THE STOCKMARKET COMPUTER OWNER'S MANUAL



Now You Can Make Your Move Before the Market Does

Owner's Manual

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Getting the most out of Your Stock Market Computer—
Additional Information
Solid state and reasonably fail-safe
Daily forecasts or weekly forecasts
Recording the data from Barron's
Data errors
Keeping track of where you left off
Restarting the Program
Obtaining Barron's week-ending figures and the start-up
values by phone
Avoid disturbing the calculator's memory
The Checksum
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It should not be assumed that the formulas or methods upon which the Market ForecasterTM are based can guarantee results equal to past performance. William Finnegan Associates, Inc., therefore assumes no liability, consequential or otherwise, from the use of the program or any part thereof.

Patent Pending 1982

Introducing The Stock Market Computer

The only way to "beat the market" is to know where it's going, and we have good news. Introducing the Stock Market Computer twenty years of research on a silicon chip. Now you can make your move before the market does.

The Stock Market Computer provides a forecast of the Dow-Jones Industrials 80 trading days from now. The forecast is based on the same, proven, statistical models utilized by the Finnegan Program, an investment service that—for many bank trust officers and investment counselors who subscribe to it—is considered not only trustworthy, but essential.

How accurate are the forecasts?

Using the Program for long positions only, funds supervised by the Finnegan Group appreciated by 72.1% during the past three years (March 21, 1979 through March 21, 1982). During the same period the Dow declined 6.1% and, while the results may differ in the future, they certainly tell you something about the past effectiveness of the Finnegan technique.

Simulated returns of 30.0% to 38.9% per year, after commissions, were achieved over a period covering the past 18 years. The returns varied in proportion to the aggressiveness of the investment strategy and are included later in this manual so that investors can study the results and individually adapt this forecasting tool to their own advantage.

How does the Program work?

The Stock Market Computer combines two state-of-the-art technologies—a statistically derived predictive equation, developed over the past twenty years, and a unique solid state module that contains the equation and plugs into a Hewlett-Packard HP-41 programmable calculator. With the Forecasting Module and a customized keyboard overlay in place, the calculator is transformed into a Stock Market Computer.

Although the technology is advanced, obtaining a forecast is surprisingly easy—a three minute operation. All you need is the Stock Market Computer and a copy of Barron's. Enter the start-up values (a one-time operation) and you are ready to begin.

Source statistics are entered from Barron's, the "forecast" key is pressed, and the computer goes to work. It transforms the input into 20 predictor variables, statistically weights the variables, and combines the result to produce the forecast.

With the Stock Market Computer, you'll know when to buy securities and when to sell them. When to be in mutual funds or the money market.

Remove the keyboard overlay and you have, at your fingertips, the most powerful calculator (actually a personal computing system) that Hewlett-Packard has ever designed.

Two powerful tools in one package. Use them to your advantage.

DOW-JONES (Above) VS. MA Correlation Coef



RKET FORECASTER (Below) ficient (r) = .78



William Finnegan Associates, Inc.

Understanding the HP-41C and HP-41CV

The HP-41C and HP-41CV are the most versatile, powerful, yet easy-to-use calculators Hewlett-Packard has ever designed. No matter what your profession, the HP-41 speaks your language. You communicate in words. Or with numbers. Or both.

The HP-41 can be customized to meet your personal needs, and its continuous memory saves your programs and data for later use. Add plug-in peripherals, such as a card reader, printer or the new cassette drive, and your HP-41 turns into a low-cost, portable computer system!

Since the HP-41 calculator is the heart of a very capable system, we encourage you to study the Hewlett-Packard Owner's Handbook and Programming Guide. By itself, the HP-41 could easily be all the calculator you will ever need. You'll be surprised at its power and surprised to find yourself programming, the very first day.

For those whose first interest is applying this computing power to Wall Street, a brief review of the fundamentals is in order so that you can begin using the Stock Market Computer immediately.

The HP-41C/CV Memory Size

The HP-41C and the HP-41CV are identical except for the initial memory size. The HP-41CV has a built-in memory of 319 registers, for data storage or program instructions. The HP-41C has a smaller initial memory (63 registers), which can be expanded to equal that of the HP-41CV by adding up to four Memory Modules or one Quad Module. The term "HP-41" is used throughout the rest of this manual to refer to both calculators.

Memory Modules and the Forecasting Module

If you purchased your calculator from William Finnegan Associates, a Memory Module (required only in the HP-41C) and the Finnegan Forecasting Module have already been inserted. And, except for batteries, your calculator is ready to go. Nevertheless, the basic do's and don'ts of inserting modules should be understood before you proceed. The calculator must always be turned off before inserting or removing any peripheral device. Also, users should not plug Memory Modules or a Quad Module into a HP-41CV, or more than one Quad Module into the HP-41C.

In the HP-41C, Memory Modules are inserted sequentially in the port openings, located at the top end of the calculator, beginning with the lowest port number. The position of the port openings, 1 thru 4, is shown on the back of the calculator.

The procedure for inserting the Memory Module (in the HP-41C) and the Finnegan Forecasting Module in the 41C and 41CV is as follows:

HP-41C owners:	Pull out the port caps for port numbers one and
	two at the top end of the calculator. Insert the
	Memory Module in port number one and the
	Forecasting Module in port number two.
HP-41CV owners:	Pull out the port cap for port number one, at

the top end of the calculator, and insert the Forecasting Module.

Inserting the Batteries

The HP-41 uses four size N alkaline batteries. They are inserted as follows: (Also discussed on pages 240-241 in the Hewlett-Packard Owner's Handbook.)

- Turn the calculator over and you will see the battery holder just beneath the top pair of pads.
- Remove the holder by pressing the ridge on the holder toward the top pair of pads. The battery holder will pop out.
- Insert the four batteries. The proper polarities are marked on the end of the holder.
- Replace the battery holder, top end first, and snap in place.
- Turn the calculator over and press the ON key. In a new calculator, MEMORY LOST will appear on the screen. If nothing appears on the screen, recheck the battery polarity.

The Keyboard Overlay

If you purchased your calculator from William Finnegan Associates, the customized keyboard overlay is already in place on the keyboard. When you begin programming or using some of the HP-41's special functions, you may want to remove the overlay. To remove it, proceed as follows:

- Push up the overlay hold-down between the USER and PRGM keys.
- The overlay is now free and can be removed. (To reinsert the overlay, take note that the "tongues" at the bottom of the overlay are inserted first.)

Calculator Modes:

The four calculator modes—Normal, User, Program and Alpha are selected by the mode keys located just below the display screen. The calculator is in Normal mode if it is not in User, Program or Alpha mode.

ΟN

The ON key turns the calculator on and off. With the Forecasting Module in place, the calculator "wakes up" in USER mode. Therefore, if you do not want to obtain a forecast, you will generally want to press the USER key to return the calculator to normal mode. After about 10 minutes of inactivity, the calculator turns itself off automatically to prolong battery life. (Continuous Memory maintains programs, data, and calculator status even while the calculator is off.)

USER

The USER mode key switches the calculator into and out of User mode. In User mode the keyboard is "customized" and you can run programs that you have written or "call-up" programs that have been written on special application modules such as the Forecasting Module.

PRGM

The **PRGM** mode key switches the calculator into and out of Program mode. In Program mode, keys pressed are not executed but instead are stored as program steps for later execution.

ALPHA

The ALPHA mode key switches the HP-41 into and out of the Alphabetic mode. Part of the Alpha character set is printed in blue on the lower faces of the function keys; the entire character set is shown on the back of the calculator.

If you want to perform a few arithmetic calculations or see how easy it is to program your HP-41, turn to pages 8 and 9 in the Hewlett-Packard Owner's Handbook. If not, let's put the Stock Market Computer to work.

Getting Started

Frequently Used Keys

ON	ON	Turns the calculator on and off.
	Shift	Shifts the key assignment to the
		gold label above the key.
←	Backspace	Used to erase data just entered.
CHS	Change sign	Changes the sign $(+ \text{ or } -)$ of the
		value just entered.
•	Decimal point	Enters a decimal point.
R/S	Run/Stop	Used to start or halt execution.

Frequently Used Program Labels

In the section that follows, the symbol means **press this key**. We also use the symbol to identify the key associated with a particular label on the keyboard overlay.

UPDATE	Update Routine, for entering the raw data.
LIST	List Routine, to list and verify the data that has been entered.
FORECAST	Used to obtain the forecast.
Blue labels	Refer to the key above them and can be referenced directly, i.e. enter the data and press the identifying key.
Gold labels	Refer to the key below them. To reference a gold label, press the gold key first.

The Input Data from Barron's

Daily inputs - Blue labels

(Enter data and press the label)

DJO	= Opening	g, 30	Dow-Jones	Industrials
-----	-----------	-------	-----------	-------------

- DJC = Close, 30 Dow-Jones Industrials
- DJH = High, 30 Dow-Jones Industrials
- DJL = Low, 30 Dow-Jones Industrials
- OLP = NYSE Odd-lot purchases, th.shs.
- OLSS = NYSE Odd-lot short sales, shares

Week-ending inputs - Gold labels

(Enter data, press gold key, press the label)

P/E = Price-Earnings Ratio, Dow-Jones Industrials
SPEC = Specialist Short Sales
YLDS = Barron's Best Grade Bond Yields
CONF = Barron's Confidence Index
SPREAD = Spread between yields for Barron's Best Grade Bonds and Dow-Jones Stock Average.

Step 1: The Calculator's Start-Up Condition

The condition of the calculator should be: Batteries inserted, a memory module inserted in the HP-41C, the Forecasting Module inserted in the HP-41C and HP-41CV, and the customized overlay in place.

Step 2: Set the Memory Size

- Press ON
- Press the keys XEO and ALPHA, and spell out the word SIZE (on the blue keyboard, slanted faces of the keys), and press ALPHA to end the alphabetic input.
- The calculator will show SIZE ——— on the screen. It is prompting for a three-digit memory size. Press 1 0 9 and the data memory is set at 109.

Step 3: Enter the Start-Up Values

The Forecaster Program requires the input of 46 start-up values. It's a one-time, ten minute operation.

The start-up values can be found by turning to the separately enclosed (yellow-bordered) Start-Up Sheet. Once the start-up values have been entered, you can enter the most recent market data found on the lower section of the Start-Up Sheet. If there are no holidays, this will provide six days of practice, assure that the forecast is correct, and bring the calculator's "memory" up-to-date. And, when the next issue of Barron's arrives, you will be ready to continue on your own. If you have delayed "getting started" or if Barron's magazine is not yet available to you, call us at (213) 456-5741, and we will send you the current start-up values when you are ready to begin.

To enter the start-up values, refer to the top section of the Start-Up Sheet, turn the calculator on, and proceed as follows:

Display

Enter the start-up values	
Press XEQ ALPHA START ALPHA	*START*
Press R/S	V1 = ?
Key in value 1 and press R/S	V2 = ?
Key in value 2 and press R/S	V3 = ?
Continue on thru value 46	END

List and verify the start-up values

Keystrokes

Press UPDATE	*UPDATE*
Press R/S	LFC = 0.0%
Press R/S	V1 =
Press R/S	V2 =
Continue on thru value 46,	END
noting any errors	

Edit Program to correct errors

Enter the sequence number (1 thru 46) of the value being corrected, press ENTER + , enter the correct value, press XEQ ALPHA EDIT ALPHA

Repeat, if necessary, for other corrections and list the values again to verify.

Obtaining Your First Forecast

All of the information needed to obtain the Market Forecast can be found in the Market Laboratory Section (the last few pages) of Barron's magazine. Barron's is usually delivered in Saturday's mail and contains market data for the week just ended.

The last six days of data from Barron's can be found on the bottom section of the Start-Up Sheet. To assure that you have entered the start-up values correctly, and to bring the calculator's "memory" up-to-date, use this data and follow the step-by-step procedure to calculate a new forecast for each day. It's a three-step process: **Update, List** and **Forecast**.

Until the forecast is obtained, you can always go back to the Update Routine (to reenter data) or the List Routine (to view the data). And, don't hurry. Give the calculator time to accept the data before continuing on.

Obtain your first forecast by entering the top row of data. Note that **on the first day only**, when the data is entered, the calculator will question each input (i.e. DJO = XXX.XX?) and sound a warning tone. Press \mathbb{R} to have the data accepted.

Step-by-Step Procedure for Calculating a Forecast

Update Routine

	Keystrokes	Display
	ON UPDATE	*UPDATE*
	XXX.XX DJO	DJO = XXX.XX
D A	XXX.XX DJC	DJC = XXX.XX
Î	XXX.XX DJH	DJH = XXX.XX
L Y	XXX.XX DJL	DJL = XXX.XX
	XXX.X OLP	OLP = XXX.X
	XXXX OLSS	OLSS = XXXX
	X.X P/E	P/E = X.X
W E	XXXX.X SPEC.	SPEC. = XXXX.X
Ē	XX.XX	YLDS. = XX.XX
L	XX.X CONF.	CONF. = XX.X
Y	-X.XX SPREAD	SPREAD = -X.XX

List Routine

LIST
DJO = XXX.XX
DJC = XXX.XX

Continue on....

If errors are found, enter the Update Routine update and reenter correct values. List again, to verify.

Forecast Routine

FORECAST

FORECAST ?

If ready for the forecast, press RS, wait, and in just over a minute the forecast will appear on the screen. If not ready, press I UPDATE or I IST to return to the Update or List Routine.

If your first forecast is not the same as the one shown on the Start-Up Sheet, incorrect start-up values or data have been entered and you will need to begin again at the section titled: Enter the Start-Up Values. If your forecast is correct, the rest is downhill and much easier. But first:

A word about tones, the error signal and the beep.

- Tones: When you enter the Update Routine, a tone sounds signaling that all's well.
- Groans: If you hear a double low tone (a groan) while entering data, this indicates that the data you entered differs from yesterday's value by an unexpected amount and it **may** be wrong (although usually it isn't). If it is correct, press **RS** and the data will be accepted. If it is incorrect, reenter it and press the identifying label.
- Beep: If a beep sounds when the forecast is displayed, it's time to make a decision. This is discussed in the section titled: Putting the Market Forecaster to Work.

Now, continue on, and obtain a forecast for the remaining days on the Start-Up Sheet. Note that the Monday through Thursday forecasts require only the entry of DJO through OLSS, because the weekly data (P/E through Spread) stays constant.

This will complete six days of practice. The forecasts you received have been verified, the calculator's "memory" is up-to-date, and if you read the rest of the manual, you will be ready to obtain your own forecast when the next issue of Barron's arrives.

For your convenience, a summary of the Forecasting Procedure follows.

Summary of the Forecasting Procedure

Update

Step 1:	Press UPDATE Press R/S to see last forecast.
Step 2:	Enter the data
	Daily data: Enter data press identifying label
	Weekly data: Enter data press identifying label

Step 3: Correcting the data

- Before the identifying label has been pressed, data may be corrected by using the backspace \leftarrow to erase it.
- If incorrect data has already been entered, it can be corrected by reentering it, in any order and at any time, prior to obtaining a forecast. Correct data in the Update Routine. You can always return to the Update Routine by pressing UPDATE.
- If you hear a warning sound and the display screen shows (data you entered = ?), the data **may** be wrong. If it is, reenter it. If it is not wrong, press R/S.

List

Step 4: List the data and verify

Press LIST R/S and check the first input. Press R/S to continue. When all the inputs have been checked, return to the Update Routine to make corrections.

Forecast

Step 5: Obtain the forecast

Press FORECAST. When FORECAST? appears on the screen, press R/S and wait for the result. Record the forecast. A "beep" indicates it's time to make a decision.

If You Thought the Market was Unpredictable, You Haven't Met Bill Finnegan.....

Bill Finnegan has an MBA from UCLA and is both a registered professional engineer and a registered investment advisor. After serving as an instructor at UCLA, he spent seven years as a management consultant for Price Waterhouse & Company and Theodore Barry and Associates.

The groundwork for the stock market computer began as far back as 1959. In that year Mr. Finnegan spent the summer at IBM's headquarters in Endicott, New York, where he was introduced to computer technology in its infancy—and at its source. In the years that followed, Bill Finnegan took advantage of large-scale computer technology to pioneer a new approach to stock market analysis. In 1967 he founded his own consulting firm and put his system to work. To date, the Finnegan Programs have enjoyed a success that contrasts sharply with the market's weak performance, and his clients include most of the major banks on the West Coast.

Recent and dramatic advances in computers and solid state technology have now provided a practical way to make the Finnegan Programs available to investors everywhere. By combining this new technology (plug-in modules and programmable calculators) with his own computerized statistical programs, Bill Finnegan has set new standards for stock market analysis and performance.

Building a Forecasting Model

When we began our research over twenty years ago, there was a wealth of industry, economic, and market statistics from which to choose, and that hasn't changed. What has changed is the dramatic increase in the capacity, speed and low-cost convenience of computer systems plus the development of powerful mathematical and statistical programs to analyze the data.

The development of the Finnegan Program has been a continual process of collecting source inputs, transforming the data into predictor variables, statistically screening the variables, and developing an operating strategy.

Our purpose here is not to explain 20 years of market research. Instead, we will try to provide the users of the Stock Market Computer with a factual framework, so that they can begin to understand what precedes and what follows the simple act of pressing the key labeled "forecast."

Data Collection

Building a model begins with data collection, and, because of the wealth of information available, knowing where to start is not easy. Initially, the typical researcher begins by collecting price and volume information on individual securities, supported by the rationale that, "after all, one has to buy and sell stocks to make money, so why not start here?" We did, but soon found that a much deeper probe is required.

Our data base consists of over twenty years of market-related statistics from the Federal Reserve, the Department of Commerce, Barron's, the Wall Street Journal, the Investment Company Institute (mutual funds), and a number of private and industry publications—and we have learned a few lessons:

• Approximately 60% to 70% of the price activity in individual securities (and up to 90% in dramatically rising or falling markets) can be attributed to the direction and intensity of the price action in the overall market. In other words, stock prices do tend to move together. This is the reason that our first product is a **market** forecasting program—it is the single most comprehensive and usable piece of information we can provide.

- Since market action is important, the data base must include a good sampling of market-related information, plus factors that affect the market, such as economic and monetary data. At the start, be selective (you can't collect it all) so try to visualize how a new piece of data might help the forecast. For example, Barron's Confidence Index is the ratio between the average yield on Barron's 10 highest grade corporate bonds and the 40 Dow-Jones bonds. This suggests that the ratio might be high when supposedly astute investors show confidence by buying lower-grade liens, and low when they take refuge in top-grade issues. The spread between stock and bond yields (also found in Barron's) is another statistic that might help because, after all, why buy stocks if the total return on bonds far exceeds the expected return on stocks?
- Also pay attention to the market participants because some are frequently wrong while others are more usually right. For example, the old Wall Street adage that the odd-lotters are usually wrong is only partially correct because the odd-lotters are actually three distinct groups: those that buy, those that sell, and those that sell short. Two in the group are usually wrong while the other is usually right. This suggests another consideration. Data should be collected in its narrowest form because collecting it *en masse* (such as the market's total volume) frequently masks relationships, should they exist.

Data collection is a continuing process and a difficulty that remains, rules and logic aside, is that one can never be sure that a new piece of information will prove useful. For example, we have collected and analyzed most of the data in Barron's Market Laboratory and found that much of it does not appear to correlate to future stock or market moves, or it is statistically redundant and provides nothing in the way of "new" information. Nevertheless, this type of searching and exploring is part of the research process, and the breadth and scope of our data base provides the foundation for the work ahead.

Constructing the Predictor Variables

Our source data base includes: Specialist short sales, money supply figures, bond yields, potential purchasing power, member trading, margin debt, inventory levels, delinquency rates on mortgages, mutual fund liquidity, price, volume and earnings data on individual securities, and much more. On the surface, the figures appear unrelated, and that's good, because our statistical routines search for variables that complement, not duplicate, one another. After selecting an objective—in this case to forecast the percent change in the Dow Industrials over the next 80 trading days—the data is put in a form suitable for entry into a computer and verified. Now the fun begins.

The first step is to examine each of the inputs at market turning points before expanding the search to include the entire data base. At market lows, is the variable's level, direction of movement, or rate of change different than at market highs? This preliminary look may suggest ways to transform the variable or combine it with other variables in order to sharpen its predictive ability.

Relationships between the transformed source variables and the value we are trying to predict (i.e. future moves in the Dow Industrials), are frequently masked when: A variable exhibits change over time, the relationship is non-linear, the variable leads or lags the value we are trying to predict, or a combination of the above occurs. Graphing, smoothing, statistical tests, and separating the data into time periods are all useful techniques that have been employed to recognize such situations and formulate a corrective solution.

For example, when we explore the relationship between the level of the Dow's price/earnings ratio and future moves in the Dow Industrials, it seems clear that for the past twenty years the P/E ratio has been high at market tops and low at market bottoms. Unfortunately, each P/E peak and trough has been lower than its predecessor, so determining how to use this information appears elusive. The data can be improved, however, by computing the P/E's downward sloping trendline. Now, at any point in time, the P/E ratio can be measured in relation to its position above or below its trendline and our grasp on the data begins to firm.

As the P/E ratio has trended lower over the years, interest rates have also trended—but in the opposite direction. This suggests the possibility of a relationship between what investors are willing to pay for the averages (in terms of earnings) and the level of interest rates. In other words, why invest in stocks if your funds can earn a relatively safe 15% or so in the money market? When we remove the trend from both of these variables (after first ensuring that the trend can be reasonably represented by a straight line), it becomes possible to combine the two.

The daily trading pattern of the Dow Industrials (the open, close, high and low) is an example of data that seems, on the surface, unlikely to contain useful information. However, if a predictive model can capture the price of the Dow several months or several years ago, it can relate these figures to the Dow's current price and build a profile of how far the Dow has moved, how fast, and in which direction. It can also assess the recent volatility of the Dow in relation to a longer term standard, it can track how the Dow opens and closes in relation to how it trades during the day—and much more. In other words, surface appearances can be deceiving and one can never be sure, without some imaginative digging, what will be found.

One thing is certain, a single variable never contains enough information upon which to base a forecast. Far better is a dynamic grouping of variables which complement one another. Then, when a few predictor variables occasionally stray from the target, as they will, the results are usually offsetting. After the predictor variables have been constructed, the next step is to find a way to "put them all together," but first, a few words about what we are trying to predict.

Defining the Target: The Dow in 80 days

The most useful forecast of the overall market is one that accommodates both intermediate and major moves—and ours does just that. For example, the Dow Industrials have not experienced a major move, to speak of, for the past five years. This implies that a longterm forecast might have remained relatively neutral throughout this period, ignoring the numerous 100 to 150-point moves in the Dow that did occur. By contrast, a successful short-term model would have flagged these shorter-term moves, in addition to remaining locked in the proper position should the move extend itself to major proportions.

Our short-term market forecaster was initially designed to project the change in the Dow Industrials 80 trading days into the future. The problem with this can best be explained by an example. If the Dow Industrials advance from 850 (today) to 900 (80 days hence), the percent gain is 5.9%. However, if the Dow drops from 850 to 750 before climbing to 900, the 80-day gain is still 5.9%, despite the fact that these two price moves are substantially different.

To adjust for this anomaly, we have developed an improved measure of future price activity which takes into account not only where the Dow ended up (at the end of 80 trading days) but the path it took getting there. This "modified" 80-day price change was selected as the target we are trying to predict. The easiest way to visualize it is to think of an 80-day projection weighted so that near-term price moves are given slightly more emphasis than those occurring in the more distant future. (Computer printouts are available which show the Dow's daily closing value beginning in 1963, the percent change in the Dow over the next 80 trading days, the "modified" 80-day percent price change, and the forecasted 80-day percent price change.)

Putting it all Together

The computer run, upon which the program in the plug-in module is based, involved the construction of 180 predictor variables, day by day, for the past twenty years. Except for statistical methods of analysis and a large-scale computer facility, analyzing these variables—and all of their interrelationships relative to future changes in the Dow Industrials—would truly have been an impossible task.

One of the statistical techniques, which we have found useful, is multiple regression. It provides a direct solution to the problem of finding which combination of variables provide the best forecast of what we are trying to predict. A powerful variation of multiple regression is stepwise regression analysis. To illustrate the ideas underlying stepwise regression, consider the following problem. Suppose we have 20 independent variables and want a prediction equation using the best five of these. One way of choosing the best fiveterm equation is to construct all possible combinations—but there are over 15,000 such combinations, and such an exhaustive search method is not feasible.

Stepwise regression is a convenient and efficient method which provides a near-optimum solution to the problem. The method recursively constructs a prediction equation, one independent variable at a time. The first step is to choose the single variable that is the best predictor. The second independent variable added to the regression equation is that which provides the best prediction in conjunction with the first variable. It proceeds in this fashion, adding variables step-by-step, until no other variable will make a significant contribution to the prediction equation. At each step the optimum variable is selected, given the other variables in the equation. There are two pieces of information used in the selection process. The first is the normalized regression-coefficient value b that the prospective independent variable would have if it were brought into the equation on the next step. The significance of b is that it measures the correlation of the variable in relation to the value we are trying to predict. If the relative correlation is weak, there is little reason to add the variable to the prediction equation.

The second piece of information used in the selection process is known as the tolerance. If the tolerance is small, then that variable is nearly a linear combination of variables already in the equation. A large tolerance indicates that a new "dimension" is being added to the prediction equation.

The Final Operating Strategy

The power of multiple regression has enabled us to measure the interrelationships of 180 predictor variables, day-by-day for the past 20 years, against moves in the Dow Industrials. Once the significant relationships were determined, the 20 "best" variables were statistically selected and combined in the form of a predictive equation.

The Forecasting Module incorporates this information and operates in the following manner: The module accepts the source data from Barron's, it transforms the source into 20 predictor variables, it statistically weights the variables, and it combines the result to produce the forecast.

The next step was to find a way to use the forecast to buy and sell individual securities. To accomplish this we collected daily price information, for the past 18 years, on a randomly selected group of approximately 50 securities. Using simulation techniques we tested a variety of strategies (buying when the forecast was strong, and selling, or selling short, when the forecast was weak) to converge on the optimum. Two strategies proved equally rewarding:

Strategy 1 Buy securities when the forecast equals or exceeds +3.6%Sell (or sell short) when the forecast is equal to or less than -5.3% Strategy 2 Buy securities when the forecast equals or exceeds +5.4%Sell (or sell short) when the forecast is equal to or less than -5.1%

To implement strategy 1, as an example, securities are purchased when the market forecast first exceeds +3.6% and are held until the forecast projects a -5.3% or greater decline. In the simulation, \$10,000 was invested in each trade and commission costs were deducted from each transaction in the amount of 1.25% times the dollar amount that was traded. Dividends were not included in the computations nor were profits compounded. When the operating strategy was limited to long positions only, it was assumed that funds not invested in the market would be placed in money market certificates yielding 10%. Except for periods of general market inactivity, performance was reasonably consistent from year to year, with the two strategies yielding the following average annual returns:

Strategy 1	
Long and short:	38.9% per year annual return after commissions
Long positions only:	26.9% per year annual return after commissions
Strategy 2	
Long and short:	35.1% per year annual return after commissions
Long positions only:	30.0% per year annual return after commissions

The main difference between the strategies is that Strategy 1 is slightly more responsive to market action and trades more frequently. An aggressive investor might consider following Strategy 1 (long and short), while a more conservative investor might prefer Strategy 2 (long positions only).

	Average holding period	% of trades held longer than a year	% of trades that were profitable
Strategy 1:	11.1 months	35%	83%
Strategy 2:	12.4 months	45%	92%

Putting the Market Forecaster to Work

The statistics are clear. The majority of stocks move with the market and, while our performance record (38.9% per year in the case of Strategy 1) may differ in the future, we nevertheless regard it as a fair measure of the effectiveness of our techniques. We began as skeptics, and, over the years, have spent as much time testing our work as benefiting from the results.

As far back as 1969 one of our early programs was independently tested by a national accounting firm and, on a randomly selected group of securities, found to average a 32% annual return, after commissions. Since then, we have provided guidance to many of the leading banks and investment counseling firms on the West Coast and our reports, published monthly since 1975, substantiate our capabilities.

Recent advances in technology have provided a way for us to share this information and, while more documentation is available, we will shift to the user who is ready to put the Stock Market Computer to work.

• Select a strategy

Strategy 1 (long and short) appears to yield the highest return, although some investors may prefer Strategy 2 (long positions only) because more of the trades are likely to qualify as capital gains. You should arrive at your own decision. The procedure we follow is to pick a strategy and stick to it.

• Apply the strategy

The calculator has been programmed to "beep" when the market forecast equals or exceeds +3.6%, or when it equals or falls below -5.3%. This alert signal (under Strategy 1) suggests that it is an opportune time to either buy, sell, or sell short and, excluding options, this can be accomplished in one of two ways:

- Investors who prefer to make their own security selections can still do so, with the added advantage of having the market on their side—and this makes all the difference.
- A convenient alternative would be to open an account in a no-load mutual fund and, by phone, transfer funds into one of their growth stock funds when market conditions are favorable, and shift to one of their money market funds when the market forecast deteriorates.

And, whether your money is in stocks or mutual funds, also consider the benefits of applying this tool to the management of your IRA or KEOGH retirement plan.

• Diversify

Stock purchases should include at least seven or eight wellcapitalized issues from different industry groups. If a mutual fund is selected, it should be a diversified capital appreciation or growth fund.

Getting the most out of Your Stock Market Computer—Additional Information

Solid state and reasonably fail-safe

The calculator and module are a durable combination. Solid state and trouble free. The physical module should last indefinitely, but the program's effectiveness in the marketplace will deteriorate slowly with age. A new (updated) module will be introduced every 12 to 18 months. The typical user should consider replacement every two years. Professional money managers, or those investing reasonably large sums, should consider more frequent replacement. When a new module is introduced our customers will be notified first, and for those who have had their modules less than a year, a substantial discount will be offered.

You will also find that it is hard to make a mistake because the values you enter from Barron's are checked twice:

First, in the Update Routine. The low double tones will call attention to values outside of their normal tolerance limits (usually they're okay).

Second, in the List Routine. All entries are verified again. (Should "DJ ERROR" be displayed, it means that one of the DJ entries is higher than the high or lower than the low.)

Daily forecasts or weekly forecasts

Since the forecast will usually show the greatest change at the end of each week (because of the input of weekly data), it is usually convenient to obtain the forecast for the five prior trading days at the end of the week, when Barron's arrives. A practical approach would be to update at the end of each week and shift to a daily routine when the forecast begins to approach the "trigger" level.

If you prefer your Monday through Thursday forecasts daily (instead of waiting till Barron's arrives), you can take the Dow-Jones and odd-lot information from your local paper or the Wall Street Journal. Note that odd-lot purchases of 239,486 in the Journal, appears as 239.5 in Barron's. Conform to Barron's.

Recording the data from Barron's

Some of the market information in Barron's is for a period earlier than the prior week or, in the case of odd-lot information, it is a day late. These time differences have been built into the Program and should not concern you. Simply enter the data each day, exactly as it appears in Barron's (including decimal points and the minus sign for Spread), and obtain the forecast.

You can use the enclosed Data Collection Sheets to record the data. Use the dates just below Dow-Jones Hourly Averages to keep track of the date. There are no entries for holidays.

Data errors

Occasionally, but not often, a data error is corrected in Barron's the following week. If the error is minor (bond yields should have been 13.30 instead of 13.25 or the spread is -6.40 instead of -6.37), we would ignore it. Errors are self correcting over time and even the immediate effect on the forecast will be negligible. If the error is more substantial, you should restart the Program as discussed in the section titled: Obtaining Barron's week-ending figures and the Start-Up Values by Phone.

Keeping track of where you left off

Restarting the Program

Each time you get a forecast, the 46 start-up values are automatically brought up-to-date. You can always record the latest start-up values, clear or otherwise disturb the calculator's memory, and then reenter the start-up values and be ready for the next forecast. See the section on Getting Started.

Obtaining Barron's week-ending figures and the start-up values by phone

We usually receive our issue of Barron's on Saturday afternoon. Although it is unlikely to affect the Program's performance if your copy is late, as a convenience, we will record Friday's closing figures and make them available to you over the weekend. Call (213) 456-5742. 5743

On the same tape, we will give each of the start-up values. By recording these values and entering them as explained in the section on Getting Started, the calculator's memory can be brought up-to-date and be ready for Monday's forecast.

Avoid disturbing the calculator's "memory"

- Do not press the XEQ or STO keys if you are within the Finnegan Program, i.e. you've pressed UPDATE, or LIST, or FORECAST.
- Do not store **STO** in registers 50 to 108.
- Do not reduce the memory size. It is set at 109.
- Do not turn the calculator off or press keys while the calculator is running a routine. A program is running when the "bird" is flying across the screen.

The Checksum

A single figure, called the checksum, summarizes the 46 start-up values. To obtain the checksum press XEQ [ALPHA] CS [ALPHA]. Although it is difficult to inadvertently disturb the calculator's memory, you can always calculate and record the checksum and, at a later time, obtain it again. If the two checksums are the same, the memory has not been disturbed.

Registers available for your own use

The Finnegan Program uses the continuous memory of registers 50 through 108 for permanent storage. This leaves the following registers available for data or program storage, or for other plug-in software:

	HP-41C	HP-41CV
Available registers:	(with memory module)	
	00- 49	00- 49
	109-126	109-318

Using the HP printer

The Forecasting Program is designed to function properly with the printer connected and **turned on**. If the printer is connected but **not** turned on, the HP-41 may stop unexpectedly during program execution. Pressing $\boxed{\text{R/S}}$ will allow the program to continue. Therefore, it is best to turn the printer **on** if it is connected.

Scientific notation display

On rare occasions a forecast will fall between +.05% and -.05%and $\pm X.XE \pm X\%$ will appear on the screen. The calculator is trying to tell you that the forecast is not exactly zero. Press I I and you will see the forecast to nine digits. The fixed point and scientific notation displays are discussed on pages 32 and 33 in the Hewlett-Packard Owner's Handbook.

A closer look at our computer runs

Our working papers, in the form of computer printouts, are available to those who express an interest:

Run #1 — Actual vs. the forecast

The first printout compares the Dow's percent change over the next 80 trading days (on a daily basis since 1963) to the market forecast. The results are also summarized in the form of a distribution. For example, you can look up the number of forecasts between +8% and +10%and compare it to a distribution of what actually occurred in terms of the percent change in the Dow.

Run #2 — Rate of return simulations

The second printout shows the dates of the buy and sell transactions, and the percent return, when Strategy 1, and the market forecast from the first printout, are applied to individual securities.

Guarantees, Warranties and Where to Get Help

Guarantees

Use your Stock Market Computer and, if you purchased it from us and are not completely satisfied, return the Forecasting Module, manual and overlay within 30 days for full refund.

Warranties

Hewlett-Packard offers a one-year warranty on the hardware the calculator and Forecasting Module. If the programming functions in the Forecasting Module appear to be faulty, return the module to us for a replacement. Calculators should be returned directly to Hewlett-Packard for repair or replacement. Refer to pages 242-245 in the Hewlett-Packard Owner's Handbook.

Where to Get Help

If you have questions concerning the operation of the Forecasting Program, please call us at (213) 456-5741. As an alternative, you may write to:

William Finnegan Associates, Inc. Customer Support 21235 Pacific Coast Highway P.O. Box 1121 Malibu, California 90265

Should you need technical assistance concerning your HP-41, such as programming or calculator applications, refer to page 245 in the Hewlett-Packard Owner's Handbook.

Product Description, Price List, and Placing an Order

Product description

At the top of the line, Hewlett-Packard offers two of the most advanced calculators available: The HP-41C and the HP-41CV. The two calculators are identical, except for the initial memory size. The HP-41C (with 63 registers for programming and data storage) can be expanded to equal the size of the HP-41CV (319 registers) by adding memory modules. Since the Forecasting Module uses registers 50 through 108 for storage, this requires the addition of 1 memory module in the HP-41C, leaving 68 registers free for programming, storage and other application modules.

The complete system (see below) includes the HP-41C or CV calculator, carrying case, the HP Owner's Handbook, the plug-in Forecasting Module, the Operating Manual, and the Keyboard Overlay.

Price List

Complete System: The HP-41C, memory module and forecasting module \$450 The HP-41CV and forecasting module \$490	0 0
Separate Orders: The forecasting module, manual and overlay\$250 The forecasting manual\$20	0 0*
Computer run #1 Actual vs. the forecast\$ 20 Computer run #2 Rate of return simulations\$ 20	0 0

*If you purchase the forecasting manual separately, at your request, we will deduct the cost of the manual (\$20) from your next order.

Placing an order

By phone: Orders can be placed by phone and charged to your Visa or Mastercard, by calling (213) 456-5741.

By mail: Orders by mail may be made by credit card, check or money order. Simply fill out the enclosed order form, include payment or credit card number and expiration date, and mail it in. There is no charge for delivery.

Commission dollar sales: Separate arrangements are being made for individuals and institutional investors to place an order using commission dollars. For information:

Individuals call: (213) 456-5741 Institutional investors call: (213) 456-6186

Direct from HP dealers: Calculators can be purchased from your local Hewlett-Packard dealer. Many dealers will also accept orders for the forecasting module, manual and overlay.

To order **Barron's** call (800) 345-8540, Ext. 7 In PA call (800) 662-5180 - Notes -

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