests if several requests are in process.

Parameter	Type	Description
contractDetails	ContractDetails	This structure contains a full description of the contract being looked up.

contractDetailsEnd()

This method is called once all contract details for a given request are received. This helps to define the end of an option chain.

void contractDetailsEnd(int reqId)

Parameter	Type	Description
reqID	int	The Id of the data request.

bondContractDetails()

This method is called only when reqContractDetails method on the EClientSocket object has been called for bonds.

void bondContractDetails(int reqId, ContractDetails contractDetails)

Parameter	Type	Description
reqId	int	The ID of the data request.
contractDetails	ContractDetails	This structure contains a full description of the bond contract being looked up.

execDetails()

This method is called when the reqExecutions() method is invoked, or when an order is filled.

void execDetails(int reqId, Contract contract, Execution execution)

Parameter	Type	Description
reqId	int	The reqID that was specified previously in the call to reqExecution().
contract	Contract	This structure contains a full description of the contract that was executed. **Note:** Refer to the Java SocketClient Properties page for more information.
execution	Execution	This structure contains addition order execution details.

execDetailsEnd()

This method is called once all executions have been sent to a client in response to reqExecutions().

void execDetailsEnd(int reqId)

Parameter	Type	Description
reqID	int	The Id of the data request.

commissionReport()

The commissionReport() callback is triggered as follows:

- Immediately after a trade execution
- By calling reqExecutions().

void commissionReport(CommissionReport commissionReport)

Parameter	Type	Description
commissionReport	CommissionReport	The structure that contains commission details.

updateMktDepth()

This method is called when the market depth changes.

void updateMktDepth(int tickerId, int position, int operation, int side, double price, int size)

Parameter	Type	Description
tickerId	int	The ticker Id that was specified previously in the call to reqMktDepth()
position	int	Specifies the row Id of this market depth entry.
operation	int	Identifies how this order should be applied to the market depth. Valid values are: • 0 = insert (insert this new order into the row identified by 'position')· • 1 = update (update the existing order in the row identified by 'position')· • 2 = delete (delete the existing order at the row identified by 'position')
side	int	Identifies the side of the book that this order belongs to. Valid values are: • 0 = ask • 1 = bid
price	double	The order price.
size	int	The order size.

updateMktDepthL2()

This method is called when the Level II market depth changes.

void updateMktDepthL2(int tickerId, int position, String marketMaker, int operation, int side, double price, int size)

Parameter	Type	Description
tickerId	int	The ticker Id that was specified previously in the call to reqMktDepth()
position	int	Specifies the row id of this market depth entry.
marketMaker	String	Specifies the exchange hosting this order.
operation	int	Identifies the how this order should be applied to the market depth. Valid values are: • 0 = insert (insert this new order into the row identified by 'position')· • 1 = update (update the existing order in the row identified by 'position')· • 2 = delete (delete the existing order at the row identified by 'position')
side	int	Identifies the side of the book that this order belongs to. Valid values are: • 0 = ask • 1 = bid
price	double	The order price.
size	int	The order size.

updateNewsBulletin()

This method is triggered for each new bulletin if the client has subscribed (i.e. by calling the reqNewsBulletins() method.

void updateNewsBulletin(int msgId, int msgType, String message, String origExchange)

Parameter	Type	Description
msgId	int	The bulletin ID, incrementing for each new bulletin.
msgType	int	Specifies the type of bulletin. Valid values include: • 1 = Regular news bulletin • 2 = Exchange no longer available for trading • 3 = Exchange is available for trading
message	String	The bulletin's message text.
origExchange	String	The exchange from which this message originated.

managedAccounts()

This method is called when a successful connection is made to an account. It is also called when the reqManagedAccts() method is invoked.

void managedAccounts(String accountsList)

Parameter	Type	Description
accountsList	String	The comma delimited list of FA managed accounts.

receiveFA()

This method receives previously requested FA configuration information from TWS.

receiveFA(int faDataType, String xml)

Parameter	Type	Description
faDataType	int	Specifies the type of Financial Advisor configuration data being received from TWS. Valid values include: • 1 = GROUPS • 2 = PROFILE • 3 =ACCOUNT ALIASES
xml	String	The XML string containing the previously requested FA configuration information.

historicalData()

This method receives the requested historical data results.

void historicalData (int reqId, String date, double open, double high, double low, double close, int volume, int count, double WAP, boolean hasGaps)

Parameter	Type	Description
reqId	int	The ticker Id of the request to which this bar is responding.
date	String	The date-time stamp of the start of the bar. The format is determined by the reqHistoricalData() formatDate parameter.
open	double	The bar opening price.
high	double	The high price during the time covered by the bar.
low	double	The low price during the time covered by the bar.
close	double	The bar closing price.
volume	int	The volume during the time covered by the bar.

Parameter	Type	Description
count	int	When TRADES historical data is returned, represents the number of trades that occurred during the time period the bar covers
WAP	double	The weighted average price during the time covered by the bar.
hasGaps	boolean	Whether or not there are gaps in the data.

scannerParameters()

This method receives an XML document that describes the valid parameters that a scanner subscription can have.

void scannerParameters(String xml)

Parameter	Type	Description
xml	String	A document describing available scanner subscription parameters.

scannerData()

This method receives the requested market scanner data results.

void scannerData(int reqId, int rank, ContractDetails contractDetails, String distance, String benchmark, String projection, String legsStr)

Parameter	Type	Description
reqId	int	The ID of the request to which this row is responding.
rank	int	The ranking within the response of this bar.
contractDetails	ContractDetails	This structure contains a full description of the contract that was executed.
distance	String	Varies based on query.
benchmark	String	Varies based on query.
projection	String	Varies based on query.
legsStr	String	Describes combo legs when scan is returning EFP.

scannerDataEnd()

This method is called when the snapshot is received and marks the end of one scan.

void scannerDataEnd(int reqId)

Parameter	Type	Description
reqId	int	The ID of the market data snapshot request being closed by this parameter.

realtimeBar()

This method receives the real-time bars data results.

void realtimeBar(int reqId, long time, double open, double high, double low, double close, long volume, double wap, int count)

Parameter	Type	Description
reqId	int	The ticker ID of the request to which this bar is responding.
time	long	The date-time stamp of the start of the bar. The format is determined by the reqHistoricalData() formatDate parameter.
open	double	The bar opening price.
high	double	The high price during the time covered by the bar.
low	double	The low price during the time covered by the bar.
close	double	The bar closing price.
volume	long	The volume during the time covered by the bar.
wap	double	The weighted average price during the time covered by the bar.
count	int	When TRADES historical data is returned, represents the number of trades that occurred during the time period the bar covers.

fundamentalData()

This method is called to receive Reuters global fundamental market data. There must be a subscription to Reuters Fundamental set up in Account Management before you can receive this data.

void fundamentalData(int reqId, String data)

Parameter	Type	Description
reqId	int	The ID of the data request.
data	String	One of these XML reports: • Company overview • Financial summary • Financial ratios • Financial statements • Analyst estimates • Company calendar

displayGroupList()

This callback is a one-time response to queryDisplayGroups().

displayGroupList(int reqId As Integer, String groups)

Parameter	Type	Description
reqtId	int	The requestId specified in queryDisplayGroups().
groups	String	A list of integers representing visible group ID separated by the "|" character, and sorted by most used group first. This list will not change during TWS session (in other words, user cannot add a new group; sorting can change though). Example: "3|1|2"

displayGroupUpdated()

This is sent by TWS to the API client once after receiving the subscription request subscribeToGroupEvents(), and will be sent again if the selected contract in the subscribed display group has changed.

displayGroupList(int reqId, String contractInfo)

Parameter	Type	Description
requestId	int	The requestId specified in subscribeToGroupEvents().
contractInfo	String	The encoded value that uniquely represents the contract in IB. Possible values include: • none = empty selection • contractID@exchange – any non-combination contract. Examples: 8314@SMART for IBM SMART; 8314@ARCA for IBM @ARCA. • combo = if any combo is selected.

Java SocketClient Properties

The tables below define attributes for the following classes:

- Execution
- ExecutionFilter
- CommissionReport
- Contract
- ContractDetails
- ComboLeg
- Order
- OrderState
- ScannerSubscription
- UnderComp

Execution

Attribute	Description
String m_acctNumber	The customer account number.
double m_avgPrice	Average price. Used in regular trades, combo trades and legs of the combo. Does not include commissions.
int m_clientId	The id of the client that placed the order. Note: TWS orders have a fixed client id of "0."
int m_cumQty	Cumulative quantity. Used in regular trades, combo trades and legs of the combo.
String m_exchange	Exchange that executed the order.
String m_execId	Unique order execution id.
int m_liquidation	Identifies the position as one to be liquidated last should the need arise.
int m_orderId	The order id. **Note:** TWS orders have a fixed order id of "0."
int m_permId	The TWS id used to identify orders, remains the same over TWS sessions.
double m_price	The order execution price, not including commissions.
int m_shares	The number of shares filled.

Attribute	Description
String m_side	Specifies if the transaction was a sale or a purchase. Valid values are: • BOT • SLD
String m_time	The order execution time.
String m_evRule	Contains the Economic Value Rule name and the respective optional argument. The two values should be separated by a colon. For example, aussieBond:YearsToExpiration=3. When the optional argument is not present, the first value will be followed by a colon.
double m_evMultiplier	Tells you approximately how much the market value of a contract would change if the price were to change by 1. It cannot be used to get market value by multiplying the price by the approximate multiplier.

ExecutionFilter

Attribute	Description
String m_acctCode	Filter the results of the reqExecutions() method based on an account code. Note: this is only relevant for Financial Advisor (FA) accounts.
int m_clientId	Filter the results of the reqExecutions() method based on the clientId.
String m_exchange	Filter the results of the reqExecutions() method based on theorder exchange.
String m_secType	Filter the results of the reqExecutions() method based on the order security type. Note: Refer to the Contract struct for the list of valid security types.
String m_side	Filter the results of the reqExecutions() method based on the order action. Note: Refer to the Order class for the list of valid order actions.
String m_symbol	Filter the results of the reqExecutions() method based on the order symbol.
String m_time	Filter the results of the reqExecutions() method based on execution reports received after the specified time. The format for timeFilter is "yyyymmdd-hh:mm:ss"

CommissionReport

Attribute	Description
double m_commission()	The commission amount.
String m_currency()	The currency.
String m_execId()	Unique order execution id.
double m_realizedPNL()	The amount of realized Profit and Loss.
double m_yield()	The yield.
int m_yieldRedemptionDate()	Takes the YYYYMMDD format.

Contract

Attribute	Description
Vector m_comboLegs	Dynamic memory structure used to store the leg definitions for this contract.
String m_comboLegsDescrip	Description for combo legs
int m_conId	The unique contract identifier.
String m_currency	Specifies the currency. Ambiguities may require that this field be specified, for example, when SMART is the exchange and IBM is being requested (IBM can trade in GBP or USD). Given the existence of this kind of ambiguity, it is a good idea to always specify the currency.
String m_exchange	The order destination, such as Smart.
String m_expiry	The expiration date. Use the format YYYYMM.
boolean m_includeExpired	If set to true, contract details requests and historical data queries can be performed pertaining to expired contracts. Note: Historical data queries on expired contracts are limited to the last year of the contracts life, and are initially only supported for expired futures contracts,
String m_localSymbol	This is the local exchange symbol of the underlying asset.
String m_multiplier	Allows you to specify a future or option contract multiplier. This is only necessary when multiple possibilities exist.
String m_primaryExch	Identifies the listing exchange for the contract (do not list SMART).
String m_right	Specifies a Put or Call. Valid values are: P, PUT, C, CALL.

String m_secId	Unique identifier for the secIdType.
String m_secIdType	Security identifier, when querying contract details or when placing orders. Supported identifiers are: • SIN (Example: Apple: US0378331005) • CUSIP (Example: Apple: 037833100) • SEDOL (Consists of 6-AN + check digit. Example: BAE: 0263494) • RIC (Consists of exchange-independent RIC Root and a suffix identifying the exchange. Example: AAPL.O for Apple on NASDAQ.)
String m_secType	This is the security type. Valid values are: • STK • OPT • FUT • IND • FOP • CASH • BAG • NEWS
double m_strike	The strike price.
String m_symbol	This is the symbol of the underlying asset.
String m_tradingClass	The trading class name for this contract.

ContractDetails

Attribute	Description
String m_category	The industry category of the underlying. For example, InvestmentSvc.
String m_contractMonth	The contract month. Typically the contract month of the underlying for a futures contract.
String m_industry	The industry classification of the underlying/product. For example, Financial.
String m_liquidHours	The regular trading hours of the product. For example, 20090507:0930-1600;20090508:CLOSED.
String m_longName	Descriptive name of the asset.

String m_marketName	The market name for this contract.
double m_minTick	The minimum price tick.
String m_orderTypes	The list of valid order types for this contract.
String m_priceMagnifier	Allows execution and strike prices to be reported consistently with market data, historical data and the order price, i.e. Z on LIFFE is reported in index points and not GBP.
Vector<TagValue> m_ secIdList()	A list of contract identifiers that the customer is allowed to view (CUSIP, ISIN, etc.)
String m_subcategory	The industry subcategory of the underlying. For example, Brokerage.
Contract m_summary	A contract summary.
String m_timeZoneId	The ID of the time zone for the trading hours of the product. For example, EST.
String m_tradingHours	The total trading hours of the product. For example, 20090507:0700-1830,1830-2330;20090508:CLOSED.
String m_underConId	The underlying contract ID.
String m_validExchanges	The list of exchanges this contract is traded on.
String m_evRule	Contains the Economic Value Rule name and the respective optional argument. The two values should be separated by a colon. For example, aussieBond:YearsToExpiration=3. When the optional argument is not present, the first value will be followed by a colon.
double m_evMultiplier	Tells you approximately how much the market value of a contract would change if the price were to change by 1. It cannot be used to get market value by multiplying the price by the approximate multiplier.
Bond Values	
String m_bondType	For Bonds. The type of bond, such as "CORP."
boolean m_callable	For Bonds. Values are True or False. If true, the bond can be called by the issuer under certain conditions.
boolean m_convertible	For Bonds. Values are True or False. If true, the bond can be converted to stock under certain conditions.
double m_coupon	For Bonds. The interest rate used to calculate the amount you will receive in interest payments over the course of the year.
String m_couponType	For Bonds. The type of bond coupon.

String m_cusip	For Bonds. The nine-character bond CUSIP or the 12-character SEDOL.
String m_descAppend	For Bonds. A description string containing further descriptive information about the bond.
String m_issueDate	For Bonds. The date the bond was issued.
String m_maturity	For Bonds. The date on which the issuer must repay the face value of the bond.
String m_nextOptionDate	For Bonds, only if bond has embedded options.
boolean m_nextOptionPartial	For Bonds, only if bond has embedded options.
boolean m_putable	For Bonds. Values are True or False. If true, the bond can be sold back to the issuer under certain conditions.
String m_ratings	For Bonds. Identifies the credit rating of the issuer. A higher credit rating generally indicates a less risky investment. Bond ratings are from Moody's and S&P respectively.
String m_nextOptionType	For Bonds, only if bond has embedded options.
String m_notes	For Bonds, if populated for the bond in IB's database

ComboLeg

Attribute	Description
String m_action	The side (buy or sell) for the leg you are constructing.
int m_conId	The unique contract identifier specifying the security.
String m_designatedLocation	If shortSaleSlot == 2, the designatedLocation must be specified. Otherwise leave blank or orders will be rejected.
String m_exchange	The exchange to which the complete combination order will be routed.
int m_openClose	Specifies whether the order is an open or close order. Valid values are: • 0 - Same as the parent security. This is the only option for retail customers. • 1 - Open. This value is only valid for institutional customers. • 2 - Close. This value is only valid for institutional customers. • Unknown - (3)

Attribute	Description
int m_ratio	Select the relative number of contracts for the leg you are constructing. To help determine the ratio for a specific combination order, refer to the Interactive Analytics section of the User's Guide.
int m_shortSaleSlot	For institutional customers only. • 0 - inapplicable (i.e. retail customer or not short leg) • 1 - clearing broker • 2 - third party. If this value is used, you must enter a designated location.

OrderComboLeg

Attribute	Description
double m_price	Order-specific leg price.

Order

Attribute	Description
Order Identifiers	
int m_clientId	The id of the client that placed this order.
int m_orderId	The id for this order.
int m_permid	The TWS id used to identify orders, remains the same over TWS sessions.
Main Order Fields	
String m_action	Identifies the side. Valid values are: BUY, SELL, SSHORT
double m_auxPrice	This is the STOP price for stop-limit orders, and the offset amount for relative orders. In all other cases, specify zero.
double m_lmtPrice	This is the LIMIT price, used for limit, stop-limit and relative orders. In all other cases specify zero. For relative orders with no limit price, also specify zero.
String m_orderType	Identifies the order type. For more information about supported order types, see Supported Order Types.
long m_totalQuantity	The order quantity.
Extended Order Fields	
boolean m_allOrNone	0 = no, 1 = yes

Attribute	Description
boolean m_blockOrder	If set to true, specifies that the order is an ISE Block order.
int m_displaySize	The publicly disclosed order size, used when placing Iceberg orders.
String m_goodAfterTime	The trade's "Good After Time," format "YYYYMMDD hh:mm:ss (optional time zone)" Use an empty String if not applicable.
String m_goodTillDate	You must enter GTD as the time in force to use this string. The trade's "Good Till Date," format "YYYYMMDD hh:mm:ss (optional time zone)" Use an empty String if not applicable.
boolean hidden	If set to true, the order will not be visible when viewing the market depth. This option only applies to orders routed to the ISLAND exchange.
int m_minQty	Identifies a minimum quantity order type.
String m_ocaGroup	Identifies an OCA (one cancels all) group.
int m_ocaType	Tells how to handle remaining orders in an OCA group when one order or part of an order executes. Valid values include: • 1 = Cancel all remaining orders with block • 2 = Remaining orders are proportionately reduced in size with block • 3 = Remaining orders are proportionately reduced in size with no block If you use a value "with block" gives your order has overfill protection. This means that only one order in the group will be routed at a time to remove the possibility of an overfill.
String m_orderRef	The order reference. Intended for institutional customers only, although all customers may use it to identify the API client that sent the order when multiple API clients are running.
boolean m_outsideRth	If set to true, allows orders to also trigger or fill outside of regular trading hours.
int m_parentId	The order ID of the parent order, used for bracket and auto trailing stop orders.
double m_percentOffset	The percent offset amount for relative orders.

Attribute	Description
boolean overridePercentageConstraints	Precautionary constraints are defined on the TWS Presets page, and help ensure tha tyour price and size order values are reasonable. Orders sent from the API are also validated against these safety constraints, and may be rejected if any constraint is violated. To override validation, set this parameter's value to True. Valid values include: • 0 = False • 1 = True
string m_rule80A	Values include: • Individual = 'I' • Agency = 'A', • AgentOtherMember = 'W' • IndividualPTIA = 'J' • AgencyPTIA = 'U' • AgentOtherMemberPTIA = 'M' • IndividualPT = 'K' • AgencyPT = 'Y' • AgentOtherMemberPT = 'N'
boolean m_sweepToFill	If set to true, specifies that the order is a Sweep-to-Fill order.
String m_tif	The time in force. Valid values are: DAY, GTC, IOC, GTD.
bool m_transmit	Specifies whether the order will be transmitted by TWS. If set to false, the order will be created at TWS but will not be sent.

Attribute	Description
int m_triggerMethod	Specifies how Simulated Stop, Stop-Limit and Trailing Stop orders are triggered. Valid values are: • 0 - The default value. The "double bid/ask" function will be used for orders for OTC stocks and US options. All other orders will used the "last" function. • 1 - use "double bid/ask" function, where stop orders are triggered based on two consecutive bid or ask prices. • 2 - "last" function, where stop orders are triggered based on the last price. • 3 double last function. • 4 bid/ask function. • 7 last or bid/ask function. • 8 mid-point function.
double m_trailStopPrice	For TRAILLIMIT orders only
double m_trailingPercent	Specify the trailing amount of a trailing stop order as a percentage. Observe the following guidelines when using the trailingPercent field: • This field is mutually exclusive with the existing trailing amount. That is, the API client can send one or the other but not both. • This field is read AFTER the stop price (barrier price) as follows: deltaNeutralAuxPrice stopPrice trailingPercent scale order attributes • The field will also be sent to the API in the openOrder message if the API client version is >= 56. It is sent after the stopPrice field as follows: stopPrice trailingPct basisPoint
String m_activeStartTime	For GTC orders.
String m_activeStopTime	For GTC orders.
Financial Advisor Fields	
String m_faGroup	The Financial Advisor group the trade will be allocated to -- use an empty String if not applicable.
String m_faMethod	The Financial Advisor allocation function the trade will be allocated with -- use an empty String if not applicable.

Attribute	Description
String m_faPercentage	The Financial Advisor percentage concerning the trade's allocation -- use an empty String if not applicable.
String m_faProfile	The Financial Advisor allocation profile the trade will be allocated to -- use an empty String if not applicable.
Institutional (non-cleared) Only	
String m_designatedLocation	Used only when shortSaleSlot = 2.
String m_openClose	For institutional customers only. Valid values are O, C.
int m_origin	The order origin. For institutional customers only. Valid values are 0 = customer, 1 = firm
int m_shortSaleSlot	Valid values are 1 or 2.
SMART Routing Only	
double m_discretionaryAmt	The amount off the limit price allowed for discretionary orders.
boolean m_eTradeOnly	Trade with electronic quotes. 0 = no, 1 = yes
boolean m_firmQuoteOnly	Trade with firm quotes. 0 = no, 1 = yes
double m_nbboPriceCap	Maximum smart order distance from the NBBO.
boolean m_optOutSmartRouting	Use to opt out of default SmartRouting for orders routed directly to ASX. This attribute defaults to false unless explicitly set to true. When set to false, orders routed directly to ASX will NOT use SmartRouting. When set to true, orders routed directly to ASX orders WILL use SmartRouting.
BOX or VOL Orders Only	
int m_auctionStrategy	Values include: • match = 1 • improvement = 2 • transparent = 3 For orders on BOX only.
BOX Exchange Orders Only	
double m_delta	The stock delta. For orders on BOX only.
double m_startingPrice	The auction starting price. For orders on BOX only.
double m_stockRefPrice	The stock reference price. The reference price is used for VOL orders to compute the limit price sent to an exchange (whether or not Continuous Update is selected), and for price range monitoring.

Attribute	Description
Pegged-to-Stock and VOL Orders Only	
double m_stockRangeLower	The lower value for the acceptable underlying stock price range. For price improvement option orders on BOX and VOL orders with dynamic management.
double m_stockRangeUpper	The upper value for the acceptable underlying stock price range. For price improvement option orders on BOX and VOL orders with dynamic management.
Volatility Orders Only	
boolean m_continuousUpdate	VOL orders only. Specifies whether TWS will automatically update the limit price of the order as the underlying price moves.
String m_deltaNeutralOrderType	VOL orders only. Enter an order type to instruct TWS to submit a delta neutral trade on full or partial execution of the VOL order. For no hedge delta order to be sent, specify NONE.
int m_deltaNeutralAuxPrice	VOL orders only. Use this field to enter a value if the value in the *deltaNeutralOrderType* field is an order type that requires an Aux price, such as a REL order.
int m_referencePriceType	VOL orders only. Specifies how you want TWS to calculate the limit price for options, and for stock range price monitoring. Valid values include: • 1 = Average of NBBO • 2 = NBB or the NBO depending on the action and right.
double m_volatility	The option price in volatility, as calculated by TWS' Option Analytics. This value is expressed as a percent and is used to calculate the limit price sent to the exchange.
int m_volatilityType	Values include: • 1 = Daily volatility • 2 = Annual volatility
String m_deltaNeutralOpenClose	Specifies whether the order is an Open or a Close order and is used when the hedge involves a CFD and the order is clearing away.
boolean m_deltaNeutralShortSale	Used when the hedge involves a stock and indicates whether or not it is sold short.

Attribute	Description
int m_deltaNeutralShortSaleSlot	Has a value of 1 (the clearing broker holds shares) or 2 (delivered from a third party). If you use 2, then you must specify a deltaNeutralDesignatedLocation.
String m_deltaNeutralDesignatedLocation	Used only when deltaNeutralShortSaleSlot = 2.
Combo Orders Only	
double m_basisPoints	For EFP orders only
int m_basisPointsType	For EFP orders only
Scale Orders Only	
boolean m_scaleAutoReset()	For extended Scale orders.
int m_scaleInitFillQty()	For extended Scale orders.
int m_scaleInitLevelSize	For Scale orders: Defines the size of the first, or initial, order component.
int m_scaleInitPosition()	For extended Scale orders.
int m_scalePriceAdjustInterval()	For extended Scale orders.
double m_scalePriceAdjustValue()	For extended Scale orders.
double m_scalePriceIncrement	For Scale orders: Defines the price increment between scale components. This field is required.
double m_scaleProfitOffset()	For extended Scale orders.
boolean m_scaleRandomPercent()	For extended Scale orders.
int m_scaleSubsLevelSize	For Scale orders: Defines the order size of the subsequent scale order components. Used in conjunction with scaleInitLevelSize ().
String m_scaleTable	Manual table for Scale orders.
Hedge Orders Only	
String m_hedgeParam	Beta = x for Beta hedge orders, ratio = y for Pair hedge order

Attribute	Description
String m_hedgeType	For hedge orders. Possible values are: • D = Delta • B = Beta • F = FX • P = Pair
Clearing Information	
String m_account	The account. For institutional customers only.
String m_clearingAccount	For IBExecution customers: Specifies the true beneficiary of the order. This value is required for FUT/FOP orders for reporting to the exchange.
String m_clearingIntent	For IBExecution customers: Valid values are: IB, Away, and PTA (post trade allocation).
String m_settlingFirm	Institutional only.
Algo Orders Only	
String m_algoStrategy	For information about API Algo orders, see IBAlgo Parameters.
Vector<TagValue> m_algoParams	Support for IBAlgo parameters.
String m_algoId	Identifies an order generated by algorithmic trading.
Solicited Orders	
boolean m_solicited	True = solicited (orders initiated by a broker through the brokers research and design) False = unsolicited (those instigated by a broker's customer either through their actions or by the broker at their direction)
What If	
boolean m_whatIf	Use to request pre-trade commissions and margin information. If set to true, margin and commissions data is received back via the OrderState() object for the openOrder() callback.
Smart Combo Routing	
Vector<TagValue> m_smartComboRoutingParams	Support for Smart Combo Routing.
Order Combo Legs	

Attribute	Description
OrderComboLegs() As Object	Holds attributes for all legs in a combo order.
Not Held	
boolean m_notHeld	For IBDARK orders only. Orders routed to IBDARK are tagged as “post only” and are held in IB's order book, where incoming SmartRouted orders from other IB customers are eligible to trade against them.
Internal use only	
Vector<TagValue> m_orderMiscOptions	For internal use only. Use the default value XYZ.

OrderState

Attribute	Description
double m_commission	Shows the commission amount on the order.
String m_commissionCurrency	Shows the currency of the commission value.
String m_equityWithLoan	Shows the impact the order would have on your equity with loan value.
String m_initMargin	Shows the impact the order would have on your initial margin.
String m_maintMargin	Shows the impact the order would have on your maintenance margin.
double m_maxCommission	Used in conjunction with the minCommission field, this defines the highest end of the possible range into which the actual order commission will fall.
double m_minCommission	Used in conjunction with the maxCommission field, this defines the lowest end of the possible range into which the actual order commission will fall.
string m_status	Displays the order status.
String m_warningText	Displays a warning message if warranted.

ScannerSubscription

Attribute	Description
double m_abovePrice	Filter out contracts with a price lower than this value. Can be left blank.

Attribute	Description
int m_aboveVolume	Filter out contracts with a volume lower than this value. Can be left blank.
int m_averageOptionVolumeAbove	Can leave empty.
double m_belowPrice	Filter out contracts with a price higher than this value. Can be left blank.
double m_couponRateAbove	Filter out contracts with a coupon rate lower than this value. Can be left blank.
double m_couponRateBelow	Filter out contracts with a coupon rate higher than this value. Can be left blank.
String m_excludeConvertible	Filter out convertible bonds. Can be left blank.
String m_instrument	Defines the instrument type for the scan.
String m_locationCode	The location.
String m_maturityDateAbove	Filter out contracts with a maturity date earlier than this value. Can be left blank.
String m_maturityDateBelow	Filter out contracts with a maturity date later than this value. Can be left blank.
double m_marketCapAbove	Filter out contracts with a market cap lower than this value. Can be left blank.
double m_marketCapBelow	Filter out contracts with a market cap above this value. Can be left blank.
String m_moodyRatingAbove	Filter out contracts with a Moody rating below this value. Can be left blank.
String m_moodyRatingBelow	Filter out contracts with a Moody rating above this value. Can be left blank.
int m_numberOfRows	Defines the number of rows of data to return for a query.
String m_scanCode	Can be left blank.
String m_scannerSettingPairs	Can leave empty. For example, a pairing "Annual, true" used on the "top Option Implied Vol % Gainers" scan would return annualized volatilities.
String m_spRatingAbove	Filter out contracts with an S&P rating below this value. Can be left blank.
String m_spRatingBelow	Filter out contracts with an S&P rating above this value. Can be left blank.

Attribute	Description
String m_stockTypeFilter	Valid values are: • CORP = Corporation • ADR = American Depositary Receipt • ETF = Exchange Traded Fund • REIT = Real Estate Investment Trust • CEF = Closed End Fund

UnderComp

Attribute	Description
int m_conId	The unique contract identifier specifying the security. Used for Delta-Neutral Combo contracts.
double m_delta	The underlying stock or future delta. Used for Delta-Neutral Combo contracts.
double m_price	The price of the underlying. Used for Delta-Neutral Combo contracts.

Placing a Combination Order

A combination order is a special type of order that is constructed of many separate legs but executed as a single transaction. Submit combo orders such as calendar spreads, conversions and straddles using the BAG security type (defined in the *Contract* object). The key to implementing a successful API combination order using the API is to knowing how to place the same order using Trader Workstation. If you are familiar with placing combination orders in TWS, then it will be easier to place the same order using the API, because the API only imitates the behavior of TWS.

Example

In this example, a customer places a BUY order on a calendar spread for GOOG. To buy one calendar spread means:

Leg 1: Sell 1 GOOG OPT SEP 18 '09 150.0 CALL (100)

Leg 2: Buy 1 GOOG OPT JAN 21 '11 150.0 CALL (100)

Here is a summary of the steps required to place a combo order using the API:

- Obtain the contract id (conId) for each leg. Get this number by invoking the reqContractDetails() method.
- · Include each leg on the ComboLeg object by populating the related fields.
- · Implement the placeOrder() method with the Contract and Order socket client properties.

To place this combo order

1. Get the Contract IDs for both leg definitions:

```
//First leg

Contract con1 = new Contract();

con1.m_symbol = "GOOG";
con1.m_secType = "OPT";
con1.m_expiry = “200909”;
con1.m_strike = 150.0
con1.m_right = “C”
con1.m_multiplier = “100”
con1.m_exchange = "SMART”;
con1.m_currency = "USD";

.reqContractDetails(1, con1);

//Second leg

Contract con2 = new Contract();

con2.m_symbol = "GOOG";
con2.m_secType = "OPT";
con2.m_expiry = “201101”;
con2.m_strike = 150.0
con2.m_right = “C”
con2.m_multiplier = “100”
con2.m_exchange = "SMART”;
```

```
con2.m_currency = "USD";

.reqContractDetails(2, con2);

//All conId numbers are delivered by the ContractDetail()

static public String contractDetails(int reqId, ContractDetails con-
tractDetails) {

Contract contract = contractDetails.m_summary;

/*Base on the request above,
reqId = 1 is corresponding to the first request or first leg
reqId = 2 is corresponding to the second request or second leg*/

if (reqId == 1)
{ Leg1_conId = contract.m_conId;} // to obtain conId for first leg

if (reqId == 2)
{ Leg2_conId = contract.m_conId;} // to obtain conId for second leg
}
```

2. Once the program has acquired the conId value for each leg, include it in the ComboLeg object:

```
ComboLeg leg1 = new ComboLeg(); // for the first leg
ComboLeg leg2 = new ComboLeg(); // for the second leg
Vector addAllLegs = new Vector();

leg1.m_conId = Leg1_conId;
leg1.m_ratio = 1;
leg1.m_action = "SELL";
leg1.m_exchange = "SMART";
leg1.m_openClose = 0;
leg1.m_shortSaleSlot = 0;
leg1.m_designatedLocation = "";

leg2.m_conId = Leg2_conId;
leg2.m_ratio = 1;
leg2.m_action = "BUY";
leg2.m_exchange = "SMART";
leg2.m_openClose = 0;
leg2.m_shortSaleSlot = 0;
leg2.m_designatedLocation = "";

addAllLegs.add(leg1);
addAllLegs.add(leg2);
```

3. Invoke the placeOrder() method with the appropriate contract and order objects:

```
Contract contract = new Contract();
Order order = new Order();

contract.m_symbol = "USD";     // For combo order use “USD” as the symbol value
all the time
```

```
contract.m_secType = "BAG";   // BAG is the security type for COMBO order
contract.m_exchange = "SMART";
contract.m_currency = "USD";
contract.m_comboLegs = addAllLegs; //including combo order in contract object

order.m_action = "BUY";
order.m_totalQuantity = 1;
order.m_orderType = "MKT"
.placeOrder(OrderId, contract, order);
```

Note: For more information on combination orders, see the TWS Users Guide topic About Combination Orders.

Java Code Samples: Contract Parameters

This section includes the following Java code samples:

How to Determine an Option Contract

Example 1 - Standard Method of Determining an Option Contract

```
void onHowToDetermineOption(){

     Contract contract = new Contract();
    Order order = new Order();

    contract.m_symbol = "IBKR";
    contract.m_secType = "OPT";
    contract.m_expiry = "20120316";
    contract.m_strike = 20.0;
    contract.m_right = "P";
    contract.m_multiplier = "100";
    contract.m_exchange = "SMART";
    contract.m_currency = "USD";

    order.m_action = "BUY";
    order.m_totalQuantity = 1;
    order.m_orderType = "LMT";
    order.m_lmtPrice = enteredLmtPrice;

    m_client.placeOrder(GlobalOrderId, contract, order);
}
```

Example 2 - Determining an Option Contract Using OCC Option Symbology Initiative

```
void inUsingOptionSymbologyInitiative(){

    Contract contract = new Contract();
    Order order = new Order();

    contract.m_localSymbol = "IBKR  120317P00020000"; //OSI
             contract.m_secType = "OPT";
    contract.m_exchange = "SMART";
    contract.m_currency = "USD";

    order.m_action = "BUY";
    order.m_totalQuantity = 1;
    order.m_orderType = "LMT";
    order.m_lmtPrice = enteredLmtPrice;
```

```
   m_client.placeOrder(GlobalOrderId, contract, order);

}
```

How to Determine a Futures Contract

Example 1 - Standard Method of Determining a Futures Contract

```
void onHowtoDetermineFuture(){

   Contract contract = new Contract();
   Order order = new Order();

   contract.m_symbol = "ES";
   contract.m_secType = "FUT";
   contract.m_expiry = "201109";
   contract.m_exchange = "GLOBEX";
   contract.m_currency = "USD";

   order.m_action = "BUY";
   order.m_totalQuantity = 1;
   order.m_orderType = "LMT";
   order.m_lmtPrice = enteredLmtPrice;

   m_client.placeOrder(GlobalOrderId, contract, order);
}
```

Example 2 - Determining a Futures Contract Using the Local Symbol

```
void inUsingLocalSymbolForFuture(){

   Contract contract = new Contract();
   Order order = new Order();

   contract.m_localSymbol = "ESU1";
   contract.m_secType = "FUT";
   contract.m_exchange = "GLOBEX";
   contract.m_currency = "USD";

   order.m_action = "BUY";
   order.m_totalQuantity = 1;
   order.m_orderType = "LMT";
   order.m_lmtPrice = enteredLmtPrice;

   m_client.placeOrder(GlobalOrderId, contract, order);
}
```

How to Determine a Stock

```
void onHowToDetermineStock(){
```

```
    Contract contract = new Contract();
    Order order = new Order();

    contract.m_symbol = "IBKR";
    contract.m_secType = "STK";
    contract.m_exchange = "SMART";
    contract.m_currency = "USD";

    order.m_action = "BUY";
    order.m_totalQuantity = 100;
    order.m_orderType = "LMT";
    order.m_lmtPrice = enteredLmtPrice;

    m_client.placeOrder(GlobalOrderId, contract, order);

}
```

6

C#

Beginning with API Version 9.70, a new CSharp API client is included with the API. After you install API software on your computer, you can find CSharp API components in the following locations:

- **CSharp API sample code** - located in the **samples/CSharp** folder in your API installation directory (typically TWS API X.XX, where X.XX is the current version number);
- **CSharp source code** - located in the **source/CSharpClient** folder in your API installation directory.

This chapter describes the C# (C Sharp) API, including the following topics:

Tutorial: Building a C# API Sample Application

This tutorial provides a step-by-step guide to using C# to build a console application from scratch.

> **Note:** For this tutorial, we are using Interactive Brokers C# API (v. 9.71) and creating the sample application in Microsoft Visual Studio 2010 Professional Edition.

The Tutorial includes these steps:

1. Create the Project
2. Add the CSharpAPI Project
3. Add the DLL Reference
4. Implement the EWrapper Interface
5. Connect to TWS
6. Request Market Data

> **Note:** All the code provided with this example is "as is" and for illustrative purposes only.

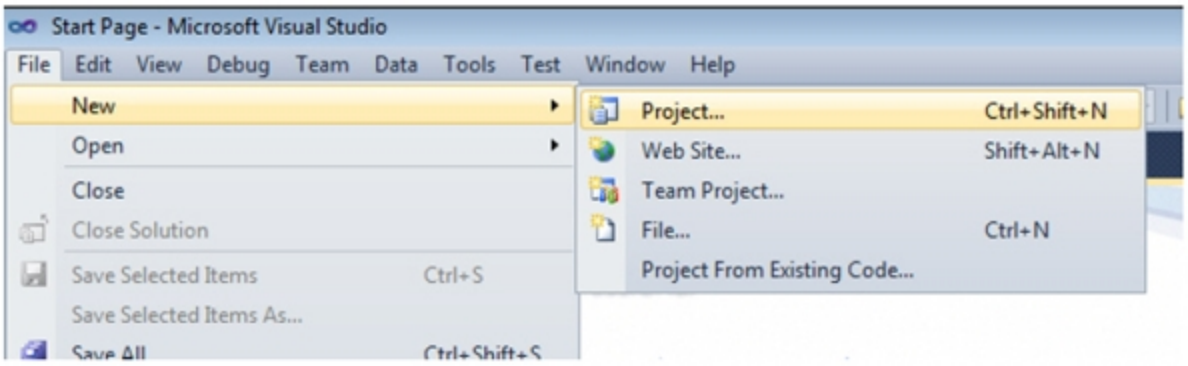
For your convenience, you can request the full sample solution resulting from this tutorial by contacting our API Support team at **api@interactivebrokers.com**.

C# Tutorial: 1. Create the Project

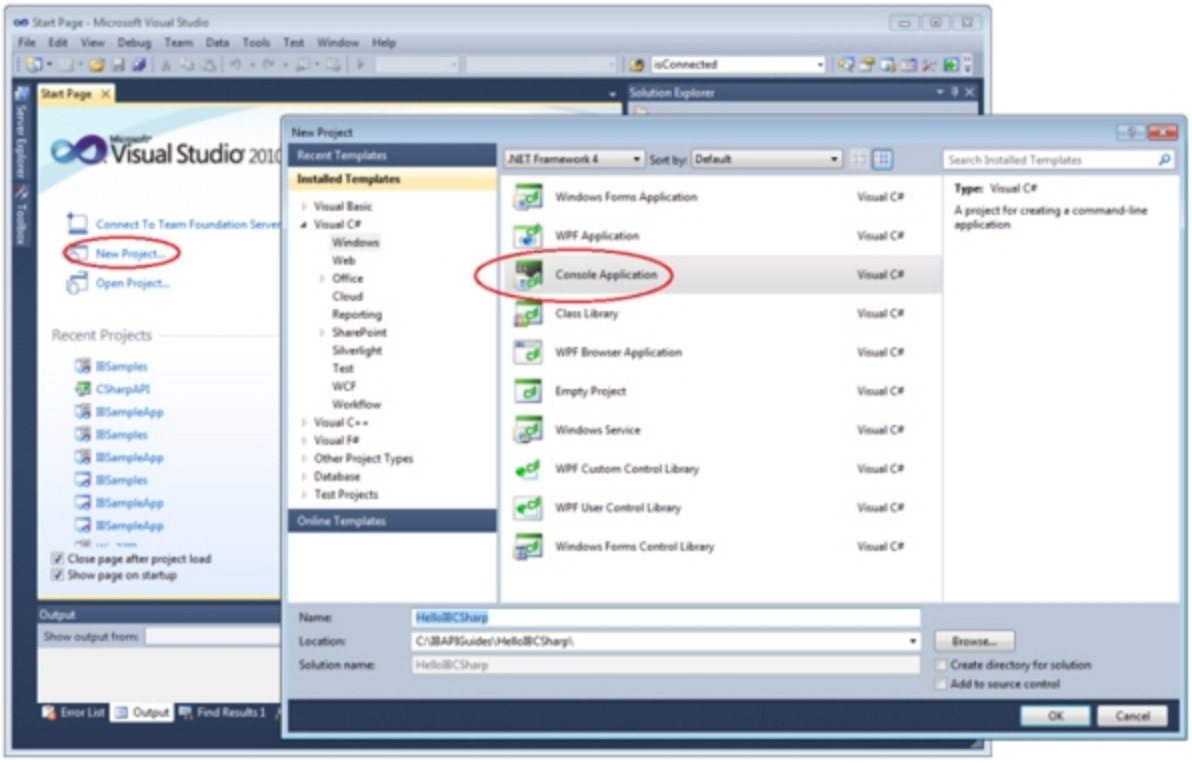
In this first part of the tutorial, you will create new C# Console Application in Visual Studio.

To create a new project in Microsoft Visual Studio 2010 Professional Edition

1. Open Microsoft Visual Studio 2010 Professional Edition, then click **File > New > Project**.



2. In New Project dialog, select *Visual C#* from the list of Installed Templates on the left, then select Console Application.
3. Type **HelloIBCSharp** as the project name in the Name field, then click the **Browse** button and choose a location for the project on your computer.
4. Click **OK**.



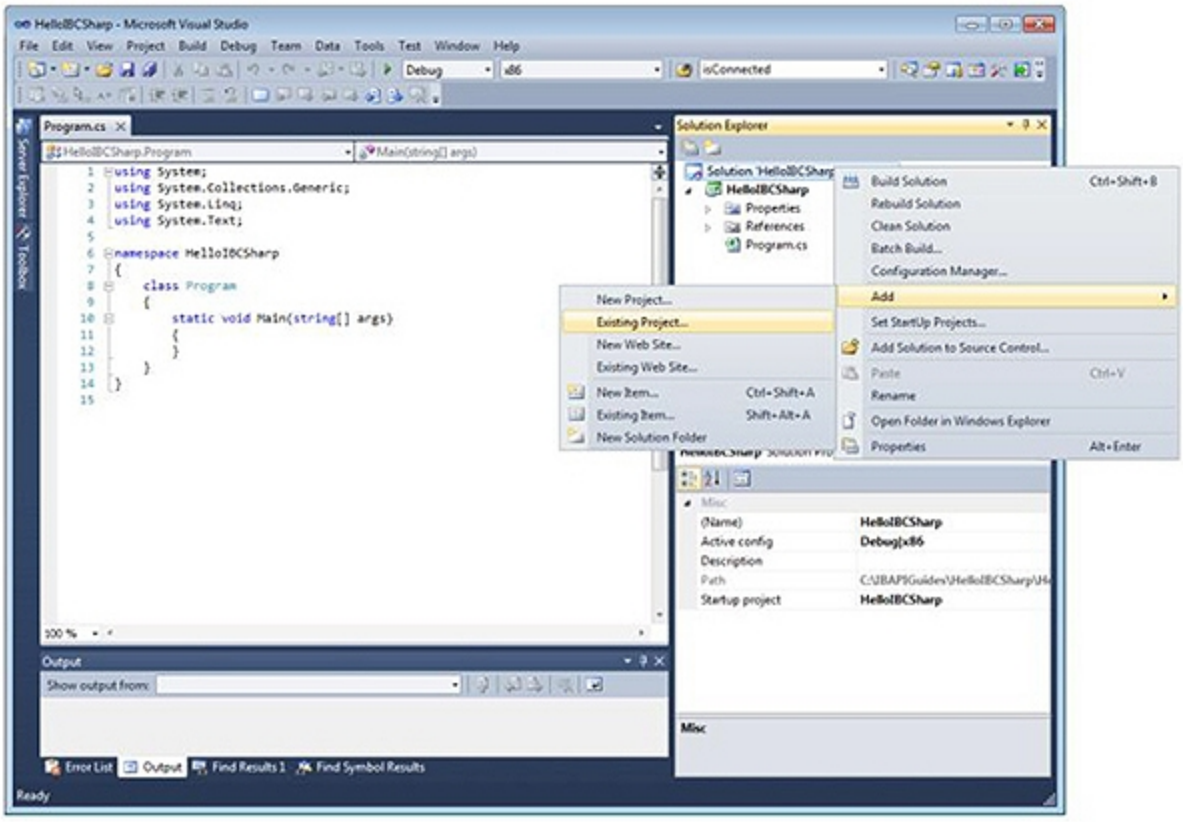
Continue to the next step in this tutorial, 2. Add the CSharpAPI Project.

C# Tutorial: 2. Add the CSharpAPI Project

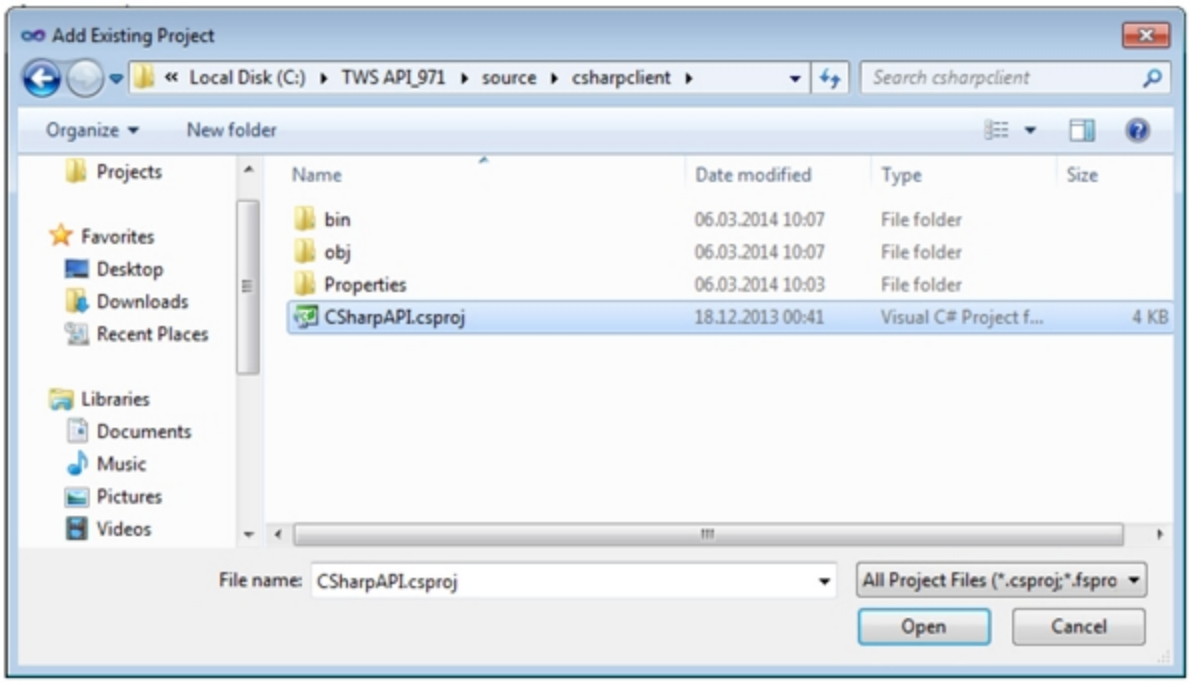
Now that the project has been created, the first thing that you need to do is to add a reference to the pre-built C# API DLL file (which is the result of opening and building the C# API project), or directly add the C# API project to the solution. Adding the entire C# API project lets gives you access to the API source code for reference while developing.

To add the CSharpAPI Project to your solution

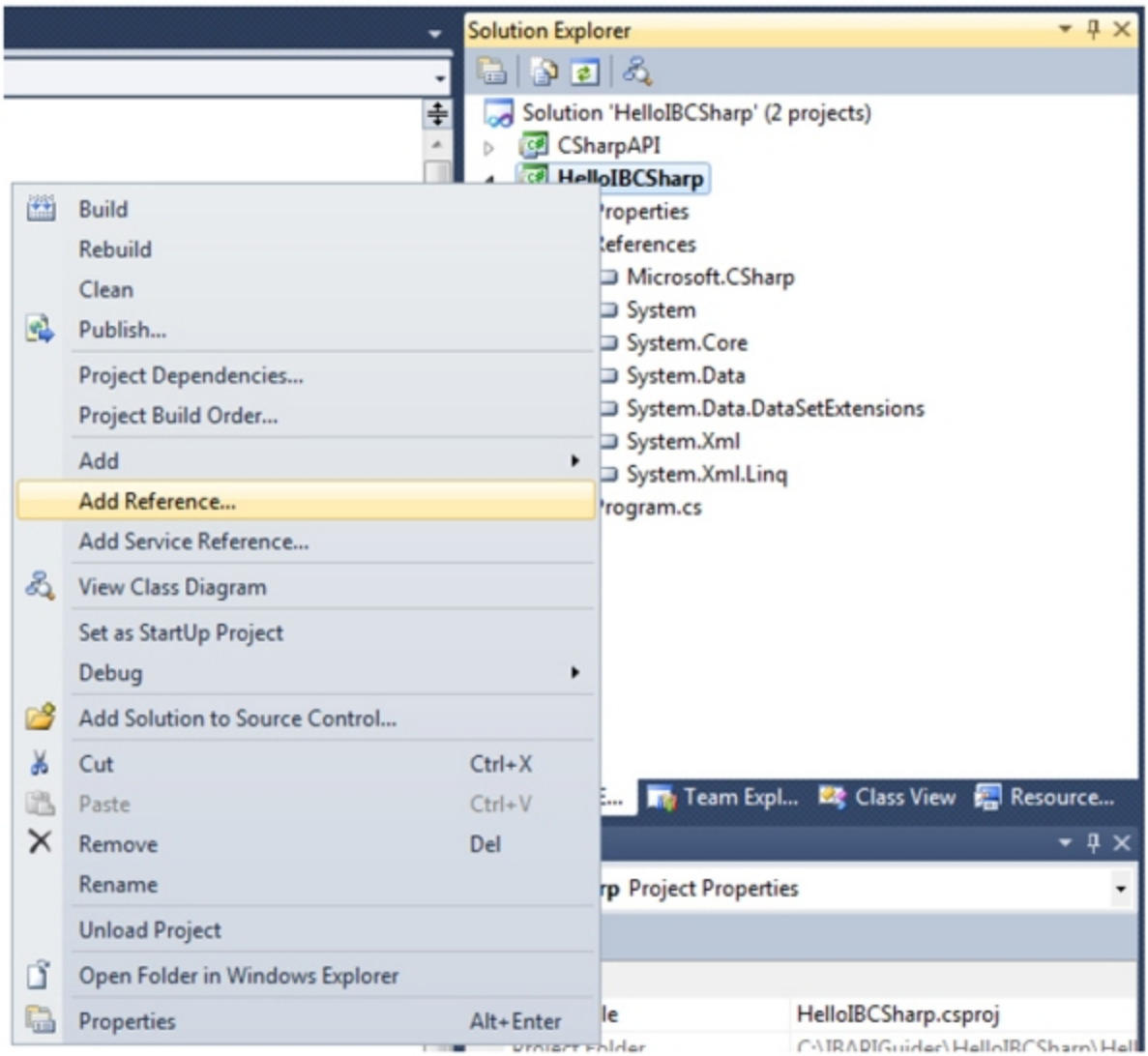
1. Right-click the **HelloIBCSharp** project in the Solution Explorer, then click **Add > Existing Project** from the menu.



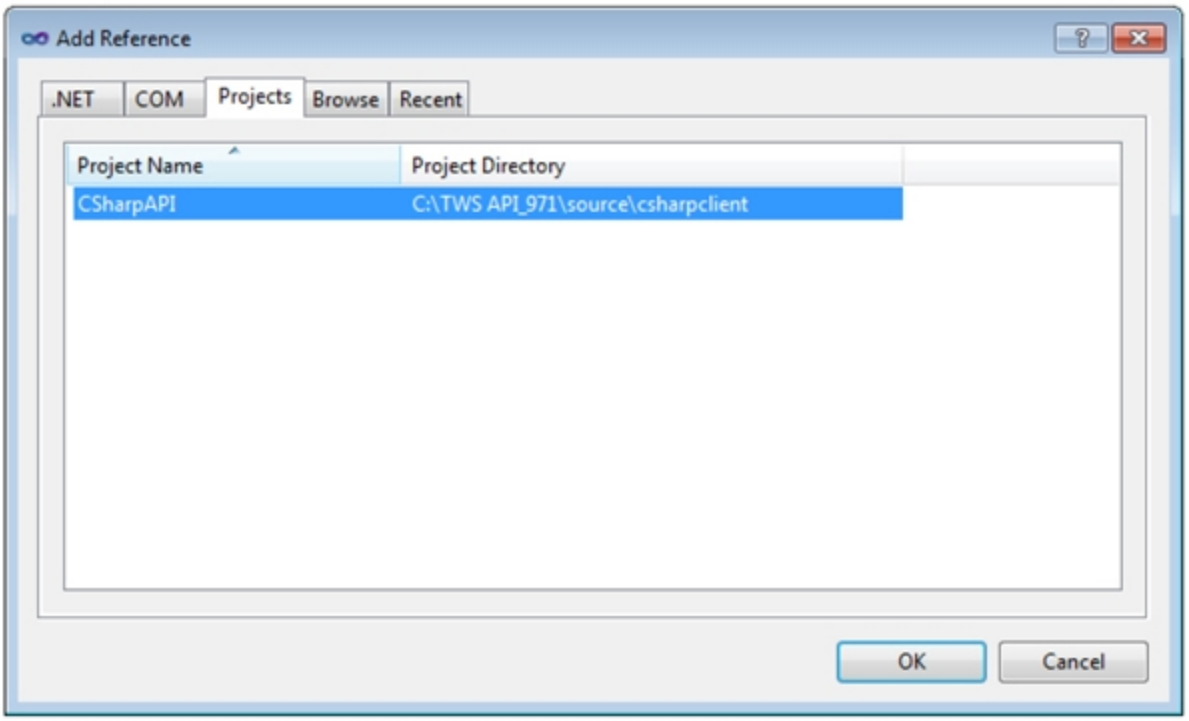
2. Navigate to the API's *source/CSharpClient*directory and select the file **CSharpAPI.csproj**, then click **Open**.



3. Now that both projects are shown in the Solution Explorer, you need to add a reference of CSharpAPI to HelloIBCSharp. Right-click the HelloIBCSharp project , then select **Add Reference** from the menu.



4. The CSharpAPI project appears on the Projects tab of the Add Reference dialog. Click **CSharpAPI**, and then click **OK** to finish adding the reference.



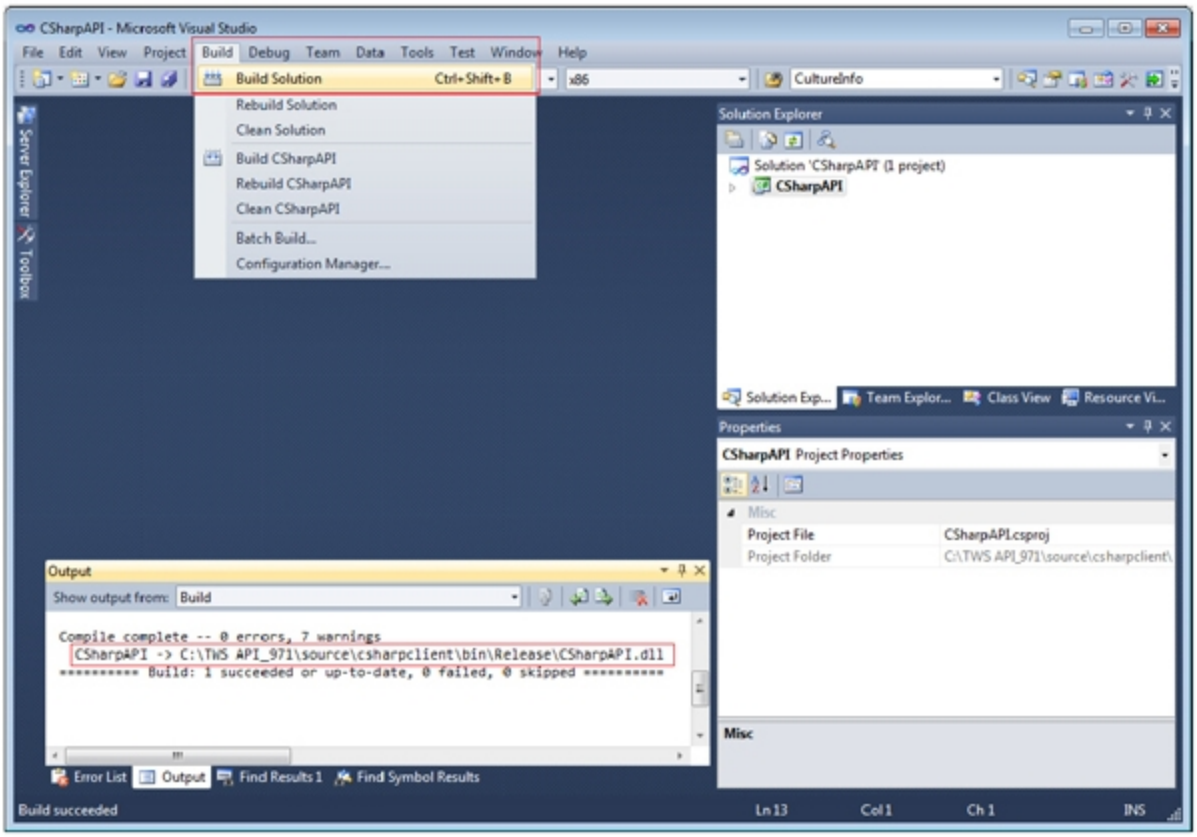
Continue to the next step in this tutorial, 3. Add the DLL Reference.

C# Tutorial: 3. Add the DLL Reference

In this step of the tutorial, instead of adding the complete CSharpAPI project to your solution, you will directly add a reference to the pre-built DLL (Dynamic Link Library).

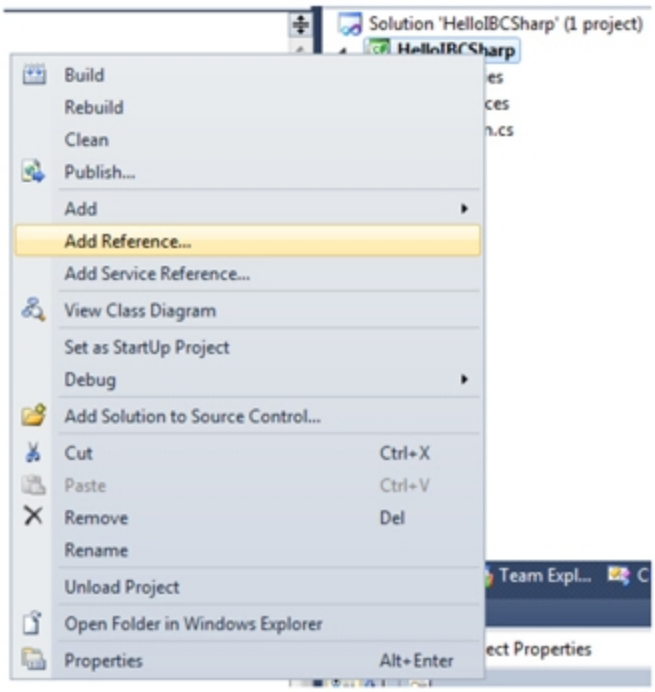
To add the DLL reference

1. In Visual Studio, open the **CSharpAPI.sln** file located in your API installation directory's **source/cscharpclient** folder.
2. Click **Build > Build Solution**.

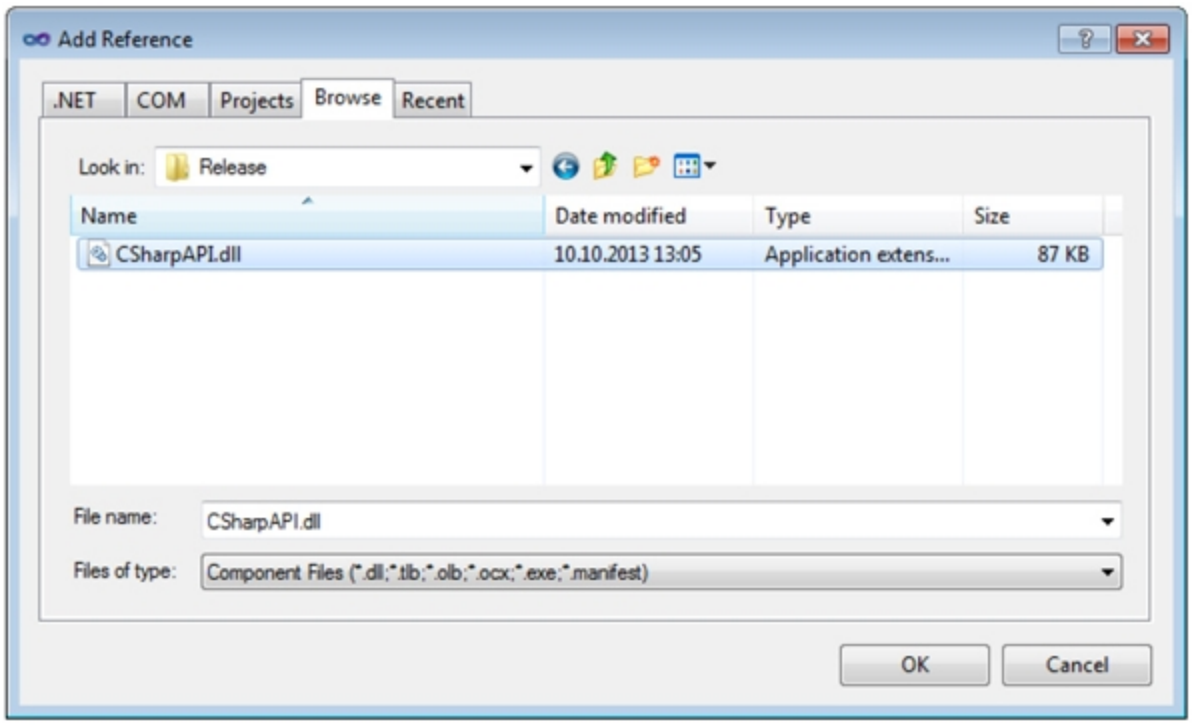


The resulting DLL will be created in your API installation directory's the **/source/csharpclient/bin/Release** folder as **CSharpAPI.dll**.

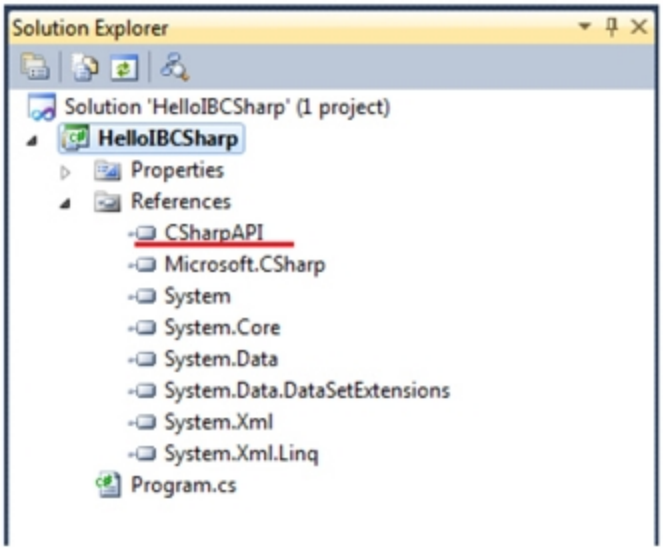
3. Right-click the **HelloIBCSharp** project in the Solution Explorer, then click **Add reference**.



4. On the resulting dialog's Browse tab, navigate to the location of the DLL (**/source/csharpclient/bin/Release** in your API installation directory) and select the library:



Your HelloIBCSharp project now has a reference on it to the C# API:



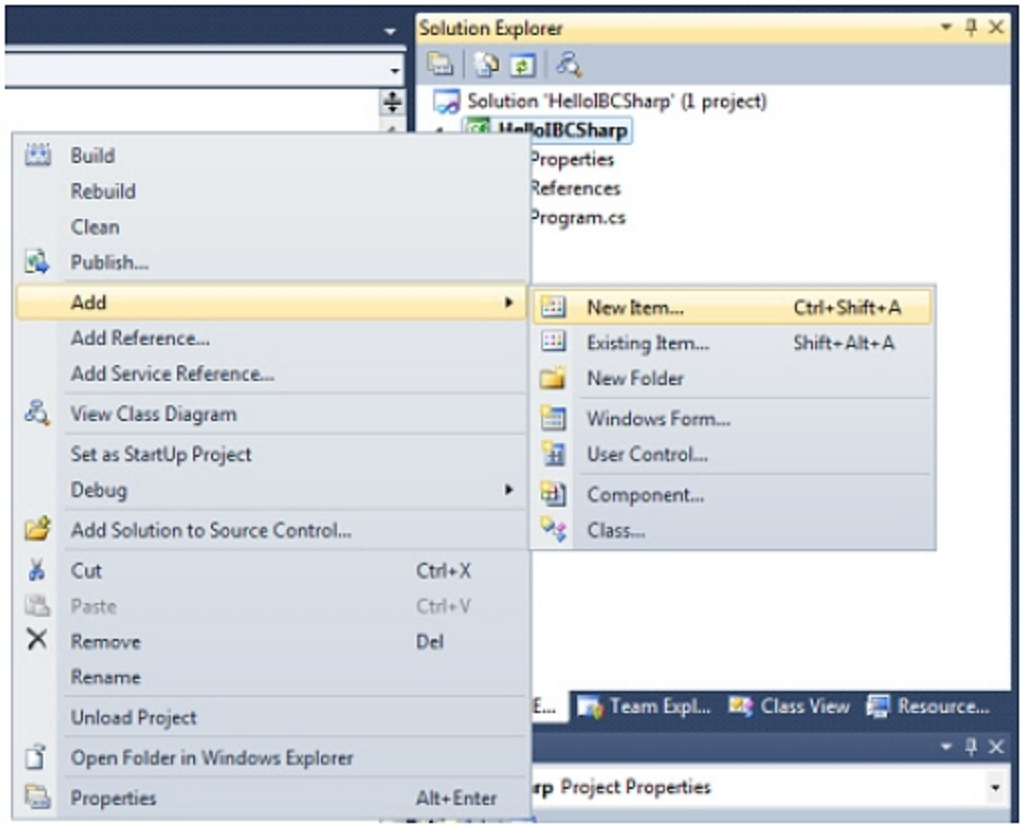
Continue to the next step in this tutorial, 4. Implement the EWrapper Interface.

C# Tutorial: 4. Implement the EWrapper Interface

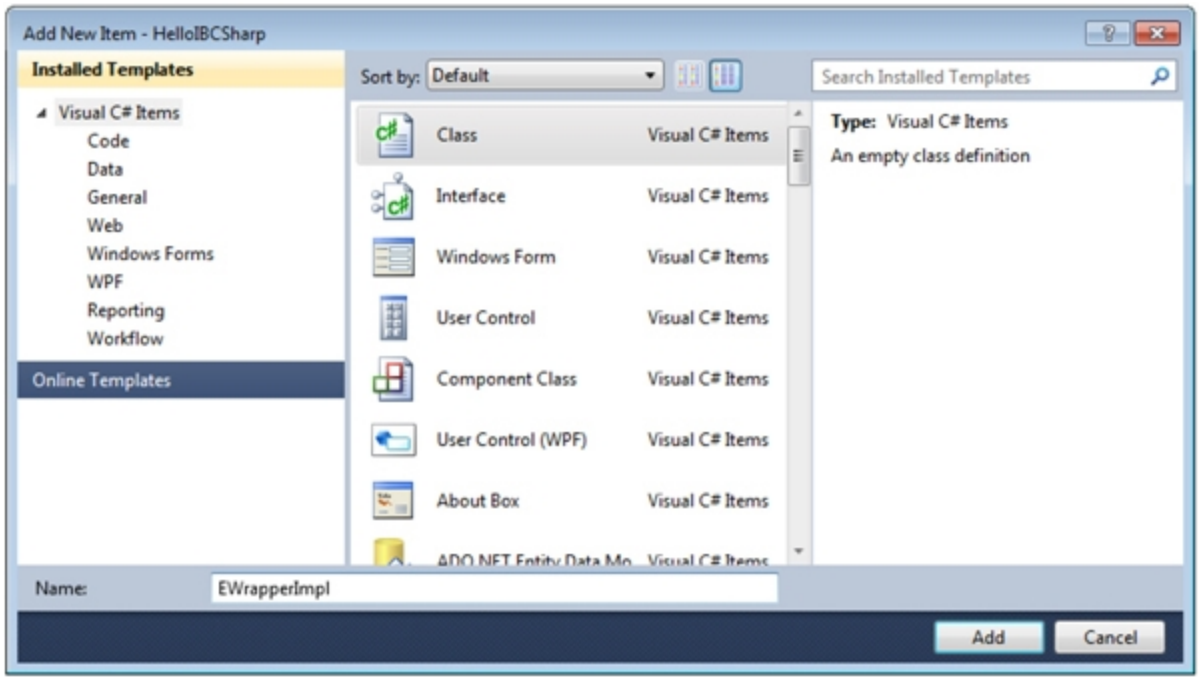
IB's C# API consists mainly of a client socket (ESocketClient) containing a reference to an object which implements the EWrapper interface. It is because of this interface's implementation that the client application (HelloIBCSharp) can receive and handle all incoming messages sent by TWS/IB Gateway. In this step of the tutorial, you will implement the EWrapper interface.

To implement the EWrapper interface

1. Add a new class to the project by right-clicking the **HelloIBCSharp** project in the Solution Explorer, then clicking **Add > Existing Item** from the menu.



2. In the Add New Item dialog, select **Class**, then enter the name of the new class as **EWrapperImpl**. Click **Add**.



Visual Studio creates the new class.

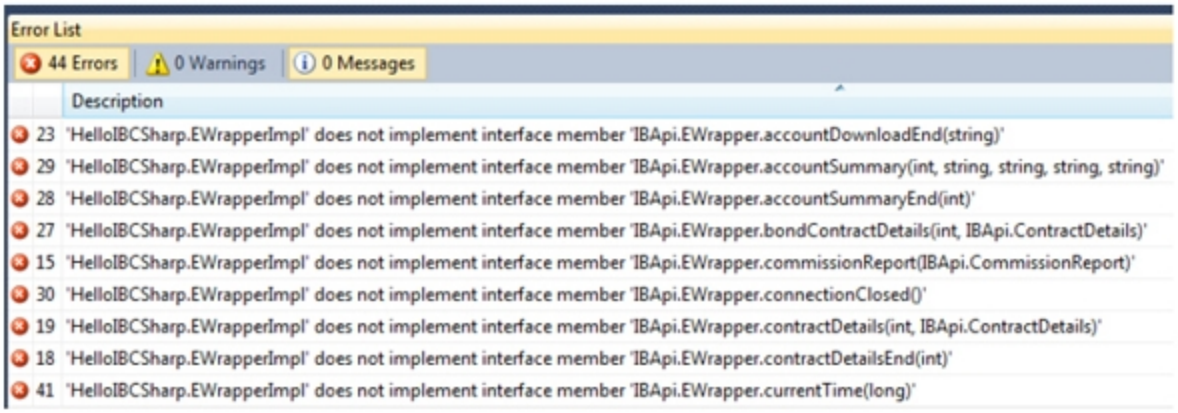
3. Given that EWrapperImpl will implement the EWrapper, extend your new class as shown below in the file EWrapperImpl.cs.

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using IBApi;

namespace HelloIBCSharp
{
    public class EWrapperImpl : EWrapper
    {
        EClientSocket clientSocket;

        private int nextOrderId;

        public EWrapperImpl()
        {
            clientSocket = new EClientSocket(this);
        }

        public EClientSocket ClientSocket
        {
            get { return clientSocket; }
            set { clientSocket = value; }
        }
```

EWrapperImpl.cs

4. Since you also want to use the EWrapperImpl class to communicate with the TWS/IB Gateway, you will need to add an EClientSocket member variable along with its get/set properties. Note that in the class constructor, you initialize the *clientSocket* variable passing a reference of the newly created EWrapperImpl object.

   If you were to try to compile and run the project at this stage, you would see errors like the ones shown below.



These errors indicate that EWrapperImpl is not implementing all of the methods declared in the EWrapper interface. In order to proceed, you need to provide at least an empty shell of all methods declared in EWrapper.

5. Save all files.

Continue to the next step in this tutorial, 5. Connect to TWS.

C# Tutorial: 5. Connect to TWS

In this step of the tutorial, you will add the code required to connect your application to TWS.

To add the code required to connect to TWS

1. Once you have finished filling in the EWrapperImpl class with the method declarations from EWrapper in the full sample solution, you can finally add the code required to connect your program to TWS. Add the lines shown below to your program's main method (in the file Program.cs).

```
namespace HelloIBCSharp
{
    class Program
    {
        static void Main(string[] args)
        {
            //IB's main object
            EWrapperImpl ibClient = new EWrapperImpl();

            //Connect
            ibClient.ClientSocket.eConnect("127.0.0.1", 7496, 0);

            //Stay alive for a little while
            Thread.Sleep(10000);
        }
    }
}
```

Program.cs

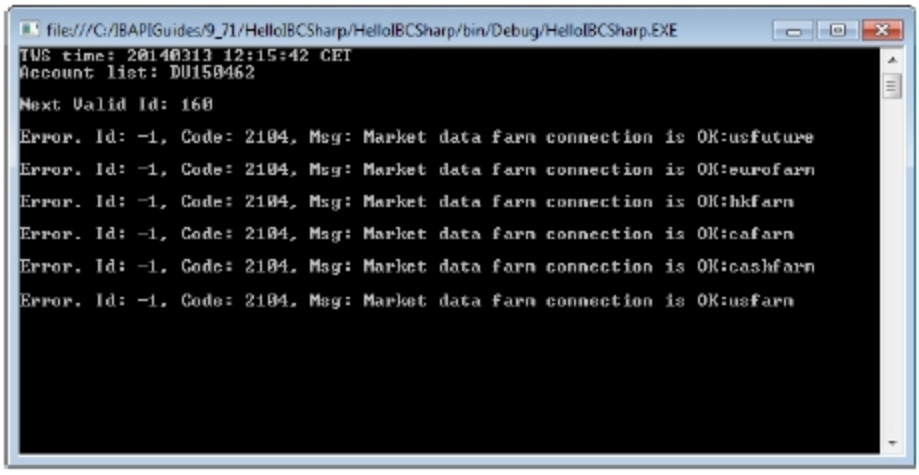
2. Note that after connecting, you also added a call to prevent the application from exiting immediately. Immediately after the connection is established, TWS will automatically send some messages like managed accounts and the server time. The following image shows the EWrapperImpl methods which get triggered:

```
public virtual void error(int id, int errorCode, string errorMsg)
{
    Console.WriteLine("Error. Id: " + id + ", Code: " + errorCode + ", Msg: " + errorMsg + "\n");
}

public virtual void currentTime(long time)
{
    Console.WriteLine("Current Time: " + time + "\n");
}

public virtual void managedAccounts(string accountsList)
{
    Console.WriteLine("Account list: " + accountsList + "\n");
}

public virtual void nextValidId(int orderId)
{
    Console.WriteLine("Next Valid Id: " + orderId + "\n");
    NextOrderId = orderId;
}
```

EWrapperImpl.cs

3. Save all files.

Running the application now should produce a console window similar to the one shown below.



Continue to the last step in this tutorial, 6. Request Market Data.

C# Tutorial: 6. Request Market Data

In the final step of this tutorial, you will add code to your solution to request market data and display it on the screen.

To request market data from TWS

1. After we request the market data, it will mainly arrive via the tickPrice() and tickSize() methods. Our implementation of them will be very simple as we only want to show the messages on the program's console window via Console.

   In the file EWrapperImpl, add the following lines of code to implement the relevant methods.

```
public virtual void tickPrice(int tickerId, int field, double price, int canAutoExecute)
{
    Console.WriteLine("Tick Price. Ticker Id:" + tickerId + ", Field: " + field + ", Price: " + price + ", CanAutoExecute: " + canAutoExecute + "\n");
}

public virtual void tickSize(int tickerId, int field, int size)
{
    Console.WriteLine("Tick Size. Ticker Id:" + tickerId + ", Field: " + field + ", Size: " + size + "\n");
}
```

EWrapperImpl.cs

2. Next, in the main method in the file Program.cs, you need to define a contract whose market data you want to request. Forex pairs are the ideal candidates as they do not require any market data subscription, so in this tutorial, you will show the price and sizes for the EUR.GBP contract.

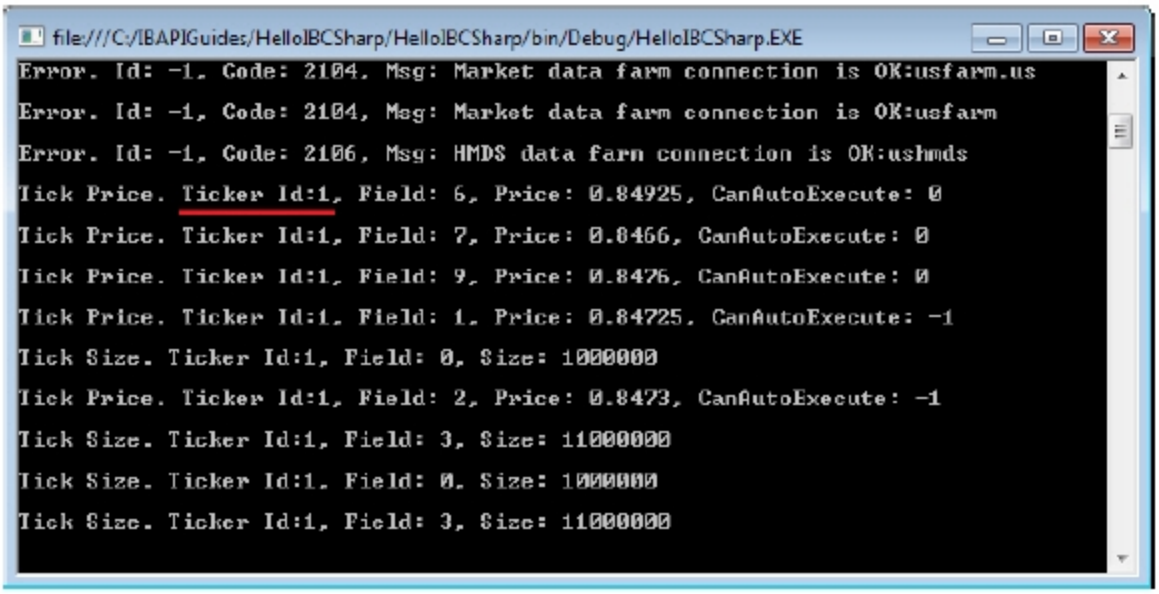
   To do this, your main class will look like the code in the following image.

```
namespace HelloIBCSharp
{
    class Program
    {
        static void Main(string[] args)
        {
            //IB's main object
            EWrapperImpl ibClient = new EWrapperImpl();

            //Connect
            ibClient.ClientSocket.eConnect("127.0.0.1", 7496, 0);

            //Create and define a contract to fetch data for
            Contract contract = new Contract();
            contract.Symbol = "EUR";
            contract.SecType = "CASH";
            contract.Currency = "GBP";
            contract.Exchange = "IDEALPRO";

            //Invoke IB's ClientSocket's data request
            ibClient.ClientSocket.reqMktData(1, contract, "", false, null);

            //Stay alive for a little while
            Thread.Sleep(10000);
        }
    }
}
```

Program.cs

The lines in the larger box pictured above show the contract's definition while on the line in the smaller box pictured above represents the actual market data request (using the reqMktData() method). When requesting real-time market data, you must provide an identifier to which the incoming data is matched. This identifier is the *tickerId* parameter, which is passed to the **tickSize** and **tickPrice** events on the EWrapper's interface and its implementing class.

3. Save all files.
4. Build and run your application. You should be able to see all the incoming values, as pictured below.



Note the underlined **Ticker Id: 1** fragment. This indicates that the received data corresponds to the request identified by Id 1.

This simple tutorial was an introduction on how to create the first C# program from scratch. The C# API provides two sample solutions demonstrating the rest of the API functionality.

For your convenience, you can request the full sample solution resulting from this tutorial by contacting our API Support team at **api@interactivebrokers.com**.

Using the VB.NET Sample Program

Another way to use the C# API is to create a VB.NET application. Beginning with API Version 9.72, we provide a VB.NET sample application. To run the sample you must:

- Install the API sample programs
- Configure the application to support the API components
- Have MS Visual Studio installed on your PC.

To run the VB.NET API sample program:

1. Navigate to the **samples\VB** directory in your API installation folder.
2. Open the file named **VB_API_sample.sln**.
3. Press **Ctrl+F5** to compile and run the project.

C# EClientSocket Methods

This section describes the class EClientSocket methods you use when connecting to TWS using C#. The list of methods includes:

Connection and Server

EClientSocket()
eConnect()
eDisconnect()
isConnected()
setServerLogLevel()
reqCurrentTime()

Market Data

reqMktData()
cancelMktData()
calculateImpliedVolatility()
cancelCalculateImpliedVolatility()
calculateOptionPrice()
cancelCalculateOptionPrice()
reqMarketDataType()

Orders

placeOrder()
cancelOrder()
reqOpenOrders()
reqAllOpenOrders()
reqAutoOpenOrders()
reqIDs()
exerciseOptions()
reqGlobalCancel()

Account and Portfolio

reqAccountUpdates()
reqAccountSummary()
cancelAccountSummary()
reqPositions()
cancelPositions()

Executions

reqExecutions()

Contract Details

reqContractDetails()

Market Depth

reqMktDepth()
cancelMktDepth()

News Bulletins

reqNewsBulletins()
cancelNewsBulletins()

Financial Advisors

reqManagedAccts()
requestFA()
replaceFa()

Market Scanners

reqScannerParameters()
reqScannerSubscription()
cancelScannerSubscription()

Historical Data

reqHistoricalData()
cancelHistoricalData()

Real Time Bars

reqRealTimeBars()
cancelRealTimeBars()

Fundamental Data

reqFundamentalData()
cancelFundamentalData()

Display Groups

queryDisplayGroups()
subscribeToGroupEvents()
updateDisplayGroups()
unsubscribeFromGroupEvents()

EClientSocket()

This client class contains all the available methods to communicate with IB. Up to eight clients can be connected to a single instance of the TWS/Gateway simultaneously.

public EClientSocket(EWrapper wrapper)

Parameter	Type	Description
EWrapper	wrapper	EWrapper's implementating class instance. Every message being delivered by IB to the API client will be forwarded to the EWrapper's implementating class.

eConnect()

Establishes a connection to TWS/Gateway. After establishing a connection successfully, TWS/Gateway will provide the next valid order id, server's current time, managed accounts and open orders among others depending on the TWS/Gateway version.

public void eConnect(string host, int port, int clientId)

Parameter	Type	Description
host	string	The host name or IP address of the machine where TWS is running. Leave blank to connect to the local host.
port	int	Must match the port specified in TWS on the Configure>API>*Socket Port* field. 7496 by default for the TWS, 4001 by default on the Gateway.
clientId	int	Unique ID required of every API client program; can be any integer. Note that up to eight clients can be connected simultaneously to a single instance of TWS or Gateway. All orders placed/modified from this client will be associated with this client identifier. **Note:** Each client MUST connect with a unique clientId.

eDisconnect()

Call this method to terminate the connections with TWS. Calling this method does not cancel orders that have already been sent.

public void eDisconnect()

isConnected()

Call this method to check if there the API client is connected to TWS/Gateway.

public bool isConnected()

setServerLogLevel()

The default level is ERROR. Refer to the API logging page for more details.

public void setServerLogLevel(int logLevel)

Parameter	Type	Description
logLevel	int	Specifies the level of log entry detail used by the server (TWS) when processing API requests. Valid values include: • 1 = SYSTEM • 2 = ERROR • 3 = WARNING • 4 = INFORMATION • 5 = DETAIL

reqCurrentTime()

Requests the server's current system time. The currentTime() EWrapper method returns the time.

public void reqCurrentTime()

reqGlobalCancel()

Use this method to cancel all open orders. It cancels orders placed from the API client and orders placed directly in TWS.

public void reqGlobalCancel()

reqMktData()

Call this method to request market data. The market data will be returned by the tickPrice(), tickSize(), tickOptionComputation(), tickGeneric(), tickString() and tickEFP() methods.

public void reqMktData(int tickerId, Contract contract, string genericTickList, bool snapshot)

Parameter	Type	Description
tickerId	int	The ticker id. Must be a unique value. When the market data returns, it will be identified by this tag. This is also used when canceling the market data.
contract	Contract	This class contains attributes used to describe the contract.
genericTicklist	string	A comma-separated list of IDs that represent generic tick types. Tick types can be found in the Generic Tick Types page.
snapshot	bool	When set to True, returns a single snapshot of market data. When set to False, returns continues updates. Do not enter any genericTicklist values if you use snapshot.
mktDataOptions	List<TagValue>	For internal use only. Use default value XYZ.

cancelMktData()

Cancels a market data request.

public void cancelMktData(int tickerId)

Parameter	Type	Description
tickerId	int	The Id that was specified in the call to reqMktData().

calculateImpliedVolatility()

Request the calculation of the implied volatility based on hypothetical option and its underlying prices. The calculation will be return in EWrapper's tickOptionComputation() callback.

public void calculateImpliedVolatility(int reqId, Contract contract, double optionPrice, double underPrice)

Parameter	Type	Description
reqId	int	Unique identifier of the request.
contract	Contract	The option's contract for which you want to calculate volatility.
optionPrice	double	The hypothetical price of the option.
underPrice	double	The hypothetical price of the underlying.

cancelCalculateImpliedVolatility()

Cancels a request to calculate implied volatility for a supplied option price and underlying price.

public void calculateImpliedVolatility(int reqId)

Parameter	Type	Description
reqId	int	The identifier of the implied volatility's calculation request.

calculateOptionPrice()

Calculates an option's price based on the provided volatility and its underlying's price. The calculation will be returned in the EWrapper tickOptionComputation() callback.

void calculateOptionPrice(int reqId, Contract contract, double volatility, double underPrice)

Parameter	Type	Description
conid	int	The request's unique identifier.
contract	Contract	The option contract for which you want to calculate the price.
volatility	double	The hypothetical volatility.
underPrice	double	The hypothetical price of the underlying.

cancelCalculateOptionPrice()

Call this function to cancel a request to calculate the option price and greek values for a supplied volatility and underlying price.

cancelCalculateOptionPrice(int reqId)

Parameter	Type	Description
reqId	int	The ticker id.

reqMarketDataType()

The API can receive frozen market data from Trader Workstation. Frozen market data is the last data recorded in our system. During normal trading hours, the API receives real-time market data. If you use this function, you are telling TWS to automatically switch to frozen market data after the close. Then, before the opening of the next trading day, market data will automatically switch back to real-time market data.

reqMarketDataType(int marketDataType)

Parameter	Type	Description
marketDataType	int	Set to 1 for real-time streaming market data or 2 for frozen market data.

placeOrder()

public void placeOrder(int id, Contract contract, Order order)

Parameter	Type	Description
id	int	The order's unique identifier. When the order status returns, it will be identified by this ID, which is also used when canceling the order. Use a sequential id starting with the ID received at the nextValidId() method.
contract	Contract	This class contains attributes used to describe the contract.
order	Order	This structure contains the details of the order. Note: Each client MUST connect with a unique clientId.

cancelOrder()

Call this method to cancel an order.

public void cancelOrder(int orderId)

Parameter	Type	Description
orderId	int	The order ID that was specified previously in placeOrder().

reqOpenOrders()

Requests all open orders that were placed from this specific API client (identified by the API client ID). Each open order will be fed back through the openOrder() and orderStatus() events.

> **Note:** The client with a clientId of "0" will also receive the TWS-owned open orders. These orders will be associated with the client and a new orderId will be generated. This association will persist over multiple API and TWS sessions.

public void reqOpenOrders()

reqAllOpenOrders

Requests all open orders submitted by any API client as well as those directly placed in the TWS. The existing orders will be received via the openOrder() and orderStatus() events.

> **Note:** No association is made between the returned orders and the requesting client.

public void reqAllOpenOrders()

reqAutoOpenOrders()

Requests all order placed on the TWS directly. Only the orders created after this request has been made will be returned. When a new TWS order is created, the order will be associated with the client and automatically fed back through the openOrder() and orderStatus() events.

> **Note:** TWS orders can only be bound to clients with a clientId of 0.

public void reqAutoOpenOrders(bool autoBind)

Parameter	Type	Description
autoBind	bool	If set to TRUE, newly created TWS orders will be implicitly associated with the client. If set to FALSE, no association will be made.

reqIDs()

Requests the next valid order ID.

public v Void reqIds (int numIds)

Parameter	Type	Description
numIds	int	Set to 1.

exerciseOptions()

Call this method to exercise options.

Note: SMART is not an allowed exchange in exerciseOptions() calls, and TWS does a request for the position in question whenever any API initiated exercise or lapse is attempted.

public void exerciseOptions(int tickerId, Contract contract, int exerciseAction, int exerciseQuantity, string account, int override)

Parameter	Type	Description
tickerId	int	The identifier for the exercise request.
contract	Contract	This class contains attributes used to describe the option contract.
exerciseAction	int	Specifies whether to exercise the specified option or let the option lapse. Valid values are: • 1 = exercise • 2 = lapse
exerciseQuantity	int	The number of contracts to be exercised.
account	string	For institutional orders. Specifies the destination account.
override	int	Specifies whether your setting will override the system's natural action. For example, if your action is "exercise" and the option is not in-the-money, by natural action the option would not exercise. If you have override set to "yes" the natural action would be overridden and the out-of-the money option would be exercised. Values are: • 0 = do not override • 1 = override

reqGlobalCancel()

Use this method to cancel all open orders. It cancels orders placed from the API client and orders placed directly in TWS.

public void reqGlobalCancel()

reqAccountUpdates()

Subscribes to a specific account's information and portfolio. Use this method to start and stop a subscription to a single account. As a result of this subscription, the account's information, portfolio and last update time will be received via the updateAccountTime(), updateAccountValue() and updatePortfolio() EWrapper events.

You can subscribe to only one account at a time. A second subscription request for another account when the previous subscription is still active will cause the first one to be canceled in favor of the second. Consider using reqPositions() if you want to retrieve all your accounts' portfolios directly.

public void reqAccountUpdates (bool subscribe, string acctCode)

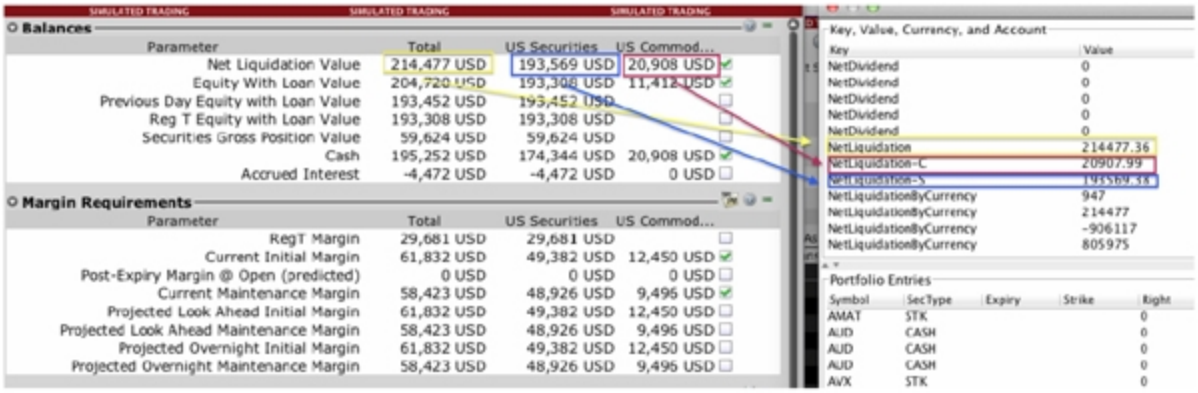
Parameter	Type	Description
subscribe	bool	If set to TRUE, the client will start receiving account and portfolio updates. If set to FALSE, the client will stop receiving this information.
acctCode	string	The account code for which to receive account and portfolio updates.

To identify API Account keys:

The API's updateAccountValue() event handler delivers all of the account information.

- Strings or keys with a suffix of **–C**, such as AvailableFunds-C, EquityForInitial-C, NetLiquidation-C, correspond to Commodities in the TWS Account Window.
- Keys with a suffix of **–S**, such as EquityForMaintenance-S, FullAvailableFunds-S or NetLiquidation-S, correspond to Securities in the TWS Account Window.
- Keys without any suffix correspond to Totals in the TWS Account Window.

The image below is an actual example of how to compare TWS's Account Window and the API's account data. In this particular case, we try to link three specific keys NetLiquidation, NetLiquidation-C, and NetLiquidation-S to the TWS Account Window.



For more information about the information presented in the TWS Account Window, see https://institutions.interactivebrokers.com/en/software/tws/usersguidebook/realtimeactivitymonitoring/the_account_window.htm

reqAccountSummary()

This method will subscribe to the account summary as presented on the TWS Account Summary tab. The data is returned by accountSummary().

> **Note:** This request can only be made when connected to a Financial Advisor (FA) account.

reqAccountSummary() only allows two concurrent requests. If you use reqAccountSummary() to request more than two concurrent account summaries, you will receive an error: **322|Error processing request**. To resolve this error, unsubscribe from one reqAccountSummary() request and then resubmit the request.

void reqAccountSummary(int reqId, string group, string tags)

Parameter	Type	Description
reqId	int	The ID of the data request. Ensures that responses are matched to requests if several requests are in process.
group	string	Set to *All* to return account summary data for all accounts, or set to a specific Advisor Account Group name that has already been created in TWS Global Configuration.

Parameter	Type	Description
tags	string	A comma-separated list of account tags. Available tags are: • *AccountType* • *NetLiquidation*, • *TotalCashValue* — Total cash including futures pnl • *SettledCash* — For cash accounts, this is the same as TotalCashValue • *AccruedCash* — Net accrued interest • *BuyingPower* — The maximum amount of marginable US stocks the account can buy • *EquityWithLoanValue* — Cash + stocks + bonds + mutual funds • *PreviousDayEquityWithLoanValue*, • *GrossPositionValue* — The sum of the absolute value of all stock and equity option positions • *RegTEquity*, • *RegTMargin*, • *SMA* — Special Memorandum Account • *InitMarginReq*, • *MaintMarginReq*, • *AvailableFunds*, • *ExcessLiquidity*, • *Cushion* — Excess liquidity as a percentage of net liquidation value • *FullInitMarginReq*, • *FullMaintMarginReq*, • *FullAvailableFunds*, • *FullExcessLiquidity*, • *LookAheadNextChange* — Time when look-ahead values take effect • *LookAheadInitMarginReq*, • *LookAheadMaintMarginReq*, • *LookAheadAvailableFunds*, • *LookAheadExcessLiquidity*, • *HighestSeverity* — A measure of how close the account is to liquidation • *DayTradesRemaining* — The Number of Open/Close trades a user

Parameter	Type	Description
		could put on before Pattern Day Trading is detected. A value of "-1" means that the user can put on unlimited day trades. • *Leverage* — GrossPositionValue / NetLiquidation

cancelAccountSummary()

Cancels the request for Account Window Summary tab data.

public void cancelAccountSummary(int reqID)

Parameter	Type	Description
reqId	in	The ID of the data request being canceled.

reqPositions()

Requests real-time position data for all accounts.

public void reqPositions()

cancelPositions()

Cancels real-time position updates.

public void cancelPositions()

reqExecutions()

Requests all the day's executions matching the filter criteria. Only the current day's executions can be retrieved. Along with the executions, the CommissionReport will also be returned. Execution details are returned to the client via execDetails(). To view executions beyond the past 24 hours, open the Trade Log in TWS and, while the Trade Log is displayed, request the executions again from the API.

public void reqExecutions(int reqId, ExecutionFilter filter)

Parameter	Type	Description
reqId	int	The request's unique identifier.
filter	ExecutionFilter	The filter criteria used to determine which execution reports are returned.

reqContractDetails()

This method returns all contracts matching the contract provided. It can also be used to retrieve complete options and futures chains. The contract details will be received via the contractDetails() method on the EWrapper.

void reqContractDetails (int reqId, Contract contract)

Parameter	Type	Description
reqId	int	The ID of the data request. Ensures that responses are matched to requests if several requests are in process.
contract	Contract	This class contains attributes used to describe the contract.

reqMktDepth()

Call this method to request market depth (order book) for a specific contract. The market depth will be returned by the updateMktDepth() and updateMktDepthL2() methods.

public void reqMarketDepth(int tickerId, Contract contract, int numRows)

Parameter	Type	Description
tickerId	int	The ticker Id. Must be a unique value. When the market depth data returns, it will be identified by this ID. This is also used when canceling the market depth.
contract	Contract	This class contains attributes used to describe the contract.
numRows	int	Specifies the number of market depth rows on each side of the order book to return.
mktDepthOptions	Vector<TagValue>	For internal use only. Use default value XYZ.

cancelMktDepth()

Cancels market depth for the specified ID.

public void cancelMktDepth(int TickerId)

Parameter	Type	Description
tickerId	int	The Id that was specified in the call to reqMktDepth().

reqNewsBulletins()

Call this method to start receiving news bulletins. Each bulletin will be returned by the updateNewsBulletin() method.

public void reqNewsBulletins(bool allMessages)

Parameter	Type	Description
allMessages	bool	If set to TRUE, returns all the existing bulletins for the current day and any new ones. IF set to FALSE, will only return new bulletins.

cancelNewsBulletins()

Call this method to stop receiving news bulletins.

public void cancelNewsBulletins()

reqManagedAccts()

Requests the accounts to which the logged-in user has access. The list will be returned by managedAccounts().

> **Note:** This request can only be made when connected to a Financial Advisor (FA) account

public void reqManagedAccts()

requestFA()

Requests Financial Advisor configuration information from TWS. The data returns in an XML string via receiveFA().A Financial Advisor can define three different configurations:

1. Groups: offer traders a way to create a group of accounts and apply a single allocation method to all accounts in the group.
2. Profiles: lets you allocate shares on an account-by-account basis using a predefined calculation value.
3. Account Aliases: lets you easily identify accounts by meaningful names rather than account numbers.

public void requestFA(int faDataType)

Parameter	Type	Description
faDataType	int	Specifies the type of Financial Advisor configuration data being requested. Valid values include: • 1 = GROUPS • 2 = PROFILE • 3 = ACCOUNT ALIASES

replaceFA()

Call this method to request new FA configuration information from TWS. The data returns in an XML string via a "receiveFA" method.

void replaceFA(int faDataType, String xml)

Parameter	Type	Description
faDataType	int	Specifies the type of Financial Advisor configuration data being requested. Valid values include: • 1 = GROUPS • 2 = PROFILE • 3 = ACCOUNT ALIASES

Parameter	Type	Description
xml	String	The XML string containing the new FA configuration information.

reqScannerParameters()

Requests all valid parameters that a scanner subscription can have.

public void reqScannerParameters()

reqScannerSubscription()

Starts a subscription to market scan results based on the provided parameters.

public void reqScannerSubscription(int reqId, ScannerSubscription subscription)

Parameter	Type	Description
reqId	int	The request's identifier.
subscription	ScannerSubscription	Summary of the scanner subscription parameters including filters.

cancelScannerSubscription()

Cancels a scanner subscription.

public void cancelScannerSubscription(int tickerId)

Parameter	Description
tickerId	The Id that was specified in the call to reqScannerSubscription().

reqHistoricalData()

Requests contracts' historical data. The resulting bars will be returned in through historicalData(). When requesting historical data, a finishing time and date is required along with a duration string. For example, having:

- endDateTime: 20130701 23:59:59 GMT
- durationStr: 3 D

will return three days of data counting backwards from July 1st 2013 at 23:59:59 GMT, resulting in all the available bars of the last three days until the date and time specified. It is possible to specify a time zone.

public void reqHistoricalData(int tickereId, Contract contract, string endDateTime, string durationString, string barSizeSetting, string whatToShow, int useRTH, int formatDate, List<TagValue> chartOptions)

Parameter	Type	Description
tickerId	int	The Id for the request. Must be a unique value. When the data is received, it will be identified by this Id. This is also used when canceling the historical data request.
contract	Contract	This class contains attributes used to describe the contract.
endDateTime	string	Use the format yyyymmdd hh:mm:ss tmz, where the time zone is allowed (optionally) after a space at the end.
durationString	string	This is the time span the request will cover, and is specified using the format: <integer> <unit>, i.e., 1 D, where valid units are: • " S (seconds) • " D (days) • " W (weeks) • " M (months) • " Y (years) If no unit is specified, seconds are used. Also, note "years" is currently limited to one.
barSizeSetting	string	Specifies the size of the bars that will be returned (within IB/TWS limits). Valid bar size values include: • 1 sec • 5 secs • 15 secs • 30 secs • 1 min • 2 mins • 3 mins • 5 mins • 15 mins • 30 mins • 1 hour • 1 day

Parameter	Type	Description
whatToShow	string	Determines the nature of data being extracted. Valid values include: • TRADES • MIDPOINT • BID • ASK • BID_ASK • HISTORICAL_VOLATILITY • OPTION_IMPLIED_VOLATILITY
useRTH	int	Determines whether to return all data available during the requested time span, or only data that falls within regular trading hours. Valid values include: • 0 - all data is returned even where the market in question was outside of its regular trading hours. • 1 - only data within the regular trading hours is returned, even if the requested time span falls partially or completely outside of the RTH.
formatDate	int	Determines the date format applied to returned bars. Valid values include: • 1 - dates applying to bars returned in the format: yyyymmdd{space}{space}hh:mm:dd • 2 - dates are returned as a long integer specifying the number of seconds since 1/1/1970 GMT.
chartOptions	List<TagValue>	For internal use only. Use default value XYZ.

Note: For more information about historical data request limitations, see Historical Data Limitations.

cancelHistoricalData()

Cancels a historical data request.

public void cancelHistoricalData (int reqId)

Parameter	Type	Description
reqId	int	The request's identifier.

reqRealTimeBars()

Requests real time bars, which are returned via realtimeBar(). Currently, only 5-second bars are provided. This request is subject to the same pacing restrictions as any historical data request.

public void reqRealTimeBars(int tickerId, Contract contract, int barSize, string whatToShow, bool useRTH,Vector<TagValue> realTimeBarOptions)

Parameter	Type	Description
tickerId	int	The Id for the request. Must be a unique value. When the data is received, it will be identified by this Id. This is also used when canceling the historical data request.
contract	Contract	This class contains attributes used to describe the contract.
barSize	int	Currently only 5-second bars are supported,so this parameter is ignored.
whatToShow	string	Determines the nature of the data extracted. Valid values include: • TRADES • BID • ASK • MIDPOINT
useRTH	bool	Regular Trading Hours only. Valid values include: • 0 = all data available during the time span requested is returned, including time intervals when the market in question was outside of regular trading hours. • 1 = only data within the regular trading hours for the product requested is returned, even if the time time span falls partially or completely outside.
realTimeBarOptions	Vector<TagValue>	For internal use only. Use default value XYZ.

cancelRealTimeBars()

Call this method to stop receiving real time bar results.

public void cancelRealTimeBars (int tickerId)

Parameter	Type	Description
tickerId	int	The Id that was specified in the call to reqRealTimeBars().

reqFundamentalData()

Call this method to receive Reuters global fundamental data for stocks. There must be a subscription to Reuters Fundamental set up in Account Management before you can receive this data.

reqFundamentalData() can handle *conid* specified in the Contract object, but not *tradingClass* or *multiplier*. This is because reqFundamentalData() is used only for stocks and stocks do not have a multiplier and trading class.

void reqFundamentalData(int reqId, Contract contract, String reportType)

Parameter	Type	Description
reqId	int	The ID of the data request. Ensures that responses are matched to requests if several requests are in process.
contract	Contract	This structure contains a description of the contract for which Reuters Fundamental data is being requested.
reportType	String	One of the following XML reports: • ReportSnapshot (company overview) • ReportsFinSummary (financial summary) • ReportRatios (financial ratios) • ReportsFinStatements (financial statements) • RESC (analyst estimates) • CalendarReport (company calendar)

cancelFundamentalData()

Call this method to stop receiving Reuters global fundamental data.

public void cancelFundamentalData(int reqId)

Parameter	Type	Description
reqId	int	The ID of the data request.

queryDisplayGroups()

queryDisplayGroups(int reqId)

Parameter	Type	Description
reqId	int	The unique number that will be associated with the response

subscribeToGroupEvents()

subscribeToGroupEvents(int reqId, int groupId)

Parameter	Type	Description
reqId	int	The unique number associated with the notification.
groupId	int	The ID of the group, currently it is a number from 1 to 7. This is the display group subscription request sent by the API to TWS.

updateDisplayGroup()

updateDisplayGroup(int reqId, const String contractInfo)

Parameter	Type	Description
reqId	int	The requestId specified in subscribeToGroupEvents().
contractInfo	String	The encoded value that uniquely represents the contract in IB. Possible values include: • none = empty selection • contractID@exchange – any non-combination contract. Examples: 8314@SMART for IBM SMART; 8314@ARCA for IBM @ARCA. • combo = if any combo is selected.

unsubscribeFromGroupEvents()

unsubscribeFromGroupEvents(int reqId)

Parameter	Type	Description
reqId	int	The requestId specified in subscribeToGroupEvents().

C# EWrapper Methods

This section describes the class EWrapper methods you can use when connecting to TWS. The list of methods includes:

Connection and Server

currentTime()
error()
connectionClosed()

Market Data

tickPrice()
tickSize()
tickOptionComputation()
tickGeneric()
tickString()
tickEFP()
tickSnapshotEnd()
marketDataType()

Orders

orderStatus()
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Account and Portfolio

updateAccountValue()
updatePortfolio()
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Market Depth

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News Bulletins

updateNewsBulletin()

Financial Advisors

managedAccounts()
receiveFA()

Historical Data

historicalData()

Market Scanners

scannerParameters()
scannerData()
scannerDataEnd()

Real Time Bars

realtimeBar()

Fundamental Data

fundamentalData()

Display Groups

displayGroupList()
displayGroupUpdated()

currentTime()

This method receives the current system time on IB's server as a result of calling reqCurrentTime().

void currentTime(long time)

Parameter	Type	Description
time	long	The current system time on the IB server.

error()

This method is called when there is an error with the communication or when TWS wants to send a message to the client.

void error(int id, int errorCode, string errorMsg)

Parameter	Type	Description
id	int	The request identifier that generated the error.
errorCode	int	The code identifying the error. For information on error codes, see Error Codes.
errorMsg	string	The description of the error.

This method is called when an exception occurs while handling a request.

void error(Exception e)

Parameter	Type	Description
e	Exception	The exception that occurred.

This method is called when TWS wants to send an error message to the client. (V1).

void error(string str)

Parameter	Type	Description
str	string	This is the text of the error message.

connectionClosed()

This method is called when TWS closes the sockets connection, or when TWS is shut down.

void connectionClosed()

tickPrice()

Market data tick price callback, handles all price-related ticks.

void tickPrice(int tickerId, int field, double price, int canAutoExecute)

Parameter	Type	Description
tickerId	int	The request's unique identifier.
field	int	Specifies the type of price. Pass the field value into TickType.getField(int tickType) to retrieve the field description. For example, a field value of 1 will map to bidPrice, a field value of 2 will map to askPrice, etc. • 1 = bid • 2 = ask • 4 = last • 6 = high • 7 = low • 9 = close
price	double	The actual price.
canAutoExecute	int	Specifies whether the price tick is available for automatic execution. Possible values are: • 0 = not eligible for automatic execution • 1 = eligible for automatic execution

tickSize()

Market data tick size callback, handles all size-related ticks.

void tickSize(int tickerId, int field, int size)

Parameter	Type	Description
tickerId	int	The request's unique identifier.
field	int	The type of size being received. Pass the field value into TickType.getField(int tickType) to retrieve the field description. For example, a field value of 0 will map to bidSize, a field value of 3 will map to askSize, etc. • 0 = bid size • 3 = ask size • 5 = last size • 8 = volume
size	int	The actual size.

tickOptionComputation()

This method is called when the market in an option or its underlying moves. TWS's option model volatilities, prices, and deltas, along with the present value of dividends expected on that option's underlying are received.

void tickOptionComputation(int tickerId, int field, double impliedVol, double delta, double optPrice, double pvDividend, double gamma, double vega, double theta, double undPrice)

Parameter	Type	Description
tickerId	int	The request's unique identifier.
field	int	Specifies the type of option computation. Pass the field value into TickType.getField(int tickType) to retrieve the field description. For example, a field value of 13 will map to modelOptComp, etc. • 10 = Bid • 11 = Ask • 12 = Last
impliedVol	double	The implied volatility calculated by the TWS option modeler, using the specified tick type value.
delta	double	The option delta value.
optPrice	double	The option price.
pvDividend	double	The present value of dividends expected on the option's underlying.
gamma	double	The option gamma value.
vega	double	The option vega value.
theta	double	The option theta value.
undPrice	double	The price of the underlying.

tickGeneric()

Market data callback.

void tickGeneric(int tickerId, int tickType, double value)

Parameter	Type	Description
tickerId	int	The request's unique identifier.
tickType	int	Specifies the type of tick being received. Pass the field value into TickType.getField(int tickType) to retrieve the field description. For example, a field value of 46 will map to shortable, etc.
value	double	The value of the specified field.

tickString()

Market data callback.

void tickString(int tickerId, int tickType, string value)

Parameter	Type	Description
tickerId	int	The request's unique identifier.
field	int	Specifies the type of tick being received. Pass the field value into TickType.getField(int tickType) to retrieve the field description. For example, a field value of 45 will map to lastTimestamp, etc.
value	String	The value of the specified field.

tickEFP()

Market data callback for Exchange for Physicals.

void tickEFP(int tickerId, int tickType, double basisPoints, string formattedBasisPoints, double impliedFuture, int holdDays, String futureExpiry, double dividendImpact, double dividendsToExpiry)

Parameter	Type	Description
tickerId	int	The request's unique identifier.
field	int	Specifies the type of tick being received. Pass the field value into TickType.getField(int tickType) to retrieve the field description. For example, a field value of 38 will map to bidEFP, etc.
basisPoints	double	Annualized basis points, which is representative of the financing rate that can be directly compared to broker rates.
formattedBasisPoints	String	Annualized basis points as a formatted string that depicts them in percentage form.
impliedFuture	double	Implied futures price.
holdDays	int	The number of hold days until the expiry of the EFP.
futureExpiry	String	The expiration date of the single stock future.
dividendImpact	double	The dividend impact upon the annualized basis points interest rate.
dividendsToExpiry	double	The dividends expected until the expiration of the single stock future.

tickSnapshotEnd()

This is called when a snapshot market data subscription has been fully received and there is nothing more to wait for. This also covers the timeout case.

void tickSnapshotEnd(int tickerId)

Parameter	Type	Description
tickerId	int	The request's unique identifier.

marketDataType()

TWS sends a marketDataType(type) callback to the API, where type is set to Frozen or RealTime, to announce that market data has been switched between frozen and real-time. This notification occurs only when market data switches between real-time and frozen. The marketDataType( ) callback accepts a reqId parameter and is sent per every subscription because different contracts can generally trade on a different schedule.

void marketDataType(int reqId, int marketDataType)

Parameter	Type	Description
int reqId	int	The request's identifier.
marketDataType	int	1 for real-time streaming market data or 2 for frozen market data.

orderStatus()

This method is called whenever the status of an order changes. It is also called after reconnecting to TWS if the client has any open orders.

void orderStatus(int orderId, string status, int filled, int remaining, double avgFillPrice, int permId, int parentId, double lastFillPrice, int clientId, String whyHeld)

Note: It is possible that orderStatus() may return duplicate messages. It is essential that you filter the message accordingly.

Parameter	Type	Description
id	int	The order Id that was specified previously in the call to placeOrder()

Parameter	Type	Description
status	String	The order status. Possible values include: • PendingSubmit - indicates that you have transmitted the order, but have not yet received confirmation that it has been accepted by the order destination. NOTE: This order status is not sent by TWS and should be explicitly set by the API developer when an order is submitted. • PendingCancel - indicates that you have sent a request to cancel the order but have not yet received cancel confirmation from the order destination. At this point, your order is not confirmed canceled. You may still receive an execution while your cancellation request is pending. NOTE: This order status is not sent by TWS and should be explicitly set by the API developer when an order is canceled. • PreSubmitted - indicates that a simulated order type has been accepted by the IB system and that this order has yet to be elected. The order is held in the IB system until the election criteria are met. At that time the order is transmitted to the order destination as specified . • Submitted - indicates that your order has been accepted at the order destination and is working. • ApiCanceled - after an order has been submitted and before it has been acknowledged, an API client client can request its cancellation, producing this state. • Cancelled - indicates that the balance of your order has been confirmed canceled by the IB system. This could occur unexpectedly when IB or the destination has rejected your order. • Filled - indicates that the order has been completely filled. • Inactive - indicates that the order has been accepted by the system (simulated orders) or an exchange (native orders) but that currently the order is inactive due to system, exchange or other issues.
filled	int	Specifies the number of shares that have been executed. For more information about partial fills, see Order Status for Partial Fills.
remaining	int	Specifies the number of shares still outstanding.
avgFillPrice	double	The average price of the shares that have been executed. This parameter is valid only if the **filled** parameter value is greater than zero. Otherwise, the price parameter will be zero.
permId	int	The TWS id used to identify orders. Remains the same over TWS sessions.
parentId	int	The order ID of the parent order, used for bracket and auto trailing stop orders.
lastFilledPrice	double	The last price of the shares that have been executed. This parameter is valid only if the filled parameter value is greater than zero. Otherwise, the price parameter will be zero.

Parameter	Type	Description
clientId	int	The ID of the client (or TWS) that placed the order. Note that TWS orders have a fixed clientId and orderId of 0 that distinguishes them from API orders.
whyHeld	String	This field is used to identify an order held when TWS is trying to locate shares for a short sell. The value used to indicate this is 'locate'.

openOrder()

This callback feeds in open orders.

void openOrder(int orderId, Contract contract, Order order, OrderState orderState)

Parameter	Type	Description
orderId	int	The order Id assigned by TWS. Used to cancel or update the order.
contract	Contract	The Contract class attributes describe the contract.
order	Order	The Order class attributes define the details of the order.
orderState	OrderState	The orderState attributes include margin and commissions fields for both pre and post trade data.

openOrderEnd()

This is called at the end of a given request for open orders.

void openOrderEnd()

nextValidId()

Receives the next valid Order ID.

void nextValidId(int orderId)

Parameter	Type	Description
orderId	int	The next available order ID received from TWS upon connection. Increment all successive orders by one based on this Id.

deltaNeutralValidation()

Upon accepting a Delta-Neutral RFQ(request for quote), the server sends a deltaNeutralValidation() message with the UnderComp structure. If the delta and price fields are empty in the original request, the confirmation will contain the current values from the server. These values are locked when the RFQ is processed and remain locked until the RFQ is canceled.

void deltaNeutralValidation(int reqId, UnderComp underComp)

Parameter	Type	Description
reqID	int	The ID of the data request.
underComp	UnderComp	Underlying component.

updateAccountValue()

This callback receives the subscribed account's information in response to reqAccountUpdates(). You can only subscribe to one account at a time.

void updateAccountValue(string key, string value, string currency, string accountName)

Parameter	Type	Description
key	string	A string that indicates one type of account value. There is a long list of possible keys that can be sent, here are just a few examples: • CashBalance - account cash balance • DayTradesRemaining - number of day trades left • EquityWithLoanValue - equity with Loan Value • InitMarginReq - current initial margin requirement • MaintMarginReq - current maintenance margin • NetLiquidation - net liquidation value
value	string	The value associated with the key.
currency	string	Defines the currency type, in case the value is a currency type.
account	string	The account. Useful for Financial Advisor sub-account messages.

updatePortfolio()

Receives the subscribed account's portfolio in response to reqAccountUpdates(). If you want to receive the portfolios of all managed accounts, use reqPositions().

void updatePortfolio(Contract contract, int position, double marketPrice, double marketValue, double averageCost, double unrealizedPNL, double realizedPNL, string accountName)

Parameter	Type	Description
contract	Contract	This structure contains a description of the contract which is being traded. The exchange field in a contract is not set for portfolio update.

Parameter	Type	Description
position	int	The number of positions held. If the position is 0, it means the position has just cleared.
marketPrice	double	The unit price of the instrument.
marketValue	double	The total market value of the instrument.
averageCost	double	The average cost per share is calculated by dividing your cost (execution price + commission) by the quantity of your position.
unrealizedPNL	double	The difference between the current market value of your open positions and the average cost, or Value - Average Cost.
realizedPNL	double	Shows your profit on closed positions, which is the difference between your entry execution cost (execution price + commissions to open the position) and exit execution cost ((execution price + commissions to close the position)
accountName	string	The name of the account to which the message applies. Useful for Financial Advisor sub-account messages.

updateAccountTime()

Receives the last time at which the account was updated.

void updateAccountTime(string timeStamp)

Parameter	Type	Description
timeStamp	string	The last update system time.

accountDownloadEnd()

This event is called when the receipt of an account's information has been completed.

void accountDownloadEnd(string accountName)

Parameter	Type	Description
accountName	string	The account ID.

accountSummary()

Returns the account information from TWS in response to reqAccountSummary().

void accountSummary(int reqId, string account, string tag, string value, string currency)

Parameter	Type	Description
reqId	int	The request's unique identifier.

Parameter	Type	Description
account	string	The account ID.

Parameter	Type	Description
tag	string	The account attribute being received. Available attributes are: • *AccountType* • *Net Liquidation* • *TotalCashValue* — Total cash including futures pnl • *SettledCash* — For cash accounts, this is the same as TotalCashValue • *AccruedCash* — Net accrued interest • *BuyingPower* — The maximum amount of marginable US stocks the account can buy • *EquityWithLoanValue* — Cash + stocks + bonds + mutual funds • *PreviousEquityWithLoanValue* • *GrossPositionValue* — The sum of the absolute value of all stock and equity option positions • *RegTEquity* • *RegTMargin* • *SMA* — Special Memorandum Account • *InitMarginReq* • *MaintMarginReq* • *AvailableFunds* • *ExcessLiquidity* • *Cushion* — Excess liquidity as a percentage of net liquidation value • *FullInitMarginReq* • *FullMaintMarginReq* • *FullAvailableFunds* • *FullExcessLiquidity* • *LookAheadNextChange* — Time when look-ahead values take effect • *LookAheadInitMarginReq* • *LookAheadMaintMarginReq* • *LookAheadAvailableFunds* • *LookAheadExcessLiquidity*

Parameter	Type	Description
		• *HighestSeverity* — A measure of how close the account is to liquidation • *DayTradesRemaining* — The Number of Open/Close trades a user could put on before Pattern Day Trading is detected. A value of "-1" means that the user can put on unlimited day trades. • *Leverage* — GrossPositionValue / NetLiquidation
value	string	The value of the attribute.
currency	string	The currency in which the attribute is expressed.

accountSummaryEnd

This is called once all account information for a given reqAccountSummary() request are received.

void accountSummaryEnd(int reqId)

Parameter	Type	Descrption
reqId	int	The request's identifier.

position()

This event returns open positions for all accounts in response to the reqPositions() method.

void position(string account, Contract contract, int pos, double avgCost)

Parameter	Type	Description
account	string	The account holding the positions.
contract	Contract	This structure contains a full description of the position's contract .
pos	double	The number of positions held.
avgCost	double	The average cost of the position.

positionEnd()

This is called once all position data for a given request are received and functions as an end marker for the position() data.

void positionEnd()

contractDetails()

Returns all contracts matching the requested parameters in reqContractDetails(). For example, you can receive an entire option chain.

void contractDetails(int ReqId, ContractDetails contractDetails)

Parameter	Type	Description
reqID	int	The ID of the data request. Ensures that responses are matched to requests if several requests are in process.
contractDetails	ContractDetails	This structure contains a full description of the contract being looked up.

contractDetailsEnd()

This method is called once all contract details for a given request are received. This helps to define the end of an option chain.

void contractDetailsEnd(int reqId)

Parameter	Type	Description
reqID	int	The Id of the data request.

bondContractDetails()

Sends bond contract data when the reqContractDetails() method has been called for bonds.

void bondContractDetails(int reqId, ContractDetails contractDetails)

Parameter	Type	Description
reqId	int	The ID of the data request.
contractDetails	ContractDetails	This structure contains a full description of the bond contract being looked up.

execDetails()

Returns executions from the last 24 hours as a response to reqExecutions(), or when an order is filled.

void execDetails(int reqId, Contract contract, Execution execution)

Parameter	Type	Description
reqId	int	The request's identifier.
contract	Contract	This structure contains a full description of the contract that was executed. **Note:** Refer to the C# SocketClient Properties page for more information.
execution	Execution	This structure contains addition order execution details.

execDetailsEnd()

This method is called once all executions have been sent to a client in response to reqExecutions().

void execDetailsEnd(int reqId)

Parameter	Type	Description
reqID	int	The request's identifier.

commissionReport()

This callback returns the commission report portion of an execution and is triggered immediately after a trade execution, or by calling reqExecution().

void commissionReport(CommissionReport commissionReport)

Parameter	Type	Description
commissionReport	CommissionReport	The structure that contains commission details.

updateMktDepth()

Returns market depth (the order book) in response to reqMktDepth().

void updateMktDepth(int tickerId, int position, int operation, int side, double price, int size)

Parameter	Type	Description
tickerId	int	The request's identifier.
position	int	Specifies the row Id of this market depth entry.
operation	int	Identifies how this order should be applied to the market depth. Valid values are: • 0 = insert (insert this new order into the row identified by 'position')· • 1 = update (update the existing order in the row identified by 'position')· • 2 = delete (delete the existing order at the row identified by 'position').
side	int	Identifies the side of the book that this order belongs to. Valid values are: • 0 = ask • 1 = bid.
price	double	The order price.
size	int	The order size.

updateMktDepthL2()

Returns Level II market depth in response to reqMktDepth().

void updateMktDepthL2(int tickerId, int position, string marketMaker, int operation, int side, double price, int size)

Parameter	Type	Description
tickerId	int	The request's identifier.
position	int	Specifies the row id of this market depth entry.
marketMaker	string	Specifies the exchange holding the order.
operation	int	Identifies how this order should be applied to the market depth. Valid values are: • 0 = insert (insert this new order into the row identified by 'position')· • 1 = update (update the existing order in the row identified by 'position')· • 2 = delete (delete the existing order at the row identified by 'position').
side	int	Identifies the side of the book that this order belongs to. Valid values are: • 0 = ask • 1 = bid.
price	double	The order price.
size	int	The order size.

updateNewsBulletin()

Provides news bulletins if the client has subscribed (i.e. by calling the reqNewsBulletins() method).

void updateNewsBulletin(int msgId, int msgType, string message, string origExchange)

Parameter	Type	Description
msgId	int	The bulletin ID, incrementing for each new bulletin.
msgType	int	Specifies the type of bulletin. Valid values include: • 1 = Regular news bulletin • 2 = Exchange no longer available for trading • 3 = Exchange is available for trading
message	string	The bulletin's message text.
origExchange	string	The exchange from which this message originated.

managedAccounts()

Receives a comma-separated string containing IDs of managed accounts.

void managedAccounts(string accountsList)

Parameter	Type	Description
accountsList	string	The comma delimited list of FA managed accounts.

receiveFA()

This method receives Financial Advisor configuration information from TWS.

receiveFA(int faDataType, string faXmlData)

Parameter	Type	Description
faDataType	int	Specifies the type of Financial Advisor configuration data being received from TWS. Valid values include: • 1 = GROUPS • 2 = PROFILE • 3 =ACCOUNT ALIASES
faXmlData	string	The XML string containing the previously requested FA configuration information.

historicalData()

Receives the historical data in response to reqHistoricalData().

void historicalData (int reqId, string date, double open, double high, double low, double close, int volume, int count, double WAP, bool hasGaps)

Parameter	Type	Description
reqId	int	The request's identifier.
date	string	The date-time stamp of the start of the bar. The format is determined by the reqHistoricalData() formatDate parameter (either as a yyyymmss hh:mm:ss formatted string or as system time according to the request).
open	double	The bar opening price.
high	double	The high price during the time covered by the bar.
low	double	The low price during the time covered by the bar.
close	double	The bar closing price.
volume	int	The volume during the time covered by the bar.
count	int	When TRADES historical data is returned, represents the number of trades that occurred during the time period the bar covers.
WAP	double	The weighted average price during the time covered by the bar.
hasGaps	bool	Whether or not there are gaps in the data.

historicalDataEnd()

Marks the end of receipt of historical data.

void historicalDataEnd(int reqId, string start, string end)

scannerParameters()

This method receives an XML document that describes the valid parameters that a scanner subscription can have.

void scannerParameters(string xml)

Parameter	Type	Description
xml	string	The xml-formatted string with the available parameters.

scannerData()

This method receives the requested market scanner data results.

void scannerData(int reqId, int rank, ContractDetails contractDetails, string distance, string benchmark, string projection, string legsStr)

Parameter	Type	Description
reqId	int	The request's identifier.
rank	int	The ranking within the response of this bar.
contractDetails	ContractDetails	This structure contains a full description of the contract that was executed.
distance	string	Varies based on query.
benchmark	string	Varies based on query.
projection	string	Varies based on query.
legsStr	string	Describes combo legs when scan is returning EFP.

scannerDataEnd()

Marks the end of one scan (the receipt of scanner data has ended).

void scannerDataEnd(int reqId)

Parameter	Type	Description
reqId	int	The request's identifier.

realtimeBar()

Updates real time 5-second bars.

void realtimeBar(int reqId, long time, double open, double high, double low, double close, long volume, double wap, int count)

Parameter	Type	Description
reqId	int	The request's identifier.
time	long	The date-time stamp of the start of the bar. The format is determined by the reqHistoricalData() formatDate parameter (either as a yyyymmss hh:mm:ss formatted string or as system time).
open	double	The bar opening price.
high	double	The high price during the time covered by the bar.
low	double	The low price during the time covered by the bar.
close	double	The bar closing price.
volume	long	The volume during the time covered by the bar.
wap	double	The weighted average price during the time covered by the bar.
count	int	When TRADES data is returned, represents the number of trades that occurred during the time period the bar covers.

fundamentalData()

This method is called to receive Reuters global fundamental market data. There must be a subscription to Reuters Fundamental set up in Account Management before you can receive this data.

void fundamentalData(int reqId, string data)

Parameter	Type	Description
reqId	int	The request's identifier.
data	string	One of these XML reports: • Company overview • Financial summary • Financial ratios • Financial statements • Analyst estimates • Company calendar

displayGroupList()

This callback is a one-time response to queryDisplayGroups().

displayGroupList(int reqId As Integer, string groups)

Parameter	Type	Description
reqtId	int	The requestId specified in queryDisplayGroups().

Parameter	Type	Description
groups	string	A list of integers representing visible group ID separated by the "|" character, and sorted by most used group first. This list will not change during TWS session (in other words, user cannot add a new group; sorting can change though). Example: "3|1|2"

displayGroupUpdated()

This is sent by TWS to the API client once after receiving the subscription request subscribeToGroupEvents(), and will be sent again if the selected contract in the subscribed display group has changed.

displayGroupList(int reqId, string contractInfo)

Parameter	Type	Description
requestId	int	The requestId specified in subscribeToGroupEvents().
contractInfo	string	The encoded value that uniquely represents the contract in IB. Possible values include: • none = empty selection • contractID@exchange – any non-combination contract. Examples: 8314@SMART for IBM SMART; 8314@ARCA for IBM @ARCA. • combo = if any combo is selected.

C# SocketClient Properties

The tables below define attributes for the following classes:

- Execution
- ExecutionFilter
- CommissionReport
- Contract
- ContractDetails
- ComboLeg
- Order
- OrderComboLeg
- OrderState
- ScannerSubscription
- UnderComp

Execution

Class that describes an order's execution.

Attribute	Description
int orderId	The order id. **Note:** TWS orders have a fixed order id of "0."
int clientId	The id of the client that placed the order.Note: TWS orders have a fixed client id of "0."
string execId	Unique order execution id.
string time	The order execution time.
string acctNumber	The customer account number.
string exchange	Exchange that executed the order.
string side	Specifies if the transaction was a sale or a purchase. Valid values are: • BOT • SLD
int shares	The number of shares filled.
double price	The order execution price, not including commissions.

Attribute	Description
int permId	The TWS id used to identify orders, remains the same over TWS sessions.
int liquidation	Identifies the position as one to be liquidated last should the need arise.
int cumQty	Cumulative quantity. Used in regular trades, combo trades and legs of the combo.
double avgPrice	Average price. Used in regular trades, combo trades and legs of the combo. Does not include commissions.
string orderRef	Allows the API client to add a reference to an order.
string evRule	Contains the Economic Value Rule name and the respective optional argument. The two values should be separated by a colon. For example, aussieBond:YearsToExpiration=3. When the optional argument is not present, the first value will be followed by a colon.
double evMultiplier	Tells you approximately how much the market value of a contract would change if the price were to change by 1. It cannot be used to get market value by multiplying the price by the approximate multiplier.

ExecutionFilter

Attribute	Description
int clientId	Filter the results of the reqExecutions() method based on the clientId.
string acctCode	Filter the results of the reqExecutions() method based on an account code. Note: this is only relevant for Financial Advisor (FA) accounts.
string time	Filter the results of the reqExecutions() method based on execution reports received after the specified time.The format for timeFilter is "yyyymmdd-hh:mm:ss"
string symbol	Filter the results of the reqExecutions() method based on the order symbol.
string secType	Filter the results of the reqExecutions() method based on the order security type. Note: Refer to the Contract object for the list of valid security types.
string exchange	Filter the results of the reqExecutions() method based on the order exchange.
string side	Filter the results of the reqExecutions() method based on the order action. Note: Refer to the Order class for the list of valid order actions.

CommissionReport

Class that class represents the commissions generated by an execution.

Attribute string execId()	Description Unique order execution id.
double commission()	The commission amount.
string currency()	The reporting currency.
double realizedPNL()	The amount of realized Profit and Loss.
double yield()	The yield.
int yieldRedemptionDate()	Date expressed in yyyymmdd format.

Contract

Class that describes an instrument's definition.

Attribute	Description
int conId	The unique contract identifier.
string symbol	This is the symbol of the underlying asset.
string secType	This is the security type. Valid values are: • STK • OPT • FUT • IND • FOP • CASH • BAG • NEWS
string expiry	The expiration date. Use the format YYYYMM.
double strike	The strike price.
string right	Specifies a Put or Call. Valid values are: P, PUT, C, CALL.
string multiplier	Allows you to specify a future or option contract multiplier. This is only necessary when multiple possibilities exist.

Vector comboLegs	Dynamic memory structure used to store the leg definitions for this contract.
string exchange	The order destination, such as Smart.
string currency	Specifies the currency. Ambiguities may require that this field be specified, for example, when SMART is the exchange and IBM is being requested (IBM can trade in GBP or USD). Given the existence of this kind of ambiguity, it is a good idea to always specify the currency.
string localSymbol	This is the local exchange symbol of the underlying asset.
string primaryExch	Identifies the listing exchange for the contract (do not list SMART).
string tradingClass	The trading class name for this contract.
bool includeExpired	If set to true, contract details requests and historical data queries can be performed pertaining to expired contracts. Note: Historical data queries on expired contracts are limited to the last year of the contracts life, and are initially only supported for expired futures contracts,
string secIdType	Security identifier, when querying contract details or when placing orders. Supported identifiers are: • SIN (Example: Apple: US0378331005) • CUSIP (Example: Apple: 037833100) • SEDOL (Consists of 6-AN + check digit. Example: BAE: 0263494) • RIC (Consists of exchange-independent RIC Root and a suffix identifying the exchange. Example: AAPL.O for Apple on NASDAQ.)
string secId	Unique identifier for the secIdType.
string comboLegsDescrip	Description for combo legs
UnderComp underComp	Delta and underlying price for Delta-Neutral combo orders. Underlying (STK or FUT), delta and underlying price goes into this attribute.

ContractDetails

Class that describes extended contract details, including bond contract details.

Attribute	Description

Contract summary	A contract summary.
string marketName	The market name for this contract.
double minTick	The minimum price tick.
string priceMagnifier	Allows execution and strike prices to be reported consistently with market data, historical data and the order price, i.e. Z on LIFFE is reported in index points and not GBP.
string orderTypes	The list of valid order types for this contract.
string validExchanges	The list of exchanges this contract is traded on.
string underConId	The underlying contract ID.
string longName	Descriptive name of the asset.
string contractMonth	The contract month. Typically the contract month of the underlying for a futures contract.
string industry	The industry classification of the underlying/product. For example, Financial.
string category	The industry category of the underlying. For example, InvestmentSvc.
string subcategory	The industry subcategory of the underlying. For example, Brokerage.
string timeZoneId	The ID of the time zone for the trading hours of the product. For example, EST.
string tradingHours	The total trading hours of the product. For example, 20090507:0700-1830,1830-2330;20090508:CLOSED.
string liquidHours	The regular trading hours of the product. For example, 20090507:0930-1600;20090508:CLOSED.
string evRule	Contains the Economic Value Rule name and the respective optional argument. The two values should be separated by a colon. For example, aussieBond:YearsToExpiration=3. When the optional argument is not present, the first value will be followed by a colon.
double evMultiplier	Tells you approximately how much the market value of a contract would change if the price were to change by 1. It cannot be used to get market value by multiplying the price by the approximate multiplier.
Vector<TagValue> secIdList()	A list of contract identifiers that the customer is allowed to view (CUSIP, ISIN, etc.)
Bond Values	

string cusip	For Bonds. The nine-character bond CUSIP or the 12-character SEDOL.
string ratings	For Bonds. Identifies the credit rating of the issuer. A higher credit rating generally indicates a less risky investment. Bond ratings are from Moody's and S&P respectively.
string descAppend	For Bonds. A description string containing further descriptive information about the bond.
string bondType	For Bonds. The type of bond, such as "CORP."
string couponType	For Bonds. The type of bond coupon.
bool callable	For Bonds. Values are True or False. If true, the bond can be called by the issuer under certain conditions.
bool putable	For Bonds. Values are True or False. If true, the bond can be sold back to the issuer under certain conditions.
double coupon	For Bonds. The interest rate used to calculate the amount you will receive in interest payments over the course of the year.
bool convertible	For Bonds. Values are True or False. If true, the bond can be converted to stock under certain conditions.
string maturity	For Bonds. The date on which the issuer must repay the face value of the bond.
string issueDate	For Bonds. The date the bond was issued.
string nextOptionDate	For Bonds, only if bond has embedded options.
string nextOptionType	For Bonds, only if bond has embedded options.
bool nextOptionPartial	For Bonds, only if bond has embedded options.
string notes	For Bonds, if populated for the bond in IB's database

ComboLeg

Class that represents a leg within a combo order.

Attribute	Description
int conId	The unique contract identifier specifying the security.
int ratio	Select the relative number of contracts for the leg you are constructing. To help determine the ratio for a specific combination order, refer to the Interactive Analytics section of the User's Guide.

Attribute	Description
string action	The side (buy or sell) for the leg you are constructing.
string exchange	The exchange to which the complete combination order will be routed.
int openClose	Specifies whether the order is an open or close order. Valid values are: • 0 - Same as the parent security. This is the only option for retail customers. • 1 - Open. This value is only valid for institutional customers. • 2 - Close. This value is only valid for institutional customers. • 3 = Unknown
int shortSaleSlot	For institutional customers only. • 0 - inapplicable (i.e. retail customer or not short leg) • 1 - clearing broker • 2 - third party. If this value is used, you must enter a designated location.
string designatedLocation	If shortSaleSlot == 2, the designatedLocation must be specified. Otherwise leave blank or orders will be rejected.

Order

Attribute	Description
Order Identifiers	
int clientId	The id of the client that placed this order.
int orderId	The id for this order.
int permid	The TWS id used to identify orders, remains the same over TWS sessions.
Main Order Fields	
string action	Identifies the side. Valid values are: BUY, SELL, SSHORT
long totalQuantity	The order quantity.
string orderType	Identifies the order type. For more information about supported order types, see Supported Order Types.

Attribute	Description
double lmtPrice	This is the LIMIT price, used for limit, stop-limit and relative orders. In all other cases specify zero. For relative orders with no limit price, also specify zero.
double auxPrice	This is the STOP price for stop-limit orders, and the offset amount for relative orders. In all other cases, specify zero.
Extended Order Fields	
string tif	The time in force. Valid values are: DAY, GTC, IOC, GTD.
string activeStartTime	For GTC orders.
string activeStopTime	For GTC orders.
string ocaGroup	Identifies an OCA (one cancels all) group.
int ocaType	Tells how to handle remaining orders in an OCA group when one order or part of an order executes. Valid values include: • 1 = Cancel all remaining orders with block • 2 = Remaining orders are proportionately reduced in size with block • 3 = Remaining orders are proportionately reduced in size with no block If you use a value "with block" gives your order has overfill protection. This means that only one order in the group will be routed at a time to remove the possibility of an overfill.
string orderRef	The order reference. Intended for institutional customers only, although all customers may use it to identify the API client that sent the order when multiple API clients are running.
bool transmit	Specifies whether the order will be transmitted by TWS. If set to false, the order will be created at TWS but will not be sent.
int parentId	The order ID of the parent order, used for bracket and auto trailing stop orders.
bool blockOrder	If set to true, specifies that the order is an ISE Block order.
bool sweepToFill	If set to true, specifies that the order is a Sweep-to-Fill order.
int displaySize	The publicly disclosed order size, used when placing Iceberg orders.

Attribute	Description
int triggerMethod	Specifies how Simulated Stop, Stop-Limit and Trailing Stop orders are triggered. Valid values are: • 0 - The default value. The "double bid/ask" function will be used for orders for OTC stocks and US options. All other orders will used the "last" function. • 1 - use "double bid/ask" function, where stop orders are triggered based on two consecutive bid or ask prices. • 2 - "last" function, where stop orders are triggered based on the last price. • 3 double last function. • 4 bid/ask function. • 7 last or bid/ask function. • 8 mid-point function.
bool outsideRth	If set to true, allows orders to also trigger or fill outside of regular trading hours.
bool hidden	If set to true, the order will not be visible when viewing the market depth. This option only applies to orders routed to the ISLAND exchange.
string goodAfterTime	The trade's "Good After Time," format "YYYYMMDD hh:mm:ss (optional time zone)" Use an empty string if not applicable.
string goodTillDate	You must enter GTD as the time in force to use this string. The trade's "Good Till Date," format "YYYYMMDD hh:mm:ss (optional time zone)" Use an empty string if not applicable.
bool overridePercentageConstraints	Precautionary constraints are defined on the TWS Presets page, and help ensure tha tyour price and size order values are reasonable. Orders sent from the API are also validated against these safety constraints, and may be rejected if any constraint is violated. To override validation, set this parameter's value to True. Valid values include: • 0 = False • 1 = True

Attribute	Description
string rule80A	Values include: • Individual = 'I' • Agency = 'A', • AgentOtherMember = 'W' • IndividualPTIA = 'J' • AgencyPTIA = 'U' • AgentOtherMemberPTIA = 'M' • IndividualPT = 'K' • AgencyPT = 'Y' • AgentOtherMemberPT = 'N'
bool allOrNone	0 = no, 1 = yes
int minQty	Identifies a minimum quantity order type.
double percentOffset	The percent offset amount for relative orders.
TRAILLIMIT Order Fields	
double trailStopPrice	For TRAILLIMIT orders only
double trailingPercent	Specify the trailing amount of a trailing stop order as a percentage. Observe the following guidelines when using the trailingPercent field: • This field is mutually exclusive with the existing trailing amount. That is, the API client can send one or the other but not both. • This field is read AFTER the stop price (barrier price) as follows: deltaNeutralAuxPrice stopPrice trailingPercent scale order attributes • The field will also be sent to the API in the openOrder message if the API client version is >= 56. It is sent after the stopPrice field as follows: stopPrice trailingPct basisPoint
Financial Advisor Fields	
string faGroup	The Financial Advisor group the trade will be allocated to -- use an empty string if not applicable.

Attribute	Description
string faProfile	The Financial Advisor allocation profile the trade will be allocated to -- use an empty string if not applicable.
string faMethod	The Financial Advisor allocation function the trade will be allocated with -- use an empty string if not applicable.
string faPercentage	The Financial Advisor percentage concerning the trade's allocation -- use an empty string if not applicable.
Institutional (non-cleared) Only	
string openClose	For institutional customers only. Valid values are O, C.
int origin	The order origin. For institutional customers only. Valid values are 0 = customer, 1 = firm
int shortSaleSlot	Valid values are 1 or 2.
string designatedLocation	Used only when shortSaleSlot = 2.
SMART Routing Only	
double discretionaryAmt	The amount off the limit price allowed for discretionary orders.
bool eTradeOnly	Trade with electronic quotes. 0 = no, 1 = yes
bool firmQuoteOnly	Trade with firm quotes. 0 = no, 1 = yes
double nbboPriceCap	Maximum smart order distance from the NBBO.
bool optOutSmartRouting	Use to opt out of default SmartRouting for orders routed directly to ASX. This attribute defaults to false unless explicitly set to true. When set to false, orders routed directly to ASX will NOT use SmartRouting. When set to true, orders routed directly to ASX orders WILL use SmartRouting.
BOX or VOL Orders Only	
int auctionStrategy	Values include: • match = 1 • improvement = 2 • transparent = 3 For orders on BOX only.
double delta	The stock delta. For orders on BOX only.
double startingPrice	The auction starting price. For orders on BOX only.
double stockRefPrice	The stock reference price. The reference price is used for VOL orders to compute the limit price sent to an exchange (whether or not Continuous Update is selected), and for price range monitoring.

Attribute	Description
Pegged-to-Stock and VOL Orders Only	
double stockRangeLower	The lower value for the acceptable underlying stock price range. For price improvement option orders on BOX and VOL orders with dynamic management.
double stockRangeUpper	The upper value for the acceptable underlying stock price range. For price improvement option orders on BOX and VOL orders with dynamic management.
Volatility Orders Only	
double volatility	The option price in volatility, as calculated by TWS' Option Analytics. This value is expressed as a percent and is used to calculate the limit price sent to the exchange.
int volatilityType	Values include: • 1 = Daily volatility • 2 = Annual volatility
bool continuousUpdate	VOL orders only. Specifies whether TWS will automatically update the limit price of the order as the underlying price moves.
int referencePriceType	VOL orders only. Specifies how you want TWS to calculate the limit price for options, and for stock range price monitoring. Valid values include: • 1 = Average of NBBO • 2 = NBB or the NBO depending on the action and right.
string deltaNeutralOrderType	VOL orders only. Enter an order type to instruct TWS to submit a delta neutral trade on full or partial execution of the VOL order. For no hedge delta order to be sent, specify NONE.
int deltaNeutralAuxPrice	VOL orders only. Use this field to enter a value if the value in the *deltaNeutralOrderType* field is an order type that requires an Aux price, such as a REL order.
string deltaNeutralOpenClose	Specifies whether the order is an Open or a Close order and is used when the hedge involves a CFD and the order is clearing away.
int deltaNeutralConId	

Attribute	Description
string deltaNeutralSettlingFirm	
string deltaNeutralClearingAccount	
string deltaNeutralClearingIntent	
string deltaNeutralOpenClose	
bool deltaNeutralShortSale	Used when the hedge involves a stock and indicates whether or not it is sold short.
int deltaNeutralShortSaleSlot	Has a value of 1 (the clearing broker holds shares) or 2 (delivered from a third party). If you use 2, then you must specify a deltaNeutralDesignatedLocation.
string deltaNeutralDesignatedLocation	Used only when deltaNeutralShortSaleSlot = 2.
Combo Orders Only	
double basisPoints	For EFP orders only
int basisPointsType	For EFP orders only
Scale Orders Only	
int scaleInitLevelSize	For Scale orders: Defines the size of the first, or initial, order component.
int scaleSubsLevelSize	For Scale orders: Defines the order size of the subsequent scale order components. Used in conjunction with scaleInitLevelSize ().
double scalePriceIncrement	For Scale orders: Defines the price increment between scale components. This field is required.
double scalePriceAdjustValue()	For extended Scale orders.
int scalePriceAdjustInterval()	For extended Scale orders.

Attribute	Description
double scaleProfitOffset()	For extended Scale orders.
bool scaleAutoReset()	For extended Scale orders.
int scaleInitPosition()	For extended Scale orders.
int scaleInitFillQty()	For extended Scale orders.
bool scaleRandomPercent()	For extended Scale orders.
string scaleTable	Manual table for Scale orders.
Hedge Orders Only	
string hedgeType	For hedge orders. Possible values are: • D = Delta • B = Beta • F = FX • P = Pair
string hedgeParam	Beta = x for Beta hedge orders, ratio = y for Pair hedge order
Clearing Information	
string account	The account. For institutional customers only.
string clearingAccount	For IBExecution customers: Specifies the true beneficiary of the order. This value is required for FUT/FOP orders for reporting to the exchange.
string clearingIntent	For IBExecution customers: Valid values are: IB, Away, and PTA (post trade allocation).
string settlingFirm	Institutional only.
Algo Orders Only	
string algoStrategy	For information about API Algo orders, see IBAlgo Parameters.
Vector<TagValue> algoParams	Support for IBAlgo parameters.
string algoId	Identifies an order generated by algorithmic trading.

Attribute	Description
What If	
bool whatIf	Use to request pre-trade commissions and margin information. If set to true, margin and commissions data is received back via the OrderState() object for the openOrder() callback.
Smart Combo Routing	
Vector<TagValue> smartComboRoutingParams	Support for Smart Combo Routing.
Order Combo Legs	
OrderComboLegs() As Object	Holds attributes for all legs in a combo order.
Solicited Orders	
bool solicited	True = solicited (orders initiated by a broker through the brokers research and design) False = unsolicited (those instigated by a broker's customer either through their actions or by the broker at their direction)
Not Held	
bool notHeld	For IBDARK orders only. Orders routed to IBDARK are tagged as “post only” and are held in IB's order book, where incoming SmartRouted orders from other IB customers are eligible to trade against them.
Internal use only	
Vector<TagValue> orderMiscOptions	For internal use only. Use the default value XYZ.

OrderComboLeg

Class that allows you to specify a price on an order's leg.

Attribute	Description
double price	Order-specific leg price.

OrderState

Attribute	Description
string status	Displays the order status.
string initMargin	Shows the impact the order would have on your initial margin.
string maintMargin	Shows the impact the order would have on your maintenance margin.
string equityWithLoan	Shows the impact the order would have on your equity with loan value.
double commission	Shows the commission amount on the order.
double minCommission	Used in conjunction with the maxCommission field, this defines the lowest end of the possible range into which the actual order commission will fall.
double maxCommission	Used in conjunction with the minCommission field, this defines the highest end of the possible range into which the actual order commission will fall.
string commissionCurrency	Shows the currency of the commission value.
string warningText	Displays a warning message if warranted.

ScannerSubscription

Attribute	Description
int numberOfRows	Defines the number of rows of data to return for a query.
string instrument	Defines the instrument type for the scan.
string locationCode	The location.
string scanCode	Can be left blank.
double abovePrice	Filter out contracts with a price lower than this value. Can be left blank.
double belowPrice	Filter out contracts with a price higher than this value. Can be left blank.
int aboveVolume	Filter out contracts with a volume lower than this value. Can be left blank.
int averageOptionVolumeAbove	Can leave empty.
double marketCapAbove	Filter out contracts with a market cap lower than this value. Can be left blank.
double marketCapBelow	Filter out contracts with a market cap above this value. Can be left blank.

Attribute	Description
string moodyRatingAbove	Filter out contracts with a Moody rating below this value. Can be left blank.
string moodyRatingBelow	Filter out contracts with a Moody rating above this value. Can be left blank.
string spRatingAbove	Filter out contracts with an S&P rating below this value. Can be left blank.
string spRatingBelow	Filter out contracts with an S&P rating above this value. Can be left blank.
string maturityDateAbove	Filter out contracts with a maturity date earlier than this value. Can be left blank.
string maturityDateBelow	Filter out contracts with a maturity date later than this value. Can be left blank.
double couponRateAbove	Filter out contracts with a coupon rate lower than this value. Can be left blank.
double couponRateBelow	Filter out contracts with a coupon rate higher than this value. Can be left blank.
string excludeConvertible	Filter out convertible bonds. Can be left blank.
string scannerSettingPairs	Can leave empty. For example, a pairing "Annual, true" used on the "top Option Implied Vol % Gainers" scan would return annualized volatilities.
string stockTypeFilter	Valid values are: • CORP = Corporation • ADR = American Depositary Receipt • ETF = Exchange Traded Fund • REIT = Real Estate Investment Trust • CEF = Closed End Fund

UnderComp

Delta-Neutral underlying component.

Attribute	Description
int conId	The unique contract identifier specifying the security. Used for Delta-Neutral Combo contracts.
double delta	The underlying stock or future delta. Used for Delta-Neutral Combo contracts.
double price	The price of the underlying. Used for Delta-Neutral Combo contracts.

7

Advisors

This chapter describes API functionality for users with Financial Advisor accounts, including the following topics:

Financial Advisor Orders and Account Configuration

This section assumes familiarity on the part of the reader with TWS Financial Advisor account configuration and order placement.

API FA functionality became significantly more powerful in TWS release 821 and higher, in that the now deprecated "allocation string" method was replaced by the much more powerful Financial Advisor order allocation methods. Prior to those new methods being used, TWS had to be configured to understand the desired FA order groups, profiles, and account aliases. This can be done manually in TWS, or via the API, or via both.

Excel DDE Support

Starting with TWS release 824, DDE orders now have six Extended Order Attributes: *Good After Time*, *Good Till Date*, *FA Group*, *FA Method*, *FA Percentage*, and *FA Profile*. These can be left empty if they do not apply to an order. TWS Financial Advisor account configuration should be done manually for DDE access.

You can place FA orders on the Advisors page in the most recent release of the TwsDde.xls DDE for Excel API spreadsheet. For more information, see the Advisors Page topic.

Support by Other API Technologies

For all ActiveX, Java, or C++ based API technologies, TWS Financial Advisor account configuration is done via two new methods and one new event. The methods are called *replaceFA*, and *requestFA*. The event is called *receiveFA*. These methods and that event pertain to the following three parts of TWS FA account configuration: creating groups, profiles, and account aliases.

- **requestFA(int faDataType)** is a method that is called by an API application to request one of those types of FA configuration data.
- **receiveFA(int faDataType, string XML)** receives the requested data from TWS, via an event that TWS sends that contains the data requested. The event includes an XML string containing the requested information.
- **replaceFA(int faDataType, string XML)** can be called from the API if the API application wishes to replace the previous FA configuration information with a new XML string.

In accordance with the existence of this new functionality, all placeOrder methods, whether ActiveX, Java, or C++ based, have four new parameters pertaining to Financial Advisor order placement: faGroup, faMethod, faPercentage, and faProfile. When one or more of these new values is not relevant to an order, simply pass in an empty string.

Improved Financial Advisor Execution Reporting

When using TWS version 823 or higher, the execution messages resulting from a new FA order will report both the initial execution of the order, as well as its being allocated to its various subaccounts.

The following example helps explains Advisor execution reporting.

Assume that 100 shares of IBM is being bought on the NYSE by a Financial Advisor who has three sub-accounts, and who wants them allocated with Equal Quantity to each. The following seven execution messages will occur:

- FA Account: Order filled on NYSE to BUY 100 IBM
- FA Account: allocation of 34 shares out of FA account and into sub account 1. Message says "BUY -34 IBM." The negative quantity reflects the fact that the execution being reported is reducing the purchase.
- SUB1 Account: BUY 34 IBM.
- FA Account: allocation of 33 shares out of FA account and into sub account 2. Message says "BUY -33 IBM."
- SUB2 Account: BUY 33 IBM.
- FA Account: allocation of 33 shares out of FA account and into sub account 3. Message says "BUY -33 IBM."
- SUB3 Account: BUY 33 IBM."

Allocation Methods for Account Groups

Note that you must type the method name in exactly as appears here, or your order won't work.

EqualQuantity Method

Requires you to specify an order size. This method distributes shares equally between all accounts in the group.

Example: You transmit an order for 400 shares of stock ABC. If your Account Group includes four accounts, each account receives 100 shares. If your Account Group includes six accounts, each account receives 66 shares, and then 1 share is allocated to each account until all are distributed.

NetLiq Method

Requires you to specify an order size. This method distributes shares based on the net liquidation value of each account. The system calculates ratios based on the Net Liquidation value in each account and allocates shares based on these ratios.

Example: You transmit an order for 700 shares of stock XYZ. The account group includes three accounts, A, B and C with Net Liquidation values of $25,000, $50,000 and $100,000 respectively. The system calculates a ratio of 1:2:4 and allocates 100 shares to Client A, 200 shares to Client B, and 400 shares to Client C.

AvailableEquity Method

Requires you to specify an order size. This method distributes shares based on the amount of equity with loan value currently available in each account. The system calculates ratios based on the Equity with Loan value in each account and allocates shares based on these ratios.

Example: You transmit an order for 700 shares of stock XYZ. The account group includes three accounts, A, B and C with available equity in the amounts of $25,000, $50,000 and $100,000 respectively. The system calculates a ratio of 1:2:4 and allocates 100 shares to Client A, 200 shares to Client B, and 400 shares to Client C.

PctChange Method

This method only works when you already hold a position in the selected instrument. Do not specify an order size. Since the quantity is calculated by the system, the order size is displayed in the Quantity field after the order is acknowledged. This method increases or decreases an already existing position. Positive percents will increase a position, negative percents will decrease a position.

Example 1: Assume that three of the six accounts in this group hold long positions in stock XYZ. Client A has 100 shares, Client B has 400 shares, and Client C has 200 shares. You want to increase their holdings by 50%, so you enter "50" in the percentage field. The system calculates that your order size needs to be equal to 350 shares. It then allocates 50 shares to Client A, 200 shares to Client B, and 100 shares to Client C.

Example 2: You want to close out all long positions for three of the five accounts in a group. You create a sell order and enter "-100" in the Percentage field. The system calculates 100% of each position for every account in the group that holds a position, and sells all shares to close the positions.

These handy charts make it easy to see how negative and positive percent values will affect long and short positions for both buy and sell orders. Phew, that was a mouthful!

BUY ORDER	Positive Percent	Negative Percent
Long Position	Increases position	No effect
Short Position	No effect	Decreases position

SELL ORDER	Positive Percent	Negative Percent
Long Position	No effect	Decreases position
Short Position	Increases position	No effect

Java Code Samples for Financial Advisor API Orders

There are generally three methods for placing an order in the API from a Financial Advisor (FA) account:

- Place an order for a single managed account.
- Place an order for an allocation profile.
- Place an order for an account group.

Place an Order for a Single Managed Account

As an FA, you can place an order for any one of your managed accounts. The following code sample performs this task.

```
Contract m_contract = new Contract();
Order m_order = new Order();

/** Stocks */
m_contract.m_symbol = "IBM";
m_contract.m_secType = "STK";
m_contract.m_exchange = "SMART";
m_contract.m_currency = "USD";

m_order.m_orderType = "MKT";
m_order.m_action = "BUY";
m_order.m_totalQuantity = 100;
m_order.m_transmit = true;

// allocate the order for this particular account
m_order.m_account = "DU74649";

m_client.placeOrder(orderId++, m_contract, m_order);
```

Place an Order for an Allocation Profile

As an FA, you can place an order for accounts that share an allocation profile. The following code sample performs the task.

> **Note:** Before trying this yourself, you must be familiar with setting up an allocation profile and placing an order in TWS.

```
Contract m_contract = new Contract();

Order m_order = new Order();

.

.

// allocate the order for this profile

m_order.m_faProfile = "USClients";


m_client.placeOrder(orderId++, m_contract, m_order);
```

Place an Order for an Account Group

As an FA, you can place an order for accounts in an account group. Note that the method attribute is a mandatory field when placing an order for account groups. The following code sample performs the task.

> **Note:** Before trying this yourself, you must be familiar with setting up account groups and placing an order in TWS.

```
Contract m_contract = new Contract();

Order m_order = new Order();

.

.

// allocate the order for this group

m_order.m_faGroup = "USGroup";

// using the percent change method

m_order.m_faMethod = "PctChange";

m_order.m_faPercentage = "100";


m_client.placeOrder(orderId++, m_contract, m_order);
```

Changing/Updating Allocation Information

As an FA, you can retrieve allocation information in XML format, and change or update allocation information by passing an XML formatted configuration back.

The following code sample changes one of the groups' name by replacing the first occurrence of "TestGroup" in the configuration file with "MyTestGroup" and passing it back.

```
public void receiveFA(int faDataType, String xml) {
```

```
switch (faDataType) {
  case EClientSocket.GROUPS:
    faGroupXML = xml ;
    String test = xml.replaceFirst("TestGroup", "MyTestGroup");
    m_client.replaceFA(1, test);
    break ;
  case EClientSocket.PROFILES:
    faProfilesXML = xml ;
    break ;
  case EClientSocket.ALIASES:
    faAliasesXML = xml ;
    break ;
}
```

8

ActiveX for Excel

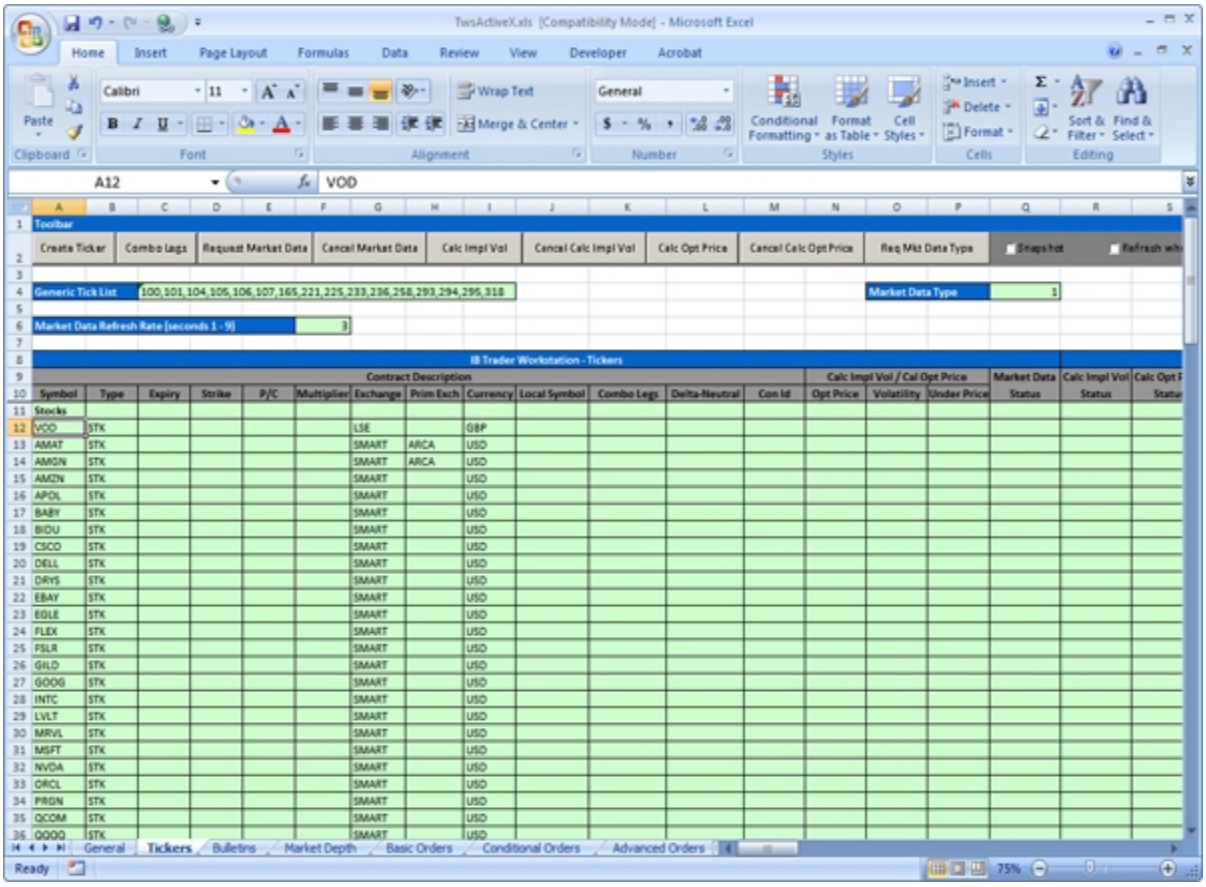
This chapter describes the ActiveX for Excel sample spreadsheet, including the following topics:

- Getting Started with the ActiveX for Excel API
- Using the ActiveX for Excel Sample Spreadsheet

The ActiveX for Excel sample spreadsheet, **TwsActiveX.xls**, duplicates the functionality of the ActiveX for Excel API spreadsheet but internally uses an ActiveX component, **Tws.ocx**. One of the benefits of using this spreadsheet is that it can connect to a TWS or IB Gateway session that is running on a remote PC. The DDE for Excel API spreadsheet cannot do this.

> **Note:** The methods, events and COM objects used in the code for the ActiveX for Excel sample spreadsheet are the same as those used in the ActiveX API. See the ActiveX chapter for complete details about the ActiveX API.

The following figure shows the Tickers page in the ActiveX for Excel API sample spreadsheet.



Getting Started with the ActiveX for Excel API

We have created a sample Excel spreadsheet, **TwsActiveX.xls**, that uses an ActiveX control, **Tws.ocx**. You can use this spreadsheet with TWS as is, or use it create your own custom TWS API Excel application. It's easy to get started:

- Download the API components, which includes the ActiveX for Excel sample spreadsheet, TwsActiveX.xls.
- Ensure that:
  - the application server is running and that it is configured to support ActiveX or
  - the IB Gateway is running.
- Open the spreadsheet and start using the ActiveX for Excel API.

The sample spreadsheet currently comprises several pages complete with sample data and action buttons that make it easy for you to get market data, send orders and view your activity.

Download the API Components and Spreadsheet

We recommending using the sample Excel spreadsheet that we provide as a starting point toward creating your own ActiveX for Excel API. Follow the steps below to download the sample spreadsheet.

To install the ActiveX for Excel sample spreadsheet

1. From the IB homepage, select *API Solutions* from the **Trading** menu.
2. Click the *IB API* button, then on the API Software page, find the column appropriate to your operating system and click *Download latest version*.

   Windows users can download the beta test version of the API by using the **Windows Beta** column, or revert to the previous production version by selecting Downgrade to Previous Version.
3. Save the installation program to your computer, and if desired, select a different directory. Click **Save**.
4. Close any versions of TWS and Excel that you have running.
5. Locate the installation program you just saved to your computer, then double-click the file to begin the API installation.
6. Follow the instructions in the installation wizard.

Note: Before you can use the spreadsheet, you must have TWS running and configured to support the ActiveX API. See Run the API through TWS for detailed instructions.

Running the ActiveX for Excel API on 64-bit Windows XP Systems

To run the ActiveX for Excel API on 64-bit Windows XP systems, do the following:

1. Install Microsoft Visual C++ 2005 SP1 Redistributable Package (x86).
2. Install Microsoft Visual J# 2.0 Redistributable Package.
3. Download and install the API software.

Open the Sample Spreadsheet

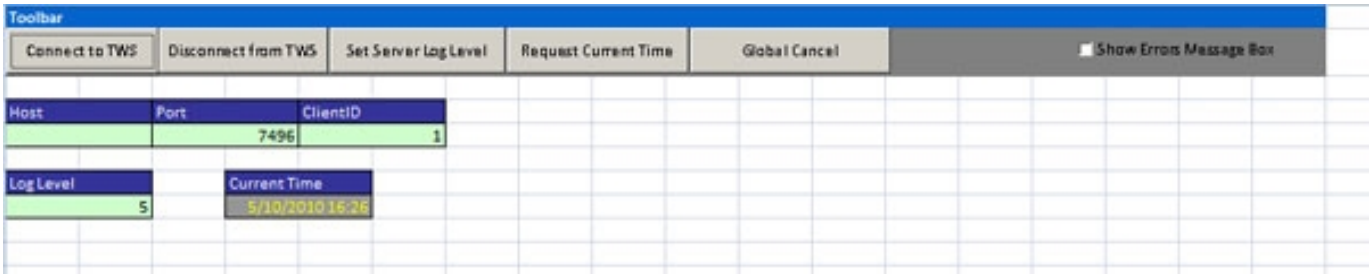
After you have downloaded the sample spreadsheet and configured the application to allow the ActiveX for Excel API to link to it, open the spreadsheet and save it as your personal file.

> **Note:** Note that not more than one API application can simultaneously access a single instance. The API application does not need to be running on the same computer on which the application is running.

To open the sample spreadsheet

1. Go to the API installation folder in which the Excel API sample spreadsheet was installed (typically C:\Jts\Excel) and double-click **TwsActiveX.xls**.
2. Save the spreadsheet with a different file name. This lets you customize the spreadsheet without changing the original.
3. Click the **General** tab.
4. Modify the default values in the *Host*, *Port*, and *ClientID* cells, then click **Connect to TWS** on the Toolbar.

- If you select the **Show Errors Message Box**check box, error messages display when you connect to TWS. In this case, you must click **OK** to dismiss any messages that appear.



Using the ActiveX for Excel Sample Spreadsheet

The ActiveX for Excel API sample spreadsheet, TwsDde.xls, includes the following pages (tabs):

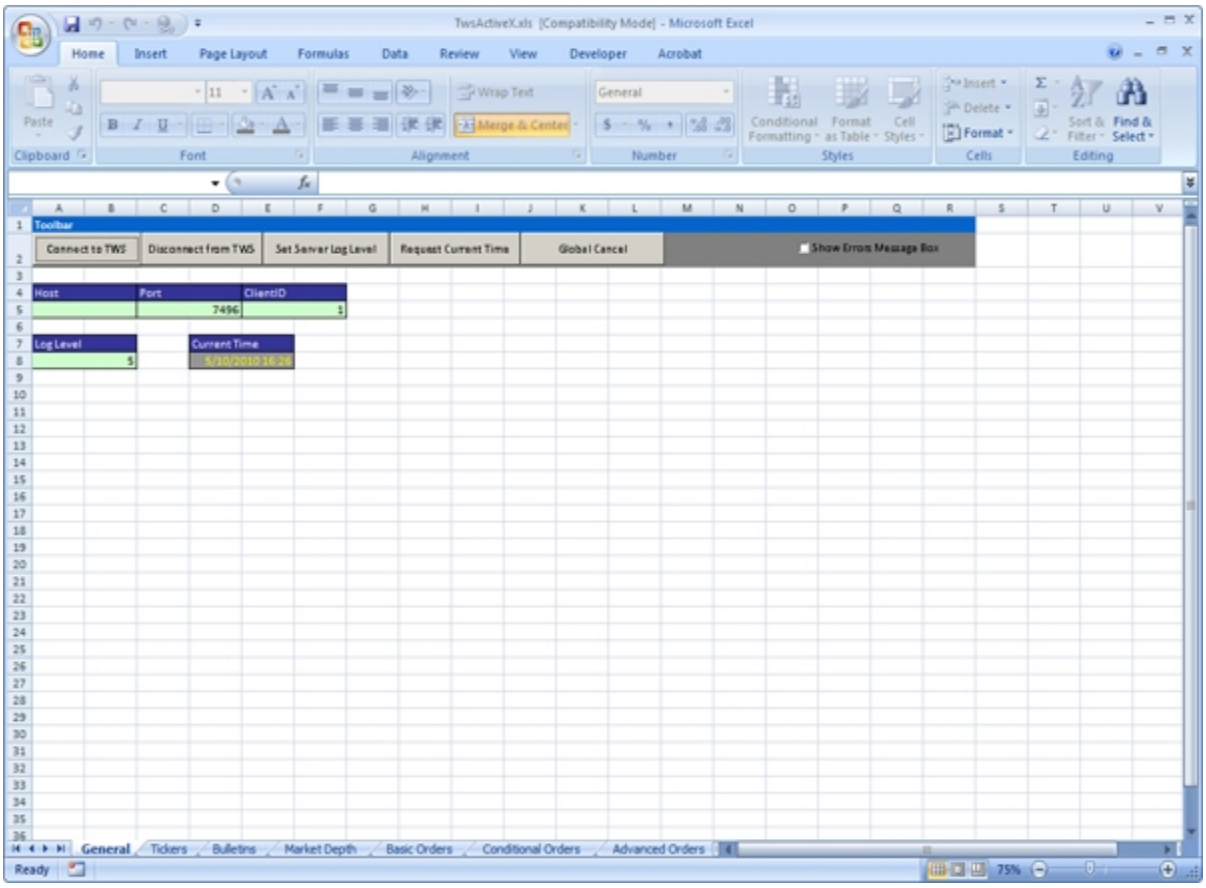
Page	Description
General	Lets you connect to and disconnect from TWS, set the server log level and request the current time.
Tickers	Lets you set up your ticker lines and request market data. You can view market data for all asset types including EFPs and combination orders.
Bulletins	Lets you subscribe to and view IB News Bulletins.
Market Depth	Lets you view market depth for selected quotes.
Basic Orders	Lets you send and modify orders, set up combination orders and EFPs, and request open orders.
Conditional Orders	Lets you create an order whose submission is contingent on other conditions being met, for example an order based on a prior fill.
Advanced Orders	Lets you send and modify advanced orders types that require the use of extended order attributes, such as Bracket, Scale and Trailing Stop Limit orders.
Extended Order Attributes	Used in conjunction with the Basic Orders, Advanced Orders, Conditional Orders and Advisors pages, this page lets you change the time in force, create Hidden or Iceberg orders and apply many other order attributes.
Open Orders	Shows you all transmitted orders, including those that have been accepted by the IB system, and those that are working at an exchange.
Account	Provides up to date account information and displays your portfolio.
Portfolio	Displays all your current positions.
Executions	Lets you view all execution reports, and includes a filtering box so you can limit your results.
Commission Reports	Lets you view commission details.
Historical Data	Request historical data for an instrument based on data you enter in a query.
Contract Details	Lets you collect contract-specific information you will need for other actions, including the conid and supported order types for a contract
Bond Contract Details	Lets you collect bond contract-specific information you will need for other actions, including bond coupon and maturity date.

Page	Description
Real Time Bars	Lets you request and view real time bars from TWS.
Market Scanner	Lets you view market scanner parameters and subscribe to TWS market scanners.
Fundamentals	Lets you request and view Fundamentals data from TWS.
Advisors	Lets Financial Advisors send and modify FA orders.
Log	Lets you view all error messages.

General Page

Use the General page to:

- Connect to TWS.
- Disconnect from TWS.
- Set the level of log entry detail used by the server when processing API requests.
- Request the current server time.



To connect to TWS

1. Click **Connect to TWS** in the toolbar.
   - If required, change the values in the *Host*, *Port* and *ClientID* cells.
   - Select the **Show Errors Message Box** to display errors when connecting to TWS.

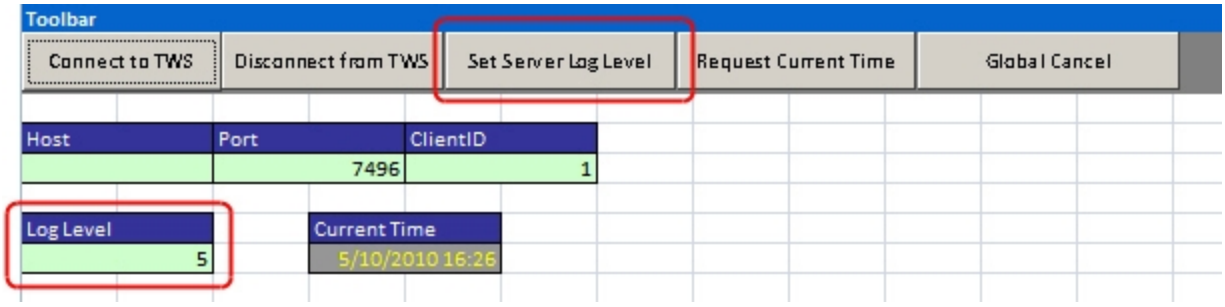
To disconnect from TWS

1. Click **Disconnect from TWS** in the toolbar.

To set the server log level

1. Type one of the following values in the *Log Level* cell:
   - 1 = SYSTEM
   - 2 = ERROR
   - 3 = WARNING
   - 4 = INFORMATION
   - 5 = DETAIL

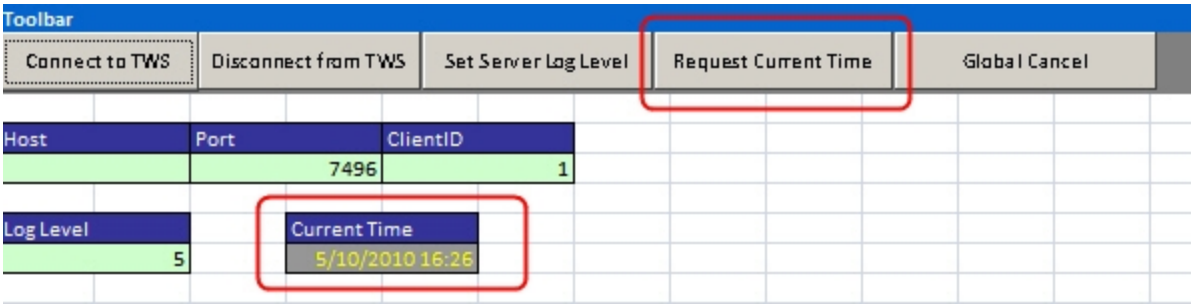
   The higher the number, the greater the level of detail and performance overhead.



2. Click **Set Server Log Level** in the toolbar.

To request the current time

1. Click **Request Current Time** in the toolbar.



General Page Toolbar Buttons

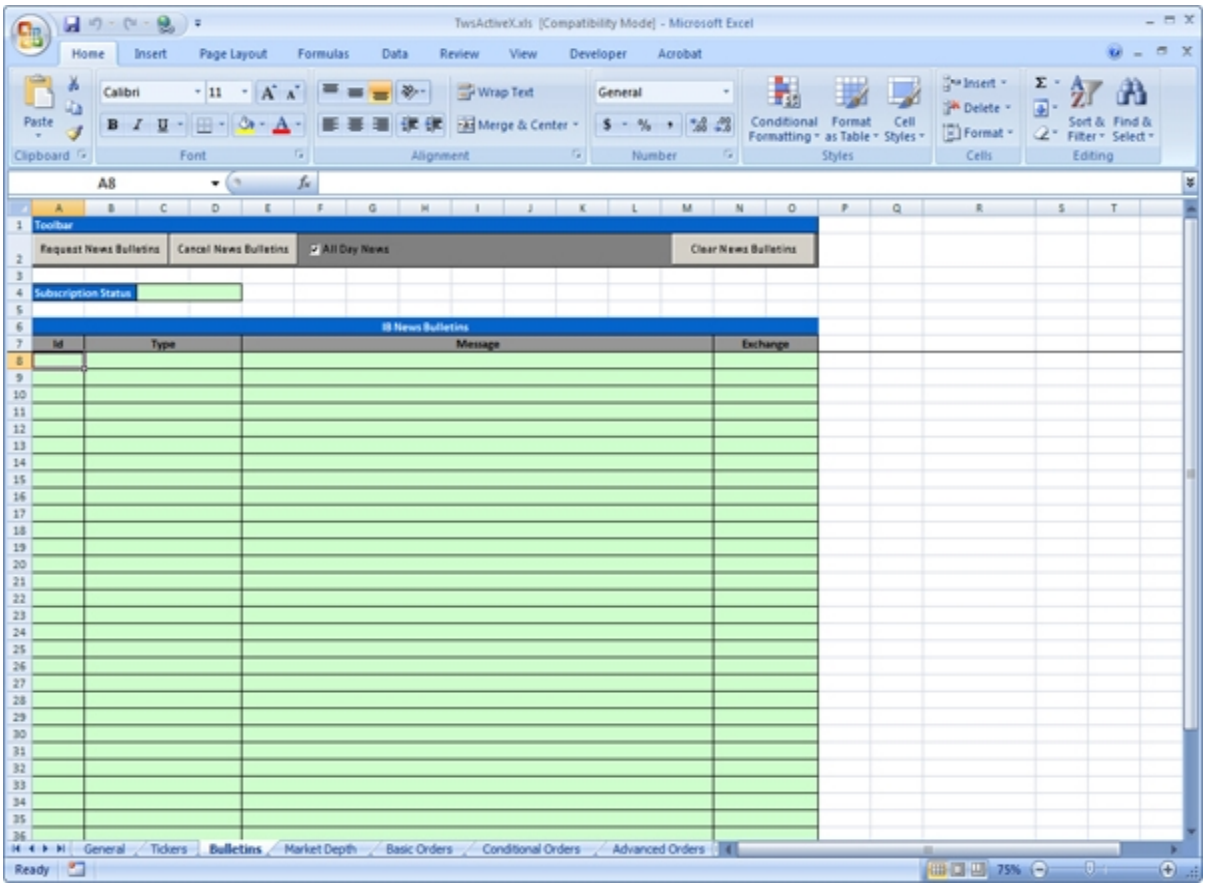
The toolbar on the General page includes the buttons described below.

Button	Description
Connect to TWS	Connects to TWS.
Disconnect from TWS	Disconnects from TWS.
Set Server Log Level	Sets the level of detail of entries in the log.txt log file.
Request Current Time	Requests the current server time.
Global Cancel	Cancels all requests.

The toolbar also includes the **Show Errors Message Box** check box, which when selected, displays error when connecting to TWS.

Bulletins Page

Use the Bulletins page to request and view IB news bulletins. Simply click **Request News Bulletins** in the toolbar. News bulletins display in the table on the page. To request all the existing bulletins for the current day and any new ones, select the **All Day News** check box on the toolbar. If this check box is not selected, you will receive only new bulletins.



Bulletins Page Toolbar Buttons

The toolbar on the Tickers page includes the buttons described below.

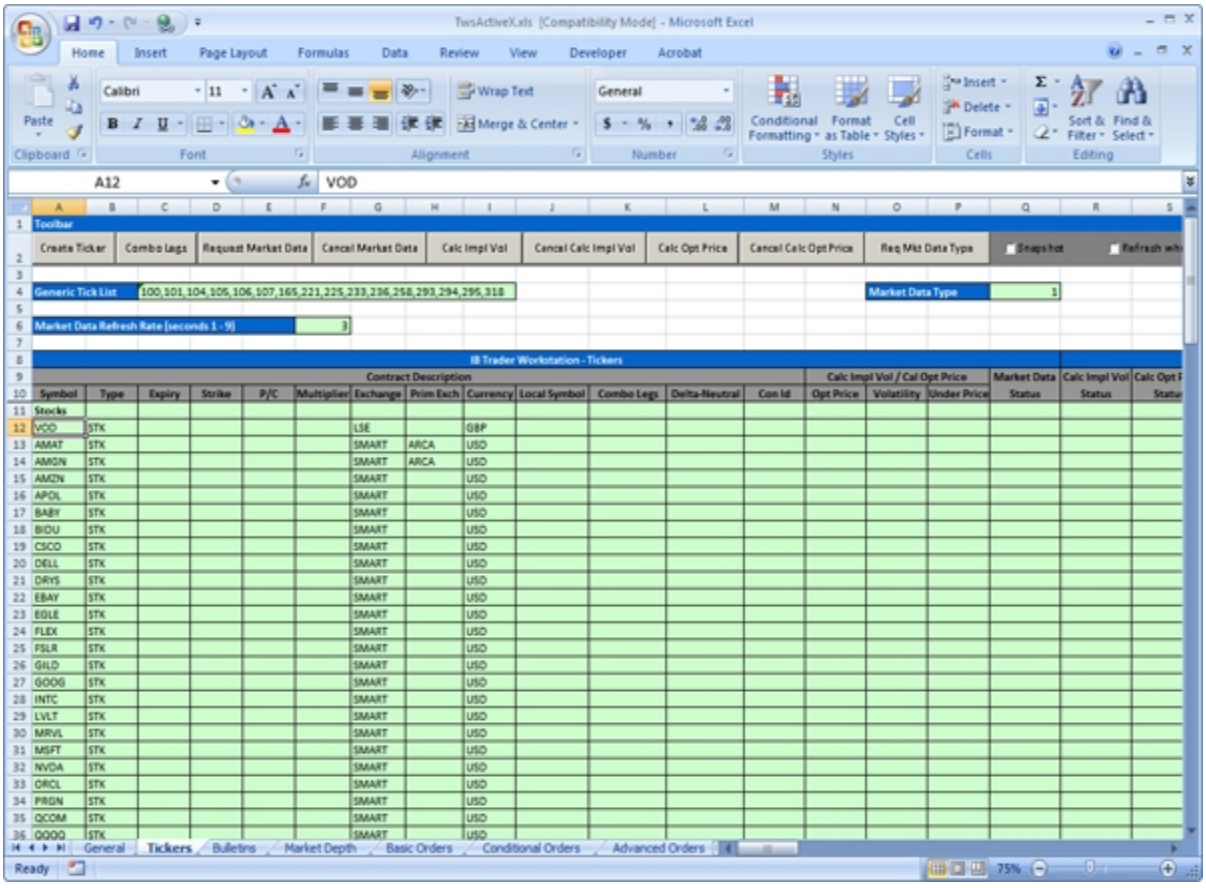
Button	Description
Request News Bulletins	Requests all the new news bulletins.
Cancel News Bulletins	Cancels receipt of all news bulletins.
Clear News Bulletins	Clears all news bulletins from the page.

The toolbar also includes the **All Day News** check box, which when selected, requests all the existing bulletins for the current day and any new ones.

Tickers Page

Use the Tickers page to:

- Create market data (ticker) lines.
- Request market data.
- Create a combination order for options.
- Create market data line for Exchange for Physical (EFP) combination orders.



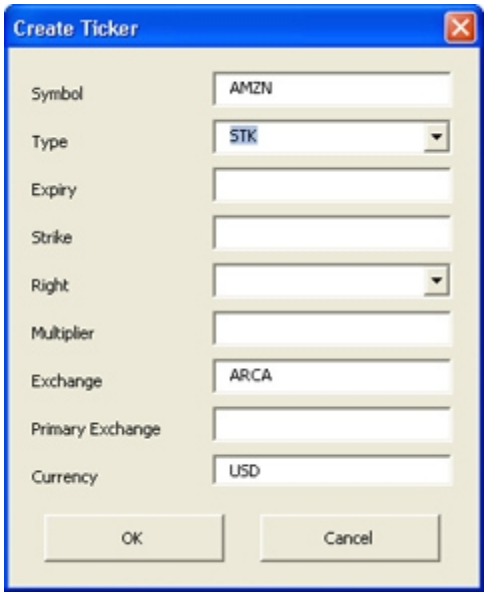
Using the Tickers Page

Note: Ensure that TWS is running, and that you have entered your user name in the *User Name* field in the *Which Trader Workstation?* section of all pages in the Excel spreadsheet to properly connect to TWS.

To create a ticker using the Create Ticker button

1. Click the **Tickers** tab at the bottom of the spreadsheet.
2. Click the line number to the left of a blank row to select the row. You must have a blank row selected to create a ticker line.
3. Click the **Create Ticker** button on the toolbar and enter information in the Create Tickers dialog.
4. Click **OK**.

For stocks, you only need to specify the *Symbol*, *Type*, *Exchange* (usually SMART), and *Currency*.



To create a ticker on the spreadsheet

1. Select a blank cell in the *Symbol* column and enter a symbol.
2. Tab through the all contract description fields and enter data where necessary, for example if you are entering a stock ticker, you don't need values in the Expiry, Strike, P/C and Multiplier fields.

Note: The Exchange field accepts the following values: SMART (for smart order routing), and any valid exchange acronym.

To request market data for a ticker

1. Select the ticker row for which you want to request market data by clicking the row number.
2. Enter a comma-separated list of generic tick values in the *Generic Tick List* cell. For details about generic tick values, see Generic Tick Types.

3. Optionally, click the **Snapshot** check box to request a single snapshot of market data.
4. Click **Request Market Data** on the toolbar.

   To get market data for a group of tickers, select multiple ticker rows while holding down the **Shift** key, then click **Request Market Data** multiple times until all rows are showing data.

To set the refresh rate

The market data refresh rate determines how often the link to TWS is refreshed.

- Enter the refresh rate value (in whole numbers, in seconds) in the Market Data Refresh Rate cell.

TWS market data updates every 3 seconds by default.

Tickers Page Toolbar Buttons

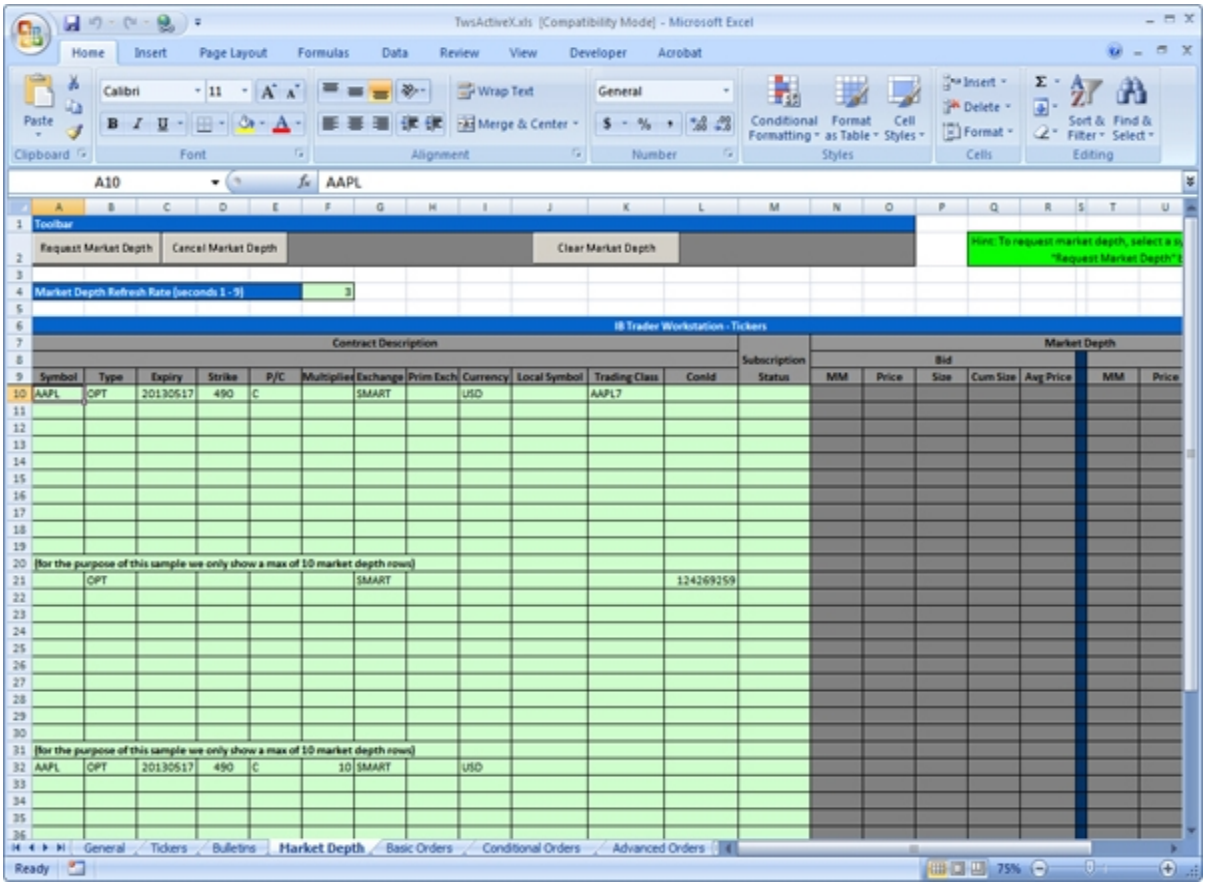
The toolbar on the Tickers page includes the buttons described below.

Button	Description
Create Ticker	Opens the Ticker box. Enter information to create a market data line.
Combo Legs	Opens the Combination Legs box. Enter contract details to create legs of a combination order one by one.
Request Market Data	Select a line and click to get market data for the selected contract.
Cancel Market Data	Cancel market data for the selected ticker.
Clear Market Data	Clears all market data from the page.

The toolbar also includes the **Snapshot** check box, which when selected, requests only a single snapshot of market data.

Market Depth Page

Use the Market Depth page to view market depth for selected contracts. You can also view market depth for NYSE-listed products through the Open Book Market Data Subscription, and NASDAQ-listed products through the TotalView Market Data Subscriptions, if you have signed up for those subscriptions.



Using the Market Depth Page

Note: Ensure that TWS is running, and that you have connected the spreadsheet to TWS.

To request market depth for a contract

1. Click the **Market Depth** tab at the bottom of the spreadsheet to open the Market Depth page.
2. Select the ticker symbol for which you want to request the market depth, or enter a new ticker on a blank line.
3. Click the **Request Market Depth** button on the toolbar.

To reset the market data refresh rate for market depth

1. Type the desired market data refresh rate in seconds in the *Market Depth Refresh Rate* cell. The value must be in whole numbers from 1 to 9.

Market Depth Page Toolbar Buttons

The toolbar on the Market Depth page includes the following buttons:

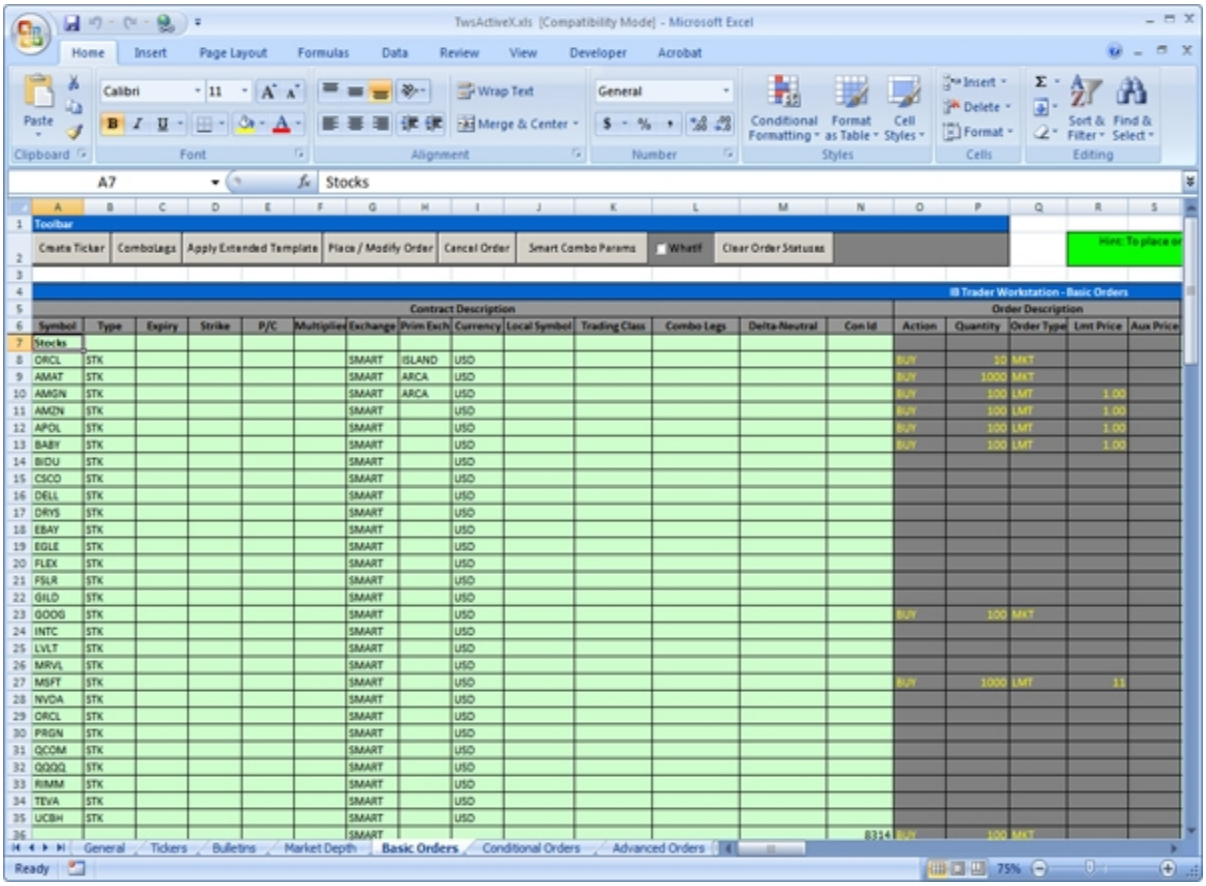
Button	Description
Request Market Depth	View bid/ask depth prices for the selected contract.
Cancel Market Depth	Cancel market depth for the selected contract.
Clear Market Depth	Clears all market depth data from the page.

The page also includes a *Market Depth Refresh Rate* cell, which lets you rest the market depth refresh rate in seconds, in whole numbers from 1 - 9. The default refresh rate is 3 seconds.

Basic Orders Page

Use the Basic Orders page to:

- Create an order.
- Place a “what if” order, which shows you the margin and commission information before you place an order.
- Create a "basket" of orders.
- Modify and cancel orders.
- Create combination orders.



Placing Orders

This topic describes how to place the following types of orders on the Orders page:

> **Note:** Ensure that TWS is running, and that you have connected the spreadsheet to TWS.

To place an order

1. Click the **Basic Orders** tab at the bottom of the spreadsheet.
2. Define a contract by typing a symbol in a blank *Symbol* field, then entering information in the relevant contract description fields.
3. Select a contract and set up the order using the *Order Description* fields.

   You must define the *Action* (Buy, Sell or Short Sell), *Quantity*, *Order Type*, *Limit Price* (unless it's a market order) and if necessary, the *Aux. Price* for order types that require it.

4. If desired, select the contract (the ticker row) and apply extended order attributes by clicking the **Apply Extended Template** button on the toolbar. This applies all attributes you have defined on the Extended Order Attributes page to the selected contract.
5. Click the **Place/Modify Order** button on the toolbar.

To place a "basket" of orders

1. Click the **Basic Orders** tab at the bottom of the spreadsheet.
2. Define a contract by typing a symbol in a blank *Symbol* field, then entering information in the relevant contract description fields.
3. Select a contract and set up the order using fields in the *Order Description* section.
4. Repeat Steps 1 and 2 for additional orders.
5. Select a group of orders.
   - To select a group of contiguous orders, highlight the first order, hold down the **Shift** key, then highlight the last order of the group.
   - To select a group of non-contiguous orders, hold the **Ctrl** key down as you select each order.
6. Click the **Place/Modify Order** button.

To modify an order (or group of orders)

1. On the Basic Orders page, change any necessary parameters in an order or group of orders.
2. Select the order or a group of orders.
   - To select a group of contiguous orders, highlight the first order, hold down the **Shift** key, then highlight the last order of the group.
   - To select a group of non-contiguous orders, hold the **Ctrl** key down as you select each order.
3. Click the **Place/Modify Order** button.

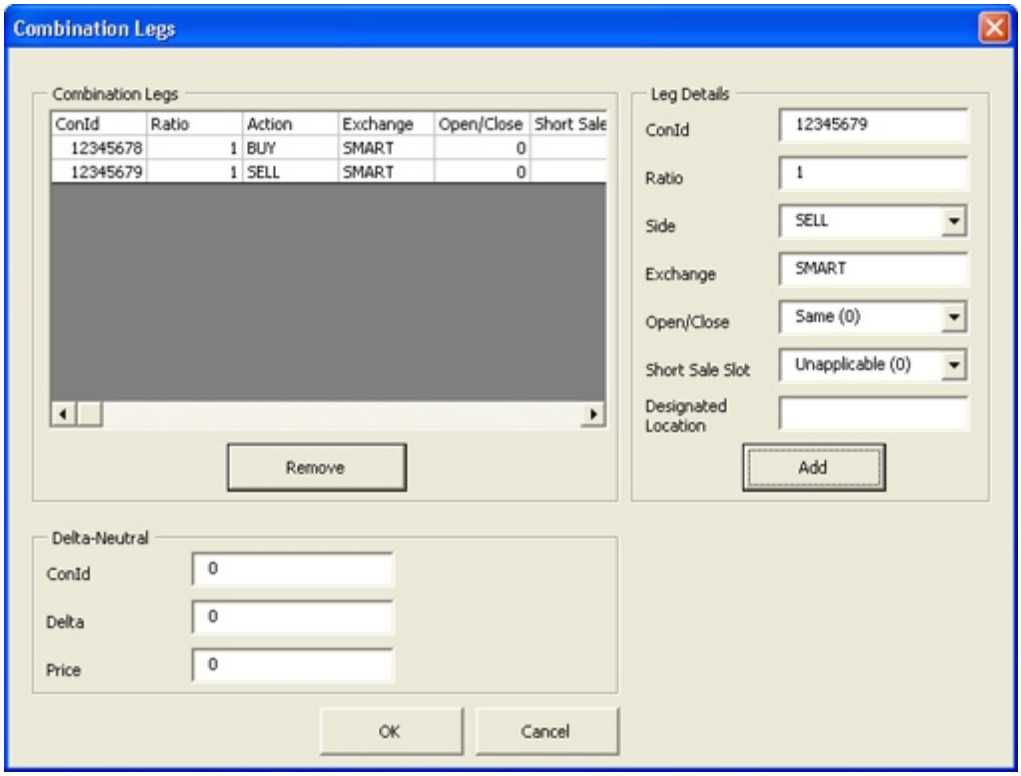
Placing a Combination Order

A combination order is a special type of order that is constructed of many separate legs but executed as a single transaction.

To buy a calendar spread, you would:

To create a calendar spread order

The following example walks you through the process of placing a hypothetical calendar spread order for XYZ on ISE.



1. Use the Contract Details page to get the contract id for both of the leg definitions.
   - The conid for XYZ option JUL08 17.5 CALL on ISE is "12345678".
   - The conid for XYZ option AUG08 17.5 CALL on ISE is "12345679".
2. Click the **Basic Orders** tab to build the combo leg definitions. Click the **Combo Legs** button on the Basic Orders page toolbar and enter leg information. Your leg information is translated into the format:

   [CMBLGS]_[NumOfLegs]_[Combo Leg Definitions]_[CMBLGS]

   where:

   - [CMBLGS] is the delimiter used to identify the start and end of the leg definitions
   - [NumOfLegs] is the number of leg definitions
   - [Combo Leg Definitions] defines N leg definitions, and each leg definition consists of [conid]_[ratio]_[action]_[exchange]_[openClose], so the resulting combo substring looks as follows:

     CMBLGS_2_17496957_1_BUY_EMPTY_0_15910089_1_SELL_EMPTY_0_CMBLGS
3. The combination leg definitions must occur before the extended order attributes. The full place order DDE request string will look like this:

=acctName|ord!id12345?place?BUY_1_XYZ_BAG_ISE_LMT_1_CMBLGS_2_12345678_1_BUY_EMPTY_0_12345679_1_SELL_EMPTY_0_CMBLGS_DAY_EMPTY_0_O_0_EMPTY_0_EMPTY_0_0_0EMPTY_0_0

If the order legs do not constitute a valid combination, one of the following errors will be returned:

- 312 = The combo details are invalid.
- 313 = The combo details for '<leg number>' are invalid.
- 314 = Security type 'BAG' requires combo leg details.
- 315 = Stock combo legs are restricted to SMART exchange.

Note: 1. The exchange for the leg definition must match that of the combination order. The exception is for a STK leg definition, which must specify the SMART exchange.

2. The openClose leg definition value is always 'SAME' (i.e.0) for retail accounts. For institutional accounts, the value may be any of the following: (SAME, OPEN, CLOSE).

Supported Order Types

The order types currently supported through the ActiveX for Excel API are:

- Limit (LMT)
- Market (MKT)
- Limit if Touched (LIT)
- Market if Touched (MIT)
- Market on Close (MOC)
- Limit on Close (LOC)
- Pegged to Market (PEGMKT)
- Relative (REL)
- Stop (STP)
- Stop Limit (STPLMT)
- Trailing Stop (TRAIL)
- Trailing Stop Limit (TRAILLIMIT)
- Volume-Weighted Average Price (VWAP)
- Volatility orders (VOL)

Basic Orders Page Toolbar Buttons

The toolbar on the Basic Orders page includes the following buttons:

Button	Description
Create Ticker	Opens the Ticker box. Enter information to create a market data line.
Combo Legs	Opens the Combination Legs box. Enter contract details to create legs of a combination order one by one. You can also enter Delta Neutral information.

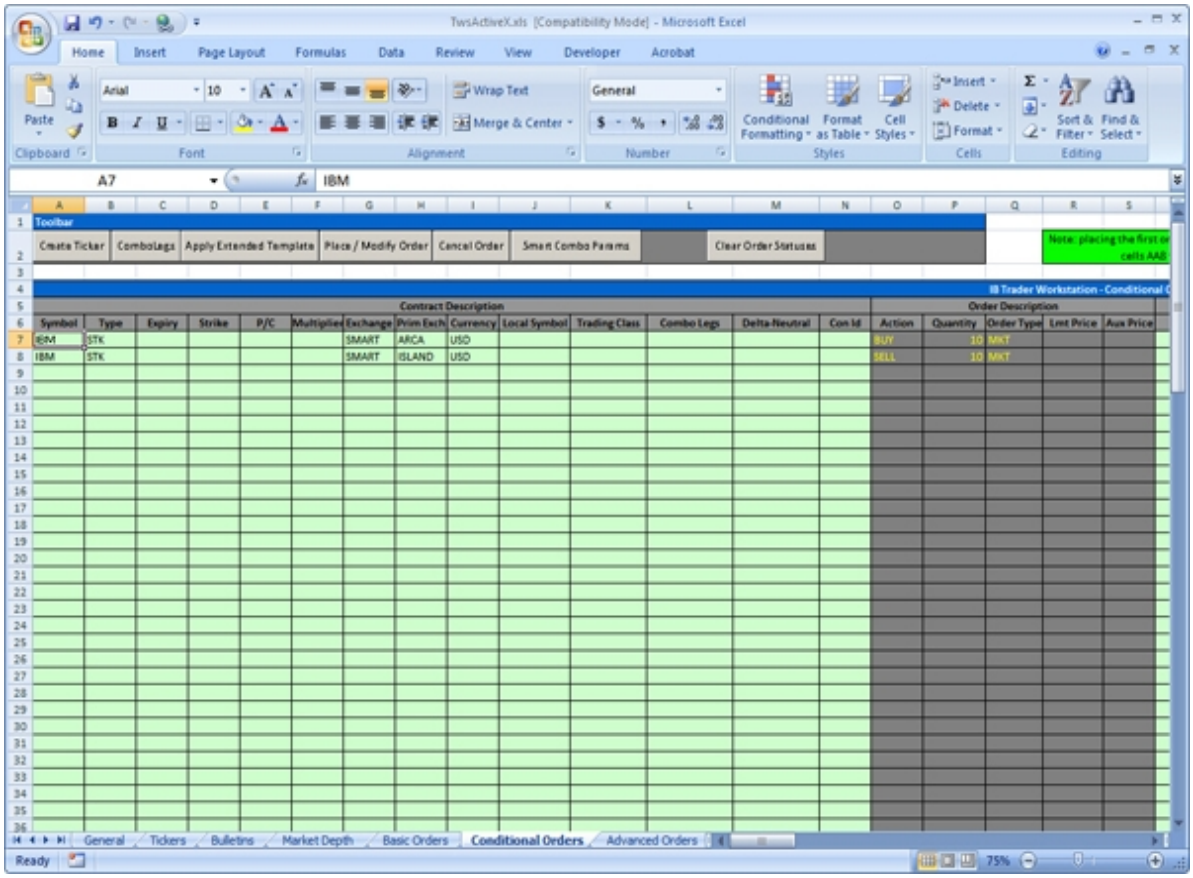
Button	Description
Apply Extended Template	Applies the current values on the Extended Order Attributes page to the highlighted order row.
Place/Modify Orders	After you have completed the Order Description fields, and defined any extended attributes, click to create an order for the selected contract.
Cancel Order	This button cancels the selected order(s).
Smart Combo Routing Params	Opens the Smart Combo Routing Parameters box, which lets you add and remove parameter/value pairs to combo orders. For more information, see Smart Combo Routing.
Clear Order Statuses	Clears all order status information from the page.

There is also a **WhatIf** check box on the toolbar. When checked, you will receive margin and commission data as if the order were placed, but the order will NOT be placed.

Conditional Orders Page

Use the Conditional Orders page to create an order whose submission is contingent on other conditions being met, for example, an order based on a prior fill or a change in the bid or ask price.

To see the Conditional Statement fields, use the scroll bar on the bottom of the page to scroll to the right.



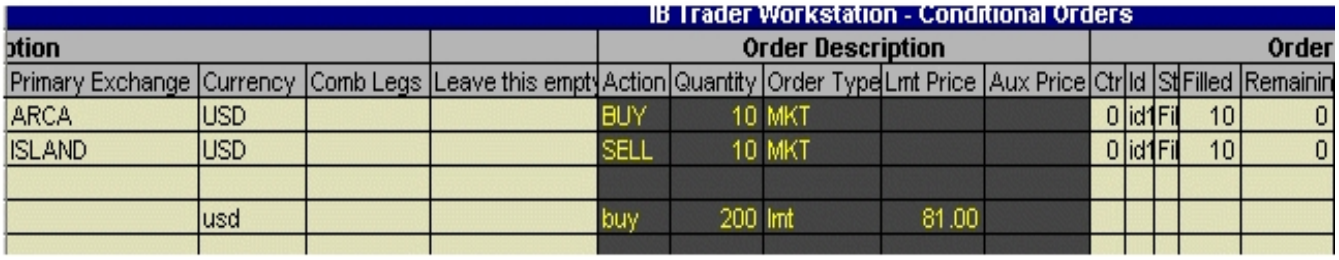
Setting Up Conditional Orders

Note: Ensure that TWS is running, and that you have entered your user name in the *User Name* field in the *Which Trader Workstation?* section of all pages in the Excel spreadsheet to properly connect to TWS.

To set up a conditional order

1. On the **Conditional Orders** page, first create the order you want transmitted when a condition is met by defining the contract in the *Contract Description* fields, and then using the *Order Description* area to set up the order parameters.
2. In the Condition Statements area, use the *Statement* field to set the criteria which must be met to trigger the order. When the Statement = TRUE, your order will be submitted.

   The sample spreadsheet includes a pair of orders, with the second orders transmission depending on the first order being completely filled. In this case, the Statement field trigger is that the value in cell T10 (the *Filled* field) must be equal to the value in M10 (the order *Quantity* field).
3. Type **ADD** in the *ADD/MOD* field because you are creating a one-time order.
4. Define the remaining order parameters just as you did in the *Order Description* area.



IB Trader Workstation - Conditional Orders													
ption				Order Description									Order
Primary Exchange	Currency	Comb Legs	Leave this empty	Action	Quantity	Order Type	Lmt Price	Aux Price	Ctr	Id	St	Filled	Remainin
ARCA	USD			BUY	10	MKT			0	id1	Fil	10	0
ISLAND	USD			SELL	10	MKT			0	id1	Fil	10	0
	usd			buy	200	lmt	81.00						

5. Complete the necessary fields on the **Conditional Orders** page according to the syntax in the following table.

Field	Description
Statement	An Excel function which returns a true or false. When true, the order will be submitted; when false, nothing happens.
ADD/MOD	Use ADD for a one-time order. Use MOD to continue checking and modifying the order until it is completely filled. This is the field that activates a conditional order, and orders will be activated only with the "ADD" or "MOD" tags.
Action	BUY SELL
Quantity	Enter the quantity of the order.
Order Type	Refer to list of supported order types.
Lmt Price	The limit price for Limit and Stop Limit order types.
Aux. Price	The stop-election price for Stop and Stop Limit order types, or the offset for relative orders.

All of the fields described above may be variables that depend on other cells, so any type of conditional order may be created.

Conditional Order Examples

If-Filled order

An if-filled order is an order that executes if a prior order executes. To create an if-filled order with the condition "If a Buy order fully executes, enter a sell limit order at a price of $50.00":

Field	Value
Statement	Filled cell = 100
ADD/MOD	ADD
Action	SELL
Quantity	100
Order Type	LMT
Lmt Price	50

Aux. Price	empty

Price-change order

A price-change order will be triggered if a specific bid or ask price is greater than, less than or equal to a specific price. To create a price change order with the condition "If the bid price drops below 81.20, submit a buy limit order for 200 shares with a limit price of $81.10:

Field	Value
Statement	On the **Tickers** page, find the bid price field you want to use, then enter the cell location in the standard Excel format (=SheetName!CellAddress) in the formula bar (“=” entry field) at the top of the **Conditional Orders** page. Add your qualifier, "=" ">" or "<" followed by the price to the statement.
ADD/MOD	ADD
Action	BUY
Quantity	200
Order Type	LMT
Lmt Price	81.10
Aux. Price	Not used in this example.

To modify an order (or basket of orders)

1. Select the order or a group of orders.
   - To select a group of contiguous orders, highlight the first order, hold down the **Shift** key, then highlight the last order of the group.
   - To select a group of non-contiguous orders, hold the **Ctrl** key down as you select each order.
2. Click the **Place/Modify Order** button.
3. Change any necessary parameters, then click the **Place/Modify Order** button.

Conditional Orders Page Toolbar Buttons

The toolbar on the Conditional Orders page includes the following buttons:

Button	Description
Combo Legs	Opens the Combination Legs box. Enter contract details to create legs of a combination order one by one.
Place/Modify Order	After you have completed the Order Description fields, and defined any extended attributes, click to create an order for the selected contract.
Apply Extended Template	Applies all attributes on the Extended Order Attributes page to the selected order(s).

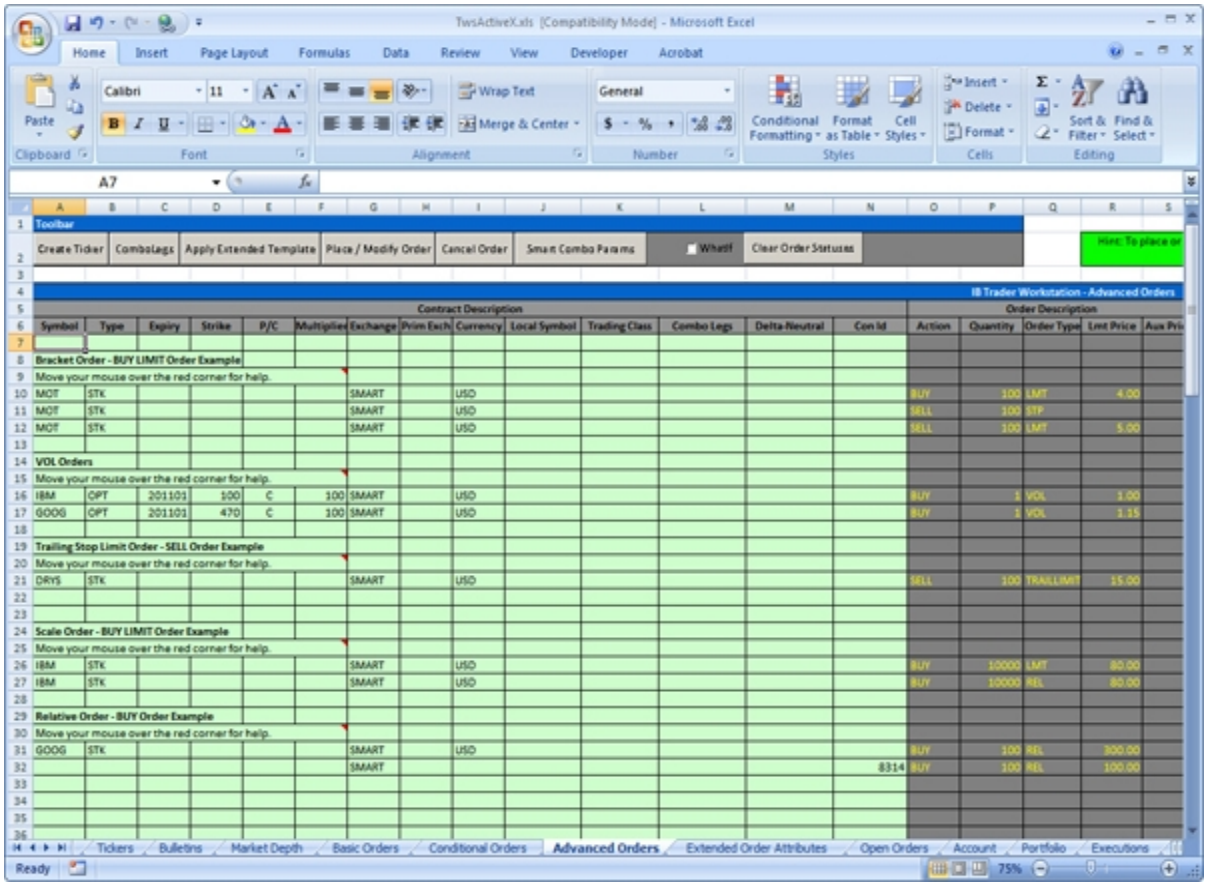
Button	Description
Cancel Order	This button cancels the order(s) you have highlighted.
Smart Combo Routing Params	Opens the Smart Combo Routing Parameters box, which lets you add and remove parameter/value pairs to combo orders. For more information, see Smart Combo Routing.
Show Errors	Jumps to the Error Code field and shows the error code.

Advanced Orders Page

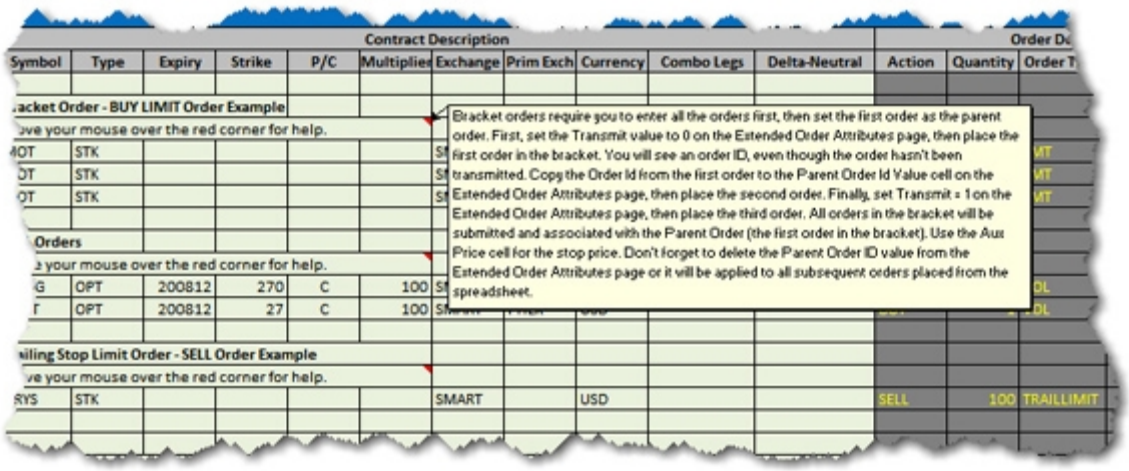
Use the Advanced Orders page to:

- Bracket orders
- VOL orders
- Trailing Stop Limit Orders
- Scale Orders

- Relative Orders



This page includes several example orders with mouseover help to assist you in learning how to place these orders. Simply move your mouse over the red triangle of the corner of cells on the page to display pop-up help.



For more information about using extended order attributes for individual orders or groups of orders, see Apply Extended Order Attributes to Individual Orders and Groups of Orders

Placing a Bracket Order

Bracket orders in the ActiveX for Excel sample spreadsheet require the use of the extended order attributes *Transmit* and *Parent Order Id*. You must turn *Transmit* off until the order is completely set up, and you must identify the first order in the bracket as the Parent Order.

To place a Buy-Limit bracket order

1. Click the **Advanced Orders** tab at the bottom of the spreadsheet.
2. Enter the contract descriptions and order descriptions for all three orders on three contiguous rows:
   - The first order should be a BUY LMT order.
   - The second order should be a SELL STP order.
   - The third order should be a SELL LMT order.
3. Click the **Extended Order Attributes** tab. Change the value for *Transmit* to **0** (row 13 on the Extended Order Attributes page).

   This ensures that your orders are not transmitted until you have completed the order setup.
4. Click the **Advanced Orders** tab, highlight the first order in the bracket order, then click the **Place/Modify Order** button.

   The order is not executed, but the system generates an Order ID.
5. Copy the Order ID for the first order, omitting the "id" prefix, then click the **Extended Order Attributes** tab and paste the Order ID into the *Value* field for *Parent Order Id* (row 14). This value will be applied to all subsequent orders until you remove it from the Extended Order Attributes page.

   The first order of the bracket order is now the primary order.
6. Click the **Advanced Orders** tab, highlight the second order, then click the **Place/Modify Order** button.

   The order is not executed but is now associated with the primary order by means of the Parent Order Id extended order attribute.
7. Click the **Extended Order Attributes** tab and change the value for *Transmit* back to **1** (row 13).
8. Click the **Advanced Orders** tab, highlight the third order in the bracket order, then click the **Place/Modify Order** button. The entire bracket order is transmitted.
9. When you are done placing your bracket order, go to the **Extended Order Attributes** page and delete the *Parent Order Id* value you entered. If you do not, this value will be applied to all subsequent orders that you place in the spreadsheet.

Placing a Volatility Order

In the ActiveX for Excel sample spreadsheet, you place VOL orders by entering values for the following extended order attributes:

- Volatility
- Volatility Type

- Reference Price Type
- Continuous Update
- Underlying Range (Low) - optional
- Underlying Range (High) - optional
- Hedge Delta Order Type - optional
- Hedge Delta Aux Price - optional

To place a VOL order

1. Click the **Advanced Orders** tab at the bottom of the spreadsheet.
2. Define a contract by typing a symbol in a blank *Symbol* field, then entering information in the relevant contract description fields.
3. Select a contract and set up the order using the *Order Description* fields.
   - Enter **VOL** in the *Order Type* field.
4. Click the **Extended Order Attributes** tab. Enter values in the *Value* field for the following extended order attributes:
   - Volatility - This value represents the volatility to use in calculating a limit price for the option. Enter this value as a percentage, not as the market data is displayed. For example, enter 17.12 instead of .1712.
   - Volatility Type - Enter 1 for daily volatility or 2 for annual volatility.
   - Reference Price Type - This value is used to compute the limit price sent to an exchange and for stock range price monitoring. Enter 1 to use the average of the best bid and ask; or 2 to use NBB (bid) when buying a call or selling a put, or the NBO (ask) when selling a call or buying a put.
   - Continuous Update - Enter 1 to automatically update the option price as the underlying stock price (or futures price, for index options) moves. Enter 0 if you do not want to use this feature.
5. On the **Extended Order Attributes** page, enter values in the *Value* field for the following optional extended order attributes:
   - Underlying Range (Low) - Enter a low-end acceptable stock price relative to the selected option order. If the price of the underlying instrument falls below the lower stock range price, the option order will be canceled.
   - Underlying Range (High) - Enter a high-end acceptable stock price relative to the selected option order. If the price of the underlying instrument rises above the higher stock range price, the option order will be canceled.
   - Hedge Delta Order Type - Enter LMT, MKT or REL. Enter NONE if you do not want to use delta hedging.
   - Hedge Delta Aux Price - If you have entered LMT or REL as the Hedge Delta Order Type, enter the price as the value for this attribute.
6. Click the **Advanced Orders** tab, then highlight the order row.
7. Click the **Apply Extended Template** button. The values you entered for the extended order attributes are applied to the order row and displayed in the *Extended Order Attributes* section of the page.
8. With the order row highlighted, click the **Place/Modify Order** button.

9. When you are done placing VOL orders, go to the **Extended Order Attributes** page and delete the VOL order values you entered. If you do not, these values will be applied to all subsequent orders that you place in the spreadsheet.

Placing a Trailing Stop Limit Order

In TWS, there are four values that make up a trailing stop limit order:

- trailing amount
- stop price
- limit price
- limit offset

In the ActiveX for Excel API spreadsheet, you enter the trailing amount, stop price and limit price. There is no field or extended order attribute for the limit offset value. You must include the limit offset in the stop price (the *Trail Stop Price* extended order attribute).

To create a Trailing Stop Limit Order

1. Click the **Advanced Orders** tab at the bottom of the spreadsheet.
2. Define a contract by typing a symbol in a blank *Symbol* field, then entering information in the relevant contract description fields.
3. Select a contract and set up the order using the *Order Description* fields.
   - Enter **BUY** or **SELL** in the *Action* field.
   - Enter the limit price in the *Lmt Price* field.
   - Enter **TRAILLIMIT** in the *Order Type* field.
   - Enter the trailing amount in the *Aux Price* field.
4. Click the **Extended Order Attributes** tab. Specify the trailing stop price as an extended order attribute. Type this value in the Trail Stop Price *Value* field.
   - The Trail Stop Price value must include the limit offset.
     For a sell order:

     Trail Stop Price = Limit Price - Trailing Amount - Limit Offset

     For a buy order:

     Trail Stop Price = Limit Price + Trailing Amount + Limit Offset
5. On the **Advanced Orders** page, select the order row and click the **Apply Extended Template** button. The *Trail Stop Price* value is applied to the selected order and displayed in the *Trail Stop Price* field in the *Extended Order Attributes* section of the page.
6. Click the **Place/Modify Order** button.
7. When you are done placing your order, go to the **Extended Order Attributes** page and delete the *Trail Stop Price* value you entered. If you do not, this value will be applied to all subsequent orders that you place in the spreadsheet.

Placing a Scale Order

In the ActiveX for Excel sample spreadsheet, you place scale orders by entering values for the following extended order attributes:

- Scale Component Size
- Scale Price Increment

To place a scale order

1. Click the **Advanced Orders** tab at the bottom of the spreadsheet.
2. Define a contract by typing a symbol in a blank *Symbol* field, then entering information in the relevant contract description fields.
3. Select a contract and set up the order using the *Order Description* fields. The order type should be LMT or REL.
4. Click the **Extended Order Attributes** tab. Enter values in the *Value* field for the following extended order attributes:
   - Scale Component Size - Enter the size of the first, or initial, order component. For example, if you submit a 10,000-share order with a Scale Component Size value of 1000, the first component will be fore 1000 shares.
   - Scale Price Increment - Enter the amount used to calculate the per-unit price of each component in the scale ladder. This cannot be a negative number.

     Note: As of API Release 9.41, the Scale Num Components not supported.
5. On the **Advanced Orders** page, select the order row and click the **Apply Extended Template** button. The scale order values are applied to the selected order and displayed in the *Extended Order Attributes* section of the page.
6. Click the **Place/Modify Order** button.
7. When you are done placing your order, go to the **Extended Order Attributes** page and delete the scale order values you entered. If you do not, these values will be applied to all subsequent orders that you place in the spreadsheet.

Placing a Relative Order

In the ActiveX for Excel sample spreadsheet, you place relative orders by entering a value for the *Percent Offset* extended order attribute.

To place a relative order

1. Click the **Advanced Orders** tab at the bottom of the spreadsheet.
2. Define a contract by typing a symbol in a blank *Symbol* field, then entering information in the relevant contract description fields.
3. Select a contract and set up the order using the *Order Description* fields.
   - Enter **REL** as the order type.
   - Enter the price cap in the *Lmt Price* cell.
4. Click the **Extended Order Attributes** tab. Enter a percentage in decimal form in the *Value* field for the *Percent Offset* extended order attribute.

5. On the **Advanced Orders** page, select the order row and click the **Apply Extended Template** button. The percent offset value is applied to the selected order and displayed in the *Extended Order Attributes* section of the page.
6. Click the **Place/Modify Order** button.
7. When you are done placing your order, go to the **Extended Order Attributes** page and delete the *Percent Offset* value you entered. If you do not, this value will be applied to all subsequent orders that you place in the spreadsheet.

Advanced Orders Page Toolbar Buttons

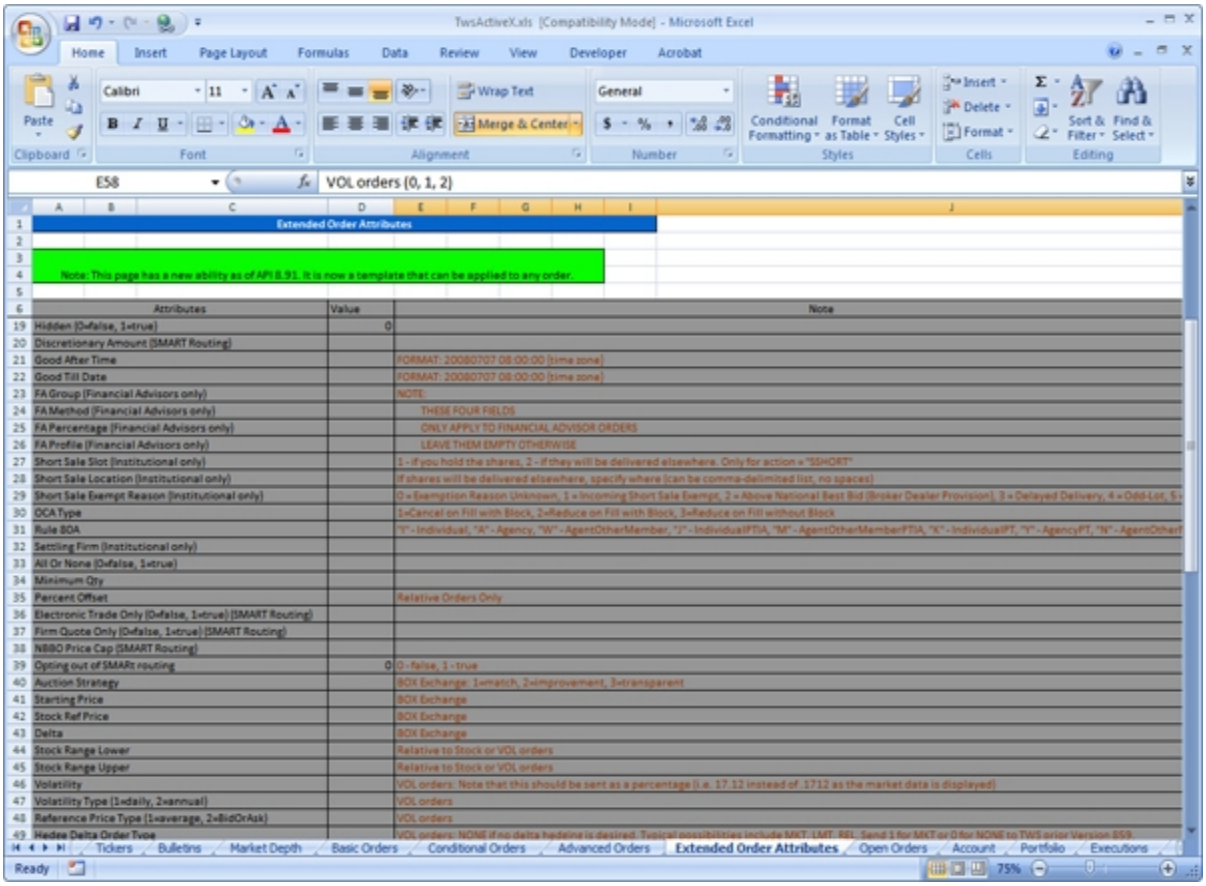
The toolbar on the Advanced Orders page includes the following buttons:

Button	Description
Create Ticker	Opens the Ticker box. Enter information to create a market data line.
Combo Legs	Opens the Combination Legs box. Enter contract details to create legs of a combination order one by one.
Apply Extended Template	Applies the current values on the Extended Order Attributes page to the highlighted order row.
Place/Modify Orders	After you have completed the Order Description fields, and defined any extended attributes, click to create an order for the selected contract.
Cancel Order	This button cancels the selected order (s).
Smart Combo Routing Params	Opens the Smart Combo Routing Parameters box, which lets you add and remove parameter/value pairs to combo orders. For more information, see Smart Combo Routing.
Clear Order Statuses	Clears all order status information from the page.

There is also a **WhatIf** check box on the toolbar. When checked, you will receive margin and commission data as if the order were placed, but the order will NOT be placed.

Extended Order Attributes Page

The Extended Order Attributes page includes all of the optional attributes you can use when you send an order, such as setting a display size to create an iceberg order, adding orders to an OCA group, and setting the transmit date for a Good After Time order. Once you define the attributes on this page, you can apply them to a single order or selected group of orders using the **Apply Extended Template** button, which occurs on both the Orders page and the Conditional Orders page. The attributes populate the extended order attributes fields that follow the *Order Status* fields to the far right of the page.



For a complete list of extended order attributes supported by the API, see Extended Order Attributes.

Manually Program Extended Order Attributes

Observe the following guidelines when you manually assign an attribute:

- When appended to orderDescription, the number and order of attributes cannot be changed.
- For any attribute that is not defined, use the value 'EMPTY' or {}. Since a string length is limited to 255 characters, we recommend using the open/close curly braces {}.
- A place order message for a simple stock limit day order looks as follows, with the primary exchange "ISLAND" separating the extended attributes:

```
=psmith12|ord!'id1814454745?place?BUY_1_MSFT_STK_SMART_USD_LMT_26_{}_DAY_{}_{}_O_0_
{}_1_{}_0_0_
0_0_0_0_{}_{}_{}_{}_{}_{}_{}_{}_ISLAND_{}_{}_{}_{}_{}_{}_{}_{}_{}_{}_{}_{}_{}_{}_{}_
{}_{}_1_2_3_4_5'
```

Apply Extended Order Attributes to Individual Orders and Groups of Orders

Normally, values that you enter on the Extended Order Attributes page apply to all subsequent orders. However, you also can apply selected attributes to an individual order or a group of orders on the Orders page.

Note: You can also use this procedure to apply extended order attributes to orders on the Conditional Orders page.

To apply extended order attributes to individual orders or a group of orders

1. Enter the value or values on the Extended Order Attributes page that you want to apply to an individual order or group of orders.
2. On the Orders page, select the order or group of orders.
3. Click the **Apply Extended Template** button.

   The extended order attributes are applied to the order(s) and the values you entered on the Extended Order Attributes page are added to the corresponding fields in the *Extended Order Attributes* section of the Orders page.

   When you place the order or group of orders, the extended order attribute values you entered are applied to the order.

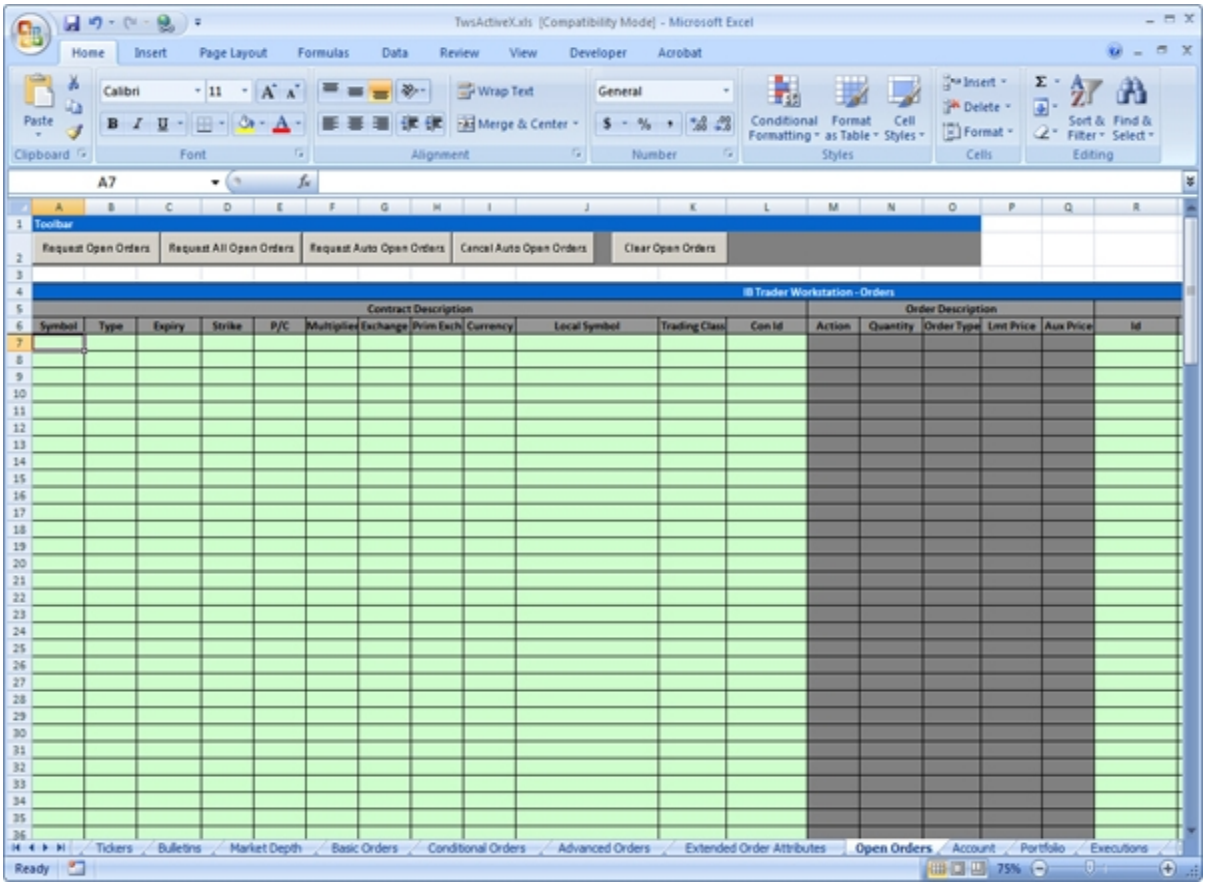
   For example, you might want to assign a unique Order Ref number to a group or basket of orders. To do this, you would enter the number for the Order Ref attribute on the Extended Order Attributes page, then select all the orders in the group on the Orders page and click Apply Extended Template.

4. Delete the value of the extended order attributes you used for the order from the Extended Order Attributes page. These values will still apply to all subsequent orders that you place from the ActiveX for Excel API spreadsheet unless you remove the value.

Open Orders Page

The Open Orders page shows you all transmitted orders, including those that have been accepted by the IB system, and those that are working at an exchange. Once you have subscribed, the page is updated each time you submit a new order, either through the API or in TWS.

Once an order executes, it remains on the Open Orders page for 30 seconds, with the Status value changed to FILLED. Then the filled order is cleared and you can see it on the Executions page if you subscribed to real-time executions.



Viewing Open Orders

Note: Ensure that TWS is running, and that you have connected the spreadsheet to TWS.

To view open orders:

1. Click the **Open Orders** tab at the bottom of the spreadsheet.
2. Do one of the following:
   - To request open orders from the current ActiveX for Excel spreadsheet, click **Subscribe to Open Orders** on the toolbar.
   - To request all open orders for the current account, click **Request All Open Orders** on the toolbar.
   - To associate all newly created TWS orders with the current client, click **Request Auto Open Orders** on the toolbar. Note that the Client ID must be 0.

   All of the requested open orders are displayed on the page, including orders you enter in the spreadsheet and in TWS.

   Orders that fill remain on the page for 30 seconds with a value of *Fill* in the *Status*field.

To remove open orders

1. Click the **Cancel Open Orders Subscription** button on the toolbar.
2. Click the **Clear Open Orders** button.

Open Orders Tab Toolbar

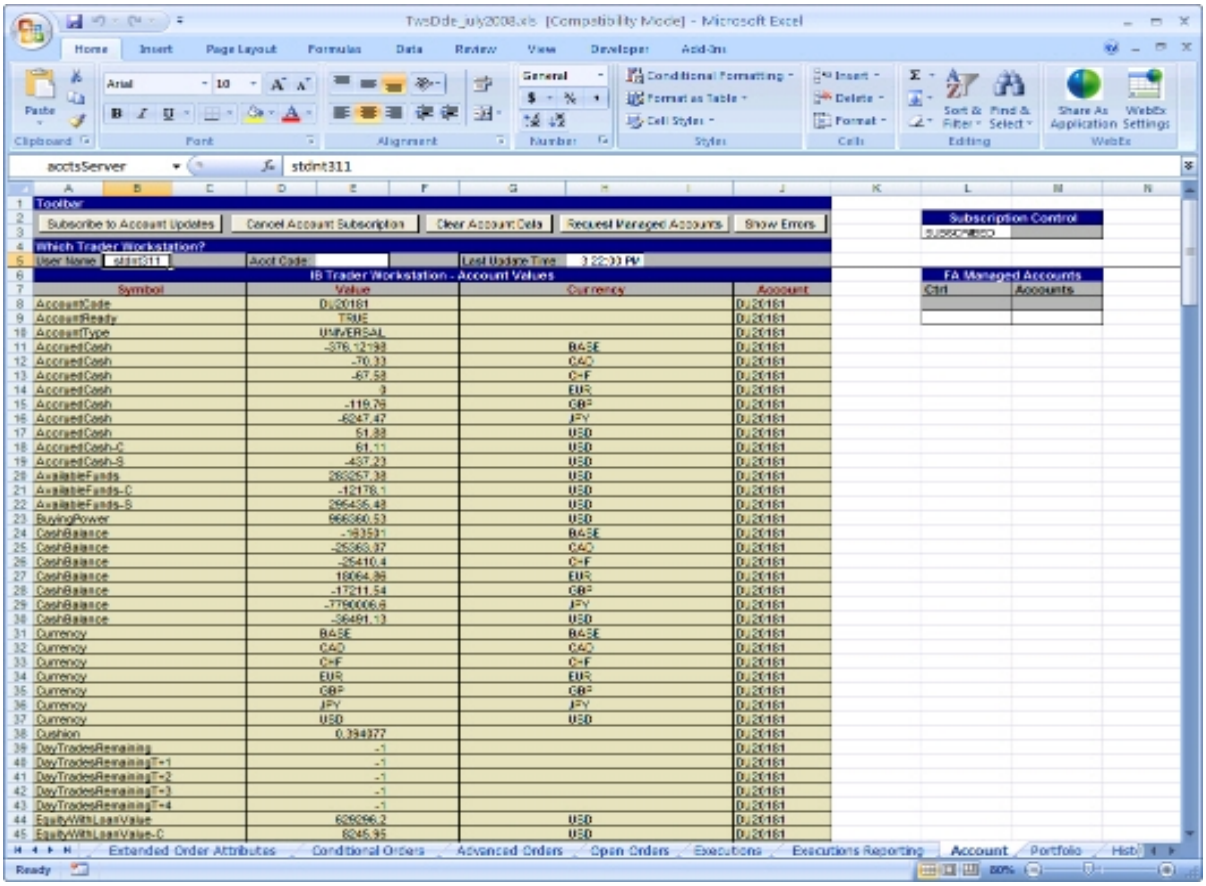
The toolbar on the Open Orders page includes the following buttons:

Button	Description
Request Open Orders	Queries TWS and returns all open orders. Once you subscribe to open orders, this page updates each time there is a new open order.
Request All Open Orders	Queries TWS and returns all open orders from the current account. Once you subscribe to open orders, this page updates each time there is a new open order.
Request Auto Open Orders	Queries TWS and associate all newly created TWS orders with the current client, which must be Client ID 0.
Cancel Auto Open Orders	Cancels association of newly created TWS orders with the client
Clear Open Orders	Removes all open orders from the page.

Account Page

Use the Account page to:

- View account details including your current Equity with Loan Value and Available funds.
- View list of advisor-managed account codes.
- Financial Advisors can view FA information.
- View your current portfolio.



Using the Account Page

Note: Ensure that TWS is running, and that you have connected the spreadsheet to TWS.

To view account information

1. Click the **Account** tab at the bottom of the spreadsheet.
2. Click **Request Account Updates** on the toolbar.

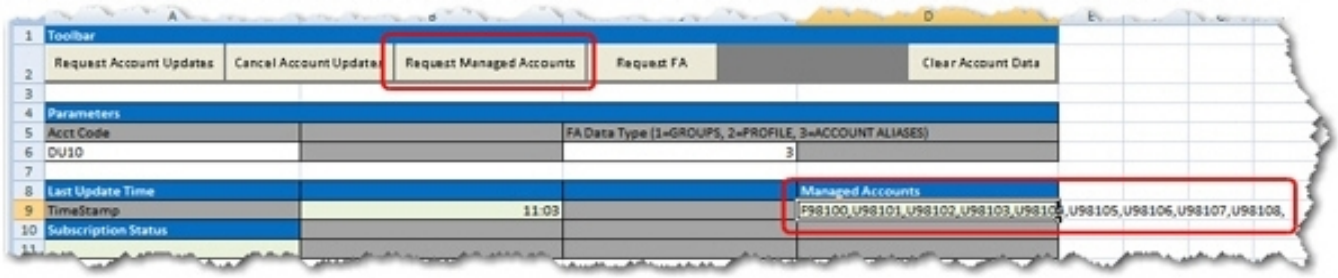
To remove account information

1. Click the **Account** tab at the bottom of the spreadsheet.
2. Click **Cancel Account Updates** on the toolbar to stop receiving account updates.
3. Click **Clear Account Data** on the toolbar to clear all data from the page.

To request the list of Financial Advisor (FA) managed account codes

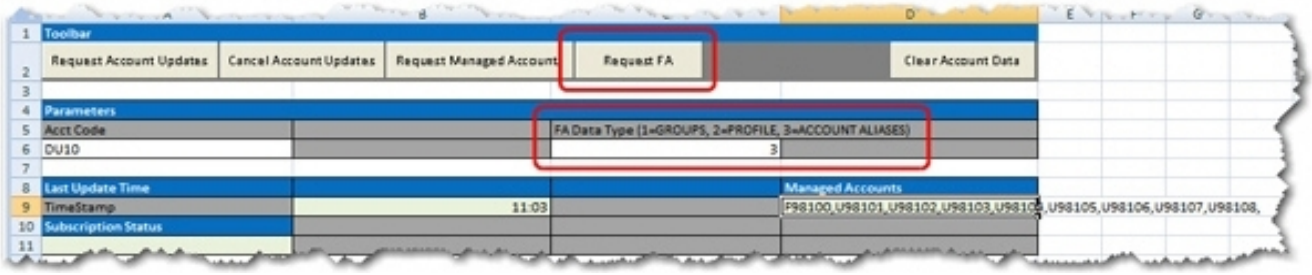
1. Click the **Account** tab at the bottom of the spreadsheet.
2. Click **Request Managed Accounts** on the toolbar.

   A comma-separated list of all managed account numbers displays in the *Managed Accounts* cell.



To request Financial Advisor (FA) information

1. Click the **Account** tab at the bottom of the spreadsheet.
2. In the *Account Code* cell, type the account code for which you want details.
3. In the *FA Data Type* cell, enter a numeric value representing the type of data you wish you receive:
   - Type **1** for groups.
   - Type **2** for profiles.
   - Type **3** for account aliases.
4. Click **Request Managed Accounts** on the toolbar.



Account Page Toolbar Buttons

The toolbar on the Account page includes the following buttons.

Button	Description
Request Account Updates	Each click gives you data for a specific account value. All blank lines that precede the Account Portfolio section will hold data. Continue to click until all lines are populated.
Cancel Account Updates	Click this button one time for each position you hold. When you get a line of "0's" you know you have downloaded all current positions. These values continue to update in real-time.
Request Managed Accounts	For advisor accounts, receives a list of managed accounts and displays them as a comma-separated list in the *Management Accounts* cell.

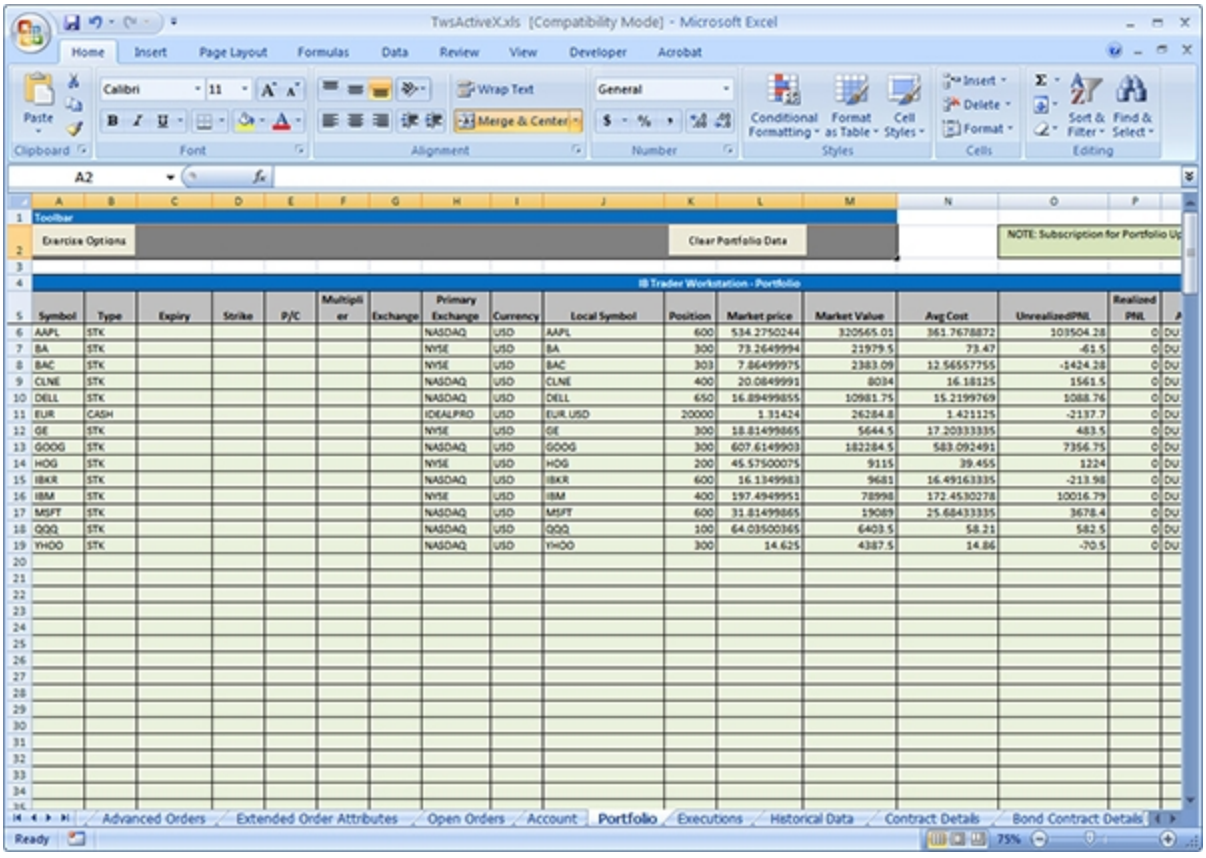
Button	Description
Request FA	For advisor accounts, displays FA data of the type specified in the *FA Data Type* cell.
Clear Account Data	Clears all information from the page. You must first cancel your subscription before you can clear the data.

Portfolio Page

Use the Portfolio page to:

- Displays all of your current positions.
- Exercise options.

Note: Ensure that TWS is running, and that you have connected the spreadsheet to TWS.



Viewing Your Portfolio

To view your portfolio

1. Click the **Account** tab on the bottom of the worksheet, then click **Request Account Updates** on the toolbar.
2. Click the **Portfolio** tab at the bottom of the worksheet to view your portfolio.

To remove portfolio information

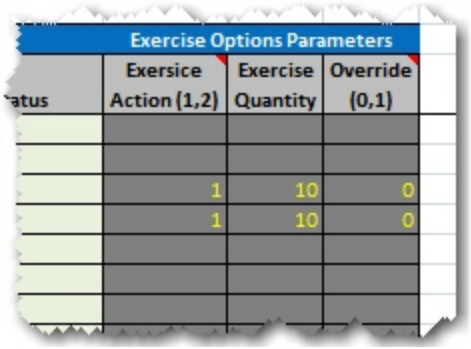
1. Click the **Account** tab on the bottom of the worksheet, then click **Cancel Account Updates** on the toolbar to stop receiving portfolio updates.
2. Click the **Clear Portfolio Data** button to clear all data from the page.

Exercising Options

You can exercise options or let options lapse on the Portfolio page.

To exercise an option or let an option lapse

1. Click the **Portfolio** tab at the bottom of the worksheet.
2. Enter values in the *Exercise Options Parameters* cells at the far right side of the page:
   - *Exercise Action* - Enter **1** to exercise the selected option; **2** to let the option lapse.
   - *Exercise Quantity* - Enter the number of contracts you wish to exercise or let lapse.
   - *Override* - Enter **1** to override the system's natural action; **2** to not override.



3. Click **Exercise Options** in the toolbar. The *Status* column updates.

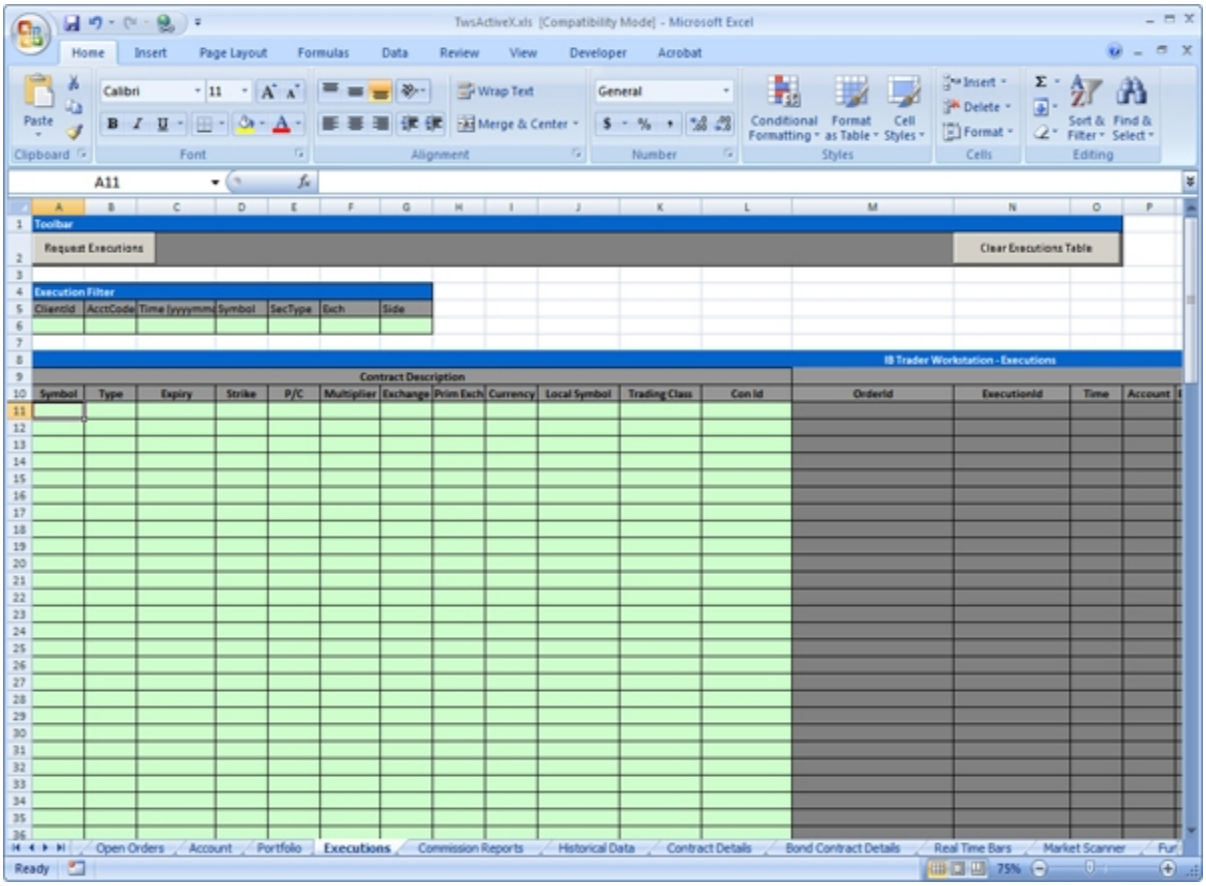
Portfolio Page Toolbar Buttons

The toolbar on the Portfolio page includes the following buttons.

Button	Description
Exercise Options	Exercises the selected option or lets the selected option lapse, depending on the value in the *Exercise Action* cell.
Clear Portfolio Data	Removes all data from the page.

Executions Page

When you subscribe to executions, the Executions page displays information about all completed trades.

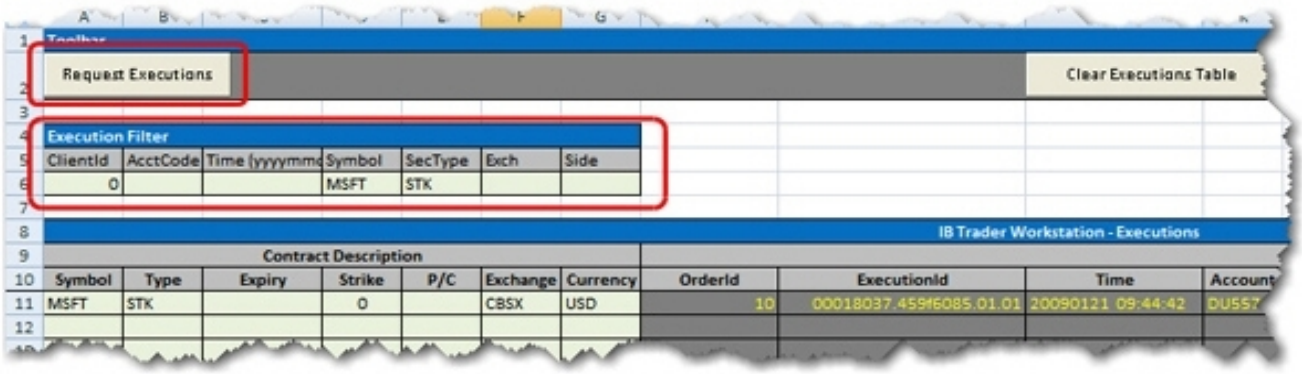


Viewing Executions

Note: Ensure that TWS is running, and that you have connected the spreadsheet to TWS.

To view executions

1. Click the **Executions** tab at the bottom of the spreadsheet.
2. Optionally, filter your executions by entering values in the *Execution Filter* cells:
   - Filter executions by client ID, account code, date/time, symbol, security type, exchange or side.



3. Click **Request Executions** on the toolbar.

To remove execution data

1. Click **Clear Executions Table** on the toolbar. All data is removed from the page.

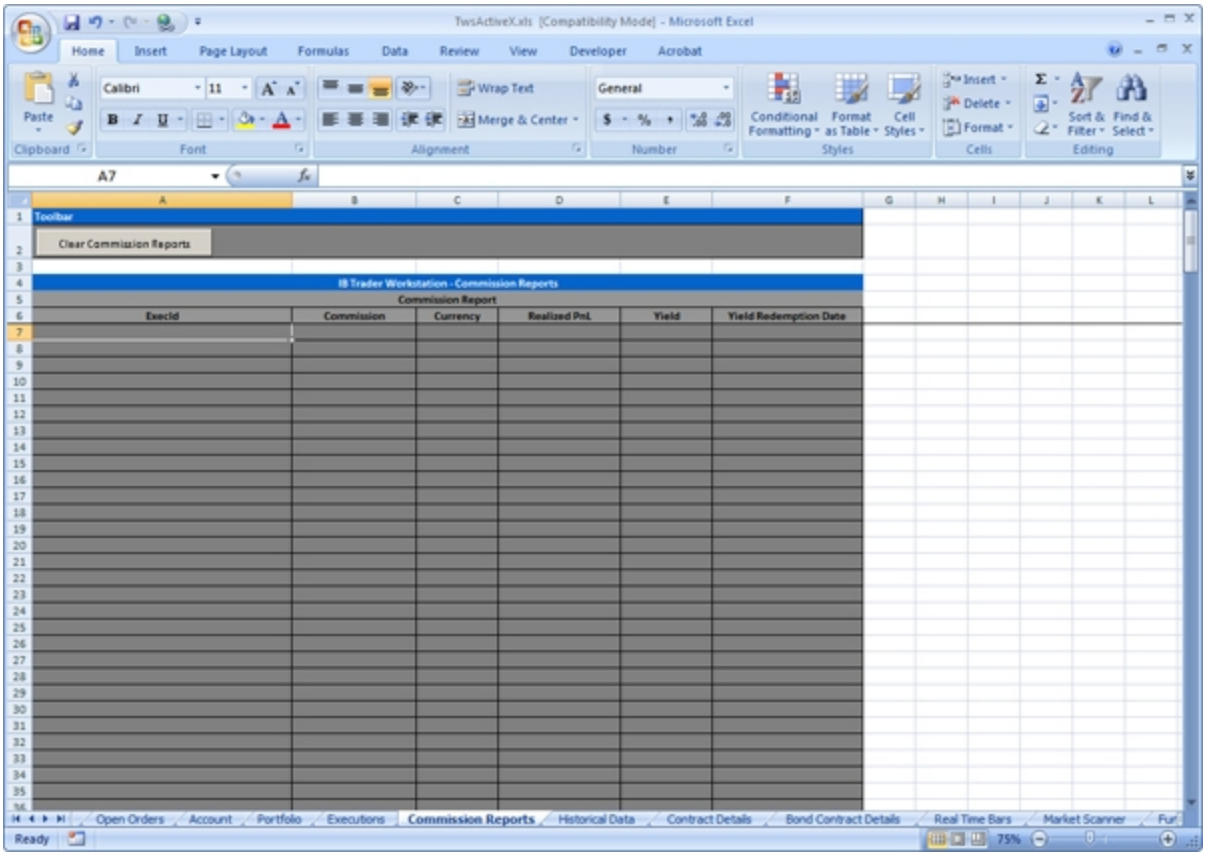
Executions Page Toolbar Buttons

The toolbar on the Executions page includes the following buttons:

Button	Description
Request Executions	Queries TWS and returns information about all valid executions. After you subscribe to executions, this page updates each time an order executes.
Clear Executions Table	Removes all execution reports from the page.

Commission Reports

The Commission Reports page displays commission details, including commission, currency, realized P&L, yield and yield redemption date. When you request Executions on the Execution page, you also receive commission reports.



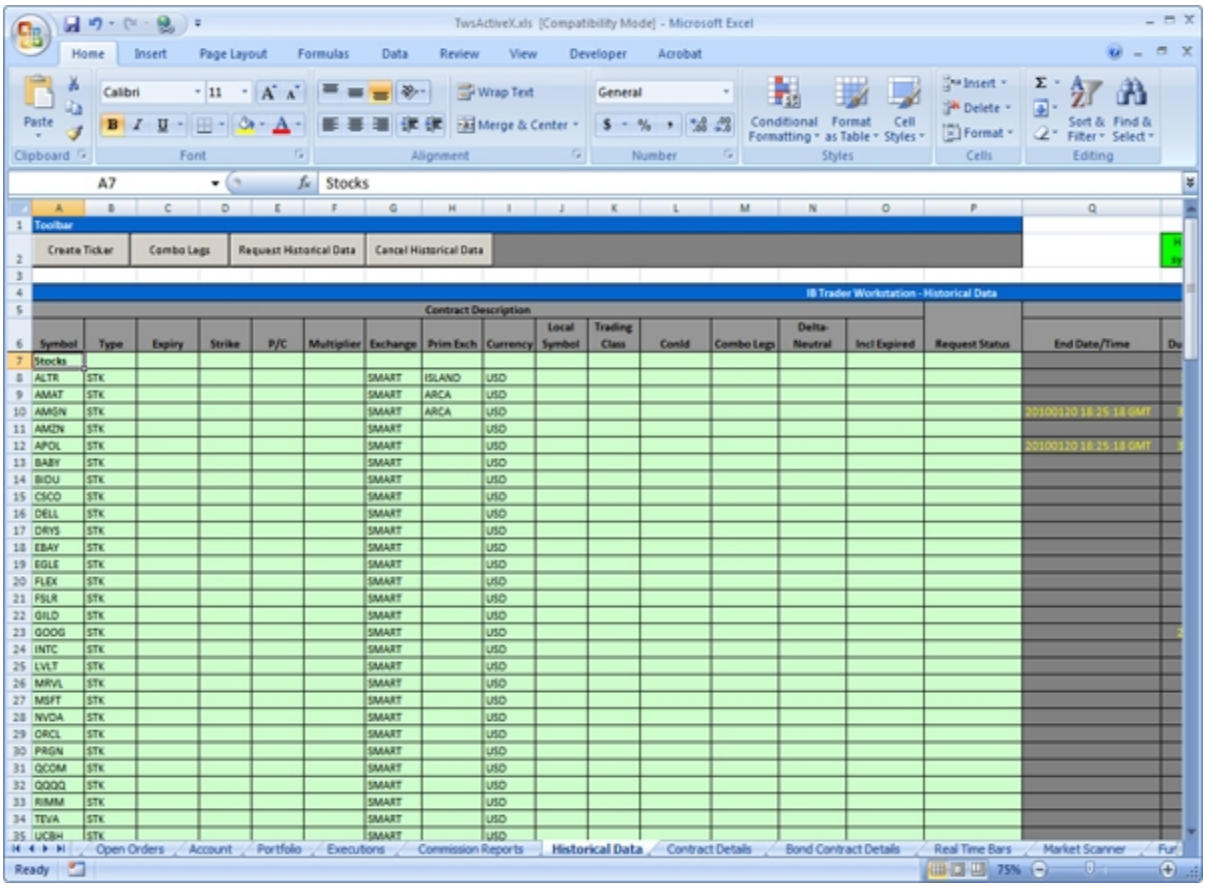
Commission Reports Toolbar Buttons

The toolbar on the Commission Reports page includes the following buttons:

Button	Description
Clear Commission Reports	Removes all commission reports from the page.

Historical Data Page

Use the Historical Data page to request historical data for an instrument based on data you enter in query fields. The query results display on a separate worksheet page and creates a new page for the results if the page doesn't currently exist.



Note: For a information about historical data request limitations, see Historical Data Limitations.

Viewing Historical Data

Note: Ensure that TWS is running, and that you have connected the spreadsheet to TWS.

To request historical data

1. Click the Historical Data tab at the bottom of the spreadsheet.
2. Create a ticker by filling in the fields in the *Contract Description* section of the page, or by clicking the **Create Ticker** button on the toolbar and entering the required information in the Ticker box.
3. Enter the parameters of your query in the *Query Specification* fields. For complete descriptions of the query fields, Historical Data Page Query Specification Fields.
4. Select the line, then click the **Request Historical Data** button. The status of your request displays in the *Request Status* cell.

   In the *Activate Page* cell, enter **TRUE** to display the results page on top of the current window. Enter **FALSE** to display the page on a separate tab in the spreadsheet without displaying on top of the current window.

   The results are displayed on a new tabbed page in the spreadsheet, the name of which is specified in the *Page Name* cell.

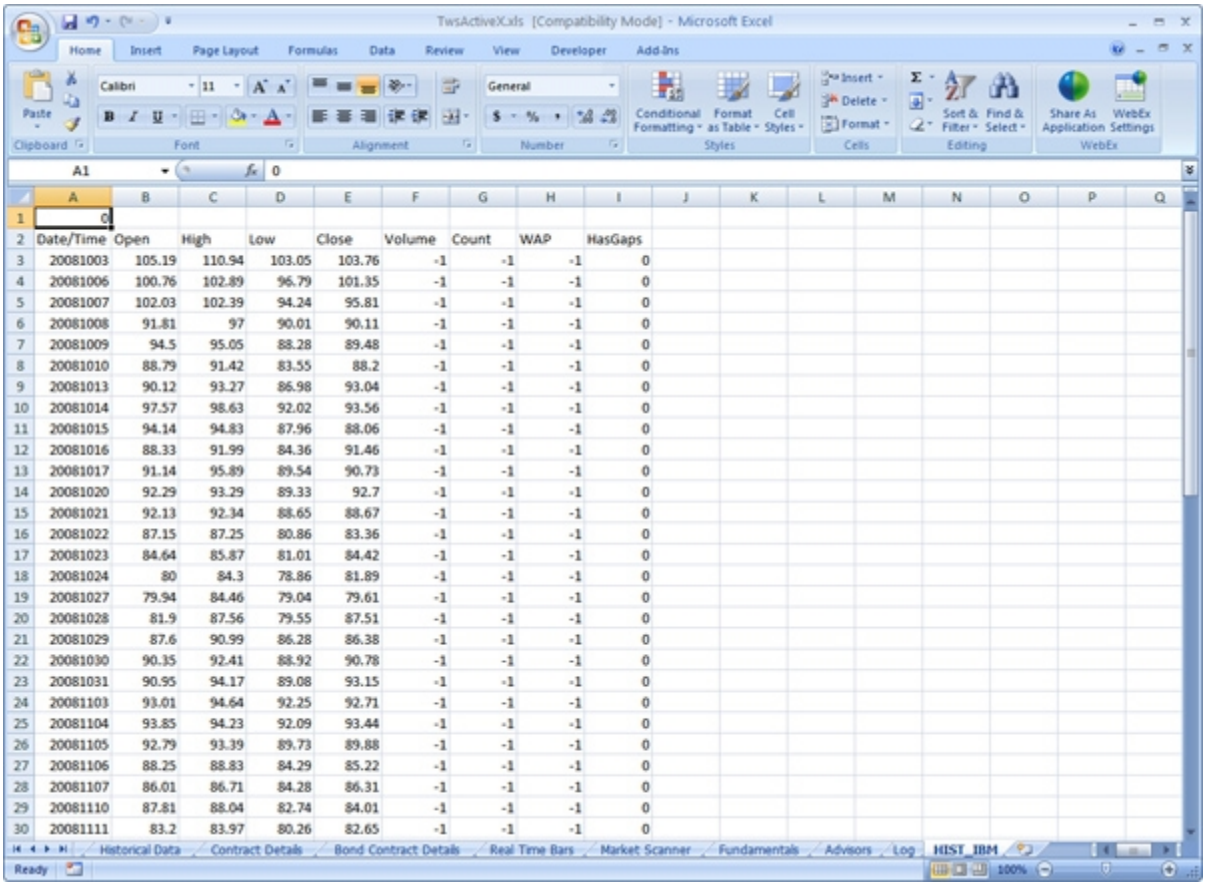
To request historical data for expired contracts

1. On the Historical Data page, create a ticker by filling in the fields in the *Contract Description* section of the page, or by clicking the **Create Ticker** button on the toolbar and entering the required information in the Ticker box.
2. Enter the parameters of your query in the *Query Specification* fields.
3. In the *Incl Expired* cell in the Query Specification section, enter **TRUE**.
4. Select the line, then click **Request Historical Data** on the toolbar. The status of your request displays in the *Request Status* cell.

   In the *Activate Page* cell, enter **TRUE** to display the results page on top of the current window. Enter **FALSE** to display the page on a separate tab in the spreadsheet without displaying on top of the current window.

   The results are displayed on a new tabbed page in the spreadsheet, the name of which is specified in the *Page Name* cell.
5. Historical data queries on expired contracts are limited to the last year of the life of the contract.

   The following figure shows a typical historical data results page.



	A	B	C	D	E	F	G	H	I
1	0								
2	Date/Time	Open	High	Low	Close	Volume	Count	WAP	HasGaps
3	20081003	105.19	110.94	103.05	103.76	-1	-1	-1	0
4	20081006	100.76	102.89	96.79	101.35	-1	-1	-1	0
5	20081007	102.03	102.39	94.24	95.81	-1	-1	-1	0
6	20081008	91.81	97	90.01	90.11	-1	-1	-1	0
7	20081009	94.5	95.05	88.28	89.48	-1	-1	-1	0
8	20081010	88.79	91.42	83.55	88.2	-1	-1	-1	0
9	20081013	90.12	93.27	86.98	93.04	-1	-1	-1	0
10	20081014	97.57	98.63	92.02	93.56	-1	-1	-1	0
11	20081015	94.14	94.83	87.96	88.06	-1	-1	-1	0
12	20081016	88.33	91.99	84.36	91.46	-1	-1	-1	0
13	20081017	91.14	95.89	89.54	90.73	-1	-1	-1	0
14	20081020	92.29	93.29	89.33	92.7	-1	-1	-1	0
15	20081021	92.13	92.34	88.65	88.67	-1	-1	-1	0
16	20081022	87.15	87.25	80.86	83.36	-1	-1	-1	0
17	20081023	84.64	85.87	81.01	84.42	-1	-1	-1	0
18	20081024	80	84.3	78.86	81.89	-1	-1	-1	0
19	20081027	79.94	84.46	79.04	79.61	-1	-1	-1	0
20	20081028	81.9	87.56	79.55	87.51	-1	-1	-1	0
21	20081029	87.6	90.99	86.28	86.38	-1	-1	-1	0
22	20081030	90.35	92.41	88.92	90.78	-1	-1	-1	0
23	20081031	90.95	94.17	89.08	93.15	-1	-1	-1	0
24	20081103	93.01	94.64	92.25	92.71	-1	-1	-1	0
25	20081104	93.85	94.23	92.09	93.44	-1	-1	-1	0
26	20081105	92.79	93.39	89.73	89.88	-1	-1	-1	0
27	20081106	88.25	88.83	84.29	85.22	-1	-1	-1	0
28	20081107	86.01	86.71	84.28	86.31	-1	-1	-1	0
29	20081110	87.81	88.04	82.74	84.01	-1	-1	-1	0
30	20081111	83.2	83.97	80.26	82.65	-1	-1	-1	0

Historical Data Page Query Specification Fields

Parameter	Description
End Date/Time	Use the format yyyymmdd {space}hh:mm:ss{space}*tmz* where the time zone is allowed (optionally)after a space at the end.
Duration	This is the time span the request will cover, and is specified using the format *integer* {space} *unit*, where valid units are: • S (seconds) • D (days) • W (weeks) • Y (years) This unit is currently limited to one. If no unit is specified, seconds are used.

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>Bar Size</td><td>Specifies the size of the bars that will be returned. The following bar sizes may be used, and are specified using the parametric value:

<table>
<tr><th>Bar Size String</th><th>Integer Value</th></tr>
<tr><td>1 second</td><td>1</td></tr>
<tr><td>5 second-s</td><td>2</td></tr>
<tr><td>15 second-s</td><td>3</td></tr>
<tr><td>30 second-s</td><td>4</td></tr>
<tr><td>1 minute</td><td>5</td></tr>
<tr><td>2 minute-s</td><td>6</td></tr>
<tr><td>3 minute-s</td><td>16</td></tr>
<tr><td>5 minute-s</td><td>7</td></tr>
<tr><td>15 minute-s</td><td>8</td></tr>
<tr><td>30 minute-s</td><td>9</td></tr>
<tr><td>1 hour</td><td>10</td></tr>
<tr><td>1 day</td><td>11</td></tr>
</table>

On the query return page, each "bar" is represented by a line in the spreadsheet. If you specify a duration of 300 seconds, and a bar size of "1" (one second) your return will include 300 lines, and the value in each line is equal to one second, or is a one-second bar. Note that you can use either the Integer value of the Bar Size String or the Integer Value to define the bar sizes.</td></tr>
</table>

Parameter	Description
What to Show	Determines the nature of the data extracted. Valid values include: • Trades • Midpoint • Bid • Ask • Bid/Ask All but the Bid/Ask data contain the *start time*, *open*, *high*, *low*, *close*, *volume* and *weighted average price* during the time slice queried. For the Bid/Ask query, the *open* and *close* values are the time-weighted average bid and the time-weighted average offer, respectively. These bars are identical to the TWS charts' candlestick bars.
RTH Only	Regular Trading Hours only. Valid values include: • 0 - all data available during the time span requested is returned, including time intervals when the market in question was outside of regular trading hours. • 1 - only data within the regular trading hours for the product requested is returned, even if the time span falls partially or completely outside.
Date Format Style	Valid values include: • 1 - dates that apply to bars are returned in the format yyyymmdd {space}{space}hh:mm:dd (the same format used when reporting executions). • 2 - the dates are returned as an integer specifying the number of seconds since 1/1/1970 GMT.
Page Name	The name of the results page. This appears in the tab for the results page at the bottom of the worksheet.
Activate page	Enter TRUE to display the results page on top of the current window. Enter FALSE to display the results on a new page in the spreadsheet without appearing on top of the current window.

Note that the new page is added to the right of the existing tabs on the worksheet.

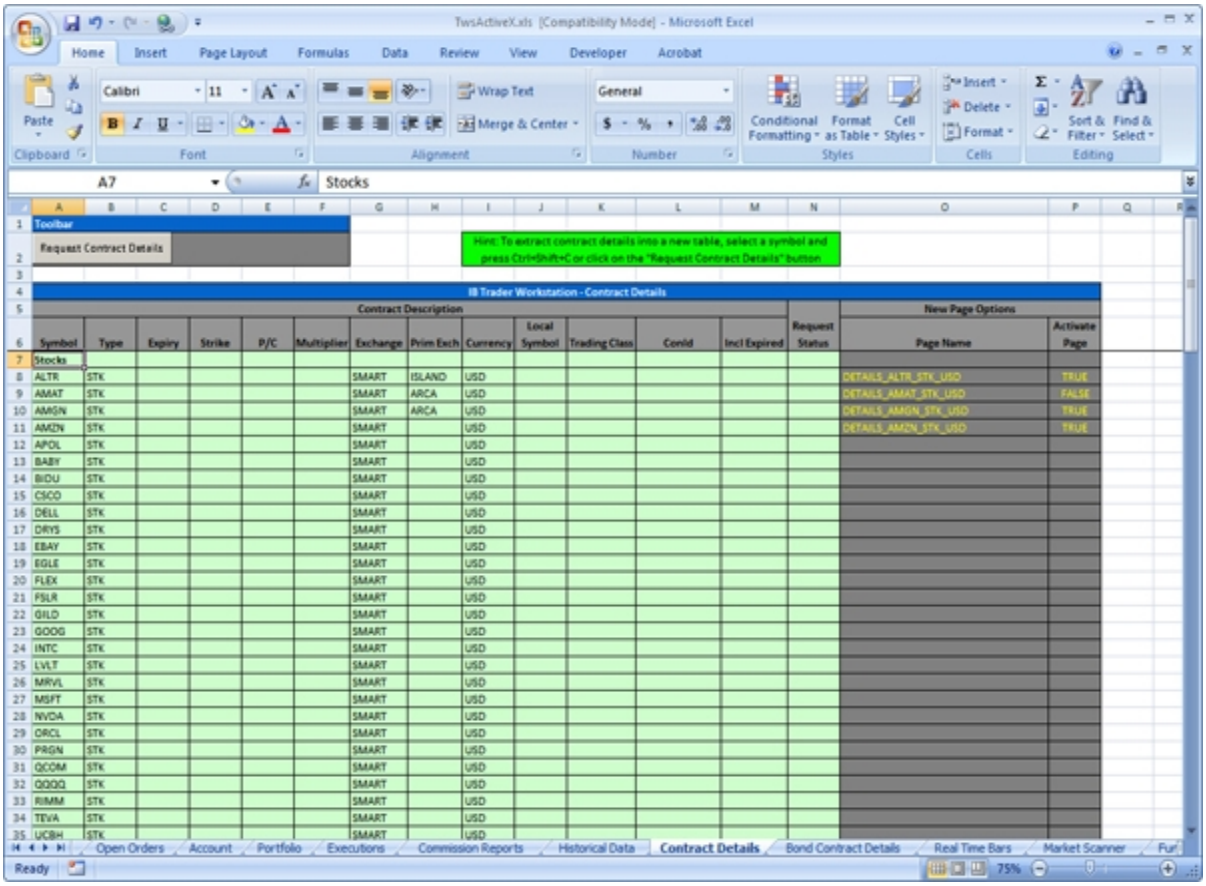
Historical Data Page Toolbar Buttons

The toolbar on the Historical Data page includes the following buttons.

Button	Description
Create Ticker	Opens the Ticker box. Enter information to create a market data line.
Combo Legs	Opens the Combination Legs box. Enter contract details to create legs of a combination order one by one.
Request Historical Data	Submits your historical data query to TWS and displays the results on a separate worksheet page.
Cancel Historical Data	Cancels the historical data request.

Contract Details Page

Use the Contract Details page to request contract-specific information such as supported order types, valid exchanges, the contract ID, and so on.



Requesting Contract Details

Note: Ensure that TWS is running, and that you have connected the spreadsheet to TWS.

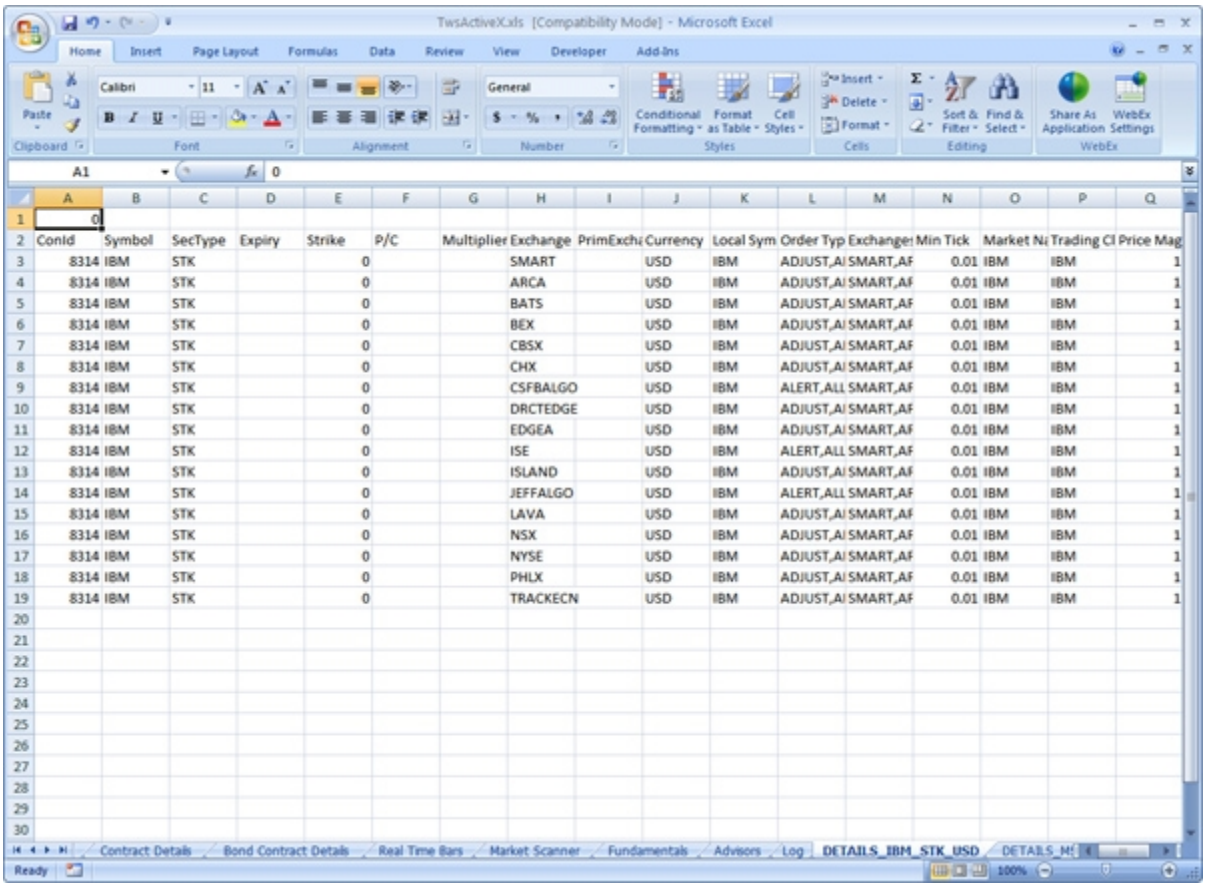
To request details for a contract

1. Click the **Contract Details** tab at the bottom of the spreadsheet to open the Contract Details page.
2. Select or enter the ticker symbol for which you want to request contract details.
3. To request contract details for an expired contract, type **TRUE** in the *Incl Expired* cell.
4. Select the row, then click **Request Contract Details** on the toolbar. The status of your request displays in the *Request Status* cell.

   In the *Activate Page* cell, enter **TRUE** to display the results page on top of the current window. Enter **FALSE** to display the page on a separate tab in the spreadsheet without displaying on top of the current window.

   The results are displayed on a new tabbed page in the spreadsheet, the name of which is specified in the *Page Name* cell.

   The following figure shows a typical contract details page.



Contract Details Page Toolbar Buttons

The toolbar on the Contract Details page includes the following button:

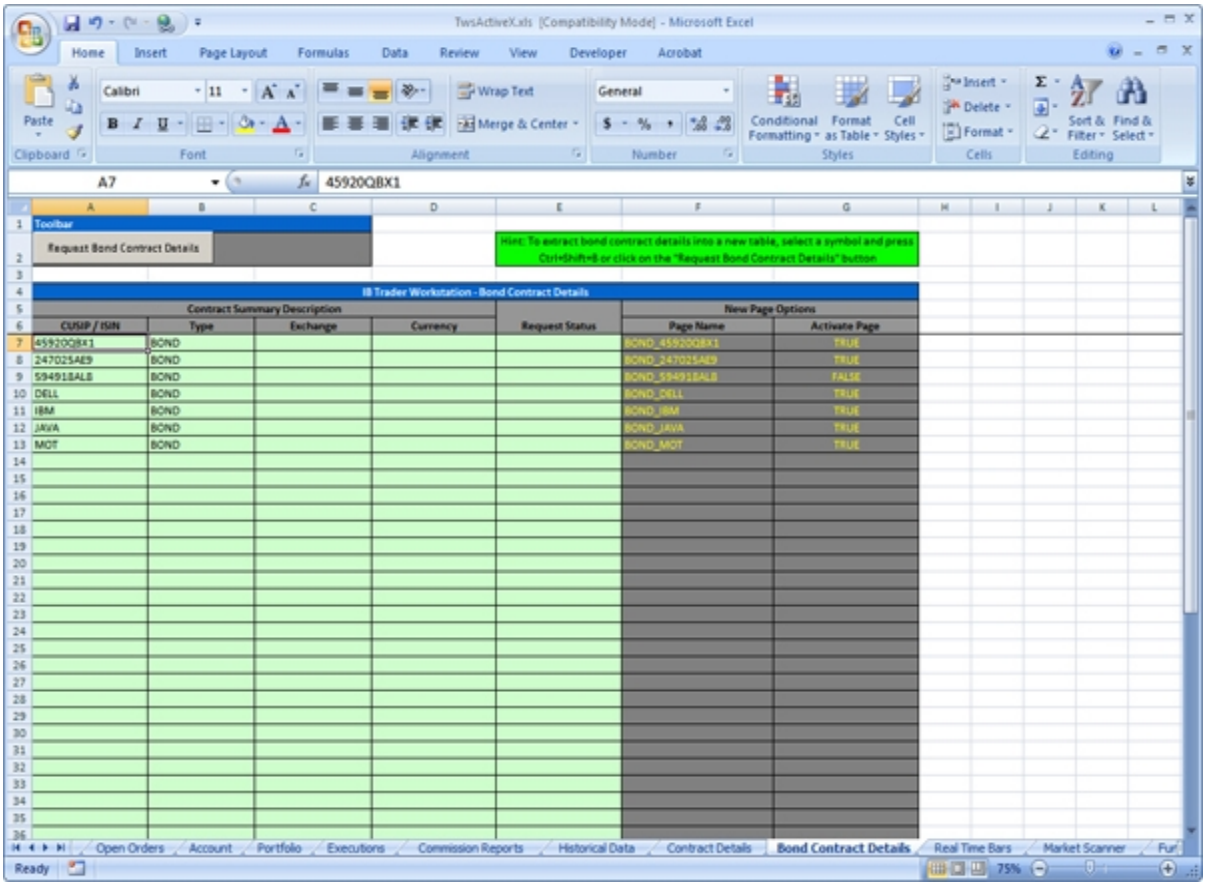
Button	Description
Request Contract Details	Returns information on the selected contract.

Bond Contract Details Page

Use the Bond Contract Details page to request contract-specific information for bonds, including the coupon, ratings, bond type, maturity date, and so on.

Note: Beginning with TWS Version 921, some bond contract data will be suppressed and will not be available from the API. All bond contract data will continue to be available from Trader Workstation, but only the following bond contract data will be available from the API:

- Contract ID
- Minimum Tick
- CUSIP (if you have subscribed to the CUSIP service)
- Rating (if you have subscribed to ratings)



Requesting Bond Contract Details

Note: Ensure that TWS is running, and that you have connected the spreadsheet to TWS.

To request details for a bond contract

1. Click the **Bond Contract Details** tab at the bottom of the spreadsheet to open the Bond Contract Details page.
2. Select or enter the ticker symbol for which you want to request bond contract details.
3. Select the row, then click **Request Bond Contract Details** on the toolbar. The status of your request displays in the *Request Status* cell.

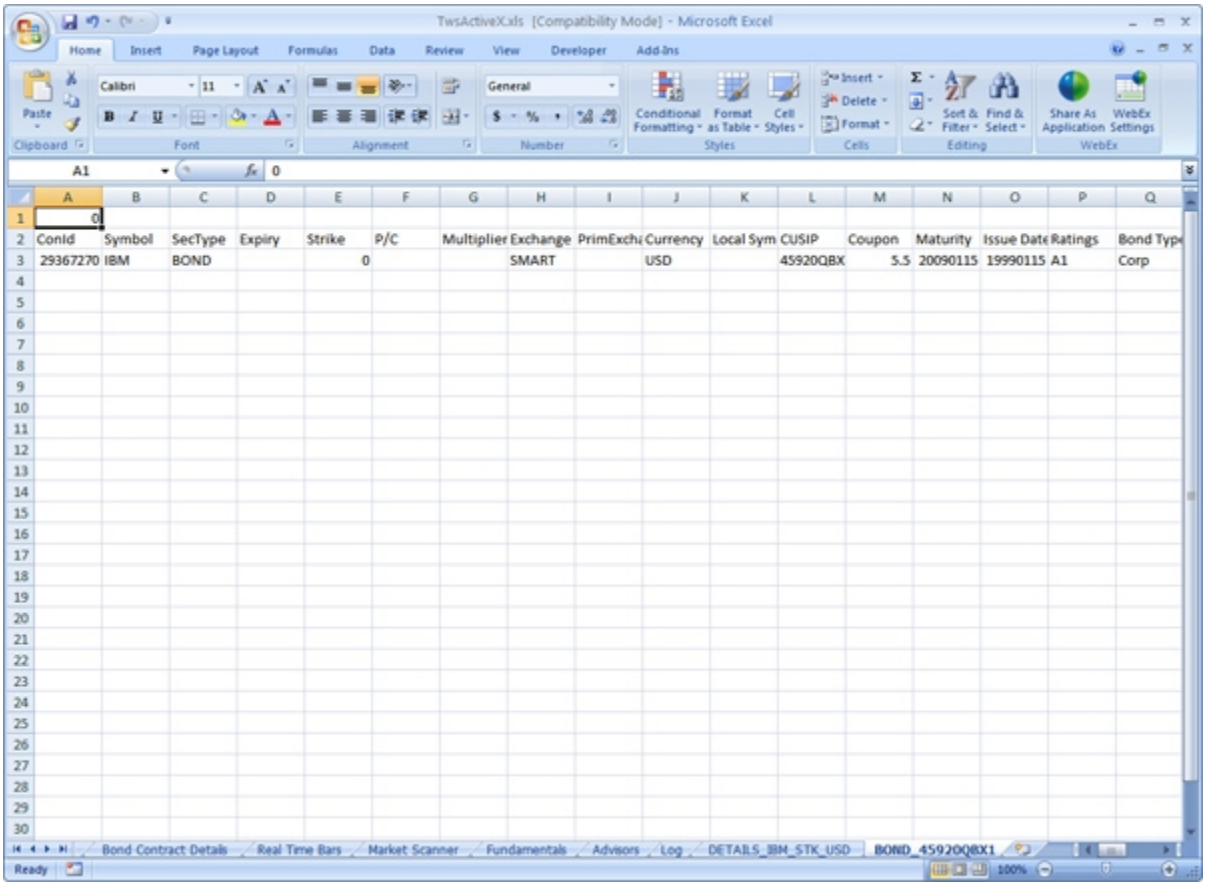
   In the *Activate Page* cell, enter **TRUE** to display the results page on top of the current window. Enter **FALSE** to display the page on a separate tab in the spreadsheet without displaying on top of the current window.

   The results are displayed on a new tabbed page in the spreadsheet, the name of which is specified in the *Page Name* cell.

   Note: Beginning with TWS Version 921, some bond contract data will be suppressed and will not be available from the API. All bond contract data will continue to be available from Trader Workstation, but only the following bond contract data will be available from the API:

   - Contract ID
   - Minimum Tick
   - CUSIP (if you have subscribed to the CUSIP service)
   - Rating (if you have subscribed to ratings)

   The following figure shows a typical bond contract details page.



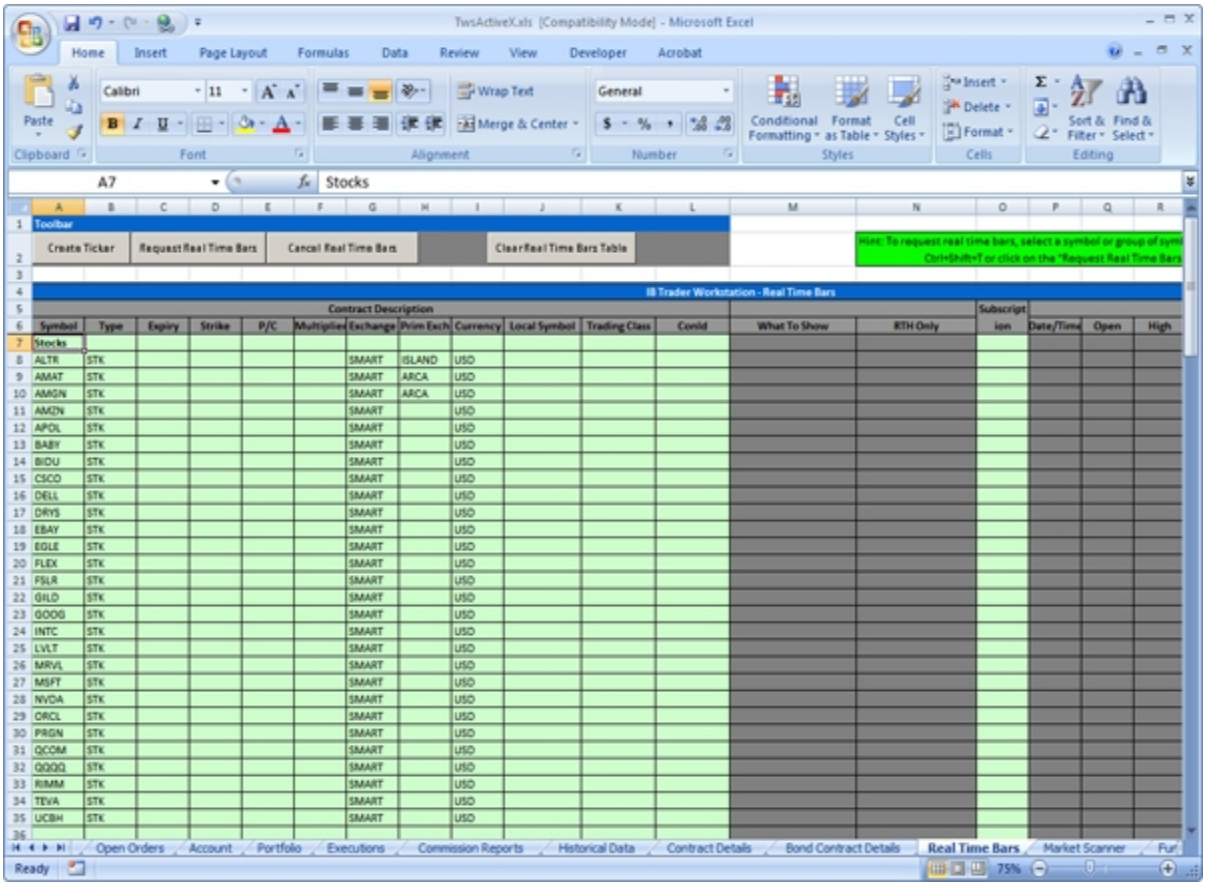
Bond Contract Details Page Toolbar Buttons

The toolbar on the Bond Contract Details page includes the following button:

Button	Description
Request Bond Contract Details	Gets bond information data for the selected contract.

Real Time Bars Page

Real time bars allow you to get a summary of real-time market data every five seconds, including the opening and closing price, and the high and the low within that five-second period (using TWS charting terminology, we call these five-second periods "bars"). You can also get data showing trades, midpoints, bids or asks. You request real time bars on the Real Time Bars page, which is shown below.



To request real time bars

Note: Ensure that TWS is running, and that you have connected the spreadsheet to TWS.

1. Click the **Real Time Bars** tab at the bottom of the spreadsheet to open the Real Time Bars page.
2. Select or enter the ticker symbol for which you want to request real time bars.
3. Enter the following information for the selected row:
   - In the *What to Show* cell, enter TRADES, BID, ASK or MIDPOINT.
   - In the *RTH Only* cell, enter **0** to return all data available during the time span requested, including time intervals when the market in question was outside of regular trading hours. Enter **1** to return only data within the regular trading hours for the product requested is returned, even if the time span falls partially or completely outside.
4. Select the row, then click **Request Real Time Bars** on the toolbar. The status of your request displays in the *Subscription Status* cell.

   Results are displayed in the *Real Time Bars* cells on the right side of the page.

Real Time Bars Page Toolbar Buttons

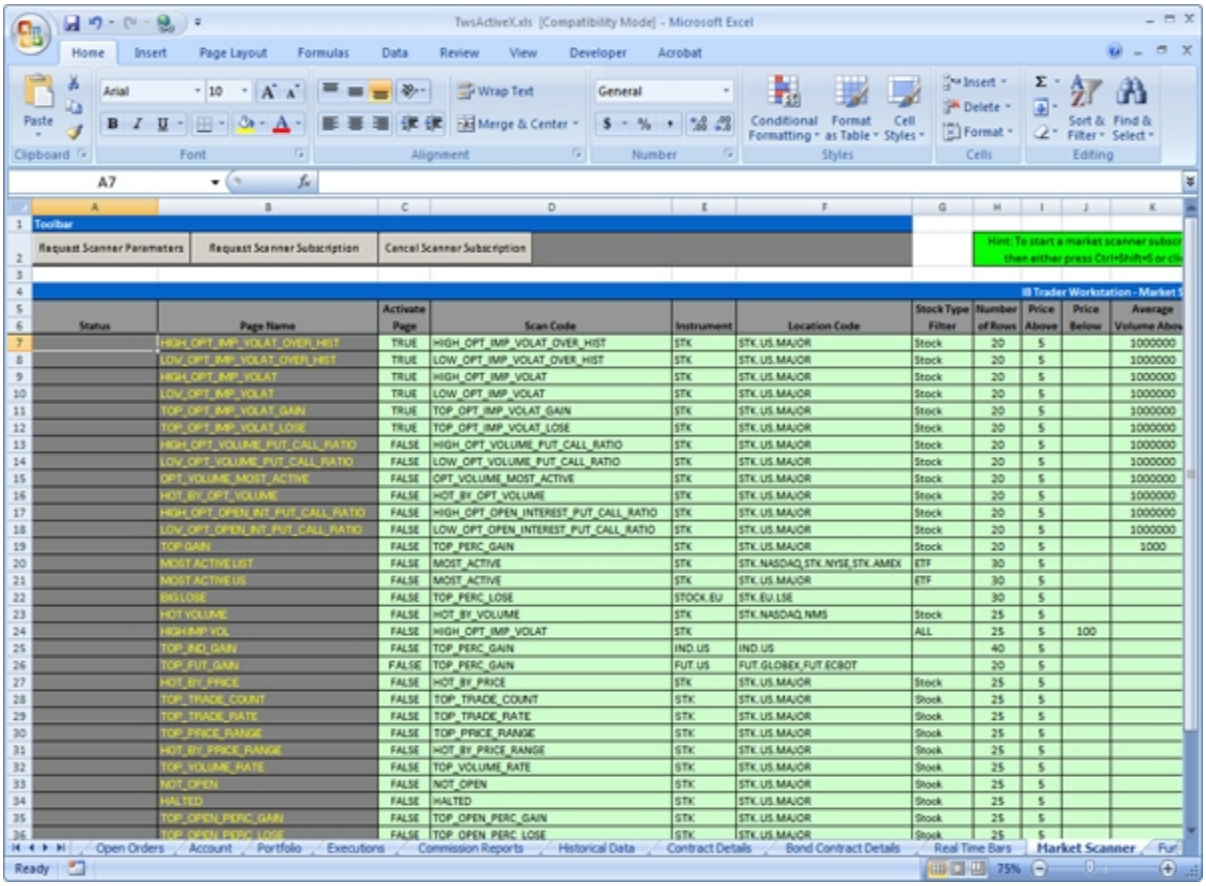
The toolbar on the Real Time Bars page includes the following buttons.

Button	Description
Create Ticker	Opens the Ticker box. Enter information to create a market data line.
Request Real Time Bars	Submits your real time bars request to TWS and displays the results in the dark gray cells the right side of the page.
Cancel Real Time Bars	Cancels the real time bars request.
Clear Real Time Bars Table	Clears all real time bar data from the page.

Market Scanner Page

Use the Market Scanner page to subscribe to TWS market scanners. These scanners allow you to define criteria and set filters that return the top *x* number of underlyings which meet all scan criteria. The scan is continually updated in real time.

You can also display market scanner parameters from this page.



Starting a Market Scanner Subscription

Note: Ensure that TWS is running, and that you have connected the spreadsheet to TWS.

To start a scanner subscription

1. Click the **Market Scanner** tab at the bottom of the spreadsheet.
2. Highlight an existing scanner row, or enter information for a different market scanner:
   a. Type the name of the scan results page in the *Page Name* cell.
   b. Type **TRUE** or **FALSE** in the *Activate Page* cell.

      Setting this cell to TRUE forces the scan results page to pop to the front of your application every time it updates. To stop this behavior, set the value of this field to FALSE.

   c. Type values for the rest of the scan parameters in the lightly shaded section of the page. You can get all of the scan codes from the market scanner parameters.
3. Click **Request Scanner Subscription** on the toolbar. A new page for the scanner is created and is displayed after the subscription is processed.

Market Scanner Parameters

You can display all of the market scanner parameters from the Market Scanner page. Scanner parameters are returned to the spreadsheet from TWS as an XML file.

> **Note:** Ensure that TWS is running, and that you have connected the spreadsheet to TWS.

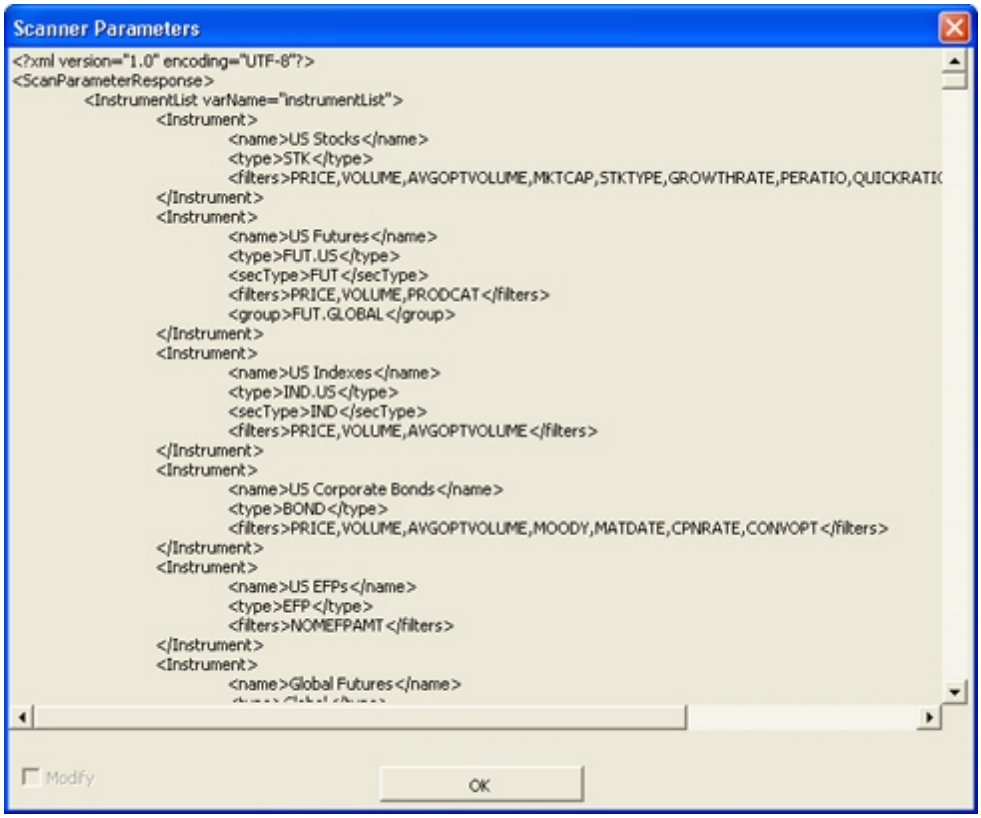
To view scanner parameters

1. Click the **Market Scanner** tab at the bottom of the spreadsheet.
2. Click **Request Scanner Parameters** on the toolbar.

   The entire scanner parameters XML file is displayed in a window.

3. To save the parameters in a convenient file on your computer, manually select part or all of the contents of the XML file in the Scanner Parameters window, then copy and paste it into a separate text document.
4. Click **OK** to close the Scanner Parameters window.

   The Scanner Parameters window is shown on the next page.



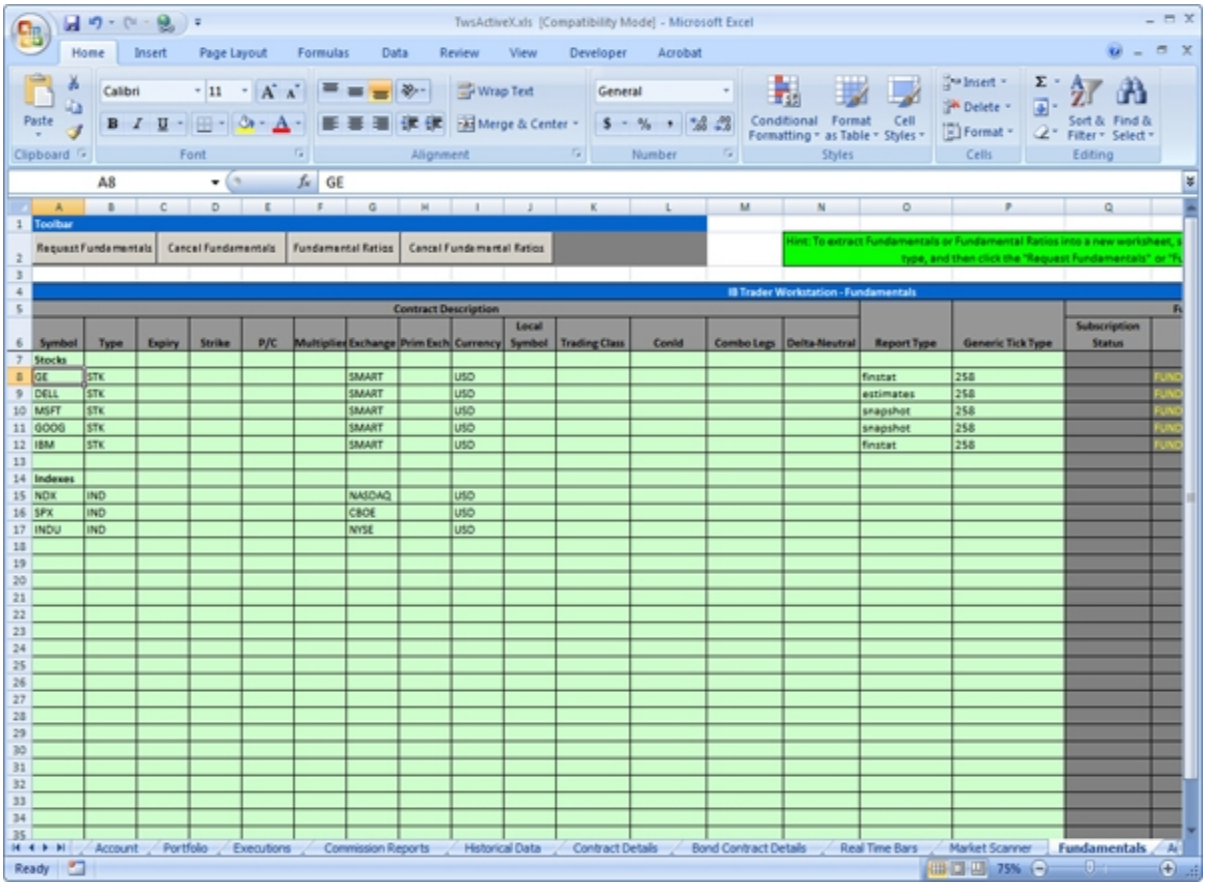
Market Scanner Page Toolbar Buttons

The toolbar on the Market Scanner page includes the following buttons.

Button	Description
Request Scanner Parameters	Displays all scanner parameters in an XML file in a separate window.
Request Scanner Subscription	Creates and displays a new page for results of the selected market scanner.
Cancel Scanner Subscription	Cancels the market scanner.

Fundamentals Page

Use the Fundamentals page to receive Reuters global fundamental data and fundamental ratios. There must be a paid subscription to Reuters Fundamental set up in Account Management before you can receive this data.



To receive Reuters global fundamental data and fundamental ratios

Note: Ensure that TWS is running, and that you have connected the spreadsheet to TWS.

1. Click the **Fundamentals** tab at the bottom of the spreadsheet to display the Fundamentals page.
2. Enter information about the contract for which you want fundamentals data or ratios into the *Contract Description* cells.
3. In the *Report Type* cell, enter the type of report you wish to view:
   - **finstat** - Financial Statement
   - **estimates** - Estimates
   - **snapshot** - Summary
4. In the *Generic Tick Type* cell, enter **258** as the tick type value. For details on generic tick type values, see Generic Tick Types.
5. Enter the following information in the *Fundamentals* section of the page for fundamental data, or the *Fundamental Ratios* section for fundamental ratios:
   a. Fundamental data and ratio results display on a new page in the spreadsheet. Type the name of the results page in the *Page Name* cell.

b. Type **TRUE** or **FALSE** in the *Activate Page* cell.

Setting this cell to TRUE forces the results page to pop to the front of your application every time it updates. To stop this behavior, set the value of this field to FALSE.

6. Do one of the following:
   - Click **Request Fundamentals** on the toolbar to view fundamentals data. A new page for the results is created and is displayed after the request is processed.
   - Click **Fundamentals Ratios** on the toolbar to view fundamentals ratios. A new page for the results is created and is displayed after the request is processed.

   The status of your request appears in the *Subscription Status* cell.

Fundamentals Page Toolbar Buttons

The toolbar on the Market Scanner page includes the following buttons.

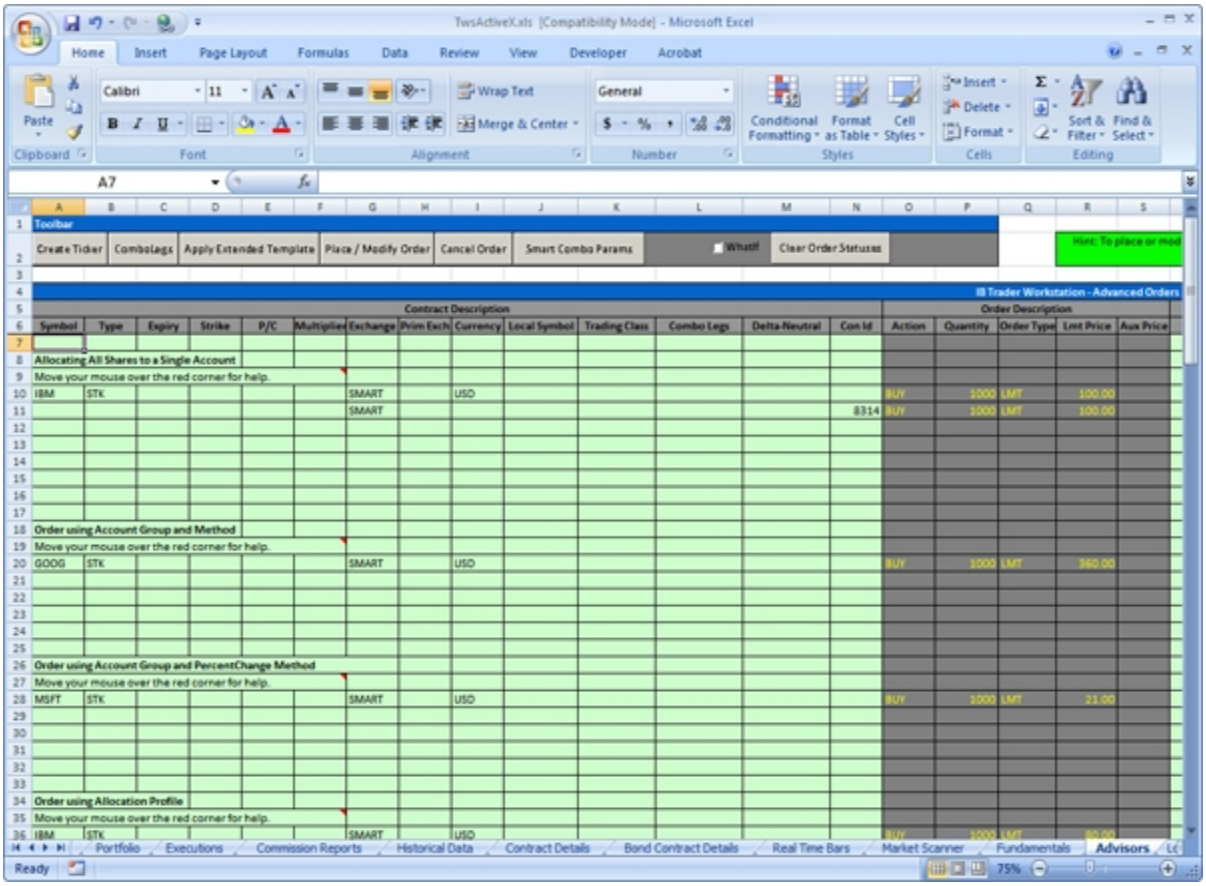
Button	Description
Request Fundamentals	Requests fundamentals data, which displays on a new page in the spreadsheet based on the information you enter on the page.
Cancel Fundamentals	Cancels fundamentals data.
Fundamental Ratios	Requests fundamentals ratios, which displays on a new page in the spreadsheet based on the information you enter on the page.
Cancel Fundamental Ratios	Cancels fundamentals ratios.

Advisors Page

If you are a Financial Advisor and manage multiple accounts, use the Advisors page to create FA orders that:

- allocate shares to a single managed account
- use FA account groups and methods
- use allocation profiles

Note: You must set up your managed accounts, account groups, methods and allocation profiles in TWS before you can place FA orders in the ActiveX for Excel API sample spreadsheet.



Allocating Shares to a Single Account

You can use the **Advisors** page to set up an order and allocate all shares in the order to a single account.

> **Note:** Ensure that TWS is running, and that you have connected the spreadsheet to TWS.

To allocate shares to a single account:

1. Create an account group in TWS.
2. Click the **Advisors** tab at the bottom of the spreadsheet.
3. Enter the contract information in the *Contract Description* cells, then enter the order information in the *Order Description* cells.
4. Click the **Extended Order Attributes** tab. Enter the account code in the *Value* cell for the *Account (Institutional only)* extended order attribute.
5. Click the **Advisors** tab.
6. Highlight the order row, then click the **Apply Extended** button to apply the *Account* order attribute value to the order. The *Account* value is applied to the selected order and displayed in the *Extended Order Attributes* section of the page.
7. Click the **Place/Modify Order** button.

8. When you are done allocating shares to the account, delete the *Account* value from the **Extended Order Attributes** page. If you do not delete this value, it will be applied to all subsequent orders placed from the ActiveX for Excel spreadsheet.

Optionally, you can receive margin and commission information that would result from the order if you placed it by selecting the **WhatIf** check box on the toolbar. In this case, your order is not actually placed. Deselect the check box to place your order without seeing the margin and commission information ahead of time.

Placing an Order using an FA Account Group and Method

You can also use the **Advisors** page to set up an order using an FA account group and FA method.

To place an order using an FA account group and FA method:

1. Create the FA account group(s) and FA method(s) in TWS.
2. Click the **Advisors** tab at the bottom of the spreadsheet.
3. Enter the contract information in the *Contract Description* cells, then enter the order information in the *Order Description* cells.
4. Click the **Extended Order Attributes** tab. Enter values for the following extended order attributes:
   - FA Group - Enter the name of the account group.
   - FA Method - Enter the name of the allocation method to use for this order.
   - FA Percentage - Enter the percentage used by the PctChange allocation method to use for this order. This attribute applies only to FA groups that use this method.
5. Click the **Advisors** tab.
6. Highlight the order row, then click the **Apply Extended** button to apply the extended order attribute values to the order. The values for *FA Group*, *FA Method* and *FA Percentage* are applied to the selected order and displayed in the *Extended Order Attributes* section of the page.
7. Click the **Place/Modify Order** button.
8. When you are done allocating shares to the account, delete the values you entered on the **Extended Order Attributes** page. If you do not delete these values, they will be applied to all subsequent orders placed from the ActiveX for Excel spreadsheet.

Optionally, you can receive margin and commission information that would result from the order if you placed it by selecting the **WhatIf** check box on the toolbar. In this case, your order is not actually placed. Deselect the check box to place your order without seeing the margin and commission information ahead of time.

Placing an Order using an Allocation Profile

You can also use the **Advisors** page to set up an order using an FA allocation profile.

To place an order using an FA allocation profile:

1. Create the FA allocation profile in TWS.
2. Click the **Advisors** tab at the bottom of the spreadsheet.
3. Enter the contract information in the *Contract Description* cells, then enter the order information in the *Order Description* cells.

4. Click the **Extended Order Attributes** tab. Enter the name of the allocation profile in the *Value* field for the *FA Profile* extended order attribute.
5. Click the **Advisors** tab.
6. Highlight the order row, then click the **Apply Extended** button to apply the extended order attribute value to the order. The value for *FA Profile* is applied to the selected order and displayed in the *Extended Order Attributes* section of the page.
7. Click the **Place/Modify Order** button.
8. When you are done allocating shares to the account, delete the *FA Profile* value you entered on the **Extended Order Attributes** page. If you do not delete this value, it will be applied to all subsequent orders placed from the ActiveX for Excel spreadsheet.

Optionally, you can receive margin and commission information that would result from the order if you placed it by selecting the **WhatIf** check box on the toolbar. In this case, your order is not actually placed. Deselect the check box to place your order without seeing the margin and commission information ahead of time.

Advisors Page Toolbar Buttons

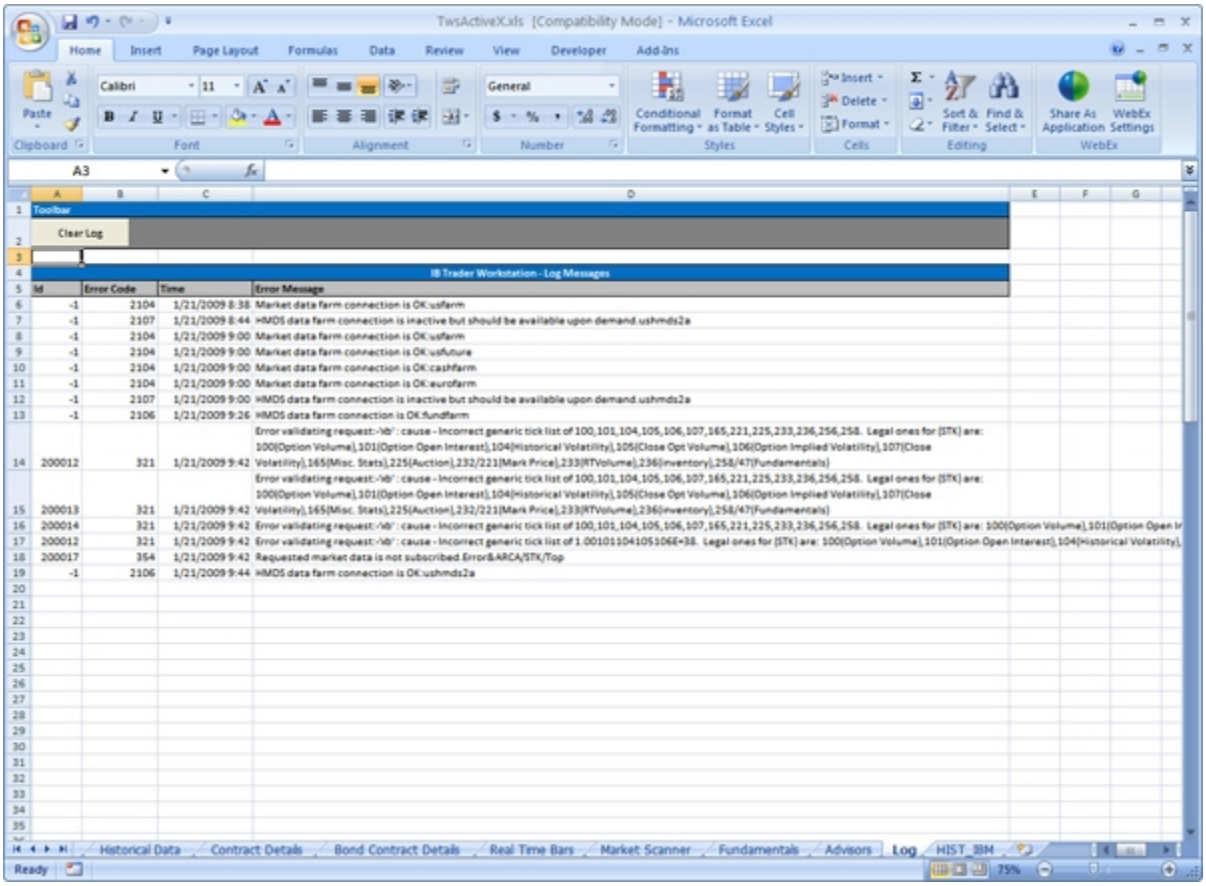
The toolbar on the Basic Orders page includes the following buttons:

Button	Description
Create Ticker	Opens the Ticker box. Enter information to create a market data line.
Combo Legs	Opens the Combination Legs box. Enter contract details to create legs of a combination order one by one.
Apply Extended Template	Applies the current values on the Extended Order Attributes page to the highlighted order row.
Place/Modify Orders	After you have completed the Order Description fields, and defined any extended attributes, click to create an order for the selected contract.
Cancel Order	This button cancels the order(s) you have highlighted.
Clear Order Statuses	Clears all information from the *Order Status* cells.

Log Page

The Log page displays all error messages received while logged into TWS and using the ActiveX for Excel spreadsheet. You can clear all the information on the page by clicking **Clear Log** on the toolbar.

Here is an example of a typical Log page:


TwsActiveX.xls [Compatibility Mode] - Microsoft Excel
Toolbar
Clear Log
IB Trader Workstation - Log Messages
Id
Error Code
Time
Error Message
Historical Data
Contract Details
Bond Contract Details
Real Time Bars
Market Scanner
Fundamentals
Advisors
Log
HIST_IBM
Ready

9

POSIX

This chapter describes the POSIX API.

The POSIX API is based on our C++ API code. The C++ code was refactored so it could be built on any POSIX-compliant platform. Use this new POSIX API to build a TWS API on Linux, and on Windows in non-MFC applications.

> **Note:** Although the pre-existing public interface has been preserved, you must recompile your client applications.

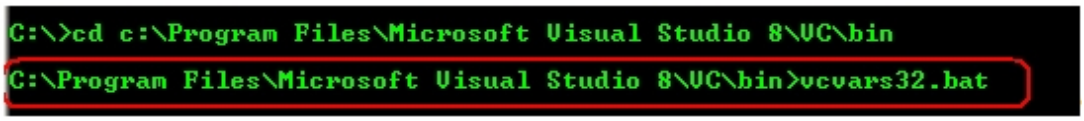
We also include a POSIX test client. The API installation directory includes these directories for the POSIX API: PosixSocketClient and TestPosixSocketClient. The POSIX test client uses the same methods as the C++ Socket client, plus it exposes several extra methods that clients must call when data is available on a socket for read/write. Refer to TestPosixSocketClient as an example. Please note that this test client is greatly simplified. For real POSIX API applications, you will have to use a select system of some kind to manage several sockets and/or asynchronous events.

To run the POSIX test client on a Windows machine, see Running the POSIX Client on a Windows Machine.

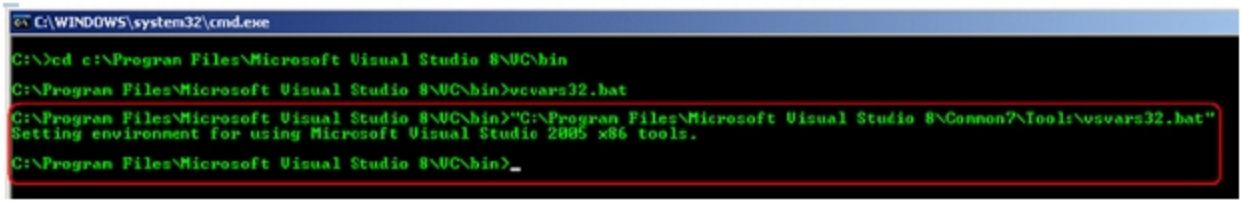
Running the POSIX Client on a Windows Machine

To run the POSIX client on a Windows machine

1. Run **vcvars32.bat** at the command prompt. In the example below, vcvars32.bat is located in *C:\Program Files\Microsoft Visual Studio 8\VC\bin*.



2. If you ran vcvars32.bat successfully, the command prompt should look like this:



3. Navigate to *C:\... \TestPosixSocketClient* in the same command prompt window. In the example below, TestPosixSocketClient is located in the *C:\IB_API_963*.

4. Type **nmake -f Makefile.win** at the command prompt.

5. Now run the POSIX sample application by running **PosixSocketClientTest.exe** in the same *C:\...\TestPosixSocketClient* directory.

Reference

This chapter includes the following TWS API reference information:

API Message Codes

This section lists all of the API Error, System and Warning message codes and their descriptions.

Message codes shown below that end with a colon (:) display additional information.

Error Codes

Code	Description
100	Max rate of messages per second has been exceeded.
101	Max number of tickers has been reached.
102	Duplicate ticker ID.
103	Duplicate order ID.
104	Can't modify a filled order.
105	Order being modified does not match original order.
106	Can't transmit order ID:
107	Cannot transmit incomplete order.
109	Price is out of the range defined by the *Percentage* setting at order defaults frame. The order will not be transmitted.
110	The price does not conform to the minimum price variation for this contract.
111	The TIF (Tif type) and the order type are incompatible.
113	The Tif option should be set to DAY for MOC and LOC orders.
114	Relative orders are valid for stocks only.
115	Relative orders for US stocks can only be submitted to SMART, SMART_ECN, INSTINET, or PRIMEX.
116	The order cannot be transmitted to a dead exchange.
117	The block order size must be at least 50.
118	VWAP orders must be routed through the VWAP exchange.
119	Only VWAP orders may be placed on the VWAP exchange.
120	It is too late to place a VWAP order for today.
121	Invalid BD flag for the order. Check "Destination" and "BD" flag.
122	No request tag has been found for order:
123	No record is available for conid:
124	No market rule is available for conid:
125	Buy price must be the same as the best asking price.
126	Sell price must be the same as the best bidding price.

Code	Description
129	VWAP orders must be submitted at least three minutes before the start time.
131	The sweep-to-fill flag and display size are only valid for US stocks routed through SMART, and will be ignored.
132	This order cannot be transmitted without a clearing account.
133	Submit new order failed.
134	Modify order failed.
135	Can't find order with ID =
136	This order cannot be cancelled.
137	VWAP orders can only be cancelled up to three minutes before the start time.
138	Could not parse ticker request:
139	Parsing error:
140	The size value should be an integer:
141	The price value should be a double:
142	Institutional customer account does not have account info
143	Requested ID is not an integer number.
144	Order size does not match total share allocation. To adjust the share allocation, right-click on the order and select “Modify > Share Allocation.”
145	Error in validating entry fields -
146	Invalid trigger method.
147	The conditional contract info is incomplete.
148	A conditional order can only be submitted when the order type is set to limit or market.
151	This order cannot be transmitted without a user name.
152	The "hidden" order attribute may not be specified for this order.
153	EFPs can only be limit orders.
154	Orders cannot be transmitted for a halted security.
155	A sizeOp order must have a username and account.
156	A SizeOp order must go to IBSX
157	An order can be EITHER Iceberg or Discretionary. Please remove either the Discretionary amount or the Display size.
158	You must specify an offset amount or a percent offset value.
159	The percent offset value must be between 0% and 100%.
160	The size value cannot be zero.

Code	Description
161	Cancel attempted when order is not in a cancellable state. Order permId =
162	Historical market data Service error message.
163	The price specified would violate the percentage constraint specified in the default order settings.
164	There is no market data to check price percent violations.
165	Historical market Data Service query message.
166	HMDS Expired Contract Violation.
167	VWAP order time must be in the future.
168	Discretionary amount does not conform to the minimum price variation for this contract.

Code	Description
200	No security definition has been found for the request.
201	Order rejected - Reason:
202	Order cancelled - Reason:
203	The security <security> is not available or allowed for this account.

Code	Description
300	Can't find EId with ticker Id:
301	Invalid ticker action:
302	Error parsing stop ticker string:
303	Invalid action:
304	Invalid account value action:
305	Request parsing error, the request has been ignored.
306	Error processing DDE request:
307	Invalid request topic:
308	Unable to create the 'API' page in TWS as the maximum number of pages already exists.
309	Max number (3) of market depth requests has been reached. **Note:** TWS currently limits users to a maximum of 3 distinct market depth requests. This same restriction applies to API clients, however API clients may make multiple market depth requests for the same security.

310	Can't find the subscribed market depth with tickerId:
311	The origin is invalid.
312	The combo details are invalid.
313	The combo details for leg '<leg number>' are invalid.
314	Security type 'BAG' requires combo leg details.
315	Stock combo legs are restricted to SMART order routing.
316	Market depth data has been HALTED. Please re-subscribe.
317	Market depth data has been RESET. Please empty deep book contents before applying any new entries.
319	Invalid log level <log level>
320	Server error when reading an API client request.
321	Server error when validating an API client request.
322	Server error when processing an API client request. If you get this error when submitting a reqAccountSummary() request, unsubscribe from one reqAccountSummary() request and then resubmit the request. reqAccountSummary() only allows two concurrent requests.
323	Server error: cause - %s
324	Server error when reading a DDE client request (missing information).
325	Discretionary orders are not supported for this combination of exchange and order type.
326	Unable to connect as the client id is already in use. Retry with a unique client id.
327	Only API connections with clientId set to 0 can set the auto bind TWS orders property.
328	Trailing stop orders can be attached to limit or stop-limit orders only.
329	Order modify failed. Cannot change to the new order type.
330	Only FA or STL customers can request managed accounts list.
331	Internal error. FA or STL does not have any managed accounts.
332	The account codes for the order profile are invalid.
333	Invalid share allocation syntax.
334	Invalid Good Till Date order
335	Invalid delta: The delta must be between 0 and 100.

336	The time or time zone is invalid. The correct format is hh:mm:ss xxx where xxx is an optionally specified time-zone. E.g.: 15:59:00 EST Note that there is a space between the time and the time zone. If no time zone is specified, local time is assumed.
337	The date, time, or time-zone entered is invalid. The correct format is yyyymmdd hh:mm:ss xxx where yyyymmdd and xxx are optional. E.g.: 20031126 15:59:00 EST Note that there is a space between the date and time, and between the time and time-zone. If no date is specified, current date is assumed. If no time-zone is specified, local time-zone is assumed.
338	Good After Time orders are currently disabled on this exchange.
339	Futures spread are no longer supported. Please use combos instead.
340	Invalid improvement amount for box auction strategy.
341	Invalid delta. Valid values are from 1 to 100. You can set the delta from the "Pegged to Stock" section of the Order Ticket Panel, or by selecting Page/Layout from the main menu and adding the Delta column.
342	Pegged order is not supported on this exchange.
343	The date, time, or time-zone entered is invalid. The correct format is yyyymmdd hh:mm:ss xxx where yyyymmdd and xxx are optional. E.g.: 20031126 15:59:00 EST Note that there is a space between the date and time, and between the time and time-zone. If no date is specified, current date is assumed. If no time-zone is specified, local time-zone is assumed.
344	The account logged into is not a financial advisor account.
345	Generic combo is not supported for FA advisor account.
346	Not an institutional account or an away clearing account.
347	Short sale slot value must be 1 (broker holds shares) or 2 (delivered from elsewhere).
348	Order not a short sale -- type must be SSHORT to specify short sale slot.
349	Generic combo does not support "Good After" attribute.
350	Minimum quantity is not supported for best combo order.

351	The "Regular Trading Hours only" flag is not valid for this order.
352	Short sale slot value of 2 (delivered from elsewhere) requires location.
353	Short sale slot value of 1 requires no location be specified.
354	Not subscribed to requested market data.
355	Order size does not conform to market rule.
356	Smart-combo order does not support OCA group.
357	Your client version is out of date.
358	Smart combo child order not supported.
359	Combo order only supports reduce on fill without block(OCA).
360	No whatif check support for smart combo order.
361	Invalid trigger price.
362	Invalid adjusted stop price.
363	Invalid adjusted stop limit price.
364	Invalid adjusted trailing amount.
365	No scanner subscription found for ticker id:
366	No historical data query found for ticker id:
367	Volatility type if set must be 1 or 2 for VOL orders. Do not set it for other order types.
368	Reference Price Type must be 1 or 2 for dynamic volatility management. Do not set it for non-VOL orders.
369	Volatility orders are only valid for US options.
370	Dynamic Volatility orders must be SMART routed, or trade on a Price Improvement Exchange.
371	VOL order requires positive floating point value for volatility. Do not set it for other order types.
372	Cannot set dynamic VOL attribute on non-VOL order.
373	Can only set stock range attribute on VOL or RELATIVE TO STOCK order.
374	If both are set, the lower stock range attribute must be less than the upper stock range attribute.
375	Stock range attributes cannot be negative.
376	The order is not eligible for continuous update. The option must trade on a cheap-to-reroute exchange.
377	Must specify valid delta hedge order aux. price.
378	Delta hedge order type requires delta hedge aux. price to be specified.

379	Delta hedge order type requires that no delta hedge aux. price be specified.
380	This order type is not allowed for delta hedge orders.
381	Your DDE.dll needs to be upgraded.
382	The price specified violates the number of ticks constraint specified in the default order settings.
383	The size specified violates the size constraint specified in the default order settings.
384	Invalid DDE array request.
385	Duplicate ticker ID for API scanner subscription.
386	Duplicate ticker ID for API historical data query.
387	Unsupported order type for this exchange and security type.
388	Order size is smaller than the minimum requirement.
389	Supplied routed order ID is not unique.
390	Supplied routed order ID is invalid.
391	The time or time-zone entered is invalid. The correct format is hh:mm:ss xxx where xxx is an optionally specified time-zone. E.g.: 15:59:00 EST. Note that there is a space between the time and the time zone. If no time zone is specified, local time is assumed.
392	Invalid order: contract expired.
393	Short sale slot may be specified for delta hedge orders only.
394	Invalid Process Time: must be integer number of milliseconds between 100 and 2000. Found:
395	Due to system problems, orders with OCA groups are currently not being accepted.
396	Due to system problems, application is currently accepting only Market and Limit orders for this contract.
397	Due to system problems, application is currently accepting only Market and Limit orders for this contract.
398	< > cannot be used as a condition trigger.
399	Order message error

Code	Description
400	Algo order error.
401	Length restriction.

402	Conditions are not allowed for this contract.
403	Invalid stop price.
404	Shares for this order are not immediately available for short sale. The order will be held while we attempt to locate the shares.
405	The child order quantity should be equivalent to the parent order size.
406	The currency < > is not allowed.
407	The symbol should contain valid non-unicode characters only.
408	Invalid scale order increment.
409	Invalid scale order. You must specify order component size.
410	Invalid subsequent component size for scale order.
411	The "Outside Regular Trading Hours" flag is not valid for this order.
412	The contract is not available for trading.
413	What-if order should have the transmit flag set to true.
414	Snapshot market data subscription is not applicable to generic ticks.
415	Wait until previous RFQ finishes and try again.
416	RFQ is not applicable for the contract. Order ID:
417	Invalid initial component size for scale order.
418	Invalid scale order profit offset.
419	Missing initial component size for scale order.
420	Invalid real-time query.
421	Invalid route.
422	The account and clearing attributes on this order may not be changed.
423	Cross order RFQ has been expired. THI committed size is no longer available. Please open order dialog and verify liquidity allocation.
424	FA Order requires allocation to be specified.
425	FA Order requires per-account manual allocations because there is no common clearing instruction. Please use order dialog Adviser tab to enter the allocation.
426	None of the accounts have enough shares.
427	Mutual Fund order requires monetary value to be specified.
428	Mutual Fund Sell order requires shares to be specified.
429	Delta neutral orders are only supported for combos (BAG security type).

430	We are sorry, but fundamentals data for the security specified is not available.
431	What to show field is missing or incorrect.
432	Commission must not be negative.
433	Invalid "Restore size after taking profit" for multiple account allocation scale order.
434	The order size cannot be zero.
435	You must specify an account.
436	You must specify an allocation (either a single account, group, or profile).
437	Order can have only one flag Outside RTH or Allow PreOpen.
438	The application is now locked.
439	Order processing failed. Algorithm definition not found.
440	Order modify failed. Algorithm cannot be modified.
441	Algo attributes validation failed:
442	Specified algorithm is not allowed for this order.
443	Order processing failed. Unknown algo attribute.
444	Volatility Combo order is not yet acknowledged. Cannot submit changes at this time.
445	The RFQ for this order is no longer valid.
446	Missing scale order profit offset.
447	Missing scale price adjustment amount or interval.
448	Invalid scale price adjustment interval.
449	Unexpected scale price adjustment amount or interval.
40	Dividend schedule query failed.

Code	Description
501	Already connected.
502	Couldn't connect to TWS. Confirm that API is enabled in TWS via the Configure>API menu command.
503	Your version of TWS is out of date and must be upgraded.
504	Not connected.
505	Fatal error: Unknown message id.
506	Unsupported version. For Java clients only.
507	Bad message length. For Java clients only.
508	Bad message. For Java clients only.

510	Request market data - sending error:
511	Cancel market data - sending error:
512	Order - sending error:
513	Account update request - sending error:
514	Request for executions - sending error:
515	Cancel order - sending error:
516	Request open order - sending error:
517	Unknown contract. Verify the contract details supplied.
518	Request contract data - sending error:
519	Request market depth - sending error:
520	Cancel market depth - sending error:
521	Set server log level - sending error:
522	FA Information Request - sending error:
523	FA Information Replace - sending error:
524	Request Scanner subscription - sending error:
525	Cancel Scanner subscription - sending error:
526	Request Scanner parameter - sending error:
527	Request Historical data - sending error:
528	Cancel Historical data - sending error:
529	Request real-time bar data - sending error:
530	Cancel real-time bar data - sending error:
531	Request Current Time - Sending error:

Code	Description
10000	Cross currency combo error.
10001	Cross currency vol error.
10002	Invalid non-guaranteed legs.
10003	IBSX not allowed.
10005	Read-only models.
10006	Missing parent order.
10007	Invalid hedge type.
10008	Invalid beta value.
10009	Invalid hedge ratio.
10010	Invalid delta hedge order.

10011	Currency is not supported for Smart combo.
10012	Invalid allocation percentage
10013	Smart routing API error (Smart routing opt-out required).
10014	PctChange limits.
10015	Trading is not allowed in the API.
10016	Contract is not visible.
10017	Contracts are not visible.
10018	Orders use EV warning.
10019	Trades use EV warning.
10020	Display size should be smaller than order size.
10021	Invalid leg2 to Mkt Offset API.
10022	Invalid Leg Prio API.
10023	Invalid combo display size API.
10024	Invalid don't start next legin API.
10025	Invalid leg2 to Mkt time1 API.
10026	Invalid leg2 to Mkt time2 API.
10027	Invalid combo routing tag API.

System Message Codes

Code	Description
1100	Connectivity between IB and TWS has been lost.
1101	Connectivity between IB and TWS has been restored-data lost.*
1102	Connectivity between IB and TWS has been restored-data maintained.
1300	TWS socket port has been reset and this connection is being dropped. Please reconnect on the new port - <port_num>
*Market and account data subscription requests must be resubmitted	

Warning Message Codes

Code	Description
2100	New account data requested from TWS. API client has been unsubscribed from account data.
2101	Unable to subscribe to account as the following clients are subscribed to a different account.
2102	Unable to modify this order as it is still being processed.
2103	A market data farm is disconnected.

2104	A market data farm is connected.
2105	A historical data farm is disconnected.
2106	A historical data farm is connected.
2107	A historical data farm connection has become inactive but should be available upon demand.
2108	A market data farm connection has become inactive but should be available upon demand.
2109	Order Event Warning: Attribute “Outside Regular Trading Hours” is ignored based on the order type and destination. PlaceOrder is now processed.
2110	Connectivity between TWS and server is broken. It will be restored automatically.

Historical Data Limitations

Historical data requests are subject to the following limitations:

- Historical data requests that use a bar size below 30 seconds can only go back six months.
- Historical data requests can go back one full calendar year or more, depending on the number of concurrent real-time market data lines:

Number of Market Data Lines	Historical Data Request Limit
Less than 499	One year
500 - 749	Two years
750 - 999	Three years
1000	Four years

Market data lines can be increased based on monthly commission amounts, amount of equity and Quote Booster subscriptions.

- For more information on how market data is affected by commissions and equity, see the second-to-the-last Note (the long note with the examples) at the bottom of the Market Data page on our website.
- For more information on Quote Boosters, see the Quote Boosters page on our website. You subscribe to Quote Boosters on the Market Data Subscriptions page in Account Management.

Pacing Violations

All of the API technologies support historical data requests. However, requesting the same historical data in a short period of time can cause extra load on the backend and subsequently cause pacing violations. The error code and message that indicates a pacing violation is:

162 - Historical Market Data Service error message: Historical data request pacing violation

The following conditions can cause a pacing violation:

- Making identical historical data requests within 15 seconds;
- Making six or more historical data requests for the same Contract, Exchange and Tick Type within two seconds.

Also, observe the following limitation when requesting historical data:

- Do not make more than 60 historical data requests in any ten-minute period.
- If the whatToShow parameter in reqHistoricalData() is set to BID_ASK, then this counts as two requests and we will call BID and ASK historical data separately.

Note: For more information about historical data requests, see Viewing Historical Data in the DDE for Excel chapter, reqHistoricalDataEx() in the ActiveX chapter, reqHistoricalData() in the C++ chapter, and reqHistoricalData() in the Java chapter.

Minimum Bar Size Settings for Historical Data Requests

The following table lists the minimum bar size settings for API historical data requests.

Duration	Minimum Bar Size
1 min	1 second
5 mins	1 second
15 mins	1 second
1 hour	5 seconds
2 hours	5 seconds
4 hours	10 seconds
1 day	30 seconds
2 days	1 minute
1 week	10 minutes
2 weeks	15 minutes
1 month	30 minutes
3 months	1 day
Everything else	1 day

Valid Duration and Bar Size Settings for Historical Data Requests

The following table lists the minimum bar size settings for API historical data requests.

The following table lists valid duration and bar size settings for API historical data requests. Please note that these are only guidelines.

Duration	Bar Size
1 Y	1 day
6 M	1 day
3 M	1 day
1 M	1 day, 1 hour
1 W	1 day, 1 hour, 30 mins, 15 mins
2 D	1 hour, 30 mins, 15 mins, 3 mins, 2 mins, 1 min
1 D	1 hour, 30 mins, 15 mins, 5 mins, 3 mins, 2 mins, 1 min, 30 secs
14400 S (4 hrs)	1 hour, 30 mins, 15 mins, 5 mins, 3 mins, 2 mins, 1 min, 30 secs, 15 secs
7200 S (2 hrs)	1 hour, 30 mins, 15 mins, 5mins, 3 mins, 2 mins, 1 min, 30 secs, 15 secs, 5 secs

Duration	Bar Size
3600 S (1 hr)	15 mins, 5 mins, 3 mins, 2 mins, 1 min, 30 secs, 15 secs, 5 secs,
1800 S (30 mins)	15 mins, 5 mins, 3 mins, 2 mins, 1 min, 30 secs, 15 secs, 5 secs, 1 secs
960 S (15 mins.)	5 mins, 3 mins, 2 mins, 1 min, 30 secs, 15 secs, 5 secs, 1 secs
300 S (5 mins)	3 mins, 2 mins, 1 min, 30 secs, 15 secs, 5 secs, 1 secs
60 S (1 min)	30 secs, 15 secs, 5 secs, 1 secs

Tick Types

The following table lists all possible values for the tickType parameter, which is used in the following ActiveX events, C++ EWrapper functions, and Java EWrapper methods:

- tickPrice()
- tickSize()
- tickOptionComputation()
- tickGeneric()
- tickString()
- tickEFP

Tick Value	Description	Event/Function/Method
-1	Not applicable.	--
0	BID_SIZE	tickSize()
1	BID_PRICE	tickPrice()
2	ASK_PRICE	tickPrice()
3	ASK_SIZE	tickSize()
4	LAST_PRICE	tickPrice()
5	LAST_SIZE	tickSize()
6	HIGH	tickPrice()
7	LOW	tickPrice()
8	VOLUME	tickSize()
9	CLOSE_PRICE	tickPrice()
10	BID_OPTION_COMPUTATION	tickOptionComputation() See Note 1 below
11	ASK_OPTION_COMPUTATION	tickOptionComputation() See Note 1 below
12	LAST_OPTION_COMPUTATION	tickOptionComputation() See Note 1 below
13	MODEL_OPTION_COMPUTATION	tickOptionComputation() See Note 1 below
14	OPEN_TICK	tickPrice()
15	LOW_13_WEEK	tickPrice()
16	HIGH_13_WEEK	tickPrice()
17	LOW_26_WEEK	tickPrice()
18	HIGH_26_WEEK	tickPrice()

Tick Value	Description	Event/Function/Method
19	LOW_52_WEEK	tickPrice()
20	HIGH_52_WEEK	tickPrice()
21	AVG_VOLUME	tickSize()
22	OPEN_INTEREST	tickSize()
23	OPTION_HISTORICAL_VOL	tickGeneric()
24	OPTION_IMPLIED_VOL	tickGeneric()
25	OPTION_BID_EXCH	NOT USED
26	OPTION_ASK_EXCH	NOT USED
27	OPTION_CALL_OPEN_INTEREST	tickSize()
28	OPTION_PUT_OPEN_INTEREST	tickSize()
29	OPTION_CALL_VOLUME	tickSize()
30	OPTION_PUT_VOLUME	tickSize()
31	INDEX_FUTURE_PREMIUM	tickGeneric()
32	BID_EXCH	tickString()
33	ASK_EXCH	tickString()
34	AUCTION_VOLUME	tickSize()
35	AUCTION_PRICE	tickPrice()
36	AUCTION_IMBALANCE	tickSize()
37	MARK_PRICE	tickPrice()
38	BID_EFP_COMPUTATION	tickEFP()
39	ASK_EFP_COMPUTATION	tickEFP()
40	LAST_EFP_COMPUTATION	tickEFP()
41	OPEN_EFP_COMPUTATION	tickEFP()
42	HIGH_EFP_COMPUTATION	tickEFP()
43	LOW_EFP_COMPUTATION	tickEFP()
44	CLOSE_EFP_COMPUTATION	tickEFP()
45	LAST_TIMESTAMP	tickString()
46	SHORTABLE	tickString()
47	FUNDAMENTAL_RATIOS	tickString()
48	RT_VOLUME	tickString()
49	HALTED	See Note 2 below.
50	BIDYIELD	tickPrice() See Note 3 below
51	ASKYIELD	tickPrice() See Note 3 below

Tick Value	Description	Event/Function/Method
52	LASTYIELD	tickPrice() See Note 3 below
53	CUST_OPTION_COMPUTATION	tickOptionComputation()
54	TRADE_COUNT	tickGeneric()
55	TRADE_RATE	tickGeneric()
56	VOLUME_RATE	tickGeneric()

1. Tick types BID_OPTION_COMPUTATION, ASK_OPTION_COMPUTATION, LAST_OPTION_ COMPUTATION, and MODEL_OPTION_COMPUTATION return all Greeks (delta, gamma, vega, theta), the underlying price and the stock and option reference price when requested. MODEL_OPTION_COMPUTATION also returns model implied volatility.
2. Prior to TWS Version 939, when trading is halted for a contract, TWS receives a special tick: haltedLast=1. When trading is resumed, TWS receives haltedLast=0. A tick type, HALTED, tick ID = 49, is available in regular market data via the API to indicate this halted state. Possible values for this tick type are:

   0 = Not halted
   1 = Halted.

   Beginning with TWS Version 939, possible values for the HALTED tick type are:

   0 = Not halted
   1 = General halt (trading halt is imposed for purely regulatory reasons) with/without volatility halt.
   2 = Volatility only halt (trading halt is imposed by the exchange to protect against extreme volatility).
3. Applies to bond contracts only.

Generic Tick Types

For all socket-based API technologies, including the socket client library, ActiveX and Java, we provide several types of market data ticks that can be requested as a part of the market data request.

Starting with API version 9.0 (client version 30), version 6 of the REQ_MKT_DATA message is sent containing a new field that specifies the requested ticks as a list of comma-delimited integer Ids (generic tick types). Requests for these ticks will be answered if the tick type requested pertains to the contract at issue.

Note that Generic Tick Tags cannot be specified if you elect to use the Snapshot market data subscription.

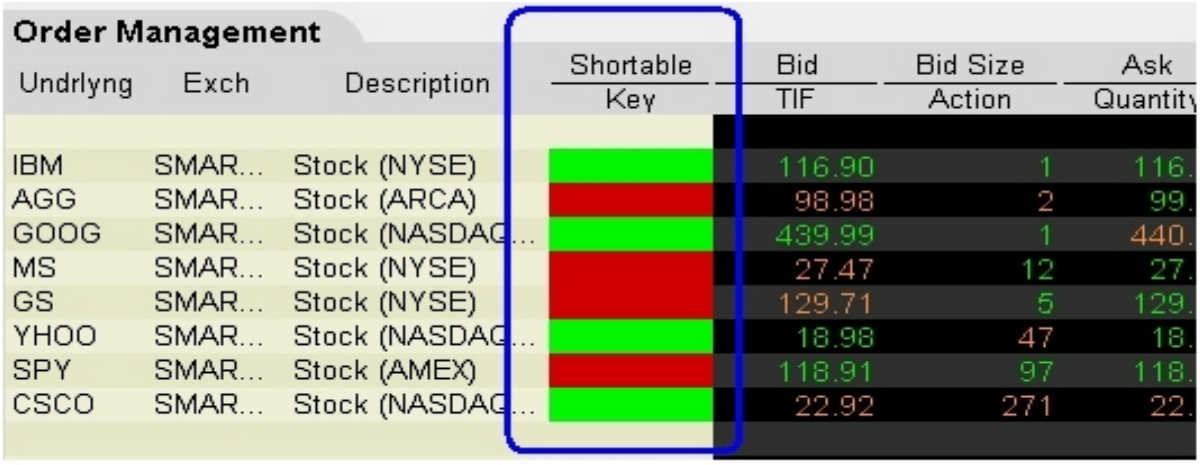
The generic market data tick types are:

Integer ID Value	Tick Type	Resulting Tick Value
100	Option Volume (currently for stocks)	29, 30
101	Option Open Interest (currently for stocks)	27, 28
104	Historical Volatility (currently for stocks)	23
106	Option Implied Volatility (currently for stocks)	24
162	Index Future Premium	31
165	Miscellaneous Stats	15, 16, 17, 18, 19, 20, 21
221	Mark Price (used in TWS P&L computations)	37
225	Auction values (volume, price and imbalance)	34, 35, 36
233	RTVolume - contains the last trade price, last trade size, last trade time, total volume, VWAP, and single trade flag.	48
236	Shortable	46
256	Inventory	
258	Fundamental Ratios	47

Integer ID Value	Tick Type	Resulting Tick Value
292	Receive top news for underlying contracts from TWS for news feeds to which you have subscribed (in Account Management). Use secType = NEWS in the Contract object. See Requesting News for examples. You will receive at least one news tick regardless of its timeliness (it could be new or it could be weeks old). Some news providers limit us to maximum news retention of 30 days, so those limitations may affect which news you see. Otherwise you will receive a maximum of five of the most recent news items in the last 24 hours, and you will receive additional news items as they come in.	62
411	Realtime Historical Volatility	58
456	IBDividends	59

Using the SHORTABLE Tick

In TWS, there is a SHORTABLE column, as shown below. The column describes number of shares with which the security can be sold short.



The color GREEN indicates that at least 1000 shares are available to sell short. DARK GREEN indicates that this contract can be sold short but that at the moment there are no shares available for short sale, and that the system is searching for shares. RED indicates that no shares are available for short sale.

With API 9.30 or higher, the shorting indicator is supported for all socket connections. The functionality equates to the SHORTABLE column in the TWS workstation.

When invoking the reqMktDataEx()/reqMktData() methods, you must include generic ticktype 236 in the argument to obtain the shortable value. For example:

The Shortable tick determines if SHORT SELL orders for a contract will be accepted. Analyze the value returned from tickGeneric(int tickerId, int tickType, double value) as follows:

```
if (value > 2.5) { // 3.0
// There are at least 1000 shares available for a short sale
// In TWS, this is identical to GREEN status
}
else if (value > 1.5) { // 2.0
// This contract will be available for short sale if shares can be    // located
// In TWS, this is identical to DARK GREEN status
}
else if (value > 0.5) { // 1.0
// Not available for short sale
// In TWS, this is identical to RED status
}
else {
// unknown value
}
```

Note: This feature is supported as of server version 33 (872 release of TWS).

TAG Values for FUNDAMENTAL_RATIOS tickType

The FUNDAMENTAL_RATIOS tickType (Tick Value 47) lets you request fundamental ratios in the form TAG-G=VALUE, TAG2=VALUE2, and so on. This ratios are sent using the tickGeneric() callback. The following table lists all the TAG values for FUNDAMENTAL_RATIOS.

TAG	Description
NPRICE	**Closing Price** This is the closing price for the issue from the day it last traded. It is also referred to as the Current Price. Note that some issues may not trade every day, and therefore it is possible for this price to come from a date prior to the last business day.
Three_Year_ TTM_ Growth	3 year trailing twelve months growth.
TTM_over_TTM	Trailing twelve months over trailing twelve months.
NHIG	**High Price** This price is the highest price the stock traded at in the last 12 months. This could be an intra-day high.
NLOW	**Low Price** This price is the lowest price the stock traded at in the last 12 months. This could be an intra-day low.
PDATE	**Pricing date** The pricing date is the date at which the issue was last priced.
VOL10DAVG	**Volume** This is the daily average of the cumulative trading volume for the last ten days.

TAG	Description
MKTCAP	**Market capitalization** This value is calculated by multiplying the current Price by the current number of shares outstanding.
TTMEPSXCLX	**EPS excluding extraordinary items** This is the Adjusted Income Available to Common Stockholders for the trailing twelve months divided by the trailing twelve month Diluted Weighted Average Shares Outstanding.
AEPSNORM	**EPS Normalized** This is the Normalized Income Available to Common Stockholders for the most recent annual period divided by the same period's Diluted Weighted Average Shares Outstanding.
TTMREVPS	**Revenue/share** This value is the trailing twelve month Total Revenue divided by the Average Diluted Shares Outstanding for the trailing twelve months. **Note:** Most banks and insurance companies do not report revenues when they announce their preliminary quarterly financial results in the press. When this happens, the trailing twelve month values will not be available (NA).
QBVPS	**Book value (Common Equity) per share** This is defined as the Common Shareholder's Equity divided by the Shares Outstanding at the end of the most recent interim period. Book Value is the Total Shareholder's Equity minus Preferred Stock and Redeemable Preferred Stock.
QTANBVPS	**Book value (tangible) per share** This is the interim Tangible Book Value divided by the Shares Outstanding at the end of the most recent interim period. Tangible Book Value is the Book Value minus Goodwill and Intangible Assets for the same period.
QCSHPS	**Cash per share** This is the Total Cash plus Short Term Investments divided by the Shares Outstanding at the end of the most recent interim period. **Note:** This does NOT include cash equivalents that may be reported under long term assets.
TTMCFSHR	**Cash Flow per share** This value is the trailing twelve month Cash Flow divided by the trailing twelve month Average Shares Outstanding. Cash Flow is defined as the sum of Income After Taxes minus Preferred Dividends and General Partner Distributions plus Depreciation, Depletion and Amortization.

TAG	Description
TTMDIVSHR	**Dividends per share** This is the sum of the Cash Dividends per share paid to common stockholders during the last trailing twelve month period.
IAD	**Dividend rate** This value is the total of the expected dividend payments over the next twelve months. It is generally the most recent cash dividend paid or declared multiplied by the dividend payment frequency, plus any recurring extra dividends.
PEEXCLXOR	**P/E excluding extraordinary items** This ratio is calculated by dividing the current Price by the sum of the Diluted Earnings Per Share from continuing operations BEFORE Extraordinary Items and Accounting Changes over the last four interim periods.
APENORM	**P/E Normalized** This is the Current Price divided by the latest annual Normalized Earnings Per Share value.
TMPR2REV	**Price to sales** This is the current Price divided by the Sales Per Share for the trailing twelve months. If there is a preliminary earnings announcement for an interim period that has recently ended, the revenue (sales) values from this announcement will be used in calculating the trailing twelve month revenue per share. NOTE: Most Banks and Finance companies do not report revenues when they announce their preliminary interim financial results in the press. When this happens, the trailing twelve month values will not be available (NA) until the complete interim filing is released.
PR2TANBK	**Price to Tangible Book** This is the Current Price divided by the latest annual Tangible Book Value Per Share. Tangible Book Value Per Share is defined as Book Value minus Goodwill and Intangible Assets divided by the Shares Outstanding at the end of the fiscal period.
TTMPRCFPS	**Price to Cash Flow per share** This is the current Price divided by Cash Flow Per Share for the trailing twelve months. Cash Flow is defined as Income After Taxes minus Preferred Dividends and General Partner Distributions plus Depreciation, Depletion and Amortization.
PRICE2BK	**Price to Book** This is the Current Price divided by the latest interim period Book Value Per Share.

TAG	Description
QCURRATIO	**Current ratio** This is the ratio of Total Current Assets for the most recent interim period divided by Total Current Liabilities for the same period. NOTE: This item is Not Available (NA) for Banks, Insurance companies and other companies that do not distinguish between current and long term assets and liabilities.
QQUICKRATI	**Quick ratio** Also known as the Acid Test Ratio, this ratio is defined as Cash plus Short Term Investments plus Accounts Receivable for the most recent interim period divided by the Total Current Liabilities for the same period. NOTE: This item is Not Available (NA) for Banks, Insurance companies and other companies that do not distinguish between current and long term assets and liabilities.
QLTD2EQ	**LT debt/equity** This ratio is the Total Long Term Debt for the most recent interim period divided by Total Shareholder Equity for the same period.
QTOTD2EQ	**Total debt/total equity** This ratio is Total Debt for the most recent interim period divided by Total Shareholder Equity for the same period. NOTE: This is Not Meaningful (NM) for banks.
TTMPAYRAT	**Payout ratio** This ratio is the percentage of the Primary/Basic Earnings Per Share Excluding Extraordinary Items paid to common stockholders in the form of cash dividends during the trailing twelve months.
TTMREV	**Revenue** This is the sum of all revenue (sales) reported for all operating divisions for the most recent TTM period. NOTE: Most banks and Insurance companies do not report revenues when they announce their preliminary quarterly financial results in the press. When this happens, the quarterly value will not be available (NA).
TTMEBITD	**EBITD** Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA) is EBIT for the trailing twelve months plus the same period's Depreciation and Amortization expenses (from the Statement of Cash Flows). NOTE: This item is only available for Industrial and Utility companies.
TTMEBT	**Earnings before taxes** Also known as Pretax Income and Earnings Before Taxes, this is Total Revenue for the most recent TTM period minus Total Expenses plus Non-operating Income (Expenses) for the same period.

TAG	Description
TTMNIAC	**Net Income available to common** This is the trailing twelve month dollar amount accruing to common shareholders for dividends and retained earnings. Income Available to Common Shareholders is calculated as trailing twelve month Income After Taxes plus Minority Interest and Equity in Affiliates plus Preferred Dividends, General Partner Distributions and US GAAP Adjustments. NOTE: Any adjustment that is negative (ie. Preferred Stock Dividends) would be subtracted from Income After Taxes.
AEBTNORM	**Earnings before taxes Normalized** This is the Income Before Tax number excluding the impact of all unusual/one-time/special charges items for the most recent annual period.
ANIACNORM	**Net Income Available to Common, Normalized** This is the annual dollar amount accruing to common shareholders for dividends and retained earnings excluding the impact of all unusual/one-time/special charges items.
TTMGROSMGN	**Gross Margin** This value measures the percent of revenue left after paying all direct production expenses. It is calculated as the trailing 12 months Total Revenue minus the trailing 12 months Cost of Goods Sold divided by the trailing 12 months Total Revenue and multiplied by 100. NOTE: This item is only available for Industrial and Utility companies.
TTMNPMGN	**Net Profit Margin %** Also known as Return on Sales, this value is the Income After Taxes for the trailing twelve months divided by Total Revenue for the same period and is expressed as a percentage. NOTE: Most Banks and Finance companies do not report revenues when they announce their preliminary quarterly financial results in the press. When this happens, the trailing twelve month value will not be available (NA).
TTMOPMGN	**Operating margin** This value measures the percent of revenues remaining after paying all operating expenses. It is calculated as the trailing 12 months Operating Income divided by the trailing 12 months Total Revenue, multiplied by 100. Operating Income is defined as Total Revenue minus Total Operating Expenses.
APTMGNPCT	**Pretax margin** This value represents Income Before Taxes for the most recent fiscal year expressed as a percent of Total Revenue for the most recent fiscal year.
TTMROAPCT	**Return on average assets** This value is the Income After Taxes for the trailing twelve months divided by the Average Total Assets, expressed as a percentage. Average Total Assets is calculated by adding the Total Assets for the 5 most recent quarters and dividing by 5.

TAG	Description
TTMROEPCT	**Return on average equity** This value is the Income Available to Common Stockholders for the trailing twelve months divided by the Average Common Equity and is expressed as a percentage. Average Common Equity is calculated by adding the Common Equity for the 5 most recent quarters and dividing by 5.
TTMROIPCT	**Return on investment** This value is the trailing twelve month Income After Taxes divided by the average Total Long Term Debt, Other Long Term Liabilities and Shareholders Equity, expressed as a percentage.
REVCHNGYR	**Revenue Change %** This value is calculated as the most recent interim period Sales minus the Sales for the same interim period 1 year ago divided by the Sales for the same interim period one year ago, multiplied by 100.
TTMREVCHG	**Revenue Change %** This is the percent change in the trailing twelve month Sales as compared to the same trailing twelve month period one year ago. It is calculated as the trailing twelve month Sales minus the trailing twelve month Sales one year ago divided by the trailing twelve month Sales one year ago, multiplied by 100.
REVTRENDGR	**Revenue growth rate** The Five Year Revenue Growth Rate is the annual compounded growth rate of Revenues over the last 5 years.
EPSCHNGYR	**EPS Change %** This value is calculated as the most recent interim period EPS minus the EPS for the same interim period 1 year ago divided by the EPS for the same interim period one year ago, multiplied by 100. NOTE: EPS must be positive for both periods. If either EPS value is negative, the result in Not Meaningful (NM).
TTMEPSCHG	**EPS Change %** This is the percent change in the trailing twelve month EPS as compared to the same trailing twelve month period one year ago. It is calculated as the trailing twelve month EPS minus the trailing twelve month EPS one year ago divided by the trailing twelve month EPS one year ago, multiplied by 100. NOTE: If either value has a negative value, the resulting value will be Not Meaningful (NM).
EPSTRENDGR	**EPS growth rate** This growth rate is the compound annual growth rate of Earnings Per Share Excluding Extraordinary Items and Discontinued Operations over the last 5 years. NOTE: If the value for either the most recent year or the oldest year is zero or negative, the growth rate cannot be calculated and a 'NA' (Not Available) code will be used.

TAG	Description
DIVGRPCT	**Growth rate % - dividend** The Dividend Growth Rate is the compound annual growth rate in dividends per share. DIVGR% is calculated for 3 years whenever 4 years of dividends are available.

IBDividends Tick Example

The IBDividends generic tick returns a comma-separated list of dividends in the following order:

1. sum of dividends for the past 12 months
2. sum of dividends for the next 12 months
3. next dividend date
4. next single dividend amount

Example

Here is an example of an IBDividends tick update for the symbol MSFT:

```
0.83,0.92,20130219,0.23
```

Where

```
0.83 = sum of dividends for the past 12 months
0.92 - sum of dividends for the next 12 months
20130219 - next dividend date
0.23 - next single dividend amount
```

RTVolume

RTVolume is one of the generic tick tags that can be requested as part of a market data request. RTVolume returns the following:

- Last trade price
- Last trade size
- Last trade time
- Total volume
- VWAP
- Single trade flag - True indicates the trade was filled by a single market maker; False indicates multiple market-makers helped fill the trade

RTVolume is the API equivalent to opening the Time and Sales Window in Trader Workstation and viewing the updates in real time. To implement this, you must include *233* in the genericTicklist parameter in your market data request.

You will receive the RTVolume update through the tickString() event within field value 48.

Example

Here is an example of the RTVolume formatting for AAPL:

```
RTVolume=701.28;1;1348075471534;67854;701.46918464;true
RTVolume=701.26;3;1348075476533;67857;701.46917554;false
RTVolume=701.27;3;1348075482034;67860;701.46916674;true
RTVolume=701.27;3;1348075482336;67863;701.46915809;false
RTVolume=701.25;1;1348075483534;67864;701.46915486;true
RTVolume=701.24;1;1348075487029;67865;701.46915151;true
RTVolume=701.25;1;1348075489787;67866;701.46914828;true
RTVolume=701.32;4;1348075490787;67870;701.46913949;true
RTVolume=701.32;2;1348075493802;67872;701.46913497;true
RTVolume=701.29;1;1348075494789;67873;701.46913233;true
```

Order Types and IBAlgos

This section includes the following topics:

Supported Order Types

IB's API technologies support the order types listed below.

API orders only mimic the behavior of Trader Workstation (TWS). Test each order type, ensuring that you can successfully submit each one in TWS, before you submit the same order using the API.

Order Type	Abbreviation
Limit	LMT
Limit Risk	
Bracket	
Market-to-Limit	MTL
Market with Protection	MKT PRT
Request for Quote	QUOTE
Stop	STP
Stop Limit	STP LMT
Trailing Limit if Touched	TRAIL LIT
Trailing Market If Touched	TRAIL MIT
Trailing Stop	TRAIL
Trailing Stop Limit	TRAIL LIMIT
Speed of Execution	
At Auction	
Discretionary	
Market	MKT
Market-if-Touched	MIT
Market-on-Close	MOC
Market-on-Open	MOO
Pegged-to-Market	PEG MKT
Relative	REL
Sweep-to-Fill	

Order Type	Abbreviation
Price Improvement	
Box Top	BOX TOP
Price Improvement Auction	
Block	
Limit-on-Close	LOC
Limit-on-Open	LOO
Limit if Touched	LIT
Pegged-to-Midpoint	PEG MID
Privacy	
Hidden	
Iceberg/Reserve	
VWAP - Guaranteed	VWAP
Time to Market	
All-or-None	
Fill-or-Kill	
Good-after-Time/Date	GAT
Good-till-Date/Time	GTD
Good-till-Canceled	GTC
Immediate-or-Cancel	IOC
Advanced Trading	
One-Cancels-All	OCA
Spreads	
Volatility	VOL
Algorithmic Trading (Algos)	
Arrival Price	
Balance Impact and Risk	
Minimize Impact	
Percent of volume	
Scale	
TWAP	
VWAP - Best Effort	
Accumulate/Distribute	
IBDARK	

IBAlgo Parameters

Beginning with TWS API Release 9.6, the ActiveX, C++ and Java APIs support the following IBAlgo orders for US Stocks and US Options:

US Stocks

- Arrival Price (ArrivalPx)
- Dark Ice (DarkIce)
- Percentage of Volume (PctVol)
- TWAP (Twap)
- VWAP (Vwap)

US Options

- Balance Impact and Risk (BalanceImpactRisk)
- Minimize Impact (MinImpact)

US Products

- Accumulate/Distribute (AD)

The following image lists all of the IBAlgo strategies and parameters supported by the API, except Accumulate/Distribute, which is documented in Accumulate/Distribute (AD).

	Corresponding Parameters									
	maxPctVol	pctVol	strategyType	startTime	endTime	allowPastEndTiime	noTakeLiq	riskAversion	forceCompletion	displaySize
Algo Strategy										
For US Stocks										
Arrival Price	X			X	X	X		X	X	
Dark Ice				X	X	X				X
Percentage of Volume		X		X	X		X			
TWAP			X	X	X	X				
VWAP	X			X	X		X			
For US Options										
Balance Impact and Risk	X							X	X	
Minimize Impact	X									

Arrival Price (ArrivalPx)

Parameter	Description	Syntax
maxPctVol	Maximum percentage	range: “0.01” – “0.5”
riskAversion	Urgency/Risk aversion	“Get Done”, “Aggressive”, “Neutral”, “Passive”
startTime	Start time	“9:00:00 EST”

Parameter	Description	Syntax
endTime	End time	“15:00:00 EST”
forceCompletion	Attempt completion by EOD	“0” or “1”
allowPastEndTime	Allow trading past end time	“0” or “1”

Arrival Price Java Code Example:

```
Contract m_contract = new Contract();
Order m_order = new Order();
Vector<TagValue> m_algoParams = new Vector<TagValue>();

/** Stocks */
m_contract.m_symbol = "MSFT";
m_contract.m_secType = "STK";
m_contract.m_exchange = "SMART";
m_contract.m_currency = "USD";

/** Arrival Price */
m_algoParams.add( new TagValue("maxPctVol","0.01") );
m_algoParams.add( new TagValue("riskAversion","Passive") );
m_algoParams.add( new TagValue("startTime","9:00:00 EST") );
m_algoParams.add( new TagValue("endTime","15:00:00 EST") );
m_algoParams.add( new TagValue("forceCompletion","0") );
m_algoParams.add( new TagValue("allowPastEndTime","1") );
m_order.m_action = "BUY";
m_order.m_totalQuantity = 1;
m_order.m_orderType = "LMT";
m_order.m_lmtPrice = 0.14
m_order.m_algoStrategy = "ArrivalPx";
m_order.m_algoParams = m_algoParams;
m_order.m_transmit = false;
m_client.placeOrder(40, m_contract, m_order);
```

For More Information...

- Arrival Price Algo

Dark Ice (DarkIce)

Parameter	Description	Syntax
displaySize	Display size	
startTime	Start time	“9:00:00 EST”
endTime	End time:	“15:00:00 EST”
allowPastEndTime	Allow trading past end time:	“0” or “1”

For More Information...

- Dark Ice Algo

Percentage of Volume (PctVol)

Parameter	Description	Syntax
pctVol	Percentage of volume	range: “0.01” – “0.5”
startTime	Start time	“9:00:00 EST”
endTime	End time	“15:00:00 EST”]
noTakeLiq	Attempt to never take liquidity	“0” or “1”

For More Information...

- Percentage of Volume Algo

TWAP (Twap)

Parameter	Description	Syntax
strategyType	Trade strategy	“Marketable”, “Matching Midpoint”, “Matching Same Side”, “Matching Last”
startTime	Start time	“9:00:00 EST”
endTime	End time	“15:00:00 EST”
allowPastEndTime	Allow trading past end time	“0” or “1”

For More Information...

- TWAP Algo

VWAP (Vwap)

Parameter	Description	Syntax
maxPctVol	Maximum percentage	range: “0.01” – “0.5”
startTime	Start time	“9:00:00 EST”
endTime	End time	“15:00:00 EST”
allowPastEndTime	Allow trading past end time	“0” or “1”
noTakeLiq	Attempt to never take liquidity	“0” or “1”

For More Information...

- VWAP Algo

Balance Impact and Risk (BalanceImpactRisk)

Parameters	Description	Syntax
maxPctVol	Maximum percentage	range: “0.01” – “0.5”
riskAversion	Urgency/Risk aversion	“Get Done”, “Aggressive”, “Neutral”, “Passive”
forceCompletion	Attempt completion by EOD	“0” or “1”
allowPastEndTime	Allow trading past end time	“0” or “1”

Balance Impact and Risk Java Code Example:

```
Contract m_contract = new Contract();

Order m_order = new Order();
```

```
Vector<TagValue> m_algoParams = new Vector<TagValue>();


/** Options */
m_contract.m_symbol = "C";
m_contract.m_secType = "OPT";
m_contract.m_exchange = "SMART";
m_contract.m_localSymbol = "C     110304C00004500";


/** Balance Impact and Risk (OPT) */
m_algoParams.add( new TagValue("maxPctVol","0.1") );
m_algoParams.add( new TagValue("riskAversion","Aggressive") );
m_algoParams.add( new TagValue("forceCompletion","1") );
m_order.m_action = "BUY";
m_order.m_totalQuantity = 1;
m_order.m_orderType = "LMT";
m_order.m_lmtPrice = 0.14;
m_order.m_algoStrategy = "BalanceImpactRisk";
m_order.m_algoParams = m_algoParams;
m_order.m_transmit = false;


m_client.placeOrder(45, m_contract, m_order);
```

For More Information...

- Balance Impact and Risk Algo

Minimize Impact (MinImpact)

Parameter	Description	Syntax
maxPctVol	Maximum percentage	range: “0.01” – “0.5”

For More Information...

- Minimize Impact

Accumulate/Distribute (AD)

Parameter	Description	Syntax
componentSize	Quantity of increment	Cannot exceed the amount of the initial order
timeBetweenOrders	Time interval	
randomizeTime20	Randomize time period by +/- 20%	"0" or "1"
randomizeSize55	Randomize size by +/- 55%	"0" or "1"
giveUp	Number associated with the clearing	
catchUp	Catch up in time:	"0" or "1"
waitForFill	Wait for current order to fill before submitting next order	"0" or "1"
startTime	Start time	“9:00:00 EST”
endTime	End time:	“15:00:00 EST”

Accumulate Distribute Java Code Example

```
Contract m_contract = newContract();

Order m_order = newOrder();

Vector<TagValue>m_algoParams = new Vector<TagValue>();


/** Stocks */

m_contract.m_symbol = "IBM";

m_contract.m_secType = "STK";

m_contract.m_exchange = "SMART";

m_contract.m_currency = "USD";


/** Accumulate/Distribute (All) */

m_algoParams.add(newTagValue("componentSize", "100"));

m_algoParams.add(newTagValue("timeBetweenOrders", "60"));

m_algoParams.add(newTagValue("randomizeTime20", "1"));

m_algoParams.add(newTagValue("randomizeSize55", "1"));

m_algoParams.add(newTagValue("giveUp", "1"));

m_algoParams.add(newTagValue("catchUp", "1"));

m_algoParams.add(newTagValue("waitForFill", "1"));

m_algoParams.add(newTagValue("startTime", "20110302-14:30:00 GMT"));
```

```
m_algoParams.add(newTagValue("endTime", "20110302-21:00:00 GMT"));


m_order.m_action = "BUY";
m_order.m_totalQuantity = 700;
m_order.m_orderType = "LMT";
m_order.m_lmtPrice = 140.0;
m_order.m_algoStrategy = "AD";
m_order.m_tif = "DAY";
m_order.m_algoParams = m_algoParams;
m_order.m_transmit = false;
m_client.placeOrder(orderId++, m_contract, m_order);
```

For More Information...

- Accumulate Distribute Order Type
- TWS Accumulate Distribute

CSFB Algo Parameters

The ActiveX, C++ and Java APIs support the following CSFB algo strategies:

- Crossfinder
- Float
- Guerilla
- Work It IW
- Work It
- Pathfinder
- Reserve
- Strike
- 10B 18
- Tex
- TWAP
- VWAP

The following image lists all of the CSFB algo strategies and parameters supported by the API.

	CSFB Algo Corresponding Parameters						
	Abbreviation	StartTime	EndTime	MinPctVolume	MaxPctVolume	DisplaySize	ExecutionStyle
Algo Strategy							
CrossFinder	CROS	X	X		X		X
Float	FLT	X				X	X
Guerilla	GRRL	X			X		X
Work It IW	INIW	X					
Work It	INLN	X	X	X	X		X
Path Finder	PTHF	X	X				
Reserve	RSRV	X				X	
Strike	SNPR	X				X	
10B 18	TENB	X	X		X		
Tex	TEX	X	X		X		X
TWAP	TWAP	X	X		X		
VWAP	VWAP	X	X		X		

Crossfinder (CROS)

Parameter	Description	Syntax
startTime	Start time	“9:00:00 EST”
endTime	End time:	“15:00:00 EST”
MaxPctVolume	Maximum percentage volume	range: “0” – “99”
ExecutionStyle	Execution style	"Normal", "Patient", "Aggressive"

Crossfinder (CROS) Java Code Sample

```
void onCrossFinderAlgo(){


Contract con = new Contract();
con.m_symbol = "IBM";
con.m_secType = "STK";
con.m_exchange = "CSFBALGO";
con.m_currency = "USD";


Vector<TagValue> m_algoParams = new Vector<TagValue>();
m_algoParams.add(new TagValue("StartTime", "13:30:00 EST"));
m_algoParams.add(new TagValue("EndTime", "14:30:00 EST"));
m_algoParams.add(new TagValue("MaxPctVolume", "25")); // Max % Volume
m_algoParams.add(new TagValue("ExecutionStyle", "Normal"));
//possible values for ExecutionStyle: Normal, Patient, Aggressive
```

```
Order order = new Order();
order.m_action = "BUY";
order.m_totalQuantity = 100;
order.m_orderType = "LMT";
order.m_lmtPrice = 200.0;
order.m_algoStrategy = "CROS";
order.m_algoParams = m_algoParams;
order.m_transmit = false;
m_client.placeOrder(globalOrderId++, con, order);

}
```

Float (FLT)

Parameter	Description	Syntax
startTime	Start time	“9:00:00 EST”
DisplaySize	Display size	“50” (integer)
ExecutionStyle	Execution style	"Normal", "Patient", "Aggressive"

Float (FLT) Java Code Sample

```
void onFloatCsfbAlgo(){
Contract con = new Contract();
con.m_symbol = "IBM";
con.m_secType = "STK";
con.m_exchange = "CSFBALGO";
con.m_currency = "USD";

Vector<TagValue> m_algoParams = new Vector<TagValue>();
m_algoParams.add(new TagValue("StartTime", "13:30:00 EST"));
m_algoParams.add(new TagValue("DisplaySize", "10")); //iceberg
m_algoParams.add(new TagValue("ExecutionStyle", "Normal"));
//possible values for ExecutionStyle: Normal, Patient, Aggressive
```

```
Order order = new Order();
order.m_action = "BUY";
order.m_totalQuantity = 100;
order.m_orderType = "LMT";
order.m_lmtPrice = 200.0;
order.m_algoStrategy = "FLT";
order.m_algoParams = m_algoParams;
order.m_transmit = false;
m_client.placeOrder(globalOrderId++, con, order);

}
```

Guerilla (GRRL)

Parameter	Description	Syntax
startTime	Start time	“9:00:00 EST”
MaxPctVolume	Maximum percentage volume	range: “0” – “99”
ExecutionStyle	Execution style	"Normal", "Patient", "Aggressive"

Guerilla (GRRL) Java Code Sample

```
void onGuerillaCsfbAlgo(){

Contract con = new Contract();
con.m_symbol = "IBM";
con.m_secType = "STK";
con.m_exchange = "CSFBALGO";
con.m_currency = "USD";

Vector<TagValue> m_algoParams = new Vector<TagValue>();
m_algoParams.add(new TagValue("StartTime", "13:30:00 EST"));
m_algoParams.add(new TagValue("MaxPctVolume", "25")); // Max % Volume
m_algoParams.add(new TagValue("ExecutionStyle", "Patient"));
//possible values for ExecutionStyle: Normal, Patient, Aggressive
```

```
Order order = new Order();
order.m_action = "BUY";
order.m_totalQuantity = 100;
order.m_orderType = "LMT";
order.m_lmtPrice = 200.0;
order.m_algoStrategy = "GRRL";
order.m_algoParams = m_algoParams;
order.m_transmit = false;
m_client.placeOrder(globalOrderId++, con, order);
}
```

Work It IW (INIW)

Parameter	Description	Syntax
startTime	Start time	“9:00:00 EST”

Work It IW (INIW) Java Code Sample

```
void onWorkItIwCsfbAlgo(){

Contract con = new Contract();
con.m_symbol = "IBM";
con.m_secType = "STK";
con.m_exchange = "CSFBALGO";
con.m_currency = "USD";

Vector<TagValue> m_algoParams = new Vector<TagValue>();
m_algoParams.add(new TagValue("StartTime", "13:30:00 EST"));

Order order = new Order();
order.m_action = "BUY";
order.m_totalQuantity = 100;
order.m_orderType = "LMT";
order.m_lmtPrice = 200.0;
```

```
order.m_algoStrategy = "INIW";
order.m_algoParams = m_algoParams;
order.m_transmit = false;
m_client.placeOrder(globalOrderId++, con, order);

}
```

Work It (INLN)

Parameter	Description	Syntax
startTime	Start time	“9:00:00 EST”
endTime	End time:	“15:00:00 EST”
MinPctVolume	Minimum percentage volume	range: “0” – “99”
MaxPctVolume	Maximum percentage volume	range: “0” – “99”
ExecutionStyle	Execution style	"Normal", "Patient", "Aggressive"

Work It (INLN) Java Code Sample

```
void onWorkItCsfbAlgo(){

Contract con = new Contract();
con.m_symbol = "IBM";
con.m_secType = "STK";
con.m_exchange = "CSFBALGO";
con.m_currency = "USD";

Vector<TagValue> m_algoParams = new Vector<TagValue>();
m_algoParams.add(new TagValue("StartTime", "13:45:00 EST"));
m_algoParams.add(new TagValue("EndTime", "15:30:00 EST"));
m_algoParams.add(new TagValue("MinPctVolume", "15")); // Min % Volume
m_algoParams.add(new TagValue("MaxPctVolume", "25")); // Max % Volume
m_algoParams.add(new TagValue("ExecutionStyle", "Patient"));
//possible values for ExecutionStyle: Normal, Patient, Aggressive

Order order = new Order();
```

```
order.m_action = "BUY";
order.m_totalQuantity = 100;
order.m_orderType = "LMT";
order.m_lmtPrice = 200.0;
order.m_algoStrategy = "INLN";
order.m_algoParams = m_algoParams;
order.m_transmit = false;
m_client.placeOrder(globalOrderId++, con, order);
}
```

Pathfinder (PTHF)

Parameter	Description	Syntax
startTime	Start time	“9:00:00 EST”
endTime	End time:	“15:00:00 EST”

Pathfinder (PTHF) Java Code Sample

```
void onPathFinderCsfbAlgo(){

Contract con = new Contract();
con.m_symbol = "IBM";
con.m_secType = "STK";
con.m_exchange = "CSFBALGO";
con.m_currency = "USD";

Vector<TagValue> m_algoParams = new Vector<TagValue>();
m_algoParams.add(new TagValue("StartTime", "13:45:00 EST"));
m_algoParams.add(new TagValue("EndTime", "15:30:00 EST"));

Order order = new Order();
order.m_action = "BUY";
order.m_totalQuantity = 100;
order.m_orderType = "LMT";
order.m_lmtPrice = 200.0;
```

```
order.m_algoStrategy = "PTHF";
order.m_algoParams = m_algoParams;
order.m_transmit = false;
m_client.placeOrder(globalOrderId++, con, order);
}
```

Reserve (RSRV)

Parameter	Description	Syntax
startTime	Start time	“9:00:00 EST”
DisplaySize	Display size	“50” (integer)

Reserve (RSRV) Java Code Sample

```
void onReserveCsfbAlgo(){
Contract con = new Contract();
con.m_symbol = "IBM";
con.m_secType = "STK";
con.m_exchange = "CSFBALGO";
con.m_currency = "USD";

Vector<TagValue> m_algoParams = new Vector<TagValue>();
m_algoParams.add(new TagValue("StartTime", "14:40:00 EST"));
m_algoParams.add(new TagValue("DisplaySize", "50")); //iceberg

Order order = new Order();
order.m_action = "BUY";
order.m_totalQuantity = 100;
order.m_orderType = "LMT";
order.m_lmtPrice = 200.0;
order.m_algoStrategy = "RSRV";
order.m_algoParams = m_algoParams;
order.m_transmit = false;
m_client.placeOrder(globalOrderId++, con, order);
}
```

Strike (SNPR)

Parameter	Description	Syntax
startTime	Start time	“9:00:00 EST”
DisplaySize	Display size	“50” (integer)

Strike (SNPR) Java Code Sample

```
void onStrikeCsfbAlgo(){
Contract con = new Contract();
con.m_symbol = "IBM";
con.m_secType = "STK";
con.m_exchange = "CSFBALGO";
con.m_currency = "USD";

Vector<TagValue> m_algoParams = new Vector<TagValue>();
m_algoParams.add(new TagValue("StartTime", "14:40:00 EST"));
m_algoParams.add(new TagValue("DisplaySize", "50")); //iceberg

Order order = new Order();
order.m_action = "BUY";
order.m_totalQuantity = 100;
order.m_orderType = "LMT";
order.m_lmtPrice = 200.0;
order.m_algoStrategy = "SNPR";
order.m_algoParams = m_algoParams;
order.m_transmit = false;
m_client.placeOrder(globalOrderId++, con, order);
}
```

10B 18 (TENB) Java Code Sample

Parameter	Description	Syntax
startTime	Start time	“9:00:00 EST”
endTime	End time:	“15:00:00 EST”

Parameter	Description	Syntax
MaxPctVolume	Maximum percentage volume	range: “0” – “99”

10B 18 (TENB) Java Code Sample

```
void on10BCsfbAlgo(){
Contract con = new Contract();
con.m_symbol = "IBM";
con.m_secType = "STK";
con.m_exchange = "CSFBALGO";
con.m_currency = "USD";

Vector<TagValue> m_algoParams = new Vector<TagValue>();
m_algoParams.add(new TagValue("StartTime", "14:40:00 EST"));
m_algoParams.add(new TagValue("EndTime", "15:40:00 EST"));
m_algoParams.add(new TagValue("MaxPctVolume", "35")); // Max % Volume

Order order = new Order();
order.m_action = "BUY";
order.m_totalQuantity = 100;
order.m_orderType = "LMT";
order.m_lmtPrice = 200.0;
order.m_algoStrategy = "TENB";
order.m_algoParams = m_algoParams;
order.m_transmit = false;
m_client.placeOrder(globalOrderId++, con, order);
}
```

Tex (TEX)

Parameter	Description	Syntax
startTime	Start time	“9:00:00 EST”
endTime	End time:	“15:00:00 EST”
MaxPctVolume	Maximum percentage volume	range: “0” – “99”
ExecutionStyle	Execution style	"Normal", "Patient", "Aggressive"

Tex (TEX) Java Code Sample

```
void onTexCsfbAlgo(){
Contract con = new Contract();
con.m_symbol = "IBM";
con.m_secType = "STK";
con.m_exchange = "CSFBALGO";
con.m_currency = "USD";

Vector<TagValue> m_algoParams = new Vector<TagValue>();
m_algoParams.add(new TagValue("StartTime", "14:40:00 EST"));
m_algoParams.add(new TagValue("EndTime", "15:40:00 EST"));
m_algoParams.add(new TagValue("MaxPctVolume", "47")); // Max % Volume
m_algoParams.add(new TagValue("ExecutionStyle", "Normal"));
//possible values for ExecutionStyle: Normal, Patient, Aggressive

Order order = new Order();
order.m_action = "BUY";
order.m_totalQuantity = 100;
order.m_orderType = "LMT";
order.m_lmtPrice = 200.0;
order.m_algoStrategy = "TEX";
order.m_algoParams = m_algoParams;
order.m_transmit = false;
m_client.placeOrder(globalOrderId++, con, order);
}
```

TWAP (TWAP)

Parameter	Description	Syntax
startTime	Start time	“9:00:00 EST”
endTime	End time:	“15:00:00 EST”
MaxPctVolume	Maximum percentage volume	range: “0” – “99”

TWAP (TWAP) Java Code Sample

```
void onTwapCsfbAlgo(){
Contract con = new Contract();
con.m_symbol = "IBM";
con.m_secType = "STK";
con.m_exchange = "CSFBALGO";
con.m_currency = "USD";

Vector<TagValue> m_algoParams = new Vector<TagValue>();
m_algoParams.add(new TagValue("StartTime", "14:40:00 EST"));
m_algoParams.add(new TagValue("EndTime", "15:40:00 EST"));
m_algoParams.add(new TagValue("MaxPctVolume", "48")); // Max % Volume

Order order = new Order();
order.m_action = "BUY";
order.m_totalQuantity = 100;
order.m_orderType = "LMT";
order.m_lmtPrice = 200.0;
order.m_algoStrategy = "TWAP";
order.m_algoParams = m_algoParams;
order.m_transmit = false;
m_client.placeOrder(globalOrderId++, con, order);
}
```

VWAP (VWAP)

Parameter	Description	Syntax
startTime	Start time	“9:00:00 EST”
endTime	End time:	“15:00:00 EST”
MaxPctVolume	Maximum percentage volume	range: “0” – “99”

VWAP (VWAP) Java Code Sample

```
void onVwapCsfbAlgo(){
Contract con = new Contract();
con.m_symbol = "IBM";
con.m_secType = "STK";
con.m_exchange = "CSFBALGO";
con.m_currency = "USD";

Vector<TagValue> m_algoParams = new Vector<TagValue>();
m_algoParams.add(new TagValue("StartTime", "14:40:00 EST"));
m_algoParams.add(new TagValue("EndTime", "15:40:00 EST"));
m_algoParams.add(new TagValue("MaxPctVolume", "49")); // Max % Volume

Order order = new Order();
order.m_action = "BUY";
order.m_totalQuantity = 100;
order.m_orderType = "LMT";
order.m_lmtPrice = 200.0;
order.m_algoStrategy = "VWAP";
order.m_algoParams = m_algoParams;
order.m_transmit = false;
m_client.placeOrder(globalOrderId++, con, order);
}
```

Extended Order Attributes

The extended order attributes below can be used in all placeOrder functions and Open_Order events.

Attribute	Possible Values
string m_tif	Day, GTC, IOC, GTD
string m_ocaGroup	Identifies a member of a one-cancels-all group.
string m_account	Institutional only.
string m_openClose	Institutional only.
int m_origin	Institutional only.
string m_orderRef	Customer defined order ID tag.
boolean m_transmit	Specifies whether the order will be transmitted by TWS. If set to false, order is created by not transmitted.
int m_parentId	The order ID of the parent, used for bracket, auto stop and trailing stop orders.
boolean m_blockOrder	If set to true, specifies that the order is a block order.
boolean m_sweep-ToFill	If set to true, specifies that the order is a Sweep-to-fill order.
int m_displaySize	The publicly disclosed order size to be used when placing iceberg orders.

Attribute	Possible Values
int m_triggerMethod	Specifies how simulated Stop, Stop-Limit, and Trailing Stop orders are triggered: • O - the default value. The "double bid/ask" method will be used for orders for OTC stocks and US options. All other orders will use the "last" method. • 1 - use "double bid/ask" method, where stop orders are triggered based on two consecutive bid or ask prices. • 2 - "last" method, where stop orders are triggered based on the last price. • 3 - "double-last" method, where stop orders are triggered based on last two prices. • 4 – “bid-ask” method. For a buy order, a single occurrence of the bid price must be at or above the trigger price. For a sell order, a single occurrence of the ask price must be at or below the trigger price. • 7 – “last-or-bid-ask” method. For a buy order, a single bid price or the last price must be at or above the trigger price. For a sell order, a single ask price or the last price must be at or below the trigger price. • 8 – “mid-point” method, where the midpoint must be at or above (for a buy) or at or below (for a sell) the trigger price, and the spread between the bid and ask must be less than 0.1% of the midpoint. For a complete description of Trigger Methods, see Modify the Trigger Method in the Trader Workstation Users' Guide.
boolean m_ignoreRth	If set to true, allows triggering of orders outside of regular trading hours.
boolean m_hidden	If set to true, the order will not be visible when viewing the market depth. The only applies to orders routed to INet.
string m_goodAfter-Time	Indicates that the trade should be submitted after the time and date set, with format YYYYMMDD HH:MM:SS (seconds are optional). Use an empty string if not applicable.
string m_goodTillDate	Indicates that the trade should remain working until the time and date set, with format YYYYMMDD HH:MM:SS (seconds are optional). You must set the tif to GTD when using this string. Use an empty string if not applicable.
string m_faGroup	The advisor group to which the trade will be allocated. Use an empty string if not applicable.
string m_faProfile	The advisor allocation profile to which the trade will be allocated. Use an empty string if not applicable.
string m_faMethod	The advisor allocation method with which the trade will be allocated. Use an empty string if not applicable.

Attribute	Possible Values
string m_faPercentage	The advisor percentage concerning the trade's allocation. Use an empty string if not applicable.
string m_primaryExch	To clarify any ambiguity for Smart-routed contracts, include the primary exchange, along with the Smart designation, for the destination.
int m_shortSaleSlot	For institutional customers only. • 0 - unapplicable (i.e. retail customer or not sshort leg) • 1 - clearing broker • 2 - third party. If this value is used, you must enter a designated location.
string m_designatedLocation	Only valid when shortSaleSlot value = 2. Otherwise leave blank or orders will be rejected.
long ocaType	Cancel on Fill with Block = 1 Reduce on Fill with Block = 2 Reduce on Fill without Block = 3
int rthOnly	Regular trading hours only. yes=1, no=0
String rule80A	Individual = 'I' Agency = 'A', AgentOtherMember = 'W' IndividualPTIA = 'J' AgencyPTIA = 'U' AgentOtherMemberPTIA = 'M' IndividualPT = 'K' AgencyPT = 'Y' AgentOtherMemberPT = 'N'
String settlingFirm	Institutional only
String clearingAccount	The true beneficiary of the order. This value must be sent on FUT/FOP orders for reporting the exchange.
String clearingIntent	IB, Away, or PTA
int allOrNone	yes=1, no=0
long minQty	Identifies a minimum quantity order type.
double percentOffset	The percent offset for relative orders.
int eTradeOnly	Trade with electronic quotes. yes=1, no=0

Attribute	Possible Values
int firmQuoteOnly	Trade with firm quotes. yes=1, no=0
double nbboPriceCap	Maximum SMART order distance from the NBBO.
long auctionStrategy	match = 1 improvement = 2 transparent = 3 For BOX exchange only.
double startingPrice	Starting price. For BOX exchange only.
double stockRefPrice	The stock reference price. For BOX exchange only.
double delta	For BOX exchange only.
double stock-RangeLower	The lower value of the acceptable stock range. For BOX exchange only.
double stock-RangeUpper	The upper value of the acceptable stock range. For BOX exchange only.
double m_volatility	The option price in volatility, as calculated by TWS' Option Analytics. This value is expressed as a percent and is used to calculate the limit price sent to the exchange.
int m_volatilityType	1 = Daily; 2 = Annual
m_continuousUpdate	0 = false; 1 = True
int m_ref-erencePriceType	1 = Average; 2 = BidorAsk
String m_deltaNeut-ralOrderType	Enter an accepted order type such as: MKT, LMT, REL etc.
double m_deltaNeut-ralAuxPrice	Enter the Aux Price for Hedge Delta order types that require one.
int m_scaleNumCom-ponents	For Scale orders: Defines the number of component orders into which the parent order will be split, thereby backing into the number of units within each component.
int m_scaleCom-ponentSize	For Scale orders: Defines the number of units per component, backing into the number of components into which the parent order is split.
double m_scalePriceIn-crement	For Scale orders: Defines the price increment per scale component.
double m_basisPoints	EFP orders
int basisPointsType	EFP orders

Order Status for Partial Fills

The following example demonstrates how the orderStatus() event behaves when there is a partial fill of an order.

Partial Fill Example

You place an order for 1000 shares of XYZ stock. There are four separate executions before the order for 1000 total shares is completed. The first partial fill executes with 200, then the second partial fill executes with 200 shares. The third partial fill executes with another 200 shares and finally, the last partial fill executes with 400 shares.

- First execution: 200
- Second execution: 200
- Third execution: 200
- Fourth execution: 400

In the orderStatus() event, here is the sequence of status messages that will be received by the API based on this example:

Execution	Status Message
1st Execution	Status = Submitted Filled qnty = 200 Remaining qnty = 800
2nd Execution	Status = Submitted Filled qnty = 400 Remaining qnty = 600
3rd Execution	Status = Submitted Filled qnty = 600 Remaining qnty = 400
4th Execution	Status = Filled Filled qnty = 1000 Remaining qnty = 0

Available Market Scanners

The following table shows a list (current as of July 2008) of the available scanners.

Market Scanner (Scan Code)	Description
Low Opt Volume P/C Ratio (LOW_OPT_VOL_PUT_CALL_ RATIO)*	Put option volumes are divided by call option volumes and the top underlying symbols with the lowest ratios are displayed.
High Option Imp Vol Over Historical (HIGH_OPT_IMP_VOLAT_OVER_ HIST)*	Shows the top underlying contracts (stocks or indices) with the largest divergence between implied and historical volatilities.
Low Option Imp Vol Over Historical (LOW_OPT_IMP_VOLAT_OVER_ HIST)*	Shows the top underlying contracts (stocks or indices) with the smallest divergence between implied and historical volatilities.
Highest Option Imp Vol (HIGH_OPT_IMP_VOLAT)*	Shows the top underlying contracts (stocks or indices) with the highest vega-weighted implied volatility of near-the-money options with an expiration date in the next two months.
Top Option Imp Vol % Gainers (TOP_OPT_IMP_VOLAT_GAIN)*	Shows the top underlying contracts (stocks or indices) with the largest percent gain between current implied volatility and yesterday's closing value of the 15 minute average of implied volatility.
Top Option Imp Vol % Losers (TOP_OPT_IMP_VOLAT_LOSE)*	Shows the top underlying contracts (stocks or indices) with the largest percent loss between current implied volatility and yesterday's closing value of the 15 minute average of implied volatility.
High Opt Volume P/C Ratio (HIGH_OPT_VOLUME_PUT_CALL_ RATIO)	Put option volumes are divided by call option volumes and the top underlying symbols with the highest ratios are displayed.
Low Opt Volume P/C Ratio (LOW_OPT_VOLUME_PUT_CALL_ RATIO)	Put option volumes are divided by call option volumes and the top underlying symbols with the lowest ratios are displayed.
Most Active by Opt Volume (OPT_VOLUME_MOST_ACTIVE)	Displays the most active contracts sorted descending by options volume.
Hot by Option Volume (HOT_BY_OPT_VOLUME)	Shows the top underlying contracts for highest options volume over a 10-day average.

Market Scanner (Scan Code)	Description
High Option Open Interest P/C Ratio (HIGH_OPT_OPEN_INTEREST_PUT_CALL_RATIO)	Returns the top 50 contracts with the highest put/call ratio of outstanding option contracts.
Low Option Open Interest P/C Ratio (LOW_OPT_OPEN_INTEREST_PUT_CALL_RATIO)	Returns the top 50 contracts with the lowest put/call ratio of outstanding option contracts.
Top % Gainers (TOP_PERC_GAIN)	Contracts whose last trade price shows the highest percent increase from the previous night's closing price.
Most Active (MOST_ACTIVE)	Contracts with the highest trading volume today, based on units used by TWS (lots for US stocks; contract for derivatives and non-US stocks). The sample spreadsheet includes two Most Active scans: Most Active List, which displays the most active contracts in the NASDAQ, NYSE and AMEX markets, and Most Active US, which displays the most active stocks in the United States.
Top % Losers (TOP_PERC_LOSE)	Contracts whose last trade price shows the lowest percent increase from the previous night's closing price.
Hot Contracts by Volume (HOT_BY_VOLUME)	Contracts where: • today's Volume/avgDailyVolume is highest. • avgDailyVolume is a 30-day exponential moving average of the contract's daily volume.
Top % Futures Gainers (TOP_PERC_GAIN)	Futures whose last trade price shows the highest percent increase from the previous night's closing price.
Hot Contracts by Price (HOT_BY_PRICE)	Contracts where: • (lastTradePrice-prevClose) /avgDailyChange is highest in absolute value (positive or negative). • The avgDailyChange is defined as an exponential moving average of the contract's (dailyClose-dailyOpen)
Top Trade Count (TOP_TRADE_COUNT)	The top trade count during the day.

Market Scanner (Scan Code)	Description
Top Trade Rate (TOP_TRADE_RATE)	Contracts with the highest number of trades in the past 60 seconds (regardless of the sizes of those trades).
Top Price Range (TOP_PRICE_RANGE)	The largest difference between today's high and low, or yesterday's close if outside of today's range.
Hot by Price Range (HOT_BY_PRICE_RANGE)	The largest price range (from Top Price Range calculation) over the volatility.
Top Volume Rate (TOP_VOLUME_RATE)	The top volume rate per minute.
Lowest Option Imp Vol (LOW_OPT_IMP_VOLAT)	Shows the top underlying contracts (stocks or indices) with the lowest vega-weighted implied volatility of near-the-money options with an expiration date in the next two months.
Most Active by Opt Open Interest (OPT_OPEN_INTEREST_MOST_ ACTIVE)	Returns the top 50 underlying contracts with the (highest number of outstanding call contracts) + (highest number of outstanding put contracts)
Not Open (NOT_OPEN)	Contracts that have not traded today.
Halted (HALTED)	Contracts for which trading has been halted.
Top % Gainers Since Open (TOP_OPEN_PERC_GAIN)	Shows contracts with the highest percent price INCREASE between the last trade and opening prices.
Top % Losers Since Open (TOP_OPEN_PERC_LOSE)	Shows contracts with the highest percent price DECREASE between the last trade and opening prices.
Top Close-to-Open % Gainers (HIGH_OPEN_GAP)	Shows contracts with the highest percent price INCREASE between the previous close and today's opening prices.
Top Close-to-Open % Losers (LOW_OPEN_GAP)	Shows contracts with the highest percent price DECREASE between the previous close and today's opening prices.
Lowest Option Imp Vol (LOW_OPT_IMP_VOLAT)	Shows the top underlying contracts (stocks or indices) with the lowest vega-weighted implied volatility of near-the-money options with an expiration date in the next two months.

Market Scanner (Scan Code)	Description
Top Option Imp Vol % Gainers (TOP_OPT_IMP_VOLAT_GAIN)	Shows the top underlying contracts (stocks or indices) with the largest percent gain between current implied volatility and yesterday's closing value of the 15 minute average of implied volatility.
Top Option Imp Vol % Losers (TOP_OPT_IMP_VOLAT_LOSE)*	Shows the top underlying contracts (stocks or indices) with the largest percent loss between current implied volatility and yesterday's closing value of the 15 minute average of implied volatility.
13-Week High (HIGH_VS_13W_HL)	The highest price for the past 13 weeks.
13-Week Low (LOW_VS_13W_HL)	The lowest price for the past 13 weeks.
26-Week High (HIGH_VS_26W_HL)	The highest price for the past 26 weeks.
26-Week Low (LOW_VS_26W_HL)	The lowest price for the past 26 weeks.
52-Week High (HIGH_VS_52W_HL)	The highest price for the past 52 weeks.
52-Week Low (LOW_VS_52W_HL)	The lowest price for the past 52 weeks.
EFP - High Synth Bid Rev Yield (HIGH_SYNTH_BID_REV_NAT_YIELD)	Highlights the highest synthetic EFP interest rates available. These rates are computed by taking the price differential between the SSF and the underlying stock and netting dividends to calculate an annualized synthetic implied interest rate over the period of the SSF. The High rates may present an investment opportunity.
EFP - Low Synth Bid Rev Yield (LOW_SYNTH_BID_REV_NAT_YIELD)	Highlights the lowest synthetic EFP interest rates available. These rates are computed by taking the price differential between the SSF and the underlying stock and netting dividends to calculate an annualized synthetic implied interest rate over the period of the SSF. The Low rates may present a borrowing opportunity.

Instruments and Location Codes for Market Scanners

Market scanners in the TWS API support the following instruments and location codes:

Instruments

- STK - US stocks
- STOCK.HK - Asian stocks
- STOCK.EU - European stocks

Location Codes

- STK.US - US stocks
- STK.US.MAJOR - US stocks (without pink sheet)
- STK.US.MINOR - US stocks (only pink sheet)
- STK.HK.SEHK - Hong Kong stocks
- STK.HK.ASX - Australian Stocks
- STK.EU - European stocks

Supported Time Zones

The following table shows a list of time zones supported by the TWS API.

Time Zone	Description
GMT	Greenwich Mean Time
EST	Eastern Standard Time
MST	Mountain Standard Time
PST	Pacific Standard Time
AST	Atlantic Standard Time
JST	Japan Standard Time
AET	Australian Standard Time

Smart Combo Routing

These features are for both guaranteed and non-guaranteed combination orders routed to Smart, and are available based on the combo type and order type. For example, users can specify the maximum size to submit at one time (Maximum leg-in combo size) and which leg should be legged in first.

Smart Combo Routing is also supported in the Active X, C++ and Java APIs through the use of **smartComboRoutingParams**, which requires TWS server version 57 or higher. **smartComboRoutingParams** is similar to AlgoParams in that it makes use of tag/value pairs to add parameters to combo orders. The parameters cover the following capabilities:

- **Priority** - User can specify which leg to be executed first.

  Tag = LeginPrio
  Values = -1, 0 or 1

- **Discretionary Amount** - When one leg is executed, we can adjust the other leg by up to a discretionary amount.

  Tag = MaxSegSize
  Value = An amount

- **Market-If-Touched Timeout** - For Market-If-Touched combo orders, we record the firstTradeTime of the first fill of the first leg to execute, and the lastTradeTime of the last partial fill. For these kinds of orders, you can now specify timeout values of the last fill and the timeout since the first fill, in seconds.

  Tags = ChangeToMktTime1 is the timeout after the last fill, and ChangeToMktTime2 is the timeout after the first fill.
  Value = Number of seconds

- **Market-If-Touched Stop-Loss** - Specify an absolute stop-loss amount per combo. If specified and if the implied execution price of the combo (based on a leg that has already been executed and current market data) exceeds the combo price plus the stop-loss amount, we convert the order from LMT to MKT immediately in order to finish executing the combo order. If the stop-loss amount is specified but timeouts have not been specified, we will continue to try to execute the second leg at the calculated LMT price until it either executes or the stop-loss amount is reached.

  Tag = ChangeToMktOffset
  Value = An amount.

- **Maximum Leg-In Size** - Specify the maximum allowed leg-in size per segment.

  Tag = MaxSegSize
  Value = Unit of combo size

- **Discretionary Percentage** - Specify a percentage of the combo price. This applies to scale combos in which the discretionary amount is calculated from the current scale level. When the discretionary amount is entered as a percentage, the API converts it to a dollar amount based on the combo. This amount will be updated when the order price changes or for scale orders for each level. You can enter a value for this parameter or for the Discretionary Amt extended attribute one at a time, but not both at the same time.

  Tag = DiscretionaryPct
  Value = A value between 0 and 100.

API Logging

As client requests are processed (both system and API clients) it logs certain information to its 'log.txt' log file, which is located in the installation directory. The purpose of this file is to help resolve problems by providing some insight into the state of the program before the problem occurred.

API clients can specify how detailed they want these log entries to be by setting the log level. Log levels are:

- 1 = SYSTEM
- 2 = ERROR
- 3 = WARNING
- 4 = INFORMATION
- 5 = DETAIL

> **Note:** Setting the log level to 5 will increase performance overhead. You should only use log level 5 when you are trying to resolve an issue.

The log entries for API requests have the format:

`[ClientID:ClientVersion:ServerVersion:ClientType:Request:Response:Version:LogEntryType]`

where:

- **`ClientID`** is the clientId used when connecting.
- **`ClientVersion`** identifies the client's request stream (for internal use).
- **`ServerVersion`** identifies the server's response stream (for internal use).
- **`ClientType`** is the type of API connection: DDE = 0, Socket = 1.
- **`Request`**: If greater than 0, indicates that the log entry is the result of an API client request. The number shown is the request identifier as listed in the "Outgoing Request Identifiers" section below.
- **`Response`**: If greater than 0, indicates that the log entry is the result of a server response to the API. The number shown is the response identifier as listed in the "Incoming Response Identifiers" section below.
- **`Version`** identifies the version of the request or response message. The version changes when the message format changes.
- **`LogEntryLevel`** identifies the type of log entry (i.e. the log level as listed above)

Example Log Entry

```
[0:9:9:1:1:0:3:DET]Socket request - [3;52;IBM;STK;null;0.0;2;SMART;null;null]
```

From this example, we can tell that a socket client with clientId=0 connected and made a request for market data. The version of the market data request, which was 3, implies what data should have been sent.

API Request/Server Response Message Identifiers

Outgoing Request Identifiers	Incoming Response Identifiers
1 = Request Market Data	1 = Ticker Price
2 = Cancel Market Data	2 = Ticker Size
3 = Place Order	3 = Order Status
4 = Cancel Order	4 = Error Message
5 = Request Open Orders	5 = Open Order
6 = Request Account Data	6 = Account Value
7 = Request Execution Reports	7 = Portfolio Value
8 = Request Next Order Id	8 = Account Update Time
9 = Request Contract Details	9 = Next Valid Order Id
10 = Request Market Depth	10 = Contract Details
11 = Cancel Market Depth	11 = Execution Report Details
12 = Request News Bulletins	12 = NYSE Open Book Row Entry
13 = Cancel News Bulletins	13 = Level II Quotes Row Entry
14 = Set Server Log Level	14 = News Bulletin

Note: This information, along with the various request/response message versions, can be found in the EClientSocket implementation file supplied with the API installation.

Requests for Quotes (RFQs)

RFQs from the IB Options Trading Desk allow you to get quotes for large orders from IB affiliate Timber Hill. Quotes are available for US equity and index options, and major European and Asian index options and combinations. For a complete list, please contact the IB Options Trading Desk.

RFQs from the IB Options Trading Desk are available only to users who have access to these specific areas. Please contact the IB Options Trading Desk if you are interested in participating.

Submitting RFQs using the API

Submit an RFQ by submitting an order with an order type of QUOTE. In the response, tickPrice()/tickSize() are called with the tickerId matching the orderId of the RFQ. Use orderId's with a relatively high number to avoid clashes. Additional space is required for non-RFQ tickerIds.

Market data for an RFQ is received until the user cancels the RFQ or the RFQ is canceled by the server. The server normally cancels an RFQ when it expires (approximately 1 minute) or if the RFQ request is invalid and/or for an unsupported product.

Delta-Neutral RFQs

Submit Delta-Neutral RFQs by creating a combo order, even if a single contract must be hedged, and filling up and attaching an UnderComp structure to a contract underComp field.

In the UnderComp structure, you must specify the conId of the hedge contract. The price and delta fields can be left empty (0).

Upon accepting a Delta-Neutral DN RFQ, the server sends a deltaNeutralValidation() message with the UnderComp structure. If the delta and price fields are empty in the original request, the confirmation will contain the current values from the server. These values are locked when the RFQ is processed and remain locked until the RFQ is canceled.

RFQ Samples

To learn more about submitting RFQs with the TWS API, look at the RFQ samples included in the 9.6 release of the API software. The samples are located in the *samples/rfq* folder in your API software installation folder. The *SampleRFQ.java* sample implements a small-state machine and shows how to submit RFQ's for:

- EU Stocks
- US Futures
- US Stock Options
- EU Stock Options
- Calendar Spread for Index Option (Delta-Neutral)
- US Stock Option (Delta-Neutral)
- US Index Option (Delta-Neutral)
- EU Index Option (Delta-Neutral)

Support for Mini Options

The APIs support mini-options in requests to TWS and data returned by TWS. Click one of the following links for more information.

- Support for Mini Options - Active X, Java and C++ APIs
- Support for Mini Options - DDE for Excel API

Support for Mini Options - ActiveX, Java and C++ APIs

You can identify mini options in the Active X, Java and C++ APIs by providing the multiplier or trading class in both requests to TWS and responses from TWS.

The following requests and callbacks that include the Contract structure as a parameter can now use the *tradingClass* and *multiplier* attributes to identify mini options. Also, some of these requests can now use the *conId* attribute to identify a security (these are indicated below).

Requests

- reqMktData
- reqHistoricalData - also *conId*
- reqRealTimeBars - also *conId*
- reqContractDetails
- reqMktDepth - also *conId*
- exerciseOptions - also *conId*
- placeOrder
- calculateImpliedVolatility
- calculateOptionPrice

Callbacks

- openOrder
- updatePortfolio
- execDetails
- position

Note the following:

- *multiplier* is encoded/decoded after *contract.right* and before *contract.exchange* in all requests and callbacks.
- *conId* is encoded after *tickerId*/*reqId* and before *contract.symbol* in all requests and callbacks.
- *tradingClass* is encoded/decoded after *contract.localSymbol* in all requests and callbacks.

The **reqFundamentalData** request, available for stocks only, can also handle the *conid* attribute in the Contract structure but not *tradingClass* or *multiplier*.

Support for Mini Options - DDE for Excel

You can identify mini options in the DDE for Excel API by providing the multiplier or trading class in both requests to TWS and responses from TWS. The DDE for Excel API spreadsheet (*TwsDde.xls*) released with API Version 9.69 was updated to include the Trading Class column on most pages. You use this field to request mini options data from TWS.

Requirements

Mini-option support in the DDE for Excel API requires the following:

- The updated Excel spreadsheet requires *ddedll.dll* Version 16 and TWS Version 9.69 or higher.
- Previous versions of the Excel spreadsheet will not work with *ddedll.dll* Version 16 and TWS Version 9.69 or higher.
- However, TWS Version 9.69 or higher will work with previous versions of the Excel spreadsheet if you are using a previous version of the *ddedll.dll* file.

DDE Syntax Examples

DDE syntax has been updated to support mini options data. The following examples show which requests for contract data have been updated for mini options support. To check the DDE syntax in the Excel spreadsheet, look at the Ctrl cells on the spreadsheet page for each data request.

Requests That Send Contract Data to TWS

- Request market data:

  topic=tik request=req (Request Market Data - Tickers page)

  ```
  =Salexd406|tik!'id0?req?AAPL_OPT_20130614_530_C_SMART_USD_~_AAPL7/'
  ```

  ```
  =Salexd406|tik!'id1?req?AAPL_BAG_SMART_USD_CMBLGS_2_126721266_1_BUY_SMART_0_1236033_1_
  SELL_SMART_0_CMBLGS_~/'
  ```

- Calculate implied volatility:

  topic=calcimplvol request=get (Calculate Implied Volatility - Tickers page)

  ```
  =Salexd406|calcimplvol!'id4?get?5_690_AAPL_OPT_20130614_530_C_SMART_USD_AAPL7/'
  ```

- Calculate options price:

  topic=calcoptionprice request=get (Calculate Option Price - Tickers page)

  ```
  =Salexd406|calcoptionprice!'id5?get?0.23_690_AAPL_OPT_20130614_530_C_SMART_USD_AAPL7/'
  ```

- Request generic ticks:

  topic=gentick request=get (Request Generic Ticks - Tickers page)

  ```
  =Salexd406|gentik!'id6?req?318?AAPL_OPT_20130614_530_C_SMART_USD_~_AAPL7/'
  ```

  ```
  =Salexd406|gentik!'id5?req?318?AAPL_BAG_SMART_USD_CMBLGS_2_126721266_1_BUY_SMART_0_
  1236033_1_SELL_SMART_0_CMBLGS_~/'
  ```

- Place order:

  topic=ord request=place (Place / Modify Order - Basic Orders, Conditional Orders, Advanced Orders, Advisors pages)

  ```
  =Salexd406|ord!'id424433486?place?AAPL_OPT_20130614_530_C_SMART_USD_~_AAPL7/BUY_1_LMT_
  0.05_~_DAY_~_~_O_0_~_1_~_0_0_0_0_~_0_0_~...'
  ```

  ```
  =Salexd406|ord!'id424433487?place?AAPL_BAG_SMART_USD_CMBLGS_2_126721266_1_BUY_SMART_0_
  1236033_1_SELL_SMART_0_CMBLGS_~/BUY_1_LMT_0.05_~_DAY_~_~_O_0_~_1_~_0_0_0_0_~_0_0_~...'
  ```

- Request historical data:

  topic=hist request=req (Request Historical Data - Historical Data page)

  ```
  =Salexd406|hist!'id4?req?AAPL_OPT_20130517_490_C_SMART_USD_~_
  AAPL7/20130512singleSpace10singleColon00singleColon00singleSpaceGMT_1singleSpaceW_11_
  MIDPOINT_0_1_TRUE'
  ```

  ```
  =Salexd406|hist!'id5?req?AAPL_OPT_20130517_490_C_SMART_USD_~_
  AAPL7/20130512singleSpace10singleColon00singleColon00singleSpaceGMT_1singleSpaceW_11_
  MIDPOINT_0_1'
  ```

  ```
  =Salexd406|hist!'id6?req?AAPL_BAG_SMART_USD_CMBLGS_2_126721266_1_BUY_SMART_0_1236033_1_
  SELL_SMART_0_CMBLGS_~/20130512singleSpace10singleColon00singleColon00singleSpaceGMT_
  1singleSpaceW_11_MIDPOINT_0_1'
  ```

- Request contract details:

  topic=contract request=req (Re-request Contract Details - Contract Details page)

  ```
  =Salexd406|contract!'id1?req?AAPL_OPT_20130517_490_C_SMART_USD_~_AAPL7/'
  ```

- Request market depth:

  topic=mktDepth request=req (Request Market Depth - Market Depth page)

  ```
  =Salexd406|mktDepth!'id0?req?AAPL_OPT_20130517_490_C_SMART_USD_AAPL7/?0'=
  ```

Requests That Receive Contract Data from TWS

- topic=opens request=req (open orders - Open Orders page)

  Trading Class is expected after Multiplier and before Exchange

- topic=execs request=req (executions - Executions page)

  Trading Class is expected after P/C (Right) and before Exchange

- topic=ports request=req (portfolio updates - Portfolio page)

  Trading Class is expected after Right and before Currency

- topic=scan request=req (market scanner data)

  Trading Class is expected after Right and before Exchange

For more information

- DDE Syntax for Excel

Requesting Real-Time Index Premium Data

You can request real-time Index Premium market data using the following APIs and API sample applications:

- ActiveX (including the ActiveX API sample application)
- C++ (including the C++ API sample application)
- Java (including the Java API sample application)
- ActiveX for Excel

To request real-time Index Premium data, you must do the following:

- Specify the Symbol, Security Type and Exchange.
- For example, INDU, IND and NYSE would get you Index Premium data for the Dow Jones Industrial Average.
- The exchange must match the index for which you want data.
- You must use the generic tick type 162 (for Index Future Premium).

Requesting News from an API Client

You can receive news top news for underlying contracts from TWS for news feeds to which you have subscribed (in Account Management) using generic tick type 292. The following examples illustrate the different ways you can request news from TWS.

Note that we use the Java API method/parameters in the examples below, but you can substitute the correct method/parameters for your API language of choice.

To request news for IBM

Request market data with the following parameters:

```
symbol=IBM
secType=STK
exchange=SMART
currency=USD
genericTicklist="mdoff,292"
```

> **Note:** mdoff indicates that top market data will not tick.

or

Request market data with the following parameters:

```
conId=8314
secType=[empty]
exchange=SMART
currency=[empty]
genericTicklist="mdoff,292"
```

To request only Fly On The Wall (FLY) News for IBM

Request market data with the following parameters:

```
symbol=IBM
secType=STK
exchange=SMART
currency=USD
genericTicklist="mdoff,292:FLY"
```

To request only Fly On The Wall and Briefing.com (BRF) news for IBM

Request market data with the following parameters:

```
symbol=IBM
secType=STK
exchange=SMART
currency=USD
```

```
genericTicklist="mdoff,292:FLY+BRF"
```

To request top data and news for IBM

Request market data with the following parameters:

```
symbol=IBM
secType=STK
exchange=SMART
currency=USD
genericTicklist="292"
```

To request a list of news topics

Request contract data with the following parameters:

```
symbol=*
secType=NEWS
exchange=FLY or NEWS:FLY
currency=[empty]
```

To request Reuters European Union News

Request market data with the following parameters:

```
symbol=FLY:EU
secType=NEWS
exchange=FLY or NEWS:FLY
currency=[empty]
genericTicklist="292"
```

or

Request market data with the following parameters:

```
conId=6145497
symbol=[empty]
secType=[empty]
exchange=NEWS
currency=[empty]
genericTicklist="292"
```

Frequently Asked Questions

Here are some common API issues/questions and their solutions/answers.

I received the error "The DDEDLL.dll file required for Excel integration is either missing or out of date." - (DDE for Excel API)
This error appears when you try to launch Trader Workstation (TWS) on a 64-bit Windows computer using a 32-bit Java executable. To solve this issue, launch TWS using the 64-bit Java executable.

To launch the standalone TWS using the 64-bit Java executable

1. On your Windows desktop, right-click the TWS shortcut and select *Properties* from the popup menu.
2. In the Properties dialog, click the **Shortcut** tab, then click at the very beginning of the Target field.
3. Typically the text in the Target field displays a long path beginning with "*C:\Windows\system32\javaw.exe ...*". Change the part of the path that says *system32* to *sysWOW64*. The *sysWOW64* folder contains the 64-bit Java executable (javaw.exe). Click **OK** when you're done.
4. If the Target path already contains "sysWOW64,". change to *system32*, then click **Apply**. Then change *system32* back to *sysWOW64* and click **Apply**, then **OK**.
5. Launch TWS.

The browser-based TWS can be launched using 64-bit Java executable with a 64-bit browser like Internet Explorer (Firefox and Google Chrome do not have 64-bit version when this version of the API Reference Guide was published). In some cases, when both Java executables are installed (32-bit and 64-bit), the 64-bit browser may still use the 32-bit Java. In this case it is necessary to uninstall the Java 32-bit executable and possibly even re-install the Java 64-bit executable.

Can I get historical data without a market data subscription?
No. However, some market data subscriptions are free and enabled by default and you can retrieve historical data for the market data represented by these free subscriptions.

Can I retrieve API orders created in TWS?
Yes.

Can I modify orders in the API that were created in TWS?
Yes in the Active X, Java and C++ APIs (*not* in the DDE for Excel API). To modify the orders, you must use the orderID, not the permID. The orderID will be negative if the order is created in TWS.

Why do I get I get all zeroes in a market data cell when using the DDE for Excel API?
This happens when the Excel DDE sheet has not been connected properly to TWS. To solve, restart both Excel and TWS.

Are conditional orders possible in the API?
Conditional orders sent from API, in the sense that they are held and monitored on the servers of Interactive Brokers, are not available. Traders can monitor the condition on their machines and send the orders for execution when the condition is satisfied.

TWS *does* offer conditional orders that are held and monitored on IB's servers, albeit the range of conditions is limited to a few variables like price and volume.

How many API clients can connect to Trader Workstation/IB Gateway simultaneously?
A single instance of Trader Workstation (or IB Gateway) can support a maximum of 8 API clients at the same time.

When receiving market data, does tickPrice() always come before tickSize()?
Yes.

When receiving market data, why do I receive two consecutive LAST_PRICE tick values?
TWS sends two LAST_PRICE tick values because one has the timestamp, which gives you the time of the last trade.

Is there any method in the Java API that gives me the close time for a particular financial product?
No, but we do send the opening and closing time of a particular exchange in the *m_tradingHours* (total trading hours) and *m_liquidHours* (regular trading hours) attributes of the **contractDetails()** callback. These attributes send the current trading day times and the following trading day times in this format:
YYYYMMDD:HHmm-HHmm;YYYYMMDD:HHmm-HHmm.

Is there away to get the minimum order size for Hong Kong stocks through the API?
No, but you can use the Contract Search on our website; search results include details such as minimum order size. Simply click **Contract Search** under the Help and Contacts menu located in the upper right corner of our website.

What is the best way to get real-time up-to-date quote information once for a series of tickers (up to 100)?
Subscribe to real-time market data with snapshot set to false so you get the latest up-to-date information. If snapshots are old, it may be due to the market being closed; in that case, only the latest available information is sent to the API.

Is volatility data available for options?
Yes. You can also calculate volatility using the **calculateImpliedVolatility()** method.

Can I receive news and events for currencies and futures in the Java API?
Not at this time. If this is a feature that you would like to see added to the API, use the New Feature Poll on our website to request it.

Is there any method in the Java API that receives economic events as provided by the economic events calendar in IBIS?
No, because we have not integrated the API with IBIS. If this is a feature that you would like to see added to the API, use the New Feature Poll on our website to request it.

In the Java API beta version 9.69, why is the OPT value missing from com.ib.controller.Instrument?
There are no scans for Options in the API.

I'm using two separate machines to request FTSE futures tick data by calling reqMktData() and the two machines receive similar but not identical data. Why is this happening?
We provide snapshots of the data based on what we receive from the exchange, and these snapshots can be generated at a different pace for different users. This is why you are not getting the exact same data from both machines.

What is "frozen" market data?/When do I call reqMarketDataType()?
Frozen market data is the last data recorded in our system at the moment trading stops for the day. During normal trading hours, the API receives real-time market data. The *type* parameter for **reqMarketDataType()** may be set to 1 for real-time market data or 2 for frozen market data. When you use **reqMarketDataType()**, you are telling TWS to automatically switch to frozen market data after the close. Then, before the opening of the next trading day, market data will automatically switch back to real-time market data.

Why do I receive an *error 200 - No security definition has been found for the request* when I call reqContractDetails, reqMktData, or addOrder() for a stock contract?

When using these methods for a stock contract, leave Global Symbol and Trading Class blank.

Is there a way to connect to your server directly, without connecting to TWS locally, in an authorized and secure manner?
No. Any client application has to go through TWS or IB Gateway in order to reach our servers.

Is historical data available for options?
Yes, but you cannot request one-day bars in this case.

What is the easiest way to program a simple moving average in real time on a chart using the API?
While the API does not directly support chart indicators, you can construct your own indicators based raw data received through the API. Try appending real-time bars to historical data requests.

How do I convert chart data to ASCII using the API?
Use historical data available via the API. If you're only looking for time and sales, you can export this from TWS.

When sending an order outside regular trading hours for the S&P Mini, I receive the following error message: *Order Event Warning:Attribute 'Outside Regular Trading Hours' is ignored based on the order type and destination. PlaceOrder is now being processed.*. even though I set the property *m_outsideRth* to True in the order object when calling placeOrder() to ensure the order gets executed outside regular trading hours.
It is not necessary to set this for limit orders on Globex. The *outsideRTH* flag only applies to stop orders on Globex.

Why isn't it possible to send more than 20 orders or order-modifications per executed order with the API?
This is an Interactive Brokers policy. However, it is possible to adjust the order modification ratio. For more information, see http://ibkb.interactivebrokers.com/article/1765.

How do you submit a TRAIL order with percentage instead of amount?
Use the trailingPercent attribute to specify the trailing amount as a percentage.

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