Investor/RT

Concepts and Facilities Guide

Version 3.6

Investor/RT

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Introduction to Investor/RT

About This Document

This document is designed to provide an overview of the concepts and facilities of Investor/RT. The material has been updated through version 3.6 of Investor/RT. We appreciate your feedback on the content and organization of this document. Please address your comments to support@linnsoft.com.

Investor/RT Product Definition

Investor/RT is a tool kit for the computerized investor. It provides powerful market monitoring, data capture, charting, technical analysis, and portfolio management features for users of a wide variety of real-time, delayed, and end-of-day market data services. Supported data services include the Signal, BMI, and eSignal data feeds from Data Broadcasting Corporation, DTN Spectrum and DTN Real-time data services from Data Transmission Network, Inc., InterQuote, an Internet-based real time service of Paragon Software, Inc., myTrack, an Internet based real-time service of Track Data Corporation, and Dial/Data, an Internet-based end-of-day quote and historical pricing service of Track Data Corporation. Investor/RT will monitor and analyze any security type transmitted by your data vendor, whether the data you receive from your data service is broadcast in real time, delayed, or end-of-day.

Continuous feed editions of Investor/RT are available for Signal, BMI, eSignal, DTN, InterQuote and myTrack. These editions provide real-time or delayed market data monitoring for the respective services. Internet based access to Dial/Data is also built into each continuous feed edition to facilitate historical data downloading to complement the real-time or delayed market data provided by the continuous feed data service.

A version of Investor/RT called the Dial/Data Edition provides Internet access to Dial/Data for daily, weekly, and monthly historical quotes coupled with the full complement of charting and technical analysis features. The Dial/Data edition also provides downloading of news on selected ticker symbols, downloading of fundamental data on stocks, company profiles, security names, and industry groups.

Investor/RT is "cross platform" software. All editions are available for Windows 95 and 98, Windows NT, and Power Macintosh platforms. The graphical user interface and product functionality are identical on each platform.

Starting Investor/RT for the First Time

Product Registration

Each user of Investor/RT is assigned a twenty character registration code that activates the software for the user's data feed. For DTN, Signal, and BMI feed users, the code also activates data reception for a particular receiver ID. For InterQuote, myTrack, and eSignal users, the registration code activates data reception for a particular login ID or user name. For Dial/Data users, the password activates the software for use with a particular Dial/Data account number. Investor/RT Dial/Data account numbers are of the form N99999, i.e. an N followed by a 5 digit number. myTrack users do not need a Dial/Data account number since access to Dial/Data is included with the myTrack service for Investor/RT users.

There are two ways to register Investor/RT, automated and manual. The automated method involves the use of a registration file sent via email to the user from Linn Software, and registration occurs automatically when Investor/RT is opened for the first time. The manual method involves typing the password and related information into the Registration window. Experience has shown the automated registration procedure to be the fastest and most reliable way to register.

Automated Registration

To auto register the Investor/RT software, copy the registration file attached to the e-mail message into the investrt\program directory (Windows) or into the Investor/RT Folder (Macintosh). Then start Investor/RT and go to the Registration window under Setup: Preferences. Assure that the status message in this window reads, "Registration OK".

Manual Registration

Upon starting Investor/RT for the first time, choose Setup: Preferences and select the Registration section from the list of preference topics (See Figure 1). Enter the user name, Investor/RT registration code, receiver or login ID, and Dial/Data account number into the spaces provided. Enter this information exactly as it is shown in the e-mail message received with the 20-character password. When typing the password, the software automatically separates each group of 4 characters with a hyphen to improve readability. There is no need to type in the hyphens. When all four items of information have been entered, press the OK button.
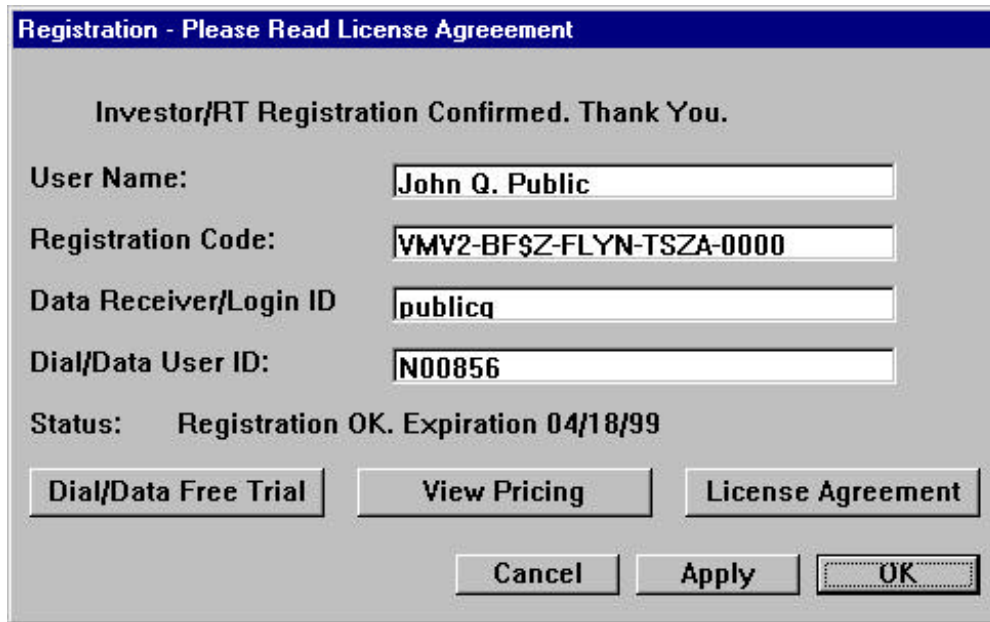
Figure 1. Registration window

In the event that registration is unsuccessful, a dialog box will appear asking if you would like assistance. Press the "Assist Me" button and the software will guide you through the registration process. If difficulties persist, please use the automated registration method as instructed in the email message sent along with the registration code.

Registration codes have an expiration date. Make sure your computer's date/time control panel is set to the correct date and time. If you are unsuccessful registering the software, contact Linn Software by e-mail to support@linnsoft.com.

Investor/RT Concepts

The fundamental purpose of Investor/RT is to collect, organize, monitor, analyze, display, and chart market data for stocks, bonds, futures, options, indexes, and mutual funds of interest to the user. In Investor/RT we use the term "instrument" to refer to a particular item the user wishes to monitor. Each instrument is uniquely identified to Investor/RT by three pieces of information: the ticker symbol, the session number, and the requested exchange.

1. Ticker symbol. The ticker symbol is a sequence of 1 to 24 characters that identifies the instrument according to the data service in use. For example, eSignal and InterQuote use the ticker symbol $INDU to identify market data for the Dow Jones Industrial Average, BMI and DTN use INDU, Dial/Data uses *DWI X. Typically, ticker symbols are composed of uppercase letters. When typing in ticker symbols in various places in Investor/RT, the software automatically capitalizes each letter. There is no need to use the caps lock or shift key. In the rare instances that a ticker symbols contains a lower case letter, hold down the shift key, the opposite of normal use of the shift key.

2. Requested Exchange. Some data services, such as BMI, broadcast a unique code with each trade to identify the exchange on which the trade occurred. By requesting a particular exchange when defining an instrument, Investor/RT can monitor just those trades that occur on that exchange. The special exchange COMP (which stands for "composite") is used to request that all trades for the ticker symbol regardless of exchange be monitored for the instrument. You may define as many instruments as you like having the same ticker symbol. Ticker IBM, requested exchange COMP and ticker IBM, requested exchange NYSE can both be defined as distinct instruments. The former will track all trades in IBM, the latter will track only the trades that take place on the New York Stock Exchange. InterQuote and Dial/Data users should always specify COMP as the requested exchange since exchange identification is not supplied by the data service. In most cases, the requested exchange should be COMP. Do not specify an exchange unless you are certain that your data vendor transmits data for the instrument with that exchange identifier. If in doubt, always specify COMP as the exchange.

3. Session. A session (or trading session) has a name and a session number. A session represents the hours during which trading occurs for some collection of instruments being monitored by Investor/RT. For example, session 0 is pre-defined in Investor/RT to represent the trading hours of the New York Stock Exchange. Investor/RT is shipped with several sessions defined for Eastern Time Zone as a default. IMPORTANT: All session times must be expressed in the local time of the user. For Windows users, it is important that the time zone be set correctly in the Date/Time control panel. The user may specify as many as 50 unique trading sessions to Investor/RT. Assigning a session to an instrument causes the instrument to be monitored during the trading hours associated with that session. The session to which an instrument is assigned restricts the data collection and intra-day charting to the trading hours of the assigned session. There are a dozen or so sample sessions pre-defined in Investor/RT. Any of these sessions can be renamed by the user to reflect the trading session times of interest.

In summary, ticker symbol, requested exchange and session together form a unique identifier for an instrument. The same ticker may be used in combination with different exchanges and sessions to form possibly related but distinct instruments. This is particularly important to futures traders who often track certain futures contracts during distinctly different trading periods and wish to keep the market data segregated by session.

For many users, the ticker symbol is sufficient to identify the instruments of interest. If this is the case, accepting the default values of COMP for exchange, and zero for session is appropriate. The key concepts to remember are:

(1) an instrument specifies a ticker symbol,

(2) the requested exchange (usually COMP) can optionally restrict monitoring to just those trades that occurs on a particular exchange, and

(3) the session restricts monitoring and intra-day charting of the instrument to trades that occur within a specific start and stop time each trading day.

Each instrument has an associated security type (stock, future, index, etc.). For Dial/Data and InterQuote users, the security type is for documentation and display purposes only. For other continuous feed users, there are situations in which correctly specifying the security type is crucial. The rule is as follows: if an instrument's requested exchange is COMP then the security type of incoming data for the ticker symbol must agree with the security type specified for the instrument. If they do not agree the incoming data is not applied to that instrument. For example, BMI transmits data for a stock with the ticker symbol BAY. BAY is also the ticker symbol of an index. If you establish an instrument BAY:COMP:0 and set the security type to stock, that instrument will receive only the data for BAY, the stock. Data for BAY, the index, will be appropriately ignored. BAY, the index, is transmitted with an exchange identifier of BMIC. Therefore you can track both the BAY stock and the BAY index by adding an instrument BAY:BMIC:0. As a rule, if you know the security type, specify it. If you are unsure, specify the security type as "Unknown".

When setting up instruments, one of the choices for security type is "Unknown". If Investor/RT receives a quote or trade for an instrument with unknown security type, the software sets the security type to the type transmitted by the data service (if applicable) for the matching ticker symbol. In the BAY example above, specifying unknown would enable the instrument to receive data for either BAY the stock or BAY the index. The quote that arrives first sets the security type of the instrument. Dial/Data and InterQuote do not transmit the security type of the instrument.

Investor/RT also has the capability of tracking "custom instruments". A "custom instrument" is an instrument defined by the user as a weighted sum, difference, or ratio of two or more instruments. For example, a futures trader may wish to track the difference (the spread) between the March and December S&P 500 futures contract. Custom instruments are not quoted by the data service, they are calculated by Investor/RT whenever one of the defined components changes price. Custom instruments have all of the properties of data feed transmitted instruments. They may be charted in any time frame; they may be monitored for high and low price levels like any instrument; and they may be "owned" in a portfolio.

In summary, custom instruments allow the Investor/RT user to track spreads, straddles, ratios, and weighted sums of two or more instruments. The components of a custom instrument may also be custom instruments. As a result, complex indicator calculations may be defined as custom instruments in Investor/RT.

Investor/RT is an "object oriented" system. The user manipulates "objects" of various kinds to view, analyze, or organize investment related information. An object is typically presented to the user in a window. The word "window" can generally be used in place of "object". The definition of an object is saved by Investor/RT in a database stored on the user's hard drive. A window is used to make a particular object visible on the computer screen. Some examples of Investor/RT objects are charts, quote pages, portfolios, scans, and ticker tapes. A chart window is essentially the manifestation of a chart object on the computer screen. You may have as many objects of any type "open" for viewing as you want. You can open copies of the same object in two or more windows if you like. An overview of each type of object is

provided in this section to introduce the basic purpose and function of each object. Each object type is then treated in more detail in the sections that follow.

Most windows in Investor/RT are "live", that is, open windows update automatically as new market data arrives. For example, the arrival of a real-time trade from a continuous feed triggers an update to the market data shown in a quote page window; a ticker tape object shows the trade price and tick volume; charts displaying the security instantly update to reflect the last trade; and your trading portfolio's gain/loss for all positions in that security are updated along with the total gain/loss.

Objects of different types interact with one another. For example when viewing a portfolio, a click of the mouse can open a chart object for any security in the portfolio. When viewing a portfolio or a quote page a single click will open up a ticker tape showing live trades on just those securities in the quote page or portfolio. With a chart object open, a double-click in an adjacent quote page substitutes the security in the chart with a new one, recalculating and redrawing all technical indicators automatically.

Investor/RT uses a database management system to save the definition of all objects created by the user. Each object has a name by which it is identified in menu selections or lists. Investor/RT provides a convenient "Object" menu as well as scrolling lists of object names to facilitate selecting the objects the user desires to open for viewing or manipulation. The database contains detailed information about the user's preferences when viewing each object. The size and position of the window is retained along with various color preferences and other settings particular to the type of object.

Objects may be combined in useful ways. An arrangement of several charts, portfolios, and other object windows can be saved as a Layout object so that all objects in the layout can be opened by a single menu selection. Quote page objects and chart objects may be "joined" together to form a slide show, a special object that sequences a series of securities from a quote page through a particular chart.

Object Types

In this section we provide an overview of each of the object types implemented in Investor/RT. A detailed description of each object is presented in the sections that follow.

Instrument Selector

Investor/RT places no limits on the number of instruments that may be monitored. Many of Investor/RT features require a simple method for quickly selecting particular instruments of interest A special object called the Instrument Selector fulfills this requirement.

The instrument selector appears in numerous places throughout Investor/RT, sometimes in a window by itself, sometimes embedded in a window for the purpose of identifying an instrument on which some function is to be performed. The selector shown in Figure 2 is used to pick instruments for addition to a quote page.

Figure 2. An instrument selector

The instrument selector is a miniature spreadsheet with the rows containing all available instruments and the columns containing ticker symbol, requested exchange, session, instrument name, last price, and security type. The selector is initially sorted alphabetically by ticker symbol. Typing characters on the keyboard selects the instrument with a matching ticker symbol. When the keyboard is used to select an instrument, the first instrument matching the letters typed thus far is highlighted. A caret symbol (^) is used to mark the letters matched thus far. For example, if the user types AA, the instrument for Apple Computer may be highlighted with the symbol displayed as AA^PL. The caret informs the user that AA has been typed thus far. If the next letter typed is Q, the first instrument matching AAQ will be highlighted and so on. When a letter is typed that, when added to the letters typed thus far, matches no known instrument, then Investor/RT discards all typing and starts a new search beginning with that letter.

To search for an instrument by name instead of ticker, click the plus sign icon in the upper right corner of the selector. The instrument selector will then be sorted by name. Typing characters will then match instruments whose name matches the characters typed in the same manner described above. Press return, enter, or double-click to perform the action associated with the selected instrument. In the case above, the action is to add the chosen symbol to the open quote page.

Any instrument selector accepts a right-click on a ticker symbol(command + click if Macintosh). This calls up a pop-up menu to facilitate common operations on the symbol, such as viewing the news stories for the instrument or viewing the time and sales for the instrument. Further, a right-click on the instrument selector's column title brings up a menu of

instrument types (stocks, futures, etc.). This menu makes it possible to change the list of instruments viewed in the selector at any time.

Quick Quote

The Quick Quote object is a rectangular window with an instrument selector positioned at the left (see Figure 3). As you use the mouse or keyboard to select an instrument, a detailed array of market data for the instrument appears to the right, including open, high, low, last, change, previous close, 52 week high and low (contract high/low for futures). All market data is updated as trades or quotes arrive on the data feed. Fundamental data such as PE ratio, earnings per share, dividend and yield are shown when those data items are provided by the data service in use. When a quick quote window is closed, Investor/RT saves the object in the database. The name of each saved quick quote object is composed of the ticker symbol, requested exchange and session number of the associated instrument separated by colons. A list of saved quick quote objects is available in the Objects menu for convenient recall.
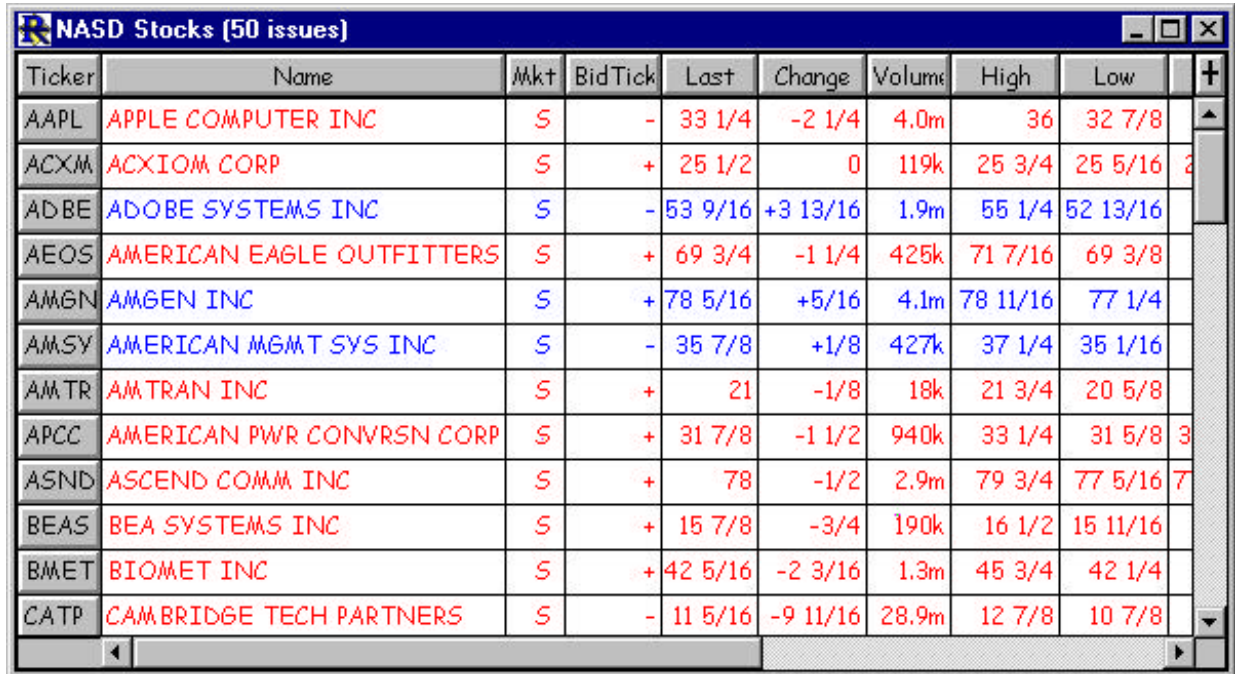
Figure 3. A quick quote window

The Quick Quote object is useful for (1) inspecting a detailed quote on one or more instruments, (2) monitoring the activity of a single instrument as trades occurs, and (3) as a general purpose tool for identifying an instrument for some other purpose. Along the top left of the Quick Quote window is an array of icon buttons. Each button performs some action on the selected instrument. Actions include: producing a chart, accessing the setup information for the instrument, viewing news items pertaining to the selected instrument, accessing trading notes for the selected instrument, and accessing portfolios which contain positions in the selected instrument. The default action is to request a chart. Pressing enter, return or double-clicking a row in the instrument selector performs the default action. If one or more chart objects are open, the instrument is inserted into the front chart, otherwise a new chart object is opened for the instrument. Thus a quick quote window can serve as an instrument selector for the front chart window.

Quote Page

The Quote Page object is a spreadsheet used for viewing market data for a list of instruments, entering new instruments, and editing various attributes of instruments. Each quote page has a name and contains rows of instruments. As many as 30 columns of market data may be displayed at one time. There are more than 150 data columns to choose from. Horizontal and vertical scroll bars are available when the number of rows or columns exceeds the size of the quote page window. See Figure 4, a sample quote page window.

NASD Stocks (50 issues)

Ticker	Name	Mkt	BidTick	Last	Change	Volume	High	Low	
AAPL	APPLE COMPUTER INC	S	-	33 1/4	-2 1/4	4.0m	36	32 7/8	
ACXM	ACXIOM CORP	S	+	25 1/2	0	119k	25 3/4	25 5/16	2
ADBE	ADOBE SYSTEMS INC	S	-	53 9/16	+3 13/16	1.9m	55 1/4	52 13/16	
AEOS	AMERICAN EAGLE OUTFITTERS	S	+	69 3/4	-1 1/4	425k	71 7/16	69 3/8	
AMGN	AMGEN INC	S	+	78 5/16	+5/16	4.1m	78 11/16	77 1/4	
AMSY	AMERICAN MGMT SYS INC	S	-	35 7/8	+1/8	427k	37 1/4	35 1/16	
AMTR	AMTRAN INC	S	+	21	-1/8	18k	21 3/4	20 5/8	
APCC	AMERICAN PWR CONVRSN CORP	S	+	31 7/8	-1 1/2	940k	33 1/4	31 5/8	3
ASND	ASCEND COMM INC	S	+	78	-1/2	2.9m	79 3/4	77 5/16	7
BEAS	BEA SYSTEMS INC	S	+	15 7/8	-3/4	190k	16 1/2	15 11/16	
BMET	BIOMET INC	S	+	42 5/16	-2 3/16	1.3m	45 3/4	42 1/4	
CATP	CAMBRIDGE TECH PARTNERS	S	-	11 5/16	-9 11/16	28.9m	12 7/8	10 7/8	

Figure 4. A quote page window

Like most windows in Investor/RT, the quote page is live. Displayed market data is updated instantly as new data arrives. Live updating is suspended temporarily when the user is editing the contents of a cell in the quote page. Clicking on or tabbing to an editable cell selects the cell for editing and places a bold border around the cell. After editing is completed, press enter or return. When editing cells in a quote page or any other spreadsheet-like display in Investor/RT and copy/paste commands are supported.

Investor/RT has a dozen built-in system quote pages whose rows of instruments are determined when the quote page is opened. These system defined quote pages have names that begin with a period to distinguish them from user-defined quote pages. For example, the quote page ".Stocks" lists all instruments whose security type is stock; the quote page ".Intra day" lists all instruments designated for intra-day data collection.

The instruments assigned to user-defined quote pages are strictly controlled by the user. The instruments may be listed or sorted in any order. The columns displayed in the quote page are

user-specified. Facilities are provided for defining commonly used data column arrangements, called formats, and switching among formats easily. A complete list of available data columns can be viewed by pressing the "Add Column" button on the quote page tool bar.

Ticker Tape

The ticker tape object is a live object that displays trades or quotes as they arrive on the data feed (See Figure 5).The ticker tape object is associated with a particular quote page object in order to specify which instruments are to be displayed in the tape. The user may limit the trades reported to those that equal or exceed a specified tick volume. This feature is useful when watching for large block trades for stock instruments. You may open as many ticker tapes as you like. A ticker tape may report trades on a single instrument, a few, or even thousands. When opening a ticker tape for a large number of instruments, it is advisable to specify the tick volume limit or the tape may move too fast to be readable. Sizing controls are provided on the right end of the ticker. The horizontal size button expands the ticker tape to the full screen width. The vertical size button expands and contracts the window size to reveal the ticker tapes controls that reside beneath the tape display area. In Figure 5 below, the controls are hidden. The back ground color of the ticker tapes is user-controlled as are the colors used to indicate which instruments are up, down, or unchanged in price.

CTAS	MACR	ACXM	CBIZ	AMTR	TRAC	SBAS	THQI	TWMC	TWLB	ASND
69 1/8	38 3/4	25 1/2	9 15/16	21	9 3/4	1 1/2	19 7/8	12 1/8	7 15/16	78
+	unch	0	-1/16	-1/8	-1/8	-1/8	-1/4	-5/16	-7/16	-1/2

Figure 5. A ticker tape window

Chart

Investor/RT features advanced charting and technical analysis through the chart object. A chart object is a collection of graphs of instruments and technical indicators derived from the historical data of one or more instruments. Chart objects may be viewed in any of several time frames: daily, weekly, monthly, or intra-day. Intra-day chart objects may display data in tick-by-tick form or in intra-day minute bars of any user specified duration (in minutes).

Instrument graphs may be displayed in various formats: bar, candlestick, connected line, and continuous line. Technical indicators are usually drawn as continuous lines. See Figure 6 below, a sample daily chart window with an instrument graphed in candlestick format and with 3 indicators: a volume histogram, a 10 period moving average, and a MACD oscillator.

A chart object is displayed in a window, usually sub-divided into two or more sub windows. Multiple instruments may be graphed in the same or different sub windows according to the user's preference. Some technical indicators are always displayed in their own sub windows.

Others may be overlaid with their associated instrument in the same chart sub window as is the moving average in Figure 6.

Figure 6. A chart window. IBM daily with technical indicators

Investor/RT places no arbitrary limits on the time periods that may be charted and the amount of historical data that may be retained in the database for each instrument. The user specifies the retention period for each time frame. Twenty year monthly charts, 10-year weekly charts, a month of tick data or 5 minute bars--Investor/RT can handle any time period and any amount of data subject only to the limits of hard disk space and memory allocated to the application. Traditional graphs of instruments, like the one shown above can be shown as lines, bars (open, high, low, close), or as Japanese candlesticks. In addition, there are a variety of special chart types available in Investor/RT. These include point and figure charts, market profile charts, volume profile charts, and day bar charts and raw tick charts. These will be discussed later in the section on charting.

Portfolio

The portfolio object is a spreadsheet with many characteristics in common with the quote page object. The key difference is that the portfolio contains only instruments in which the user has

an open position. Each row of the portfolio spreadsheet represents an open position in a particular instrument. A position may be long or short, cash or on margin. The portfolio object performs a variety of accounting functions to show the gain or loss in each position and the total gain/loss of the portfolio as price updates are received. The gain/loss calculations are automated for most security types including futures contracts, stocks, mutual funds, bonds, and equity and index options. See Figure 7, a sample portfolio.

Investor/RT provides facilities for entering positions into a portfolio or for entering trading orders. Trading orders, when later confirmed by the user, cause a new position to be added to the portfolio. Investor/RT is designed to support electronic order entry. At present (March 1999) the order placement and confirmation process is manual.

For position traders and long term investors, the portfolio enables the user to track dividends and interest earned and interest and commission expenses associated with each position in order to calculate a true annualized rate of return on each position.

Each portfolio may be assigned a privacy password to protect the confidentiality of the portfolios. When a password is assigned to a portfolio, the password must be entered when the portfolio is opened for viewing. Portfolio passwords may be changed at any time or eliminated if desired.

Ticker	Last	Value	Net G/L	L/S	Qty	Cost Basis	Open Pos	Days	% G/L
DBCC	13 9/16	40,687.50	31,465.00	L	3000	9,222.50	3 1/16	166	341.18%
CSCO	00 5/16	50,156.25	3,710.00	L	500	46,446.25	92 13/16	80	7.99%
ASND	76 7/8	38,437.50	9,402.50	L	500	29,035.00		58	99	32.38%
Mkt Value		129,281.25				84,703.75			
Cash (Debt)		73,952.50							
Equity		$203,233.75	$44,577.50						

Figure 7. A portfolio window

Scan

A Scan object is a specification for searching through all of the instruments in a particular quote page to identify those whose current or historical market data exhibit user-defined characteristics. The result of a scan is a quote page that lists the instruments that "passed" the scan request. Scans can be used to screen large numbers of issues for particular technical patterns in preparation for the trading session, or they may be used during the trading session to watch for buy and sell signals according to user specified criteria.

The scan criteria for each scan are specified using a scan request language. The scan request language, described in detail later, supports arithmetic, relational, and logical operations of

arbitrary complexity. Using this language, the user may test any logical expression involving market prices, fundamental data, historical prices, and the present or historical values of any technical indicator. Scans may be performed on daily, weekly, monthly, tick data, or minute bar data of any user specified duration.

Since the result of running a scan is a quote page, the scan results may in turn be used to supply a list of instruments for sorting and display, for charting in a slide show, for data downloading etc.

The scan object has an "auto scan" feature which enables any scan to be run repeatedly throughout the trading session at a user-specified interval. When the auto scan detects the condition specified in the scan request, an audible alert sound and/or a custom message may be displayed.

Finally, one or more scans can be added to a chart window. This enables the user to see graphically in the historical chart when each buy and sell signal would have triggered. Trading systems of arbitrary complexity can thus be setup and tested on the historical data for any instrument.

News Ticker

Investor/RT tracks and organizes various types of news items transmitted by each of the supported data services. The news ticker object is a live object that shows headlines of arriving news items (see Figure 8). The most recently received headline appears at the top of the new ticker window along with the date and time it arrived. Older items are pushed down as new items arrive and eventually disappear from the window. A news ticker may be limited to items in a particular news category or it may show arrivals from all categories. The number of items that may be viewed is limited by the size of the news ticker window. Double-clicking on an item in the news ticker opens up a text window in which the full text of the news item is displayed. The News Ticker object is designed to allow the user to keep an eye on market news in one or more categories as news arrives. News items are stored in the Investor/RT database and are often associated with instruments mentioned in the news item.

11:33 05590 C	11:34 B: UPI Texas Second News Briefs (Comtex)
11:33 05589 C	11:33 B: Second Pennsylvania News in Brief (Comtex)
11:30 05585 C	11:31 AP Top Headlines At 11:29 a.m. EDT (Comtex)
11:26 05576 C	11:26 NKorea Told To Give Up Nuke Program (Comtex)
11:25 05575 C	11:26 Ukraine's hard-line parliament speaker announces presidentia (Comtex)
11:24 05566 C	11:24 B: Russian government composition -- factsheet. (Comtex)
11:22 05564 C	11:23 South Africa's Mbeki pushes for vote in Zulu stronghold (Comtex)
11:22 05563 C	11:23 B: RETRANSMITTING to delete eds note with news conference sc (Comtex)
11:21 05555 C	11:21 Weather Around the World (Comtex)
11:20 05554 C	11:21 Jordan's king meets Lebanese president (Comtex)
11:03 05484 C	11:03 France, Germany Call for G8 Meeting on Yugoslavia (Comtex)
11:02 05482 C	11:03 B: Ukraine's hard-line parliament speaker announces presiden (Comtex)

Figure 8. A news ticker window

News Browser

The news browser is a general purpose object designed for browsing or searching for news items on file in the Investor/RT database. The news browser window has two sub windows. The top half of the window shows a scrollable list of one line headlines for each news item on file. When a news headline is selected in this list, the full text of the news items appears in the text viewing area at the bottom of the news browser window. See Figure 9, a sample news browser. Double-clicking a headline opens a text window containing the full text of the news item. Facilities are provided for searching the headlines for words or phrases of interest. News items may be deleted individually or *en masse* in a news browser. Some news items are received by Investor/RT with an explicit declaration of the ticker symbol(s) to which the item refers. In such cases, Investor/RT links the news item automatically to the associated instrument. Many news items are received by Investor/RT without any automatic associations. When reading such items in the news browser, a facility is provided to enable the user to assign the news item to one or more instruments. These news linkages, whether automatic or user-linked, make the news item accessible from the instrument. Linked news items are typically retained for a longer period than free standing news item.

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ALL Categories                                              _ □ ✕
May 21      BARRON'S: RESEARCH REPORTS -2-  (DJNEWS)                ▲
May 21      BARRON'S: RESEARCH REPORTS  (DJNEWS)
May 21      BARRON'S: OTHER WINNERS  (DJNEWS)
May 21      BARRON'S: THEY'RE STILL WATCHING  (DJNEWS)
May 21      DJ CORRECTION: U.S. FAA ORDERS CHECKS OF BOEING 727S  (DJNEWS)
May 21      BARRON'S: INSIDER TRANSACTIONS  (DJNEWS)
May 21      BARRON'S: THE LONG HAUL: RAILROADS AS GROWTH -2-  (DJNEWS)
May 21      BARRON'S: THE LONG HAUL: RAILROADS AS GROWTH STOCKS? CSX AND
May 21      BARRON'S: THE THROWBACK: VALUATIONS MATTER, SAYS A PRO WHO'S T
May 21      BARRON'S: AIG ALSO HIKES OUTLAY, SPLITS STOCK  (DJNEWS)
May 21      BARRON'S: REVIEW & PREVIEW FOLLOW-UP -- A RETURN VISIT TO EARLIEF
May 21      BARRON'S: THE TRADER -2-  (DJNEWS)                      ▼

BARRON'S: THE THROWBACK: VALUATIONS MATTER, SAYS A PRO WHO'S THRIVED BY
FOLLOWING THAT PRECEPT

Instruments:  AOL-AMERICA ONLINE INC +3.6250 at 119.3750   GE-GENERAL
ELEC CO +1 1/8 at 101 11/16   HD-HOME DEPOT INC +.062500 at 56.875000
KO-COCA COLA CO VKO LKO +3/8 at 68 5/16   MHP-MCGRAW HILL COS  WMP VMP
-.250000 at 51.875000   NTRS-NORTHERN TRUST CORP NRQ +2 3/16 at 90 3/8
PG-PROCTOR & GAMBLE CO LPR ZPG -.6250 at 93.3750   SUNW-SUN MICROSYSTEMS
INC LSU ZSU +1.000000 at 59.750000   AOL-AMERICA ONLINE INC +3.6250 at
119.3750   GE-GENERAL ELEC CO +1 1/8 at 101 11/16
DJ48_990521220012
```

Figure 9. A sample news browser window

Trading Notes

The trading notes object is designed as a notepad for recording notes associated with particular instruments. At the top of the trading notes window is a standard instrument selector. When an instrument is selected, its trading notes are listed in the center portion of the window. Each trading note has a date time stamp and is limited to 256 characters of text. Selecting a note brings the note into the area at the bottom of the window for viewing and editing. Access to the trading notes for a particular instrument is provided from other types of objects such as the quote page, quick quote, and portfolio objects (see Figure 10). Stocks splits and portfolio transactions involving stock instruments automatically generate trading note entries noting those events.
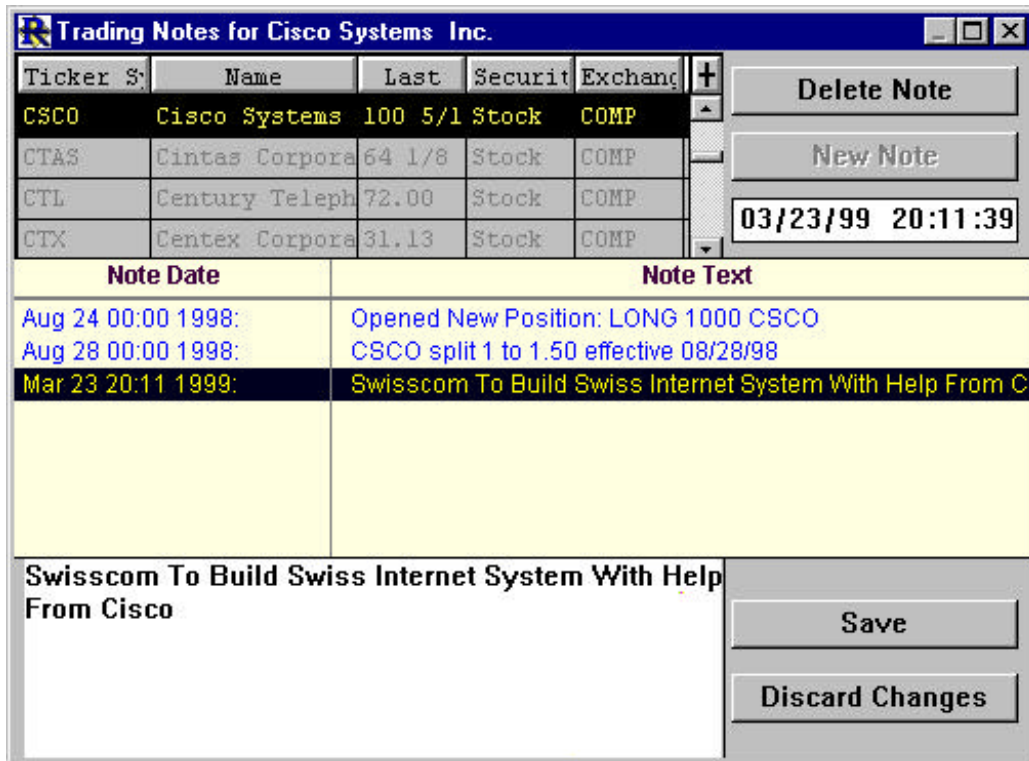
Figure 10. Trading notes for CSCO

Layout

The layout object provides a way to save a collection of windows that are open on screen. The screen position and other attributes of the windows that are open at the time the layout is created are stored in the Investor/RT database. At any later time you may recall a layout by name from the Object: Layout menu. Each constituent window will be opened at the same screen position. Since the objects that make up a layout are usually "live" objects, when the layout is recalled, each window will reflect current market data. A layout can be composed on any combination of: charts, ticker tapes, news tickers, news browsers, quote pages, portfolios, quick quote windows, and scan windows.

To create a layout you must first assure that each of the component windows of the layout are saved. Saving provides an identity for the object that can be used as a reference when each object is recalled to reconstruct the layout. The "Save All" command in the File menu provides a means of saving every window currently open. After you have sized and arranged the objects into the layout you wish to save, choose File: Save Layout or File: New: Layout. Then enter a name for the layout and click OK in the ensuing dialog box.

Slide Show

A slide show object is a one-of-a-kind object that is designed to provide a convenient method of sequencing a series of instruments through a chart window. To accomplish this, the slide show object automatically associates the active chart object and the active quote page. By

"active object" we mean the front most object of that type. The slide show object's window is a small toolbar type window with an array of icon buttons for controlling the slide show. The slide show sequences each instrument in the quote page into the associated chart, one-by-one. Slide shows can proceed automatically with a user-specified pause between each chart or manually by clicking the slide show toolbar to advance to the next chart. The slide show pause between charts may be adjusted by choosing Setup: Preferences: Charting, General. The chart window used in a slide show may be of any complexity. Each instrument in the quote page replaces the primary instrument in the chart and all technical indicators are automatically associated, recalculated and re drawn as each new instrument is inserted into the chart.

Since the association between quote page and chart object is dynamic, you may switch to a different quote page or chart object or make adjustments to the quote page or chart at any time. It is recommended that the slide show be "paused" by pressing the pause button on the slide show toolbar prior to making quote page or chart adjustments.

Object Toolbars

Several Investor/RT object types have an associated toolbar designed to provide convenient, single-click access to common operations on that type of object. Object specific toolbars are available for quote pages, portfolios, news browser, and chart objects. The quick quote object has an array of buttons built into the object itself instead of floating in a separate toolbar window. The slide show object is also a special case of a toolbar designed to operate with the current chart object and the current quote page object.

The object specific toolbars appear and disappear automatically as the associated object window gains or loses focus. For example, when a new chart object is opened, the charting toolbar will appear. Clicking the mouse on a quote page window then causes the focus to shift to that quote page. The charting toolbar will disappear and the quote page toolbar will appear. The user may manually show and hide toolbars as well. Toolbars "float" above all object windows so they are always accessible for activating various functions.

By default, each toolbar utilizes small buttons and is oriented vertically. The user may adjust the preferred toolbar orientation for all toolbars to horizontal or vertical, and the button size to large or small using Setup: Preferences: General.

Any object specific toolbar may be positioned anywhere on screen. Toolbar positions are recorded in the database so toolbars will always re appear where you last left them. Each object toolbar has a button for adjusting the orientation and button size of the toolbar.

Many toolbar buttons operate on the current selection in the associated object window. For example, selecting a row in a quote page and clicking the green trash can in the quote page toolbar removes the selected instrument from the quote page.

Pointing the mouse at any button on any toolbar for a second or two will cause a small window to pop up near the mouse pointer showing the purpose or action associated with the

button. The toolbar help delay time may be adjusted in the General Preferences section of Setup: Preferences.

Main Toolbar and Status Messages

A special toolbar called the main toolbar contains icons buttons for opening objects of each type and other buttons for accessing frequently used features of the application (see Figure 11). The main toolbar may be anchored at the top of the screen to conserve screen space or it may float like other toolbars at any user preferred location. The main toolbar also contains a message area where informational messages are displayed as Investor/RT monitors the data feed or responds to user commands.

Sometimes status messages may appear only briefly before being replaced with a new message. Important messages are logged to a text file, called the "message log". The contents of this text file may be reviewed at any time by choosing File: Open: Message Log.

The main toolbar may be displayed expanded with button titles as shown in Figure 11, or it may be displayed condensed or expanded without titles. Specify the preferred style in Setup: Preferences: General Preferences.
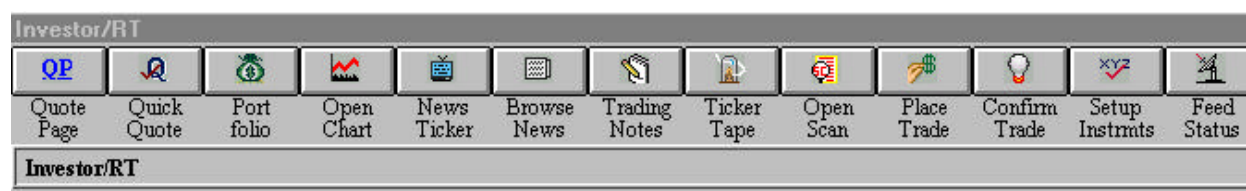
Figure 11. A portion of the main toolbar

Preferences

General Preferences

Investor/RT provides numerous preference settings that enable the user to customize the operation of the application. Some of these preferences are general in nature, that is, they govern the overall operation of some aspect of the application. General preferences are such things as retention periods for historical data or news items, default window background and text colors, session start and stop times, toolbar style, etc.

Shown below are the general charting preferences, accessed by clicking on the topic "Charting, General" in the preference list on the left to select it. To access any of the preference window, click "Setup Preferences" on the main toolbar, then pick the preference topic from the list of preference topics that appears. It is strongly recommended that every new user of Investor/RT open all of the preference topic windows to customize the behavior of the software to the preferred settings. To do this, click the Preferences button on the main toolbar and then click the "All" button at the bottom of this list of preference topics. This will open every preference window.
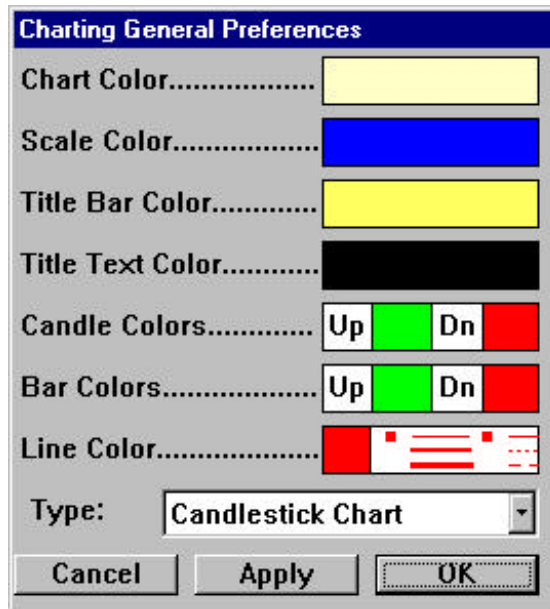
Figure 12. Charting General Preferences

Object Default Preferences

Many Investor/RT objects have default preferences that govern how new objects of that type are created. For example, when you open a new chart window, the chart window is created with a prescribed height and width, a background color, a time period (daily, weekly, etc.), and other characteristics. These are called object default preferences, in this case, chart default preferences. General preferences and object default preferences are specified using Setup: Preferences in the menu bar or by clicking the "preferences" icon in the main toolbar.

Object Instance Preferences

When an object of some type is created, it takes on the default preferences for that object type. In some cases, such as when opening a new chart object, the default preferences for the chart are displayed, allowing the user to override them before actually opening the new chart window. Once an object is open in a window, the characteristics of the object may be modified by the user, overriding the default preferences. When an object of some type is saved, its preferences settings, called the instance preferences, are stored in the database. When the saved object is opened again, its instance preferences will be used to display the object again.

Adjusting the preferences for an existing chart or quote page is accomplished using the "preferences" icon on the toolbar associated with the chart or quote page. All other objects utilize only the preferences accessed throughout the main tool bar or the Setup menu.

Default vs. Instance Preferences

For chart and quote page objects there is a clear distinction between the default preferences and the current preferences of a particular chart or quote page. Adjusting a characteristic of an

existing chart or quote page affects only that one object. Newly created quote pages or charts continue to be created using the object default preferences. Similarly, adjusting the default preferences only affects newly created charts and quote pages. Such changes do not affect any quote pages or charts that have been created and saved in the past.

When you change a default preferences for quote pages you can apply the new default preference to an existing quote pages by opening the quote page, clicking the preferences icon on the quote page toolbar and clicking the button "Reset to Defaults". The "Reset to Defaults" button in the quote page preferences window applies the current default preferences to the associated quote page.

Historical Data

Historical Data Periods

Investor/RT records historical data of four types: daily, weekly, monthly, and intra-day data. Daily, weekly, and monthly historical data consists of bars. Each bar is composed of a date, an opening price, high, low, closing price, volume, and (if applicable) open interest. Intra-day data consists of ticks with each tick composed of a date/time stamp, a trade price, a trade volume, and (if applicable) the bid and ask prices at the time of the trade. Further, the user can request that Investor/RT convert tick data to minute bar data of some duration for longer term retention. For example, the user may wish to retain tick by tick data for 2 days and 5-minute bars thereafter for a total of 90 days of intra-day.

Each instrument created in Investor/RT can be set to collect data for any, all, or none of the historical data periods. The default for newly created instruments is daily data collection. The desired collection periods may be revised for individual instruments using the Setup: Instruments window. When you request a weekly or monthly chart of any instrument, Investor/RT will automatically construct the weekly or monthly chart from any daily data present in the database and mark that instrument for weekly or monthly data collection automatically.

Data collection preferences for an instrument may be adjusted in several ways. Manual adjustment is accomplished by selecting the instrument in a quote page or a quick quote window and pressing the "Setup Instrument" icon. As a shortcut, right click on an instrument in a quote page and pick "Setup" from the menu that appears. On the Macintosh platform, a right click is accomplished by clicking with the command key down. Data collection preferences are also adjusted automatically in several cases. For example, downloading daily, weekly, or monthly data from Dial/Data for an instrument automatically marks the instrument for daily, weekly, or monthly data retention, respectively. As cited above, requesting a weekly or monthly chart for an instrument has the effect of marking the instrument for weekly or monthly data retention. Adding or removing an instrument to/from the system defined intra-day quote page automatically marks (un-marks) the instrument for intra-day data collection.

Intra-day (tick) Data Collection

Each symbol desired for intra-day data collection must be marked for intra-day data collection. Intra-day data collection may be specified individually for each instrument using the Setup: Instruments window. You may also select the symbol in a quote page (by clicking on it) use the 'mark for intra-day' icon in the quote page toolbar. An entire quote page can be marked for intra-day collection by pressing the "mark for intra-day" icon in the quote page toolbar when no individual symbols are selected. If the user attempts to chart an instrument intra-day and the instrument is not marked for intra-day data collection, the user is asked if intra-day collection should begin at that time. If the user replies "yes", the instrument is marked for intra-day collection, otherwise, the intra-day chart will open and will update as data arrives but the intra-day data will be discarded when the chart object window is closed.

It is also important that the instruments of interest have the correct session set for each instrument and the session is defined in local time to the user. See Sessions.

Historical Retention Preferences

Investor/RT collects tick data for each instrument marked for intra-day data collection. Ticks are collected during the time period that the instrument's associated session is open for trading. Instruments marked for daily data collection receive a new daily bar each day after the trading session is closed. This occurs at the "Post Time" specified for the session. Similarly, new weekly and monthly bars are added at the beginning of each week and month. The current weekly and monthly bar for an instrument is updated each day after the instrument's session is closed to reflect the new closing price, cumulative volume for the bar, and new high or low price if applicable. At Post Time, any ticks older than the user specified tick data retention period are condensed into minute bars of some duration for longer term retention.

The Historical Preferences window (under Setup: Preferences) allows the user to specify a default retention period for each type of historical data, for example, 30 days for tick data, 500 days for daily data, 5 years for weekly data, and 10 years of monthly data. To conserve disk space the user may also elect to compress the tick data older than some period into minute bars of some duration. The user may also override the default value for individual instruments by using the instrument selector and entering different retention periods for the selected instrument. Note that the daily retention period is in calendar days not trading days.

Each day when historical data is posted to the database, any blocks of data that are older than the specified retention period are removed from the database.

Use the retention preference settings with caution. If you have years of daily data on file and then change the default retention period to a shorter period, Investor/RT will remove all blocks of data older than that when the next session posting is performed.

Note that the days specified for the retention period are calendar days NOT trading days. If you want to collect two years of daily data enter 730 days (365 times 2) for the daily retention

period. For tick data collection, if you want to always have at least the entire previous week and current week's tick data, specify 12 days, i.e. allow for the two weekend days.

Database Concepts

Investor/RT utilizes a sophisticated database management system to record and maintain various kinds of data and the relationships among that data. The database contains a data record for each instrument. These in turn are related to the records containing historical data for the instrument. Similarly, relationships are maintained between instruments and the quote pages in which they appear; between instruments and trading positions within portfolios; between instruments and news items and trading notes pertaining to the instrument. Preferences and definitions of all saved objects are kept in the data base.

The Investor/RT database is a collection of 39 files kept within the Data_f folder (directory) on the hard drive. Since the component files are inter-related, the entire collection of files must be treated as a unit. That is, they may not be removed or individually replaced. An exception to this principle are two "preferences" files which can be treated as "standalone" files. Investor/RT has an automated daily back-up feature and built-in database recovery system that will restore the database to its most recent back-up if the database is damaged in any way due to a system error or application failure. The Backup Preferences window of Setup: Preferences allows the user to specify when the daily backup is to be made and the location where the back-up is to be kept. The back-up location defaults to the Backup_f folder (directory) within the Data_f folder (directory). The back-up location may be on another hard drive or some other back-up medium. It is recommended that new Investor/RT users backup the database immediately upon registration of the software and after installing new releases of Investor/RT. Set the backup preferences for daily backup at some convenient time of day. During initial setup of Investor/RT when instruments and quote pages and portfolios are being defined, it is good practice to periodically issue the Backup Database command (Control menu) to make a database backup. This assures that none of the setup work up to that point will be lost in the event of a failure.

When Investor/RT starts up, it determines whether the database was closed normally the last time Investor/RT was shut down. If so, startup continues normally. If the database was not closed properly, Investor/RT launches a database maintenance procedure which corrects minor errors and verifies the integrity of the database. If the database is okay, startup continues normally. If the database is damaged, the user is given the opportunity to restore the database to the most recent back-up or this action is taken automatically if the user's backup preferences so indicate. The maintenance utility run can take anywhere from a few seconds to several minutes to complete its work. The time depends on the speed of the computer and hard disk, the number of instruments tracked, and the amount of historical data on file.

Daily back-up is necessary. Additionally, a weekly or monthly back-up to some other medium is advised just in case hard drive failure renders both the database and backup unrecoverable. Again, in the early phases of setting up Investor/RT or when instruments, charts, quote pages,

and portfolios are being defined, it is recommended that the database be backed up even more frequently.

Quote Pages

This section provides a complete description of the Quote Page object in Investor/RT. The quote page and its relationships with other object types is discussed in detail. It is assumed you have read the Investor/RT concepts section above, especially the overview of each of the object types.

The quote page is essentially a spreadsheet window for viewing, editing, and analyzing market data for the instruments you are tracking in Investor/RT (see Figure 4). Each quote page is displayed in the form of a spreadsheet where each row represents a particular instrument and each column represents an item of data for each instrument. Each quote page has properties that affect the content, organization, and appearance of the quote page.

Properties of Quote Pages

Quote Page Name

Each quote page has a name of up to 32 characters assigned by the user when the quote page is saved. Investor/RT has 18 built-in system defined quote pages. The names of system defined quote pages are pre-defined and all of them begin with a period to distinguish them from user-defined quote pages.

Quote Page Instrument List

Each quote page has a list of instruments which defines the sequence of the rows of the quote page. The list of instruments in a user-defined quote page is strictly controlled by the user. The instruments may be listed in any order convenient to the user, or the list may be sorted by various criteria.

System Quote Pages

Investor/RT also maintains a number of system defined quote pages that contain all the symbols entered into the software for a particular security type or some other property For example, any stock defined to Investor/RT will automatically be entered into the .Stocks quote page, any futures contract will automatically appear in the .Futures quote page, etc. System defined quote pages are denoted by a period (.) in front of the category name. The list of instruments for system-defined quote pages is dynamically determined when the system-defined quote page is opened. System defined quote pages cannot be deleted. System-defined quote pages are initially sorted alphabetically by ticker symbol unless a sort field is specified in the preferences of the quote page. Once a system-defined quote page is open, the user may

elect to sort the list of instruments by some other criteria such as security name, or percent price change. The system defined quote pages are:

.All Symbols--This quote page lists every instrument defined to Investor/RT.

.Stocks--This quote page lists every instrument with security type set to "Stock"

.Futures--This quote page lists every instrument with security type set to "Future"

.Mutual Funds--This quote page lists every instrument with security type set to "Fund"

.Indices--This quote page lists every instrument with security type set to "Index"

.Custom Instruments--This quote page lists every instrument with security type set to "User Defined". See Setup: Custom Instruments.

.Options--This quote page lists every instrument with security type set to either "StockOpt" or "FutureOpt"

.Monitored--This quote page lists every instrument being monitored for price or volume levels.

.Intraday--This quote page lists every instrument for which tick data is being collected, i.e. those for which intra-day monitoring has been requested.

.Unupdated--This quote page lists every instrument that has not received a price update since Investor/RT began execution or since the opening of the session. All instruments are marked as unupdated when Investor/RT starts. When a session opens for trading, all instruments for that session are marked as unupdated until a quote or trade is received. Unupdated symbols have an asterisk suffixed to the quote time column in quote pages.

.Unquoted--This quote page lists every instrument that has never received a quote at all, usually because the ticker symbol is incorrectly specified. Unquoted instruments have a last price of zero. Note that Investor/RT may be used to track financial instruments whose prices are not reported by the data feed. The user may create such instruments with arbitrary ticker symbols. Prices for such instruments may be imported into Investor/RT using the Import command. If such instruments are held in portfolios, prices may be updated manually within the portfolio object.

.Watched--This quote page lists every instrument currently being "watched" when the an Internet data service is used. Watched instruments include all instruments marked for intra-day data collection and all other instruments that are currently open in other quote pages, charts, portfolios, etc. There is a limit of 300 instruments that may be active at any one time when using the InterQuote and myTrack data service. The eSignal service have limits of 50 to 500 depending on service level.

Alarms-All--This quote page lists every instrument in any of several alarm conditions. Five additional system quote pages show instruments for which particular types of alarms have been triggered. See the section titled "Alarms" for additional details.

Quote Page Colors, Font, and Size

Each quote page object has properties that control the visual appearance of the data displayed in the spreadsheet. Background color, text font and size can be customized for each quote page. A contrasting highlight color can be specified. Rows (instruments) in the quote page are briefly displayed with the highlight color background when an update is received from the data service. Each quote page has three text color preferences: up color, down color, and unchanged color. These colors are used to display the text of each instrument depending on the price movement of the instrument. Up, down, or unchanged may be interpreted relative to the previous day's closing price or the opening price of the instrument's current trading session. The default preferences for each of the quote page general preferences may be adjusted by choosing Setup: Preferences: Quote Page, General, or by clicking the Preferences icon on the main toolbar. The preferences for existing quote pages (including system-defined quote pages) are adjusted by clicking the Preferences icon on the quote page toolbar (see Figure 12).

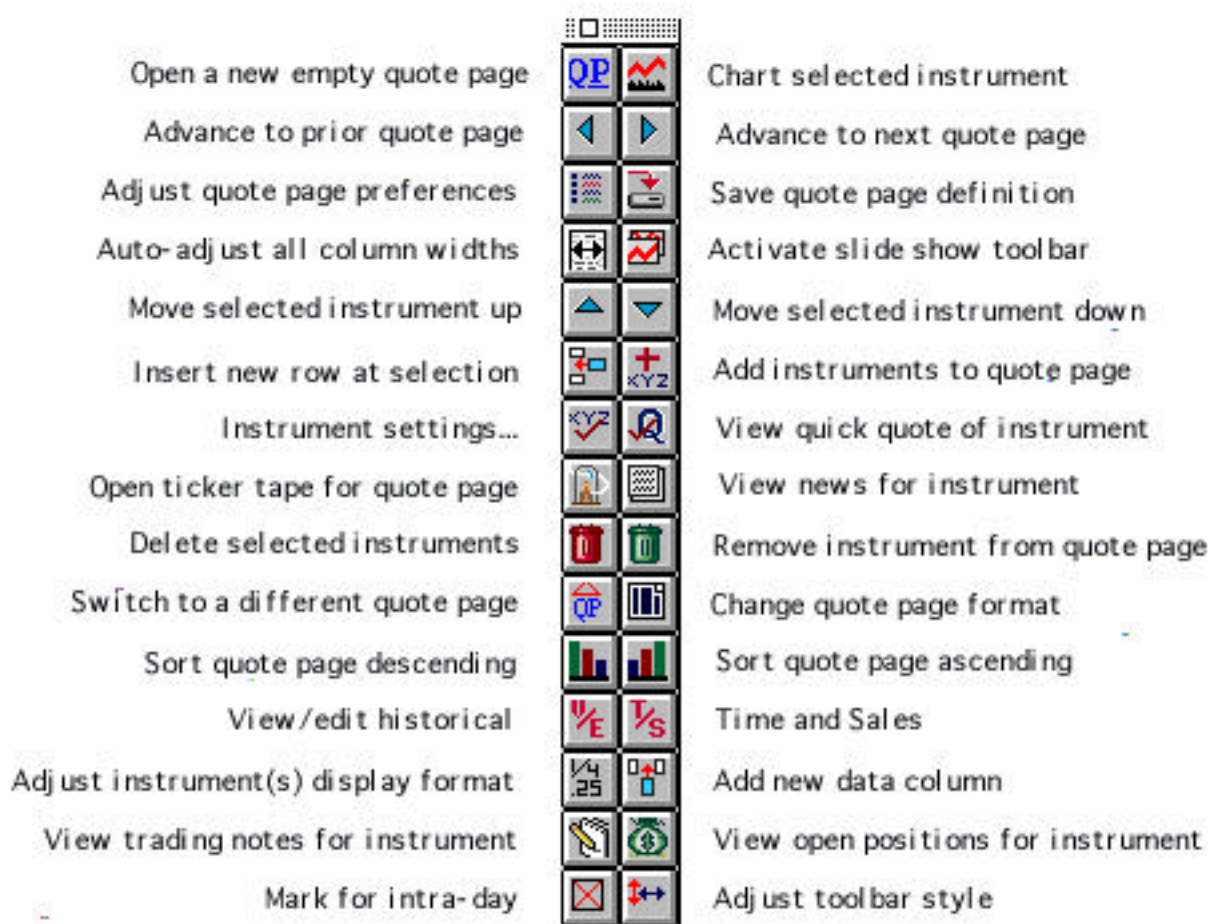|			
Open a new empty quote page	QP	〰	Chart selected instrument
Advance to prior quote page	◀	▶	Advance to next quote page
Adjust quote page preferences	▦	⬇	Save quote page definition
Auto-adjust all column widths	↔	⬈	Activate slide show toolbar
Move selected instrument up	▲	▼	Move selected instrument down
Insert new row at selection	⊟	+ XYZ	Add instruments to quote page
Instrument settings...	XYZ✓	🔍Q	View quick quote of instrument
Open ticker tape for quote page	📄	🖥	View news for instrument
Delete selected instruments	🗑	🗑	Remove instrument from quote page
Switch to a different quote page	QP	📊	Change quote page format
Sort quote page descending	📊	📊	Sort quote page ascending
View/edit historical	⁹⁄E	T/S	Time and Sales
Adjust instrument(s) display format	¼ .25	⬆	Add new data column
View trading notes for instrument	📝	💰	View open positions for instrument
Mark for intra-day	⊠	⤡	Adjust toolbar style

Figure 13. The quote page toolbar.

Quote Page Column Format

Investor/RT maintains 168 items of data for each instrument, depending on the data service(s) in use. These include 70 fundamental data items on stocks that are available from the Dial/Data service. Dial/Data access is an optional service available in all editions of Investor/RT. A quote page may display up to 30 of these data items at one time as columns in the spreadsheet. To make it convenient to switch quote pages from one set of data columns to another, Investor/RT allows the user to define quote page formats. A format is simply a list of column identifiers in the left to right sequence in which they will appear across the quote page. Each format has a name to identify it. Investor/RT has 12 built-in formats that serve as samples. These formats may be used "as is" or they may be modified or deleted. The user may create any number of new formats.

To add, modify, or delete a format, choose Setup: Preferences: Format Definition or click the Preferences icon on the main toolbar and Format Definition (see Figure 13). Choose the format name you wish to modify or choose New Format to make a new one. Choose data items from the list on the left to construct a list of columns on the right. Adjust the order of the items on the right if appropriate. The top most items will be left most in the quote page when the format is displayed. Press Save to save the format. Use Save As to make a new format from an existing one.

To display an open quote page in a different format, click the Change Format icon on the quote page toolbar. If you later save the quote page, the new format will be saved as a property of the quote page. Saving a quote page normally takes place when you close a quote page window whose properties have been modified. If you elect to discard the changes to the quote page, the original format will be retained.
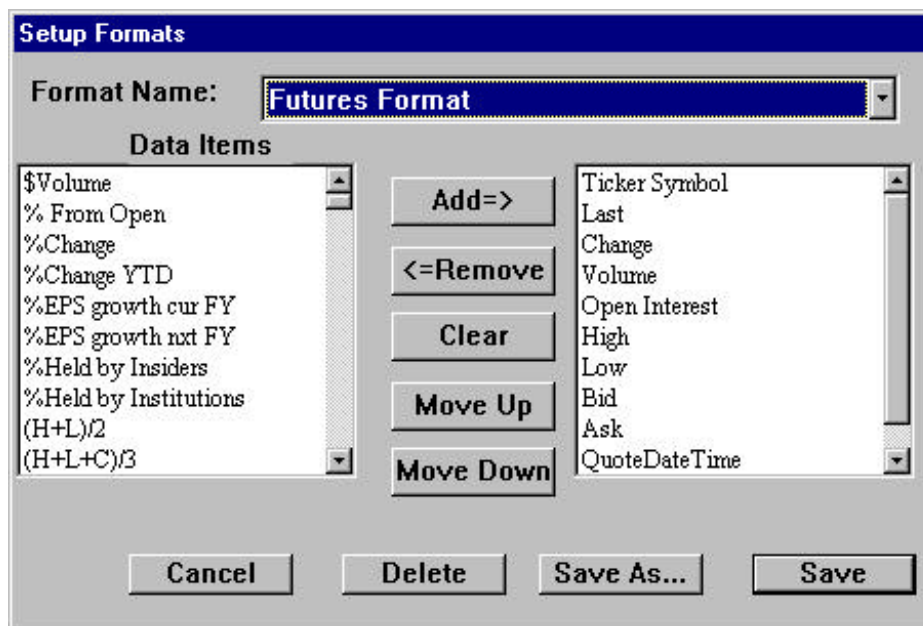
Figure 14. Defining a Format

The display properties of system-defined quote pages are implicitly saved when they are closed. In other words, each time you open a system-defined quote page it will be opened at the same screen position and with the same properties it had when you last viewed it. The properties of user-defined quote pages, on the other hand, are only saved upon user request.

Repeating Formats

Investor/RT allows any format to be repeated multiple times. This feature is normally used in conjunction with formats that have only a few data columns. For example, a format with the columns (Symbol, Last, Change) repeated 4 times means that the data for four instruments will be shown in each row of the quote page. The quote page in this example will have 12 columns (3 columns repeated 4 times). Quote pages that are displayed in repeating format allow the user to see many more instrument prices at one time. To place a quote page in repeating format, click Preferences on the quote page toolbar. Choose a "short" format and enter a repeating factor. Click OK and size the quote page window so that all repeating columns are visible without scrolling.

Creating Quote Pages

Creating a quote page may be accomplished in several ways:

1. Open a new quote page (File: New: Quote Page) and enter or select the instruments you want in the quote page. To open a new empty quote page choose File: New: Quote Page or click the Quote Page icon at the far left of the main toolbar, or click the New Quote Page icon on the quote page toolbar. See the section Adding Instruments to a Quote Page below.

2. Import a text file containing a list of symbols. A quote page can, at your option, be created for the list of instruments imported. See the section on Importing and Exporting for additional details.

3. Use the Quote Sifter to build a list of instruments using criteria you specify. See the section Using the Quote Sifter for details. The quote sifter can only be used for this purpose with "broadcast" type data feeds, but not with "Internet based" data services.

4. Use Setup: Equity and Index Options to build quote pages of option instruments for one or more stocks or indexes. See the section Using Symbol Generators for details.

5. Use Setup: Futures to build quote pages of futures instruments. See the section Using Symbol Generators for details.

6. Use Setup: Future Options to build quote pages of future option instruments for one or more futures contracts. See the section Using Symbol Generators for details.

Adding Instruments to Quote Pages

Whether you have just opened a new quote page or you want to add an instrument somewhere in an existing quote page, the methods of adding instruments are the same.

To add one or more existing instruments to a quote page. Click the "Add Instruments to Quote Page" icon on the quote page tool. An instrument selector window will open(see Figure 2). The instrument selector window is opened for you automatically when you create a new empty quote page. The instrument selector lists all of the instruments that are already known to Investor/RT. As you double-click or select and press return, the chosen instruments will be added to empty rows of the quote page. If there are no empty rows, the instrument will be added at the end of the quote page in a new row.

Another method is recommended for quickly setting up a quote page for those who know the ticker symbols of the instruments they want. Simply type the ticker symbols directly into the spreadsheet. First click the mouse pointer in an empty cell in the Symbol column, type the ticker symbol. To inform Investor/RT that you are finished typing the symbol press enter, return, tab, or one of the arrow keys. Investor/RT will then lookup the symbol to determine if any instrument exists for that symbol. If so, that instrument is assigned to the quote page row. If there is no instrument having that symbol, Investor/RT will make one automatically. Instruments created in this fashion will have a security type, requested exchange, and session as specified in Setup: Preferences: Instruments. If this is not what you want, then edit the requested exchange cell and/or the session number for the instrument in the same fashion. When entering instruments directly into a spreadsheet, you may use an empty row or replace some other instrument in the quote page by changing the ticker symbol in an occupied row. To insert new empty rows anywhere in the quote page, first establish an insertion point if you like by selecting some cell in the quote page, then click the Add New Row icon in the quote page toolbar (or press the insert key on the keyboard) A new row will be added beneath the

selected row or at the end of the quote page if an insertion point was not established. Click the Add New Row several times to insert multiple blank rows into the quote page.

When all instruments have been added to the quote page press the Save icon in the quote page toolbar or choose File: Save from the menu bar, or simply close the window. You will be asked to name the quote page if it is untitled. Blank rows are removed from quote pages when the quote page is stored on the database. If you wish to leave blank rows in the quote page as separators, for example, then enter a single hyphen in the symbol column. The hyphen will serve as a place holder for the blank row and the row will not be removed when the quote page is saved. You may have as many hyphen place holders as you like in the quote page.

Using Symbol Generators

Ticker symbols for stock options, index options, futures, and futures options are formed using a pattern that includes a root symbol, an expiration month, and, in the case of options, a strike price. Investor/RT includes three symbol generators, each accessed from the Setup menu, to automate and simplify the process of producing suites of futures or options.

Equity and Index Option Generator

The equity and index option generator is a tool for defining option instruments for some underlying stock or index (see Figure 14). Choose Setup: Equity and Index Options, enter the symbols for the underlying stock or index and press tab. At this point, if Investor/RT has the three letter option prefix and option cycle on file for the underlying stock or index, these items will appear automatically. If no option prefix or cycle is on file for underlying instrument entered, enter this information manually and it will be retained.

Figure 15. The equity and index option generator

Investor/RT is shipped with a text file named "Stocks with Options List" that contains the ticker symbol, option prefix, and cycle for more than 2500 stocks. You may use this file as a reference to verify the correct option prefix and cycle to use. If you wish Investor/RT to track all of the stocks included in this file, you may use the File: Import command to import the file. When this file is imported, Investor/RT will record the option prefix and cycle information for each instrument. Option Prefix and Cycle are Investor/RT data columns. You may include these data columns in any format or add them individually to your quote pages if you like.

Choose the session to be used in generating the option instrument. The default is session 1, "Equity Options Session".

After specifying the prefix, cycle, and session, indicate whether Investor/RT is to produce puts for each strike price, calls for the strike price, or both. Then enter a list of strike prices separated by commas, or use the suggested strikes provided by the program. Investor/RT generates options for strike prices that are a multiple of $5 plus the special half strikes. When specifying the strike prices, use whole numbers or whole numbers followed by .5, e.g. 20, 22.5, 25

When building a suite of options, checking the box titled "Add to quote page" instructs Investor/RT to insert the generated option instruments into the front quote page. If this box is checked and no quote page is open, a new quote page will be created for the generated options instruments. Press Add to generate the option instruments and add them to the Investor/RT database.

Futures Generator

Choose Setup: Futures to open the futures generator (see Figure 15). Then choose the underlying future type you wish to monitor. Investor/RT is shipped with 40 commonly followed futures types pre defined. If the future type you wish to follow is not included in the Choose Future Type menu, then choose "Setup..." from the Choose Future Type menu to add it.
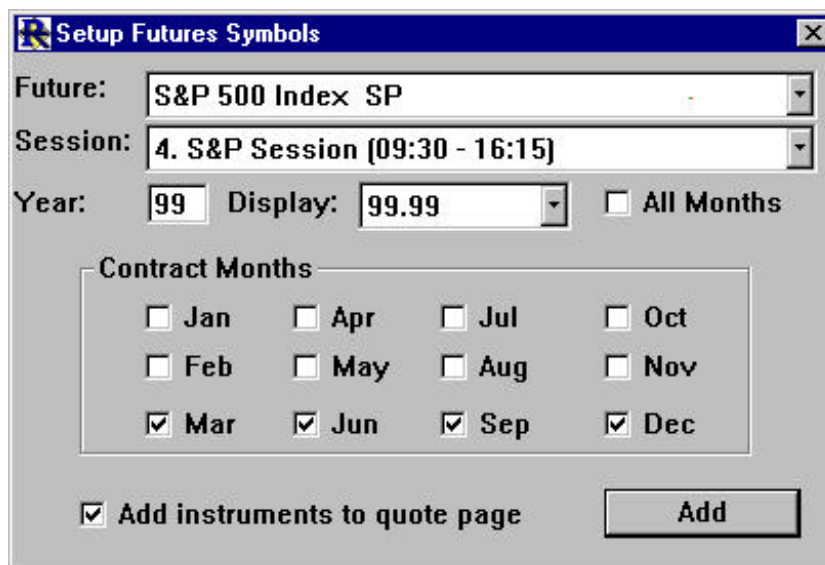
Figure 16. Setting up Futures Instruments

When adding new future types to Investor/RT, specify the name and future code. Consult the symbol guide published by your data feed vendor to determine or verify the future code you need. The contract size is optional and is for documentation purpose only. The point move and the corresponding point value (in dollars) convey to Investor/RT the information needed to evaluate the gain/loss of futures positions in portfolios.

Finally, specify the valid trading months for the future and press Save.

The "Setup..." menu choice may also be used to modify the specifications for any existing future type. Just type in the future code and press tab. If the future code already exists, its specifications will appear automatically for editing. Make any changes you wish and press Save.

After pressing Save to update or add a new future type, you will be returned to the Setup Future Symbols window. The future type menu will automatically be set to the future type whose definition was just added or updated. The display format and months check boxes will be set according to the futures definition selected. Select the session during which the futures will be traded.

If you wish the generated instruments to be added to the current quote page, check the box titled "Add to Quote Page". If this box is checked and no quote page is open, a new quote will be created to hold the generated symbols. Press the Add button to generate futures instruments for each of the designated months. Futures instruments for the contract months that are not already defined to Investor/RT will be added to the database.

You may use the Setup Futures window to build quote pages even if the instruments have already been added. Make sure the Add to Quote box is checked when you press Add.

Futures Options Generator

The futures options generation process is very similar to the equity and index options process described above (see Figure 16). Select the underlying future type for the suite of options. Indicate a session. Specify whether puts or calls or both should be generated for each strike price. Enter one or more strike prices, separated by commas. Check the Add to quote page box if you want to add each future option to the open quote page. If no quote page is open, a new one will be create to containing the generated futures option instruments.

Figure 17. Setting up Futures Options

The way strike prices are expressed varies with the data service. The Quote Sifter, described later in this guide, is a useful tool for scanning the raw data feed for futures options to quickly determine how the data vender transmits strike prices for options on a particular futures contract. See the section, Using the Quote Sifter for details.

Ordering Instruments in a Quote Page

The instruments in a quote page can be sorted in ascending or descending sequence using a data column in the quote page as the sort criteria. Instruments may be sorted by ticker symbol, security name, security type, last price, change in price from previous close, percent change in price from previous close, trading volume, dollar volume (last price times trading volume), tick count, price earnings ratio, dividend amount, yield, percent below 52 week high, percent above 52 week low, last quote time, gap amount (opening price minus previous close), and percent volume (current volume expressed as a percentage of 20-day average volume), just to name a few.

The user-defined data column, titled "User Data" in a quote page, is a text field of up to 24 characters in length. The user data for an instrument may be entered directly into a quote page or it may be entered for a particular instrument using the Setup: Instruments window. This data field could be used to classify instruments according to risk level, or perhaps to indicate an industry group for stock instruments. Sorting on this field would then bring all instruments with the same custom value into adjacent rows in the quote page.

Instruments can be "dragged" and "dropped" from one quote page to another. The instrument is inserted into a blank row just above the row it was dropped on. Dragging and dropping within the same quote page is also permitted as a means of arranging the order of the rows in the quote page. User defined quote pages retain the last "saved" order of the rows. System defined quote pages are always initially opened in ticker symbol alphabetic sequence. The saved order of a quote page may also be over written by specifying a sort field to be used whenever a particular quote page is opened.

Sorting quote pages is accomplished by clicking the ascending or descending sort buttons on the quote page toolbar. The data column selected for sorting does not have to be displayed in the quote to sort on that criteria.

Another method of sorting, when the sort criteria is a displayed column in the quote page, is to click the mouse in the column heading while holding down a modifier key. On the Macintosh, option + click sorts the quote page in ascending sequence using the column clicked on as the criteria. Command + click a column for a descending sort. Windows users employ control + click and shift + click respectively.

Sorting quote pages is usually performed on system-defined quote pages, especially the ".All Symbols" quote page, to examine all instruments sorted by various criteria.

Tool buttons are provided on the quote page tool bar for adding new blank rows, moving the selected row up or down in the spreadsheet, and removing rows. Explore the toolbar with the mouse pointer. The purpose of each button will appear in a pop up window when you point the mouse pointer to a button for a second or so.

Adjusting Quote Page Properties

Adjusting Quote Page Format

A quote page may be switched from one format to another by clicking the New Format button on the quote page toolbar. A list of format names appear. Pick one and click OK or Apply, either applies the new format to the quote page but Apply leaves the list of format names open for another selection.

Working with Columns

Ordering columns in a quote page

Selecting a format affect which data columns are initially displayed in the quote page and their order. The order may be rearranged with mouse simply by dragging the column title and dropping it to the left or right of some other column title.

Adding Columns to a Quote Page

New columns may be added individually to a quote page by clicking the Add New Column button in the quote page toolbar. A list of data column names will appear. Select a column name and press OK or Apply--both add the new column to the rightmost column position. The apply button leaves the selection list open to enable multiple selections.

Deleting a Column from a Quote Page

To delete a column from a quote page simply click and drag it into the interior of the quote page window and drop. Dropping the column outside the quote page window has no effect.

Adjusting column widths

The width of a column in a quote page may be adjusted with the mouse by dragging the divider line on the right side of a column heading to make the column wider or narrower. A shortcut is to double-click the mouse pointer in a column heading. That column will then be automatically sized to a width sufficient to display the data in that column. Empty columns are reduced to the width of their column titles.

The quote page toolbar also features an auto size button that causes every column in the quote page to be sized to fit the data in view.

Saving Quote Pages

When modifications are made to a user-defined quote page, e.g. new instruments are added, columns adjusted, background color changed, etc., Investor/RT marks the quote page as modified. The quote page and all of its new properties may be saved by clicking the Save button on the quote page toolbar or by selecting Save from the File menu. Closing a modified quote page results in a dialog box in which the user may elect to save the changes, discard the changes, or cancel the close operation leaving the quote page open. If you elect to save the quote page and the quote page is as yet untitled, a dialog box will prompt for a name for the quote page.

Closing system defined quote pages, even if they have been modified causes just the properties of that particular system defined quote page to be saved. The instruments that will appear in the quote page the next time it is requested will be determined at that time. Sometimes it may be useful to open a system-defined quote page, make some alterations to it

and save it for future use. In such cases, issue the save command before closing the quote page. The Save As... command in the file menu may be used to save any quote page under a different name.

Deleting Quote Pages

System defined quote pages may not be deleted, they are built-in to the Investor/RT system. User defined quote pages may be deleted by choosing Delete: Quote Page from the Control: Data Management menu. Quote pages may be deleted individually by selecting the name and pressing Delete. A Delete All button is also provided. Confirmation is requested before deleting all quote pages. Note that deleting a quote page does not in any way affect the instruments that were listed in that quote page.

Deleting Instruments

Instruments may be removed from a quote page by pressing the Remove button on the quote page toolbar (the green trash can). The delete button (red trash can) removes the instrument from all quote pages in which it is listed and permanently deletes the instrument all of its associated historical data from the Investor/RT database. Confirmation is requested prior to deleting individual symbols. Instruments can also be removed from a quote page by dragging them off the quote page and dropping them on the desktop (i.e. not on some other window). Dragging an instrument off the ".All Symbols" quote page "deletes" the instrument also.

An entire quote page of symbols may be deleted by pressing the Delete button (red trash can) when no instrument is selected in the quote page. A confirmation is requested prior to deleting all instruments. Use this feature with caution.

Other Quote Page Features

Accessing news

News items are often transmitted by the data services with references to one or more ticker symbols mentioned in the new item. Investor/RT makes note of these references and established a relationship in the database between the news items and the instruments to which it pertains. When a news item of this kind is received for an instrument, Investor/RT marks the instrument with a news alarm. If the Alarm data column is displayed in a quote page, an "N" will appear in the alarm cell for the instrument. To view all of the news items for a particular instrument, select the instrument by clicking the symbol cell with the mouse pointer. A bold border will appear around the cell to indicate the symbol is selected. Then press the button titled "Get News for Selection". A news browser object will be opened containing all related news items. By default, news items are kept for 30 days if they are related to an instrument you are tracking. This preference may be adjusted in the General Preferences section of the Preferences window.

Accessing trading notes

A trading notes window for a particular instrument may be quickly accessed in similar fashion: select the instrument and click the trading notes button in the quote page tool bar. The trading notes object is opened with the notes for the selected instrument in view.

Accessing Charts from a quote page

Requesting a chart of the selected instrument may be accomplished by double-clicking on the ticker symbol cell in the quote page, or by selecting the instrument and pressing the Chart icon in the quote page toolbar.

The chart that results depends on whether a chart object is already open. If so, that chart object is used as a "template". The selected instrument is inserted into the open chart object, replacing the former instrument. All technical indicators associated with the former instrument are re-associated with the new instrument, re-calculated and re-drawn. When the chart object template contains more than one instrument, the first instrument in the window is replaced by the new instrument.

If more than one chart object is open when you request a chart of an instrument in a quote page, the front most chart object is used as the template. If one or more chart windows are open and you want a new chart window opened for some other instrument, hold down the option key (Macintosh) or the control key (Windows/95) while double-clicking on the ticker symbol in the quote page.

If no chart objects are open when the request is made, Investor/RT uses the preference settings established for new charts to create a new chart object containing a graph of the selected instrument and optionally, a volume histogram. The properties of the new chart window are established from the default period (daily, weekly, etc.) settings in Charting Period section of the Preferences window as well as the Charting General section.

Creating ticker tapes

The list of instruments that make up a quote page may be used to open a ticker tape object to display trades for any instrument in the quote page. Simply click the Ticker Tape icon in the quote page toolbar.

View/Editing an Instrument's Historical Data

To inspect the historical data on file for any instrument, select the instrument in the quote page and press the "View/Edit Historical Data" button on the quote page tool bar. Investor/RT will display a list of time periods (daily, weekly, monthly, etc.). Choose the time period you want and press OK. A spreadsheet will appear with all of the historical data for the chosen period arrayed as rows (see Figure 17). If you are viewing tick data, the columns

displayed will be date/time, price, tick volume, bid, and ask price. All other time periods will include the data columns date, open, high, low, last, volume, and open interest.

The historical edit spreadsheet may be edited if for some reason you find it necessary to make a correction or delete a bar of data or a tick.

QuoteDateTime	Open	High	Low	Last	Volume
Mon 19990426	87 3/16	88 15/16	86 3/4	88	24.2m
Tue 19990427	88 3/4	88 3/4	83 15/16	84	29.3m
Wed 19990428	85 5/16	86 1/2	81 11/16	82 1/8	28.0m
Thu 19990429	82 3/8	83 11/16	80 3/8	82 1/16	30.4m
Fri 19990430	82 3/4	83 3/4	79 7/8	81 5/16	29.3m
Mon 19990503	81 1/2	81 1/2	78 9/16	79 7/8	33.6m
Tue 19990504	80 1/2	81 13/16	77 3/4	78 1/16	33.3m
Wed 19990505	79 1/8	79 7/8	76 7/16	79 1/8	33.5m
Thu 19990506	80 11/16	81 1/8	77 1/2	77 15/16	37.0m
Fri 19990507	79 5/8	80 3/8	78	79 1/16	24.0m
Mon 19990510	79 7/8	80 1/2	78 1/4	79 11/16	23.1m
Tue 19990511	80 3/4	81	79 1/16	79 7/8	21.4m

Microsoft Corporation-Daily (Memory=16K)

Figure 18. Viewing and Editing Historical Data

To delete the data for a particular row in the spreadsheet, click in the QuoteDateTime cell to select the row you wish to delete and press the del key on the keyboard.

Note that any chart windows open at the time the historical data is being edited are not affected by the edit until you close the view/edit spreadsheet. The front chart window is redrawn to reflect the updated data when the view/edit spreadsheet is closed.

To edit a price or volume figure in the spreadsheet, click the mouse in the cell, edit the data, press enter, return, or tab. Price data may be entered or edited in fractional format or decimal format. Volume numbers may be entered with a k or m suffix to indicate thousands or millions, respectively. For example, 1100000, 1.1m, or 1100k are equivalent.

Exporting Historical Data for a Quote Page

The View/Edit historical data icon on the quote page toolbar has another special purpose. If this button is pressed when no instrument is selected in the quote page, Investor/RT will export all of the historical data for the chosen time period to an ASCII text file.

Using the Instrument Pop up Menu

Quote pages and other "spreadsheet" like windows in Investor/RT that list the ticker symbols of instruments all respond to the right mouse click (command click on Macintosh). The effect is to display a menu of operations that can be performed on the instrument. This menu includes choices for accessing the setup for the instrument, opening a chart of the instrument, opening a time and sales window for the instrument, accessing trading notes, news, and even NASDAQ Level II screen with some data services. The right click menu is available from any quote page, portfolio, quick quote window, or any other window containing an "instrument selector".

Quick Quote Windows

What is a Quick Quote Window?

The Quick Quote object is a window with an instrument selector positioned at the left (see Figure 3). As you use the mouse or keyboard to select an instrument, detailed market data for the instrument appears to the right. All market data is updated instantly as trades or quotes arrive on the data feed. Fundamental data such as PE ratio, earnings per share, dividend and yield are shown when those data items are provided by the data service in use.

When a quick quote window is closed, Investor/RT saves the object in the database. The name of each saved quick quote object is simply the ticker symbol, requested exchange and session number of the associated instrument separated by colons. A list of saved quick quote objects is available in the Objects menu.

The Quick Quote object is useful for inspecting a detailed quote on one or more instruments, for monitoring the activity of a single instrument as trades occurs, and as a general purpose tool for identifying an instrument for some other purpose.

Along the bottom of the Quick Quote window is an array of icon buttons. The Chart button produces a chart of the selected instrument. This is the default action when the return or enter key is pressed, or if any instrument is double-clicked. The chart produced, like charting an instrument from a quote page, depended on whether a chart object is open. If a chart is open, the selected instrument is inserted into the chart object "template". The Quick Quote window operates in conjunction with the chart object to effect rapid substitution of instruments into an open chart object. For example, open a quick quote window and type IBM and press return. IBM will appear in the open chart window. Then type another ticker symbol and press return. The chart object will pass the keystrokes along to the quick quote window as you type. The result is a chart of the new instrument.

Other function buttons in the quick quote window are Setup, News, Notes, and Positions. Pressing the Setup button opens a window for viewing or editing the definition of the selected instrument, including the setting of price and volume alarms levels for the instrument.

The Notes button, opens a trading notes object to review, modify or add trading notes for the selected instrument.

The Positions button displays a list of all of the portfolio positions for the selected instrument. Each position is listed as long or short with the quantity. The list window may be used simply for its information content and dismissed by pressing the escape key or closing the window manually. Selecting a position and pressing OK opens the portfolio containing the selection position.

Ticker Tape Object

The ticker tape object is a live object that displays trades or quotes as they arrive on the data feed (see Figure 5). The ticker tape object is associated with a particular quote page object. When a new ticker tape object is opened, the ticker tape window is expanded to reveal several controls for specifying the properties of the ticker tape. A pull down menu of quote pages is provided. Selecting a quote page specifies the instruments whose trades will appear in the tape. To create a ticker for a single instrument, first create a new quote page, add the instrument to the quote page and save the quote page. Then open a ticker tape on the newly created quote page.

The user may limit the trades reported to those that exceed a specified tick volume by filling in a value in the space provided. To see all trades regardless of size, enter 0 or clear the tick volume limit edit field. The current tick volume limit, if any, is displayed as part of the window title. Tick volume limit only applies to issues of security type "stock". Thus, if you have other security type instruments mixed in a quote page with some stocks, all trades on the non-stock instruments will appear in the ticker tape.

If the recap check box is checked, the ticker tape recapitulates the current quotes of all tracked instruments alphabetically. Recapitulated quotes show the price and the net change in price. Actual trades show the trade price and the tick volume of the trade.

The ticker tape quotes are displayed color coded when the colors check box is checked. The colors used are the default up color, down color, and unchanged color specified for Quote Page, General Preferences. During trading hours the up color is used to show "up ticks" and the down color is used the display "down ticks". After trading hours, the up/down colors reflect whether the issue was up or down on the day. The up/down on the day can be based on the previous close or the open price of the day. Set the preference in Setup: Preferences: Quote Page Preferences.

The background color of the ticker tape may be specified using Setup: Preferences: General Preferences. This preference setting applies to all open ticker tapes.

A tapes font and text size can be adjusted by clicking the font and size button. A font/size selection dialog box will appear. The ticker tape window size will be adjusted to correspond with the selected font and size.

Two controls are provided at the right side of the ticker tape, one to zoom the tape to full size horizontally, the other to show or hide the ticker tape controls. One or more ticker tapes can be active simultaneously. When using ticker tapes with Internet based data feeds, keep in mind that each instrument in the ticker tape's quote page must be "watched". Be sure that the total number of instruments watched does not exceed the maximum permitted by the data service.

Chart Windows

Introduction to Charting

A chart object is a template or format for displaying one or more graphs of instruments and technical indicators derived from the historical data of one or more instruments. Each chart object has a name (e.g. "Bar Chart with 9 Period Moving Average") by which it is stored and recalled when needed. When a chart object is opened and displayed in a window, the title of the window will show the name of the instrument or instruments displayed within the window, e.g. Apple Computer: Daily. See Figure 6, a sample chart window, and Figure 18, the charting toolbar.

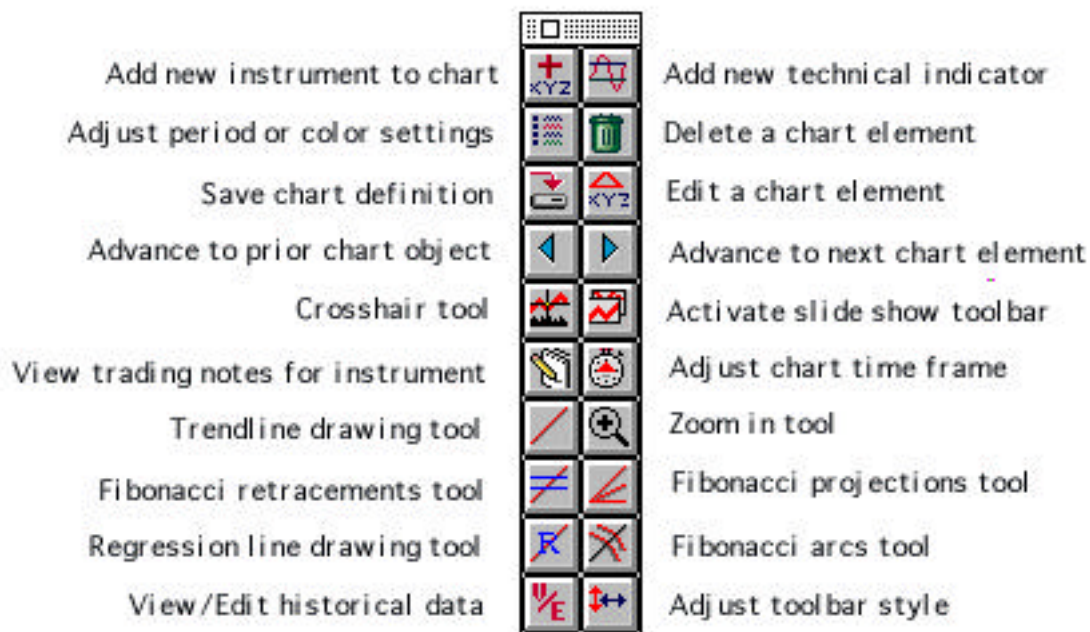|		
Add new instrument to chart		Add new technical indicator
Adjust period or color settings		Delete a chart element
Save chart definition		Edit a chart element
Advance to prior chart object		Advance to next chart element
Crosshair tool		Activate slide show toolbar
View trading notes for instrument		Adjust chart time frame
Trendline drawing tool		Zoom in tool
Fibonacci retracements tool		Fibonacci projections tool
Regression line drawing tool		Fibonacci arcs tool
View/Edit historical data		Adjust toolbar style

Figure 19. The charting toolbar

A chart window has one or more sub windows. Each sub window has a thin title bar with a title showing the contents of the sub window. The sub window title bars are also used to display data values of instruments and technical indicators as you move the mouse in the chart window.

Each sub window may contain the graph of an instrument, one or more technical indicators, or both. Multiple instruments may be graphed within the same sub window or the chart object may contain several instruments, each graphed in its own sub window.

Some technical indicators are designed to be shown in the same sub window with the instrument upon whose data the indicator is derived. For example, the moving average and

Bollinger Bands indicators are drawn in the same sub window as the instrument. Other technical indicators are calculated to a different scale than the instrument itself, thus they always appear in a sub window by themselves. Examples of stand-alone indicators include Moving Average Convergence/Divergence (MACD), Relative Strength Index (RSI), and Stochastics.

Multiple instances of the same technical indicator with different preferences may be added to a chart. For example, you may have 9, 16, and 25 day moving averages displayed in a chart sub window, with each moving average drawn with a different color and line thickness.

Graph Types

When adding an instrument to a chart, the instrument is graphed in one of four formats according to the Chart General Preferences: bar format, candlestick format, connected line or continuous line format.

Bar Format

A bar shows a vertical line representing the high to low trading range for the bar. Tick marks on the left and right side of the vertical bar mark the open and closing price of the bar. Daily, weekly, and monthly bars are color coded with an up color or down color based on whether the closing price of the bar is higher or lower than the closing price of the prior bar. The default colors used are specified in Chart General Preferences. Intra-day minute bars may be color coded based on either the closing price of the previous bar or on the opening price of the bar. When viewing a tick by tick chart, if bar format is chosen, the trading range of the bar is drawn to depict the bid-ask range (instead of high low range). The trading price of each tick is then depicted as a mark through the trading range. The is a convenient way to watch how an instrument is trading relative to its current bid/ask.

Candlestick Format

A candlestick chart shows each bar as a color coded rectangle (called the candle body) representing the range of trading between the open price and closing price of the period. If the closing price is higher than the opening price, the candle is colored with the user specified up color, otherwise, the down color. Vertical lines (called wicks) are drawn protruding from the upper and lower edge of the candle body to represent the high and low extremes of trading during the period. Investor/RT always paints down candles filled with the down color. Up candles, however, are drawn hollow with the frame of the candle body colored with the down color. This makes up and down candles easily distinguishable when printed in black and white. The user may elect to have up candles painted solid in the up color rather than painted hollow. This option is set in Chart General Preferences.

Connected and Continuous Line Format

For line graphs, the price used to draw the line may be the open, high, low, last, the median of high and low , or the median of high, low, and last. A continuous line graph is simply a line drawn between each of the price points for the selected price type. A connected line adds dots at each price point. Line graphs may be drawn with one of three line thickness choices and in a user specified color.

Line graphs of different price types for the same instrument may be drawn in a chart window, either in the same sub window or each in its own sub window.

When the charting period for the chart window is tick-by-tick, each instrument must be drawn in either connected or continuous line format. Additionally, the bid and ask prices at the time of each trade are available for charting if bid and ask prices are broadcast by the data feed. Thus, it is possible to form a chart object with 3 color codes lines graphs showing the bid price, ask price, and last trade of an instrument. This is accomplished by adding the same instrument three times to the chart window, each time selecting a different price type.

Creating a chart window

There are several ways to create a chart in Investor/RT:

1) double click on the symbol in a quote page or portfolio

2) click once on the symbol in the quote page and then click the "view a chart for selected instrument" icon in the charting toolbar

3) File: New: Chart, then use the instrument selector to choose the instrument you wish to chart

4) Click the Chart button when viewing a quick quote for any instrument.

As seen in the previous section on quote pages, a new chart object may be created by double-clicking a symbol in a quote page when no charts objects are open or by double-clicking on a symbol with the option or control key down. Chart objects created in this fashion show the instrument graph in a chart sub window and optionally, a volume histogram indicator in a second sub-window beneath the instrument. The "Chart Preferences, General" section within the Preferences window provides a check box for specifying whether each new chart should show the volume indicator.

Another way to create a new chart object is to choose File: New: Chart from the menu bar, or click the Chart icon in the main toolbar and select New from the list selection window that appears. In either case, the Create New Chart window appears. This window contains the standard instrument selector for choosing an instrument to be charted. List boxes are provided for selecting the graph type (bar, candle, connected or continuous line), the time frame (daily, weekly, etc.) and the price to be used when a line graph is desired. When candle or bar are selected, a color selection control is provided for choosing the up color and down color for the

bars or candles. Color selection controls appear throughout the preference setting windows of Investor/RT. The control always shows a patch of color indicating the current setting of the control. Click on the color patch and a color selection window will appear for selecting a replacement color setting.

Make your selections and press OK to create a new chart object containing a graph of the selected instrument. The viewing period of the new chart is established from the Chart Period section of the Preference window. The time frame default may be overridden in the Create New Chart window. Once the chart object is open, the period may be revised in a variety of ways. Each newly created chart is created with a chart name of Untitled_n, where n is a number. The name itself does not appear in the window title since the window title shows the names or symbols being charted. To view or revise the name of the chart object, click the preference icon in the charting toolbar. The chart name appears at the bottom of the charting preferences window that appears.

The name, time frame, viewing period, and spacing property of the chart may also be revised by pressing the Preferences icon on the charting toolbar. Avoid using a security name or ticker of an instrument as part of the name of a chart object. The chart name should be descriptive of the format of the window, e.g. Candle Chart with MACD. The chart name is used to identify charts on hand. When Investor/RT draws the chart with a particular instrument or instruments, the names of the instrument(s) are used to title the chart window.

Viewing Period

Each chart object has a "time frame" and "viewing period". Investor/RT supports time frames of daily, weekly, monthly, and intra-day. Intra-day time frames are further broken down into tick-by-tick, and any user-selected minute bar interval(1 minute, 5 minute, 60 minute, etc.). The viewing period is the range of dates or times for which data is being graphed in the chart window.

The default viewing period for new chart objects is specified in the Charting View Period section of Preferences. Once a chart object is open, its viewing period may be adjusted by pressing the Preferences icon on the charting toolbar. Investor/RT provides considerable flexibility in specifying the viewing period of interest. Four methods are supported, each identified by a radio button in the Viewing Period Preferences window (see Figure 19). The viewing period preferences may also be viewed by double-clicking in the horizontal (time) axis area of a chart window.
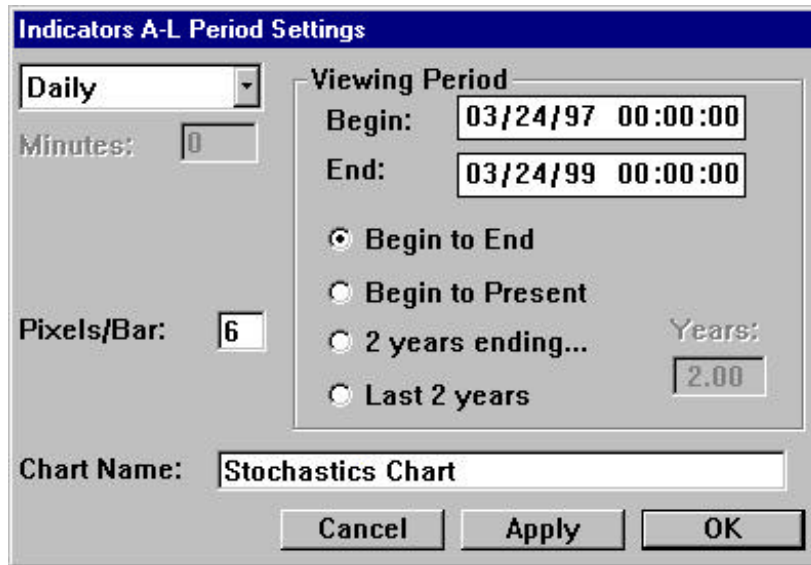
Figure 20. Adjusting Period Settings

Method 1 is titled "Begin to End". If method 1 is chosen, the user specifies both the beginning date/time and the ending date/time for the viewing period. Chart objects saved with this preference setting will always reopen with the set viewing period. The starting and ending date/times may be revised at any time using the Preferences button on the charting toolbar. Method 1 charts are static charts, i.e. since they have an ending date they are not affected by the arrival of new market data.

Method 2 is titled "Begin to Present". When method 2 is chosen, the user specifies only the beginning date of the chart. The ending date/time of the viewing period is dynamically adjusted by Investor/RT to the current date/time when the chart object is opened. The beginning date/time may be modified at any time using the Preferences button on the charting toolbar. Method 2 charts are live charts, i.e. the update as new market data arrives.

Method 3 is titled "N Periods Ending", where N is a user-specified number, and Periods may be expressed in years or days. The number N is specified in years for daily, weekly, and monthly time frames and in hours for intra-day time frames. An N value user default preference is separately maintained by Investor/RT for daily, weekly, monthly, and intra-day time frames. For example, for daily time frame, the method 3 choice might read "2 years ending"; for weekly time frames it might read "5 years ending" and for monthly, "20 years ending". When using method 3, the user specifies only the ending date and Investor/RT calculates the beginning date for you. Method 3 charts are static.

Method 4 is titled "Last N Periods" where N is the same user-specified number described in the paragraph above, and Periods may be expressed in years or days. Depending on the time frame the method 4 choice might read, "Last 2 Years" (daily), "Last 5 Years" (weekly), or "Last 2 Days" (intra-day). Using this method makes the chart object viewing period completely dynamic. That is, each time you open a saved chart object with the method 4 preference

setting, the viewing period is automatically adjusted to establish a fixed period of time ending at the current date/time. Method 4 charts are live charts.

When methods 2 or 4 are used, the chart object is notified each time a quote or trade occurs for any instrument in the chart window. For continuous feed users, this means that the chart is updated each time a new quote or trade arrives for any instrument graphed within the window. For daily time frames, the current daily bar for the open trading session updates as trades occur. For intra-day time frames, new ticks appear automatically in charts or new bars are added or updated appropriately.

Adjusting the Chart View Period

The viewing period for a chart window may be adjusted at any time by pressing the Preferences icon on the chart toolbar (see Figure 19) or by double-clicking or right-clicking the mouse button in the horizontal (time) axis area at the bottom on the chart window. See the discussion of View Period above for details of the four view period types.

Adjusting Tick Chart Resolution

The view period preference window also allows you to adjust the time frame of the chart (daily, weekly, monthly, etc.). If the time frame is Intra day, you may enter the number of minutes for the intra day bars. If the time frame is tick by tick, you may specify the number of seconds of resolution to use in the chart window. A seconds value of 1 means "one second resolution", that is, there will be a plot point (a pixel) on the chart for each second of time. This makes for very fine resolution of the tick data on the chart but reduces the viewable time to just a few minutes on most monitors. A higher seconds number, say 5, causes Investor/RT to map each tick into a plot point representing 5 seconds of time. Thus, if two ticks occur within 5 seconds of one another, they plot at the same horizontal point in the chart. The effect of increasing the seconds of tick resolution is to compress the time so you can view more time without scrolling the chart window. For fast trading futures markets a value of 3 or less is recommended. For active stocks, a value less than 10 usually works well. For lightly traded issues (those that trade on average less than once a minute), use a value of 60.

Adding Instruments to a Chart Window

Once a chart object has been created, additional instruments may be added to it by clicking the Add New Instrument button on the charting toolbar. A Select New Instrument window, similar to the Create New Chart window appears with an instrument selector. Choose the instrument to be added and the instrument's graph type and associated color preferences. The Select New Instrument window provides a list button for specifying whether the new instrument is to be graphed in its own sub window or in the same sub window as an existing instrument in the chart. Choose New Graph to add the new instrument to its own new sub window. Other sub windows are identified in the list by their contents. Choose one containing another instrument and the new instrument will be added and graphed along side the other instrument in the same sub window. In such cases, the sub window is automatically scaled to

include the trading range of all instruments in the sub window. Press OK or Apply to add the instrument. The apply button leaves the window open for adding more instruments.

Another way to add an instrument to a chart window is to drag and drop an instrument from a quote page into the chart. Drop the instrument inside an existing pane to add the instrument to that pane. Drop the instrument on any pane title bar to add the instrument to a new pane.

Adding technical indicators to a chart window

Adding new technical indicators to a chart object is similarly accomplished by pressing the Add Technical Indicator button on the charting tool bar. A window appears with a scrolling list of technical indicators from which to choose (see Figure 20). Use the mouse or type the first few letters of the indicator you want. The default preferences for the indicator will appear. Make any adjustments and press Apply or OK. The Apply button adds the indicator and leaves the window open to add another. If there is more than one instrument in the chart object, a list button of instruments allows the technical indicator to be applied to the instrument of your choice. If you want the indicator to be applied to all instruments, use the apply button, selecting each instrument in turn. A sub window list button is also provided for situations where it may not be obvious from the instrument alone to which sub window the technical indicator should be directed. For example, a chart object may contain a bar chart of IBM in one sub window, and a candlestick chart of IBM in another sub window. Choose a sub window from the list to identify to which IBM instrument an indicator applies.
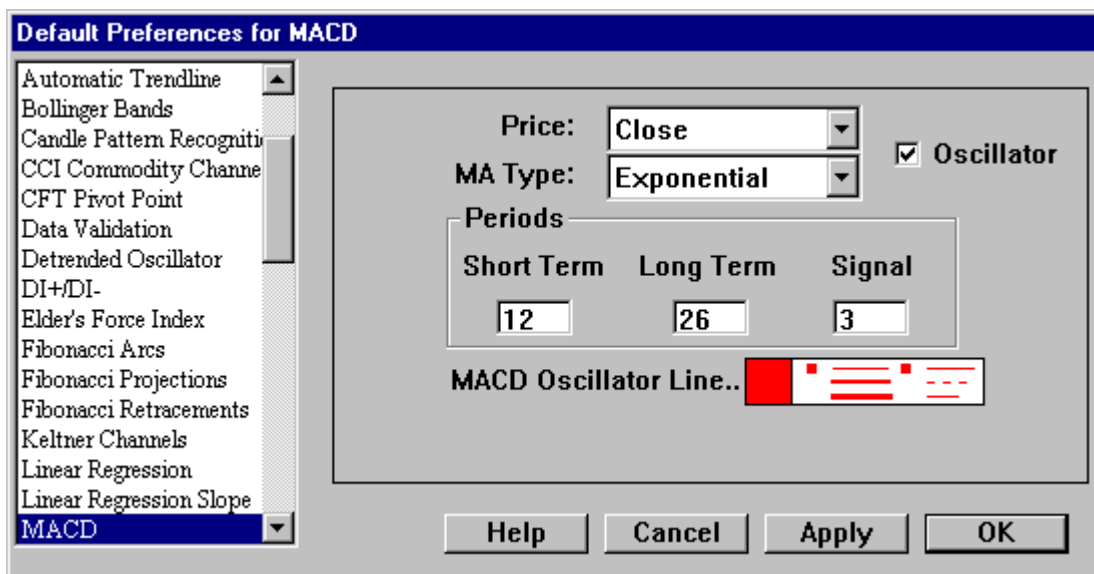

Figure 21. Adding a technical indicator to a chart

Deleting technical indicators from a chart

To delete an indicator from a chart window, click the delete icon (trash can) on the charting toolbar. A list of instruments and technical indicators will appear. You may delete one item by double-clicking on it, or by selecting it and pressing OK. To delete several items, select each one in turn and press Apply. Some technical indicators are drawn in a separate chart sub window. In this case, a faster method of deleting the indicators from the window is to click the close box in the sub window title bar.

Chart elements may be deleted from a chart by dragging and dropping the element off the chart onto the desktop (i.e. not on to another chart window). For example, click the mouse on a moving average line and holding the mouse button down, drag and drop it off the window to remove it from the chart. While an indicator is being dragged the mouse pointer will show the name of the indicator.

Finally, any element in the chart window can be "selected" by clicking on it. When an element is selected it takes on a distinct visual appearance and the name of the selected element appears in the status message area of the main toolbar. Strike the del key on the keyboard to delete the selected chart element.

Using Drawing Tools

Certain of the technical indicators may be added to a chart object using special drawing tools accessible from the charting tool bar. These include the trend line drawing tool, tools for drawing Fibonacci arcs, retracements, and projections (fans), and the regression line drawing tool. Each drawing tool is represented by a button on the charting toolbar. Only one drawing tool may be active at a time. You can tell which, if any, of the drawing tools is active by inspecting the charting toolbar. The button for the active tool, if any, will have a "depressed" appearance. Also, the mouse cursor, normally an arrow, changes appearance when a drawing tool is active.

Drawing Trend Lines

The trend line drawing tool is used to draw a straight line connecting any two points within a chart sub window. Activate the trend line drawing tool and the cursor changes to a pencil. Position the mouse at the starting point of the trend line. Press down and drag the mouse to the ending position and release the mouse. After drawing a trend line, if you wish to change the trend line's properties you may either delete the trend line and re draw it, or you may edit its properties. See the section below, "Editing Properties". The easiest way to change the trend line's position is to drag and drop it using the mouse. Grab either end of the trend line with the mouse and drop it on a new position in the chart.

Trend line properties include the starting and ending date time of the line, the starting and ending prices, and whether the trundling should be "extended" to the current time or not. You may also specify whether Investor/RT should use "realized prices" at the starting and ending

dates. If the default preference is to use realized prices, Investor/RT uses the starting date's low and the ending date's high when the trend line slopes upward and vice versa for download sloping trend lines. If the default preference is not to use realized prices, the price points used are the actual calculated price values at the points the mouse was depressed and released.

Investor/RT also has an automated, dynamic trend line indicator. Adding this indicator to a chart window causes up and down trend lines to be calculated and drawn by the software for some user specified look back period.

Drawing Fibonacci Arcs, Projections, Retracements

The Fibonacci drawing tools operate just like the trend line tool described above. Usually, the Fibonacci trend line is drawn connecting a significant high with a significant low. The arcs, projections, and retracement levels are drawn in accordance with the default preferences for the chosen indicator. You may adjust the properties after drawing the Fibonacci indicator as described below in the section "Editing Properties", or you can drag and drop either end of any Fibonacci indicator as described above for ordinary trend lines.

Drawing Regression Lines

To draw a regression line, activate the regression line tool and draw a line connecting any two dates in the chart sub window. Investor/RT calculates the best fit line for all data points in the chosen time period and draws the line. Optionally, the regression indicator can show channel lines above and below the regression line offset by some user specified number of standard deviations from the regression line. You may adjust these properties after drawing the regression line as described below in the section "Editing Properties".

Drawing Rectangles

To draw and time specific rectangle on a chart, activate the rectangle tool. Position the mouse point at the beginning time of the desired period, mouse down and drag a rectangle to include the desired ending time. When the mouse button is released, Investor/RT will calculate the range of prices realized during the specified period and drag a rectangle enclosing the price action for that period. A user specified comment may be added to annotate the rectangle by editing the properties of the rectangle. To edit the properties of any indicator either right-click on it or click on it to select it and press the return or enter key.

Drawing Vertical Reference Lines

To draw a vertical reference line at any position on the chart, activate the vertical line tool on the chart toolbar. Position the mouse at the desired bar on the chart and click the mouse button. The cross hair tool may be useful while drawing vertical reference lines to line up the reference line with a signal displayed in a sub-window. If a chart window has several panes, vertical reference lines must be placed in each pane individually when desired.

Zooming in on a chart period

The cropping tool (zoom tool) on the chart toolbar, when activated, changes the cursor to a magnifying glass. Position the cursor at the starting point of the period of interest, mouse down and drag a rectangle to include the time period of interest. When you release the mouse, the chart window will zoom in and show the data for the dates included in the zoom rectangle. To undo the zoom and return to the prior state, choose Edit: Undo. You may zoom repeatedly as many times as you like and then issue multiple undo commands to return to the original state of the chart window. When you are zoomed in, you may operate the scrollbar to see data either before or after the zoom in period.

Adjusting chart sub-window sizes

The relative size of each chart window may be adjusted by grabbing the sub window title bar with the mouse and dragging it up or down. First position the mouse at the top of the title bar. The cursor changes to a vertical re size cursor. Press down and drag the line up or down to increase or decrease the size of the sub window. You may maximize any sub window so it occupies the full window by double-clicking on its sub window title bar.

Changing the order of sub-windows

The top to bottom order of the sub windows within a chart window may be adjusted by dragging and dropping any sub window title bar onto a sub window above or below.

Closing sub-windows

Chart sub windows may be closed by clicking inside the close box in the upper left corner of the chart sub window. Chart sub windows are also closed automatically when all of the instruments or indicators within the window are deleted using the delete icon (trash can).

Adjusting Chart Properties

Colors

There are 4 global color preferences that control the general color appearance of chart windows. These are specified using Setup: Preferences: Charting, General. The four preferences are:

1. Chart Background--the background color of all sub windows.

2. Scale Color--The color used to draw the vertical scale lines and the scale numbers

3. Title Background--The color used to draw the background of the sub window title bars. This color should be different from Chart Background.

4. Title Color-- The color used to draw the sub window title text. This color should contrast nicely with the Title Background color.

Editing Instrument Properties

Instrument graphing properties include the graph type, graph price, and colors. These properties may be changed by double-click inside an instrument's chart sub window. If there are multiple instruments or indicators in the sub window, Investor/RT attempts to determine which one you clicked closest to and brings up a window to edit the chosen instrument (or indicator). If Investor/RT cannot tell which one you clicked on, it will bring up a list of instruments and indicators with the sub window. Pick one and press OK.

The "Edit Chart Element" icon on the chart toolbar may also be used to get a list of all instruments and indicators for the entire chart window. Pick the one you wish to edit and press OK. Alternatively, right-click (command-click on Macintosh) on any instrument graph or technical indicator line in the chart to edit it. Click on any chart element to select it and then press the return/enter key to edit the selection. Press the tab key repeatedly to "cycle" through each of the instrument(s) and indicators in a chart window, selecting each one in turn. The name of the selected indicator or instrument appears in the main toolbar window. Then press enter/return to edit the properties of the selected element.

Technical Indicator Properties

Each technical indicator has one more variables or parameters that control how the indicator is calculated or displayed. You may edit the properties of technical indicators by double-clicking in the chart sub window or by using the "Edit Chart Element" button on the chart toolbar. A window for editing the indicator parameters will appear. Make any adjustments and press OK to close the edit window and see the revised chart. If you press Apply instead, the editing window stays open but the parameters are revised and the chart re drawn. You may wish to move the editing window to the side so you can apply various parameters and observe the effect of your revisions prior to closing the editing window.

Viewing/Editing Chart Data

When viewing a chart, if you wish to see the actual data underlying the chart, click the "View/Edit Historical Data" button on the charting toolbar. The data will appear in the form of a spreadsheet (see Figure 17 below). The spreadsheet will be scrolled to the end, showing the most recent data points. If the time frame is daily, weekly, monthly. The data columns will be date, open, high, low, close, volume, and open interest. If the chart is tick by tick or intra-day bars, the data will be shown in tick format: date/time, price, tick volume, bid, and ask. The bid, and ask data are present only when supported by the data service in use. The tick volume is applicable to stock instruments only as a rule. The data cells (except the date) are editable. To correct an invalid data point, click the mouse pointer in the cell, edit the value, and press return or tab or click in another cell. To delete a tick or a bar of data completely, first select the QuoteDateTime cell in the row you wish to delete then press the "del" key on the

keyboard. Confirmation will be requested. After revising the chart data. close the view/edit spreadsheet window. The chart window will then be re drawn with the revised data, if any.

Figure 22. Viewing and Editing Historical Data

If there is more than one instrument in the chart window, pressing the View/Edit button will bring up the data for the first instrument in the window. The first instrument is the one listed first in the window title. If you wish to view or edit the data for one of the other instruments, move the sub window containing the instrument you want so it is above the other instrument sub windows. Then press the View/Edit button. If you do not wish to disturb the format of the chart then bring up a quote page containing the instrument, select the instrument and press the View/Edit button on the quote page toolbar (not the chart toolbar).

Replacing Instruments in a Chart

A chart window is like a template that describes a format for charting and analyzing the market data for an instrument. Even though a chart may contain more than one instrument, usually there is only one instrument with several technical indicators calculated and displayed for that instruments. For the sake of this discussion when we refer to a chart's instrument, we are referring to the first instrument listed in the chart window's title.

Investor/RT provides a variety of methods for quickly changing a chart's instrument to a different instrument. The slowest and most methodical way to accomplish this is to click the "Edit Chart Element" button on the chart toolbar. When the list of instruments and indicators appears, pick the instrument you want to replace and press OK. A window will appear for updating the instrument. Choose "Replace" from the Action menu. An instrument selector will appear. Pick the replacement instrument and press OK. The chart will then be re drawn with the replacement instrument.

Fortunately, there are faster and more intuitive methods for quickly replacing an instrument in a chart. The most common is to simply use an open quote page and a symbol selector for the active chart. If a chart object is open, double-clicking an instrument in a quote page will insert that into the active chart replacing the chart's prior instrument. This is not always convenient, however, since the chart may be covering all or a part of the quote page.

When the chart window is the front active window, you may identify a replacement instrument by simply beginning to type the first few letters of the ticker symbol for the instrument. When the chart object notices you are typing alphabetic characters, it assumes you are typing a ticker symbol so it opens or activates a quick quote window to accept your keystrokes. The quick quote window in turn uses it's instrument selector to identify the instrument you want. When you then press return or enter, the quick quote object inserts the selected instrument into the chart window and brings the chart window to the front again. In summary, when a chart window is in front, you can replace its instrument by simply typing a new ticker and pressing return.

When a quick quote window is in front, use it's instrument selector to identify an instrument and press return or enter or click the quick quote window's chart icon. The chosen instrument will either replace the instrument in the active chart if one is open, or a new chart window will be opened for the instrument if none is open.

If a portfolio or quote page window is in front, either double-click the symbol or select the row and press the chart button on the associated toolbar. The chosen instrument will replace the instrument in the active chart if there is one, or a new chart window will be opened for the instrument.

Adjusting the Vertical Scale

Normally, the vertical scale of each chart window is determined automatically by Investor/RT. By default, the vertical scale is set according to the maximum and minimum values exhibited by the instruments and technical indicators displayed in chart sub windows. The user may adjust the vertical scale values by double clicking in the area to the right of the vertical scale in any chart sub window. A dialog box will appear in which you may select automatic or manual scaling and set the minimum and maximum values desired. Manual scaling may also be set using the mouse. Mouse down in the vertical scale area of the chart and drag the mouse slowly upward to expand the scale and downward to contract the range. To return to automatic scaling, double-click in the vertical scale area and select automatic scaling again.

Creating Slide Shows

The need to see a series of instruments charted in a user prescribed format is so common that Investor/RT implements a slide show object specifically for this purpose. A slide show object is a one-of-a-kind object that provides a dynamic association between the list of instruments in

a quote page and the active chart window. The slide show toolbar is opened by clicking the Slide Show icon on either the quote page toolbar or the chart toolbar (see Figure 21).
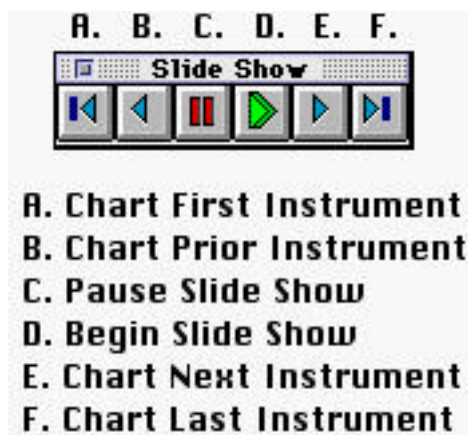

Figure 23. The slide show toolbar

The slide show toolbar has a green start button which starts the slide show. Every few seconds the chart window is updated with the next instrument in the quote page until the last instrument is charted. The delay time between chart updates is control by the user (see Setup: Preferences: Charting General). The slide show may be paused with the pause button. You may advance forward or backward in the list of instruments by clicking the forward or reverse buttons. You may reset the slide show back to the beginning or to the end by pressing the First or Last buttons.

While the slide show is paused (i.e. not automatically advancing), you may adjust either the chart or the quote page however you like. You may even close the quote page and/or chart and open news ones. The slide show toolbar will then pick right up with the new list of instruments and/or new chart window.

While the slide show is paused, a single click on any symbol in a quote page will position the slide show at that instrument and re draw the chart with that instrument.

If you attempt to operate a slide show when there is either no quote page or no chart window open, you will be prompted with a list of charts or quote pages. Pick the one you want and press OK and the slide show will incorporate the selected chart or quote page.

Saving Chart Windows

When you close a chart window or press the Save button on the chart toolbar you will be asked whether you wish to save the chart object for future reference. If you press Save, the chart object and its content will be saved in the database under the chart object's name. If the chart object is untitled, you will be asked to provide a name for the chart object. The names of all saved chart objects appear in the Open: Chart menu. To recall a chart object that has been previously saved, either select it from the Objects menu or click the chart icon on the main

toolbar. A list of chart objects will appear, click the one you wish to open and press OK. You may open several chart objects by selecting each in turn and pressing Apply.

When a chart object is saved, it is saved with the instruments(s) currently charted in the window. When you open a saved object, the chart will initially open with the instrument(s) it contained when it was saved. You may then, of course, substitute any other instruments into the chart using the methods described above.

Deleting Chart Objects

To delete a chart object that is no longer needed, choose Delete: Chart from the Control: Data Management menu. Choose a chart name and press the Delete button to remove it from the database. Deleted items will no longer appear in the Open: Chart menu.

To change the name of a chart object, open it and press the Preferences icon in the chart toolbar. Revise the chart name and press OK. Then press the Save icon on the chart toolbar or close the window. When prompted, save the chart. It will be saved under the revised name. Then delete the prior name using Control: Data Management: Delete: Chart as described above.

Technical Indicators

Investor/RT supports a wide variety of technical indicators. A technical indicator, when added to a chart object, performs some calculation on the historical data of a user-specified instrument within the chart. As of this writing the list of supported technical indicators includes the following, listed alphabetically:

>   Accumulation/Distribution

This is a momentum indicator which takes into account changes in price and volume together. The idea is that a change in price coupled with an increase in volume may help to confirm market momentum in the direction of the price move.

If the Accumulation/Distribution indicator is moving up the buyers are driving the price move and the security is being accumulated. A decreasing A/D value implies that the sellers are driving the market and the security is being distributed. If divergence occurs between the Accumulation/Distribution indicator and the price of the security a change in price direction is probable.

>   Average Directional Movement (ADX)

Average Directional Movement is a momentum indicator developed by J. Welles Wilder. The ADX attempts to measure the extent to which a market is trending. The first step is to calculate DX, or Directional Movement Index:

DX= |[(+DI)-(-DI)]| / [(+DI)+(-DI)] * 100

A moving average of DX is then calculated to generate ADX:

ADX = moving average (DX)

This indicator measures the strength of the trend, regardless of direction; the higher the value, the stronger the trend.

Average Directional Movement Index (ADXR)

ADXR further smoothes the ADX by taking a sum of the current ADX value and the value of ADX at the beginning of the period, then dividing by two. This further smoothing was originally done by Wilder to smooth fluctuations in ADX. Interpretation of ADXR is the same as ADX; the higher the number the greater the trending behavior of the instrument.

Chart Annotation

This indicator provides the capability of making textual notations on a chart window. The notations can be centered in the window, or the notes may be pegged to a particular date so they come into view when the chart is scrolled to the associated time period. The annotation indicator can also be setup to display a current quote of the associated instrument, include bid and ask price.

Arm's Ease of Movement Index

The Ease of Movement indicator, developed by R.W. Arms, shows the relationship between volume and price movement. It is a measure of the amount of volume required to move the price during some specified period. The indicator oscillates above and below zero. A buy is indicated when the indicator moves above zero. This indicates that prices are moving upward more easily. Conversely, a sell signal is given when the ease of movement value goes negative (prices are moving downward more easily).

Bollinger Bands

Bollinger bands are calculated by first calculating a simple moving average of typical price, where the typical price for each bar (day) is defined as (high + low + close)/3. The standard deviation is then calculated for the series of typical prices. Trading bands are then drawn at some multiple of standard deviations above and below the moving average line. Market reversals often occur near the upper and lower bands.

Candlestick Pattern Recognition (42 patterns in all)

The candlestick pattern recognition technical indicator allows the user to test for and visualize any of 41 distinct candlestick patterns of interest. When adding the indicator to a chart object, choose as many patterns as you like from the list of available patterns. Other parameters include three values used by the indicator to perform the pattern matching.

The "Equal Percent" value is used to specify how close two prices must be to one another to be considered "equal" for the purposes of pattern recognition. . Specify the value in percentage points, e.g. 1 means 1%, .5 means one half of 1%. If a candlestick closes within "Equal Percent" of it's open, then it is considered a Doji pattern. If a body is too long to be a Doji pattern, then it is considered either "Long" or "Small". It is "Long" if the body is larger than the average of all candle body lengths in the chart and "Small" if it is smaller.

The "Long Shadow" value is used to test whether a candlestick has a long shadow. The shadow of a candle, sometimes called "wick", is the portion of the candle that protrudes above or below the candle body. The long shadow value is multiplied by the actual body length and compared with the shadow length to determine if the shadow is "long". A value of 2, the default, means that a shadow must be twice a long as the candle body to be considered a long shadow.

Similarly, the "Small Shadow" value is used to determine whether a candle has a shadow smaller than the value times the real body length. A value of 1, the default, means that smaller shadows are those whose length is less that one body length. A value of .5 means that a shadow must less than half the size of the body to be considered small.

The candle pattern recognition indicator is displayed in its own sub window within a chart window. Each pattern name selected is represented by a horizontal line with diamonds marking the view period positions where a the pattern was recognized. It is advisable, but not necessary, that the chart of the instrument be displayed in candlestick format. The cross hair tool may be used to line up a diamond with the actual candle.

Pointing the mouse at an instrument's candle while holding the mouse button down causes the title bar of the candle pattern recognition sub window to show the names, if any, of any patterns recognized for that candle.

Commodity Channel Index

The CCI is a measure of the variation of an instrument's price from its statistical mean. Developed by D. Lambert, CCI can be used with any security type, not just futures. The CCI usually oscillates between extremes of +100 and -100. Values above 100 imply an overbought condition, those below -100 indicate over sold conditions. Divergence of the CCI value and price can also signal a change in price trend.

Directional Movement (+DI , - DI)

Directional Movement is a momentum indicator which attempts to quantify the trending or directional behavior of a market. Directional Movement is defined as the largest part of the current period price range which lies outside the previous period price range. If the larger excess is above the previous period high, it is considered Positive Directional Movement, or +DI. If the larger part of the current range is below the previous period low, it is considered Negative Directional Movement, or -DI. The values are exponentially smoothed.

Exponential average must be twice the period you want to examine for odd period values, and twice the period minus one for even period values. For example, if you wish to look at a 14 period directional movement, your exponential average will be (14x2)-1 or a 27 period exponential average.

Consider the +DI to measure the percentage of up movement and -DI to measure the percentage of downtrend. One interpretation is to note a buy signal when the +DI line crosses the -DI line from below. Conversely, a sell signal is indicated when the -DI line crosses the +DI line from above.

Elder's Force Index

Force Index uses volume and price change from previous close to determine the momentum behind a price move in a given direction. An increasing Force Index is indicative of strong interest in the direction of the price move while a decreasing Force Index suggests that price is moving counter to the major trend. It is calculated by exponentially smoothing the product of volume and the difference in price from previous close to current close. The default period in Investor/RT is 2 as suggested by the indicator's author, Alexander Elder.

Fibonacci Arcs

Fibonacci Arcs are displayed by first drawing a trend line between two extreme points, for example, a trough and opposing peak Three arcs are then drawn, centered on the second extreme point, so they intersect the trend line at the Fibonacci levels of 38.2 percent, 50.0 percent, and 61.8 percent.

The interpretation of Fibonacci Arcs involves anticipating support and resistance as prices approach the arcs. A common technique is to display both Fibonacci Arcs and Fibonacci Fan Lines and to anticipate support/resistance at the points where the Fibonacci studies cross.

Fibonacci Projections

Fibonacci Projections, or Fan Lines, are displayed by drawing a trend line between two extreme points, for example, a trough and opposing peak. Then an "invisible" vertical line is drawn through the second extreme point. Three trend lines are then drawn from the first extreme point so that they pass through the invisible vertical line at the Fibonacci levels of 38.2 percent, 50.0 percent, and 61.8 percent.

Fibonacci Retracements

Fibonacci Retracements are displayed by first drawing a trend line between two extreme points, for example, a trough and opposing peak. A series of nine horizontal lines are drawn intersecting the trend line at the Fibonacci levels of 0.0 percent, 23.6 percent, 38.2 percent, 50 percent, 61.8 percent, 100 percent, 161.8 percent, 261.8 percent, and 423.6 percent.

After a significant move, (either up or down), prices will often retrace a significant portion (if not all) of the original move. As prices retrace, support and resistance levels often occur at or near the Fibonacci Retracement levels.

Linear Regression

The Regression study looks at a sample of price data over a discrete time period and represents all of those data points in the form of a straight line that best represents the trend of price data for the period.. You may apply the study to any of the price data types. Click the linear regression icon in the charting tool palette to enable the linear regression drawing tool and hold your mouse button down while you drag the drawing tool between the two points of interest. When you release the mouse button Investor/RT draws the regression line. As an option, you may choose to draw straight band lines parallel to the regression line. The bands are drawn a user-specified distance above and below the regression line. The distance is specified by the user as the number of standard deviations away from the regression line.

The following approximations offer a few rules of thumb for using the standard deviation settings:

Plus or minus one standard deviation takes in 68.3% of all expected outcomes (historical price moves). Plus or minus two standard deviations takes in 95.4% of all expected outcomes (historical price moves) . Plus or minus three standard deviations takes in 99.7% of all expected outcomes (historical price moves)

For example, excursions of price more than 2 standard deviations above or below the regression line represent an unlikely event (less than 5% probable). Such excursions usually represent overbought or oversold conditions.

Momentum

The momentum indicator, like "Rate of Change" described below compares the price at each bar with the price some fixed number of periods ago. The momentum line show the difference in price (rather than the ratio of prices). The resulting line oscillates around zero. The graph is essentially identical in shape to the Rate of Change line.

Moving Averages (Simple MA,   Weighted MA, Exponential MA, Wells Wilder MA)

A moving average is an indicator that shows the average value of an instrument's price over some time period. Investor/RT supports simple, exponential, weighted, and Wilder moving averages. The simple moving average applies equal weight to all prices in the period. Weighted and exponential averages apply more weight to recent prices.

Moving Average Channels

Moving average channels use a moving average of price to create an envelope above and below the moving average line at a user specified number of standard deviations. The point

of this study is to create a channel which represents support and resistance at its outer bounds based on the moving average.

As always, the period of the moving average should match the trading time horizon of interest to the user. As price moves above its n-period moving average, a bullish indication is noted. Conversely, a price move below its x-period moving average is a bearish event. Using standard deviation to create a boundary above and below the moving average attempts to give the user a handle on how far the price has moved from the moving average in the past.

The following approximations offer a few rules of thumb for using the standard deviation settings:

Plus or minus one standard deviation takes in 68.3% of all expected outcomes. Plus or minus two standard deviations takes in 95.4% of all expected outcomes. Plus or minus three standard deviations takes in 99.7% of all expected outcomes

In other words, you would expect to see a price move outside the moving average band using:

one standard deviation 1 time in 3

two standard deviations 1 time in 20

three standard deviations 1 time in 370

Using a standard deviation which includes 99.7% of all possible occurrences sets levels in the study which may never be tested. You may enter decimal numbers which enable you to adjust the sensitivity of the bands. Note that the standard deviation is a "moving standard deviation". The user may specify the period to use for the standard deviation calculation, usually, but not necessarily the same period as the moving average itself.

Moving Average Convergence/Divergence (MACD)

MACD Oscillator

Developed by Gerald Appel, MACD utilizes various exponential moving averages of closing price to generate buy and sell signals. Exponential moving averages assign greater weight to the most recent price data and therefore are more sensitive to current price movement than simple moving averages. MACD consists of a Differential Line and a Signal Line. The Differential Line is constructed by measuring the difference between two exponential moving averages, typically a 12- and 26-period. The Signal Line is a 9-period exponential moving average of the Differential Line values. Buy signals are generated when the Differential Line crosses the Signal Line from below while sell signals occur when the Differential Line crosses the Signal Line from above.

Investor/RT also displays the MACD Oscillator, which is a histogram which crosses a zero reference line when these signals occur. A cross of zero from below into positive territory

represents a buy signal, and a cross of zero from above into negative territory indicates a sell signal.

Money Flow

Money Flow attempts to measure the amount of money flowing into and out of a security. The criteria used to measure money flow are price and volume. An average price is calculated for the period (H+L+C/3) and then multiplied by the volume over that period. When the average price is higher than the previous period it is considered Positive Money Flow. When the average price is lower than the previous period it is considered Negative Money Flow. The average price is multiplied by volume to gauge the market interest in moving the price in a given direction.

Money Flow Index

The Money Flow Index creates a ratio of Positive Money Flow and Negative Money Flow over time and scales it to a number between 0 and 100. The MFI value can be used to evaluate overbought and oversold conditions in a security the index moves above or below a certain reference level (Investor/RT defaults to 80 for overbought and 20 for oversold).

Divergence between MFI and the price direction can also be indicative of a reversal. If price is trending higher and MFI is decreasing over that period, a market top may occur.

On Balance Open Interest

The On Balance Open Interest for an n-bar period is defined as the sum of all Open Interest for up bars minus all Open Interest for down bars. An up bar is one where the price closed higher or the same as the previous bar. The On Balance Open Interest study calculates the n-bar Open Interest for each day and charts it as a line which can oscillate around the zero line.

On Balance Volume

The On Balance Volume (OBV) for an n-bar period is defined as the sum of all volumes for up days minus all volumes for down days. An up bar is one where the price closed higher or the same as the previous bar. The On Balance Volume study calculates the n-bar OBV for each bar and charts it as a line which can oscillate around the zero line.

Open Interest Histogram/Moving Averages

This indicator is simply a moving average applied to trading open interest instead of a price. The moving average of period 1 yields the actual open interest for each period. The data may be graphed as a line or a histogram.

Percent Change Price/Volume

This indicator graphs the percent change in price or volume (or both) over a specified time period. It can be very useful in gauging whether volume has confirmed a price move by

increasing with the move. By the same reasoning, decreasing volume while price moves in a given direction may represent the counter trend.

Pivot Point

The Pivot Point study is one which works best in futures markets with a wide daily trading range (high volatility). The study uses the previous day high, low, close, and open price to generate a pivot, two support levels, and two resistance levels. Because it is generated from daily data it must always be created in a daily chart in Investor/RT. You can, however, use the Reference Line study to mark these levels on a tick chart or intra day chart after you have generated the values.

Price crossing the pivot on an up move is a bullish event; a cross below the pivot on a down move is a bearish event. Once a bullish indication has registered the study offers two resistance levels for the price to test. If the first resistance is penetrated price can be expected to test the second resistance. The same idea holds true for the support levels on a downward cross of the pivot point.

Random Walk Indicator

The random walk indicator is used to determine if an instrument is trending or if prices are just fluctuating randomly. It attempts to do this by first determining the instruments' average trading range. Then two RWI lines, called the RWI high line and RWI low line, are calculated using a user specified look back period. An issue is trending higher when the RWI high line is greater than 1.0. The instrument is down trending when the RWI low line is greater than 1.0.

Rate of Change

The ROC measures the ratio of the price to the price a fixed period ago. A rising ROC line indicates expanding velocity of price change. A declining ROC line implies a loss of momentum. It is advisable to add multiple ROC indicators to Investor/RT charts, each with a different time period to compare the rate of change over different periods. The ratio is multiplied by 100 and displays as a line oscillating around 100.

Reference Lines

The Reference Line indicator draws a horizontal line at a fixed price on the displayed chart according to the preferences of the user. The line can be drawn according to a trading value on a particular day, an alarm value, or an arbitrary value of the user's choosing. This indicator may be used repeatedly to overlay several reference lines on any chart.

Regression Lines

This indicator can be drawn with the mouse using the Regression Line Drawing tool. The indicator calculates a least squares fit (regression) of all of the price data in the time period specified and draws a line that best fits the data. Channels above and below the regression

line may be requested. The channel lines are drawn at a user specified distance from the regression line. The distance is stated in standard deviations.

Relative Strength

Relative Strength, sometimes called "comparative relative strength", indicates the movement of an instrument relative to another instrument. If the base instrument has stronger movement than the monitored instrument, the Relative Strength line will dip down. If the monitored instrument has stronger movement than the base instrument, the line will rise. This indicator can be used to compare the performance of any instrument to some to index such as the Dow Jones Industrial Average, or the S&P 500 Index.

Relative Strength Index (RSI)

The RSI is a measure of price strength on a scale of 1 to 100. It is calculated based on price movements during a specified period. The RSI usually tops above 70 and bottoms below 30.

Stochastics (Slow D, Fast D, Raw K)

Stochastic is a momentum or price velocity indicator developed by G.C. Lane. The rawK component is first calculated as 100 * (Close - L)/(H-L) where L is the lowest L during the specified period and H is the highest high during the specified period. The FastD and SlowD lines are then calculated by applying simple moving averages. Price trend reversals can be signaled when the fastD line diverges from price. Actual buy/sell signals are indicated when the fastD line cross above (buy) or below (sell) the slowD line.

Trend Lines

Trend lines may be drawn on charts connecting any two points using the trend line drawing tool. The trend line may then be extended, at the user's option, out to the present time. As an option, the trend line may also be drawn between realized prices, as opposed to being drawn freehand in the chart window.

True Range

Welles Wilder described these calculations to determine the trading range for a stock or commodity.

True Range = the largest of the following:

absolute value(current high-current low)

absolute value(current high-previous close)

absolute value(current low -previous close)

True Strength Index

The TSI is a variation of the Relative Strength Index. The TSI uses a doubly smoothed exponential moving average of price momentum to eliminate choppy price changes and spot trend changes.

True Strength

True Strength is a variation of the Relative Strength indicator. It uses a double smoothed exponential moving average of price momentum to eliminate choppy price changes and spot trend changes. This indicator has little or no time lag. An increasing True Strength value indicates increasing momentum in the direction of price movement.

Up/Down Volume Ratio

The Up/Down Volume ratio compares the representation of buyers vs. sellers over a period of time. The assumption is that if a stock closes up for the day, the attributable volume was induced by buying pressure and thus the stock is under accumulation. Conversely, if a stock closes down for the day, the trading activity is deemed to be selling induced, a sign of distribution. Up/Down ratio is calculated by creating a ratio of the volume on days when price increased to volume on days when price decreased. For each n-day period:

U/D ratio = Sum of Volumes on Up Days divided by Sum of Volume on Down Days

This value oscillates around a value of 1. For U/D ratios greater than 1 there have been more buyers than sellers over that time period and the ratio is bullish. U/D ratios less than 1 exhibit more sellers than buyers over the study period and the ratio is bearish.

Although the U/D ratio is a powerful indicator of previous accumulation/distribution history, it is the trend or slope of this ratio that signals a change in price trend, not the raw value. Investor/RT computes the slope of the ratio line (linear regression) for the last period in the chart and displays the text "Bearish" or "Bullish" in the chart sub window.

Volume Histograms/Moving Averages

This indicator is simply a moving average applied to trading volume instead of a price. The moving average of period 1 yields the actual volume for each period. The data may be graphed as a line or a histogram.

Williams AD

This indicator measures market pressure by comparing the relationship between Closing price and daily range to quantify accumulation, or buying pressure, and distribution, or selling pressure. The indicator is calculated as follows:

When current close is higher than the previous close, AD increases by current Close minus minimum(Current Low or Previous Close). When current Close is lower than the previous Close, AD decreases by maximum(Current High or Previous Close).

Look for divergence of William's AD and price. Rising prices and falling AD can indicate a selling opportunity. Falling prices and a rising AD can indicate a buying opportunity.

Williams %R

A momentum indicator that measures overbought/oversold levels. This indicator is the inverse of the Lane Stochastic indicator

Each technical indicator has several user specified parameters which govern the periods used in calculating the indicator, and the drawing of the indicator, e.g. line color and thickness. The default preferences for each technical indicator is specified by choosing Setup: Preferences: Charting Indicators. The user can accept the defaults or override them at the time an indicator is added to a chart object. A description of each technical indicator and the parameters may be found in the Online Help topic "Technical Indicators".

Suggestions for Further Reading

It is beyond the scope of this guide to provide more than an overview of the various technical indicators implemented by Investor/RT. Here are some supplemental texts which provide details on the calculation and use of technical market indicators.

Technical Analysis Explained. Martin J. Pring. Third Edition. 1991. McGraw-Hill, Inc.

Technical Analysis from A to Z. Steven B. Achelis. 1995 Probus Publishing.

The Encyclopedia of Technical Market Indicators. Robert W. Colby and Thomas A. Meyers, 1988. Business One Irwin.

Secrets for Profiting in Bull and Bear Markets. Stan Weinstein. 1988. Dow Jones-Irwin.

New Concepts in Technical Trading Systems. J. Welles Wilder, 1978. Trend Research.

Portfolio Windows

What is a Portfolio?

The portfolio object in Investor/RT is a spreadsheet object much like the quote page (see Figure 7 above). The key difference is that the portfolio tracks positions. Each row in a portfolio represents a position. The columns in the portfolio represent the data items for each position. These include the name and ticker of the instrument, the number of shares or contracts, the type of position--long or short, cash or margin, the entry date. Some data columns are calculated each time an updated quote or trade price arrives for an instrument which has a position in the portfolio. These include the current value of the position, the gain/loss, and an annual rate of return on the position.

You may define as many distinct portfolios as you wish. Each portfolio has a cash balance, called the credit balance, that tracks the cash on hand in the account. The credit balance is adjusted when you open or close positions in the portfolio. Each portfolio also has a debit balance, used to keep track of margin liabilities when you purchase a security on margin. When you close a margin position, the proceeds are used first to clear the margin liability from the debit balance. Any excess proceeds (the profit) is then added to the credit balance. When a loss is incurred when closing out a margin position, cash to taken from the credit balance as needed to eliminate the margin liability.

Creating a Portfolio

To create a new portfolio, choose File: New: Portfolio. A window will appear for entering the portfolio name, the account number, and trading desk telephone number, if applicable, and the initial cash balance in the account. The cash balance may be easily adjusted so it is not necessary that you have the exact figure available when you create the portfolio.

The portfolio spreadsheet will then open. Initially there will be only a credit and debit balance and no open positions. Creating a new portfolio also causes the Order Desk window to appear automatically for entering positions into the portfolio. When a portfolio window is the front most window, the portfolio toolbar is visible. The portfolio toolbar provides access to quote page and ticker tapes for the instruments in the portfolio, plus access to charts, trading notes, and news for instruments with positions in the portfolio.

The portfolio spreadsheet may be customized to the user's preferences. When first created, the portfolio contains 30 standard data columns. Columns may be deleted by dragging the column title into the body of the portfolio and dropping them. Columns may be added by pressing the "Add New Column" button on the portfolio toolbar. Newly added columns appear in the second position and may be moved to any position by dragging and dropping the column title in the title area of the spreadsheet.

Data columns may be sized individually by dragging the right border or the column title box left or right. Double-clicking a column title optimizes the column width so that all data content fits. The entire portfolio's columns may be optimized to fit by clicking the "Size to Fit" button on the toolbar.

Data columns that may be added to the portfolio include portfolio specific items such as annualize rate of return, number of days held, percent gain/loss, etc. In addition, current trading data columns may be added (open, high, low, last, change, volume, bid, bid size, ask size, etc.). By adding the trading data columns the intra-day trader can watch the market data directly within the portfolio window along with the profit/loss related data columns in real-time.

Each portfolio may be assigned a password to protect the privacy of the financial data contained within it. A newly created portfolio has no password. To assign one, open the portfolio and click the "Set Password" button on the portfolio toolbar. Subsequent attempts to open the portfolio will require entry of the password. Once a portfolio is open, you may eliminate or change the password by again clicking the "Set Password" button on the toolbar. Be sure to make a note of any assigned passwords. If you forget or lose the password, the portfolio will no longer be accessible.

Create quote page for portfolio	QP / icon	Open ticker for portfolio instruments
Check instrument settings...	icon	Quick quote for instrument
Chart selected instrument	icon	View news for instrument
Open order desk window	icon	Confirm trades...
Resize columns to fit	icon	Add a new data column
Sort descending by...	icon	Sort positions ascending by...
View asset allocation	icon	Set portfolio password
Delete position	icon	Adjust portfolio cash
Portfolio reports	icon	Portfolio daily value chart
View trader's notes for selected row	icon	Change toolbar style

Figure 24. The portfolio toolbar

Adding Positions to a Portfolio

Positions are added to a portfolio using the Order Desk window (see Figure 22). The trading desk window appears when you create a new portfolio or when you click the "Place a Trade" icon in the main toolbar. The trading desk window may be used to "journal in" positions into a

portfolio. Choose "Journal Entry" as the Order type to journal in positions. This option adds positions to the portfolio without adjusting the cash balance in any way. Choose "Trade Entry" to enter completed trades as positions in the portfolio in a single step. Trade Entry transactions either debit or credit your cash balance to reflect the cost or proceeds from the sale of a position. In either case, you must specify which instrument to use for the trade entry or journal entry, whether the entry is a buy or sell and whether the entry opens a position or closes an existing position in the portfolio. You also enter the entry price (journal price), the quantity to be bought or sold, the date of the journal entry or trade, and the commission cost if known. Commissions may be adjusted later so it is not necessary to enter a commission amount. Finally, press the "Make Journal Entry" or "Make Trade Entry" button. A confirmation window will appear. Press OK to submit the entry.

Figure 25. Placing a trade using the Order Desk

Placing Trades

The Journal Entry and Trade Enter methods described above are used to add or close out positions in a portfolio whether all of the information needed such as the fill price, commission amount, etc. are at hand. Investor/RT also permits entry of trading orders that have not yet been confirmed. Entering a trading order does not add a position to the portfolio. The order is placed in a pending status until either the order is canceled or confirmed as complete. These order types include: market orders, stop orders, limit orders, fill or kill orders, limit if touched orders, on open order, on close orders, and all or none orders.

Confirming Trades

When a pending order is confirmed as filled or canceled, use the Confirm Trades button on the main toolbar to bring up the Order Confirmation window. Identify the order by selecting it with the mouse, fill in the quantity filled, the price per unit, commission amount, and confirmation id (if applicable). Adjust the fill date time and press the Confirm Order button. This causes the order to be processed to either open or close a position in the associated portfolio. When a pending order is not filled, select the order with the mouse and press the "Cancel Order" button to remove the pending order from the system.

Closing Positions

In Investor/RT, closing a position or removing a position from the portfolio amounts to making an offsetting trade. If you are long 500 shares of XYZ, then to close the position, make a trade entry to sell 500 shares of XYZ. Closing the position properly assures that the cash balance in the portfolio is maintained correctly. To correct clerical errors in the portfolio, positions can be eliminated using the Trash Can button on the portfolio toolbar. Select a position in the portfolio and click the trash can to remove the position. The cash balance in the portfolio may have to be adjusted manually in such cases.

Making Portfolio Adjustments

As you enter new positions into a portfolio, news rows will appear in the spreadsheet for each position. If you have a continuous data feed, the portfolio valuations and gain/loss calculations will update continuously as new prices are received for the instruments held in the portfolio. You may edit many of the data cells within the portfolio to provide details not known at the time the position was entered, or simply to make corrections to reconcile the portfolio with a brokerage statement, for example. Income from dividends and interest expenses may also be maintained for each position by manually entering these values. Dividends and interest received and interest expenses are incorporated by Investor/RT into the gain/loss and annualized rate of return calculations for each open position.

Editing the portfolio spreadsheet

You may edit the Last Price cell for any position. This is especially useful for updating prices of bonds or other special instruments that may not be quoted by the data service in use. Updating the last price of a quoted instrument will have only a temporary affect since the next quote will update the last price value automatically.

Other editable fields include: Qty, Open Date, Open Price, Commission, Dividend, Margin Cost, Misc. Fees, and Description.

Adjusting Balances

The "Cash Balance Adjustment" button in the portfolio toolbar opens a window used to make deposits or withdrawal transactions. The Cash Adjustment window may also be used to set the cash balance in the portfolio to a specific amount. This may be useful, for example, to synchronize the cash balance with a brokerage statement.

The cash (debt) balance may also be edited in the portfolio spreadsheet. A dialog box will appear in which you may give an explanation for the change in balance. This information is kept in the Investor/RT database as an audit trail for future reference.

Deleting a Position from a Portfolio

You may remove (journal out) a position from your portfolio by selecting the row you wish to remove by clicking in a cell in that row, then pressing the "Delete Position" button in the portfolio toolbar. The position is closed with Journal Entry, that is, there is no effect on the portfolio cash balance.

Cash Balance/Margin Debt Accounting

Here is an overview of how the cash balance or debit balance value is maintained by Investor/RT. The cash balance is not affected in any way by Journal Entry transactions. All other transactions cause adjustments to the balance, taking into account the purchase/sales price of the position and other costs. Purchase/sales price for stocks and mutual funds is determined by multiplying the entry price times the quantity purchased or sold. For bonds, purchase/sales price is the quantity times price (where price is in percentage points of par value) times 10, i.e. each bond is treated as $1000 face value. For equity and index options, purchase /sales price is the quantity times 100 times the option price. At the present time, Investor/RT does not handle purchase/sale price accounting for future options. For futures contracts, Investor/RT calculates only the gain/loss for each position while the position is open. When the position is closed, the gain/loss either increases or decreases the cash balance. Futures contracts purchases and sales therefore do not affect credit or debit balance until the position is closed.

Buy to Open (cash)-- the purchase price and commission reduce the cash balance.

Buy to Open(margin)-- the full purchase price and commission reduce the cash balance. Adjustments may be made manually to the cash (debt) balance to reflect the actual margin debit, if any, in the account. This is done by editing the cell in the portfolio window.

Sell to Open-- the proceeds of the short sale increase the credit balance. The value of the position is a debit against the overall portfolio value.

Buy to Close-- the cost of covering the short position, including commission, reduces the credit balance and the position is removed. When the reduction is less than the original proceeds credited, a profit has been made.

Sell to Close a Cash Position--the proceeds, less commission, increase the cash balance.

Sell to Close a Margin Position-- the proceeds, less commission, are added to the cash balance. Adjustments may be made, if necessary, to the cash balance to reflect any remaining margin debit in the account by editing the cash balance figure.

Deleting Portfolios

Investor/RT is shipped with a portfolio named "Sample Portfolio". Use this portfolio to experiment with the portfolio entry process. Whenever you wish, you may delete the sample portfolio or any user-defined portfolio by choosing Delete: Portfolio from the Control: Data Management menu. Select each portfolio you wish to delete and press the Delete button.

Renaming Portfolios

To rename a portfolio, choose Save As from the File menu while the portfolio is the front window. A dialog box will appear requesting a new name for the portfolio. Enter the revised name and press Save.

Adjusting Portfolio Format

Up to 30 columns of data may be displayed in the portfolio window. Just as in the quote page object, a portfolio column may be deleted by dragging the column title into the body of the portfolio window and dropping it. The width of columns may be adjusted with the mouse or by double-clicking on the column title to set its width automatically based on the contents of the column. Columns may be added by clicking on the "Add New Column" icon on the portfolio toolbar. Columns may be moved by dragging column titles to the left or right. When a portfolio window is closed, it column format and the widths of each column are stored in the database so that the window will reappear in the same format when it is opened again.

Sorting Portfolio Positions

A portfolio window may be sorted by any data column in ascending or descending sequence. This may be accomplished using the portfolio toolbar by clicking on either the ascending or descending sort buttons. A list of columns will appear. Choose a column and press OK to sort by that column. Multi-level sorts may be accomplished by choosing several column in turn and pressing Apply for each one. The portfolio may also be sorted by some column by clicking on the column title while holding down a special modifier key on the keyboard. Macintosh users may sort ascending and descending using the option and command keys respectively. Windows/95 users use the control and shift keys.

Windows

Sort Ascending--Click on column title while depressing control key
Sort Descending--Click on column title while depressing shift key

Macintosh

Sort Ascending--Click on column title while depressing option key
Sort Descending--Click on column title while depressing command key

View Asset Allocation

The asset allocation mix of any portfolio may be viewed at any time by pressing the "View Asset Allocation" button on the portfolio toolbar. A text window appears showing asset allocation percentage and dollar amounts by security type and then by asset class.

The Asset Allocation by security type shows the asset breakdown by stocks, funds, bonds, other, and cash. The Asset allocation by asset class shows the asset breakdown by user-defined asset class. Asset Class is a data column in the portfolio window that may be assigned a value of 0 to 99 for each position. The field enables the user to organize and sort positions according to any class scheme you wish. The Asset Allocation by Asset Class report will show the percentage and dollar amounts in the portfolio for each asset class assigned by the user.

Portfolio Reports

The Investor/RT database maintains three types of portfolio reports:

1) Audit Trail

2) Closed Position Summary

3) Closed Position Detail

The Audit Trail report shows a dated list of changes to the cash balance in the portfolio. These include buy and sell transactions, commissions paid, and any manual adjustments to the portfolio's cash position.

The Closed Position Summary and Detail reports show information about each closing transaction, i.e. each closed position or partially closed position. Data items include the dates the positions was opened and closed, the opening and closing values of the position and the profit or loss realized upon closing the position.

Scans

What is a Scan?

A Scan is a specification for searching through all of the instruments in a particular quote page to identify those whose current or historical market data exhibit defined characteristics. The result of a scan is a quote page that lists the instruments that match the criteria requested in the scan. Also noted in the resultant quote page are the quantitative values for the requested criteria. A scan can also be considered a "signal", in other words, a specification of some market related criteria that the user considers meaningful as a trading signal to buy or sell. Scans can be shown historically in a chart window with each bar marked with a distinctive marker to signify that the scan criteria were met at that bar.

Properties of Scan Objects

Scan Objects, like charts, quote pages, portfolios and other Investor/RT objects have various properties. These include:

Name. A user specified name up to 31 characters in length containing alphabetic characters and underscores. Scan names may not contain numeric digits, spaces, or other special characters.

Source Quote Page: Each scan operates on (scans) the data for each instrument in the designated source quote page. The quote page that results from a scan operation (the resultant quote page) is named with the name of the scan. A scan's source quote page may be any system or user define quote page, or even a quote page produced as the resultant quote page from some other scan object.

Scan Time frame: The scan request is interpreted according to the user specified time frame (daily, weekly, monthly, tick, intra-day 1 minute, etc.) Version 2.0 of Investor/RT supports only the daily time frame.

Scan Elements: Each scan object has one or more scan elements. A scan element is a property of an instrument (e.g. PE Ratio, 52-week-high), or a bar data value (e.g. high, low, close, etc.), or a technical indicator calculated from the historical data for each instrument.

Scan Request: Each scan object has a scan request composed by the user in the scan request language. The scan request language (SRL) is a language for stating a logical condition that must be true for an instrument to be accepted by the scan. Scan requests formulated in the SRL are expressions composed of scan elements, numbers, and operators as described below.

Scan Request Language Notation

The following is a list of the scan elements that may be selected for use in formulating a scan request. There are three kinds of scan elements: historical properties, fixed properties, and technical indicators. Historical properties and technical indicators have a "current" value and a historical value some number of days (bars) ago. Fixed properties are properties of an instrument for which Investor/RT has only the "current" value. Each scan element has a "token", an abbreviated name used to reference the scan element when writing expressions in the SRL.

Historical Properties

OP   the current opening price

HI   the current high price

LO   the current low price

CL   the current or closing price

VOL   the current of closing volume

OI   the current open interest

MED   the current average of high and low price

MID   the current average of high, low, and close where n represents any number

When the token for a historical scan element is suffixed with one or more digits, the numeric suffix is interpreted to mean the value of the scan element that number of bars (days) ago. For example CL5 is a "qualified token" that means the closing price 5 bars (days) ago. Thus for any number n:

OPn   the opening price n bars (days) ago

HIn   the high price n bars (days) ago

LOn   the low price n bars (days) ago

CLn   the closing price n bars (days) ago

VOLn   the volume n bars (days) ago

OIn   the open interest n bars (days) ago

MEDn   the average of high and low price n bars (days) ago

MID   the average of high, low, and close n bars (days) ago

Fixed Properties

BID   the current bid price

BIDZ   the current bid size

ASK   the current asked price

ASKZ   the current ask size

BAS   the current bid ask spread

PREV   the previous day's closing price (equivalent to CL1 but faster)

CH   the current day's change in price from the previous day's close

YRHI   the 52 week high price

YRLO   the 52 week low price

AVGVOL   the 20 day average trading volume

PE   the price earnings ratio

EPS   the earnings per share

DIV   the dividend amount

YLD   the annual dividend yield

BETA   volatility measure (transmitted)

GAP   gap open amount, i.e. opening price minus previous close.

HIALARM   the user specified high alarm level for the instrument

LOALARM   the user specified low alarm level for the instrument

VOLALARM   the user specified volume alarm level

BARS   the number of bars of data available for the instrument

LEN   the length of the ticker symbol of the instrument.

PCHO   the percentage change in price from the open

PCHY   the percentage change in price yesterday

QTAGE   the time since the last quote or trade in seconds

SECTYPE   a number indicating the security type of the instrument: Stock 1, Stock Option 2, Future 3, Spread 4, Future Option 5, Spot 6, Corporate Bond 7, Government Bond 8,   Municipal Bond 9, Fund 10. Statistic 11, Index 12, Forex 13, Cash 14, Garvin Bond 15, User Defined16

SESSION   the instrument's session number

TICKD   the number of down ticks

TICKU   the number of up ticks

TICKS   the number of ticks

XAVGVOL   ratio of current trading volume to average trading volume.

The following thirteen scan tokens can be used to perform option analysis, i.e. when scanning instruments having security type "Stock Option" or "Future Option".

DAYS   the number of days until expiration on the option.

IV   the intrinsic value of the option (the amount the option is "in the money")

TV   the "time value" of the option, i.e. the last price minus the intrinsic value of the option.

STRIKE   the strike price of the option.

THEO   the calculated theoretical value of the option

ULPRICE   the price of the stock, future, or index that underlies the option

BETA, DELTA, GAMMA, RHO, THETA, LAMBDA, VEGA calculated values of the option's "greeks"

IVOLAT   the implied volatility of the instrument.

              The following scan tokens are textual items that can be tested using the "=" operator in scan requests. Wildcard matching is supported where ? represents any single character and * represents any string of 0 or more characters. For example, the scan criterion NAME = "*Put*" would identify any instrument having the word "Put" in the security name. The scan criterion TICKER = "????X" would identify all instruments having 5 letter ticker symbols ending

with an X, while TICKER = "??" would identify all instruments with two letter tickers.

TICKER   the instrument's ticker symbol

ALIAS   the Dial/Data alias ticker symbol used for downloading data.

NAME   the security name of the instrument

CUSTOM   the "User Data" text data for the instrument

EXCHR   the requested exchange of the instrument

EXCHT   the transmitted exchange of the instrument

70 additional fundamental indicators available from Dial/Data.

Unlike historical scan elements like CL, fixed properties only have a current value. The tokens for fixed properties may not be qualified by a number.

Technical Indicators

MA   Moving Average

RMA   Relative Moving Average

The relative moving average is identical to the moving average calculation except that the value of the moving average is divided by the closing price for each bar in the period. Thus the RMA indicator oscillates above and below 1.0. Values above 1.0 imply that the moving average is above the closing price and vice versa. This indicator is especially convenient for test whether the price is above or below the moving average in scan requests.

STAT   Statistics (minimum, maximum, average, or standard deviation)

This indicator can be configured to calculate the minimum, maximum, average, total or standard deviation of some "price value" for some specified number of periods. The "price value" may be the high, low, last, high + low average, or high + low + last average, volume, open interest, or "range"(high - low). This indicator is used only in scan requests.

RSI   Relative Strength Index

MACD   Moving Average Convergence/Divergence Oscillator value

RAWK   Stochastics rawK value

FASTD   Stochastics fastD value

SLOWD	Stochastics slowD value
CCI	Commodity Channel Index
ADX	Average Directional Index
AD	Accumulation Distribution
BOLU	Bollinger Band (upper band value}
BOLD	Bollinger Band (lower band value)
KELTU	Keltner Band (upper band value)
KELTD	Keltner Band (lower band value)
MOM	Momentum
DIPLUS	+DI Directional Indicator
DIMINUS	-DI Directional Indicator
MFI	Money Flow Index
ARMS	Arms Ease of Movement Index value
ROC	Rate of Change index
VMA	Moving Average of Volume
TSI	True Strength Index
AD	Accumulation/Distribution Index
WAD	Williams Accumulation/Distribution Index
WPR	William %R value
EFI	Elder Force Index
UDVRS	Up/Down Volume Ratio Slope

Like historical properties, all technical indicators can be qualified by suffixing a number to the name, e.g. MACD1 means the value of the MACD oscillator yesterday. Note that the preferences for each technical indicator name are specified elsewhere. The specification of technical indicator preferences is discussed in the scan user interface section.

Scan Request Language operators

There are three kinds of operators in the Scan Request Language: logical operators, relational operators, and arithmetic operators. In addition, there are several special built-in functions like MIN, MAX, ABS, and SQRT that extend the language is useful ways

Arithmetic Operators

Arithmetic operators are addition, subtraction, multiplication, division, and exponentiation represented by the operators +, -, *, /, and ^ respectively. Arithmetic operators are used to compute values from scan elements. Some sample arithmetic operations follow:

(YRHI - CL)*100 /YRHI   the percent away the close is from the 52-week high

(HI-LO)   the high price minus the low, i.e. the current trading range,

(HI-LO)^2   the square of the high low range.

(MA30 - MA) the difference between the moving average 30 days ago and today. The token MA can represent any term moving average.

The result of evaluating an arithmetic express is an arithmetic value that can then be compared to other arithmetic values using relational operators.

Relational Operators

<   less than

<=   less than or equal to

=   equal to

!=   not equal to

>   greater than

>=   greater than or equal to

Some sample relational expressions are:

MA > (MA30 * 1.1) The current moving average is more than ten percent higher than it was 30 days ago.

(YRHI - CL)*100 /YRHI < 20   The current price is at least 20% off the 52 week high.

Logical Operators

The result of evaluating a relational expression is true or false; the condition described is either met or it is not. All valid scan requests can be evaluated as true or false. To formulate more complex scan requests, relational expressions can be tested in combination with other relational expressions using logical operators. Logical operators are (1) logical and, (2) logical or, and (3) logical not.

The logical "and" operator may be written as "AND", "and", "&," or "&&". The scan request expression "x and y" is true if and only if expressions x and y are both evaluated as true.

The logical "or" operator may be written as "OR", "or", "|" or "||". The scan request expression "x or y" is true if either x or y are evaluated as true.

The logical not operator may be written as "NOT", "not", or "!". The scan request expression NOT x is true if and only if the expression x is evaluated as false.

Special Functions

There are several special built-in functions that extend the scan language in useful ways by performing arithmetic or statistical calculations.

SQRT(HI-LO)   The square root of the high low range

ABS(CL - CL1}   The absolute value of the difference of last price and yesterday's close

The SQRT and ABS functions can operate on arithmetic express of any complexity.

MIN(RSI5)   The minimum value of the RSI indicator during the 5 preceding periods

MAX(CL30)   The maximum closing price for the preceding 30 periods

AVG(CCI15)   The average value of the CCI indicator during the preceding 15 periods

STD(VOL20)   The standard deviation of volume during the preceding 20 periods.

The MIN, MAX, AVG, and STD functions operate on a single token (not an expression). The token must be one of the technical indicators followed by a numeric qualifier or it can be one of the historical data elements followed by a numeric qualifier (OP, HI, LO, CL, VOL, OI). The numeric qualifier specifies the period back from the current bar to be used in evaluating the statistic function. Notice that AVG(CL30) is equivalent to using a MA indicator configured for a 30 period simple moving average. The key property of these statistical functions is that they can operate on a range of technical indicator values. For example, if you want to test to see if the RSI indicator has been above 70 at any time during the preceding 4 periods, this condition is expressed briefly as

MAX(RSI4) > 70

Without the MAX function, this condition could only be expressed by:

(RSI > 70 or RSI1>70 or RSI2>70 or RSI3>70 or RSI4 > 70)

Numbers.

Any string of consecutive digits, with or without a decimal point, can be used in a scan request for arithmetic calculations and in relational comparisons. Numbers prefixed with a minus sign are interpreted as negative numbers. Numbers suffixed with the lower case letter k or m are multiplied by a thousand or a million respectively, e.g. VOL > 3.2m is equivalent to VOL > 3200000. Note that numbers may not contain commas.

Parentheses and other punctuation

The Scan Request Language supports expressions of arbitrary complexity. Parentheses may be used to enclose any expression to improve readability and to assure the correct interpretation of the scan request. If you wish to insert a comment into the scan request, terminate the scan request with a semicolon. Any characters entered to the right of the semicolon are treated by Investor/RT as commentary.

Scan User Interface.

Scan objects may be viewed, modified, or created in Investor/RT using the Scan Setup window. To access the Scan Setup window, click the Scan icon on the main toolbar. A list of existing scan objects will appear. Choose the one you wish to work with and press OK or choose New and click OK to bring up an empty Scan Setup window for defining a new scan. A pop up list button at the top left of the window provides quick access to any previously saved scan objects. Choose "New Scan Definition" from this list at any time to start a new scan request.
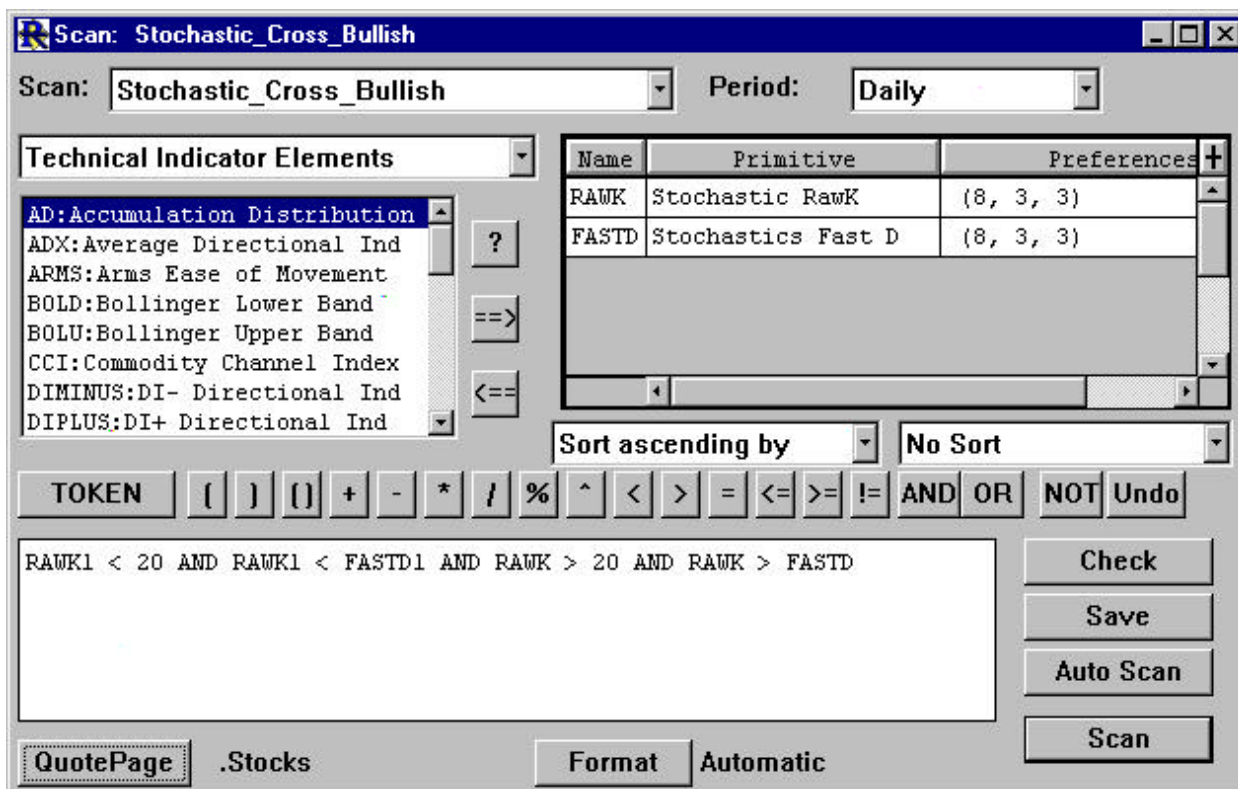
Figure 26. Scan definition

Defining Scan Objects.

The first step in defining a scan is to choose the scan elements you wish to use in the scan request. A list of available scan elements appears on the left side of the window in a scrollable list. Double-click items in this list and they will appear in the scan element spreadsheet on the right side of the window. When you choose a technical indicator scan element, you will first be prompted to set the preferences for the technical indicator chosen. When a technical indicator has been chosen the preferences for the technical indicator are shown in the scan element spreadsheet on the right.

The preferences for any technical indicator scan element may be adjusted at any time by double-clicking on the technical indicator name in the scan element spreadsheet. A technical indicator may be chosen more than once from the list on the left, each time with a different set of preferences. If you do this, be sure to assign each indicator a unique name by editing the name in the scan element spreadsheet. For example, you could add the MA moving average technical indicator twice, once with a 100 day period, and once with a 25 day period. To distinguish between the two moving averages in the scan request language, adjust the names to say, MAa and MAb. Note that the adjusted scan element name must be composed of alphabetic characters or the underscore character and may be up to 31 characters in length.

Writing the Scan

The second step is to write the scan definition. Names, operators and parentheses may be entered by clicking the mouse on the various buttons arrayed above the scan request entry box. Clicking on a scan element name in the spreadsheet causes a button to appear with that name. Clicking that button inserts the scan element name into the entry box for you. If you prefer you can type in the request manually. Note that scan element names are case sensitive and must be entered exactly as listed in the scan element spreadsheet on the right.

The scan entry area is large enough to accommodate a very lengthy request and some commentary about the request. The scan request entry box can accept up to 750 characters of text. If you wish to insert a comment into the scan request, terminate the scan request with a semicolon. Any text entered after the semicolon is treated by Investor/RT as commentary and is saved with the scan request for future reference. For example, a scan request entry box may read:

HI4 < HI3 and HI3 < HI2 and HI2 < HI1 and HI1 < HI; This request finds issues with 4 consecutive new highs.

Check the Scan

Press the "Check" button and Investor/RT will analyze the scan request for syntax errors and report any errors it finds or display the message "Scan request is okay" in the main toolbar message area.

Choose the List of Symbols to Scan

Set the source quote page for the scan by pressing the QP button in the lower left corner of the Scan Setup window. A list of available quote pages appears. Pick the one you want and press OK. The selected quote page defines the list of instruments to be scanned. Set the time frame for the scan using the pop up list button in the upper right.

Choose a Format for the Resulting Quote Page

By default, the quote page resulting from a scan is displayed in "automatic" format. Automatic means that the columns displayed in the resulting quote page will be those values used or calculated in the scan request. Alternatively, click the Format button and select a user defined format for the resulting quote page. When specifying a user defined format a dialog box will ask whether the automatic columns should be displayed also at the end of the user define format.

Choose Sorting Criteria

The resulting quote page can be sorted automatically on an data column or calculation in the scan request. Choose ascending or descending sort. Then pick the sort column from the menu of available sort field. The list of sort fields will be available only after "checking" the scan syntax.

Save the Scan Definition

To save the scan object in the database, press the Save button. If the scan request is a new one, you will be asked to provide a name for the scan. Scan names must be alphabetic. If you enter spaces in the name, they will automatically be changed to underscores. The newly saved scan object is added to the Open: Scan menu.

Run the Scan

To run the scan, press the Run button. Investor/RT checks the scan request and, if no errors are found, it begins examining the data for each instrument in the source quote page according to the scan request. A progress monitoring window will appear showing the percentage complete during longer running scans.

Scan Results

When the scan completes, if any instruments were found a quote page will appear showing the list of instruments that "passed" the scan request. Sometimes, instruments are encountered during the scan that have insufficient historical data on file to evaluate the scan request. If that is the case, a message box will appear stating the number of rejections that were based on insufficient data.

The resultant quote page will have the same name as the scan object. The quote page will be automatically formatted to show the scan elements and the results of the calculations performed during the scan request for each instrument, or the resulting quote page will be displayed in the desired format. The resultant quote page is like any other quote page. You may save it for future reference, use it to perform a slide show on the list of instruments; you can use the resultant quote page as the source quote page for another scan object once it has been saved.

The resultant quote page will sometimes have one or more "dynamic columns" of data that list values of technical indicators, arithmetic calculations, and historical bar data items. For example, the request

HI4 < HI3 and HI3 < HI2 and HI2 < HI1 and HI1 < HI;

will list columns labeled HI4, HI3, HI2 and HI1 showing the high prices for each instrument for the previous 4 days. These "dynamic columns" are created "on the fly" by Investor/RT whenever a scan is run. When you run another scan, the dynamic columns may be reassigned according to the new scan request. Please keep this in mind. The dynamic columns that appear in a scan result quote page may become invalid after one or more additional scans have run.

Scan Performance Issues.

A scan request can take a few seconds or several minutes, depending on the nature of the scan request and the number of instruments in the source quote page. Scan requests that use only fixed properties and unqualified current price scan elements run in a second or so because they make no reference to historical pricing data. Scan requests that contain technical indicators or qualified historical data references take considerably longer. The order of the comparisons in a scan request can also affect the time it takes to execute the request. for example, consider these two equivalent requests:

CL <= 50 and MA5 < MAMA5 < MA and CL <= 50

where MA represents a 100-period simply moving average technical indicator. The first request will run faster since it can reject instruments with current prices over $50 without having to calculate the moving average. The second request always calculates the moving average first and then rejects those instruments that pass the moving average test that are over $50.

If you wish to see Investor/RT's analysis of the scan request and the calculation order for the scan request, click the "Check" button in the Scan Setup window. Then choose File: Open: Message Log. The message log will show the details of the scan requests and the calculation order to be used when the scan is run.

Miscellaneous Scan features

Two special technical indicators, "Relative Moving Average" (RMA) and "Statistics" (STAT) are supplied with Investor/RT to provide useful technical calculations in formulating scan requests. The RMA indicator is configured just like the moving average (MA) technical indicator but the values for each bar (day) are divided by the closing price for that bar. A value of 1.0 indicates that the closing price was the same as the moving average on that day. Values greater than 1.0 indicate the price was above the moving average and by how much, e.g. 1.11 means the price was 11% above the moving average. Similarly, values below 1.0 indicate the price is below the moving average, e.g. .94 means the price is 6% below the moving average. The expression

RMA1 < 1 and RMA > 1.03

for example, would identify issues whose closing price in the current trading session moved up through the moving average and now exceeds the moving average by at least 3%, i.e. strong movements of price, breaking above the moving average by a significant amount.

The "Statistics" function allows reference to five useful statistical measures: maximum, minimum, total, average, and standard deviation. When the STAT technical indicator is chosen from the list of functions, the preferences window appears in which you may specify which statistical value you want, the period, and the data value to use. After specifying the preferences, the new scan element will appear in the scan element spreadsheet with the name

STAT. The preferences column will show the selected calculation. Note that the data value may be the high, low, or last price, or it an be the volume or open interest.

Typically, you would change the name STAT to a meaningful name, like MAX, MIN, STDDEV, etc. Using the STAT function you can easily include measures like the highest high in the last 250 periods or the highest trading volume during the previous 5 sessions. For data services that do not transmit a 52 week high value, this provides the value by inspecting the historical data. The standard deviation can useful in ranking the volatility of issues. Define STDDEV as the standard deviation statistics on the closing price with a period of say, 100. Then use a scan request such as:

STDDEV/CL > 0

This will result is a quote page with data columns containing standard deviation, closing price, and the ratio of standard deviation and the close. Then sort the issues in the quote in ascending or descending sequence by the ratio to rank the list by a simple price volatility measure.

Check Amount of Data Available for an Instrument

A special instrument property, called BARS, may also be used in scan requests. The value of this property for any instrument is the number of bars (days) that are stored on the database for the instrument. Thus the scan request expression

BARS < 50

will scan for any instrument having less than 50 days of historical data on file. If you have a Dial/Data or InterQuote account, you can then use the resultant quote page as the target in a historical download to acquire historical data on the selected instruments. You must "Save" the quote page before you can use it in the Internet Download window to download historical data.

Identifying Splits/Bad Data

The Split Finder and Data Validation technical indicators are especially useful when used in a scan request. With these indicators, it is possible to scan any quote page to obtain a list of those instruments for which a possible stock split was detected. Similarly, the data validation study, when used in a scan, identifies issues that have one or more invalid bars during the previous user specified period.

Investor/RT supports access to 70 items of fundamental data for stocks for users with a Dial/Data account. All of the fundamental data items have corresponding tokens which may be used in scan requests. A complete list of all of the fundamental data items available for downloading and scanning may be seen by clicking the "Add Column" button on the quote page toolbar.

Automatic Scanning

A significant feature for intra-day traders is the capability to run scans automatically, repeating the scan at a fixed time interval during the trading hours of a session. To initiate an "auto scan", click the "Start Auto Scan" button at the bottom on the scan setup window. A dialog box will appear in which you may specify a trading session and a time interval in minutes, e.g. "run the scan every 3 minutes during session 0". The minute interval may be expressed as a whole number, a decimal number or in fractional notation(1.5 or 1 1/2). Thus it is possible to automatically run a scan every 10 seconds by specifying an interval of 10/60 or 1/6 minutes. Press the dialog's OK button to start the auto scan. The minimum scan interval is 5 seconds (5/60 or 1/12 or .0833 minutes.

If the session specified is open for trading, the scan will run immediately and will run repeatedly at the specified time interval. If the specified session is not yet open, the scan will not begin running automatically until the trading session opens. For example, you can start an auto scan in the evening and Investor/RT will automatically begin scanning when the session opens the next morning, without any further user input. While an "auto scan" is in progress, the "Start Auto Scan" button will read "Stop Auto Scan" instead. Clicking this button or closing the scan object window will stop the auto scan.

While an auto scan is in progress, you may make revisions to the scan request (or even switch to a different scan object) by operating any of the controls in the scan window. Each time the scan is run, the syntax of the scan request is rechecked in case changes were made to it. You may also change the target quote page for the scan run. The next time the scan is initiated, the new target quote page will be used. To change the frequency of an auto scan run you must stop the auto scan first and the press "Start Auto Scan" to specify a new frequency and/or trading session.

Exercise care when activating auto scans. If the scan you wish to run repeatedly takes only a few seconds, then the auto scan interval may be as low as every 5 seconds. However, if the scan run typically takes a minute or two to run, then specify a time interval greater than that.

This enhancements adds considerable power to continuous feed editions of Investor/RT. It is possible to perform real-time technical monitoring of one or several instrument's market behavior by auto scanning frequently with a source quote page containing just those instruments. When the trading condition is met, the scan will trigger the creation of a quote page reporting which symbol(s) satisfied the condition. In effect, this feature provides real-time alerts on any combination of technical indicators and user-specified conditions stated in the scan request.

Multiple "auto scans" may be in progress at one time. To accomplish this, open multiple scan setup windows using the main toolbar. Each scan window may be set in "auto scan" mode as described above, with all scans running concurrently, each with its own interval, source quote page and scan criteria.

While an auto scan is in progress it is permissible to update the quote page upon which the scan is operating. You may add or remove instruments from the source quote page. When you save the quote page, the next timed execution of any related auto scans will then use the revised list of instruments.

When initiating an auto scan, check boxes are also provided to specify how you are to be notified when the scan detects one or more instruments that satisfy the scan request. The default behavior is to simply open a quote page showing the results. Optionally, you may elect to have an audible alarm sounded and/or a user-specified message displayed in an "ok box". The user-specified message text is displayed along with the time of day that the event occurred and the number of instruments detected at that time.

When a scan is run repeatedly and instrument(s) are found satisfying the request, the quote page listing the instruments replaces any previous quote page with the same name.

Any scan window may be saved as text using the Save as text command in the File menu. The resultant scan definition text files may then be sent by email to other Investor/RT users. The recipient may then import the scan definition using the File: Open: File command. When Investor/RT opens any text file, it inspects the file to determine if it is a scan definition file and if so, the file is used to create the scan setup window. The user may then adjust or revise the scan definition and save it. All Investor/RT users are invited to submit their favorite scans via email to info@linnsoft.com. The scans will be tested and published with attribution (with your permission) on our web site. The saved scan definition file may include arbitrary comment lines describing the scan and how to use it. A special line in the text file, beginning with COMMENT= may be used to display any comment you like whenever that file is opened in Investor/RT. The comment could include your name and brief instructions for using the scan. When another Investor/RT user opens your scan text file, this comment will be displayed in a dialog box prior to setting up the scan in the recipient's Investor/RT system. For documentation purposes, the saved scan text file includes the name of the user (from Setup: Preferences: Registration), the date the scan was saved, the version of Investor/RT and data feed in use by the creator of the scan. When a scan definition is saved, Investor/RT displays the contents of the saved text. Scan text files are platform independent, this is, Windows 95 users can exchange scan files with Macintosh users and vice versa.

Linn Software has included a dozen or so scan definition files with Investor/RT You will find these in the scans directory within the investrt/program directory under Windows 95. The scan folder for Macintosh users is directly inside the Investor/RT Folder. Any scan definition file may be opened and edited using a word processor or text editing program. Opening a scan definition text file with Investor/RT results in the creation of that saved scan in your Investor/RT system.

When you open a scan definition text file for a scan definition that contains one or more technical indicators, Investor/RT will prompt you one-by-one for your preferred settings for each technical indicator. The indicator settings that were used by the creator of the scan will be displayed as text in the main toolbar message area for your reference. You may use the

same or different parameters in setting up the scan. After responding to each technical indicator setup prompt, the newly opened scan window will appear. Click the Scan button to launch the scan or the Auto Scan button to launch the scan to run repetitively at some prescribed interval of time. The scan definition is not saved in your Investor/RT database until you issue the File: Save command or click the Save button. If you open a scan text file and after reviewing (or even running the scan) decide not to keep the scan, close the scan setup window and click "Discard" when asked if you wish to save the scan.

Viewing Scan Signals in a Chart

A scan request is essentially a "signal", a specification of some market condition to be tested based on the current and historical data for an instrument. When Investor/RT runs a scan, it tests each instrument in some quote page to determine if that "signal" is true at the present time. On the other hand, if you wish to see if (and when) a particular scan signal would have signaled "true" at some time in the past for some instrument, Investor/RT provides a way to add any scan signal to a chart.

This is accomplished by the "Scan" technical indicator. When one or more scan signals are added to a chart, Investor/RT will mark the bars (or candles) for which the scan signal is "true". To add a scan to a chart, click the "Add Technical Indicator" button on the chart toolbar and select "Scan" from the list of indicators. The preferences for the scan indicator will appear to the right. These include:

1. the name of the scan to be applied to the chart (choose one from the menu of available scan signals)

2. the marker type to use to label the bars for which the scan is true (up arrow, down arrow, diamond, etc.) and the size of the marker in pixels. A size of 16 pixels is the default. The size may be from 4 to 64 pixels.

3. the position where the marker should be drawn (above or below the bar or at the bottom of the chart pane)

4. the number of bars back to scan from the current bar. To scan all bars use a big number like 9999.

5. the color to use when drawing the marker

To see this feature in action, create a simple scan with the scan syntax:

MACD1 < 0 AND MACD > 0 ; Bullish crossover of MACD Oscillator

Setup the MACD as an oscillator with periods 26, 12, 3. Save the scan under the name "MACD Bullish". Open a daily bar or candle chart for an instrument having plenty of daily historical

data and add a scan indicator. Choose "MACD Bullish" as the scan name. Pick "Up Arrow" as the marker, set the color if you like and position the marker "Below the low". Set the period to 999 and click Ok and observe the chart.

You should see colored up arrows below each bar or candle where there is a MACD bullish crossover.

Right click (Macintosh command-click) on one of the up arrows to get the properties of the scan indicator. Click on "Add Scan Technicals to Chart" and Investor/RT will add the MACD (from the scan) to the chart so you can observe the indicators used in the chart scan graphically. When viewing a scan signal in a chart it is not necessary for the chart to contain any of the technical indicators used in testing the scan condition. For testing purposes the "Add Scan Technicals" button provides a quick way to verify the state of all indicators graphically at the point a scan signaled "true".

During development of a scan signal, it is often desirable to revise the scan request and view the revised signals in a chart. Investor/RT makes this easy. Right click on a scan marker in the chart to access the properties of that scan signal. Click the button "View Scan Setup". This will open the definition of the scan request. Make your revisions to the scan request and click the Save button in the scan setup dialog. The chart will update automatically showing the revised scan markers. If you wish, keep the scan setup window open and make changes any time you like. When the changes are saved, Investor/RT notices that a chart is using that scan and updates it.

There is also a checkbox title "Alert on Current Bar". Check this box if you want Investor/RT to alert you if a MACD Bullish signal occurs at the current bar. When charting daily or intra-day, the scan is recalculated on every trade. This is a powerful way to watch for intra-day trading signals with a chart object. If an alert is requested, the first time the alert occurs you will be notified with a message window. If the alert condition continues to hold true you will be notified by the scan alert sound once a minute. You may also specify the particular sound to be made when the alert occurs. Thus a chart window with several scan signals can watch the market for the trading signals of your choice and make a unique "announcement" for each signal.

Charts containing scan signals can be used in slide shows to view the scan signals' performance for any list of instruments.

News Browser Windows

What is a News Browser

All data services supported by Investor/RT transmit various kinds of textual items including news headlines, market advisories, full text news stories, market summaries, etc. Investor/RT captures all transmitted news items, stores them in the database and, in some cases, links the news items to the instrument(s) to which each item pertains. The News Browser is a tool for reviewing, searching, and organizing the news items captured by Investor/RT (see Figure 9). When a news browser window is the front most window, the news browser toolbar is visible.

Prior news item	▲	▼	Next news item
Prior news category	◄	►	Next news category
Switch to a different category	▤	▤	Open news ticker for category
Delete news item(s)	🗑	🔍	Search for news containing...
View news in a text window	T	+xYZ	Link news item to instrument(s)...
reserved for future use		↕↔	Adjust toolbar style

Figure 27. The news browser toolbar

News Categories

Each data service has various categories of text items. Some text categories are transmitted to all customers, some are available by subscription only, some are broadcast for a limited time on a trial basis and by subscription thereafter. Investor/RT associates each incoming text items with a category for the data service. A catch-all category named "All Other Items" is used for text items for which Investor/RT could not ascertain a known category.

Opening a News Browser

To open a news browser click the News Browser icon on the main toolbar. A selection box will appear showing each category for which there are available news items and a count of the items in the category. You may open a browser for a specific category or you may choose "All Categories" to browser all items. Press OK and the news browser window will open, or select each category in turn and press Apply to open multiple news browser windows, each for a specific category. Any number of news browser windows may be open at one time. The News Browser toolbar provides buttons for operating the front most news browser window.

Viewing News Items

The news browser window is divided into two panes. The top pane contains a scrollable list of one line headlines summarizing each news item on file. If you are viewing "All Categories", the news headlines are grouped by category with the Category Name heading each group. Clicking once on an item in the top pane causes the full text of the item to be displayed in the lower pane. The full text is preceded by some header information and a list of the instruments to which the news item is linked along with a current quote of those instruments.

Resize the news browser to expand the size of the lower pane to see more text. Alternatively, double-clicking a headline in the upper pane causes the full text to be brought up in its own window. The up and down arrow keys on the keyboard may be used to move through the headlines in the upper pane. As each item is selected in turn, the full text appears in the lower pane.

Searching for News Items

To search for a particular word or phrase mentioned in the headline entries in the upper pane, click the Search icon, enter the word or phrase and press OK. Another news browser window will open listing all of the items that satisfied the search. Each news browser showing the search results can be used to review the matching item's full text or to initiate further searches.

News Browser Toolbar

Up and down buttons are provided to move the selection up or down in the list of headlines. Left and Right buttons move to the next or prior category, skipping categories for which there are no items. The News Browser button can be used to switch the current browser directly to a different category. The news ticker button opens a news ticker window (described below) for the current category. The Text button opens a full text window for the selected headline. This button is equivalent to double-clicking the headline. The link button brings up an instrument selector for linking the current news items to one or more instruments. To link the news item to an instrument either double-click the instrument in the selection window or select an instrument and press enter or return. News items may be deleted manually by selecting them and pressing the trash can icon on the news browser toolbar.

Deleting News Items

News items which have aged past a user-specified retention period are automatically purged from the database each hour on the hour. There are two user-specified retention periods, one for news items that are not related (linked) to any instrument and another (usually longer) period for those that are linked. These retention periods are specified in the General Preferences section of Setup:Preferences.

News Ticker Windows

What is a News Ticker

A news ticker is a "live" window showing the arrival of new text items for any category or for a specific category (see Figure 8 above). You may have as many news ticker windows open as you want. Each news ticker window is associated with a text category, or all categories. New text items appear at the top of the ticker the instant they arrive from the data feed, one line per item. Each item is prefixed with a date/time stamp. Double-click any item to open a full text window if you wish to read the entire text of the news item. There is no toolbar for the news ticker object. News ticker windows are not scrollable although you may expand the size of the window to see more items. The news ticker is a complement to the news browser. The news browser refreshes its list of news items each time the news browser window changes categories. While reading items in a news browser, you will not be interrupted by newly arriving items. The news ticker, on the other hand, lets the user keep an eye on the most recent news items received for a particular category of any category with instant notification of new text items.

Other Investor/RT Features

Toolbar Button Help

When you point your cursor at any button on any Investor/RT toolbar, a small help window appears showing the title or function of the button. The time delay between pointing the mouse and seeing the tool button help window is user adjustable from instant to some number of seconds. Choose Setup: Preferences and adjust the tool button help delay in the General Preferences section. While you are learning how to use Investor/RT instant tool button help is recommend (use a delay setting of one). After you become familiar with the toolbars a delay of 3 to 5 seconds is suggested. Investor/RT shows the tool button help only after the mouse pointer has been pointing at a button for the specified number of seconds. If you wish to turn off toolbar button help completely, specify a long interval, like 999.

On Line Help

Investor/RT has a built-in Help system containing detailed documentation of the program's many features and capabilities. Each page of information in the Help system is "hyper-linked" or cross referenced with related pages. The Help information may be searched by topic and keyword by clicking the "Search" button at the bottom of the Help window.

To activate the help system, click the Help icon on the main toolbar or choose one of the common Help topics from the Windows menu (see Figure 23). Macintosh users may activate the Help system from the standard Apple Help menu in the upper right corner of the screen or by clicking the Help button on an extended keyboard.

When you click the Help icon on the main toolbar, Investor/RT will take you directly to the Help topic associated with the currently active window. This is an easy way to learn about Investor/RT. Explore the menus and toolbars, opening windows and pressing the Help icon to learn about the features and functions associated with each window.

When the Help window appears, click on any underlined text to jump to the related topic. Use the "Back" button at the bottom of the window to jump back to where you were much like using the "Back" button in an Internet browser. Click the "Search" button and specify "By Keyword" or "By Topic". A list of keywords or topics will appear. Identify the item you want and click "Go To Selection" to review the text associated with the keyword or topic. The Help Topic "Help on Operating Help" provides further details on using the built-in Help system.
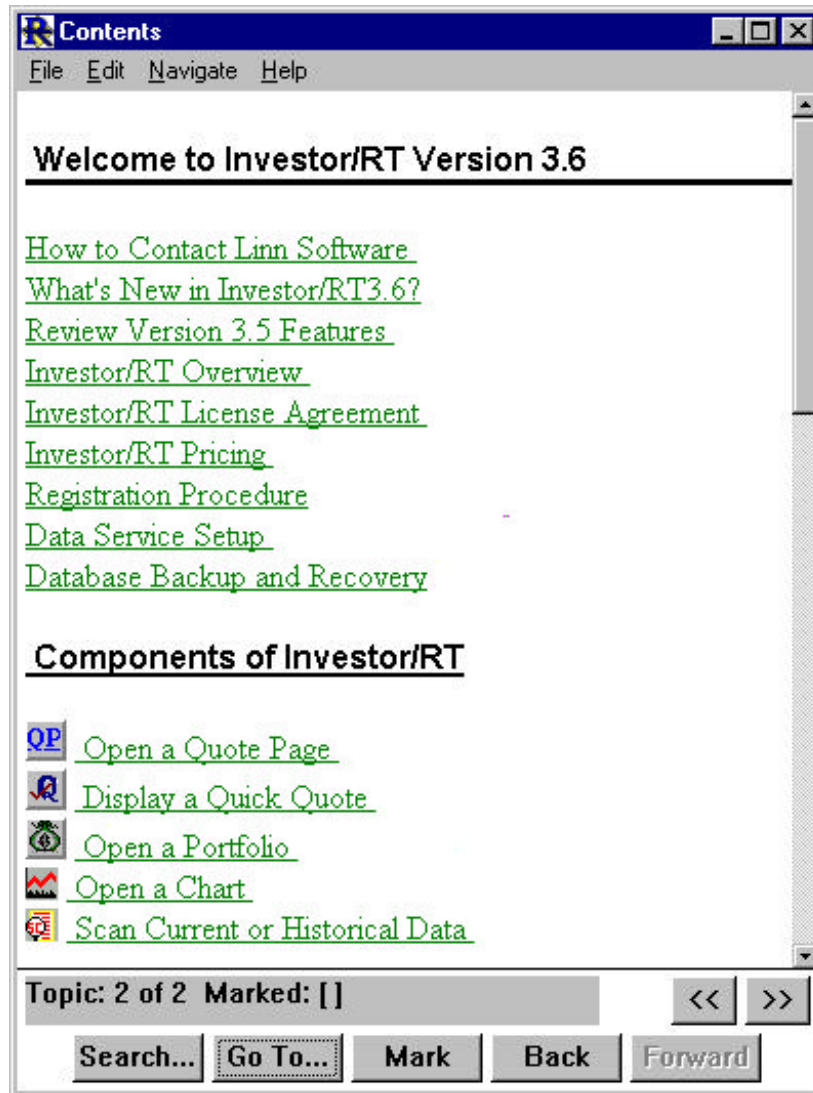
Figure 28. The Online Help window

Alarms

Instrument alarms

Each instrument tracked by Investor/RT can be monitored for a price and/or volume alarm levels set specifically for the instrument. To set the alarm levels for an instrument, right-click the instrument in a quote page or in a quick quote window and choose "Setup" from the menu. The Setup Instruments window will appear with the chosen instrument identified in the window. Fill in the price levels for high alarm, low alarm, and volume alarm, and turn on monitoring by checking the associated check boxes. Then press Modify to record the settings. Notice that the price alarm may be set on either the bid, ask, or last price.

Each quote or trade that arrives for the chosen instrument from a continuous feed or from Dial/Data will be compared with the alarm levels specified and if an alarm is triggered, several things happen:

First, an alarm window appears stating the reason for the alarm. Buttons are provided for resetting the alarm, accessing news or a chart for the instrument, calling up the Order Desk, or changing the alarm levels. Second, the instrument is marked as being in an alarm state. Various alarms quote pages are provided for listing the instruments in various alarm conditions. These are listed below. Third, the instrument is added to the top of any ".Alarm" type quote pages that may be open at the moment.

Global Stock Alarms

The alarm levels discussed above are specific to an individual instrument. Global stock alarms are alarm conditions that can apply to any instrument of type stock. Global alarm levels are specified by accessing the Stock Alarms section under "Setup: Preferences" (see Figure 29 below). This window sets up levels that will trigger an alarm on any stocks that exhibits price actions meeting any one of several criteria.
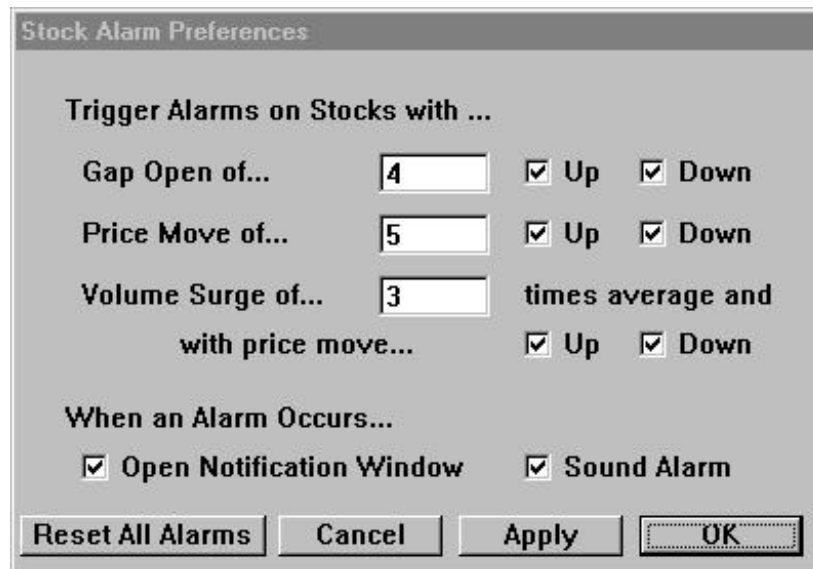
Figure 29. Setting up Stock Alarms

You may request alarms on any stock that gaps open by more that a specified price move up or down or both. The gap open amount is defined as the difference between the opening price of the stock and the previous day's close. Gap open alarms are trigger when the market opens and the opening price of each stock is received.

Big mover alarms may be requested on any stock that has a price move or more than some specified amount either up or down or both. Price move is defined as the current price minus

the previous day's close. Big mover alarms may be triggered at any time during the trading session when the movement amount is reached.

Big Volume alarms are be requested when any stock exhibits trading volume at or above some multiple of average trading volume, e.g. 3, 3.5, etc.). Average trading volume is determined by Investor/RT to be the average volume for the preceding 20 trading days. If fewer than 20 trading days of historical data are available for an instrument then the average volume is the average of all trading days on file. Volume surge alarms may be triggered on all stocks or just those showing an increase or a decrease in price.

All global stock alarms triggered cause the instrument to be marked as being in the alarm state. An instrument may be in more than one state, for example, gap open on a volume surge. The user may elect to have each global alarm open the standard alarm window or sound an audible alarm tone, or neither or both. A reset alarms button is provided for resetting all global alarms prior to the open of a new session.

The capabilities of stock alarms feature of Investor/RT can also be implemented using the scan feature of Investor/RT. For example, if you wanted to be alerted of any issues that moved up or down more than three percent (instead of 3 points), an auto running scan could test any list of instruments periodically throughout the trading session for this condition.

Alarm Quote Pages

Investor/RT has six built-in quote page for listing instruments in various alarm states. These are:

.Alarms, All-- Lists all instruments in any alarm condition. The alarm data column contains a code specifying which alarm condition(s) have been triggered for each instrument in the quote page. The codes are (N-News, H-High Price Alarm, L-Low Price Alarm, V-Volume Alarm, M-Big Mover Alarm, G-Gap Open Alarm, S-Scan Alarm (Scans is a future Investor/RT feature).

.Alarms, News--Lists all instruments for which Investor/RT has one or more news items on file.

.Alarms, Price-- Lists all instruments having any price related alarm, high alarm, low alarm, gap open, or big mover.

.Alarms, Volume--Same as .Alarms, Price, but also includes those will volume alarms.

.Alarms, Open Gap-- Lists all instruments with an open gap greater than or equal to the gap amount specified.

.Alarms, Big Mover-- Lists all instruments with price movement greater than or equal to the move amount specified.

Alarm quote pages are "live", that is, if an alarm condition occurs and an appropriate ".Alarm" type quote page is open, then the instrument will automatically be inserted into the top row of the .Alarm quote page.

Layouts

A layout is a collection of one or more Investor/RT object windows. The layout contains the size, position, and type of each window in the layout. Layout windows may be charts, quote pages, quick quotes, portfolios, news browsers, news tickers or text windows in any combination. The user assigns a name to each layout when it is defined and stored in the database. A layout of windows may be opened by selecting the layout name from the Open: Layout menu.

Creating a new layout

To create a layout, first open, size, and position each component window in the desired location. Make sure that each chart and quote page window is "saved". For example there may be several chart windows open that are new "untitled" windows. These must be saved and given a unique name before they may be used in a layout. To make certain that every window in the layout is "saved" choose "Save All" from the File menu. Investor/RT will prompt for names for any untitled windows. The windows in a layout may span two or more physical monitors. To create the new layout, choose File: Save Layout or File: New: Layout. A window will appear in which a name for the layout is requested. Name the layout and press OK.

Opening a Layout

A layout may be recalled by choosing the name of the desired layout from the Open: Layout menu. Each component window will be opened and positioned according to the layout definition. When opening a layout, Investor/RT will ask if all other windows should be closed first. Thus layouts can be added on top of any existing collection of windows, or they can replace the current array of windows.

Deleting a layout

Layouts may be deleted using the Delete: Layout... command in the Control: Data Management menu. Select each layout name you wish to delete and press the Delete button.

System Defined Layouts

Investor/RT makes a system defined layout named "Last Session Layout" each time Investor/RT quits with one or more windows open. The purpose of the "Last Session Layout" is to enable Investor/RT to recall these same windows automatically upon the next startup. The "Last Session Layout" is deleted when Investor/RT quits with no windows open. When

Investor/RT is started again, the "Last Session Layout" is automatically opened at startup, unless the user holds down the shift key during startup.

Modifying a Layout

To modify a layout, open it, make any modifications, and choose File: Save Layout. Name the layout with the same name. The new window arrangement will replace the former definition.

Trading Notes

The Investor/RT database has provision for storing an arbitrary number of trading notes for any instrument. A trading note is text of up to 255 characters. The trading notes object provides a means of viewing and editing the trading notes stored for any instrument (see Figure 30 below). A Trading Notes window may be opened by clicking the Trading Notes icon on the main toolbar, or it an be accessed by right-clicking on any instrument and choosing Trading Notes from the menu.

The notes window has three panes. At the top is a standard instrument selector for identifying an instrument. When an instrument is selected, the list of trading notes for the instrument, if any, is displayed, in the center pane. Each note is stamped with the date and time it was created.
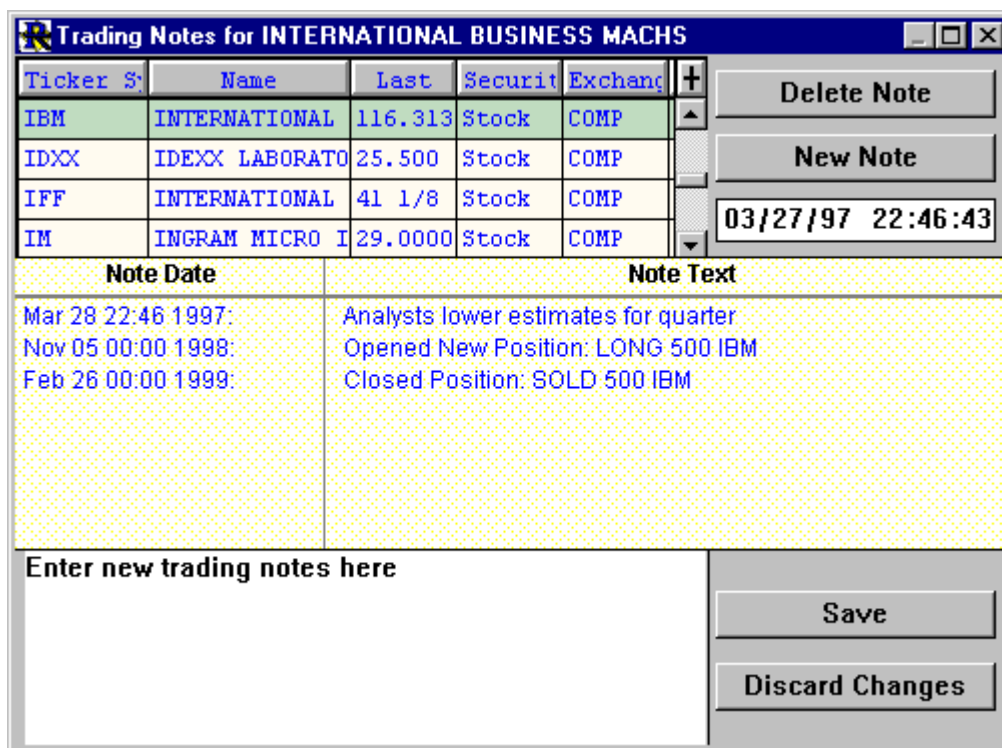
Figure 30. Trading notes for IBM

To add a new trading note for an instrument, select the instrument, if you wish, adjust the date time stamp, then press the "New Note" button. The note is added with default text. To edit the note, select the note by clicking on it, the note will then appear in the lower pane for editing. Revise the note and press the "Save" button. A common technique for entering trading notes is to use Copy/Paste to copy some text from a news item and paste it into a new trading note.

Trading Notes may be deleted by selecting them and pressing the "Delete" button in the upper right portion of the trading notes window.

Trading notes for a particular instrument may be accessed in a variety of ways. You may select an instrument in a quote page and click the trading notes icon on the quote page toolbar. A trading notes window will open with the selected instrument's notes displayed. Trading notes for a particular symbol may be similarly called up from quick quotes window, portfolios, and alarm windows, and chart windows. As noted above, right-click on any instrument's ticker in a quote page, portfolio, or any instrument selector to access trading notes.

Data Feeds

Data Feed Status

Users of continuous data feeds may examine the status of serial communications with the data feed receiver or the status of the Internet connection using the Data Feed Status window. The Data Feed Status window is opened by clicking the Data Feed Status icon on the main toolbar, or by choosing "Status" from the menu item naming the data service in use.

The Data Feed Status window updates automatically every 5 seconds showing counts of various kinds that can be useful in verifying the data is begin received properly and processing in active. Depending on the data service in use, the window shows information about the data receiver and the authorization codes for the receiver. Authorization codes govern the types of data transmitted to Investor/RT by the data provider.

When the data feed is active and working properly, the window will display a "reads issued" and a "packets received" count that increases every 5 seconds. The "Last Raw Symbol" shows the most recent ticker symbol transmitted by the receiver regardless of whether the ticker is one of those being tracked by Investor/RT. This raw symbol should also change every 5 seconds as a further indication that raw quote data is arriving from the receiver.

Internet feed users will notice a " Watch Count" number. This is the number of instruments being monitored over the Internet. Internet data services each have a watch count limit that is also displayed. Users of Internet data services must assure that the total number of issues marked intra-day plus the number active in quote pages, charts, and other windows does not exceed the watch limit for their service.

Starting/Stopping the Feed

The Data Feed section of Setup: Preferences for all continuous feeds has a checkbox titled "Activate Data Feed at Startup". This box is purposely left unchecked when the product is shipped to new customers. This allows the Investor/RT to start up without initiating access to the data feed until the Data Feed preferences have been established. Depending on the data service, preferences include the designation of which serial port is used by the data feed receiver, the connection speed, and other feed specific options. Once the data feed is working properly, the Activate Data Feed at Startup box should be checked. The Start Data and Stop Data commands in the (data service) menu may be used to manually control the state of the data feed. There is also a "Start Data Feed" icon in the main toolbar. Under normal operating conditions, the data feed will be activated at startup and data will be received continuously while Investor/RT is active. When changing serial ports or adjusting other data feed options, issue the Stop Feed command, adjust the Data Feed preferences and close the preferences window, then restart the feed by issuing the Start Feed command.

Signal Data Feed Feature Options

Diagnostic Mode is an option applicable to the Signal data feed. When enabled, Investor/RT receives information from the Signal receiver indicating the data reception quality. The reception quality, expressed as a percentage with 100% meaning perfect, is displayed frequently in the message area of the main toolbar while the Signal feed is active.

Auto Scan Mode is an option applicable only to the Signal data feed when used in locations outside the United States. Signal receivers deployed in international markets have the capability to scan the entire frequency spectrum in search of Signal data. When this option is on, Investor/RT determines if a frequency scan is necessary and initiates the scan when the feed is started. The scan can take up to 15 minutes. When the scan is completed, Investor/RT "remembers" the located frequency so that subsequent starts will not require the auto scan. The auto scan box should, however, be left checked after Investor/RT has locked in the frequency. To force a new auto scan to be performed, set the Signal Channel number to zero in the Data Feed section of Setup:Preferences and restart the data feed using the Control menu.

The Load ROS button is an option applicable only to the Signal data feed. The ROS (Receiver Operating Software) is software that must be loaded into the Signal receiver at startup whenever the Signal receiver has lost power. This processing happens automatically when the data feed is start, if Investor/RT determines that it is necessary. Pressing the Load ROS button causes Investor/RT to reset the Signal receiver and load a fresh copy of the ROS into the receiver. This process may be necessary, if some other application was previously in use with the Signal receiver prior to starting Investor/RT. In some cases, it may be necessary to manually disconnect the power cord from the Signal receiver to reset the receiver and place it into a state where it is ready to load the ROS.

A command titled "Signal Market Leaders" is present in the Signal menu in the menu bar at the top of the screen. This command opens a window for displaying the leading percentage

gainers and losers, or most active issues for the NYSE, American, NASDAQ, and stock options markets. The user selects which market to show and three lists of ticker symbols appear (gainers, losers, most actives). Any list of tickers may be viewed as quote page by clicking the Quote Page button. Constructing the quote page includes defining the instruments to Investor/RT if necessary. You can also add (define) individual instruments by double-clicking on any ticker symbol. Clicking once on any listed symbol causes the current quote (if available) to appear in the message area of the main toolbar.

Data Broadcasting refreshes the market leader ticker symbol lists frequently during trading hours. Click the refresh button requests that Investor/RT re-display the lists using the most recently received data. This is recommended if the market leaders window has been left open for more than a few minutes. Each time the user switches markets (NYSE, AMEX, NASDAQ, OPTIONS), Investor/RT displays the most recently received market leader tickers.

Dial/Data Access

All editions of Investor/RT provide Internet based access to Dial/Data for downloading of end-of-day quotes and historical data for all instrument types. To use this feature, you must have a dial-up connection to the Internet through an Internet Service Provider (ISP) or a direct TCP/IP network connection with Internet access. To access the Dial/Data service, a Linn Software Dial/Data account number is required. Linn Software account numbers are of the form "Nxxxxx" where xxxxx is a 5 digit number. If you have a Dial/Data account for use with some other software product, you may change the account to a Linn Software "N" number account by contacting Dial/Data at 1-800-275-5544.

Investor/RT also provide an online Dial/Data sign-up feature which can issue a "N" account for unlimited usage for 30 days at little or no cost. The sign-up feature is accessed by pressing the Free Trial button in the Registration section of Setup: Preferences. Your account information and credit card number are transmitted to Dial/Data via the Internet and a trial account number is issued for immediate use. Continued use of the account after the 30 day trial period initiates monthly billing to your credit card for the service level requested and a one-time sign-up charge of $35. All charges and fees are listed for you during the sign-up process. No information is sent to Dial/Data until you have indicated your acceptance of the trial terms and the usage fees (should you decide to continue using the account beyond the 30 day period). This special trial offer is available only with automatic sign-up. You may call Dial/Data at 1-800-275-5544 to sign up for an "N" account for use with Investor/RT, however the sign-up fee will be charged and monthly billing will start immediately. If you call Dial/Data directly to sign-up and are issued an "N" number, it will be necessary to contact Linn Software to acquire an Investor/RT registration password that incorporates the Dial/Data user id. This may be accomplish via Internet e-mail to support@linnsoft.com or by calling 404-733-5733 (press 0). It is not necessary to contact Linn Software if you sign-up for a Dial/Data account using the automatic sign-up (free trial) method.

Downloading Historical Data

To download market data from Dial/Data or InterQuote, myTrack, or eSignal, or Momentum CD ROM, click the Download button on the main toolbar or choose Internet from the Control menu (command or alt-D). The Data Download window will appear (see Figure 25). This dialog box is used by Internet subscribers to do daily historical downloads on stocks or indices, or by Dial/Data subscribers to perform any of the available download types. This window can also be used to download historical data for stocks from the Momentum CD ROM. The CD ROM is available from Linn Software. If an Internet subscriber is also registered with a Dial/Data account in Setup: Preferences: Registration, Investor/RT will use the service selected from the "Server" menu at the bottom of the window to perform the downloading.

Specify the Download Type, set the date(s) for the download if required, and select the instrument or quote page to use for the download if applicable. You may request download of data for a single instrument by checking the one instrument checkbox. When you do this a standard instrument selection box appears. Pick the instrument you want by double-clicking or selecting and pressing return. If you know the ticker symbol of the instrument you want, you may type it directly into the edit box rather than clicking the one-instrument checkbox.

Usually, downloading is accomplished by choosing a quote page from the list on the left of the window. The default quote page is ".All Symbols" which means you are requesting data on every instrument defined to Investor/RT. Notice that the number of quotes you have requested is calculated for you at the bottom of the screen. Dial/Data currently has a 15,000 quote limit per download, and so you may need to perform more than one download to obtain all the quotes you require. If you want to download data for a more restrictive list of instruments, create a quote page for the list of instrument you want, then open the Dial/Data window and pick that quote page.
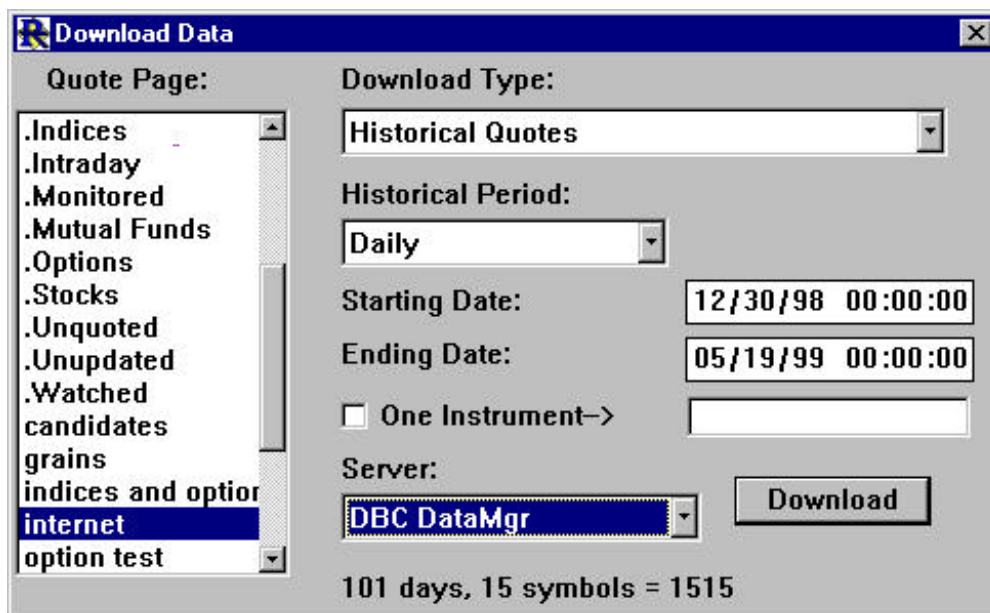
Figure 31. The Download Data window

Dial/Data symbols for various security types may differ from the ticker symbol used by your continuous feed data service. Continuous feed users may specify an "alias" ticker symbol for each instrument to be used whenever requesting data from Dial/Data for the instrument. The Dial/Data alias is called the Dial Ticker in the Setup Instruments window. The Dial/Data alias ticker for each instrument may be shown in any quote page by adding the data column "alias" to the quote page. Most stock symbols are the same for Dial/Data and the continuous feeds supported by Investor/RT. Some preferred stock and common class stock issues have different symbols and require the alias. Mutual fund symbols are consistent. Futures and options symbols are significantly different. If you use the Setup: Futures and Setup: Equity and Index Options feature of Investor/RT to define your futures and options instruments, Investor/RT sets the alias symbol for you automatically. Investor/RT does not automatically create aliases for futures options. Dial/Data uses a special coding scheme for futures options that requires these special alias tickers to be setup manually by the user. If you use Setup: Instrument to add a future or option, the alias must also be setup manually. Dial/Data provides extensive documentation of symbols for all security types in the form of text files that may be downloaded via the Internet at www.tdc.com.

It is sometimes that case that you wish to download data for all instruments in some quote page with the exception of certain special instruments for which Dial/Data has no information. Examples are be the instruments that represent portfolio values in Investor/RT and user-defined instruments. If you have one or more instruments that you wish Investor/RT to ignore simply set the Dial alias ticker to a hyphen. Any instrument in a quote page with a hyphen as the first character of the alias will be ignored whenever data is downloaded from Dial/Data for that quote page.

Current Quotes Download

The current quote download type requests end-of-day closing quotes for the instrument(s) requested. An "ending date" is required which specifies the date for which closing prices are requested. Most Dial/Data users are setup for end-of-day quotes. Attempting a current quote download for the current date but before the close of trading will result in no data. You may do current quote download for the prior trading day at any time of day. If you use Investor/RT infrequently and have not accessed quotes for several days, then you may do a current quote download for each day in turn starting with the oldest date and moving forward to the current date. Be sure to issue the Post History command from the Control menu after each day's closing quotes have been downloaded.

Dial/Data also supports 15-minute delayed quotes during market hours. The Dial/Data account must be specifically setup for this service level. There are per quote charges for intra-day quotes. Contact Dial/Data for pricing details.

Bulk Quotes

Investor/RT supports Dial/Data's bulk download capability for stocks, futures, and mutual funds. A bulk download is a highly compressed download of closing quotes for a particular security type. For example, the bulk download for stocks fetches closing quotes for more that 8,000 equities in just a few minutes. Investor/RT user who wish to accumulate charting data on thousands of stocks or mutual funds, or most of the futures market will find this type of download ideal. Specify the download type and set the date you want. The downloaded bulk data is automatically placed into the Investor/RT database, no Post History step is required. Bulk downloads are available for the most recent 20 trading days. If you use Investor/RT infrequently and have not accessed quotes for several days, then you may do a bulk quote download for each day in turn starting with the oldest date and moving forward to the current date. This is the fastest way to bring your database up-to-date when you are tracking thousands of instruments with Investor/RT.

Historical Quotes

The historical quote download types provide for downloading daily, weekly, or monthly bar data on any instrument for all trading between a starting date and ending date. When downloading historical data, care must be taken that the download request does not exceed 15,000 bars of data per download. For example, downloading two years of daily data (roughly 250 trading days) on 100 stocks or mutual funds would require 25,000 daily bars and would exceed Dial/Data's limitation. To get around the limitation you may either request the same date range on fewer instruments or request a narrower date range for the same list of instruments.

If you wish to download two years of data on a large number of issues, we recommend you create temporary quote pages containing no more than 60 issues each (60 times 250 = 15,000). Then do a historical download on each quote page in turn.

Company Profiles

Company profiles is an optional Dial/Data service that provides a detailed fact sheet on a company. No date is required when downloading profiles. The text of the company profile for each requested instrument is downloaded as a news item under the category "Company Profiles". Each profile is automatically linked to the instrument to which it applies.

Current News Headlines

Current news headlines is an optional service that retrieves one-line summaries of current news items for each requested instrument. Each headline is linked to the instrument to which it pertains and is stored under one of the Dial/Data news service categories. If you wish to download the full text of each current headline choose "News Headlines and Stories" as the download type. This causes a two step download. Step 1 is to download the headlines, followed by a second connection to request the full text of each headline item. A common

technique is to do a Current News Headlines download on a possibly large list of instruments. After reviewing the headlines, make a quote page of the instruments for which you wish to see the full text and download "News Headlines and Stories" for the shorter list of instruments.

Historical News Headlines

This type of download provides a list of up to 50 headlines per instrument. A date may be specified, usually the current date. The headlines downloaded for each instrument will be up to 50 headlines with a date on or before the ending date specified.

Company Names

This type of download provides official company names and CUSIP numbers for stock instruments in the specified quote page.

Fundamental Data

Investor/RT now supports downloading of comprehensive fundamental data for stocks from Dial/Data. Seventy (70) new data columns are available for downloading and display in Investor/RT quote pages. A complete list of available fundamental data can be viewed by opening a quote page and clicking on the "Add Column" button on the quote page toolbar.

To download fundamental data, the first step is to define a Format that contains the fundamental data items you wish to download. Up to 30 fundamental data items may be included in the format. The format name must be "Fundamentals Format". Formats are defined or modified using Setup: Preferences: Format Definition.

The next step is to open the Internet Download window by clicking the Internet icon on the main toolbar. Choose "Fundamental Data" as the download type and choose the quote page on the left that contains the symbols for which you want fundamental data (e.g. ".Stocks"). Do not request fundamental data for instruments of other types. Press Connect and the fundamental data items will be downloaded. Then open a quote page and place the quote page in "Fundamental Data" format.

Any of the 70 new fundamental data items can be used to sort a quote page. This is accomplished by clicking on any fundamental column title while holding down a modifier key on the keyboard. On the Macintosh, hold down the option key to sort the quote page in ascending order and the command key to sort in descending order. Windows users hold down the control key or the shift key.

All 70 of the new fundamental data items are scan elements in the I/RT scan definition language. This means that Investor/RT is capable of selecting and displaying lists of stocks which satisfy any user-specified fundamental and technical criteria.

Industry Groups

The Dial/Data Internet download feature supports downloading of ticker symbols for industry groups. The download feature automatically creates a quote page for the industry groups requested. Each Dial/Data industry group is represented by a ticker symbol that begins with ##. For example,

##ACROPS	Crops
##ADVERT	Advertising
##AGRLIV	Fish/Livestock
##AIRCOU	Air Courier
##AIRDEF	Aerospace & Defense
##AIRLIN	Airline
##ALARMS	Security Systems & Services
##APLNCE	Appliance & Tool
##APPARL	Apparel/Accessories
##AUDVID	Audio & Video Equipment

To create industry group quote pages you must first define the industry groups you wish to track by creating a quote page of industry group tickers. A complete list of all of the available industry groups and their tickers is available by opening the file "IGROUP.DOC" located in the Symbols folder. The entire list of industry group tickers may be imported using File: Import: Ticker Symbols: ASCII Text File.

Once each industry group ticker is defined to Investor/RT, click on the "Download Data" icon on the main toolbar. When the Internet Download window appears, choose "Industry Groups" as the download type. You may then download a list of industry groups by choosing a quote page name on the left that contains a list of industry group tickers. The list of stock tickers that make up the industry group will then be downloaded and each stock ticker will be setup as an Investor/RT instrument (if it isn't already) and a quote page will be created automatically to house the list of instruments. You can also download individual industry group using the "One Instrument" checkbox in the Internet Download window.

Normally, when you double click on a symbol in a quote page, Investor/RT charts the symbol. However, when you double-click in a quote page on an industry group ticker (a ticker that begins with ##), Investor/RT instead opens the associated industry group quote page containing the actual stock instruments for the group. The name of the industry group quote page to open is obtained from the "security name" of the industry group ticker. If Investor/RT determines that the associated industry group quote page does not yet exist, Investor/RT users with Dial/Data accounts will be asked if you wish to download the group. If you reply OK, Investor/RT will log in to Dial/Data, download the ticker symbols for the industry group and create the industry group quote page for you automatically.

Linking a Quote Page to Another Quote Page

This new feature can also be used to link quote pages together. For example, suppose you have a quote page named "Focus Stocks" and another quote page named "IBM Stock Options". You could add a group ticker (just make up a ticker symbol) such as "##IBMOPTS" and give it the name "IBM Stock Options", and place the ##IBMOPTS instrument in the "Focus Stocks" quote page, along with IBM and several other stocks. Then, whenever you wish to see the quote page of options for IBM you simply double click the ##IBMOPTS symbol and Investor/RT opens the quote page whose name is "IBM Stock Options". Note that you can change the association between a group ticker and it's associated quote page simply by editing the security name for the group ticker in a quote page or in the Setup: Instruments window.

Stock Split Adjustments

The Control: Data Management: Adjust for Splits menu item opens a window for adjusting stock instruments for splits. A standard instrument selector is provided for specifying which instrument to split. Specify the effective date of the split and the split ratio. The effective date is the first day of trade at the new price. You may identify this date by opening a chart of the split instrument and pointing the cursor to the bar on the first day of the split. The top of the chart will display the date and price information on that day. Whole numbers or decimal numbers may be used to enter the split ratio, e.g. 2 for 1, or 1.75 to 1. Press the Split button to perform the split operation. All daily, weekly, monthly, or tick data on file for the instrument will be adjusted for the split. If a chart window is open for a instrument under going the split, the chart will be re drawn with the adjusted data automatically.

Split Adjustments are made easier by adding the "Split Finder" technical indicator to a daily chart window. The split finder will examine the historical data and place a diamond marker in the chart next to an suspected split date. To make the split adjust for that date, right click on the diamond to access the Split Adjustment window.

Viewing Investor/RT Status

A system status window may be opened by choosing System Status from the Control menu or by clicking the Investor/RT Status icon on the main toolbar. The status window provides a list of all Sessions for which instruments are defined and the status of the session, open or closed, posted or not posted. This is followed by a list of all portfolios defined to Investor/RT and the value of each. This information is static. Unlike the feed status window, the system status window does not update periodically.

Importing and Exporting Data

Importing Data

Investor/RT provides functions for importing ticker symbols, current quotes, and historical data into the Investor/RT database. Each type of import supports a variety of input file types. Where applicable, the user may specify a file format which defines the order of the data fields within each line of an imported text file.

Importing Ticker Symbols

The Import Ticker Symbols function is used to define instruments to Investor/RT and to setup quote pages. Four import file types are supported: ASCII text file, Industry Monitors, Stocks with Options, and TickerWatcher Quote File (Macintosh Only).

ASCII text files containing lists of ticker symbols and security names may be imported to define new instruments to Investor/RT and to optionally create quote pages of those instruments. Each line must be either a command line or a line containing a ticker symbol and a security name. A tab or comma may separate the ticker from the security name. Any information in the line following the tab or comma following the security name is ignored. Command lines begin with a slash and may be placed anywhere in the file. Comment lines begin with a hyphen and are ignored during the import process. The /SESSION command specifies the session to be used in defining the instruments whose ticker symbols follow. If no /SESSION command is included in the file, session zero is implied. The /TYPE command specifies the security type for the instruments whose ticker symbols follow. If no /TYPE command is included in the file the security type is set to Unknown for each new instrument. For continuous feed users, the security type is set automatically when the first quotes arrives from the continuous data feed. The /EXCHANGE command is used to specify the requested exchange for the instruments whose ticker symbols follow. If no /EXCHANGE command is included in an import file, each newly defined instrument will be given a requested exchange of COMP (composite).

Ticker Symbol Lists available in Investor/RT

Linn Software includes several pre-defined lists of ticker symbols with Investor/RT. These text files are stored in the Symbols directory (folder). Macintosh users will find the Symbols folder in the Investor/RT folder. Windows/95 users will find the Symbols directory inside the Program directory within the InvestRT directory. Files are included for the 30 Dow Jones Industrial Stocks, the S&P 100 and 500 Index stocks, and feed specific lists of index symbols. Before importing, you may wish to inspect the content of these import file. Choose File: Open: File and pick the text file you wish to view and Investor/RT will display the file's content in a text window.

Stocks with Options List

The Stocks with Options import file type is used for importing the Stocks w/ Options List, a special ASCII text file distributed with Investor/RT. The Stocks w/Options List file may be found in the Symbols directory (folder). The file contains a line of data for each stock with trading options. The data includes the ticker symbol, the security name, the option symbol prefix, and the option cycle (January, February, or March). At present, this file contains tickers for more than 1800 stocks. Investor/RT uses the imported information to generate options instruments at user specified strike prices for all of the correct contract months. If you are tracking equity options you may import the entire file or use a word processor to make a smaller file for importing those stocks whose options you may wish to follow.

Industry Monitors

Industry Monitors is another special file ASCII file format that may be may be useful for importing a list of instruments and automatically building a quote page of those instruments. Industry Monitors format files may contain a /ADD command that specifies the name of the quote page that is to be created for the instruments whose symbols follow. Each line in the file contains a ticker symbol followed by a security name.

TickerWatcher Symbol Import

Macintosh users of Linn Software's TickerWatcher software product will find it convenient to migrate to Investor/RT by importing the TickerWatcher Quote File. The Quote File is located in the Admin_f folder within the TickerWatcher_f folder. Importing this special file has the effect of defining each TickerWatcher symbol to Investor/RT. The current quote for each instrument is also imported if the quote is more current than the quote Investor/RT has on file.

Importing Historical Data

Several kinds of historical data import as supported: daily, weekly, monthly and tick data import. Weekly, monthly, and tick data imports apply only to data in ASCII text files. The Daily Historical import may use either ASCII text files or TickerWatcher History File. An import function for Metastock data files is also available.

The TickerWatcher History File import is a migration aid to users of Linn Software's TickerWatcher software. The history file must be in TickerWatcher's 500 trading day format.

When importing historical data from ASCII files, Investor/RT must know how the data items on each line is arranged. This is accomplished by specifying a File format from the pull down menu. The default is Import Format. The definition of any format may be obtained by Setup: Preferences: Quote Page Formats. Choose the format name and view the data item list that is displayed. For example Import Format is defined as "Symbol, QuoteDateTime, Open, High, Low, Last, Volume, Open Interest". This particular format is typical, in fact, it is the format used by Dial/Data in transmitting historical data. If the ASCII text file you wish to import has

some other format, simply define a new format with the desired data items in left to right sequence. Specify the new format name in the Import window.

Data items in an ASCII import file must conform to the specified import format sequence. Data items may be comma, space, or tab-delimited. Dates may be express as mm/dd/yy or yymmdd. When importing tick data, the quote time must be in the format mm/dd/yy hh:mm:ss or yymmdd hh:mm:ss. If the hours, minutes or seconds are omitted they are assumed to be zero, e.g. 4/15/97 10:40 would be interpreted as 4/15/97 10:40:00 and the same date with no hh:mm:ss would be interpreted as 4/15/97 00:00:00 (midnight).

Importing Current Quotes

Importing current quotes may be accomplished from the TickerWatcher Quote File or from an ASCII text file in any prescribed format. This feature may be used to import current quotes from any source that can place quote data in a tab or comma delimited text file. The TickerWatcher current quote feature is a migration aid to enable TickerWatcher data to be quickly imported into Investor/RT.

Exporting Data

Current quotes or historical data for any collection of Investor/RT instruments may be exported to an ASCII text file suitable for use by other applications. Exporting of individual instruments is accomplished by the File: Export command. A window appears with a standard instrument selector and a time frame menu. Choose the instrument to export and the time frame (daily, weekly, etc.) and press the Export button. A standard file dialog will appear for naming and placing the export file in any desired location.

Current quote data may be saved using the quote page object. Place the quote page in the desired format (Import Format is recommended) and issue the Save As Text command. The quote page is saved in the desired format in an ASCII text file. A dialog box appears for naming and placing the file in any desired location.

Historical data for ALL instruments in a quote page may be exported to a text file by opening any quote page and immediately pressing the "View/Edit Historical Data" button on the quote page toolbar . It is important that no cell in the spreadsheet is selected. A standard file dialog box appears for naming and directing the storage of the ASCII text file to any desired location. When a cell is selected, the "View/Edit Historical Data" button opens a spreadsheet that displays the historical data on file for the selected instrument. The spreadsheet cells may be edited to make corrections, or entire rows may be deleted by selecting a row and pressing "del" key on the keyboard.

Index