

Vincent Tseng peeks at Hewlett Packard's HP 41C. Could this be the forerunner of a portable micro, nestling in the pocket of the future?

Has the pocket computer arrived?

THE POCKET has a great deal of significance in landmarking history. For example: the introduction of the pocket radio back in the early 1960s, the pocket calculator in the 70s and more recently the pocket TV. Now there is speculation on the pocket computer. Hewlett-Packard's HP 41C programmable calculator has been heralded as the first pocket computer. Is this title justified? Is it an indication of things to come?

Everyone's definition of "computer" will be slightly different. Remember when the early pocket electronic calculators were first on the market? They were called, and even advertised, by many as computers. Of course most people will now laugh at those claims. To be pedantic about it, the electronic calculator is based on microprocessor technology: if the internal architecture is examined, it is easily recognised as that of a computer.

Without rhetorical discussions on what is or isn't a computer, the most sensible approach is to compare it with equipment which has already been classified. I have chosen equipment with which I am familiar, and which is in a similar price bracket.

These are the Rockwell AIM-65 (reviewed in *PC*, July 1979) which I assume most people would classify as a computer, and the Texas Instruments TI-59 programmable calculator, which has been around for about 2-3 years and has always been called a calculator. These comparisons do not bear on value for money or relative performance.

The choices for comparison are quite appropriate. The TI-59 is fairly obvious, being a calculator of similar class and price but from a different manufacturer. The AIM-65 was chosen because it offered similar facilities in terms of

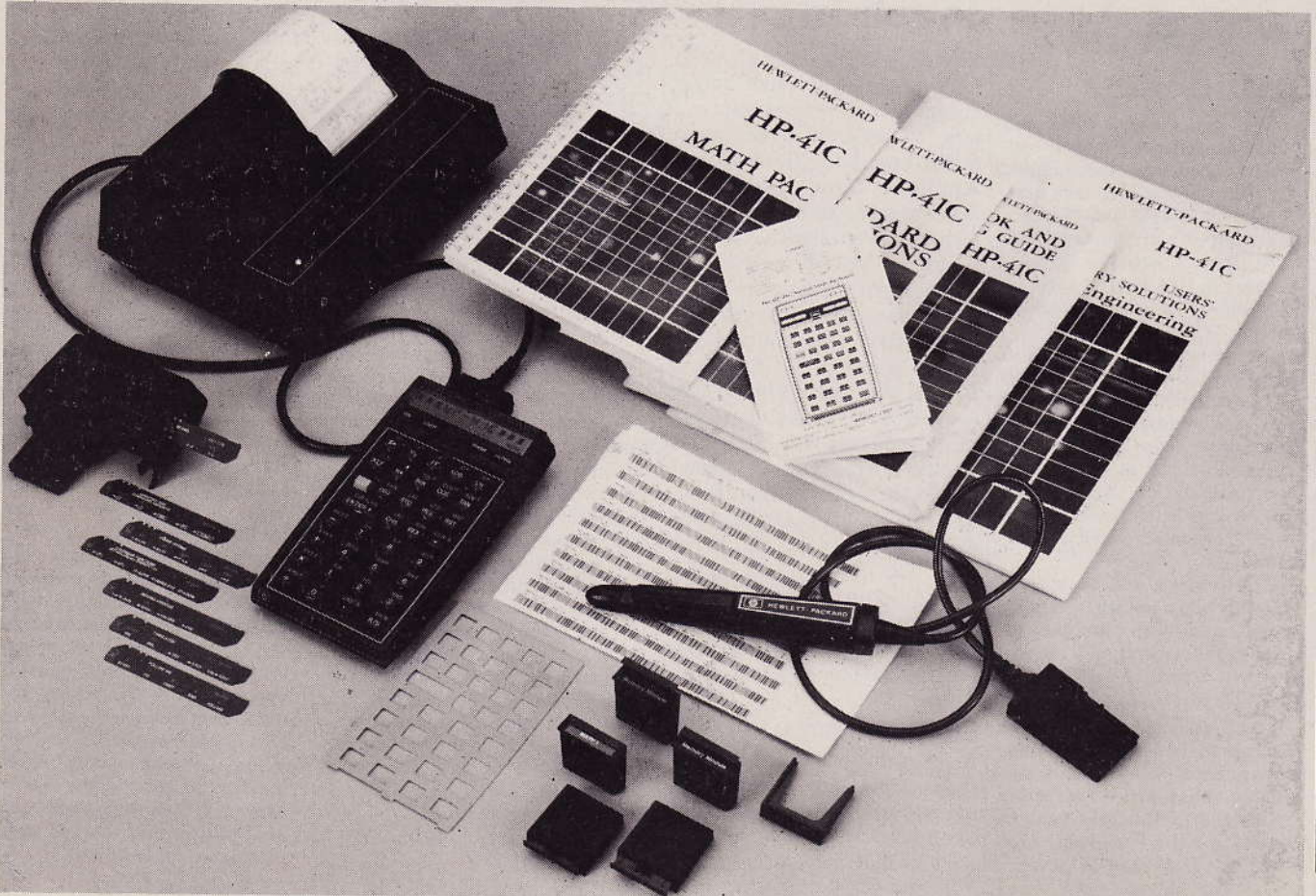
display and output.

In appearance, the two calculators both look like calculators of three to four years ago, ie, fairly bulky, more coat than waistcoat pocket-sized. The AIM-65 is a typical single board computer.

●**Keyboards:** the HP-41C and the TI-59 both have typical calculator key layout, while the AIM has a full alphanumeric keyboard in the conventional typewriter layout. All three have printer output capability on 2in wide roll paper using thermal printing. The AIM had the printer built-in but with the calculators this is an optional extra.

●**Displays:** the AIM and the TI-59 both use LEDs, 20 characters of upper case alphanumerics for the AIM, whereas the TI-59 has 10 numeric digits only. The HP-41C used LCD capable of displaying 12 characters of upper-case alphanumerics with indicators of the chosen mode.

Hewlett Packard's HP 41C calculator with printer, alpha-numeric display, magnetic and ROM memory modules, light-pen and programs in bar chart form.



●**Power supplies:** the HP-41C used disposable batteries (the new half penlight size) which Hewlett-Packard claims will last about one year. The AIM needs a stabilised +5V at 2A and +24V at 0.25A and is therefore usually powered from the mains. The TI-59 is rechargeable, so can work off the Ni-Cad pack or from the charger/mains adaptor.

The HP-41C was fairly easy to use as a normal calculator, although it uses the Reverse Polish Notation (RPN). This method was not difficult to understand, but a little awkward, in my opinion. The best way to remember the principle of this method is that the order of operations is the order in which one calculates an equation. Although this sounds logical, my preference is for the algebraic notation with hierarchy as in the TI-59.

The difference is that in the TI-59 method one enters the equation as written and the calculator takes account of the operational hierarchy order, so on pressing the "=" key the correct answer appears; with RPN one has to first analyse the equation and decide which operation should be calculated first and the order of the rest of the operations. However, RPN does dispense with the necessity for brackets. The difference is a bit like that between a high-level language and that of an assembly code but not quite as marked.

A feature of the HP-41C which the other machines lack is that it retains the contents of memory when the calculator has been turned off. Memory is held in low-powered standby mode. This means that the batteries cannot be removed for more than a few seconds without corrupting or losing the contents. This ability to retain the memory is a very convenient feature.

I found that it was all too easy to clear the program memory, especially when attempting to append operations on the end of a program, or when trying to write a program into the remaining free area. This is a shortcoming which needs serious consideration. I feel that programs should be capable of being protected in memory, or even automatically protected, with an operation which needs to be made obviously deliberate for clearing the memory.

The programming operations, editing functions and instruction/function set are similar for the two calculators. Both have numerous built-in extra functions, but the manipulative and testing functions are primitive. The AIM-65 does not have the powerful calculator functions, but the instruction set is much more suitable for testing, manipulation and the moving of data.

Therefore the programmability of the HP-41C (and the TI-59) is much more the capability of stringing together calculator functions, with some basic test conditions, to make the calculation of long equations and expressions less tedious and more automatic.

Although it can be argued that many computers are used for calculations, computers do have the ability to manipulate data in a far more sophisticated way than either of these machines. But, no doubt, both manufacturers would be the first to admit that the calculators were designed primarily for calculations.

Taking the above discussions into account, the ability of the HP-41C to display alphabets can be viewed in context, as that of making the calculator more convenient, and more meaningful for messages and prompting. But I found the keyboard awkward to use for alphabets. The letters are placed in alphabetical order, starting from the top left-hand key, and perhaps because of this, letters were surprisingly difficult to find quickly. It did not help that letters were marked on the sloping vertical face of the keys, which meant that the markings were not very prominent and that the calculator needed to be tilted away from the user to be viewed clearly. This feature, although not very convenient in its execution, does take the HP-41C a step closer to what is generally accepted as a computer. This certainly was one of the attractive features of the AIM-65 as well: the ability to display meaningful messages.

More permanent storage, or mass storage, is achieved by the use of magnetic strip cards for both calculators. The TI-59's is built-in, the HP-41C's is an optional extra. Each card can store approximately 200 steps in both systems. The AIM uses domestic audio cassettes, and can store about 100Kbytes on a C-60 per side, that is about 50,000 instructions. All three systems are tolerable in terms of speed and convenience.

Strangely enough, all three really come into their own when the printers are used. All three can trace their respective programs by means of automatic single stepping, all three "disassemble" the program steps into either the calculator operations, or into their mnemonics. The TI-59 and the AIM print the machine code stored in memory, but the HP-41C does not. All three printers can print full alphanumerics upper case only. Plotting simplified graphs is reasonably convenient with both the HP-41C and the TI-59, but with the AIM the user would have to write his own general routine.

A few niggly points about the HP-41C. It does have quite a number of built-in extra functions which are not marked on the keyboard. However, it is really fiddly to access them. The sequence is to press the "XEQ" key, set the calculator into alpha mode, key in the mnemonics for the instruction, re-press the alpha mode switch (to take it out of the alpha mode) then the digits for the operand. So an instruction of four characters takes seven key-strokes to enter! This is stretching the use of alpha capability for the sake of the facility.

The other point is the speed of the printer. It is slow, and for one based on the latest technology, surprisingly dumb when it comes to straightforward printing. It does not have bi-directional printing, and worse: it has to print a full line of 24 characters, filling in with 23 spaces, even when only one character needs printing. This is really a silly oversight.

The HP-41C claims to be a "system", with various expansion options. Printer and mag card reader as mentioned, and with extra memory plug-in modules — either ROM or RAM — each can add about 640 steps or 380 alphanumeric characters (note a number entered as an alphanumeric is not interchangeable with a digit entered for calculation). Up to four modules can be added, taking the total memory area to about 3.2K steps. In comparison the TI-59 has a total built-in memory of 960 steps. The AIM has 1Kbytes, expandable to 4K on board. The TI-59 in addition takes a plug-in ROM module containing about 5,000 steps and the AIM can have 20K bytes of ROM on board.

I found the HP-41C's documentation infuriating. Hewlett-Packard claims it was written by prize-winning teams for manual writing, but I found it next to impossible for quick and concise reference. For example an easy-to-find (if it does exist, I did not find it) reference of a list of the functions not marked on the keyboard and how to enter them, would have been useful and much appreciated!

Although I can see that the manual might be good for a first-time user, I did not find it particularly easy to learn quickly from it, and also I found it a little patronising. In contrast, the manual of the TI-59 was, in my opinion, excellent, both for a beginner as well as for a reference manual.

Conclusions

●As a calculator, the HP-41C is certainly one of the most sophisticated I have come across, although the TI-59 rivals it quite closely.

●As a computer, I feel it still has some way to go (unless of course one regards it as a dedicated calculating computer).

●The main limitation that I foresee for the advent of the true pocket computer, is the restriction of the size itself — limiting the computer by its keyboard and display, so it will always be relatively inconvenient, unless some dramatic advance can be made in ergonomic design.

●Any claims to being a computer cannot be justified, since the TI-59 matches almost point-for-point the capabilities of the HP-41C, and the TI-59 has always been regarded as a calculator.

●The HP-41C is nevertheless a significant step forward toward the pocket computer, and I do not intend to argue too vigorously with those who might claim that it has arrived!

Scribble nibble

QUEST AUTOMATION has introduced an updated version of its Datapad which allows hand-written data to be entered directly into any computer via a standard serial interface. The device, Micropad, occupies no more desk space than a telephone and only costs £1725 compared with £21,000 for Datapad.

Micropad does not need special paper; the user can design his own documents and data can be entered with an ordinary ball-point pen. The surface of the pad is sensitive to pressure and gives each contact point an XY coordinate, tracking the pen as it moves.

The microprocessor-based device records how each letter is constructed and compares them with a dictionary of different writing styles. It can distinguish between the number 8 and the letter B as they are written in different ways. As each letter is written, a 40-character visual display lets the operator confirm that the correct letter has been recognized.

Quest is financing its new Micropad factory by floating 1.5m. of their shares which are hoped to raise over £1.2m. The factory is at Wimborne, Dorset. Tel: Ferndown (0202) 891518.

Microwriter launched

Another device which could well touch a similar market is the so-called 'pocket typewriter'. Microwriter was originally demonstrated in 1978 and launched commercially at IBS last October. It is a portable battery-operated five-finger machine, the size of an electronic calculator.

Words are keyed by the fingers of one hand simulating the shape of a character. The letter 'I', for instance, is formed by pressing the button under the thumb and the index finger to resemble the vertical stroke. About 1500 words can be stored in the device's memory, edited and re-formatted.

The microwriter can be plugged directly into a printer for a typed copy, or a TV monitor and, for additional storage, a micro-cassette recorder.

About 90 Microwriters are already in trial installations where speeds of up to 80% of handwriting have been reached and sustained. Microwriter Ltd, which is backed by Hambros Bank, is based at 7 Old Park Lane, London W1, 01-493 5633.

New Tandy for 1980

THE NEW TRS-80 Model II has been shown in the UK and Tandy has announced that it will start taking orders although the first shipments are not expected until April 1980.

Ted Russell, director of Tandy's computer division, claims that the Model II is comparable, in performance, with the IBM 5110, the Hewlett Packard H9800, and the Wang WCS15. A basic configuration with 32K of RAM and ½MB of additional storage capacity will sell for around £2000. This can be expanded to 64KRAM with 2MB storage for around £4000.

Model II has been designed as a business system starting at the upper limit of the Model I, the old TRS-80. The entire computer and 80 character monitor is housed in one box which includes a ROM disk, two serial and one parallel ports. It is claimed that the Model II will operate at 2½ times faster than the Model I. Tandy hopes that it will have peripheral hardware and software in this country by the first delivery dates.

Although the Model II incorporates new features which must have been included to

some degree in response to criticisms of the Model I, such as a lower cost facility for word-processing, the Model I will continue to be sold. As if to emphasise the point, the Model I prices have been reduced by about 10%. The TRS-80 4K RAM Level I BASIC will now sell at £385.

It will be interesting to see how the Model I market will be affected by the news from the States that Tandy will be selling a home computer, without a monitor (to use with a TV set) from the second half of 1980.

Little Genius for micro teach-in

FRUSTRATED USERS who have struggled through barely comprehensible manuals on how to program their micro might find *Little Genius* from Applied Data Education Services a life-saver. The *Little Genius* diskettes are claimed to replace text-books and manuals with a series of easy-to-follow screens and exercises.

The first two courses for Apple II micros — *Applesoft BASIC* and *Using Your Apple* — are now available. Four more courses for Pet and Tandy micros will be issued within the next few months — *Petsoft BASIC*, *Using your PET*, *Tandy BASIC* and *Using Your TRS-80*.

The courses are being written by Baldchin Ltd in association with ADES and will sell for £46 each. ADES is on 01-580 6361.

● SEVEN NEW TANDY computer stores will be opened by the end of January from Birmingham and Bristol to Southampton, each of which will have a resident engineer.

Awards for best-selling computer ads

ENTRIES have been invited for the Computer Advertisement of the Year Award 1980. Over £7m is being spent every year on computer advertising so organizers Crouchmead Ltd expects a high response. Entry fees will be donated to the BCS Disabled Group.

Four categories of advertisement will be considered — computer hardware, computer software, computer related products/services and recruitment. The panel of judges will be asked to consider the aesthetic as well as the informative merits of the entries.

The entries will be judged and the winner announced on Tuesday, 25th March 1980 at the West Centre Hotel. Send for entry forms from John Godley, 42 Great Windmill Street, London W1, on 01-437 4187.

Micro event set for macro success

MICROSYSTEMS 80 looks set to break another micro record. With more than 80 stands already sold for the exhibition, at the Wembley Conference Centre from January 30-February 1, 1980, it will be the largest specialised micro event ever held in the UK.

The four-part program includes a Professional Development Course which aims to provide managers and engineers with an introduction to micros and, for those with a specific interest in software, to Pascal.

The Conference will provide delegates with a state-of-the-art review of developments in the microprocessor field, with sessions devoted to New Developments, Systems design and specification, Software for micros and Micros in Control. The third day has been designed to appeal to those interested in personal computers and their growing significance in the business world.

There will also be a Buyer's Forum, held in parallel with the Conference Sessions, which will try and help prospective buyers establish criteria for selecting equipment.

There will be no charge for admission to the Exhibition, which is being co-sponsored by *Practical Computing*. For further details about the Conference, contact Iliffe Promotions, Dorset House, Stamford Street, London SE1. Tel: 01-261 8437/8.

Ignorance is no excuse

PERSONAL COMPUTERS Ltd have produced some laws of personal computing betraying homely prejudices and, of course, some traits from computing's more sinister followers. It begins with such useful home truths as "Personal computing equals interactive computing" and "Software is hard: hardware is soft," and continues with "BASIC is to personal computing as sign language is to English" and "The goal of personal computing is to reduce the differences between humans and computers."

Personal Computers also tell us that they are going to reduce their dependence on the Apple and start distributing the TI-99/4 within the next few months. □