RT Options Scanner

Introduction

Our **RT Options Scanner** allows you to **search in real-time through all publicly traded US equities and indexes options** (more than 170,000 options contracts total) for trading opportunities involving strategies like:

- Naked or Covered Write Protective Purchase, etc.
- Any complex multi-leg option strategy – to find the "missing leg"
- Calendar Spreads

Search is performed against our Options Database that is updated in real-time and driven by HyperFeed's Ticker-Plant and our Implied Volatility Calculation Engine. We offer both 20-minute delayed and real-time modes.

Unlike other search engines using real-time quotes data only our system takes advantage of individual contracts Implied Volatilities calculated in real-time using our high-performance Volatility Engine.

The Scanner is universal, that is, it is not confined to any special type of option strategy. Rather, it allows determining the option you need in the following terms:

- Cost
- Moneyness
- Expiry
- Liquidity
- Risk

The Scanner offers Basic and Advanced Search Interfaces.

Basic interface can be used to find options contracts satisfying, for example, such requirements: "I need expensive Calls for Covered Call Write Strategy. They should expire soon and be slightly out of the money. Do not care much as far as liquidity, but do not like to bear high risk."

This can be done in five seconds - set the search filters to:

Cost -> Dear
Moneyness -> OTM
Expiry -> Short term
Liquidity -> Any
Risk -> Moderate

and press the "Search" button. It is that easy. In fact, if your request is *exactly* as above, you can just press the "Search" button - these values are the default filtering criteria.

By default the search is performed against all equities covered by the scanner. You can limit this list by specifying a list of 'your' equities – comma separated tickers accepted. This filter is available in both Basic and Advanced Views.

Basic View parameters

Basic Version of the Scanner allows filtering by Cost, Moneyness, Expiry, Liquidity and Risk. Each of the filters below has the "Any" level of course - set the filter to it if you are not interested in a certain parameter. To narrow the search universe you may also specify a stock group (for example, "All USA", "S&P 500 stocks", "NASDAQ 100 stocks" etc)
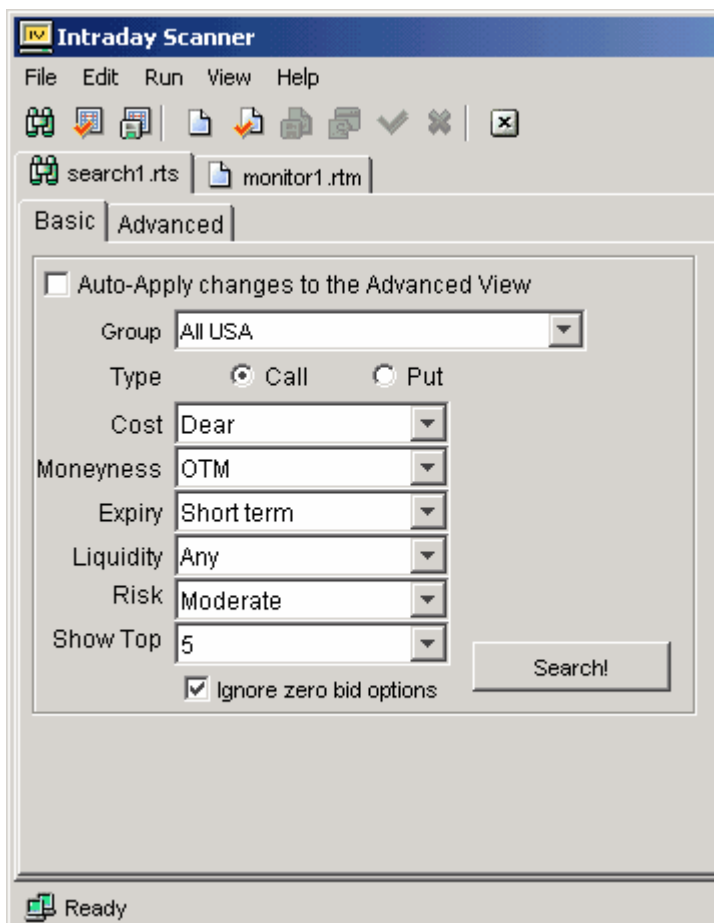
Moneyness

Moneyness is a standard way to assess how near the option strike to current underlying price is. It is calculated as

Calls: 100 % * (Underlying Price - Strike Price) / Underlying Price
Puts: 100 % * (Strike Price - Underlying Price) / Underlying Price

The Moneyness of zero means that option strike is exactly equal to underlying price - "at the money option", ATM. Positive values are inherent in "in the money" (ITM) options (such options, if exercised, allow to Buy/Sell underlying for better price than the market one). Finally, negative value

of Moneyness means that there is no reason to exercise the option at the moment - that's "out of the money" (OTM) option. Mind that Moneyness depends on the underlying price, and therefore changes in time: the Call option, once being ITM, might become OTM should the underlying price decline.

The following levels are available in Basic Scanner:

Deep OTM - Moneyness below -25 %
OTM - Moneyness between -25 % and -10 %
ATM - Moneyness between -10 % and +10 %
ITM - Moneyness between +10 % and +25 %
Deep ITM - Moneyness above +25 %

Note that we use Moneyness range of -10%...+10% for ATM options - that's because there can be no option contracts with strike exactly equal to underlying price at the moment.

Expiry

Different trades have different horizons and require different option expiries, right? Basic Scanner has a simple option expiry filter, with the following levels:

Short Term – two-three nearest months
Mid Term - two-three months to half a year till expiry
Long Term – more than half a year till expiry

Cost

There are different possible measures of option's cost - starting from just option price "as is" to complex model-specific parameters. We choose something in the middle, namely, option contract Implied Volatility. This popular measure of option cost is calculated using mean of bid/ask spread and shows option "extrinsic" (above par) value in a normalized way, comparable across different option contracts. You can find more details on Implied Volatility calculation and usage in our online Knowledge Base - http://www.ivolatility.com/help/4.html

The following levels are used to discriminate dear / cheap options:

Cheap - Implied Volatility below 25 %
Normal - Implied Volatility between 25 % and 55 %
Dear - Implied Volatility greater than 55 %

These values reflect average actual market levels, up to our knowledge.

One thing to be aware of - deep out of the money options can have large Implied Volatility values, and would be considered "Dear" by Scanner, although their price might be somewhere around $0.05 per contract. This just means that these options do not cost even $0.05, that's why treated as "Dear".

Liquidity

The liquidity value is even harder to assess, compared to cost, but this is one of the essential parameters, when considering the trade opportunity. Yes, the trade looks attractive, but would you be able to close the position on the winning price or would the bid/ask spread eventually turn your profit into loss? On the other hand illiquid assets might look more promising. We take quite a simple measure for liquidity, namely, end of day option contract volume. If it was high yesterday, probably the option is liquid and has a narrow bid/ask spread, so that you would be able to close your position quickly.

The levels for liquidity are:

Low - end of day option contract volume less than 50 contracts
Moderate - end of day option contract volume between 50 and 500 contracts
High - end of day option contract volume above 500 contracts

Risk

The Risk is a very complex concept but even the Basic Version of Scanner can help you to handle the Risk. Basic approaches to the Risk usually assume estimation of the so-called "Greeks" - the sensitivities of option price to different factors. The most commonly used "Greeks" are:

Delta - sensitivity of option price to minor changes in underlying price
Gamma - sensitivity to larger changes in underlying price (or sensitivity of Delta)
Theta - option price decay with time
Vega - sensitivity to Implied Volatility, or, in other words, to mispricing
Rho - sensitivity to the market interest rates level
Alpha - Gamma to Theta ratio

How can all this be included into one value called Risk? We've chosen the single main risk factor, leaving the secondary ones out. Sure, it is a simplification, but still gives a good feeling of the Risk involved.

If you do not have time to consider the details, a brief answer to what Risk is (in terms of our Basic Scanner) is as follows:

if you intend to **Buy** an option - the Risk is Theta
if you intend to **Sell** an option - the Risk is Gamma
if **not sure** - the Risk is Vega

Now, the detailed information of how this Risk measure was derived. As a first step, we've left out Delta, Rho and Alpha for the following reasons:

Delta: no reason to account for this, since Moneyness parameter already gives a fairly good estimate of Delta. ATM options have Delta about 50 % (by absolute value), ITM - close to 100 % and OTM - close to zero. Just to make things clear, Call option having Delta of 100 % loses $1 for each $1 decline in underlying price; Put option - the same for each $1 advance.

Rho: this parameter is traditionally left out when speaking of stock options; it affects only very long term options (LEAPS), and not that much, taking into account current low interest rates.
Alpha: this is a risk/reward characteristic, rather than pure risk - so we left this out in our Basic version.

The remaining factors (Gamma, Theta and Vega) are used as above. Indeed, if you buy an option contract, your main enemy is time decay - it is well-known that option prices decay with time, all other factors being constant. When selling option, the first thing to beware is fast option price increase when underlying price rapidly changes. But how do we determine if you going to buy or sell an option ? The secret is simple - we assume that you are going to buy cheap options, and sell expensive ones (Cost = Dear). If you select Cost level of "Any" or "Normal" (considering both Buy and Sell), the Vega risk factor comes into play - as you need to be sure that the pricing is fairly correct.

The levels of Risk are as follows:

1) when **Buying** an option (Cost = Cheap, so that Risk = Theta):

Low - option price loses less than 1 % for a 1 day passed
Moderate - option price loses less than 5 % daily
High - option price loses more than 5 % daily

2) when **Selling** an option (Cost = Dear, so that Risk = Gamma):

Low - option price gains less than 0.25 % for a 1 % move in underlying price
Moderate - option price gains less than 5 % for a 1 % move in underlying
High - option price gains more than 5 % for a 1 % move in underlying

3) when **considering both Selling or Buying** (Cost = Normal or Any, so that Risk = Vega):

Low - option price changes less than by 1 % for a 1 % (absolute) change in Implied Volatility
Moderate - option price changes less than by 10 % for a 1 % change in Implied Volatility
High - option price changes more than by 10 % for a 1 % change in Implied Volatility

Mind, that "Risk" field takes into account only the sensitivity to the main risk factor. The other risk-related filters in Basic Scanner are Cost and Liquidity, described above. Indeed, low liquidity is a high Risk, and high Cost (high Implied Volatility) too.

Advanced View Parameters

The Advanced Search View gives you total search control while still using a very simple interface. You can select from a wide range of Stock's and Option's filtering criteria. Each filtering criterion is defined by the following fields (some criteria can have less):

1. Filter **Name** (variable to filter by - like Implied vola)
2. Filter **Level** (like Dear / Expensive, High / Low etc.)
3. Filter **Level modifier** (like Absolute value, % of 1 month average etc.)

4. **From** field (Level low boundary)
5. **To** field (Level high boundary)

Combining Filter **Name** and Filter **Level modifier** defines the filtering criterion, for example:
Filter name = Historical vola
Filter modifier = in 1 year range

Will produce the following filter
Filtering criterion = HV in 1 year range

Now you need to specify an acceptable criterion range. This can be done using the **Level** field. We have several predefined settings – such as "Low", "High", etc. This selection is translated into the From / To fields using the pre-defined constants, so you see the result of your choice immediately. Filter level combobox for each of the fields contains two special values - "Any" and "Custom". "Any" means that there is no filtering by this criterion; "Custom" pops up when you manually edit From or To fields.

Below we show the complete list of Stock and Option filters, available in Advanced View. We do not provide the pre-defined constants here, as they are easily accessible right in Advanced View interface.

	Basic	Advanced

Hide inactive filters   **Show all filters**

Underlying filters

○ Select Group `All USA` ▼   or ○ Symbol(s) `_____`

				from:		to:	
Underlying price:	`Any` ▼	`Absolute` ▼		from:	`____`	to:	`____`
EoD Underlying volume:	`Any` ▼	`Absolute` ▼		from:	`____`	to:	`____`
EoD Options volume:	`Any` ▼	`% of 1 m avg` ▼		from:	`____`	to:	`____`
EoD Options OI:	`Any` ▼	`% of 1 m avg` ▼		from:	`____`	to:	`____`
EoD C/P volume ratio:	`Any` ▼	`Absolute` ▼		from:	`____`	to:	`____`
EoD Historical Vola:	`Any` ▼	`Absolute` ▼		from:	`____`	to:	`____`
IVX 1m:	`Any` ▼	`Absolute` ▼		from:	`____`	to:	`____`
IVX 1m/IVX 6m:	`Any` ▼			from:	`____`	to:	`____`
IVX 1m - IVX 6m:	`Any` ▼			from:	`____`	to:	`____`
Call/Put IVX 1m ratio:	`Any` ▼			from:	`____`	to:	`____`
EoD IVX 1m:	`Any` ▼	`Absolute` ▼		from:	`____`	to:	`____`
EoD Relative vola:	`Any` ▼			from:	`____`	to:	`____`

Option filters

Type: ● Call   ○ Put

			from:			to:		
Expiry:	`Short term` ▼		from:	`-` ▼ `-` ▼		to:	`Mar` ▼ `05` ▼	
Moneyness, %:	`OTM` ▼		from:	`-25`		to:	`-10`	
Price:	`Any` ▼	`% of stock` ▼	from:	`____`		to:	`____`	
Implied vola:	`Dear` ▼	`Absolute` ▼	from:	`55`		to:	`____`	
Delta level:	`Any` ▼	`% of price` ▼	from:	`____`		to:	`____`	
Gamma level:	`Moderate` ▼	`% of price` ▼	from:	`____`		to:	`5`	
Theta level:	`Any` ▼	`% of price` ▼	from:	`____`		to:	`____`	
Vega level:	`Any` ▼	`% of price` ▼	from:	`____`		to:	`____`	
Alpha level:	`Any` ▼	`Normalized` ▼	from:	`____`		to:	`____`	
Volume:	`Any` ▼	`EoD Absol...` ▼	from:	`____`		to:	`____`	
Bid Size:	`Any` ▼		from:	`____`		to:	`____`	
Ask Size:	`Any` ▼		from:	`____`		to:	`____`	

Sort by: `Implied vola` ▼ `Absolute` ▼   ○ Asc ● Desc

Show top: `5` ▼

☑ Ignore zero bid options

Quotes & data no older than: `_____` minutes

Search!

Underlying Filters

A full list of Stock filters, along with modifiers available, is presented below. Variable changing over the day is shown in **bold**. Depending on your subscription (real-time or 20-minute delayed)

these variables will be either realtime or 20-minute delayed data based. Formula / comment column specifies the exact formula used for the criterion.

Filter	Modifier	Formula / comment
Underlying Price	**Absolute**	**underlying price, S**
	% from yesterday	**S / S(yesterday)**
	in 1 year range*	**(S - S(1yr min))/(S(1yr max) - S(1yr min))**
EoD Underlying Volume	Absolute	underlying close volume, V
	% of 1 m average	V / avg(V), last month average
EoD Total Options Volume	Absolute	total close options volume, OV
	% of 1 m avg	OV / avg(OV), last month average
EoD Options Open Interest	Absolute	total close options open interest, OI
	% of 1 m avg	OI / avg(OI), last month average
EoD C/P volume ratio	Absolute	total close (calls volume) / (puts volume), CP
	% of 1 m avg	CP / avg(CP), last month average
EoD Historical Vola	Absolute	HV for 20 trading days (1 month), HV
	% from yesterday	HV / HV(previous close)
	in 1 year range	(HV - HV(1yr min))/(HV(1yr max) - HV(1yr min))
IVX 1m	**Absolute**	**Intraday IV Index for term 30 (1 month), IVX**
	% from yesterday	**Intraday IVX / IVX(previous close)**
	in 1 year range*	**(Intraday IVX - IVX(1yr min))/(IVX(1yr max) - IVX(1yr min))**
IVX 1m / IVX 6m		**Ratio of intraday 1m IVX to 6m IVX**
IVX 1m - IVX 6m		**Difference of intraday 1m IVX and 6m IVX**
Call / Put IVX 1m ratio		**Ratio of intraday IVX 1m Call to IVX 1m Put**
EoD IV Index	Absolute	IV Index for term 30 (1 month), IVX
	% from yesterday	IVX / IVX(previous close)
	in 1 year range	(IVX - IVX(1yr min))/(IVX(1yr max) - IVX(1yr min))
EoD Relative vola	Absolute	IVX / HV

* - resulting figure can be outside of 0..1 interval due to the fact that intraday value is compared against historical high and low (when new high or low record is set).

Examples:

1) Stock price advances more than by 5 % from end of day value: set Stock price modifier to "% from yesterday", "From" to 105.

2) Stock close volume larger than monthly average by 20 %: set EoD Stock volume modifier to "% of 1 m avg", "From" to 120.

3) EoD IV Index less than 25%: set EoD IV Index modifier to "Absolute", To to 25.

4) 1 month IV Index is at least 10% more than 6 months IV index (when looking for Calendar Spread): set **IVX 1m - IVX 6m** "from" field to 10.

Option filters

A full list of Options filters, along with modifiers available, is presented below. Variable changing over the day is shown in **bold**. Formula / comment column specifies the exact formula used for the criterion.

Filter	*Modifier*	*Formula / comment*
Type		Call / Put
Expiry	Absolute	expiration month and year
Price	Absolute	mean of the option contract bid/ask, C
	% from yesterday	C / C(yesterday)
	% of stock	C / S, S - intraday stock price
Implied vola	**Absolute**	**option contract implied vola, IV**
	% from yesterday	**IV / IV(yesterday)**
	in IVX 1 year range	**(IV - IVX(1yr min))/(IVX(1yr max) - IVX(1yr min))**
Moneyness, %	**Absolute**	**1 - K / S for Calls, K / S - 1 for Puts (K = strike)**
Delta	**Absolute**	**option contract absolute value of Delta; non-negative input is expected for both Calls and Puts**
	% of price	**Delta * S / (100*C)**
Gamma	**Absolute**	**option contract gamma, Gamma**

	% of price	Gamma * S^2 / (10000*C)
	% of delta	Gamma * S / (100* Delta)
Theta	**Absolute**	**option contract premium decay, Theta; non-negative input is expected**
	% of price	Theta / C
	% of delta	Theta * 100 / (S* Delta)
Vega	**Absolute**	**this option contract vega, Vega**
	% of price	Vega / C
	% of delta	Vega * 100 / (S* Delta)
Alpha	**Absolute**	**Gamma / Theta; non-negative input is expected**
	Normalized	**Gamma * S^2 / (10000* Theta)**
Volume	**Absolute**	**option contract volume**
	EoD Absolute	**option contract EoD volume**
Bid Size		**Intraday best bid size (liquidity indicator)**
Ask Size		**Intraday best ask size (liquidity indicator)**

Some examples of the filters usage:

1) Option premium is at least 10 % of the underlying: set Price modifier to "% of stock", Level low Boundary ("From" field) to 10.

2) Option premium decays less than 2 % daily: set Theta modifier to "% of price", Level high boundary ("To" field) to 2.

3) Risk of option price decay due to Gamma is not greater than that due to Delta: set Gamma modifier to "% of Delta", Level low boundary ("To" field) to 100.

For the Greeks (Delta, Gamma, Theta, Vega, Alpha), in addition to "Absolute" Level modifier, we introduced "% of price" and "% of delta" modifiers. These normalized criteria help to understand percentage change in option price, and to compare the change magnitude with sensitivity to underlying price (Delta). The following increments are implied when using normalized Greeks:

- Delta, Gamma - 1 % of underlying price
- Theta - 1 day
- Vega - 1 % (absolute, like change from 20 % to 21 % in implied vola)
- Alpha - 1 day for Theta and 1% of underlying for Gamma

Mind, that all the Greeks in filters are entered by their absolute value. So, if you are looking for Puts with Delta between -0.75 and -0.5, just set Level boundaries range to (50, 75).

Scanner usage tips

Though the application interface is pretty intuitive and most likely you won't need any additional usage instructions here are some hints you might find useful.

General Hints

First, you can position 'Monitor' screens within a single frame (accessible by the tabs at the top) or you can have every screen open in a separate window. To switch back and forth between this two modes just click 📄 / 📄 buttons (or use the 'View' menu).

The 'File' menu can be used to open a new Search or Monitor window. You can also Save/Load a Search profile - all your search criteria will be saved into your local drive – do this from File menu or use 📄 / 📄 buttons. There is an ability to Save and Reload the list of the option contracts present in current Monitor screen. This can be done through File menu as well (or 📄 / 📄 buttons)

Since permanent data updates might generate considerable network traffic you might want to 'freeze' updates for some time – stop/play button (🔴/🟢) serve exactly this purpose - or 'Run' menu item.

Finally, you can rename any of the 'screen' tabs – select the screen you wish to rename and click the Rename menu item from the Edit menu.

Search Screen Hints

We've already described the Search screen variables above. You might consider useful a small checkbox at the top of Basic Search screen – 'Auto-apply changes to the Advanced View'. If you click on that checkbox and switch to the Advanced Search Mode you will have values from the Basic screen used as default values for the Advanced Screen – that's actually a simple way to understand what our default search profiles mean. Finally, the very bottom field in the Advanced view can be used to exclude contracts where the bid/ask quotes has not being updated for some time. Remember that since this version of the scanner is based on the 20-minute delayed data any value less than 20 will produce an empty result

Search profile criteria (Basic or Advanced) can be saved to your local drive for subsequent reload – just use File->Save Profile menu item (or Ctrl-S). Saved Profile also keeps track of the selected columns to be shown as a search result.

Monitor Screen Hints

Monitor Screen displays options contracts that match your search criteria. You can have several screens (up to ten) with different set of options contracts shown simultaneously. Each screen can have up to 1200 option contracts. Maximum number of options contracts to show at one time (across all screens) is 3000.

It is also possible to add options contracts to your watch-list using contracts selection filter at the top of Monitor screen. You can add either selected options of the specified underlying or just add options contracts directly by specifying an option ticker.

Left area of the Monitor screen lists all available columns (the ones in **bold** are updated in real-time). 'Delete' column allows you to mark an option contract for deletion (Edit->Delete or Ctrl-D). Quote time indicator (a small ball with different colors) gives you an idea of how 'fresh' current option contract data is. Green ball means the quote is less than 40 minutes old, yellow is for quotes in 40 to 1h 20min range and the rest is marked as red.

Most of the fields are pretty self-explanatory. The ones with EoD prefix are variables as of previous close. You can combine both Intraday and close values on one screen for simpler comparison. EoD Relative Vola is a standard term we use on Ivolatility.com – this is the ratio of 30-day IV index to 30-day Historical Volatility (i.e. "EoD 1m IVX"/"EoD 1m HV"). EoD C/P volume ratio is a stock characteristic – a ratio of EoD total Calls volume to EoD total Puts volume.

You can add and remove fields to display, new field will be added as a first column – you can drag it with a mouse to a position you like (just drag the column title).

To save the list of options contracts to monitor into your local drive use the File menu (Save List or Alt-Shift-S).

Your feedback

We welcome your comments on the **RT Options Scanner** – we will certainly use them as ideas for subsequent versions of the Scanner. We will be adding more features to our scanner in coming months to help it make as useful as possible. Our email address is support@ivolatility.com