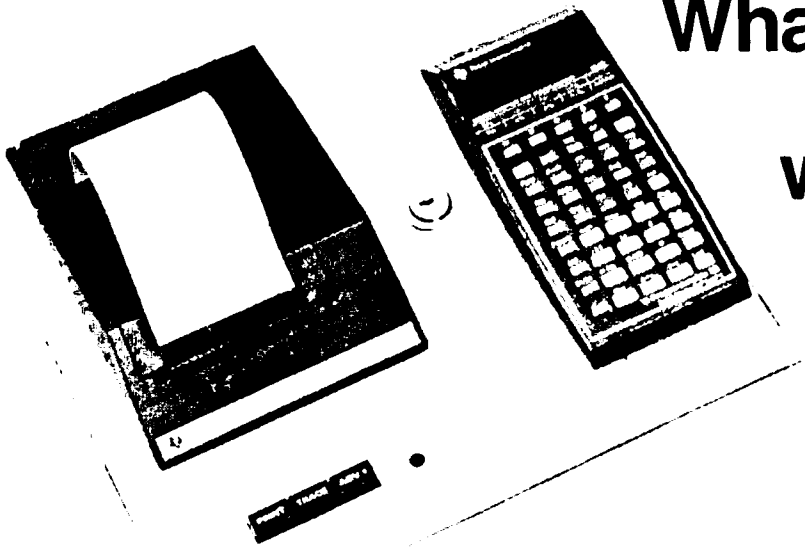


# What you can do with your own 'computer'



**PC 100A**  
(with T1-59)

By D.E. New

For some time now, the idea that computers can give traders an "edge" has been fairly well accepted.

The computer doesn't make a particular trader any smarter than others, but it does make it feasible for this trader to rapidly examine, filter and manipulate vast quantities of data in several ways. Users are able to construct and test a multitude of different models, trading methods and systems, allowing them to systematically analyze and evaluate more markets than would have been practical without computers.

Computer models are often used in an attempt to gain some understanding of complicated market behavior. Another advantage of computers is that they tend to encourage consistency and discipline. But because of their large costs, computers have not been generally available to the average trader.

Now, however, the smaller individual trader can have computer power at his fingertips to manipulate more data with less chance of error. You can examine more variables and make better decisions faster while making more efficient and productive use of your time.

That's because of the programmable calculators now on the market. These programmables, available for as little as \$300, may be fine-tuned to aid you in

technical analysis. While much could be written about this relatively new area, the scope of this introductory article will be limited to the history of these tools, models available and ways programmables can be used by commodity traders.

## Better Performance, Lower Price

Today's programmable calculators offer more computing power and cost much less than when first introduced about four years ago.

Hewlett-Packard introduced the first of the magnetic card hand-held programmables, the HP-65, for a price of \$795. The 65 had a memory capacity of 100 program steps — each step corresponded to a keystroke sequence. The user was able to record his program on a three-inch magnetic strip approximately the size of a stick of gum. The strip slid into the side of the 65.

Texas Instruments countered with its SR-52 about two years ago. The 52, which had 224 steps, was also able to use a thermal printer. The printer, which plugged into the back of the 52, operated under control of the 52, printing only those items the program chose to print.

HP reacted with its HP-67 in the summer of 1976. Like the SR-52, the 67 has 224 program steps but has no printer

capability. Instead, Hewlett-Packard offers the HP-97 which is functionally equivalent to a 67 with a built-in printer. Both the SR-52 and the HP-67 use the magnetic card to record the programs for future use.

In May of last year, Texas Instruments struck the next blow in its fight with Hewlett-Packard with the introduction of the TI-59. The 59 is currently the most sophisticated of the programmables in terms of program steps, memory registers and price performance.

It has a plug-in module which contains up to 5,000 program steps plus up to 960 additional steps which a user can record on a pair of magnetic cards. Like the 52, the 59 can be used with or without a thermal printer, the PC-100A. However, the 59, unlike the 52 or HP-97, can use its printer for printing alphabetic characters and numbers as well as plotting histograms and curves. The 52 and 67 only print numbers under program control.

## Programmable Uses

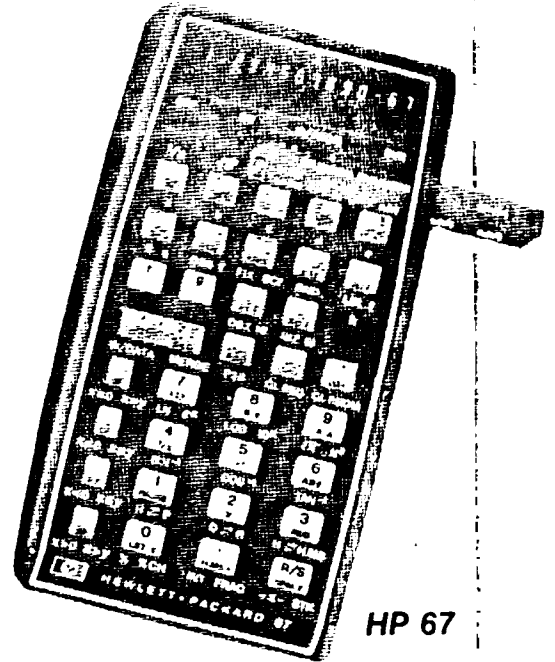
Programmable calculators are being used increasingly by businessmen and analysts other than just professional commodity brokers and traders — by the business executive evaluating acquisitions or production costs, by financial and

Table 1  
How the Programmables Stack Up

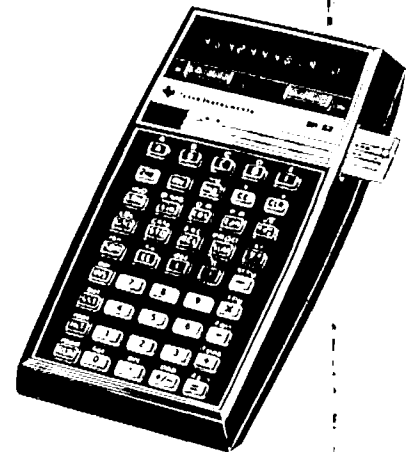
	SR-52*	TI-59	HP-67	HP-97
<b>PROGRAM MEMORY</b>				
# Steps, Max	224	960	224	224
<b>EXTRA MODULE</b>				
# Steps		5,000		
<b>DATA MEMORY</b>				
# Registers	32-60**	0-100**	26	26
<b>MAGNETIC CARD STORAGE</b>				
Steps per card	224	480	224	224
Registers per card	28	60	26	26
<b>OPTIONAL PRINTER</b>	yes	yes		included
<b>PRINTER FEATURES</b>				
Print Numerics	yes	yes		yes
List Program	yes	yes		yes
Trace Operation	yes	yes		yes
Print Alphabet		yes		
Plot		yes		
List Labels		yes		
<b>PRICE</b>				
Calculator	\$250	\$300	\$450	\$750
Optional printer	\$200	\$200		included

\*Discontinued when TI-59 was introduced.

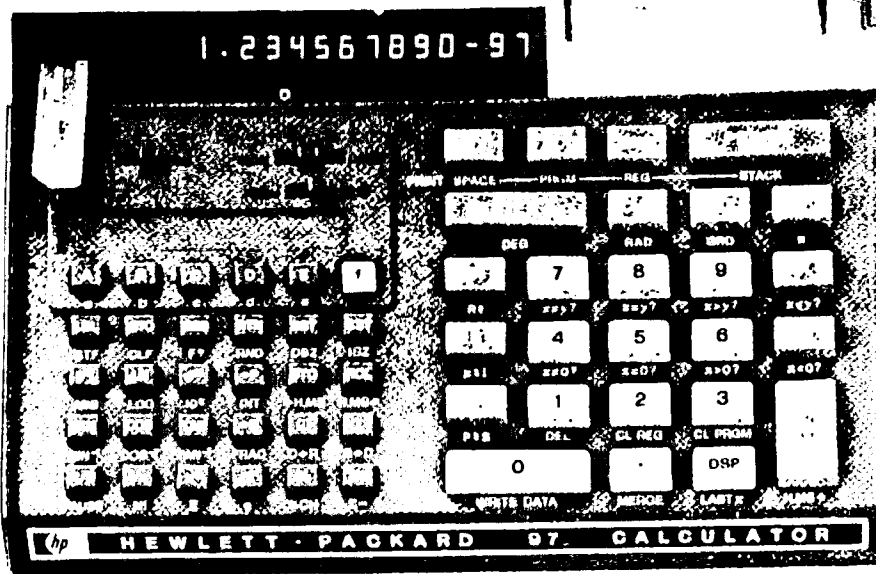
\*\*Data Registers and program memory may be used interchangeably. Minimum number of registers is available with maximum number of program steps.



HP 67



SR 52



HP 97

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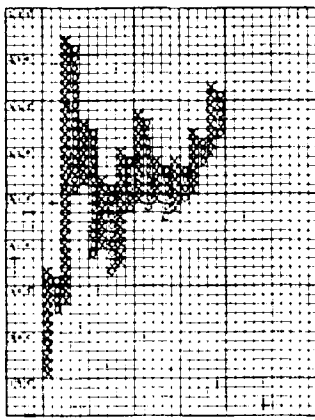
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stock analysts comparing investment alternatives or maintaining financial data files and by many others.

Commodity traders are using programmables to compute moving averages, as point-and-figure charts and as predictive tools. Some of the more common use categories include:

(1) *Moving averages.* Programmables can be used to compute all of the familiar and not so familiar averages — ordinary moving averages, exponential moving averages and linear weighted averages.

(2) *Regression analysis.* Both linear regression and curvilinear regression analysis are being used as predictive tools.

(3) *Point-and-figure.* Traders are using these programs to optimize point-and-figure charts. In some cases, these programs are even replacing charts.

(4) *History.* In many cases programmables are being used to store price history, which can either be used by itself or in conjunction with another program.

(5) *Miscellaneous uses.* These include such things as momentum oscillators.

(6) *Investment decisions.* Programs in this category determine if a proposed commitment meets pre-determined criteria.

(7) *Theoretical analysis.* These include supply-demand analysis, option price analysis (Black-Scholes), and stock price analysis.

(8) *Evaluation of risk vs. return.* These programs assess risk (and reward) based on a number of parameters established by each trader.

Programmables are very simple to use — you don't even have to be able to write programs to use them. Programs are available from several sources including manufacturers, user groups, and at least one commercial source which specializes in programs for commodity, stock and stock option trading.

Table 2 illustrates the relative ease of using a programmable in a moving average program, showing you the steps required in a hypothetical program which computes 4, 9 and 18-day averages on a daily basis.

Notice how simple it is in contrast to using an ordinary four-function calculator. With the four-function, you have to do at least 18 additions and three divisions to compute the required averages (31 additions if you use a straight forward approach). Compare this with entering a price and pressing three keys with a programmable. In addition, the program remembers the previous 18 days' history so you do not have to re-enter that each day.

Programmables are really little com-

puters. They can distinguish between memory and data. They can take action and make decisions based upon various inputs and results. They can read and write on a magnetic medium (cards). They can produce a printed record on thermal printers.

## Programmable Advantages

Because of these capabilities, they give the user many of the benefits of a regular computer — without the price. Some of the obvious advantages are:

(1) They are inexpensive. A cost of \$250 to \$300 places them within the means of any serious trader.

(2) They save time. Moving average programs, for instance, can save several minutes per commodity. If you follow several commodities, the time savings can quickly add up. You can spend your time analyzing the data instead of calculating.

(3) They reduce error. You don't have to look up data from a chart and enter it. You perform fewer mechanical computations so your chances for error are greatly reduced.

(4) Programmables are convenient and easy to use. You can carry the equivalent of several charts in your pocket. You can review averages, point-and-figure charts, etc. any time any place at your leisure. Just slip the magnetic card into your programmable, and you're ready to go to work.

(5) Improve your trading by increasing your ability to make fast decisions and analyze new prices quickly.

(6) Make better decisions. Because programmables allow you to look at more data than would be possible without a programmable, you should be able to make more intelligent and better-informed decisions with more insight than was possible before.

(7) Programmables encourage discipline and orderly thinking. Using them systematically tends to promote an organized approach to trading while minimizing emotion. In addition, programming (defining the proper steps to solve a problem) can promote an analytical frame of mind.

(8) Programmables can "stretch" your mind. Users will solve problems they would never have attempted without programmables. Users often become more familiar with mathematics and statistics.

(9) Educational. Programmables are the first close contact many people have with computers. As they become familiar with them, they usually lose any fears of a computer they might have previously had. They learn computers can be

**Table 2**  
**User Instructions For Sample Program**

- | Step |   |
|------|---|
| 1.   | Turn on calculator.   |
| 2.   | Slide magnetic card into the calculator.  |
| 3.   | Enter current price and press the "A" key. The calculator will display the 4-day average. |
| 4.   | To see the 9-day average, press the "B" key.  |
| 5.   | To see the 18-day average, press the "C" key.   |
| 6.   | Record the card for tomorrow's calculation.   |

friendly, faithful servants who do what they are told.

#### Putting the Programmables to Work

Programming is not hard, and you don't need to be a professional computer programmer to do it. You are probably an expert at programming already.

Programming is simply issuing a set of instructions to someone (or something) which allows him (or it) to solve a problem or perform some task. You are programming, for instance, when you use an ordinary four-function calculator to compute a set of moving averages (it is actually more precise to say that you are executing a program in this case).

Programmables just repeat the same steps you took to solve the problem — and in doing so removed most of the drudgery and repetition from it. Any problem which involves repetition, decision-making based on results or inputs, or involves several sub-problems is a logical candidate for a program.

Both Texas Instruments and Hewlett-Packard have very good user manuals which are included with the calculators. In addition, several business schools are teaching the applications of the programmables to business and, in at least one case, are offering a short course on the programmables themselves. Or if you have no desire to write your own programs, you can get them from commercial sources.

#### The Next Step

Cost of the programmables has been more than cut in half since their introduction. That trend should continue, encouraging more people to use them.

For the person who already has a programmable and wants more, there is the "personal computer," the next step up from the programmable. In fact, there is really a fine line between the two.

Usually, a personal computer consists of a typewriter-like keyboard, a video display (CRT), a micro-computer and either a cassette or flexible diskette for mass storage. It is usually programmed in a high-level language (usually BASIC).

These components may be packaged

separately or integrated into one package. The current price for such a system is around \$3,000. However, that industry is still relatively new, and new products are being announced almost daily. Commodore and Radio Shack have recently started shipping systems which cost under \$600. Both of these use the cheaper audio cassette for storage.

The small systems available today have comparable power and memory to systems that sold in the \$100,000 price range not much more than 10 years ago. It is feasible to attach them to terminals and let them follow the market on a trade-by-trade basis.

This application will not be a reality for the average trader for a few years, though. In the meantime, these systems can offer all of the advantages that the programmables offer with the additional advantages of more user prompting and increased data storage. Radio Shack is currently the largest retail chain offering such a system. When a major manufacturer like Texas Instruments or Hewlett-Packard offers them, then you will know they have arrived.

#### Summary

In summary, a programmable calculator can become a valuable addition to the trading tools and techniques you already use. Programmables permit a trader to utilize the power of a computer to effectively analyze his potential trading decisions. In addition, they are available at prices most serious traders can afford.

Remember, there is no substitute for sound judgment — the programmable calculator is no exception. It is not the ultimate "answer" to successful trading. Rather, programmables allow you to make rapid decisions with far more insight than ever before possible. They allow you to tailor the calculator to solve trading and charting problems and to find answers more quickly and easily.

More knowledge means that you improve your odds of making better-informed decisions about the risks and rewards of any trading situation. ■

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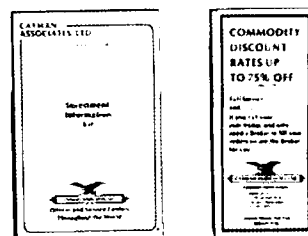
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