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special

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Take A Trip!

Your last chance to join Bill Bolton on *Your Computer's* tour of the USA, and visit one of the micro industry's most important ever happenings — CP/M '83.

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A new multi-tasking software package, launched this month, has turned a low-cost Sanyo into a powerful business proposition.

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More campaigners join the Osborne trail...Morrow with a non-portable baby which offers most of the features of big CP/M machines in a stunning value-for-money package, and Otrona with the smallest, but most powerful, portable we've seen so far.

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If you're into Commodore VICs, or would like to be, this is the place to start. This is your last chance to win \$1100-plus worth of expansion add-ons to boost the VIC's power

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Pocket Programs

Just a teaser compared to the special bonus section to be added to next issue, but these pocket programs should keep you going in the meantime.

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Up-Dating dBase II

If you can't stand American date formats, this patch for dBase II might be just what you've been looking for...

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Home Accountant

The salesmen were right all along — you really *can* do your home accounting on a micro-computer, and do it well with a package as sophisticated as this.

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Apple Disk Peeker

Steve Zanker shows you how to get into those mysterious Apple disks — presenting a useful program for any Apple owner.

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VERSATile Forms

Peter Sandys gives us the good news on a deservedly popular new addition to the range of business programs for the Apple, Versaform.

40

The Speedy Sandy's

Australian-written Sandy's word processor undergoes its most important update yet — the addition of the author's FastDOS to the package is a dramatic improvement.

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BASIC For Birdwatchers

Les Bell's tutorial looks at some of Microsoft BASIC's more useful functions in the area of string handling, and begins to delve into the world of PEEKs and POKEs.

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Now we've figured out those assembly routines, let's put them to

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Decisions, Decisions

Morrow Designs' Micro Decision is one of the stars in the latest 'all-in package' war. Total price is less than the value of the software, and all you have to do is add a terminal.

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Otrona 512

The most sophisticated of the new portables, the Otrona does almost everything as well as a 'mainframe' CP/M machine.

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Your words, our pages...

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Popular Systems

Individual columns devoted to the popular systems, including a new column for Osborne users as well as our latest additions, the MicroBee and the Hitachi Peach.

98

Readers' Services

Want to contribute a story, write a program, ask a question, subscribe, sue us or...? Read this first.



The Otrona 512 (known overseas as the Attache) might be called the Rolls-Royce of portable computers, except that in this volatile industry it's just as likely to be upstaged next month! See it on page 24.



Your last chance! Join YC columnist Bill Bolton on our tour to the USA for one of the most important events in the microcomputer calendar, CP/M '83. We leave in January, so there's NO time to waste...

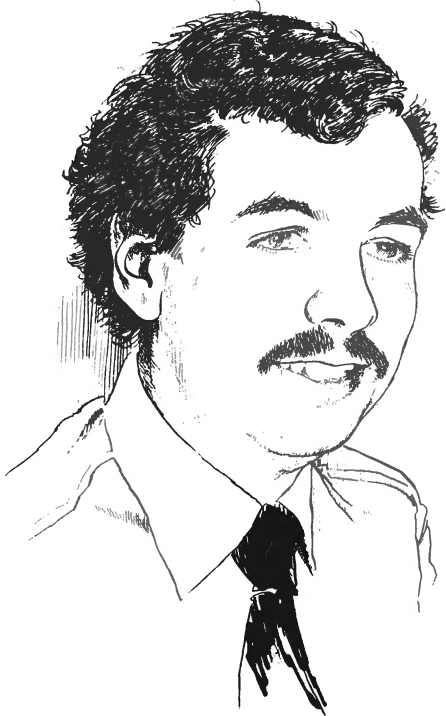
next month

Watch for our bonus liftout section of pocket programs, around 16 pages worth on top of the usual size of the magazine. If you like the idea, let us know — we might be able to talk the accountants into letting us have it as a semi-regular feature.

Speaking of semi-regular, we must apologise for the non-appearance this issue of part two of our new series, Introduction To Logic.

Staff disappearances (actually, illness) caused us quite a few time problems last month, but things are back on the tracks now...we hope. Logic will return in the December issue.

editorial



EVERY NOW and again I drag out the old crystal ball and have a go at predicting the future — which in a high-technology area like computers is extremely foolhardy. Nonetheless, it's fun to make predictions and later see how far out one was.

In this issue, I've reviewed the Hewlett-Packard HP-41 pocket calculator, and some of its features set me to thinking. I've become a heavy user of

several of the features in its extension modules — notably the alarm features and the ability to store simple lists in extended memory.

This is a major area for personal computer manufacturers to explore. The ability to schedule a month's appointments ahead of time, to check for time conflicts, to store lists of things to do has always been theoretically possible on personal computers. However it has not come to fruition because of two problems.

First, most computers do not have a real-time clock, particularly one that continues to keep time when the computer is switched off. Without any knowledge of correct time, a computer would make a lousy secretary!

Second, most computers are not portable. A lot of appointment scheduling or reminder entry is done outside working hours, when the phone is not ringing, there are no interruptions and you can get peace and quiet to plan properly. To be available at all times, a computer must be portable.

Perhaps what is needed is not a computer, but just a very sophisticated form of alarm watch with an alphanumeric display. However, the added feature of running programs adds so much functionality for so little cost that it would seem pointless to restrict such a gadget to time-keeping.

Who will be the first manufacturer to put together a really good suite of programs for time planning functions? There's a potentially huge market out there, and so far it seems only Hewlett-Packard has caught on! □

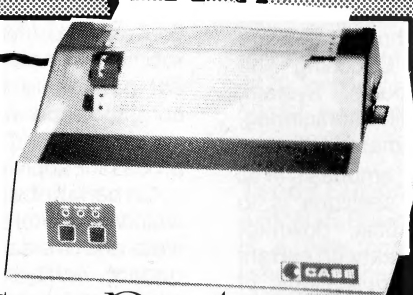
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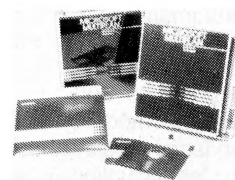
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VISIBLEND	\$64.95
(Consolidated models)	

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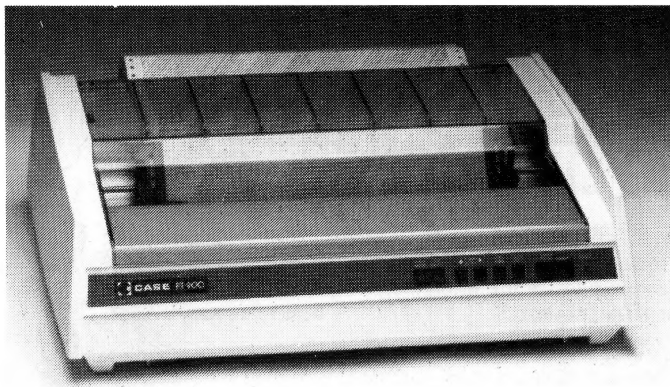
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your computer news



Quiet Performers

TWO NEW matrix printers claimed to combine high performance and quality with a 'remarkably low' operating noise level have been released by Case Communication Systems.

Called the PT 900 Series, the new models are positioned at the top of the line of Case's range of matrix printers.

As well as high speed printing in normal mode, the printers incorporate a correspondence quality print feature giving clear, crisp character printing. The series also features high resolution dot addressable graphics.

Capable of character printing speeds from 200 to 340 characters a second, the PT Series has automatic high speed head positioning (logic seeking) enabling throughput printing rates of up to 300 lines a minute in draft mode.

In correspondence quality mode, 'near letter-quality' text is produced at speeds of up to 80 characters a second.

The raster scan graphics capability provides a resolution of 144 by 144 dots a square inch at a print speed of up to 4000 dots a second.

Standard features include downloadable alternate character set, eight character sizes with double widths, four selectable line spacings, super and sub-script printing plus auto underlining.

For further information contact Case Commu-

nication Systems on (02) 438 2400. □

Apple Education

APPLE has announced a special education opportunity offer for primary schools designed to assist them in providing hands-on experience to students at an early stage.

The special offer includes a 64K Apple II computer and disk drive, PAL colour card and a complete set of Apple Logo software all for less than half the normal cost price.

Announcing the offer, David Strong, general manager for Apple in Australia said Apple has always been committed to providing computer experience to children at an early age. □

Computer Guidance Seminars

COMPUTER guidance seminars to be held in conjunction with the Data '82 Computer Exhibition at Melbourne Showground this month will cover a range of subjects of vital interest to businessmen concerned about productivity.

The Seminars, in the form of easy-to-understand briefings, will cover such subjects as selecting the right computer system, robotics, computer aided design and the automated office.

They will be held during the

day on November 9, 10 and 11 — the Data '82 exhibition dates — with sufficient time set aside to review over 130 stands displaying the latest in business computers.

The broad topic headings for each of those dates are respectively: Choosing The Right Computer System; Computers in Manufacturing, and The Automated Office.

"The major emphasis in all the seminar sessions is to provide practical, down-to-earth commentary on current and future applications of computers in the business environment," said Kevin Rebbechi, managing director of Graphic Directions, the exhibition organiser.

Victorian Premier John Cain had this to say on Data '82:

"Today, children in our primary and secondary schools are taught to use and understand a technology which is often to their parents a complete mystery.

Computer technology, it has been suggested, will have an even greater impact on the daily lives of ordinary people than the industrial revolution of the last century.

Many people have expressed apprehension at this prospect; some see computers as a threat to livelihoods, as a potential invader of privacy. Others see them as a tool to increase productivity and to release people from mundane, repetitive work, creating more time for leisure activities.

Which scenario eventually prevails depends on how wisely we use the new technology. This will be human decisions.

Whatever one's view of the future role of computers in society, there is a need to inform and educate people. If we do not understand computers fully, we risk making the wrong decisions.

Data '82 offers an opportunity for the industry to be involved in the process of

community education and understanding. I am delighted that the exhibition and seminars have attracted such wide interest.

Victoria leads Australia in general instrument application and the manufacture of robotics. We have a significant position in the fields of computer manufacture and assembly, and in micro-processor applications.

On behalf of all Victorians, I welcome visitors from interstate and overseas to this important exhibition and the seminars. I am confident that the people who take part will leave with a greater understanding of computers and computer technology, and an insight into the ways the technology can be used for the benefit of society as a whole." □

Computerised Real Estate

THERE is now a complete property management system designed specifically for the Australian real estate agent.

Called The Real Estate Agent the system is written for the Apple II computer which is widely available across the country.

The Real Estate Agent computerises the ledger card system of property management by holding all required information in electronic files.

Once filed the data is instantly accessible, can be altered easily and can be combined to product analysis reports quickly and efficiently.

For further information contact Vicki Staveacre or Lee McLean at Burson-Marsteller on telephone (02) 241 3016. □

TRS-80 Software

MOLYMERX has established a mail-order network, aimed at TRS80 and System 80 users, with outlets in Gosford and Auckland.

The company says it will

Your
Last Chance!

VISIT The CP/M Event Of The Year

Join Your Computer's Tour To:



CP/M '83 is: The biggest-ever assembly of CP/M-related hardware, software and people. Organised by Digital Research, and presided over by the man who wrote CP/M, Gary Kildall, this conference and show will be entirely devoted to the furthering of CP/M development and value to the user. You'll be able to find out anything you've ever wanted to know about CP/M, and see all the new releases and upcoming advances.

CP/M '83 is: A vitally important — and interesting — event for anyone involved in CP/M. It will be of particular benefit to dealers and salesmen who have found themselves thrown in at the deep end with the recent upsurge in CP/M implementations.

CP/M '83 is: A tax-deductible business trip for those who make their living out of microcomputers, as is the Study Tour we will conduct, for those interested, after the 'Main Event'.

CP/M '83 is: On soon, so you have to act NOW! We'll be leaving for San Francisco around January 18.

TOUR PRICE
\$1550*

Join one of Australia's most informed CP/M'ers, YC columnist Bill Bolton, who will lead the tour, conduct an in-depth post-conference debriefing, and take those interested on a further industry study tour, visiting such places as the Osborne factory and Digital Research itself.

PLUS:

This is no follow-the-leader, never-stray trip. You'll have to leave Australia on the same flight, but after that your time is your own if you choose to leave the group. Return flights are entirely optional — you can go your own way, or select one of our alternatives: The study tour; a break in Hawaii; or a family trip to Disneyland!

* Basic price ex-Sydney, includes return air fare and accommodation in the Sheraton Palace, a first-class hotel just a few blocks from the exhibition centre. Optional extensions to the tour will be at extra cost, to be advised in the detailed information we will forward to those who send in the accompanying coupon.



For further details, cut out this coupon (or copy it) and return it as soon as possible to:

Your Computer CP/M '83 Tour
PO Box 21 WATERLOO 2017

or phone Joy Quinn on (02) 662-8888.

* **YES, please, tell me more!** I want to keep right up with what's happening in the microcomputer world, so send me the details of:

Conference/Show Tour: For those who want to be out and back within a week — or do their own thing after the show — the basic trip outline.

Show and Study Tour: We're in the process of arranging visits to Osborne, Digital Research, Silicon Valley (of course!), and others. This, too, will be tax deductible for the business tripper.

Business and Pleasure: Wind down — and be the envy of your friends — with a spell in Hawaii on the way home.

Family Fun Tour: Take the family along (they'll have plenty to do in the short time you're at the show), and afterwards head off to Disneyland. A week in Hawaii on the way home wouldn't lose you any points, either...

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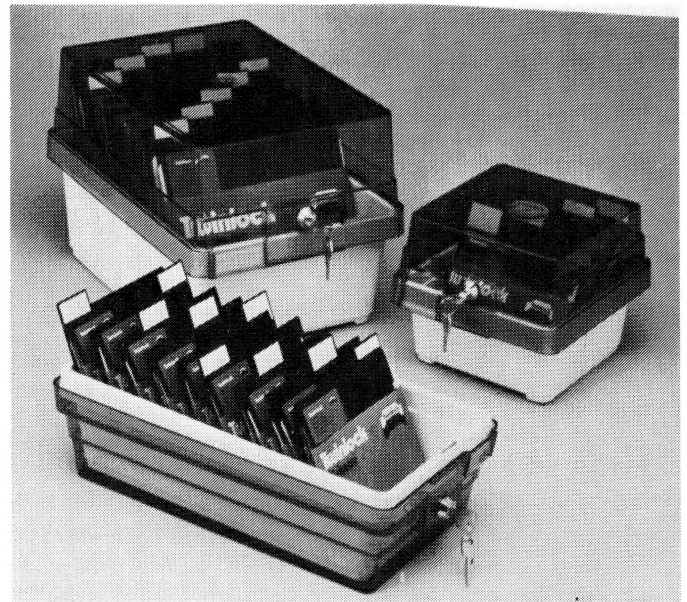
Adds 16 HI-RES functions to any disk system automatically, links with any version of disk BASIC.

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Model I, Model III & system 80 versions now available
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Continued on page 14

your computer news • your computer news



Lockable Floppy Trays

TWINLOCK has introduced a range of lockable plastic trays for the storage of both 13 and 20cm diskettes, or floppy disks.

There are four trays in the range, with 45 and 90 diskette capacity for both sizes of floppy disk. Produced in high impact ABS Plastic with a smoked perspex lid, the trays are lockable and are supplied complete with divider plates and self-adhesive title strips for indexing.

Prices range from \$32.72 for a storage tray for 45 13cm floppy disks, and from \$46.96 for 45 20cm floppy disk capacity tray.

For further information contact Mr T G Johnson on (03) 584 4000. □

Another Computer Club

STEPS ARE being taken to form a St George College of TAFE (Sydney) Computer Club that will function as a subsidiary group under the College Student Amenities Committee.

The formation of this club is intended to provide a venue for students of the College and any local residents who have an interest in microcomputers, both hardware and software, to participate in

a variety of projects and discussion groups and enable them to greatly improve their skills in these areas.

Membership of the club will not be restricted to students of the College. The only requirement would be a contribution of \$10 to Student Amenities. This means that on completion of their courses students can continue their association with the club, if they wish, as well as providing an opportunity for local residents in the St George region who have a desire to learn more about microcomputers and their applications in either business, education or the personal computer hobbyist areas, to do so.

The nature of the activities undertaken will depend on the interests of the club members and their respective skills at the time.

A number of teachers and students have already expressed an enthusiasm for this idea. They have a variety of backgrounds which include Business and Administrative Studies, Building, Electrical Engineering, Electrical Trades, and General Studies.

Anyone wishing to join the club, or learn more about it, can contact Jim Forrester, Senior Head Teacher,

School of Business and Administrative Studies, St George College of TAFE, Cnr Princes Highway and President Ave, Kogarah, 2217. Alternatively, phone (02) 587 1333. □

Vector Goes Faster

NOT A reference to clock speed — Dicker Data Projects, agent for Vector Graphic computers, is sponsoring Phillip Revell's 'Formula 1' (Australian version) racing car. Revell, who has a string of Formula Ford successes behind him, is Australia's youngest Formula 1 driver.

Using a Vector computer to analyse suspension geometries and roll centres, Revell hopes to be able to prepare his Ralt RT4 car more quickly and more accurately.

But the Dicker Data involvement goes beyond just sponsorship. Both David and Fiona Dicker are helping set up the car and are part of the pit crew on race days. □

A Little Learning

TWO COURSES being run in the Canberra area will probably be of interest to our readers.

'Microcomputers in Business and Administration' is being held on November 19 and is oriented towards end users with a need for stand-alone computing facilities as well as DP managers trying to figure out what micros are all about.

The comprehensive syllabus covers just about everything one could want to know about micros, and every participant will receive a floppy disk with the complete source code of an accounting system comprising general ledger, debtors and creditors.

The other seminar, on CP/M and its derivatives, will cover CP/M-80, CP/M-86, MP/M, MP/M-86, Concurrent CP/M-86 and CP/M-68K. The disk in this case will contain a sample CBIOS

source file for a machine with both 20 and 13cm disk drives. Practically everything you wanted to know about CP/M but were afraid to ask should be covered in this seminar.

The course instructor in both cases is Peter Harris, foundation convenor of MICSIG and president of the CP/M User's Group of Australia.

The seminars are being organised by The Office Technology Training Centre, 2 Chauvel Circle, Chapman ACT 2611, but as time is moving on, we'd suggest you ring Ms Maureen Greer on (062) 31 0415. □

Handy Utilities

THERE ARE times when you have to perform some boring repetitive task, and know that you could easily program the machine to do it, but just don't have the time.

CBASIC programmers in particular often encounter such tasks as stripping out unreferenced line numbers or recompiling a program because a new module is bigger than the main module and the %CHAIN statement will not work correctly.

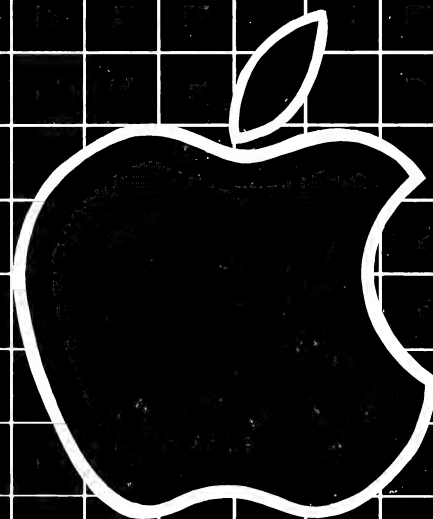
A new series of utilities from Asamer Holdings is designed to eliminate some of these problems. TRIM.COM, for example, will delete those line numbers which are not the targets of a GOTO, GOSUB and so on. This makes the source code of a CBASIC program converted from MBASIC much more readable.

RENUM.COM will renumber any BASIC program (although MBASIC programs must have been saved with the ,A option). Limits for renumbering can be specified, as can the new starting line number and increment.

READ.COM displays a CBASIC source file with line numbers; the best point is it handles %INCLUDE directives correctly, showing the

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included file. This allows faster compilations, with the file only being examined for the lines in error. PRINT.COM sends a file to the printer with proper pagination and line numbering.

CPRINT performs a similar function, but prints a CBASIC or CB-80 source file in exactly the same format as the compiler. It also recognises %LIST and %NOLIST instructions and takes the same action as the compiler, and includes %INCLUDED files.

My favourite is SIZE.COM, which allows the constant area, code size, data statement area and variable area of any CBASIC int file to be altered without re-compiling. Its other function is to report the sizes of a group of programs (using standard CP/M wildcard naming), so that the largest can be found.

Finally, UNPROT is a prog-

ram which removes the protection from Microsoft BASIC programs saved with the PROTECT option. All the packages are written in assembler for speed, and will be supplied on a 20cm diskette. Prices range from around \$30 to \$60, with UNPROT somewhat higher at around \$100.

For further details contact Asamer Holdings at PO Box 99, Cammeray NSW 2062. □

BASIC-ly Innovative

IN MELBOURNE, another new business is helping to satisfy the growing community demand for knowledge about computers and programming.

Computer Tutor began courses in BASIC programming on September 6, using video instructional modules to progressively take students from the fundamentals



of BASIC to the stage where they are writing small but useful programs; a micro-computer per student is provided to enable participants to test their programs and, of course, to learn by their mistakes.

Ten and 20-hour courses are offered, and current clients range from secondary school students to retired professional people.

Enrolled students are entitled to free use of a computer at any time during sche-

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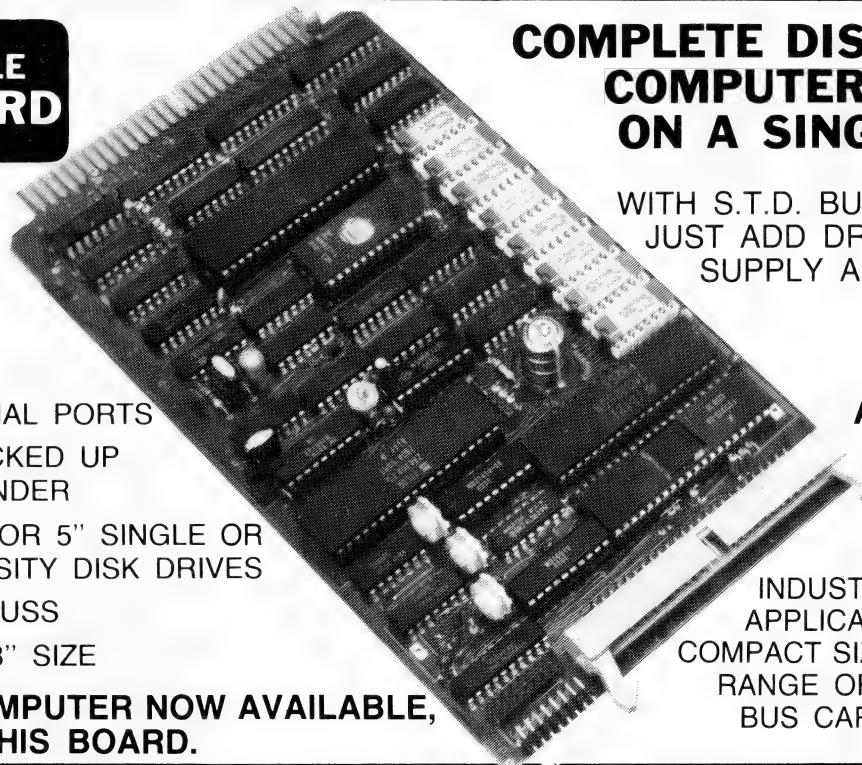
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duled 'open sessions', and these sessions are supervised by tutors who can provide assistance as required.

'Pay-as-you-use' access is available to others, beginning at \$3 per hour (or \$50 per month) for keyboard/processor/screen configuration, with loadings for use of disk drives and printers. A range of software is being built up for hire to users.

The facility is also offered to schools for 'computer awareness' exposure at an attractive rate, and the proprietor Bob Thompson is hoping that in the future he will be in a position to help other groups such as self-help agencies for the unemployed.

Computer Tutor's address for information: PO Box 129, Moorabbin, 3189. Telephone (03) 555 8456, or 580 3480. □

Digital Valium

DREAMCARDS, a Melbourne software supplier, has released a new program called 'Psychotec' that turns the personal computer into a tame psychiatrist.

Written for the MicroBee (but with full conversion instructions for any other 16K BASIC system), the program allows a dialogue between operator and computer in the style of a psychiatric interview. First developed some years ago in the USA in the controversial 'Doctor' programs, the powerful language processing logic has been entirely redesigned and refined.

The program is supplied as a booklet which contains a full expanded listing, detailed instructions for conversion to other BASICS and a complete and easily understood description of the program logic (to allow it to be modified as desired — you are only limited by your imagination!).

On its own the program is a fascinating 'game', but the detailed analysis in the

booklet allows the reader to readily comprehend how BASIC routines can be used to process and understand the English language for all sorts of applications.

Available from Dreamcards, 8 Highland Court, North Eltham, 3095, the program is \$20 and a cassette dump (MicroBee format) is \$5 extra. □

CP/M-68K For Motorola

UNDER an agreement with Digital Research, Motorola will sell the CP/M-68K operating system for the M68000-based EXORmacs development system, announced Tom Rolander, Digital Research Operating Systems Division vice president.

"The agreement with Digital Research is the foundation of Motorola's plan to become heavily involved with third party software for the 68000," said Bill Lowery, Motorola MOS SYSTEMS representative.

"Motorola, developer of the 68000, is the latest semiconductor manufacturer to align itself with digital research," said Rolander. "The 68000 is a very popular processor, and we feel that CP/M-68K will become a standard operating system for 68000-based microcomputers."

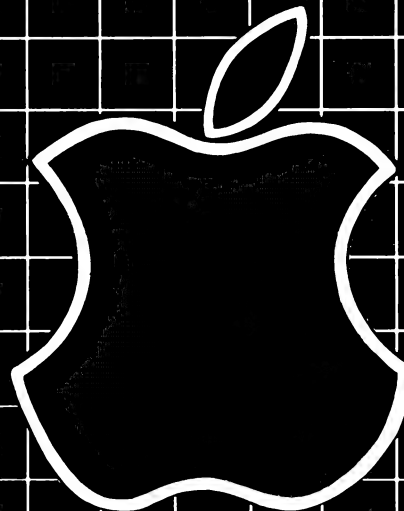
Programming languages such as CIS COBOL that already exist for the 68000 and other microprocessors allow many popular business application programs to be recompiled to 68000-based microcomputers from other 8- and 16-bit machines. Other existing languages are being developed for the 68000, including Digital Research's Pascal/MT+.

CP/M-68K maintains file compatibility with all Digital Research operating systems. Files from 8- and 16-bit microcomputers running these operating systems can be transported with no conversion to 68000-based machines running CP/M-68K. □



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(See review Your Computer, Oct. 1982)

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Affordable Power

SOLAR and Allied has announced a new power pack available to users of computers, especially the larger units, and a range of office equipment.

The system includes deep cycle, sealed, maintenance free, batteries, and multiples charger and an inverter, all in an attractive cabinet. The system provides a continuous stable power supply after a mains failure.

Power fluctuations and interference are eliminated through the built-in filter system, preventing loss of data and possible damage to the system. Power output ranges from 100 W to 5 KVA with larger units available on request. Filters for micros are also available.

For further information contact Ralph Morton, Phone (071) 43 2280. □

Big ICL Sale

ICL, that pommie computer company which is rather better known for its mainframes than in the microcomputer end of the market, has just made its biggest ever overseas sale — for microcomputers!

The order, valued at \$US27 million, has been placed by New York State Department of Social Services for 2400 of ICL's recently announced DRS-20 multi-microprocessor based distributed resource systems, to establish a distributed data processing system throughout the state of New York. □

Low-Cost Winchester

AMERICAN company SyQuest Technology has announced the industry's first 10cm removable cartridge Winchester drive which provides five Mbytes of mass storage on a single 'thin-film' metallic alloy platter.

Its half-height form factor allows two SyQuest drives to be inserted into the physical

dimension that one 13cm Winchester or minifloppy drive currently occupies.

The SyQuest SQ306 is fully compatible with the successful Seagate Technology ST506/406 13cm fixed disk Winchester drive. With identical storage capacities (6.38 Mbytes unformatted/5 Mbytes formatted), performance and data transfer specifications, track and sector formats, and control interfaces as the popular Winchesters, the SyQuest SQ306 can utilise their controller interfaces such as the DTC 510A, XEBEX 1410 and Western Digital WD 1000.

For further information contact Abacus Computers at 512 Bridge Road, Richmond, 3121. Phone (03) 429 5844. □

PIPS Inns?

MANY of our readers will recall our review of the Sord M23 personal computer, and in particular, its main piece of software called PIPS, a combined spreadsheet calculator, text editor and database system.

Mitsui Computer Systems, distributors of the M23, is opening its first computer store, called PIPS Inn, at the corner of Pitt and Bridge Streets in the centre of Sydney.

The official opening was on September 30th and, all going well, the formalities should have been performed by the Liberal MP for Ku-ring-gai, Mr Nick Greiner.

Graham Young, manager of the PIPS Inn, says 'We don't just talk about computers, we talk in plain English about improving business efficiency'. At the PIPS Inn, free training will be provided with every machine sold. □

The Daro Fox

DARO systems has announced the 'Fox'; a lightweight, portable computer, equally at home as an entry-level standalone system or as the

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It's 16 BIT. It's IBM PC compatible. And it's here now! President have a new business computer manufactured by Columbia Data Systems of the USA complete with its own software and hardware. It will also run all software and hardware produced for the IBM PC.

At first glance, this machine may bear a certain resemblance to its mentor.

That's before you switch it on.

WHAT A PERFORMANCE!

Appearances can be deceptive as a look at the credentials of the Columbia MPC machine will tell you.

Operating system software is MS-DOS® or CP/M 86®.

It's 16 BIT 8088 hardware configuration provides 128 K RAM with parity, two RS-232 serial ports, Centronics parallel printer port, DMA controller, eight levels of interrupt, dual floppy disc system with one megabyte storage, Winchester interface and eight expansion slots.

Not bad for the standard version.

EXAMINE YOUR OPTIONS

Columbia like to leave your options wide open. So they've included 256K RAM boards, 8087 arithmetic co-processor for high speed math functions, dual RS-232/RS-422 boards, and a Winchester disc based system.

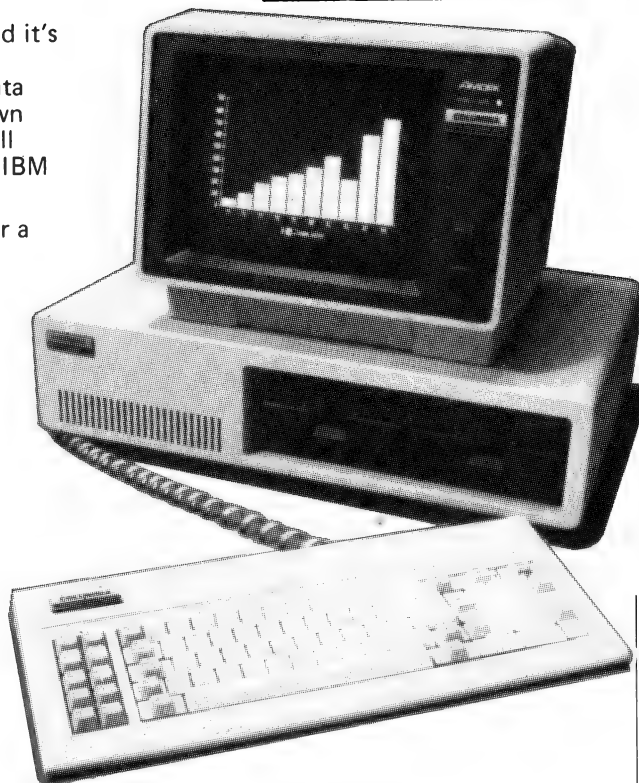
The Columbia MPC's expansion capability can easily accommodate just about any imaginable hardware configuration including one megabyte RAM and 10 megabyte disc.

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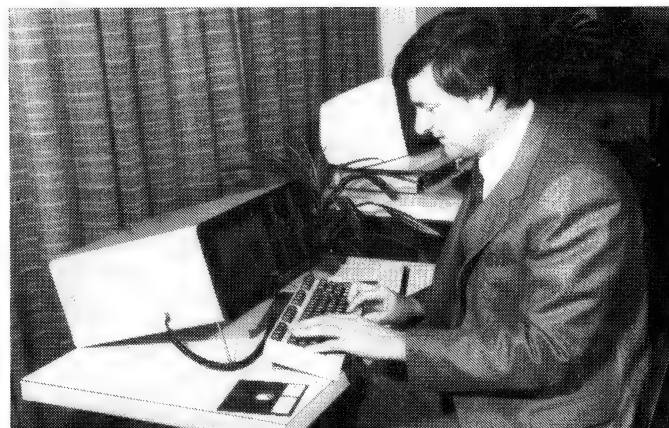
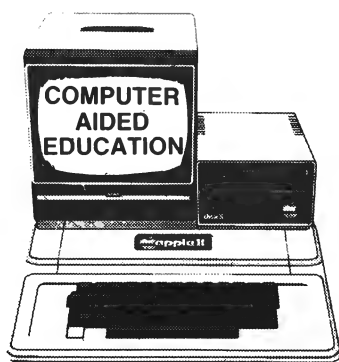
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basic building block in a local area network.

As a standalone, the Fox can be configured as a complete entry-level business system for around \$10,000. In its networking role, it can be purchased with word processing software for \$8000.

The basic system, based on the well proven Z-80A microprocessor, has 64 Kilo-bytes of main memory, plus 16K dedicated to the CRT control, and 2K of ROM. It features some 120 function keys, with 96 being fully programmable to facilitate sub-routines and so on.

Double-sided double-density diskette drives provide 1.2 Megabytes of storage, and seven full screens of the Fox's non-glare display can be instantly stored and retrieved as required.

Full networking communications are available with the Fox, allowing for expanding office automation systems of up to 30 users. BASIC, COBOL, PL/1, FORTRAN and PASCAL languages are supported, and the CP/M operating system means that a wide range of applications software is available both from Daro Systems and other suppliers.

For further information contact Roy Bettenhausen at Daro Systems on (02) 699 3877. □

tion and Boston Systems Office (BSO), have announced an agreement whereby BSO will adapt its microcomputer development software to Digital's recently announced Professional 300 series of personal computers, and the two companies will cooperatively market both the software and hardware.

This agreement is applicable to Australia and New Zealand as well.

BSO, which is reportedly the world's leading manufacturer of universal microprocessor development software, has development packages for more than 30 families of microprocessors, representing more than 25 manufacturers' products.

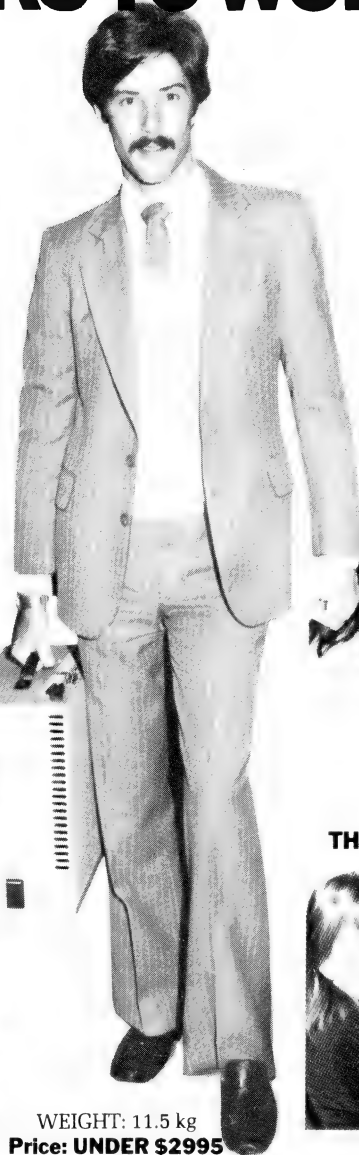
By adapting proven development software to Digital's Professional 300 series, BSO will provide a low-cost means for designers and engineers to create microprocessor application programs.

Microcomputer development software to be adapted to the Professional 300 personal computers includes CA/Micro Microprocessor assemblers, SI/Micro microprocessor symbolic debuggers, object format conversion programs, and up- and down-line loading support for selected microprocessors. Collectively, the system is known as a universal microprocessor development (UMD).

Further information can be obtained from Digital Equipment on (02) 412 5252. □

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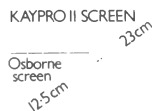
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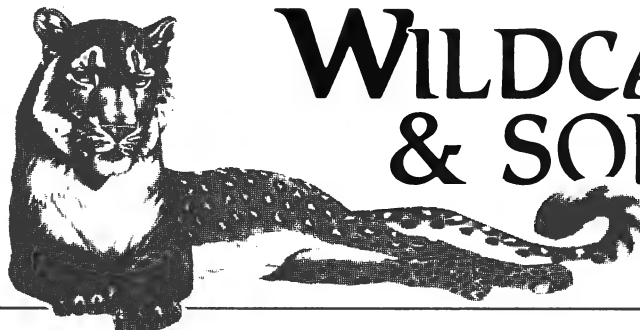
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Decisions, Decisions



In last month's examination of the portable machines, we alluded to the new Morrow Micro Decision computer. We finally got our hands on one — here's Les Bell's evaluation...

AS MANY READERS will know, my own computer system has been based since 1978 — until recently — on boards from Morrow Designs (alias Thinker Toys).

I started off with a Morrow octal front panel, two 8K dynamic memory boards (big stuff in those days!), and Morrow's Spokeasy cassette interface. Later, a Morrow Discus 2D disk system brought the system up to business standards, and it remained that way for some time until I gradually started upgrading to a Godbout dual processor system.

In the meantime, George Morrow has not been idle. Last year saw the release of the Decision One microcomputer, an extremely innovative design, based on a Z-80 with advanced memory management circuitry, which runs Micronix, a UNIX look-alike, as well as UP/M, a CP/M emulator which allows CP/M programs to

run under Micronix. The whole system performs very well, typically supporting three users effortlessly.

Morrow has also forged ahead with the production of hard disk systems, becoming America's largest independent supplier of hard disk controllers for S-100 systems.

The latest product from Morrow Designs is the Micro Decision, a small single user microcomputer which falls in roughly

the same price bracket as the Osborne and similar machines.

Unlike these computers, however, the Micro Decision is not primarily intended for portable use, although it is certainly small enough and compact enough to be moved around easily.

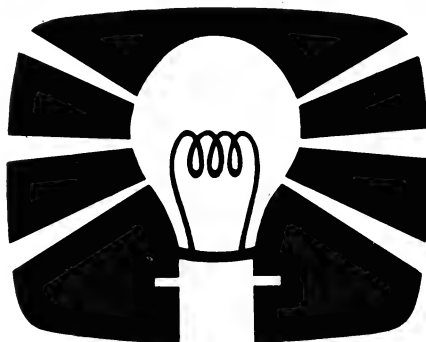
At 42 cm wide, 29 cm deep and 14 cm high, the Micro Decision is not much bigger than the pair of disk drives it contains. From this description it is obvious that it does not contain an integrated screen and keyboard, and indeed, this is its biggest advantage.

The MD is designed to work with a separate, full size, full function terminal. The user can either supply his own terminal or use the Morrow Designs terminal, which bears more than a slight resemblance to an ADM-22.

Despite its small size, the MD packs a lot of functionality into that box. The CPU is a 4 MHz Z-80A, and there is 64 Kbytes of RAM. Input/output is provided through two RS-232C serial ports, and the operating system is — you guessed it — CP/M.

It is in two areas of software that the MD particularly shines: firstly, the system software, and secondly, the application software that comes with the machine.

your computer



NEW MODEL

System Software

The people at Morrow Designs have a good deal of experience with writing BIOS software for CP/M, what with the various disk systems they have designed over the years. This experience is reflected in the friendly features of the Micro Decision.

Virtually all of our CP/M-using readers will have experienced that mind-reeling moment when CP/M cursorily (if you'll pardon the pun) displays 'BDOS Err on B: Bad Sector' and proceeds to warm-boot you out of your program, losing all your work. This does not happen on the Micro Decision.

Instead, the BIOS traps these errors, and offers the user a choice — Abort, Retry or Ignore. Abort is what CP/M will usually do anyway; the retry option may well get round the problem if it is caused by a soft error, while the Ignore option is for those hardy souls who want to press on and try to recover the error later.

This is the kind of error handling that should have been built into CP/M in the first place. It makes life so much easier that once one has used it, one couldn't go back to comparatively primitive systems.

The Micro Decision is also particularly sophisticated in the way it manages its disk drives. Each drive has almost 200 Kbytes capacity under CP/M, which is just about enough for a single drive system to be useable; and in fact, a single drive version of the Micro Decision is available for those with particularly severe budgetary constraints.

The big drawback with single drive systems is the difficulty of copying files and backing up disks. The MD gets around this with what Morrow calls the 'Virtual Disk' feature.

At any time, if you refer to a disk drive that does not exist on the system, the MD will sense this, and re-allocate drive A: to be that drive, giving the user an opportunity to change disks. This also applies to the dual drive version — both will recognise drives up to E:.

If you're wondering whether this could be of any use on a dual drive system, here's the big plus. Three programs supplied with the MD — IBM.COM, OSB.COM and XER.COM — will manipulate the CP/M disk parameter block for the specified disk drive so that it can then read and write disks in other machine formats.

For example, typing *OSB B:* will reassign drive B: to be an Osborne disk drive, and you can now read and write Osborne disks. Similarly, typing *XER C:* will reassign the (imaginary) drive C: to read and write Xerox 820 disks.

On typing *DIR C:*, for example, the user will be prompted to insert his 'C:' disk into the left hand disk drive (in place of A:), and will be prompted to remove it again once the directory has been displayed.

This ability to read 'foreign disks' is a

major plus for those organisations which already have a diversity of different machines. It is almost worth buying a Micro Decision just to provide data transfer between the machines already in use, even disregarding its other features!

Furthermore, it would not be difficult for a programmer familiar with BIOS code and disk formats to write similar utilities for other disk formats. For example, we tried a Kaypro disk in the MD, and discovered that it is formatted almost identically to an IBM PC CP/M disk, and only the skew factor is different.

User Friendly

Usually, I hate the phrase 'user friendly', regarding it as a vulgar neologism coined by ne'er-do-well computer salesmen. However, the Micro Decision has a better claim to the term than

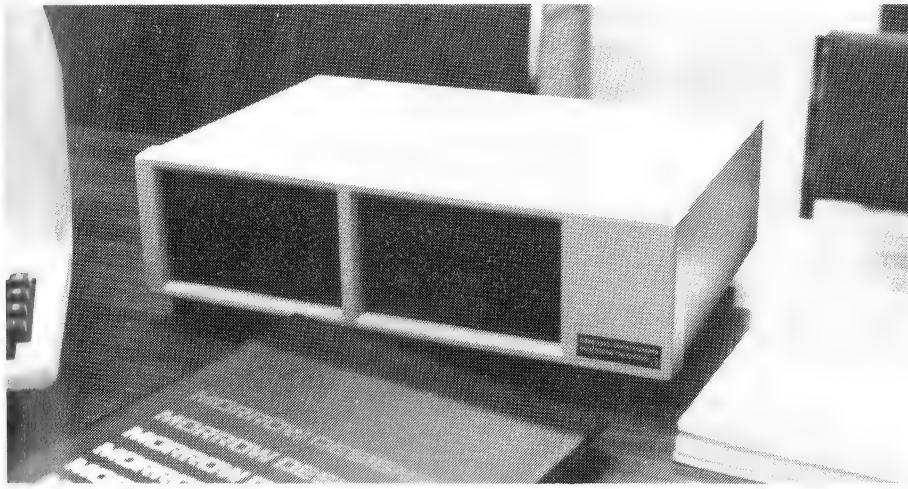
most computers, due to Morrow's inclusion of an extra language and some programs on the system.

The language is PILOT (Programmed Inquiry Learning Or Teaching) which is generally used for computer-aided instruction. This implementation of PILOT includes a number of additional features including full terminal control (cursor addressing, high/low intensity, clear screen), and the ability to chain to and return from CP/M programs.

On power-up, the standard Micro Decision system disk loads and runs PILOT, which then sets up a menu of possible commands, covering such actions as obtaining a directory display, finding disk space, running a program, and so on. The system is rather similar to Supervyz (reviewed last month) in that the user need know nothing about the CP/M operating

Specifications and Report Card

Unit:	Morrow Micro Decision
Made By:	Morrow Designs, San Leandro, CA
Processor:	Z-80A
Clock Speed:	4 MHz
RAM:	64 Kbytes
ROM:	Boot and memory test
I/O:	2 serial ports, disk connector
Languages:	PILOT, BASIC-80, BaZic, plus the usual CP/M stuff
Keyboard:	Matching terminal has full QWERTY, numeric, cursor and programmable function keys
Display:	80 × 24, full size terminal
Graphics:	N/A
Peripherals:	Terminal, printer
Expansion:	Extra disk drives
Best Points:	Low, low price, full size terminal, good software
Worst Points:	Should really have CBASIC 2 instead of BaZic
Ratings:	excellent very good good poor
Documentation:	✓
Ease of Use:	✓
Functionality	✓
Support:	✓
Value-for-money:	✓
Price:	\$1695 plus tax
Review Unit from:	Automation Statham, 47 Birch Street, Bankstown 2200. Tel (02) 709 4144.



system, only selecting the desired activity from a menu.

Because of the way PILOT chains to CP/M programs (it sets up a SUBMIT file) it is fairly slow; however it gets the job done, and the user can see the commands being submitted on the screen as it happens, thus learning about the CP/M commands. After a while, PILOT will no longer be necessary.

The PILOT language is very simple; an experienced programmer can deduce all about it by just looking at the program listings. Thus someone who knows about the system (the office 'dp manager') can write simple PILOT programs which will offer less experienced or novice users assistance with the functions they wish to use.

Like IBM.COM et al, there is a program on the disk called AUTO.COM which will automatically patch the cold-boot command line into the CP/M CCP on the disk. Thus a completely inexperienced user can create turn-key disks which boot and automatically run WordStar, LogiCalc or other application programs.

For these reasons, the Micro Decision is very user-friendly. In a typical office, for example, if one person takes a little time to learn about the system and play with PILOT, everyone else can use the computer with minimal training.

Application Software

Like the Osborne and similar machines, the MD comes complete with a swag of software ready to run. For starters, there's WordStar Version 3, complete with MailMerge. That will take care of all the user's word processing needs — except one: spelling correction.

That is handled by a very nice program called Correct-It, which I hadn't seen before. Complete with a 34,000 word dictionary, Correct-It is fast, and allows in-context correction of errors. An interesting feature is 'dictionary help', which displays the words around the miss-spelling in the dictionary. This can act as a memory jog-

ger if you are not sure what the correct spelling should be.

Two BASIC interpreters are supplied. First, there's Microsoft's BASIC-80, the 'industry standard'. That will run about 80 percent of all published BASIC programs. Then there's Micro Mike's BaZic, a Z-80 implementation of North Star dialect BASIC. Four versions of BaZic are supplied, with 8, 10, 12 and 14 digits of accuracy, allowing the user to trade off accuracy against speed.

For financial planning, the LogiCalc program provides all the usual spreadsheet calculator facilities, as well as linear regression capability. It seems to be similar in approach and screen layout to Calc-

Star, though perhaps slightly quicker in operation.

The documentation supplied with the system is quite comprehensive. In general, the standard manuals are supplied (for example, WordStar and MBASIC), with additional material in a Morrow folder. The machine manuals themselves are well written, specifically for the first-time user. Interestingly, the manual does not include a circuit diagram, although the system disk does carry a listing of the CBIOS and boot loader.

The construction is quite rugged, and because of its compact size, the Micro Decision would fit easily under a desk-top or in place of a drawer, while the full-sized terminal means no squinting at tiny screens.

Interestingly, US market research indicates a large percentage of Osborne owners are not using their machine as a portable, so that the tiny screen can not really be said to be an advantage.

In summary, then, the Morrow Micro Decision is a very neat box of tricks. At a price of only \$1695 for a two-drive machine, complete with all the software mentioned, it offers what must be close to the most computing power for the dollar.

Complete with a terminal, the system will still be priced ahead of the completely integrated systems, and has a full keyboard and large screen. Taken with its disk-handling features, it will be hard to go past when selecting a small computer. □



Otrona 512 —



The Ultimate Portable?

ONE OF THE biggest drawbacks of having a computer available to you, together with a wide range of software, is that you can very easily turn into a terminal junkie.

You reach the stage where, faced with a decision like whether to invest in a cash management trust, you can't even begin to think about it without running Visicalc. When your personal phone number file is being maintained by dBase II, then you know you've got a bad case.

Really, computer addiction is not such a bad thing in itself. You do become more productive, investigate more alternatives, make better decisions — as long as a computer is available. That's the crunch. When there's no computer around, the terminal junkie is like a fish out of water.

The solution is to take the computer with you. Which is where portable computers and even programmable calculators can score heavily off the bigger machines.

It was with this reasoning in mind that I was attracted to the Otrona 512. Here's a computer that does much the same kinds of work as my 'mainframe' micro, yet is positively microscopic by comparison. It's

light enough to carry around without strain, and is rugged enough to take it.

The Otrona is manufactured in Boulder, Colorado, and was designed by some ex-Hewlett-Packard employees. It's a high quality unit: while the Osborne, for example, is really built to a price to attract a mass market, the 512 is intended for professionals who can afford to pay extra for

a high quality, full featured unit.

Despite its small size (approximately half the volume of the Osborne) the 512 has a good sized screen, with an 80 by 24 display. The CRT tube is a high resolution type, so the characters are quite well formed and easy to read. Usage over a prolonged period produced no signs of eyestrain at all.

The keyboard, which unlocks from the main case with the push of two buttons and swings down below, is compact but full-sized. There is no numeric keypad, although some of the keys will function as a keypad for typists who feel happier entering numbers that way.

The top row of keys (numbers and punctuation) do double service; combined with the control and shift keys, the top row calls for a number of the common WordStar function sequences. This does not affect the WordStar menus and the conventional key sequences so that users who are already familiar with conventional WordStar can use this version easily.

By holding down the control and escape keys, the Otrona will redefine the top row of keys yet again; this time they will

your computer



control the screen brightness, beeper volume, keyclick sound (off, click, beep), communications and printer baud rates, and bell enable. Thanks to this feature, there are no other switches or controls on the outside of the 512 apart from the power switch. Everything else is controlled from the keyboard through firmware.

The two disk drives beside the screen are Remex double-sided units, giving a storage capacity of 364 Kbytes per disk. If the disk drive door is closed with no disk inserted, the heads are locked apart, so that the machine can be safely carried around without risking damage to the disk heads.

At the rear of the unit are the AC mains connector, DC power option connector and the two RS-232C ports for printer and communications.

The whole unit is reminiscent of a small portable oscilloscope, with a Tektronix-style handle which folds under the unit to tilt it towards the user. Two settings allow either a low-profile setting for high desks, or a more tilted setting where the machine is well below the user.

For those who can easily visualise metric measurements, the box is 30.5 cm wide by 34.5 cm deep by 14.6 cm high, and weighs just 8.1 kg.

On The Inside

The innards are fairly standard, with a Z 80A processor running at 4 MHz and 64K of RAM. Interestingly, while it is not used by any of the standard software (at least, not so you'd notice), there is a memory mapping circuit which allows software to relocate any 8 Kbyte block of memory to any 8 Kbyte virtual segment.

The main processor is aided by a DMA controller which handles disk and screen data transfers and also looks after the serial comms and printer ports.

Four Kbytes of ROM contain a bootstrap loader, diagnostics and several other useful routines such as disk formatting, I/O handlers, CRT emulators (VT-52 and ADM-3a) and other useful bits and pieces.

The screen circuitry is particularly nice, with two standard formats (80 by 24 and 40 by 24) and others obtainable with special software. Because of the DMA update of the display, the entire display can be rewritten within one frame period, so there's plenty of speed there!

Characters are formed in a 6 by 7 character cell inside an 8 by 10 block, and include proper descenders; there are 256 characters in total, including the full ASCII set, special word processing and journalism symbols (I like!), Greek and math symbols, plus accents for most languages. There's also a set of line drawing symbols.

The screen has more attributes than most reasonably smart terminals: re-

verse, intensified, underline, strike-through, subscript, superscript, double size characters and intensified background. All are driven by escape sequences and are quite easy to use.

The Otrona also features rather nice graphics facilities, to wit, a 320 dot by 240 dot display. This can be driven very easily from BASIC and other programs, and is ideal for business or scientific graphics.

Neither the graphics memory nor the standard character memory are part of the processor's work RAM, and do not chew up processor time for screen refresh — again, thanks to the DMA controller.

Two serial ports are provided for communications and a printer to be attached. These RS-232C ports are 'full' ports, with all the handshaking signals, and are also compatible with RS-422 and RS-423 standards. Baud rates are software

selectable from 75 to 19200 baud in asynchronous mode, or up to 500 Kbaud synchronously.

A real-time clock built into the Otrona is provided with a rechargeable cell, so that time, date and day of the week are maintained even when the machine is switched off. In addition, the settings of the brightness, volume and other controls mentioned above are also maintained.

The Otrona is expandable on a standard bus — no, not S-100, but rather the STD bus, a creation of Mostek and Prolog which is now supported by dozens of other manufacturers. It is especially popular with the industrial control and instrumentation fraternity, and memory cards, I/O (particularly analogue I/O) and special function cards are available from many sources.

Other mechanical options for the

Specifications and Report Card

Unit:	Otrona Attache
Made By:	Otrona Inc, Boulder, CO
Processor:	4 MHz Z-80A
RAM:	64 Kbytes
ROM:	4 Kbytes
I/O:	2 RS-232C serial ports
Languages:	MBASIC, plus the usual CP/M stuff
Keyboard:	Full qwerty, with Wordstar keycodes, no separate numeric pad
Display:	5.5-inch, 80 by 24, green
Graphics:	320 by 240, with graphics utility program
Peripherals:	DC power supply, multi-function board
Expansion:	Through optional STD bus board
Best Points:	Quality construction, portability
Worst Points:	No parallel printer interface

Ratings:	excellent	very good	good	poor
Documentation:		✓		
Ease of Use:		✓		
Functionality	✓			
Support:		✓		
Value-for-money:			✓	
Extras Included:	Stack of software, real-time clock/calendar			
Options:	Battery pack, accessory pouch, STD bus			
Price:	\$4995			
Review Unit from:	Elmeasco Instruments Pty Ltd, 15 Macdonald Street, Mortlake NSW 2137. Tel: (02) 736-2888.			

Otrona include a DC power option which will accept either 12 V or 24 V power, and when used with AC power, provides automatic switch-over to DC (the Otrona itself provides black-out and brown-out protection for up to 2 seconds approximately).

There is also a separate battery and charger unit with 5 hour life, accessory pouch for cables, disks, and so on, and a multifunction accessory card which includes hardware math processor, GPIB (IEEE 488) interface, parallel I/O, 12-bit A/D converter, and a 300-baud modem (Bell standard, and not useable here, unfortunately).

Shining Software

The Otrona really shines in the software area. First, there is word processing; this is catered for by the famous WordStar. As mentioned above, this version of WordStar is specially installed and takes advantage of the top row of keys for special functions. In addition, the cursor control keys work correctly, something that many computers don't have yet.

The standard language supplied with the 512 is Microsoft BASIC-80, which we all know and love. No surprises there, just the assurance that it will run a swag of standard software.

While many computers have real-time clocks, the 512 is the first I've seen which has good software to really take advantage of them. Valet is a special program which handles the real-time clock and interrupts.

For example, quite often, in the middle of some word processing you might want to do a quick calculation or run a BASIC program. Valet can write the current memory content out to disk, allowing the user to run that program, and then restore the word processing program just the way it was. This can be done either from the keyboard or as a result of an 'interrupt' from the real-time clock, allowing Valet to keep track of appointments and meetings.

Valet also handles asynchronous communications with other machines.

Finally, Charton is a graphics package specifically written for the 512, and can plot bar and line graphs, pie charts and special figures.

Generally speaking, that covers the most common office applications of computers, and forms quite a useful base of software with which to introduce a computer to a small office.

Quality Feel

The 512 seems to be very nicely built indeed; it has a feel of quality. Despite its small size, it performs just like a big machine; indeed, I found its capabilities to be remarkably (uncomfortably) close to those of my 'mainframe' which is many times larger than the Otrona.

Although designed as a portable com-

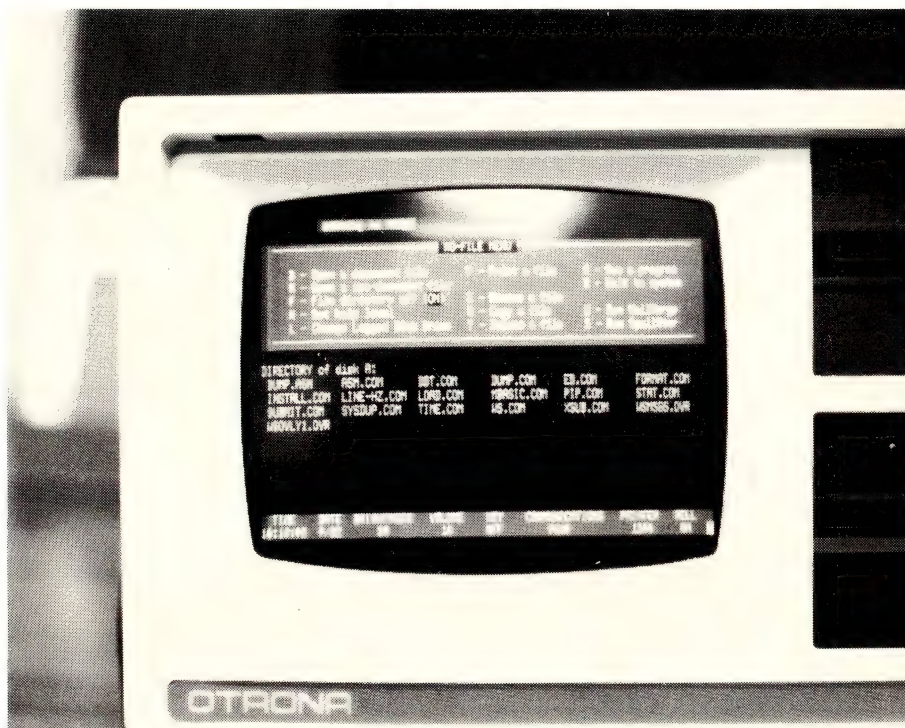
puter, the 512 is attractive enough and well enough engineered to sit on an executive's desk without looking 'strange'. As regards ease of use — I gave it to my secretary along with Otrona's rewritten WordStar manual and she fell in love with it immediately.

The WordStar manual shows how to set the 512 up, insert disks and boot the system, and then proceeds through simple examples to teach the user how to use

the system. It's a well thought out piece of documentation.

Failings? A parallel printer interface would have been nice, to attach such printers as the MX-80 without their optional serial interface. Apart from that, no complaints.

For those who want a really portable computer which has manufacturer-supported graphics and comms software, the Otrona is an excellent choice.



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VERSAtile Forms

By Peter Sandys

THE LITERATURE accompanying Applied Software Technology's Versaform calls it a Business forms processor. The description, although apt, does not help in the conceptual understanding of what use the program is except that business is likely to benefit most from its use.

This very powerful and well written piece of software opens up new dimensions for the personal computer in the business environment, possibly as much an advancement as Visicalc was. It's not really a database, yet it is. It's not a word processor, but acts like one. It's not an inventory control system, but keeps track of stock levels — and the same applies for sales orders, warranty records, invoices, statements, back orders and personnel index forms.

Some time ago word processing programs of the likes of WordStar and Spellbinder introduced a boilerplate technique in which you filled in a form to pre-defined specifications. This could then be used to generate the form with either pre-printed stationery or blank paper.

There were limitations in that these boilerplates would need to be loaded each time you wished to fill in the form. Also, no record could be kept except for paper duplicates.

With Versaform you can design a screen which can fill out a pre-designed form with the information you require, or it will also print the form at the same time.

The power of Versaform is that you have the ability to access your forms as in a database. It is possible for you to generate reports based on selection criteria that you pre-define. The report generator can be saved for future reports based on the same requirements.

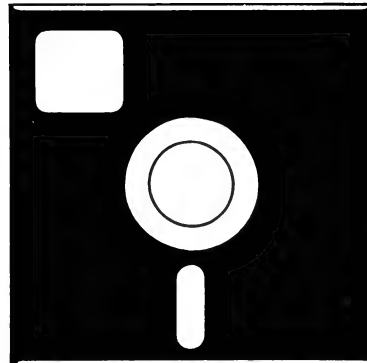
How does it work? When you design a form there are certain requirements you expect the user to fulfill when they use that form. If you have a date section you expect that to be filled in. The same for customer name and so on. If a form does not have these pieces of information it is of no use to you.

In the bad old days (or maybe even now) if the form is filled in incorrectly then this can sometimes go all the way through before it is found. Versaform has error checking facilities so that you can pre-define checking for each field procedures. I have outlined these below.

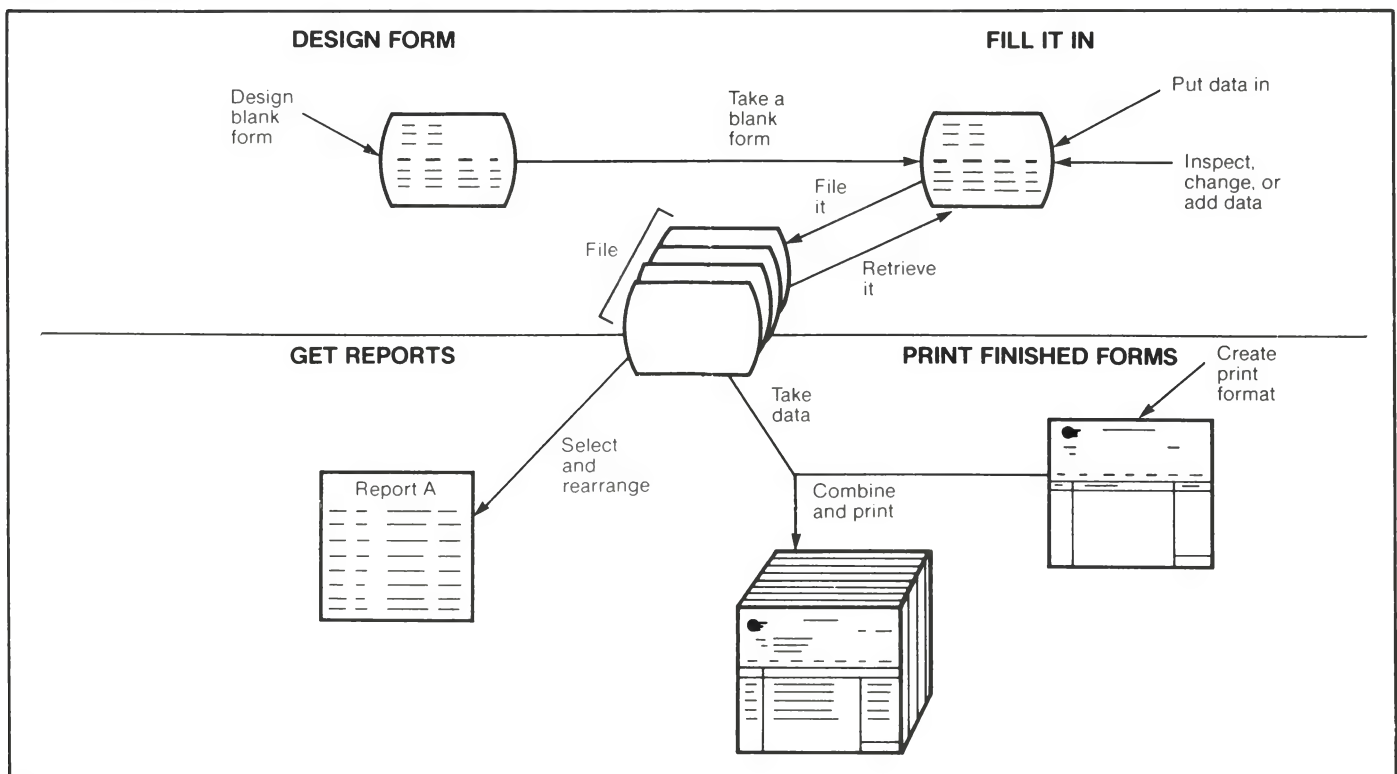
Automatic Checking Features

- **Mandatory entry.** If this field is not filled in then the record cannot be accepted. Examples of this would be date, record number, customer, salesman identity and so on.
- **Minimum length.** For example, four digits for postcode.
- **Maximum length.**
- **Justify.** Left, right, or number of decimal places after entry has been made.
- **Numeric.**
- **Self-Checking.** You can create codes that are self checking.
- **Yes or No.** Either a Y or N only.

your computer



SOFTWARE REVIEW



- Range specific limits like 56.89 to 78.99.
- List check. By pre-defining a check list of up to 99 acceptable answers the program will only accept a valid response.
- Format. Pre-defined rules like only letters, numbers or three of each, or whatever. For example, 23-AA56 where the first two digits represents the branch. The program will also check for the hyphen.
- Lookup. The program can look up 99 pre-defined answers. This is like giving a stock number and the program fills in the name. These are pre-defined.
- Other. The program can do calculations between entries using the four basic operands. It can pick low or high numbers, total columns and calculate tax, or discounts.

Versaform is friendly and easy to use. when you design a form it has a verify section so you can be sure it is correct.

It is also possible to define certain keys as single key operations.

It comes well packaged with six disks and an exceptionally well written manual which is simple and easy to understand with examples. Included in the six disks is a tutorial disk which, when used in conjunction with the separate tutorial manual, helps you to get an understanding of the program.

The error trapping is excellent and seems bug free. It is also easy to escape from most options so that if you make a mistake you can start again, not at the beginning (unless you want to) but at the start of that option.

Once the form is set up it is easy for someone else to operate the system with only the rudimentary knowledge of how to operate the Apple (like turning it on and inserting disks).

After design of the form and the setting up of the default parameters, you then can print the form so that you have a hardcopy example to check. This is not to be confused with the print format which can be designed to print your form in a completely different style for pre-printed stationery.

With this option Versaform permits you to select how you want it printed out. For example you may wish to take the information to create a statement with a tear-off remittance slip. When you set the print format Versaform will allow you to print the same field in different locations. You can also omit information that is in Versaform from this print format. This print format is then saved on your file disk with any other

print format you may require for the same file.

This print format can be used for immediate printing after the data is entered as in the case of an invoice issued with goods ordered at the counter or at a later stage in a batch run. When making a batch run you can selectively print out your forms by, say, suburb, or total amount, or you can print all automatically or individually under the manual selection criteria. You can also use your files to print mailing labels.

One final point on the printing out of your form, under the format option you can elect to have a message printed on your form — Pay now or Die later, for example.

So how can you access information on your file apart from individual documents?

The program has a reporting function. With this you can selectively extract information from your forms. As distinct from databases Versaform limits you to direct access via the screen to enquiries made using one or two of the two key fields that you have previously defined. These fields must be unique for each form; for example, invoice number and company name. You can have two invoices to the same

company but the invoice numbers must be different.

To get access to the other bits on your form you can use the report function. In this you have the ability to select fields to sort under, and also fields to report on.

This could be used to produce a price list for wholesale use and another for retail use of items in a particular group. An ideal use is for warranty records as a report could give an alpha listing of clients and dates of purchase while another report could give the products alphabetically with the purchaser's name beside also sorted alphabetically within the subgroup.

The program will also give you totals of any particular sub-group that you request. You can use standard conditional operands like and, or, if, equals, greater than, less than. The report formats can be saved.

The uses of Versaform are unlimited. It is a package best reviewed again in 12 months when more uses for the package will be known (making my life easier).

It is a package which is best used in higher volume situations. Its limitations are based purely on the capacity of your disk drives, although it is available in a hard disk version.

Software Report Card

Program:	Versaform			
Made By:	Applied Software Technology			
Useful for:	See Text			
Hardware Req'd:	Apple II, 2 Disks, 48K Memory			
Ratings:	excellent	very good	good	poor
Documentation	✓			
Ease of Use		✓		
Speed		✓		
Functionality	✓			
Support		✓		
Value-for-money	✓			
Extras included:	Tutorial Manual and Disk			
Price:	\$480			
Review copy from:	Imagineering			

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Basic For Birdwatchers

Part XII

This month, Les continues his Odyssey through the wilderness of BASIC with a look at various miscellaneous functions...

BACK WHEN we were working with screen handling functions, you may have noticed the MID\$ function hidden in there with no explanation. Well, here's the explanation.

BASIC offers several functions which assist in string handling. We've already seen how strings can be joined together (concatenated) by the '+' operator, so that for example:

```
PRINT "The quick br"+"own fox"
```

will print *The quick brown fox*.

On the other hand, how can you take strings apart? This can be achieved using the functions LEFT\$, RIGHT\$ and MID\$.

Let's take as an example the string A\$ = "The quick brown fox". The function LEFT\$, as its name implies, will return the left part of the string, so that the line `210 B$ = LEFT$(A$, 7)` will set B\$ equal to the seven leftmost characters in A\$, in other words, "The qui".

The function RIGHT\$ does a similar thing, except at the right end of the string. So `RIGHT$(A$, 7)` is the string "own fox".

MID\$ is a bit more complex. Its purpose is to extract a substring from the middle of a string. For example, `MID$(A$, 4, 7)` will move an imaginary 'pointer' to the fourth character in the string, and then extract the next seven characters. In this case, it

will return the string "quick b".

More succinctly, the function `MID$(A$, X, Y)` will return a string of Y characters, extracted from string A\$ starting at position X.

Now all of these functions are useful as long as you know exactly at what positions you are going to carve a string up. Unfortunately, text input is made up of words of varying lengths, and so we cannot assume that spaces, for example, will always be in the same positions — unless we are using an artificially structured language, for example.

This is why some languages, like COBOL, expect certain information in certain positions on punched cards. It's because the compilers that operate on the input programs are a bit simple-minded, poor things.

Fortunately, BASIC is a bit smarter than that, and most BASIC interpreters will have a function which can find the position of a given character or string in another larger string. In Microsoft BASIC, this is the INSTR function. This function comes in two flavours.

The simple INSTR looks like this: `X = INSTR(A$, "fox")` and will set X equal to 17, since that's the position of the first character of the string "fox". It starts searching the string at the first character, and then finds the first occurrence of the string it's looking for. If it finds the string, it returns its position; if it doesn't, it returns zero.

What would happen with a string like "The quick brown fox jumped over the slow brown fox"? Using the simple version of INSTR to find the string "fox", it

would never find the second occurrence of the string. Obviously, we need something a bit smarter.

The smart version of INSTR looks like this: `X = INSTR(Y, A$, "fox")`. Now, with Y set equal to zero or one, the search will start at the beginning of the string, and it will find the first occurrence of the word "fox".

However, with Y set to any other number, the search will start with the 'Yth' character. If Y is greater than 17, then it will find the second occurrence of the string.

Therefore, to find all occurrences of a pattern in a string, you need a loop that will look like this:

```
200 I = INSTR(A$, B$)
210 do something with I, A$ and B$
220 I = INSTR(I+1, A$, B$)
230 IF I <> 0 THEN 210
```

That will keep looping round and round until it has found every occurrence of B\$ in the string A\$. You can use this technique to count the number of words in a line and similar tricks.

To help with figuring out the values for LEFT\$, RIGHT\$ and MID\$, one particularly useful function is LEN. This returns the length of a string, so that, for example, `LEN("The quick")` is 9.

One useful trick that can be performed with these string-handling functions is to dissect names. Generally, a file of names and addresses would be indexed on surnames, and so we have hitherto written our file manipulation programs to explicitly ask for the surname before the christian name.

This month, in the wilderness...



...ON THE OTHER...PAW....HOW CAN YOU TAKE THEM APART..?



...THIS CAN BE ACHIEVED USING THE FUNCTIONS LEFT'S...

...RIGHTS... AND MIDS...ER.. AH..THANK YOU, ELVIS



...HARDLY MICROSOFT EH? EH...HEH HEH HEH...AH... LITTLE "IN" JOKE...HEH HEH...



...ANYHOW...A USEFUL TRICK IS DISSECTING CHRISTIAN NAMES FROM SURNAMES...AND..



...AND SO...WEEOWF!



HEY!...THE LABORATORY RATS LIBERATION FRONT OBJECT TO THAT FILTHY WORD..

CHRISTIANS...?! WHERE?..



...INCIDENTALLY, COM.DEC.(COME DECEMBER) ISSUE, WE'LL HAVE SOME LOGIC...



...AND SOME CHRISTIANS!

NO! NO! NOT ME! HIM!

FB5.AHRST.82.3

```

100 INPUT "Input a name";N$
110 P1 = INSTR(N$," ")
120 P2 = INSTR(P1,N$,".")
130 C$ = LEFT$(N$,P1-1)
140 IF P2 = 0 THEN 180
150 S$=RIGHT$(N$, LEN(N$)-P2-1)
160 I$ = MID$(N$,P1,4)
170 GOTO 200
180 S$ = RIGHT$(N$,LEN(N$)-P1)
190 I$ = " "
200 PRINT N$,S$," ", ";C$;I$
210 GOTO 100

```

However, people generally write names down christian name first, then initial, then surname. Being able to take a name written in this form and extract the surname is a useful trick. Here it is.

In this program N\$ is the full name as it is input, C\$ is the christian name, I\$ the initial and S\$ the surname. It works by looking for the first space which will follow the christian name, then looking from that point forward for the full stop which indicates an initial, and then stripping off the surname which must follow.

There are a number of other useful miscellaneous functions for handling strings. SPACE\$(X), for example, will return a string of X spaces. A similar function, SPC(X), will print X spaces on the terminal or screen.

Similar to SPACE\$ is STRING\$(X,Y). This function will return a string X characters long, consisting of the ASCII character Y repeated X times. So, STRING\$(5,43) would be "+++++". If the second argument to the function is itself a string, then the function will just use the first character. So STRING\$(5,"(A)") will be "(((((", NOT "(A)(A)(A)(A)".

To convert a numeric variable into a string can be useful on occasions — for example, to take apart a part number which is constructed on some logical basis such as department numbers, and so on.

This is achieved by the function STR\$(X) which will return a string representing the number X. Of course, the same thing can often be achieved by dividing by 10 or multiples of 10 and using the INT function, but this is quicker and more elegant. If you've got it, flaunt it!

The reverse function is available — VAL(A\$) will convert A\$ into a numeric variable. As it does it, it will strip leading spaces, redundant plus signs and the like.

As you probably know, characters inside the computer are maintained in the ASCII (American Standard Code for Information Interchange) code. Characters can be converted to and from this code using two more functions, and this can be very useful on occasions. For example, how do you print a quote symbol (")?

The most transportable way to do it is to look up its value in the ASCII code and

```

'obvious by now, I hope
'find the first space
'then the dot after it
'extract the first name
'is there an initial?
'yes, extract surname
' then initial
'and jump to print line
'no initial, get surname
'and set initial to blank
'print the result

```

then convert that into a string using the CHR\$ function. So, PRINT CHR\$(34) will print a quote. If you want to see all the characters which can be displayed by your terminal or computer, you can usually write a small program to output all the possible ASCII codes.

```

10 FOR I = 1 TO 127
20 PRINT CHR$(I)
30 NEXT I

```

In all probability, the results will turn your screen crazy, and may even turn some terminals into self-test mode (which will generally display all the characters anyway!).

If this happens to you, change line 10 to FOR I = 32 TO 127 (which removes the control characters from 1 to 32), which should be less disastrous. If your computer has chunky graphics, you may be able to see those by changing line 10 to FOR I = 1 TO 255, but the same caveat applies.

The reverse function is ASC(A\$) which returns the ASCII code for the first character of A\$. So ASC("ABCDE") is 65.

Peeking And Poking

While BASIC was originally intended for writing simple applications programs, typically in engineering work, it has increasingly been pressed into use for what is called systems programming, that is, programs which are intended to function as part of the operating system of the computer.

This has primarily come about because on some machines BASIC is the only language and there is no operating system.

Systems programming typically involves dealing directly with memory locations, and so microcomputer BASICs provide a statement and a function to assist with this. The function POKE X,Y will place the integer value Y (in the range 0 to 255) into memory location X.

The PEEK function does the reverse. The statement Y = PEEK(X) reads the contents of location X and assigns it to the variable Y.

Now, while PEEKing is fine and dandy most of the time, POKEing is fraught with hazards. Your BASIC interpreter looks after certain locations in memory and uses it for its own purposes, and the results of poking many locations in memory are unpredictable to say the least. You could accidentally alter part of the BASIC interpreter causing disastrous results.

PEEKing is generally safe, although there is one potential danger in systems like the TRS-80 which use memory-mapped I/O (in other words, what you think are memory locations are in fact I/O ports). In such systems, reading a memory location can alter the machine's status, causing errors.





In general, though, you can use PEEK to examine memory and find out how your system makes use of its memory. Here's a short program which displays the contents of memory from E000 hexadecimal to F000 hex:

```

10 FOR N=&HE000 TO &HF000
15 IF N/16-N\16=0 THEN PRINT:
   PRINT HEX$(N);" ";
17 IF PEEK(N) < 16 THEN PRINT "0";
20 PRINT HEX$(PEEK(N));" ";
30 NEXT N
  
```

Despite its length, this program illustrates several new points. First, notice in line 10 that Microsoft BASIC will accept hexadecimal constants in the form &Hxxx. Octal constants are okay too, and they have the prefix &O or just &. So &O377 is really 255.

The first part of line 15 is used to check whether N is divisible by 16. The first division is a real number division, while the second one is an integer division. Subtracting one from the other leaves the remainder from the real division, and only if this is zero is N a multiple of 16.

If it is a multiple of 16 then we print a carriage return and line feed, then print out the hexadecimal value of N — the address being examined.

The function HEX\$ converts the value of integer N into a string representing its hex value. If N is less than 16, HEX\$(N) will be a single digit, as the function suppresses leading zeros. So in line 17 we check to see whether the memory location being examined is less than sixteen, and if it is, we supply a zero to keep the dump listing even.

Line 20 prints the hex value of memory location N, followed by a space, and line 30 goes round the loop again.

With suitable modification, you can use this program to have a look into your own computer. Here's a suggestion for a modification: check to see whether the location being PEEKed contains a printable ASCII value, and if it does, print that character using CHR\$(PEEK(N)).

This will make areas of text in memory easy to spot, and you can find the keyword tables inside your BASIC interpreter, as well as error messages, and so on.

Next month, on to logic and error handling.

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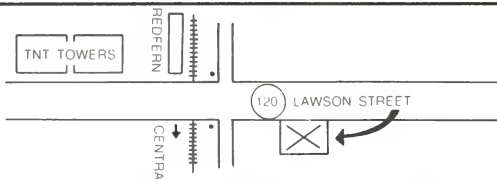
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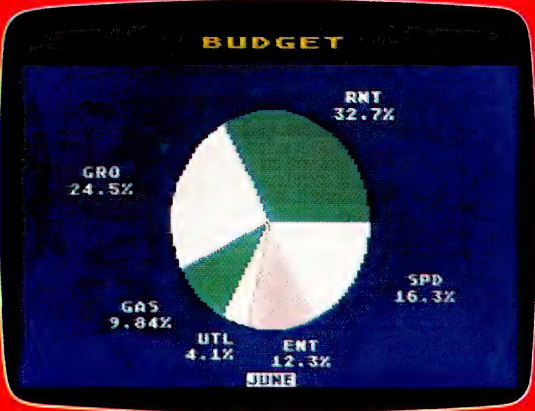
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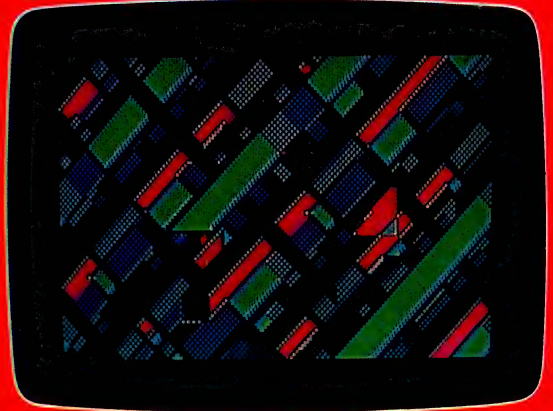
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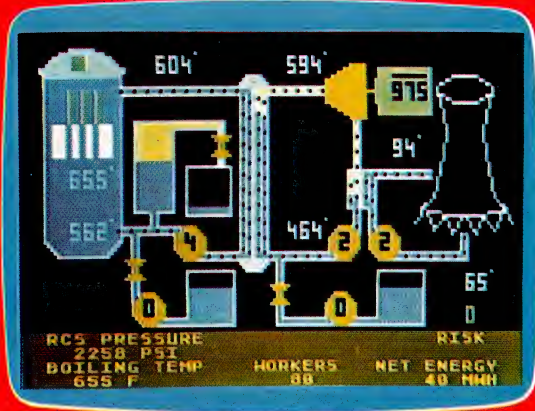
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CONCORD P 6877

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Candid Comment

I AGREE with the comments in your editorial of June, 1982. The material you have presented in the past year has been interesting, readily assimilated, good value for money; in a word, excellent.

Could I offer a few comments on the type of information I and probably a good few other readers are looking for, this may also be of some help to you to maintain your present high standard in the future.

I will confine my comments to (a) tutorials and (b) reviews. Perhaps I should also mention that I have had limited experience using Fortran and BASIC (many years ago) and want to brush up this knowledge by developing business application and mathematical (curve fit and statistical analysis) programs on the Hitachi Peach.

For my purposes, your series of BASIC articles has been spot-on, particularly where the need is specified and means of meeting it are discussed. What really places your series above the average is your concluding discussion on its limitations (for example, the Telephone Directory program on page 56) therefore giving the tyro programmer the incentive to look for and try alternative and better methods.

Can you continue to do this (if it is not already planned) to show the content of the routines that make up typical business programs, word processors, disk operating systems, and so on.

With regard to reviews, I am pleased to see you are prepared occasionally to draw attention to real limitations that you see to exist.

In closing, two final points. Firstly, I would like to know more about how programs are protected against copying or listing if you would care to discuss (or illustrate) this delicate subject.

And finally, thanks for your Annual Index — this was an unexpected bonus as I had just started preparing my own. However, next time please, could we have it provided as a centre-fold liftout (unillustrated!) for separate filing and preferably free of advertisements (for maximum compactness).

*Name With-held
Restrevor, SA*

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*D Karliner
Glen Waverley, Vic*

No Do-It-Yourself

AS A newcomer to the personal computer field, I purchased *Your Computer* for August 1982 and found it to be very informative and 'chatty' magazine.

However, I must take you to task for your replies to two letters in that issue in the Clinic column — the letters by D Astbury and D Croton.

Both of these writers requested/suggested program ideas for future publications, but your reply was to tell them to write their own! I am a reader of the same position — I too seek program ideas to use, modify and learn from, and when I seek help I wouldn't appreciate being told to do it myself!

From my reading of your magazine, and other publications, I find myself a little (?) inadequate in two areas, and perhaps you could consider these suggestions for possible future articles:

1) A comparison table listing the main program commands for the various computers showing equivalents. This could perhaps be mainly for the major micros such as the Atari, System 80, Vic-20, Apple, ZX81, TRS-80 and Microbee, that would be used by relative 'beginners'. This would enable faster adaptation of programs printed in your magazine for their own machine. I realise that all commands couldn't be translated, but any would help!

2) A short explanation, with examples of use, advantages, usefulness, construction, problems, limitations and so on of many of the jargon/special items encountered when one starts reading about

the features of various microcomputers.

I would include such things as 300/1200 baud; RS-232 interface; S-100 interface; parallel and serial ports; Z-80 expansion; CP/M; machine language; how PROMs and EPROMs can be programmed and examples; and more. How about a "Finding Out About It Corner" each month?

*BRUCE FAIRHALL
Blayney, NSW*

Been Chomped Lately?

WHAT HAS happened to you? Have you been 'chomped' by the Chomp?

Three monthly issues of *Your Computer* have passed with no Sorcerer column, which I look forward to with each delivery.

Is the Sorcerer falling into oblivion, that the same reader service offered by Apple, Tandy and so many others, is not worthy of articles or pocket programs.

As a Sorcerer owner, with little knowledge of the versatilities of a computer, I rely on example programs to gain that knowledge.

How-a-bout putting pen to paper and giving us Sorcerer owners a few pocket programs or just a few useful hints on how to get maximum use out of our computer.

*RUSSELL GERDES
Gladesville, NSW*

Unfortunately, we can't do everything ourselves — even if we did have a degree of expertise on every machine available, there aren't enough hours in a day!

We have to rely on contributors, and it seems there just aren't any who are interested in providing regular (or occasional) material for the Sorcerer.

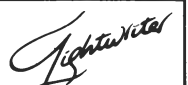
If the machine is falling into oblivion, it is its own/the owners' fault, and there is little we can do about it. Let it be known here and now that we will heartily welcome (and publish) worthwhile contributions for any machine.

Pleased As Peach

AS A Peach owner, I was most pleased to see a column for this machine has been initiated. Would you mind passing the following topics on to Mr Swinkels for inclusion (if not already planned) in future issues, please.

a) I have been unable to obtain from the local Hitachi agent, any information on the content of its ROM for possible use of subroutines incorporated in it in my own programs. Could we have a listing with an

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RE: PAGE 75



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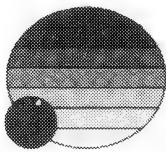
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explanatory commentary, please.

b) The demonstration disk plays a number of musical tunes. I have only been able to get endless BEEPs so far. Could you elaborate, please.

c) The "WHEELS" program was most interesting and instructive but please could future listings be a little larger with Os and Os differentiated.

D J OSMOND
Rostrevor, SA

Good One, Rod!

IN ROD Stevenson's TRS-80 column it had a program that 'drew' Lotto numbers, and it said, "As I said in June, it won't win for you, and probably won't do as well as you could by picking the numbers yourself."

Well, I typed this program into my TRS-80 Model 1 and won myself \$500! How's that for luck?

M MASLEN
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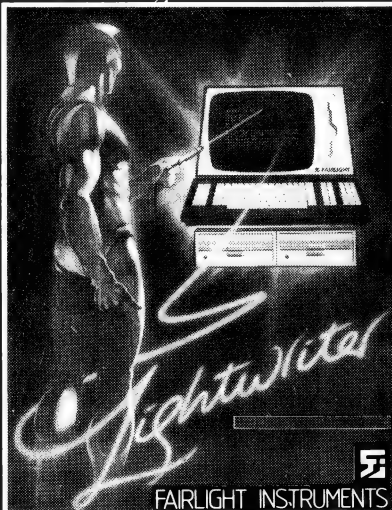
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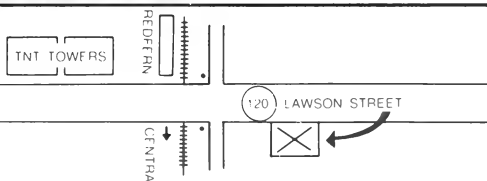
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Atari Comments

IT IS GOOD to see more information appearing about the Atari 400 and 800 computers. I would like to comment on the article by Chris McEwan and the letter by Bill Mallett.

The PAL-D version of the Atari, as imported into Australia, has the GTIA graphics chip and actually has twelve graphics modes. GRAPHICS 11 allows you to have 128 different hues on screen at the same time!

The March newsletter of the Michigan Atari Computer Enthusiasts was almost entirely devoted to this chip and a detailed description of Atari graphics handling.

Their address is PO Box 2785, Southfield, Michigan 48037, USA; they produce a very professional 30 page newsletter/magazine and have an electronic bulletin board going 24 hours a day. Their subscription is US\$15 a year and I would recommend it to any Atari owner.

I don't altogether agree with Bill Mallett about the 400 keyboard. It certainly feels different from a conventional one but I

found myself getting used to it quite quickly. For a start, each key does have a marked rim around it which helps greatly. I concede that someone trained on a conventional keyboard would have problems adjusting but, on the other hand, a person trained only on the now keyboard would probably develop slightly different skills and handle it quite well.

Another nice thing about the Atari, rarely mentioned, is that, because Atari has aimed at the home and education market, it has designed the machines to be handled by children. This can be of great assistance to us fumble-fingered adults! For example, opening the ROM cartridge compartment lid turns off the power.

The machine is far more than a child's toy however and new built-in facilities keep popping up. For example, it turns out that the four ports for joysticks, games paddles, and so on can be used for input or output and the Atari has the virtually unique ability to handle analogue inputs without special external circuitry — so,

suddenly, all sorts of control applications become possible.

BARRY THOMPSON
Mt Gambier, SA

You Blew It...

ON PAGE 74 of the September issue of Your Computer there were a couple of errors that need to be corrected.

First, the Logic Chart was lacking two very important signs. the first "(X Y)" should be (X is greater than Y) while the second one should be (X is less than Y).

The second mistake, unfortunately, was due to my careless typing. The program TV Cricket should read on line 90: LET P=RND(5) rather than LET R=RND(5). I believe if these amendments were not passed on to the readers then the meaning of that particular space would be wasted.

JEFFREY CHI POON
Camberwell, Vic

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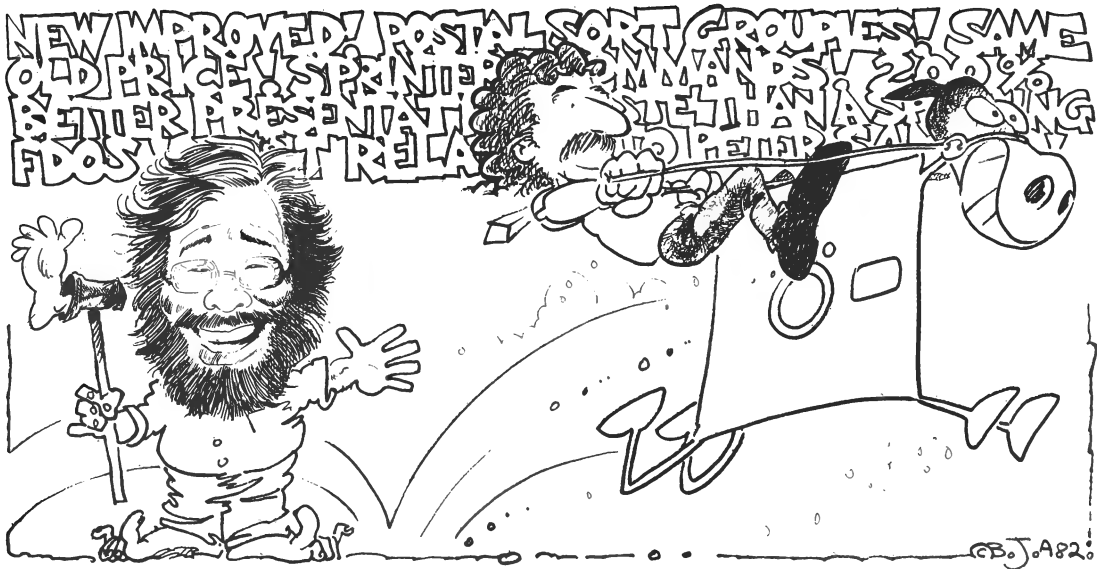
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MICRO-80

Sandys Revisits Sandy's



Dramatic changes in speed, improved documentation, refinements in display, new mailing list sort capabilities, postal group sort and additional printer commands — they're the updates one of Australia's most active programmers, James 'Sandy' Donald, has made to his Apple word processor since we first looked at it. Peter Sandys, who only wishes he was related, examined it...

THE WORD PROCESSING market for the Apple has becoming increasingly competitive.

There are in excess of 30 programs available, some of which, like WordStar and Spellbinder, require major changes to your hardware — changes which add considerably to the cost of your equipment. While the power of these programs is not in dispute, some of the lower cost packages are more than sufficient for everyday word processing.

Of all the packages I have tried for the Apple, there are only three on my short list — Screenwriter II, Zardax, and Sandy's.

It is significant that the latter two are Australian programs, and I'm not being influenced by national pride — these two have by far the best features of any word processor. What of Screenwriter II? Its main advantages are the software-developed 70 column display, meaning it is not necessary to purchase additional hardware. However when it comes to printing out your document the change

over from the editor to the run off section is extremely slow. Also the editor can be slow in the insert mode.

Zardax I reviewed last month and found it extremely easy to use and exceptionally well documented. I will not repeat myself on the program in this article.

The first major difference you notice with Sandy's word processor is the documentation. James Donald (yes, he is the author, not me) has rewritten the manual and provided a padded brown binder.

The improvement in presentation is at least 200 percent. It is easier to read and gives a greater attention to details and examples. This was one of the biggest criticisms of the program from owners of older versions, and from intending purchasers who felt that if the manual was that bad the program would be also.

However, even though the manual has been improved it has only reached the stage where it should have been when the program was first issued. It has yet to reach the minimum standard expected of a word processor today. There is also an error on the summary card which could make things difficult for a new owner — the control-W command is wrongly labeled as control-up arrow.

It's a bit like Ford introducing a new Falcon which has twice the economy and not bothering to polish the body before the advertising launch.

The only consolation is that obviously James has decided that, because of this limitation, he is still only going to market the program at \$195. With my background in marketing I am not really convinced that this is wise especially as the product itself has improved dramatically.

Faster Than A Speeding FDOS!

The major change to Sandy's is the speed of loading of the program and text files. In a short test I was able to load 16K of a document in four seconds — under the old Sandy's this took 90 seconds! Saving of a program takes slightly longer.

This speedup saves considerable time and effectively increases the power of the program. One previous feature that was handy, the scratch file for large documents, was cumbersome because of the time to load a file. In my test the new version took only 45 seconds to load a 100K document. This one feature in itself is a major argument in favour of Sandy's. For professional people it is essential to increase the speed of loading.

The next change is in the display. The program now has word wrap-around. I found this feature difficult, even annoying, at first but I have now adjusted to its effects and find it quite useful. James has also inserted visible carriage returns into the 40-column version of the program.

The scrolling effect is also different; it seems jump more than before but is faster. I was always impressed by the smoothness of the screen display but this seems to be a casualty of this speeded up scrolling.

The delete-a-line key has a click added to it so that you are more conscious that you are deleting text. This is a nice refinement.

One final thing changed in the editing mode is the control-N and control-V which previously moved up a paragraph or down a paragraph. These have now been modified to move up and down a line. This has been a welcome addition especially for

editing as the previous commands jumped too far and then you seemed to take forever to reach the word or letter you wished to correct.

Mailing Sorts

Sandy's always had a mailer program so that you could insert details into a form letter, a very nice 'free' feature. The one thing that it lacked was the ability to sort this list.

Quietly, around the end of last year (or maybe the beginning of this — it was so quiet) the ability to sort your mailing list was added. I have not tried it out but the manual states you can sort any field into alphabetical order. This then gives you the ability to select blocks of your data to selectively mail without having to use a separate program as in the past.

When sorted the new file is saved with the mail-list name and suffix .sortN where N is the number of the field you sorted the list under. Linked with this is a Postal Group Sort, which will sort a mailing list into the complex NPSP (National Pre-Sorting Plan) postcode order to suit Australia Post. Mass mailings qualifying for bulk discounts need to be presented in this order, as do Category B publications such as newsletters and magazines.

The program has new printer control commands: .SPACE, which can change the spacing of characters in a document;

Software Report Card

Program:	Sandy's Word Processor			
Made By:	Wytand Pty Ltd, Sydney			
Useful for:	Word Processing			
Hardware Req'd:	Apple II			
Ratings:	excellent	very good	good	poor
Documentation				✓
Ease of Use		✓		
Speed	✓			
Functionality	✓			
Support		✓		
Value-for-money	✓			
Extras included:	Mailer, sort, postal group sort			
Price:	\$195			
Review copy from:	City Personal Computers, Sydney.			

.HEADER, which inserts a heading at the top of each document page; and .PAGE No, which sets the page number for the next page. This can be used in conjunction with the .HEADER command.

In summary I am suitably impressed

and believe this word processor, although lacking the polish of presentation of other programs, is exceptional value and worth persevering through the somewhat spartan (although much improved) documentation.

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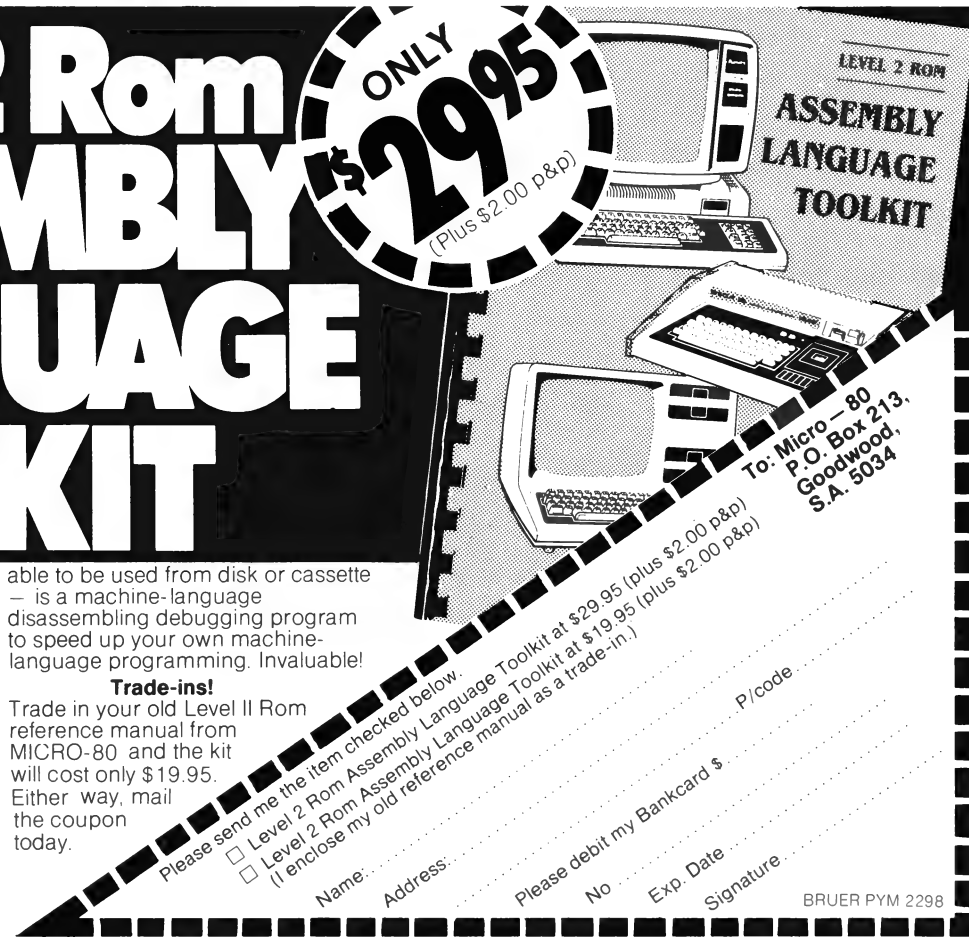
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HEARD ON THE BUS

By LEON YENDOR

MICROCOMPUTERS must be a real blessing to the publishing industry. Not just for the advances made in the mechanics of putting a paper together but mainly for the tremendous appetite of the readers of magazines dealing with small computers.

Until micros came along very few people would have ever considered having airmail subscriptions to their favourite journals, more likely one would patiently wait until three months after the cover date for their appearance on a newsstand. Now it is common to find the gap much shortened even at the newsagent.

All of this haste costs money and heavier and heavier copies coming on ever increasingly expensive airmail means that the cost can be quite high.

An airmail subscription to the ubiquitous Byte magazine now costs \$US129 although there is quite a high penalty for being in Australia in comparison with some other countries for which I've never been able to get an explanation.

So where to spend your money?

Some Of The Leaders

Having just mentioned Byte perhaps we should deal with that heavyweight first.

For most of us who don't really need to be first on the block with everything it is best to wait until you can pick up a copy at some local source thus paying only about \$4.95 a copy. The Dick Smith stores usually beat the news-stands by a month or two but never seem to have enough



copies so you'll have to drop in regularly not to miss out.

In the US most people working in the industry only read Byte to see the ads but there are some very valuable gems from time to time and unless they really become complacent it will remain a leader in circulation.

Another pioneer in the field is Dr. Dobbs' Journal of Computer Calisthenics and Orthodontia.

Commonly referred to just as Dr. Dobbs, it derived its title from its motto 'Running light without overbyte' which was coined in reference to the fact that the first issues were about the provision of very small Basic interpreters designed to fit the very small memory usually found in micros in the early years.

If you're new to the game you probably don't remember that the first Altair had only 256 bytes fitted on a 1k board and that as late as 1978 16k cost about as much as 64k does today.

The need to really cram has mostly gone now but this magazine still has some of the best software published appearing in its pages. If you want to get in to the writing of systems software and utilities you couldn't do better than to subscribe and even collect the bound volumes of back issues for reference and the historical value.

A commercial venture with some of the same flavour but touching more heavily on hardware is Microsystems (originally called S-100) edited by Sol Libes of the Amateur Computer Group of New Jersey. It is published by David Ahl of Creative

Computer and is particularly good for CP/M users and S-100 hardware owners who like to keep up with what's new without wading through all of the Byte ads. I know Bill Bolton wouldn't miss an issue of this one.

Mostly Software

Lifelines is a product of Lifeboat, the software supermarket in New York and consequently reflects to some extent the policy of its publisher.

That is not to say the reviews are biased or that they never come down heavily on some software houses, but there is always the feeling that it is not too independent.

For all that it is valuable for its contributions from such greats as Ward Christensen and the listing of current version numbers and new user group releases. Strong reader pressure may cause them to explore areas not covered at present and there have been recent signs of this.

Specialist Papers

Those with areas of particular interest are served by a number of publications.

In the case of magazines devoted to particular brands of equipment you'll have to decide for yourself whether you can get any worth from the particular magazine as these are too specialised for someone like me to evaluate when I don't have the equipment about which each is centered.

There are a number of special interest groups documenting advances in such techniques as graphics and robotics. Their papers are usually distributed to members and study of the periodicals list of the IEEE and ACM (Institute of Electrical and Electronic Engineers and Association for Computing Machines) would be helpful to those seeking this kind of material.

Where To Get Them

Byte: Some newsagents and Dick Smith stores sell individual copies. Subscriptions from: Byte Subscriptions, POB 590, Martinsville, NJ 08836, USA. \$35 surface, \$129 airmail per year.

Dr. Dobbs: People's Computer Company, Box E, 1263 El Camino Real, Menlo Park, CA 94025, USA. \$62 airmail per year.

Microsystems: Microsystems, POB 1987, Morristown, NJ 07960, USA. \$32.97 surface per year.

Lifelines: Lifelines, 1651 Third Avenue, New York, NY 10028, USA. \$50 airmail per year.

IEEE publications: IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854, USA. □

DICK SMITH 
Electronics

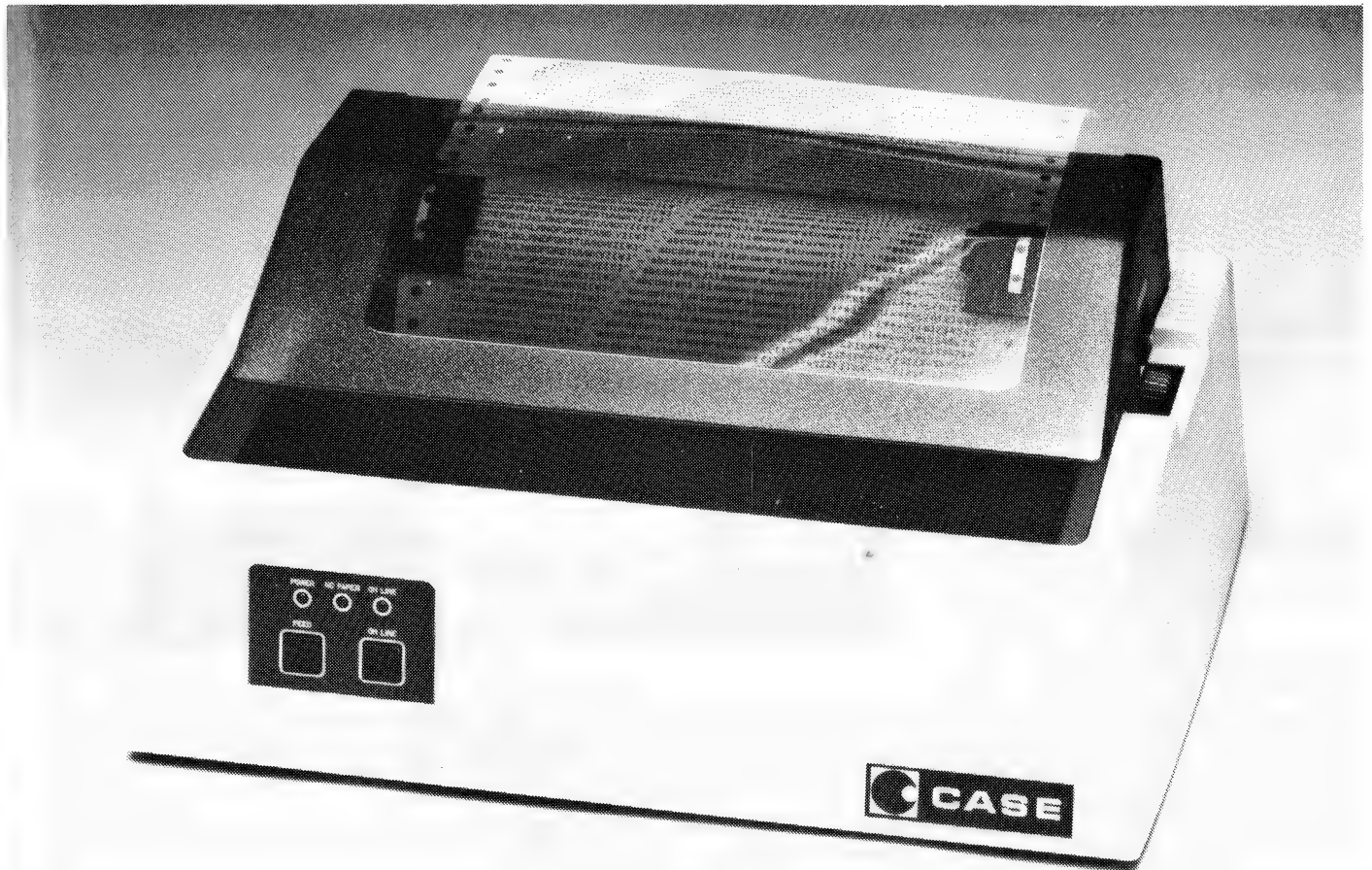
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your computer



tutorial

Understanding Assembler

Part VIII

This month, Les Bell looks at the design of a monitor program for an 8080, 8085 or Z-80 based microcomputer.

SO FAR we've looked at routines to perform a number of different functions, including input/output, arithmetic and block moves and searches. It's now time to start putting some of these routines into use, through the design of a simple monitor program.

For those who don't know what a monitor program is, here's a brief description. While many computers these days have BASIC in ROM available on power-up, many systems of more general design have only a bootstrap or in some cases no program at all in memory when switched on. In the old days a front panel consisting of switches and lamps was used to deposit binary instructions into memory and then start the processor executing them.

Generally, the short program keyed in through the front panel was a bootstrap, a short program which would then read in a proper error-detecting loader from paper tape. This loader would then bring in the operating system, BASIC interpreter, or whatever, again from paper tape. A short exposure to this kind of operation soon convinces one of the virtues of floppy disks or even cassette tapes!

Now, front panels are quite expensive, mechanically unreliable in comparison with the rest of the CPU, and add complexity. They have their uses, but much of their job can be done by a monitor program, and so most microcomputer and

minicomputer systems today have dispensed with the front panel and replaced it with either a bootstrap ROM which loads the operating system from floppy disk, or a monitor program which loads the system from cassette tape.

The monitor program is a software equivalent to the front panel. It allows the user to 'get inside' the machine, and examine memory locations, change them, start programs running, load programs, save programs, dump parts of memory in either hexadecimal or ASCII, and perform miscellaneous other functions.

System Design

Many of the functions that a monitor performs have already been introduced in this series, and some others we will have to program as we go along.

In any project of this nature, it is best to set down a complete description of your aims and objectives and to think these out quite carefully to avoid conflicts and take note of any compromises that may be necessary.

I should point out at this stage that I am in fact designing this monitor as we go; 'live' so to speak, and it is not already complete and ready to be produced like a rabbit out of a hat.

This way, we may well pursue a couple of blind alleys; start designing one approach to a problem for example, only to decide that is the wrong way to do it and start again a different way.

That is the real world of program design — particularly with assembly language. Many people become discouraged when they find themselves unable to come up with brilliantly structured programs first time; they don't realise that authors of

programming textbooks are only showing the last in a long line of programs they have refined, usually over years. They can't do it first time either!

This monitor program is intended for use in the design of I/O interfaces and therefore high on the list of priorities is the ability to read and write I/O ports.

This is the major facility missing from DDT that I wish it had, and one that is likely to be of most use to many CP/M'ers. It will also fit in nicely with our companion series on logic and interfacing.

Apart from that, the intention is to provide facilities generally comparable to most monitor programs, or indeed DDT. In addition, the monitor will implement an input-output structure similar to that of CP/M, so that programs developed under it can be transported to CP/M without major difficulty.

Machine Dependencies

This raises the major problem of ensuring that the program can be used on as many different machines as possible.

Of course, we are limited to using the 8080/Z-80 family of machines, but the monitor should run on just about any machine based on one of those chips.

For example, it should make no difference whether the host machine uses an external serial terminal or whether it has a built-in screen like the TRS-80. It should also make no difference how much memory the machine has, be it 16K or 256K.

For this reason, it seems logical to follow the example set by CP/M in having a machine independent portion (supplied by Digital Research) and a machine dependent portion, the BIOS (Basic Input

Output System, supplied by the user or computer manufacturer).

Our first task, therefore, is to decide on a common standard for input/output code, and it seems reasonable to again follow CP/M, for the simple reason that it provides a pre-defined standard and the experience gained in this will be useful to CP/M users in customising their own systems.

For ease of development under CP/M, initial versions of the monitor will load at address 0100H, but later we will produce a version which moves itself into high memory in order to debug CP/M programs in low memory.

BIOS Functions

The functions implemented in our I/O section will be the non-disk functions of CP/M 2.2, and they will be entered via a jump table as follows:

Hex addr.	Name	Function
**00	BOOT	Cold start entry point
**03	WBOOT	Warm start entry point
**06	CONST	Check console status
**09	CONIN	Console input
**0C	CONOUT	Write character to console
**0F	LIST	Write character to printer
**12	PUNCH	Write character to punch device
**15	READER	Read character from reader device

Some of these functions will be differently implemented from a standard CP/M 2.2 system.

In particular, the PUNCH and READER functions will probably be redefined to work with cassette tape, so that instead of operating on a single character, they will read or write an entire block of data. That remains to be worked out.

Furthermore, the BOOT and WBOOT functions do not have much meaning under a monitor, as the entry points to the monitor will be part of the monitor itself.

The most important parts to note and to start coding are the CONST, CONIN and CONOUT routines, as these will be essential to even a simple monitor. They have to work as follows:

CONST: this routine checks the console status and returns a value in the accumulator. The value is 00H if no character is ready, and FFH if a character is ready.

CONIN: this routine gets a character from the keyboard and returns with it in A. It can either do its own status checking, or it can call CONST, but in either case, it waits until a character is ready and then reads it.

CONOUT: writes the character in register C to the console. It does its own checking of the output status, and once the console is ready to accept the character it writes it out.

All of these routines are not required to preserve the register contents and so may use all the processor registers. The calling program has the responsibility of saving its registers on the stack if necessary.

Typical Code

Here is some typical code for a device, using a 2651 UART chip. This chip has two registers which are of most importance here: the status register and the data register. The status register has two bits to indicate the condition of its receive and transmit buffers.

If bit 1 is high, then a character has been received and can be read from the data port. If bit 0 is high, then the transmit buffer is empty, and a character can be sent by writing it to the data port.

This example is fairly straightforward;

```

org      0100h

data    equ    00h          ;data port
stat    equ    01h          ;status port
mode    equ    02h          ;mode port
cmmnd   equ    03h          ;command port
rbf     equ    00000010b    ;receive buffer full bit
tbe     equ    00000001b    ;transmit buffer empty bit

start:  jmp    init

; this is where the monitor will go

org      0200h

; JUMP TABLE
init:   jmp    boot
        jmp    wboot
        jmp    const
        jmp    conin
        jmp    conout
        jmp    list
        jmp    punch
        jmp    reader

; boot performs initialization of the 2651 UART and any other
; functions you may need

boot:   mvi    a,11101110b    ;asynchronous, 8 bits no parity 2 stop bits
        out    mode
        mvi    a,01111110b    ;9600 baud
        out    mode
        mvi    a,00100111b    ;set up command port
        out    cmmnd
        ret

; console status routine, returns 0 if no char, 0FFH if character avail.

const:  in     stat
        ani    rbf           ; mask rbf bit
        rz     ; if no data, return with zero in A
        mvi    a,0ffh       ; otherwise put 0ffh in A
        ret                ; and return

; console input routine

conin:  in     stat          ; get status from UART
        ani    rbf          ; mask rbf bit
        jz     conin        ; wait for character
        in     data         ; get character
        ani    7fh          ; strip high bit
        ret

; console output routine

conout: in     in           ; get status from UART
        ani    tbe          ; mask tbe bit
        jz     conout       ; wait for buffer to empty
        mov    a,c          ; move character into A
        out    data         ; and send it
        ret

; other functions dummies for this example

wboot:
list:
punch:
reader:
ret     ; return

end

```

others may not be so lucky. Owners of memory-mapped video boards, for example, may need to write simple routines to write a character to the screen, or at best, re-write the code supplied with the boards to output from the C register, and then reassemble it.

TRS-80 owners may well be able to find a routine in the machine's ROM to do the job for them; otherwise they will have to write a routine from scratch.

Next month, the monitor code will start with memory dump routines. □

VECTOR 4

VECTOR 4 SPECIFICATIONS

Central Processing Unit:

Processors: 8-bit Z-80B⁺ and 16-bit 8088
(single or multiprocessor operation)
Clock Speed: 5.1 MHz
Memory: 128K Dynamic RAM Standard
Expandable to 256K

Video Display:

Screen: 12 inch high contrast green phosphor
20 KHz Horizontal, 60 Hz Vertical
Alphanumeric: 24 Lines x 80 characters
High resolution 16 x 13 dot matrix
High Resolution Graphics: 640h x 312v pixels (B/W)
Gray Scale Graphics: 160h x 312v pixels, 16 levels of gray
320h x 312v pixels, 4 levels of gray
Color Graphics: External RGB Monitor¹
160h x 312v pixels, 8 colors
320h x 312v pixels, 4 of 8 colors

Keyboard:

Detached, with 8035 auxiliary processor. Capacitance keyswitch with 91 keys, including 15 programmable special function keys, cursor control keys, and 10-key numeric pad for rapid data entry.
Coiled cable with Interface

Input/Output:

Serial Keyboard
Centronics Parallel Interface
Qume/NEC Parallel Interface
RS-232 Serial Printer Interface
RS-232 Communications Interface
RGB color signals
Programmable Tone Generators and Speaker
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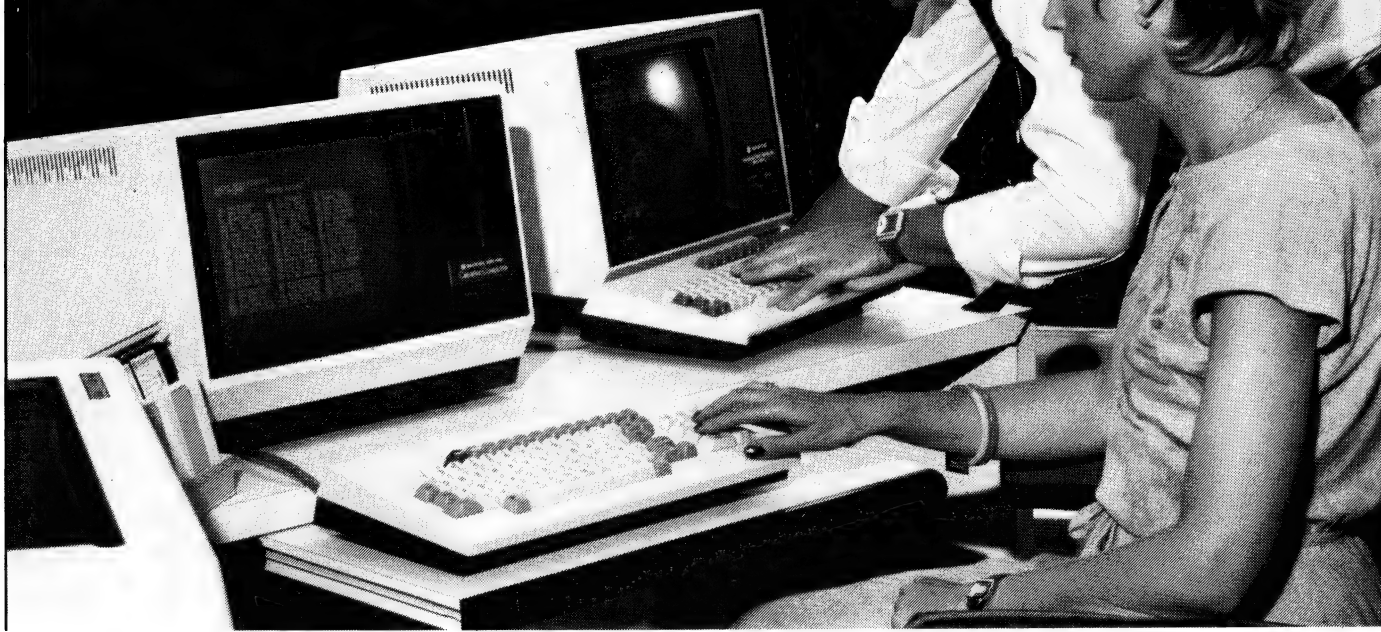
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Sanyo's Software Solution



A NEW package from Sanyo must be amongst the best value around in small office systems.

For some months now, Sanyo has been selling the MBC-1000, a small business computer, at \$2990 including tax, complete with CP/M and Sanyo BASIC. With a single disk drive (320 Kbytes capacity under CP/M) and a Z-80 with 64 K RAM, the MBC-1000 can support the usual CP/M applications programs.

Additional disk drives are available (\$998), as well as hard disks ranging from 5 Mbytes to 20 Mbytes. However, the latest feature to be added to the machine gives it a unique advantage over competitors — multi-user operation.

The 'Sanyo System Solution' is a complete accounting package for small business which is rather different from most such packages. Written completely in assembly language, it incorporates its own multi-tasking operating system, allowing on-line enquiry and other operations from external terminals.

With the basic MBC-1000, with only one disk drive, it is possible to run an additional terminal with a restricted set of facilities — such as account enquiries — while the main console continues to run the full set of accounting programs.

With the addition of a second disk drive or a hard disk, up to 4 remote terminals can be supported, each able to perform

any function, although normally they would be dedicated to such tasks as order entry, and so on.

A number of modules are available, priced at up to \$400 approximately per module. There's the usual general ledger, debtors, creditors and inventory, as well as a letter-writing package with facilities well beyond the usual dunning letter generation, order entry with back-order facilities, supplier system, invoicing package and delivery address module.

The delivery address module automatically keeps track of orders placed by large companies which may have a central buying office but many delivery addresses.

As well as being multi-user, the system is also multi-tasking. In other words, once a job such as printing invoices is started, the user can detach it from the terminal and start doing something else. This feature alone is a major boon, as otherwise a computer can become a bottleneck in an otherwise efficient accounting system. Up to seven tasks can be handled concurrently.

A report generator allows dissections by product, by product group, by region, and so on. Similar selection facilities are available in the letter-writing module.

A particularly interesting capability of the system is its ability to recover elegantly from power outages. When the

system goes down, it attempts to write its status out to disk, and on powering up, will generally be able to take up at the point where it was interrupted. Approximately 80 percent success is attainable using minifloppies, while the hard disk, being faster, provides recovery from up to 95 percent of outages.

The software appears to be capable of running in a minimal system. For example, using a single minifloppy, the software can handle typically 200 debtors with up to 600 transactions per month, 500 products and 20 backorders. At the same time, it will support an additional terminal for on-line enquiries.

A two-floppy system can handle a lot more work, with more of the optional modules and much larger files. With a hard disk, quite large businesses could use the system.

Interestingly, the system was written in Australia, and to date, over 200 have been installed, so that it should be a fairly mature and stable package.

Considering the low cost of the hardware, and the high performance of the software, Sanyo's 'System Solution' should be a winner!

For further details, contact Sanyo Office Machines, 127 Walker Street, North Sydney 2060, or telephone (02) 929 4644. □

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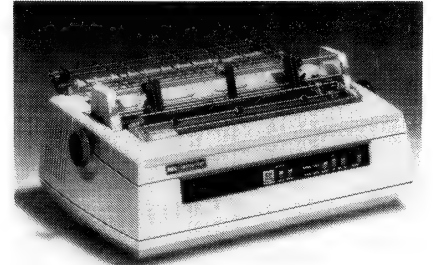
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sively heavy workloads and the maintenance of letter quality at all times.

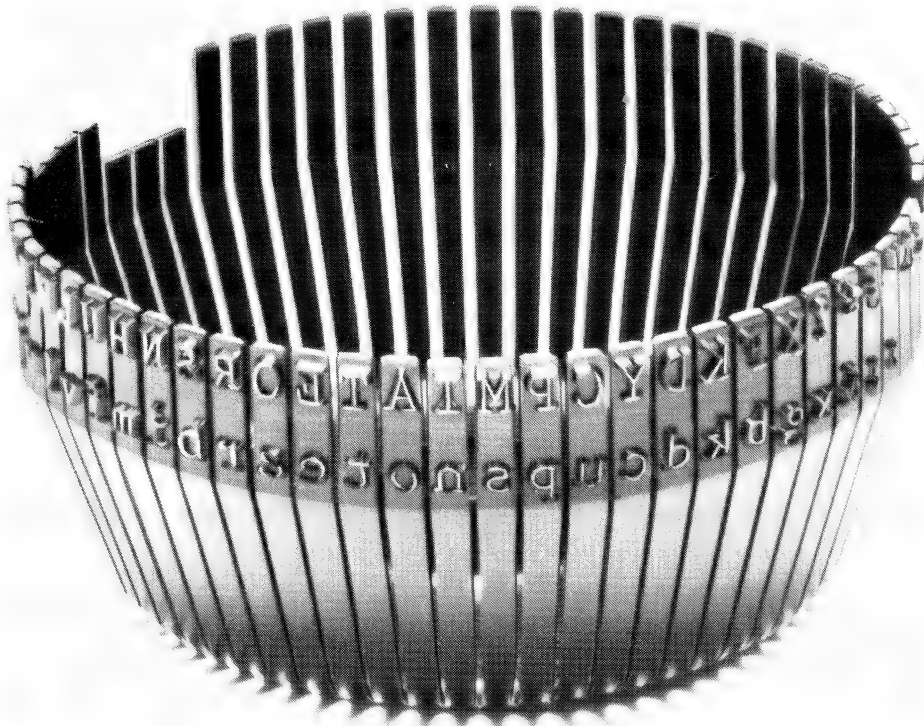
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Up-Dating dBase II

By John Hastwell-Batten

WHEN I read *Your Computer's* review of the dBASE II software package I was reminded of something which annoyed me when I first used it several months ago. The very first message displayed on the console when I ran dBASE II was a request to:

ENTER TODAY'S DATE (MM/DD/YY)

Now to even the most casual peruser of imported software it is apparent that most American software writers are either ignorant of the fact that the rest of the world uses numeric dates in a different format or are too arrogant to care.

I believe it is not reasonable to expect a user to change his behaviour unnecessarily to suit the vagaries of a particular computer system. After all, the computer and its software is presumably supplied to benefit the user, not the other way round. Why should one who is used to reading 9/6/82 as June 9 have to remember that in some instances it really means September 6?

I wrote a (polite) letter to Ashton-Tate, the distributor of dBASE II, suggesting that the INSTALL program offer the user a choice of date formats in the same way that FMS-80 does. That was in early November. As yet I have not even had an acknowledgement of my letter (*They did take note, John: the next update will give that choice — Ed*).

Internally, dBASE II does not use the date for anything other than datestamping database files and reports but it does check the validity of the response to the opening prompt and will not accept those which do not conform to the (American) rules.

To my chagrin I discovered this on November 14 last year. I had been using the package for almost two weeks, stubbornly ignoring the specified format and entering dates like 12/11/82 for November 12. Suddenly I found that dBASE II wouldn't accept 14/11/82 because it knew that there were not 14 months in a year!

After suffering for a while the ignominy of having to comply with *their* rules I set about altering the game so that I could play according to ours.

Using ZSID to monitor the program I soon discovered the date-input routine starts at address 4171h and I promptly replaced it with some code to retrieve the date from my newly-acquired QT Systems Calendar/Clock board. I'll submit that patch for publication in a future issue but for those of you who don't have a system

clock I have magnanimously interrupted my sailing...Violins please, Maestro...to provide a patch which allows dates in DD/MM/YY format.

```

;-----
;
; A disassembly of the date input
; routine of dBASE II version 2.02
;-----

```

```

;PROMPT FOR DATE IN MM/DD/YY FORMAT

```

```

4171 AF XOR A
4172 32B640 LD (40B6h),A
4175 3E72 LD A,072h
4177 CD1137 CALL 3711h
417A CD1D35 CALL 351Dh
417D CDF734 CALL 34F7h
4180 CA0742 JP Z,4207h

```

```

; MONTH

```

```

4183 CDA233 CALL 33A2h
4186 7B LD A,E
4187 B7 OR A
4188 CA7141 JP Z,4171h
418B FA7141 JP M,4171h
418E FE0D CP 13
4190 D27141 JP NC,4171h
4193 32B640 LD (40B6h),A

```

```

; DAY

```

```

4196 CD1235 CALL 3512h
4199 CDED34 CALL 34EDh
419C CDA233 CALL 33A2h
419F 7A LD A,D
41A0 B7 OR A
41A1 C22242 JP NZ,4222h
41A4 7B LD A,E
41A5 B7 OR A
41A6 CA2242 JP Z,4222h
41A9 3AB640 LD A,(40B6h)
41AC FE04 CP 4
41AE CACE41 JP Z,41CEh
41B1 FE06 CP 6
41B3 CACE41 JP Z,41CEh
41B6 FE09 CP 9
41B8 CACE41 JP Z,41CEh
41BB FE0B CP 11
41BD CACE41 JP Z,41CEh
41C0 FE02 CP 2
41C2 CAD741 JP Z,41D7h

```

```

; 31-DAY MONTHS

```

```

41C5 7B LD A,E
41C6 FE20 CP 32
41C8 D22242 JP NC,4222h
41CB C3DD41 JP 41DDh

```

```

; 30-DAY MONTHS

```

```

41CE 7B LD A,E
41CF FE1F CP 31
41D1 D22242 JP NC,4222h
41D4 C3DD41 JP 41DDh

```

```

; FEBRUARY

```

```

41D7 7B LD A,E
41D8 FE1E CP 30
41DA D22242 JP NC,4222h

```

```

; YEAR VALIDATION

```

```

41DD 32B740 LD (40B7h),A
41E0 CD1235 CALL 3512h
41E3 CDED34 CALL 34EDh
41E6 CDA233 CALL 33A2h
41E9 7A LD A,D
41EA B7 OR A
41EB C27141 JP NZ,4171h
41EE 7B LD A,E
41EF 32B840 LD (40B8),A
41F2 E603 AND 3
41F4 CA0742 JP Z,4207h

```

```

; NON-LEAP YEAR: Ensure
; date is not 29th February

```

```

41F7 3AB640 LD A,(40B6h)
41FA FE02 CP 2
41FC C20742 JP NZ,4207h
41FF 3AB740 LD A,(40B7h)
4202 FE1D CP 29
4204 D22242 JP NC,4222h
; DATE OK: Display dBASE II
; identification and exit
; to main program

```

```

4207 CD2032 CALL 3220h
420A CD2032 CALL 3220h
420D 3ABA40 LD A,(40BAh)
4210 B7 OR A
4211 C20F41 JP NZ,410Fh
4214 3E02 LD A,2
4216 CD1137 CALL 3711h
4219 219842 LD HL,4298h
421C CD3032 CALL 3230h
421F C30B41 JP 410Bh

```

```

; ERROR ROUTINE: Display
; doggerel verse and
; return for another try

```

```

4222 CD2032 CALL 3220h
4225 212E42 LD HL,422Eh
4228 CD2D32 CALL 322Dh
422B C37141 JP 4171h

```

Listing 1 used to be a commented disassembly of the date routine from dBASE II version 2.02 but Bill Bolton, on behalf of this erstwhile rag, pointed out that it could infringe copyright and suggested that I delete all of the comments and include them in the text of this article instead. It makes the exercise more difficult but conforms more closely to standard patching procedure and is less likely to invite a lawsuit.

The following remarks apply to version 2.02 of dBASE II. The code was rearranged somewhat for version 2.3C but follows the same general pattern. The notes are pretty long-winded so I'll forgive you if you skip over the boring bits.

The code from 4171h to 4180h displays the date prompt from an external message file, accepts a string of characters from the console and strips off leading blanks. If the residual string is empty then it exits to the main program via the code at 4207h.

If the input string is not empty then dBASE II expects it to contain three numbers (month, day and year). A routine at

the code which exits to the main program. In 2.02 the identification message is displayed from VMSGSG\$\$\$.COM whereas in 2.3C it is displayed from address 46BBh where it is held in a mildly-encrypted form.

You can apply the patch by the usual CP/M-supported method, that is, assemble it to a .HEX file, use DDT, SID, ZSID or whatever to overlay the date routine and then SAVE the patched memory image.

You will also want to make alterations to the message file VMSGSG\$\$\$.COM (DBASEMSG.COM for version 2.3C) to make the prompt reflect the international date format. I used a direct disk editor but it can also be done with DDT. You'll find the prompt at address 1D80h onwards.

Incidentally, I use Zilog mnemonics for all of my assembly-language programming. If by necessity or (heaven forbid) by choice you use that ridiculous Intel assembly language that Les Bell is battling to make you understand then you'll have to translate the code yourself.

If you are really stuck then for the cost of postage and packing I'll supply the source code and/or .HEX files on a (free) 20cm floppy disk. I haven't used any instructions which are specific to the Z80 processor so the patch will work on an 8080.

A final word. The dBASE II code that I looked at in the course of preparing this article is rather sloppy and uneconomical.

In defence of the package I should point out that it is non-critical, 'once-only' code which is immediately overlaid by something else. I have not examined ANY other code in the package but I would hope that the standard of programming is a good deal better. □

```

jp      nc,doggerel      ;Error if not in allowed range
call   nextnumber      ;Get next number (YY) from input
jp     c,prompt        ;Error if high bits > 0
cp     100             ;Year should be in range 0-99
jp     nc,prompt       ;Error if 100+
ld     (yy),a          ;Store year
and    3               ;Leap year?
jp     z,dateok        ;February test was valid if it is a leap year
ld     a,(mm)          ;Otherwise get month
cp     2               ;Was it February?
jp     nz,dateok       ;Date OK if it wasn't
ld     a,(dd)          ;Check day again
cp     29              ;Rule out 29th Feb if not a leap year
jp     nc,doggerel

dateok::
call   newline         ;New line
call   newline         ;New line
ld     a,(40BAh)
or     a
jp     nz,410Fh
ld     a,2             ;Message number
call   dnmsg           ;Display sign-on message
ld     hl,vmsg         ;Address of version message
call   display         ;Display version
jp     410Bh          ;Exit to main program

nextnumber::
call   svptr           ;Store new start-of-string
call   step            ;Skip over delimiter and any leading blanks

extractnumber::
call   getnum          ;Get next number into DE
xor    a
sub    d               ;Test high-order bits
ret    c               ;Return with carry true if non-zero
add   a,e              ;Else return low-order bits
ret

end

```

```

-----
;
;
;   A patch to dBASE II to allow date in DD/MM/YY format
;
;                               John Hastwell-Batten
;                               38 Silvia Street
;                               Hornsby, NSW 2077
;                               (02) 477 4225
;
;                               25/5/82
;
;   Amended for either version 2.02 or 2.3C           5/7/82
;
-----

```

```

.Z80
true   equ    -1
false  equ    0

V202   equ    false
V23C   equ    true

;EQUATES FOR dBASE II Version 2.3C

dd     equ    440Bh      ;Where day of month is saved
doggerel equ 46F1h      ;Routine to display doggerel verse:
; "Thirty days hath September ...."

origin equ 4614h        ;Address to start patching
prompt equ 45D8h        ;Issue date prompt and start over
newline equ 35BFh       ;Routine to advance cursor to next line
dchar  equ 3A15h        ;Routine to display a character on the
; console screen
dnmsg  equ 3ADCh        ;Routine to display a numbered message on the
; console screen
display equ 35CFh       ;Routine to display a message whose address is
; in HL on the console screen
nldisp equ 35CCh        ;As for "display" but first advance cursor
; to next line on console screen
rdcon  equ 390Dh        ;Routine to read a string from the console
; keyboard
skipbl equ 38E7h        ;Routine to skip over leading blanks
getnum equ 3773h        ;Routine to get a number from the input string
; into the DE register pair
step   equ 38DDh        ;Routine to step over a delimiter in the input
; string
svptr  equ 3902h        ;Routine to save input string pointer
vmsg   equ 47C2h        ;Address of version message
mm     equ dd+1
yy     equ mm+1

;INTERNATIONAL DATE ROUTINE FOR dBASE II v 203C

aseg   org   origin

```

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```

xor      a                ;Clear the entire date field
ld      hl,dd
ld      (hl),a
inc     hl
ld      (hl),a
inc     hl
ld      (hl),a
ld      a,72h            ;Message number of date prompt
call    dnmsg            ;Issue prompt
call    rdcon            ;Read string from console
call    skipbl           ;Strip leading blanks
jp      z,dateok        ;Done if null input
call    extractnumber    ;Get first number from input string (DD) to DE
jp      c,doggerel      ;High-order bits should be zero
jp      z,doggerel      ;0 can't be a day of the month
ld      (dd),a          ;Store day of month
call    svptr            ;Save new input pointer
call    step            ;Step over delimiter
cp      19h             ;No idea why the check for ^Y
call    z,4767h
call    extractnumber    ;Fetch MM from input string to DE
jp      c,prompt        ;High-order bits should be 0
jp      z,prompt        ;Month cannot be 0
cp      13               ;Should be in range 1-12
jp      nc,prompt       ;Error if 13 or more
ld      d,32            ;Days in most months +1
cp      4                ;April?
jp      z,M30           ;June?
cp      6                ;September?
jp      z,M30           ;November?
cp      11               ;February?
jp      z,M30           ;February?
cp      2                ;February?
jp      nz,M31
dec     d
M30::   dec     d
M31::   ld      (mm),a      ;Store month
        ld      a,(dd)    ;Retrieve day
        cp      d         ;Check for days in month
        jp      nc,doggerel ;Error if not in allowed range

call    nextnumber       ;Get next number (YY) from input
jp      c,prompt        ;Error if high bits > 0
cp      100             ;Year should be in range 0-99
jp      nc,prompt       ;Error if 100+
ld      (yy),a          ;Store year
and    3                ;Leap year?
jp      z,dateok        ;February test was valid if it is a leap year
ld      a,(mm)          ;Otherwise get month
cp      2                ;Was it February?
jp      nz,dateok       ;Date OK if it wasn't
ld      a,(dd)          ;Check day again
cp      29              ;Rule out 29th Feb if not a leap year
jp      nc,doggerel

dateok:: call    newline    ;New line
        call    newline    ;New line
        ld      hl,idmsg   ;Point at dBASE II identification

decrypt:: ld      a,(hl)    ;Get a byte from ident message
        or      a          ;Test for terminator
        jp      z,subversion ;Done if terminator found
        rra            ;Otherwise, make the character readable
        call    dchar     ;Display the character
        inc     hl        ;Point at next character
        jp      decrypt   ;Loop until message displayed

subversion:: ld      hl,vmsg ;Point at sub-version message
        call    display   ;Display sub-version
        ld      a,(441Bh)
        or      a
        jp      nz,445Bh ;Exit to main program
        jp      4457h

nextnumber:: call    svptr     ;Store new start-of-string
        call    step      ;Skip over delimiter and any leading blanks

extractnumber:: call    getnum     ;Get next number into DE
        xor      a
        sub     d         ;Test high-order bits
        ret     c         ;Return with carry true if non-zero
        add    a,e        ;Else return low-order bits
        ret

idmsg::  db      "TTT@@",0C8h,84h,82h ;Mildly-encrypted dBASE II
        db      0A6h,8Ah,40h,92h    ;identification message
        db      92h,"@@@@@",0ACh,0CAh
        db      0E4h,"@@" ,0

end

```

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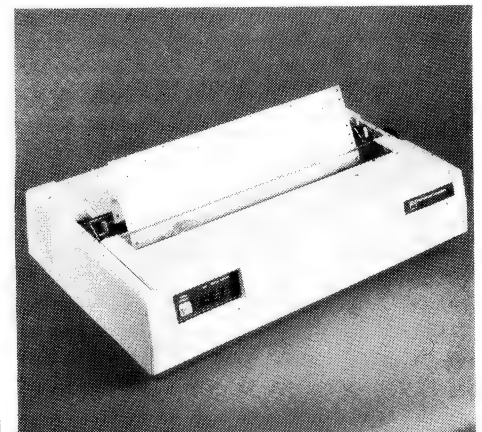
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your CP/M computer

By Bill Bolton

IF YOU'RE interested in coming with me on the *Your Computer* trip to CP/M '83 and you haven't already asked for details you'd better do so *immediately*.

We've only a limited number of seats and rooms booked and it's filling up fast! As you can see from the following advertising 'blurb' we received on CP/M '83 there will be something for everybody. I doubt whether anyone could cover it all by themselves in 3 days.

As part of the *Your Computer* group you'll have the chance to compare notes with the others in the group and find out about those exhibits you really shouldn't miss. Also, with a strong seminar/workshop program it's often impossible to get to everything; as part of a group it usually possible find out about what happened at the workshop you missed while you joined another running at the same time.

Here's the latest 'puff' we've received on the event: *CP/M '83 is an international exposition for CP/M users, manufacturers, independent software developers, OEMs, venture capitalists, software publishers, distributors and dealers.*

The exposition portion of the event will be the largest presentation of CP/M based hardware and software ever assembled. Hundreds of exhibits will showcase the full spectrum of applications, development aids, peripherals, accessories, publications and services for CP/M based computers.

The seminar and conference program will include noted leaders from the software industry such as Gary Kildall, Sol Libes, Adam Osborne, Tony Gold, Chris Morgan and John Rowley, who will conduct informative discussions exploring CP/M applications, technical information, development aids, venture capital programs and software distribution. End user workshops will show users how to get the most from their CP/M computer.

CP/M '83 is sponsored by Digital Research Inc, the creators of CP/M. Over 650 different companies support CP/M and more than 5000 companies produce applications packages. Most of these firms will be represented at CP/M '83. Attendees will see and try out applications packages for every profession plus state-of-the-art programs for word processing, telecommunications, graphics and database management.

Also on display or as workshop subjects are development aids to help you program faster, plus hundreds of CP/M



compatible products appropriate for your applications.

At CP/M '83 you can explore the entire world of CP/M under one roof and learn more in 3 days than you could in six months.

Registration is \$US20. It's on from January 21 to January 23 at the Moscone Centre, San Francisco (only a few blocks from where our group will stay —Ed). Seminars run from 9am to 11am, User Conferences and Workshops from 11am to 5pm, and the Exposition from 11am to 6pm each day.

Keeping Informed

I was talking to the people at Archive Computer Services in Brisbane about *Infoworld*, which they have been advertising in this magazine for a couple of issues. I was just interested to see how many people had taken out subscriptions — the answer was one.

I was a little surprised at this to say the least, and after a bit of reflection I decided that maybe it because very few people know what *Infoworld* is? It seems that someone in *Your Computer* should at least make an effort to tell you, as *Infoworld* has told its readers about us!

Infoworld is a weekly newspaper devoted entirely to the microcomputer industry. It is part of the Computer World group. Readers of the Australian edition of Computer World may have seen the small *Infoworld* inserts which appear occasionally, but they are but a pale imitation of the real thing.

The US edition of *Infoworld* is a vital source of information for anyone trying to make a living out of microcomputers; it is the only periodical with a short enough deadline to enable spotting the short term

trends in the industry.

It has a good range of regular columnists and features as well as excellent hardware and software reviews. There is a lot of CP/M material in it over a year.

Occasionally trivial, but never insignificant, *Infoworld* is on my list of 'must-read' journals. At over \$200 a year (airmail) it is certainly not the sort of thing that everyone will read but for those who 'need to know' it really should be a must.

Black Box BIOSs

The BIOS is that part of a CP/M system which links CP/M to the specific hardware of the microcomputer on which it is running. There is an increasing trend amongst the 'smaller' microcomputers running CP/M to not provide the source code for the BIOS. For example the Osborne 1, Kaycomp 2 and Apple Soft-card CP/M systems are supplied without BIOS source code.

Since it is very difficult to make any substantive changes to the hardware configuration of any CP/M system without access to the BIOS source code, users should tread warily before committing themselves to ANY system for which the BIOS source code is not supplied.

This doesn't mean that you shouldn't buy such a system, as often they can be excellent choices for particular applications, only that you should be know what the trade-offs involved are. The manufacture's reason for not supplying the BIOS source code is generally along the lines of "there's next to nothing to change because its a fixed hardware configuration and we don't want the problems that come from inexperienced users fiddling with the BIOS".

This has some validity but there are other points to consider. For instance there is little patch space in the CCP or BDOS areas of CP/M but there are a number of useful public domain modifications that can be made to these parts of CP/M.

As there is so little patch room in the CCP or BDOS the only alternative is to implement the patches in the BIOS with a patching routine which re-installs the patches on each warm boot. This is quite a viable technique which I use in my BIOS. However if you can't modify your BIOS you can't use the modifications!

The microcomputer industry is very volatile, and there is no way of being absolutely certain that any manufacturer of microcomputers will still be in the business next year.

They could go bust, or make a corporate decision to concentrate on other areas or even just make a massive model change. In all these cases you can expect the support for the machine you buy today to start decaying once the manufacturer is no longer producing it. The rate of decay will depend on the size of installed base of that microcomputer, the software base for the microcomputer and the determination of the remaining users to 'keep the faith'.

A reputable manufacturer (and reputable local agent) should provide ongoing support for a microcomputer model for several years after it ceases manufacture, but the support can never be as good as for the current model.

If you have access to the source code for the BIOS there is at least a fighting chance of supporting the microcomputer after the manufacturer has lost interest.

As an example consider the case of the late, lamented Processor Technology range of SOL microcomputers. One day the people who ran PT decided they didn't want to be in the microcomputer business anymore and just shut up shop.

There were a large number of SOLs out in the field and the SOL users decided that they weren't going to let the machine die. Their user group, Proteus, immediately purchased as much of the source code for SOL software as it could, as well as quite a bit of hardware and can still provide excellent support to SOL users. Similarly the major local supplier of SOL systems still maintains a good level of support for those micros.

'Black Box' BIOSs tend to discourage third party hardware support for a system. For an independent hardware supplier to consider providing support hardware (such as hard disks, real time clocks, or extra I/O facilities) for a microcomputer they must be able to get reasonable hardware and software details of the target microcomputer.

Since the 'black box' principles usually apply equally to the hardware as well as the software there tends to be little independent support for such systems.

Okay, so you have a machine with a 'black box' BIOS already, what can you do about it?

It's highly unlikely the system supplier is going to change his stand. About the only thing you can do is join the users group (or start one if there isn't one already) for your system and encourage the group to work on disassembling the BIOS as a group project: you're bound to find someone in the group has the necessary patience and

skills.

Note that the licencing agreement you signed with Digital Research only covers the CCP and BDOS, not the BIOS. Unless the BIOS is subject to specific licencing agreement of its own (which is extremely rare) you are more or less free to do what you like with it for your own purposes on your computer; after all, you have paid for it already.

Note that BIOSs may be copyrighted which would restrict your using any part of that BIOS for another computer (whether this would be defensible legally seems to be an arguable point) however as long as you only modify the BIOS for use on your own system and do not represent it as your own work or try to sell it you should be on safe ground.

CP/M User Group

It seems to be getting quite a few enquiries lately about joining the CP/M User Group. Put simply there is nothing to join.

The CP/M User Group is not a collection of users except in the broadest sense. The Group exists as a small number of individuals in New York and Chicago who collect, catalogue and issue public domain software under the name of CP/M User Group, even amongst this small group (Ward Christensen, Jim Mills and a few others) there is no formal concept of membership.

In practice the Group is a software collection only. The software collection is distributed worldwide on disks or from RCPM systems and so on.

Anyone can contribute to software collection as outlined on most of the more recent CP/M UG disk volumes or in Lifelines magazine.

There are numerous programs from Australian CP/M users (including me) in the existing collection. New additions to the software collection are announced in Lifelines and usually on RCPM/CBBS systems (as most SYSOPS seems to read Lifelines).

Software from the CP/M UG collection is generally distributed first on 20cm standard single density CP/M disks. It is sometimes available on other disk formats locally from computer stores or suppliers, if they are interested enough to maintain disk format translation/transfer utilities.

The generally accepted basis of distribution of CP/M UG software is that:

- It cannot be sold for more than the reasonable cost of the media and a reasonable copying charge.

- Its sale cannot be tied to the supply of any other service or goods.

These are not legally enforceable rules, but are the generally agreed standard amongst reasonable retailers/suppliers. If you think someone is breaching the rules you should bring it to their attention and if they won't come into line with them, take your business elsewhere and tell others via an RCPM/CBBS system.

It seems that a reasonable charge for supplying a copy on a 20cm disk is between \$10 and \$16. The suppliers who keep their collection up to date generally seem to charge the higher rate but then you get quickest access to the latest releases.

Of course you can get it for free from an RCPM system, provided you can spare the time to download at 300 bps and get on when a volume is mounted for you. From the usage my RCPM system gets, many users seem to think that is not an intolerable time burden.

If you have an unusual disk format and can't find a supplier who has the disks available your only alternative is downloading from another system (whether it's an RCPM at 300 bps or a physically adjacent system at a higher rate). The present CP/M UG collection stands at 84 volumes (1 to 85, vol 39 withdrawn).

As well as the CP/M UG there is another UG called SIG/M which is the CP/M Special Interest Group of the New Jersey and New York Microcomputer Clubs. Their collection stands at 71 volumes, however CP/M UG vols 55 through to 77 are duplications of most of the first 25 SIG/M volumes. SIG/M only distributes to 'sub-distributors', generally RCPM SYSOPS or local users groups.

There are several smaller UGs which cover specific areas of CP/M software. The largest of these is the BDS-C UG which has a collection of 29 volumes. Their collection is mostly CP/M software written for compilation with the BDS-C compiler.

Similar UGs exist for other major CP/M compilers or software products. Usually all these groups have formal membership requirements but otherwise distribute their software on a similar basis to the CP/M UG.

As I write this CP/M UG Vols 1 to 82, SIG/M 1 to 42 (no, the new ones still haven't arrived), BDS-C 1 to 29 and MISC 1 to 14 (Aussie software plus some stuff from US RCPMs and so on) are available on request for downloading from my RCPM system.

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There are sometimes CP/M special interest groups associated with local microcomputer clubs. For instance, the Melbourne Microcomputer Club (MICOMP) has a CP/M SIG which holds regular meetings. The South Australian Microcomputer Group doesn't have a CP/M SIG but seems to have a fair number of active CP/M users and often features CP/M topics at its meetings and in its newsletter. Those are the ones that I'm aware of, there are possibly others around in Australia as well.

PAMS News

Let me introduce a new buzz word. PAMS stands for Public Access Message Systems. It's an American term that is used to generically describe all Bulletin Board or similar systems.

It's not totally accurate in that it allows for restricted membership systems to be included (such as MiCC) as long as the membership is open to the public, but is as good as any other and is the defacto standard.

As yet there are very few PAMS in Au-

stralia — two active and one inactive, but as the number is sure to steadily grow it's about time someone started to get a reference system for them going.

So in future when you see a reference to PAMS you will have some idea that there may be a list of available systems and their phone numbers associated with it. For those interested in what a PAMS list can grow to, there is a very big one on The Source which lists systems world wide (including my RCPM).

While there is only the present small number of systems I hope to be able to cover the news of them in this column; in the future, who knows?

Mi-Computer Club Bulletin Board

The MiCC BBS is temporarily off line while a new CP/M microcomputer based system is being set up in place of the original Reality time slice operation.

This will mean a faster, better BBS for MiCC members but will take a little while to get going. MiCC now has the hardware and is just waiting for the software to get sorted out (I've no connection with MiCC

other than as a member and am just sorting out the communications software for them).

Melbourne CBBS On Line

The Melbourne Microcomputer Club has put a CBBS system on line. The MICOMP CBBS is a message exchange only — even though it runs on a CP/M system you do not get access to CP/M and cannot use it to exchange programs.

Still, it is a very useful service to the Melbourne microcomputer community, and you don't have to be a member of MICOMP to use it (though I guess they would be happy if you joined up). Amongst other things the CBBS contains details of upcoming CP/M SIG meetings.

The CBBS software is a direct descendent of the very first microcomputer bulletin board system set up back in 1977 in Chicago by Ward Christensen and Randy Sues so is a nicely refined and reliable system.

The phone number is (03)762-5088 (24 hours) and the data format is 8 data bits, 1 stop bit, no parity. You need your modem

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Original development took place in England, with Barry Meredith and John Perry of Padmede in Australia making extensive changes to suit local requirements. This included use of the advanced Sigma/OKI facilities such as high resolution colour display and inbuilt 80 cps printer.

Sigma/OKI Personal Computers also have a large library of software from other suppliers. These include Digital Research, Micropro, Sorcim, and Australian applications from Cyres, Boulevard, IMS, John F. Rose and others.



Kathy McLean and Barrie Meredith from Padmede

Packages ready for use under CP/M include Wordstar, Mailmerge, Supercalc, Spellstar, DBase II, FMS-80, Supersort and many more.

Our dealers will be pleased to give personalized advice. The Sigma/OKI Dealer index can be found earlier in this issue.

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set to 300 baud, full duplex, originate mode (the same as for my RCPM system).

The hardware supporting the CBBS is a 'Big Board' with a pair of 20cm drives. The SYSOP is Peter Jetson.

Peter is interested in getting an RCPM going in Melbourne but needs help with hardware (from suppliers?) and encouragement (from potential users?). Leave a message from him on the CBBS.

Now we are two; the Sydney 'Software Fools' RCPM and the Melbourne 'MICOMP' CBBS. Where will the next remote access microcomputer system appear?

RCPM News

Some support software from Trevor Marshall for the ETI modem is now available on the system.

There is a 'BYE' communications supervisor and a MODEM7 communications program for the ETI Modem.

Trevor also sent over some other interesting software collected from his RCPM system in California, including a

versions of MODEM7 patched to run on the Osborne 1 and Kaycomp 2 computers. From other sources there has also been some communications software for the IBM PC available through the system as well as some CP/M-86 programs.

I've decided to stop sending out the 'Connection Notes' for the time being. The system is so heavily used now that it is difficult for new users to get onto it so there is little point in sending out notes.

There is some hope of other RCPM systems coming on line in the future (you'll find out in this column when they happen so please don't ask for details) and when that happens I'll start making the notes available again in some form. Perhaps they'll be published in *Your Computer* at a later date as they have a lot of general advice about successfully establishing communications with any other computer system (micro or otherwise).

For those of you who have the notes and have been unable to get through there is yet some hope. Recently I tried an experiment with a 'Boredom week' for regular users.

During this week there were no software requests mounted and the system was fairly static. The usage by regular users dropped off a little as a result so there was an opportunity for some new users to at least get a chance to access the system. As there was a unprecedented number of new users coming on the system during that week I can only judge it as a success.

At some stage in the future (but not too soon) I'll probably have another boredom week, so keep trying.

When you publish offers to help people with mailings and request SSAEs you can usually expect a fairly high number of requests to breach the rules laid down in some way (no stamps, no address, no name, extra requests for info or whatever).

I've sent out a very large number of connection notes now and have only had a tiny percentage of requests for them that weren't able to be satisfied. I guess that says quite a lot about the intelligence of microcomputer users as a section of the community...well done!

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your computer clinic

Reaching RAM

COULD YOU please explain how a processor such as the Z-80 can address more RAM than 64K (0-FFFFH). I've been waiting to build a micro for some time, but this question has me stopped.

Could you suggest some places that I can collect information on building a Z-80 micro (I already know about Steve Ciarcia's book).

Could you please tell me where to find information on the MOS Technology 6545 video generator chip (featured in the AT MicroBee), or any other easier flexible video generation systems.

C HAYNES
Faulconbridge, NSW

Without the aid of external circuitry, most 8-bit microprocessors can only address 64 Kbytes of RAM. This is a fundamental limitation of their 16-bit address buses. However, it is possible to selectively enable and disable multiple banks of RAM, generally using a latch connected to an I/O port to control the circuitry.

Thus, to enable bank 1, the processor would output a byte of all zeros except bit 1 to the bank select port (typically port 40H in Cromemco and Alpha Micro systems). To select bank 2, the byte to be output would be 00000010, and so on. This scheme allows addressing of up to 8 banks, generally of 48K. In most systems, the top 16K of memory stays permanently enabled and contains the bank switching code and generally most of the operating system (for example, MP/M II).

Other schemes fully decode the bank select port, allowing up to 256 banks of memory. Finally, some recent systems utilise the

full 24-bit addressing capability of the S-100 bus to allow a theoretical maximum of 16 Megabytes of memory.

On the subject of building a Z-80 micro, Ciarcia's book is about the best I've seen. To complement it, I'd recommend 'Interfacing to S-100 (IEEE 696) Microcomputers', by Sol Libes and Mark Garetz, and published by Osborne/McGraw Hill.

Incidentally, the same publisher also has a book entitled 'The CRT Controller Handbook', by Gerry Kane, which contains all you'll need to know about the 6545, if you can't get hold of the manufacturer's data sheets and application notes.

Microbee MOVer

IN YOUR Assembler articles, you use the Intel 8080, which uses the MOV instruction.

I have ordered a MicroBee, as well as an Editor/Assembler. I am wondering if the Z80 will accept the MOV instruction, or if I must use the LD instruction? Please enlighten me!

Also, could you please include in the mag a more sophisticated MicroBee column, because I didn't learn anything last month!

Oh, by the way, thanks for a new look into computer technology through your fantastic mag!

RICHARD WALKER
Wynyard, Tas

Re the MOV instruction: both the 8080 and Z-80 execute the same instruction; it's just that Intel copyrighted the assembly language mnemonics so that Intel couldn't use them in its documentation.

If you have a Z-80 in your

CP/M system, the examples will work as given using the CP/M assembler. Other assemblers accept the Zilog mnemonics, such as the TDL/Xitan assembler.

It's only the assembler that makes the distinction; otherwise the MOV and LD instructions are the same.

Re the Microbee column: we're teaching Richard as fast as we can, but please be patient as we think he may be our most successful office idiot yet...

Help Me, Cap'n Bluebeard

I BUY your magazine regularly and enjoy reading it. You also seem to be good at solving problems. So here is mine.

When you buy a program, for example Sargon II, it comes on its own disk. Now if I copy that with Locksmith, I have another copy also on its own disk. The trouble is it takes up too much disk space, one program per disk.

Someone gave me a copy of Sargon II which someone copied for him, except this is just a normal, FID copyable program.

How does one make a program, on its own disk, into a normal Applesoft program? Simple question isn't it?

CONTRAN LEWIS
Burnie, Tas

The simple answer, if you think the cost of the diskette is too much to pay for a professionally written program, is to invest some hours (probably hundreds) in learning about DOS, machine language, and the way data is written to disks.

The person who breaks the copy protection on a disk (as someone did with your Sargon) does so by getting into it with a track/

sector editor and figuring out exactly how it is protected, then re-writing bits of code (or lifting the program portion a chunk at a time) to build up a normal, unprotected binary file.

Depending on the sophistication of the copy protection (the latest methods are very good) this task will vary from quite simple to impossible-for-the-non-genius.

Locksmith simply copies the disk bit-for-bit, duplicating the original exactly with the copy protection intact, which is why it too uses a whole disk.

Budget-Beater

BEING a poor student with a limited (nearly non-existent) budget, I have been looking for a way of getting around the high (to me) price of printers.

Is there any way to modify a standard teleprinter to receive 300 or 1200 baud RS-232 C from my MicroBee?

DAVID DOWNS JNR
Numurkah, Vic

No, you'd have to rewrite a large chunk of the monitor program to output characters as 5-bit Murray code instead of the 7-bit ASCII it uses now. In addition, you'd need to build an interface circuit to convert the RS-232C voltage levels to 80V double current signalling.

The correct answer to your question, therefore, is that there is a way, but that it isn't easy. This is what computer salesmen call compatible.

What Not To Buy

I AM interested in buying a home computer in the not too

distant future, but I am basically a novice in this field. Firstly I would like to say that I am not going to ask what should I buy but rather could you point out any problems you think I may be getting myself into depending on which system I buy.

First let me say that I want a machine that will be able to entertain me (which computers do anyway) — that is, to play games, also to be able to run my own programs and lastly it must be expandable.

Also my other main interest is photography and I have recently been looking at the Electrosonic systems to run multi-image slide/tape programs.

This system's heart is the Apple II Europlus computer fitted with 64K memory, disk drive with disk controller card,

interface card for up to 24 projectors, Electrosonic ES4057 multiplex clock card and the Esclamp Multivision production software.

As unfortunately I cannot afford an Apple, fully decked out as described above, I am after a micro that could be usable now for games/programming, but that could be expanded to take the Electrosonic components as my finances make them available.

The two units I have been looking at are the MicroBee and the Concord II — which I gather is almost an Apple.

Therefore can the Bee be made to accept Apple BASIC? Can it be expanded to take extra Apple cards? Can it be expanded to 64K and take a disk drive? If the Apple can be expanded to take a Z-80 card can the re-

verse be done to a Bee? Is it too much of a hassle for a novice or what?

Would the Concord be totally compatible? My only problem at the present is that the Concord is a little too pricey for me.

KEVIN BUCK
Montmorency, Vic

It's not just a bit much for a beginner, it's a bit much for a pro! Apple BASIC programs can be converted to run on the Microbee, but it will not accept Apple cards, and any program which is hardware dependent (and from what I've seen of Apple programs that's the majority — almost anything involving PEEK or POKE, for instance) cannot be transported easily between computers unless you are

totally familiar with both.

Yes, a 6502 card could be designed for the Bee, but there's not a great deal of point really. The result would not be either fish or fowl, would have virtually no software support and just could not succeed.

Apple copies and look-alikes are a touchy subject right now. I honestly cannot recommend that anybody buy anything that claims to be Apple compatible, because with the lawsuits currently flying around, it might not be on the market for long, and then where are you going to get it serviced, maintained, and so on?

Sorry to pour cold water but there is no way out of the old law: the more you pay, the more you get.

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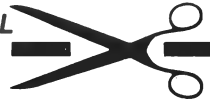
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THE Home Accountant

By Peter Sandys

WITH A computer taking pride of place in my study (oops, sorry dear — now the nursery) my financial affairs definitely need managing. In the good old (pre-computer) days when I had money to burn there was no need to keep a check on where or what I spent it on.

Alas, things are different, I have greater need now to keep track of my finances. So I turned to my trusty slave to provide the answers.

I was helped along the way by developing a model on my trusty Visicalc program. I spent hours typing in each day of the week, a column for outgoings, a column for incomings and a column for description. The model would total the difference and subtract it from balance left in the bank. If I made two payments in a day I cheated and entered one a day earlier or later depending on space. I used it for a month and then I gave it away.

Next on the scene was Apple's Personal Finance Manager. This was a great improvement as I was also able to set budgets for expenses.

However, it lacked one fundamental item, the ability to record details of cash payments. So I had to arm myself with a series of deposit forms (courtesy of my local bank) and use these as fake cheques and record these on the system. Also there was no way I could record my savings at the building society. This I had to lump with my cheque account and at reconciliation time remember to add together the balance in the cheque account to the savings and cash. This was fraught with danger as my maths is not so crash hot.

Finally I was given The Home Accountant which, in case you were wondering, is what this article is all about.

The program is designed to help you keep track of all your income, expenditure, assets and liabilities and print out reports. It comes in a handsome padded binder and is well documented. It requires only one disk drive but two drives save you having to swap disks.

The Home Accountant has a number of very powerful features. It allows you to keep up to five separate cheque accounts which can be linked to one common budget. As well you can have five separate cash accounts.

This feature is important for professional people who want to keep certain accounts separate from others. On the same point it is also possible to flag expenditure for taxation purposes.

Another feature of the program is that if



you use a credit card the system allows for keeping a record of transactions and hence the balance outstanding on that card. When you write a cheque (or cash) to pay the credit card account the system will decrease the amount of your balance on both without the need for a double entry. You can also allow for regular periodic payments.

When you first start the relevant steps you need to take are highlighted by the program. If you try to skip a step it will not allow you to, until you have created a cheque account and one cash account. When you create any category you have the option of allowing for a projected figure for any month thus creating a budget. The budget can be altered by a transaction or by an edit module.

Furthermore on the creation of accounts you can have five categories — assets, liabilities, credit cards, income and expenditure. You are limited to 100 individual sub headings under these categories.

When you enter a transaction it is stored with eight fields. Date, Check Number, Paid to, Amount, Memo, Category, Tax, Cleared.

The Home Accountant manages this differently to Personal Finance Manager, in that these entries are listed down the screen and only one entry is visible on the screen at any time. PFM permits you to see more than 10 entries on the screen by using columns. PFM's method would be superior except that with the 40 column screen the amount of information you can enter for each field is limited.

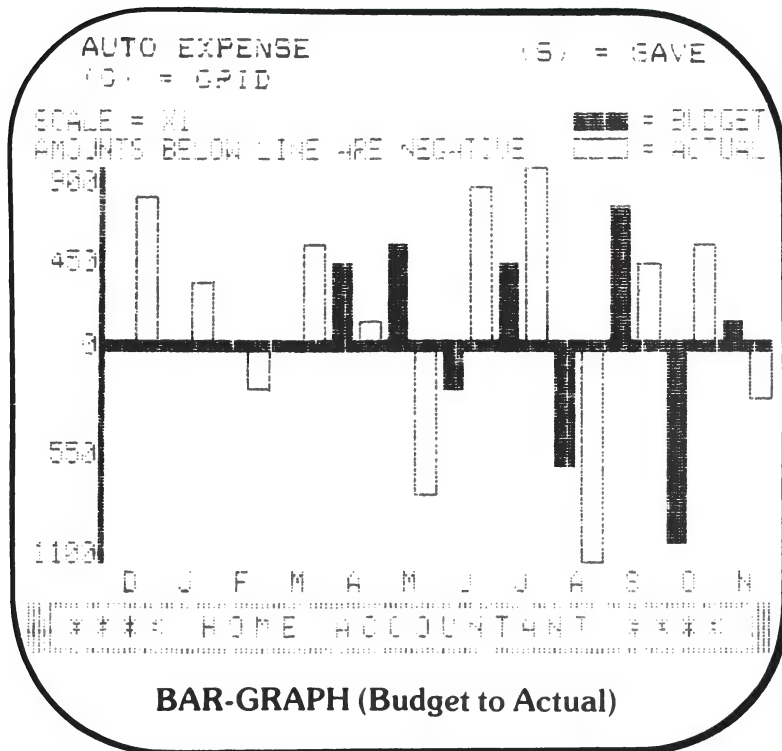
Some nice features of the Home Accountants entry routine are:

THE SPLIT TRANSACTION: With this you can use one cheque payment for multiple accounts. Similarly you can do the same for cash or credit cards.

CATEGORY SEARCH: The program lets you enter the beginning letter of a category and then search through every category until you find the right one to classify the entry. This is invaluable for forgetful (or disorganised) people. Also, if you have a hardcopy listing of the categories you can enter the number of

Software Report Card

Program:	Home Accountant			
Made By:	Continental Software			
Useful for:	Home, Small Business, Professionals			
Hardware Req'd:	Apple II (Printer Preferable)			
Ratings:	excellent	very good	good	poor
Documentation		✓		
Ease of Use		✓		
Speed			✓	
Functionality	✓			
Support	✓			
Value-for-money	✓			
Extras included:	N/A			
Price:	\$94			
Review copy from:	Imagineering			



BAR-GRAPH (Budget to Actual)

the category and the program will list the name.

PERIODIC PAYMENTS. It is possible to set up to five automatic transactions. As soon as you initialise a month these are posted.

Reports And Graphs

The program generates a large number of reports and will even print out cheques.

The reports can be printed on almost any field and may be specific to that field (for example, all cheques paid for rent or to a certain party).

Other reports include year's budget, or actual; balance sheet; net worth statement; income and expense summary; category listing; comparative balance sheet (current v previous month); comparative income and expense; and credit card and cash activity reports.

The graphs can be printed if you have a graphics printer. These are bar and line graphs, and trend analysis. If using a colour monitor these can be graphed in colour.

Is It Australianised?

Yes and no. Imagineering has arranged for the date to be changed so that our convention of day first is accepted, and reports are printed out with these dates.

The no applies to the section when you start the system and record personal details of address and postcode. When you enter the state only two letters are allowed (okay for NT, WA and SA); also, you need five digits for postcode. Imagineering advises this will change in the near future.

The Home Accountant is the best prog-

ram I have seen for personal and small professional use. It is logical in its operation and has a lot of detail. There are some criticisms that I have, some concern me and some may concern other people.

The first is the speed. Because of multiple overlays of programs the speed is greatly affected. This is because standard DOS is slow. You can overcome this by first booting an FDOS disk then inserting Home Accountant and entering 'RUN HELLO'. The speed improvement is worthwhile.

Second is the printer support. It will not work with the Epson type II/ printer cards. These are very popular printers and unless they can write a driver for them the program will have a limited market.

The printers supported are Epson with Digitek Printmaster card, Anadex 9501, IDS 440, 445, 460, 560, Okidata Microline 80 (not 82), NEC 8023A, TI810, and Diablo, Qume and Itoh letter-quality printers.

I was not able to test it on the C Itoh dot-matrix printer. Cards it supports are Apple Parallel and Serial, SSM ASIO & AIO II and Mountain Hardware multifunction. I have not tested it on all these cards or printers — these specs were from the manual. Epson and Microline 82 were from personal experience and advice from others.

The third problem comes when you want to delete an erroneous record. These can only be edited, declassified and the balance made zero. This may be of importance to you or maybe not. Also, when you finish with a month you cannot make any further adjustments to it. □

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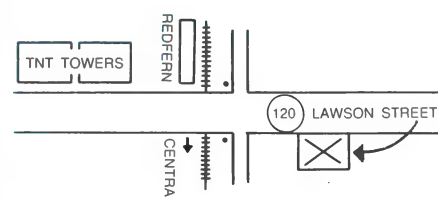
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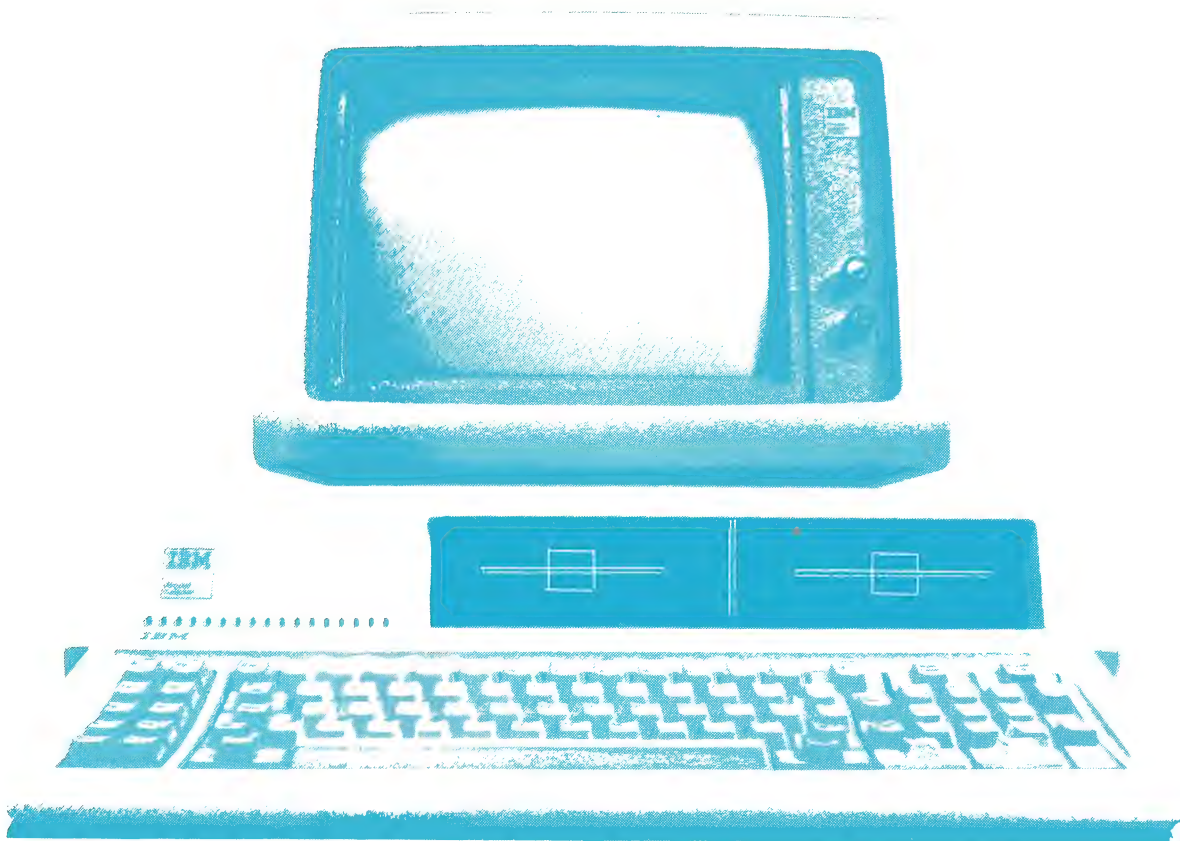
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Apple Disk Peeker

By Steven Zanker

THIS PROGRAM will allow you to indirectly 'peek' at the contents of an initialised diskette, which up until now has been hidden territory for many Apple users

It is the third of my series of utility programs using the RWTS subroutine; for further information, I suggest you refer to the first two.

LINES 500 — 900 display the variables used. The buffer for the disk sector is located immediately above HIMEM (line 560).

LINES 2000 — 2400 display the locations changed during program execution. For faster program execution, delete these lines.

LINES 2420 and 2440 poke into memory the controlling subroutine (assembly language).

The usual interrogation section begins at line 4000, requiring slot and drive numbers to be entered. Lines 4120 to 4220 poke into the IOB (Input Output Block), the slot, drive, volume, and buffer address. Note that the volume number is zero, which means that any volume number will be acceptable.

LINE 6000 begins the actual peeking segment. Before the sector can be read, the track and sector numbers are required (line 6040 — 6100). At line 6180 the sector is read, and an error check is made. If an error occurs a jump is made to 10000, for a message to be displayed. The only possible errors are DRIVE ERROR and READ ERROR.

From line 6200, the sector last read is displayed. The standard Apple screen, being only 40 by 24, is too small for a formatted display, so I have divided each sector into quarters.

The first quarter displays bytes 0 to 63, the second, bytes 64 to 127 and so on. After a read, the quarter indicator is set to 1 (line 6180). Across the top and side of the screen appear inverse grid reference numbers, from which the exact byte of the sector can be calculated (lines 6200 — 6260). Each byte appears as a 3 digit number (000 — 255), and underneath, the represented ASCII character. The array CA% is used to change the value to the range 32 to 95, because control characters are not normally displayed (lines 6280 — 6380).

The program then waits at line 6420 for a single keystroke. To view the other quarters of the sector, press key 2, 3 or 4, and it will be displayed in the same format (line 6440).

The arrow keys will cause the next sector either side to be read. Note that if the current sector is at either end of the disk, and one of these keys are used, a 'wrap-around' occurs, and the sector at the other end is read; Likewise if the current sector is at one end, the first (or last) sector in the next track is read (lines 6480 and 6520).

Pressing RETURN will cause a jump back to the track and sector questions (6500). Pressing ESC will end the program (6540). Any other key is invalid, and beeps the bell.

Here are a few interesting locations to be found on an APPLE initialised disk:

Those locations appear in the DOS section of the diskette. DOS, as you may know, is loaded into memory from the diskette when booting.

The disk directory is to be found in track 17, beginning at sector 15, and working backwards. Refer to pages 129 to 131 of the DOS manual. □

```
10 REM DISK PEEKER
200 REM /-----\
220 REM ! APPLE ] [ !
240 REM ! DOS 3,3 DISK PEEKER !
260 REM ! !
280 REM ! AUTHOR: S.ZANKER !
300 REM ! WRITTEN: 31MAR82 !
320 REM \-----/
500 REM
```

<> VARIABLES <>

```
520 A = 0:B = 0
540 ANSWER$ = ""
560 BUFFER = PEEK (116) * 256
580 DS = CHR$(4)
600 DRIVE = 0
620 GS = CHR$(7)
640 SECTOR = 0
660 SLOT = 0
680 TRACK = 0
700 DIM CACHRADJUST%(7)
2000 REM
```

<> BYTE MAPZ <>

```
2020 REM
++ RWTS MAP ++
2040 REM 768-84=CONTROL SUB
2060 REM 800-16=IOB
2080 REM 817-20=DCT
2100 REM 832 =ERROR FLAG
2120 REM
```

+ LOCATIONS ACCESSED +

```
2140 REM -----IOB-----
2160 REM 801 =SLOT NUMBER * 16
2180 REM 802 =DRIVE NUMBER
2200 REM 803 =VOLUME NUMBER
2220 REM 804 =TRACK NUMBER
2240 REM 805 =SECTOR NUMBER
2260 REM 808&9=BUFFER ADDRESS
2280 REM 812 =COMMAND CODE
2300 REM 813 =ERROR CODE
2320 REM 814 =ACTUAL VOLUME
2340 REM 815 =PREVIOUS SLOT
2360 REM 816 =PREVIOUS DRIVE
2380 REM -----ERROR TABLE-----
2400 REM 832 =ERROR FLAG(=128)
2420 FOR A = 768 TO 820: READ B:
POKE A,B: NEXT A
2440 DATA 169,3,160,32,32,217,3,176,
1,96,169,128,141,64,3,24,96,0,0,
0,0,0,0,0,0,0,0,0,0,0,1,96,
```

TRAK	SECT	BYTE	DESCRIPTION
1	7	132	Start of valid dos commands
1	8	7	End of DOS commands
1	8	65	Parameters (,V ,D ,S ,L ,R ,B ,A ,C ,I ,O)
1	8	116	Start of DOS error messages
1	9	61	End of DOS error messages
1	9	117	Greeting program name
1	9	184	'APPLESOFT'
2	2	167	'TIAB' (file types Text,Integer,Applesoft,Binary)
2	2	171	CATALOG title "DISK VOLUME" spelt backwards.

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```

1,0,18,6,49,3,34,34,0,0,1,0,0,
96,1,0,1,239,216
4460 FOR A = 0 TO 7: READ CA%(A): NEXT A
4480 DATA 64,0,0,-64,-64,-128,-128,-192
4000 REM

```

> INTERROGATION <>

```

4020 TEXT : HOME : INVERSE : LIST 200,380:
NORMAL : A = PEEK (37): POKE 33,9:
HOME : TEXT : VTAB A
4040 VTAB 16: INVERSE : PRINT "SLOT NUMBER
(1-6) "; NORMAL : INPUT AN$: ON AN$ =
"" GOTO 8000:SLOT = INT ( VAL (AN$)):
IF ABS (SL - 3.5) > 2.5 THEN
PRINT GS: GOTO 4040
4060 POKE 801,SLOT * 16
4080 VTAB 20: INVERSE : PRINT "DRIVE NUMBER
(1/2)"; NORMAL : INPUT AN$: IF AN$ = ""
THEN PRINT GS: GOTO 4040
4100 DRIVE = INT ( VAL (AN$)): IF
ABS (DR - 1.5) > .5 THEN
PRINT GS: GOTO 4080
4120 POKE 802,DRIVE
4140 POKE 803,0
4160 POKE 809,BUFFER / 256
4180 POKE 808,BUFF - PEEK (809) * 256
4200 POKE 815,SLOT * 16
4220 POKE 816,DRIVE
4240 HOME : VTAB 21: PRINT
"-----":
VTAB PEEK (37)
4260 PRINT "[1] / [2] / [3] / [4] = SECTOR QUARTER"
4280 PRINT "NEXT SECTOR: [->]FORWARD [-<]BACKWARD"
4300 PRINT "[RTN]NEW TRACK & SECTOR [ESC]END PROG.:"
4320 POKE 35,20: VTAB 1: PRINT
6000 REM

```

PEEK HERE <>

```

6020 HOME
6040 VTAB 8: INVERSE : PRINT "TRACK NUMBER (0-34) ";
: NORMAL : INPUT AN$: IF AN$ = "" THEN 4000
6060 TRACK = INT ( VAL (AN$)): IF ABS (TR - 17) >
17 THEN PRINT GS: GOTO 6040
6080 VTAB 12: INVERSE : PRINT "SECTOR (0-15) ";
: NORMAL : INPUT AN$: IF AN$ = "" THEN
PRINT GS: GOTO 6040
6100 SECT = INT ( VAL (AN$)): IF ABS (SEC - 7.5) >
7.5 THEN PRINT GS: GOTO 6080

```

```

6140 POKE 804,TRACK
6160 POKE 805,SECTOR
6180 CALL 768: ON PEEK (832) > 127 GOTO 10000:Q = 1
6200 HOME : INVERSE
6220 S = (Q - 1) * 64
6240 FOR A = 0 TO 7: HTAB 6 + A * 4: PRINT A;:
NEXT : PRINT
6260 FOR A = 0 TO 7: VTAB 3 + A * 2: PRINT
RIGHTS (" " + STRS (A * 8 + (Q - 1) * 64),3):
NEXT : NORMAL
6280 FOR A = 0 TO 63
6300 B = PEEK (BUFFER + S + A)
6320 V% = A / 8:H% = A - V% * 8
6340 VTAB 3 + V% * 2: HTAB 5 + H% * 4:
PRINT RIGHTS ("00" + STRS (B),3)
6360 VTAB 4 + V% * 2: HTAB 6 + H% * 4: PRINT
CHR$(B + CA%(B / 32))
6380 NEXT : VTAB 20: INVERSE
6400 PRINT "TRACK=";TR;" SECTOR=";SECT;
" QUARTER=";Q;" ?";
6420 NORMAL : GET AN$
6440 IF ABS ( ASC (AN$) - 50.5) < = 1.5
THEN Q = ASC (AN$) - 48: GOTO 6200
6480 IF AN$ = CHR$(8) THEN SE = SE - 1: ON
SE > = 0 GOTO 6140:SE = 15:TR = TR - 1:
ON TR > = 0 GOTO 6140:TR = 34: GOTO 6140
6500 IF AN$ = CHR$(13) THEN 6000
6520 IF AN$ = CHR$(21) THEN SE = SE + 1: ON
SE < 16 GOTO 6140:SE = 0:TR = TR + 1: ON
TR < 35 GOTO 6140:TR = 0: GOTO 6140
6540 IF AN$ < > CHR$(27) THEN PRINT
GS;: GOTO 6420
8000 REM

```

<> END OF RUN <>

```

8020 TEXT : HOME : LIST 10
8040 PRINT "END OF RUN."
8060 END :::::::::::::::::::: RUN
10000 REM


```

<> ERROR HANDLING <>

```

10020 POKE 832,0: FLASH : HOME : PRINT
10040 IF PEEK (813) = 64 THEN PRINT
"DRIVE ERROR";GS: GOTO 10100
10060 IF PEEK (813) = 128 THEN PRINT
"READ ERROR";GS: GOTO 10100
10080 PRINT "DISK-ERROR ERROR";GS
10100 NORMAL : A = PEEK (37): TEXT :
VTAB A: STOP :::::::::::::::::::: RUN

```



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your OSBORNE computer

By Greg Stringer

OVER THE last few months there have been various articles and reviews about the Osborne 1 computer. This unit is now so well established in the community, it is about time for a column in *Your Computer* dedicated to the Osborne user.

Over the next few months I will be presenting some background information on the Osborne 1, with some software and hardware reviews.

The initial articles will be aimed at the novice user and, I hope, will evolve into a useful reference-guide for future users.

Where the column goes after that will largely depend on you. It is, by rights, *your* forum for ideas and programming hints, so that we can all help one another. Please participate with any questions, tips or programs you would like to share with other Osborne users.

I will be keeping a copy of the monthly columns on diskette, so that future users may take advantage of the information published, without that soul destroying search for that back-copy that seems to have sold out all over town.

Down To Business

I have acquired one of the 'new' Osbornes, but for those of you with the earlier model (the majority), I will pass on a few observations regarding the differences from the older "Set, Wireless, No. 19, British troops for the use of" machine (YC May 1982).

The first point to stress is that, in component design and machine performance, both versions of the Osborne are identical. The major changes with the new machine are mainly cosmetic.

The first change that strikes the user is that, at last, there is a spiral keyboard connector instead of the cumbersome wide parallel cable that would sometimes obscure the screen. Three locating lugs on the top edge of the keyboard enable the main body and the keyboard to be 'locked' together for easier desk-top usage.

A sliding vent on the top-rear of the unit also helps with cooling on those hot days when I do my work down by the pool in the back yard!

Internally the chassis that holds the innards in place has been reworked and I notice that my machine has Rev 1.4 ROM. More news on what changes are contained in the ROM later.

Probably one of the most widely used programs on the Osborne is 'Wordstar'. The flexibility of the program, both in the

options provided for manipulating text, and in its capacity to be configured to so many CP/M based computers, is the biggest hurdle the beginner has to overcome.

We are lucky that all the Osborne users are supplied with a standard configuration of Wordstar since communication of ideas can be directly translated from one user to another. Probably the biggest variation between users will be in the type of printer that may be hooked onto our computer to obtain hard copy. Over the next few months I will try to supply interfacing and installation instructions for most of the popular printers on the market today.

Running An Epson

I would hazard a guess that the Epson MX80 and MX100 printers are probably the most popular dot matrix printers in the world. To use an Epson printer with our Osborne requires four steps:

- Obtain a cable to connect the IEEE488 edge connector on the front panel, to a 'Centronics' style plug on the back of the Epson.
- Set the dip switches on the Epson for the default character set and printing characteristics.
- Use the SETUP program on the system disk and set the printer option to Centronics.
- INSTALL, or tell 'Wordstar' what command sequences are required to perform the special printing characteristics, like bold print, double strike, emphasized printing and so on.

Suitable cables should be available from your local dealer. If you feel you would like to make your own, obtain a 26 pin female edge-connector, up to 3 metres of 26 core parallel cable and a 36 pin amphenole connector (male).

Configure the cable so that the wires connected to the IEEE interface are soldered to the appropriate pins on the amphenole plug as shown in the accompanying table. There is a diagram of where pins 1 through 26 are located on the IEEE connector in the users manual.

OSBORNE 1 IEEE EDGE CONNECTOR PIN #		EPSON CENTRONICS CONNECTOR PIN #
1	DATA 1	2
2	DATA 5	6
3	DATA 2	3
4	DATA 6	7
5	DATA 3	4
6	DATA 7	8
7	DATA 4	5
8	DATA 8	9
10	GROUND	30
11	STROBE	1

12	GROUND	19
15	BUSY	11
16	GROUND	29
18	GROUND	21
19	SELECT	13
20	GROUND	20

EPSON DIP SWITCH SETTINGS FOR SWITCH BLOCKS 1 & 2

1 - 1	ON	1 - 5	ON
1 - 2	ON	1 - 6	ON
1 - 3	ON	1 - 7	OFF
1 - 4	OFF	1 - 8	ON
2 - 1	ON	2 - 3	OFF
2 - 2	ON	2 - 4	OFF

Your Osborne and printer are now physically ready to 'talk' to one another. All that remains to be done is to tell the CP/M operating system what kind of printer you will be using. This is done using the SETUP program found on the system disk that came with your Osborne.

Load and run the program as indicated in the manual, changing the printer option (A) to show Centronics when the main options menu is displayed. Now save this new CP/M configuration on all the working disks you will want to use with the Epson printer.

I don't suppose it is necessary to state that you should *never* use the original disks that come with your system. You should make working copies of your supplied disks (using the copy program) and make any changes to the working disks, leaving your original disk as your library backup copy.

You are now ready to use your printer with any of your CP/M programs.

To try it out, boot the system with one of your new 'modified' disks. Do a directory listing by typing DIR. You should see on the screen a listing of all the files on your default disk drive. Assuming the printer is connected, and the ready light is green type control-P (done by holding the CTRL key down while you type the letter P). Now repeat the step above and enter DIR. The printer will list the file directory on the screen.

WordStar Set-Up

WordStar, as you know, has some very nice features, some of which control the way in which text is printed, such as bold-face, or super- and sub-scripting.

What we have done so far is to tell the CP/M operating system that a centronics printer is attached and that any output to the printer should be sent to that device. If we want to take advantage of the extended printing features offered by Word-

Star, then we will need to tell that *program* the control character sequences it has to send to the printer, to change the way the printer will print the text.

We do this with a program on the UTIL-ITY disk called *Install*. We tell the Install program what parameters the Epson will require. When finished, Install will physically rewrite parts of the WordStar program on disk.

In the manual there is a very good step-by-step procedure for running the Install program — I will not attempt to repeat it here, but will provide you with the parameters you will require to make the Epson behave the way you want.

The parameters below have been worked out by Jim Woolley who writes for *The Portable Companion*, a US-based Osborne magazine, and are based on the Epson MX80 type III and MX100 printers:

- Insert the Utility disk in drive B and your working copy of WordStar in drive A.
- Warm-boot the system (Ctrl-C) and type the command *B:INSTALL*.
- Answer the first question regarding 'normal first-time INSTALLation' with N for no.
- Answer the next question with the D option, to modify and run your existing WS.COM file. When asked for your WordStar filename enter *A:WS.COM*.
- The Install program will ask you about your terminal, printer, communications protocol and printer driver. Answer U(n-changed) to each and verify your answer with Y(es) when asked.
- When the last question is displayed asking if the modifications are complete reply N(o).

Enter the patches, as indicated below, by typing in the parameter address or name. Where there are multiple operands for a given parameter press return twice after each operand is entered.

This is the end of the patches.

The New WordStar Commands

The WordStar commands, to invoke the different Epson print modes, are as follows:

Ctrl-Y: Emphasised double print toggle. Do not use twice in the same line, as the second cancels the feature for the entire line. Do not use with Ctrl-A.

Ctrl-A: Alternate pitch (132 char/line). Do not use in the same line as Ctrl-N, since Ctrl-N cancels the feature for the entire line. Do not use with Ctrl-Y or Ctrl-Q, as these temporarily suspend the effect of Ctrl-A.

Ctrl-N: Standard pitch (80 char/line). This is the default mode. Do not use in the same line as Ctrl-A.

Ctrl-Q: Set emphasised mode. Do not use with Ctrl-A.

Ctrl-W: Cancel emphasized mode. This is the default mode. Do not use in the same line as Ctrl-Q, since Ctrl-W cancels the feature for the entire line.

Ctrl-E: Set expanded pitch (40 char/line if used with standard pitch Ctrl-N, or 66 char/line if used with alternate pitch Ctrl-A). This mode is automatically cancelled at the end of the line. It may be cancelled in mid-line by the use of Ctrl-R.

Ctrl-R: Cancel expanded pitch. This is the default mode. □

PARAMETER OPERANDS

Ø6A1	Ø1
PSCRLF:	Ø3,ØD,ØA
PSHALF:	Ø2,ØD,ØA
PALT:	Ø1,ØF
PSTD:	Ø1,12
USR1:	Ø2,1B,45
USR2:	Ø2,1B,46
USR3:	Ø1,ØB
USR4:	Ø1,14
RIBBON:	Ø4,1B,45,1B,47
RIBOFF:	Ø4,ØB,46,1B,48
PSINIT:	ØC,12,14,1B,46,1B,48,1B,41,Ø6,1B,32
PSINIT:+11	Ø3,12,14,1B,46,1B,48,1B,41,ØC,1B,32

Ø

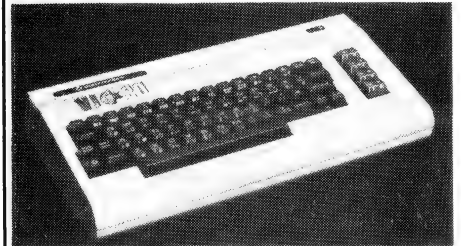
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2 Cash Flow Analysis

3 6 MONTH PROJECTION DATE

4 10/9/82

5

6 Manufacturing Costs

7 PRODUCT	Monthly Sales	30(DA)	60(DA)	90(DA)	120(DA)	150(DA)	180(DA)
9 Product A	70	7500.00	0.00	7500.00	7500.00	7500.00	7500.00
10 Product B	30	3000.00	0.00	3000.00	0.00	3000.00	0.00
11 Product C	25	0.00	4000.00	0.00	0.00	4000.00	0
12 Product D	50	0.00	3800.00	0.00	3800.00	0.00	
14	TOTALS	10500	7800	10500	11300	20	
15	SALES INCOME	18505	18505	18505	18505		
17	OVERHEADS	6000.00	6000.00	8000.00			
19	WORKING CAPITAL	2005	6710	3			

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Tape based? _____ Yes/No

Disk format _____

Operating system _____

Are you able to electronically communicate over phone lines? Yes/No

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LINTON-SIMPKINS

IF YOU LIVE in an inner Sydney suburb then you will be familiar with the sinking feeling that you get when your door bell rings and you open it to two young men in funeral suits who introduce themselves as 'Elder So And So and Elder Who's It'.

They are as difficult to move away as a snorkel-equipped Federal Labor MP sifting through the bottom of some harbour or other. On at least two occasions I have begun to call in the local Heat in an endeavour to regain the quiet enjoyment of my front verandah.

The local Heat, being more than fully occupied cruising the region's pubs to offer Her Majesty's, God bless her, hospitality to the purveyors of illegal substances, offered sympathy and the advice that I ought to buy a large dog.

The Mormons are famous for three things, the Osmond family, the alleged underwear worn by all those Elders and the church's long-abandoned practice of plural marriages or polygamy. Bearing in mind the sad lack of endurance of most men, it would seem to be a better system design to employ polyandry, a fact known in the 14th century as can be witnessed from the first novel of the third day of the Decameron.

Which all has very little to do with how I found myself some 240 metres above Sydney in the company of certain citizens such as Vance Gledhill, Neil Houston and Lionel Singer as the latter's newest computer was being launched. Or maybe the Mormons, or more accurately the members of the Church of Jesus Christ of the Latter Day Saints, have a lot to do with me being that high at 11.00 am on a Tuesday.

It seems that the Mormons are going to have a fourth thing to make them famous shortly, their expertise in making electronic gear. Since the late 1960s Univac has had a terminal-making plant in Utah, the Mormons' home state which was named after the Shoshone indians — as any crossword doer knows.

Now Elder Singer's new computer, called Wicat, is made in Utah like the Shoshone and world land speed records. It will be managed by Elder Gledhill who has left the Deanery at NSW Institute of Technology and it will be sold by a team headed by Elder Houston who has fled the guardian walls of IBM and kicked the Blue and Grey Habit.

After a quick re-read of the above it occurs to me that my reader may be wondering how Elders Singer, Gledhill, Houston, Linton-Simpkins, Dustin Heuston (would I lie to you?) and the assembled Computer Press of Australia were all able to stay 240 metres above Sydney in the company of about a half a dozen Wicat computers?

We were not in a giant cargo helicopter, we were in fact in the third level down from the top of the Sydney tower. When I arrived Elder, no since he's top man at Wicat Utah, Eldest Dustin Heuston was extolling the many virtues of the wicat.

I arrived late because Big Red the family road whale was out of petrol due to a strike and I had to push it three kilometres to get there. Then once at the base of the tower finding the lift entrance was not easy, so I was about half an hour late. So there I sat watching the city laid out beneath me and inspecting, in between the passing of tug-boats, a nearby parked and idling Wicat.

The Wicat looked good and I wasn't about to tear my eyes away from it until the clouds to the west broke up, and there in the midst of green fields was my old school. There was the flag-pole on the top of the building on which we had run up the Economics Master's pyjamas and then cut the halliards, there was the open space that used to be the school nine hole golf course and there was the rowing shed and the famous leaning pile. It was too much and even the excitement of Elder Dustin couldn't drag me back until the clouds closed over again.

Wicat is an odd name for a computer, but then it is a strange computer. For a start it doesn't use Intel micros but Motorola ones. Since the house computer at my place also uses Motorolas, I was sold on the Wicat just from that concept alone.

But enough of this, I think it's time that a look was taken at how the various companies handle their new computer releases.

Frankly, these shows have become a mite low budget lately since the various overseas parent companies realised that having a story in a major Australian paper means having it in the Computer section where it will be read only by computer people.

You simply can't trust an important thing like the purchase of a computer to a computer man, can you?, it's far too important. So a story in the computer sections means that you are preaching to the converted. It would be like tracking around Salt Lake City seeking to find and convert a non-mormon.

IBM and Wang always go for information overkill, Lionel Singer has always aimed to sit down in front of a screen and have you run your own demonstration. As a sales concept the Singer way works full well. But as far as I go, three years hard labour in front of a screen has rather soured me towards self-demonstrating. But the hands-on thing is still great for less soured computer writers and I notice that Lionel and Vance were having a lot of takers for their try and show thing.

One thing that sticks in my mind about the Singer/Wicat sky show was the statement made by Dustin Heuston about how one Saturday morning at 2am he had arrived at his Utah plant to find 40 per cent of the people still at work.

Since John H Patterson of NRC and his protege Watson of IBM it has been fashionable in the US for ambitious people to arrive at work at 7am. If you pass IBM's Sydney Pagoda at 7am you will see that the practice, albeit one of gross barbarity, still flourishes in certain commercial establishments in Australia.

From that we can conclude that the Mormons in the Wicat plant had been working for 19 hours straight. How effective their work would be after that time is problematical. Perhaps they were worried about going home in that odd underwear or maybe they were trying to avoid close encounters of the Osmond kind.

We all know how persistent the average Mormon is, that is, we who live in an inner suburb do, but 19 hours straight at work is more than a little absurd. One only hopes that the Wicat quality control people work sensible hours or Lionel Singer is going to have his troubles now he's sold Prime for a fortune.

The thing is that the Wicat machines have startlingly good specifications and they are priced at an unbelievably low level. Vance Gledhill (this isn't the first time he has stepped outside the ranks of the academics into rampant capitalism), once installed an IBM 360-50 at the NSW Electricity Commission.

This machine was identical in store capacity with one of the Wicat machines on display, but not as fast. The IBM 360-50 costs more than \$600,000 with line printers. The Wicat cost around \$20,000 and sat on a rather weak looking desk. You would have been in terrible trouble due to weight and so on if you wanted to install an IBM 360-50 in the tower we were in. It's all rather confusing, isn't it? □

APPLE Corporation was deemed guilty in the New Zealand computers-for-schools dumping case. Now the computers will cost \$2020 instead of \$1200, but New Zealand master agent CED Distributors is to supply two special language packages including Pascal along with a memory card, worth around the additional \$820.

New Zealand customs don't seem to care what enhancements or additions to the Apple II are made, as long as they don't go to the schools at the original price. The extra \$820 seems to lift them over the dumping barrier.

The managing director of CED Distributors, Mr Brian Eardley Wilmot, says only a handful of cancellations have been received and that the overwhelming majority of buyers are more than pleased with the new offer.

Polycorp Holdings, the Government-sponsored manufacturer of the Polycorp CAI system, is keeping quiet in the meantime. It levelled the dumping charge, and it cannot have gained too much goodwill among prospective secondary school customers who must now dig in for another \$820.

In New Zealand there is no set budget by the Education Department for school computers. Most of the micros are bought as a result of bottle drives and parents organisation collections.

One Brand For Schools

Meanwhile the Computer Services Division, the Government's own computer management department, has filed a 'request for information' with all the companies dealing in microcomputers whether imported or fabricated locally.

It is the preliminary to a tender for the supply of microcomputers for teaching in all the nation's secondary schools. The 'request' surprised many because it emphasised that there would be a single bulk procurement after all. The Education Department has wavered over the issue at one time claiming that it would be free choice for schools. But now it seems to have firmed up on the single source idea.

There now appear to be a number of New Zealand made computers in the running. There is the Polycorp, the Microprocessor Developments Ltd of Auckland MX Series of multiprocessors, and also the Massey University developed CAVIL for Computer Aided Video Learning.

This unusual device uses Philips VCR equipment in conjunction with microcomputers.



There is a strong degree of apprehension throughout the industry now over the outcome of the GATT decision to levy sales tax on the information on software rather than on merely the raw material itself.

In the past the formula has been to add up the cost of the plastic and the cost of putting the software on it, then include an arbitrary add-on of 100 percent of this to cover anything that might have been forgotten. The sales tax was calculated on this amount.

In New Zealand the position is all the more surprising because of the high rate of sales tax, 40 percent. If the price of the information is to be added, then it will add up to a considerable amount. Especially as the recent budget also included freight and insurance into the total sum to be levied by the 40 percent.

New Zealand Customs have never levied a sales tax on locally-made software. But this will presumably change under the weight of GATT pressure which completely forbids any preferential treatment to local suppliers.

New Zealand Customs seems to have the whole vexed question in a holding pattern pending the outcome of the appeal by the United States Government, the world's biggest software exporter, against the GATT decision.

Computerised Job-Finding

Bookseller John Schnellenberg has introduced an online computerised employment agency to Wellington.

He is using the New Zealand Post Office's OASIS satellite link to various US databanks. Under the system qualified

applicants file their credentials and wait for the job to come up. The database employment agency is available via the link to the DIALOG information retrieval service. "New Zealanders can now regard the world as their job market", notes Schnellenberg.

Career Placement Registry is divided into two parts. One for people with some sort of university qualification, the other for 'experienced' personnel including white or blue collar workers.

A recent illustration of the potential of this online job bureau, according to Schnellenberg, concerned a Wellington company seeking a computer programmer. A five minute search of the database revealed a few appropriate people, and revealed if they wanted to live overseas.

Another interesting new release from DIALOG that Schnellenberg is using is the Electronic Yellow Pages of the United States. Eventually, the complete 9,000,000 record database will be online.

"The days of searching through bulky printed directories in strange motel rooms are now definitely over", commented Schnellenberg. "You can search from your own city."

Confusing Shows

Are exhibitions such a good thing for the microcomputer industry?

In the last two years there has been one microcomputer fair each in Auckland and Wellington. A third is now due in Auckland. Many dealers feel that the sheer multiplicity of micros confuses prospective buyers.

"You have people going into those exhibitions who only know about Apple, Commodore and Radio Shack. They might want to buy one. Then they see perhaps 33 different brands — and they don't know what to buy."

In fact there are almost as many makes of micro in New Zealand as in Australia, and competing for a much smaller market. The population is slightly over three million.

At this year's Wellington micro exhibition Computer Consultants Ltd pointedly stayed away, issuing advertisements to the effect that people should drop by and study their micro range (OSI) in the peace of their swank offices.

Xerox Philosophy

Paul Strassman, vice president of Xerox corporation Information Systems, had some philosophical words when he toured New Zealand in August.

your TI 99/4 computer

By Peter Isaac

By Shane Andersen

He was outlining the capabilities of the new Xerox 8010 Star which has a symbolic approach to office management. The Star apparently will not be released in Australia for some time. Strassman said that the western culture is primarily a 'left brain' civilisation that has emphasised the linguistic, symbolic, and analytical capabilities of the brain.

This contrasted with the 'right' brain culture of the East which had a strong visual, imaginative, relational approach with a strong emphasis on picture values. The beauty of the new approach by Star, which features symbols of things like folders, in/out baskets and filing cabinets, is that it blended the 'left' and 'right' values of brain perception.

"In Xerox I can file paper in a folder by pointing to it. I can then electronically take the folder and place it in the out basket. I can then send it to a group of people just by pointing," said Strassman.

He said that the concept of man-machine communications in Xerox was one of 'metaphor' symbols. People should not be forced to deal with the electronic medium in ways that are alien or artificial such as is the case with existing terminals, claimed Strassman.

Pirates Supreme

Are there more software pirates per head of computing population in New Zealand than anywhere else in the world?

Chances are that this could be so. The aim around the world is to price hobby software at the point at which buying it fresh is simpler than copying it. But in New Zealand proprietary software routinely costs double or even treble the price of many countries — certainly double the price of the Australian variety.

Now there are signs that the software community is joining common cause with the people who represent the producers of video films and sound recordings. The software producers have been invited to join the Record and Video Association which represents the sound recording industry and people who produce films for VCR.

Association chairman Tim Murdoch has outlined a way of replacing the traditional royalties method of payment, a method which has now become out of date through ease of copying. He wants a lump sum tax to be applied to hardware so that it can then be held in a fund for distribution to the people who created the information — sound, visual — that people originally bought the hardware for.

LONG overdue, TI and Microsoft Corporation have developed a 'Visi-clone' product which will perform on the 99/4A equipped with the 32K memory expansion and disk system. This news, passed on to me by the International User Group in Oklahoma via our Melbourne branch, is very welcome!

Although the prototype version, shown at the CES, was inoperative, they had an opportunity to see Multiplan run on several other computers at NCC, said a representative of the IUG.

The Multiplan command module and diskette package is an aid for both personal and business needs, and is an extremely productive tool for data analysis. Although Multiplan will not be available until late in the fourth quarter, it is certainly a step in the right direction.

TI-Writer

Probably the most impressive piece of software in the States at the moment (and soon to arrive down under) is a new word processing program. The TI-Writer Solid State Software word processing command module (ROM pack) was designed to provide many of the features of the larger, more complex word processing systems to users of the TI-99/4A Home Computer. This product, however, cannot be used on the 99/4.

Text editing and formatting features include inserting and deleting text and lines, automatic paragraph indentation, right margin justification, automatic word wrapping, overstriking and underlining, moving and copying text and document reformatting. The user can create, edit, save and print documents with the text editor option, in either word wrap or fixed mode.

There are a number of other features, and all in all it looks great stuff. The TI-Writer command module requires the use of the 99/4A console, a TI memory expansion unit, disk system, RS-232C interface and a compatible printer like the Epson MX-80, Microline 80 or others.

In a recent article in YC, I mentioned a number of new products such as the Editor/Assembler. However, Texas Instruments, being such an innovator, is now travelling around the US displaying a new mass storage device, a 128K memory system for the 99/4(A).

Indications are that the memory is a solid-state non-volatile disk emulator. Accessed through disk operating routines, the device can perform at three times the speed of a regular disk. Another card for the new peripheral expansion which



should be out here in the first quarter of 1983?

Aussie Software Awards

On the 20th of this month (November), the TI Sydney Home Computer User Group is conducting a special full-day workshop event.

There are two reasons for this event: To help teach members how to write programs in BASIC, Extended BASIC, assembler and other languages; and to have a display put on by TI (Australia) of its forthcoming new products, such as the peripheral expansion box and printer.

Members will each bring their own computer system, and the more experienced members will assist the newcomers with their problems. The workshop will commence at 10 am and finish at 5.30 pm. Refreshments will be available throughout the day, and the announcement of the 1982 National 99/4(A) Aussie Software Award winners will be made.

As you may have previously read, this national competition for Australian 99/4(A) users has been running for a four or five month period, and TI (Australia) has very generously provided over \$1000 worth of prizes.

The judges for these awards were Dr John Buchanan of the University of NSW, Claudio Ellerio of Texas Instruments, Your Computer editor Les Bell, Brian Lewis of the Sydney 99/4 User Group and myself as National Coordinator.

Although judging took place on the October 30, that was just after the magazine's copy deadline, so we are unable to bring you the results. Needless to say, a good variety of software was entered from each state, and the task of judging was not expected to be an easy one.

your PEACH computer

By Dom Swinkels

ACCORDING to much of the advertising literature, computers should be 'friendly'. Now, I don't feel computers can either be friendly or unfriendly, but some systems are easy to use and others are not.

The term friendly has been used to describe systems — that is, hardware/software combinations — which are easier to use, because they require less memorising of commands and keystroke sequences to operate them.

The Friendly Peach

A feature of the Peach computer which allows us to make it easier to use for a particular purpose is the inclusion of 10 programmable function (PF-) keys on the keyboard.

Each of these keys can be programmed to perform any function, which the computer is capable of at a single keystroke. Furthermore we can display on the screen what we have programmed each key to do, so that we do not have to memorise this. This makes the system easier to use and hence 'friendlier'.

Let's review the commands used to program and use the PF-keys and by examining how the information is stored in memory we will discover some things we can do that are not described in the manuals.

The PF-keys are used in two basic ways. In the command mode (that is, when no program is running) pressing a PF-key will result in up to 15 characters being entered as if we had pressed this number of keys on the keyboard. While a program is running we can use the PF-keys to interrupt the normal flow of the program and go to a subroutine to perform the task programmed there and then return to the main program.

The PF-Key Commands

The important BASIC commands for the use of the PF-keys are:

KEY LIST

KEY n, "(string)"
on KEY n GOSUB (line number)
KEY(n) ON/OFF/STOP

The first of these typed in from the keyboard followed by RETURN (or within a program) will list the contents of all 10 PF-keys on the screen.

We can also display the contents of the PF-keys on the bottom line of the screen using the CONSOLE command. Thus, CONSOLE 0,24,1 will set the scrolling window to 24 lines starting from the top,

while the bottom line shows the contents of PF1 to PF5. If we are in 80 character width mode then up to 15 characters are displayed, while in 40 character mode only the first seven characters of each PF-key are displayed. Pressing the SHIFT key displays the contents of PF6 to PF10 in the same way.

The manual tells us that we can program each key with a string of up to 15 ASCII characters using the command KEY n, "(string)" where n=1 to 10 and (string) is any string of any length, but only the first 15 characters will be used. When we now press this PF-key it is as if we have entered this sequence of ASCII characters from the keyboard. If the string is a valid BASIC command followed by RETURN (CHR\$(13)) then the computer will execute this command.

Since the contents of the PF-keys can be programmed, this information must be stored in RAM and since on power-up the keys are already programmed with a standard set of strings this standard set must be stored in ROM and be transferred to RAM as part of the power up procedure.

Being naturally curious I wondered where in RAM and ROM this information was stored. So I wrote a short program, MEMLOOK1 shown in Listing 1, which allows 256 byte blocks of memory to be displayed on the screen in both their hexadecimal values and their ASCII equivalents.

If you run this program and enter &HC3B as the starting point, then you will see something like Table 2. This part of RAM contains the current contents of the PF-keys. If you run the memory display program again and now enter &HFD50 as the starting point, then you will see part of ROM containing the initial Microsoft message and the standard PF-key contents,

which are loaded into RAM at power up.

You might also like to start at &HA070 and see part of ROM, where all the reserved words of ROM BASIC are stored in order of their token values. They may look a little strange because the last character of each word is different. This is because bit 7 has been set to 1 to indicate the end of the reserve word.

Fifteen-Character Limit

Being restricted to only 15 characters for each PF-key significantly limits what you can program into each key.

For example, SAVE"1:THISFILE" or LOAD"1:THATFILE" do not fit within the 15 character limit. Although these commands would work without the final double quote, it would be nice if we could also fit in the RETURN character (CHR\$(13)) which is not normally possible.

There are several ways around this. First we will consider a way which is not given in the manuals and probably was not envisaged by the programmers who developed the BASIC for this machine.

If you look at Table 2 you will see that 16 bytes are allowed in RAM for each PF-key. All unused bytes are NULL bytes. I wondered what would happen if I changed all the NULL bytes. The result was that on pressing the appropriate PF-key the system read all the characters until it encountered a NULL byte.

To test this you may want to follow these steps: Step 1. From the keyboard enter KEY 1, "ABCEFGHIJKLMNOP" and KEY 2, "QRSTUVWXYZ" each followed by RETURN. If you now press PF1 then the first 15 letters of the alphabet are displayed on the screen, while PF2 will display the last 10.

The letter P has been lost because it

TABLE 2. Sample output of MEMLOOK1 program given in LISTING 1.

loc.	B	C	D	E	F	0	1	2	3	4	5	6	7	8	9	A	Characters.
0C3.	4C	4F	41	44	20	0D	00	00	00	00	00	00	00	00	00	00	LOAD
0C4.	3F	44	41	54	45	24	2C	54	49	4D	45	24	0D	00	00	00	?DATE\$, TIME\$...
0C5.	4B	45	59	20	00	00	00	00	00	00	00	00	00	00	00	00	KEY
0C6.	4C	49	53	54	20	0D	00	00	00	00	00	00	00	00	00	00	LIST
0C7.	52	55	4E	20	0D	00	00	00	00	00	00	00	00	00	00	00	RUN
0C8.	54	45	52	4D	20	00	00	00	00	00	00	00	00	00	00	00	TERM
0C9.	53	43	52	45	45	4E	20	00	00	00	00	00	00	00	00	00	SCREEN
0CA.	43	4F	4C	4F	52	20	00	00	00	00	00	00	00	00	00	00	COLOR
0CB.	4C	49	53	54	22	4C	50	54	30	3A	22	0D	00	00	00	00	LIST"LP0: ".....
0CC.	43	4F	4E	54	20	0D	00	00	00	00	00	00	00	00	00	00	CONT
0CD.	FF	00	00	00	00	00	FF	00	00	00	00	00	FF	00	00	00
0CE.	00	00	FF	00	00	00	00	00	FF	00	00	00	00	00	00	FF	00
0CF.	00	00	00	00	FF	00	00	00	00	00	FF	00	00	00	00	00
0D0.	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0D1.	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
0D2.	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

was ignored during the execution of the KEY 1 command. You can verify that by running the MEMLOOK1 program. Now do step 2: Poke the ASCII code for P into the memory location at the end of PF1 in RAM containing the NULL byte. To do this enter POKE &HC4A,80 followed by RETURN. If you now press PF2 the same 10 letters are obtained but PF1 will give the entire alphabet.

KEY LIST still only shows the first 7 or 15 characters of each key contents, but it is now possible to execute several commands at a single keystroke even though together they require more than 15 characters.

There is a simpler way of doing this by programming a PF-key with GOSUB (line number) and then placing the multiple commands in the subroutine at (line number). A disadvantage of this approach is that the contents of the PF-key now no longer indicates what the result of pressing it will be, so that we are back to having to memorise this.

To overcome this we can limit the scrolling window to the top 20 lines of the screen (CONSOLE 0,20,0) and then place the message relating to each PF-key on the bottom of the screen using the LOCATE command. These can then in fact be more user-friendly than the actual contents of the PF-key. An example might be the message 'PF1- next page', while the actual contents of PF1 might be "P=P+1:SCREEN,P"+CHR\$(13).

As pointed out earlier, pressing a PF-key has the same effect as pressing a sequence of keys on the keyboard. This will therefore only have a result when input from the keyboard is possible. During the running of a program we can however use the PF-keys in a different way to interrupt the program and to re-direct the flow of program execution.

Key Interrupts

To interrupt a running program using the PF-keys we must first use the ON KEY n GOSUB (line number) command in the program and place the sequence of commands to be executed on interruption in the subroutine starting at (line number).

Since there are 10 PF-keys we can in fact select any one of 10 program segments and each segment can be programmed to contain another 10 segments, and so on. We can then turn the ability to interrupt on (KEY(n) ON) or turn it off (KEY(n) OFF) or we can take note of the fact that the PF-key has been pressed but

stop the interrupt (KEY(n) STOP) until a convenient point in the program, where it can be executed (KEY(n) ON). The program in Listing 2 shows the various uses of the PF-key interrupt commands.

The program is somewhat trivial in that it simply draws lines on the high resolution graphics screen. However, it clearly demonstrates that you can interrupt a given task (drawing a line) and perform another task (drawing a line in a different direction) which in turn can be interrupted.

On completion of the last task, control is returned to the previous task, which is then completed, and so on. The program requires high resolution graphics, so you must execute NEW ON 7 before running it. Line 20 checks for this.

One important feature to note is that in the command mode, the PF-keys must be in the OFF state to allow their normal use to enter the string of up to 15 characters. This means that we must ensure within the program that all PF-key interrupts are turned OFF, otherwise they cannot be

used at all in the command mode.

The RUN command will set all PF-interrupts to OFF so that each program starts with all interrupts off. However, even a normal exit from a program via an END statement does not turn OFF any interrupts left ON within the program.

When you have made provision within the program to turn all interrupts OFF in the course of a normal exit, you may still have a problem when an error causes the program to terminate.

You then have two ways of turning the interrupts off. One way is to type in the KEY(n) OFF command for each key left on. This may be a bit slow when several PF-key interrupts were left on or if you do not know which ones might have been on.

The other and faster way is to type in RUN (line number) where (line number) is the number of a program line containing only the END command. The RUN command will turn all PF-key interrupts off and the END command will immediately terminate the running of the program.

LISTING 1.

```

10 REM..."MEMLOOK1"...by Dom Swinkels.
20 REM...Look at 256 memory locations and print on screen.
30 WIDTH 80:CONSOLE0,24,1
40 INPUT "Enter memory location to start at: ";ST
50 REM...Prepare and print heading lines.
60 M=ST-256*INT(ST/256):L$="loc.  "
70 FOR J=0 TO 15:M$=HEX$(M+J):M$=RIGHT$(M$,1)
80 L$=L$+M$+"  ":NEXT J
90 L$=L$+" Characters.":PRINT L$
100 PRINT STRING$(72,"-")
110 REM...Read and analyse 16 lines. Print on screen.
120 FOR L=ST TO ST + 255 STEP 16
130 L$=HEX$(L):B$=""
140 IF LEN(L$)<4 THEN L$="0"+L$:GOTO140
150 L$=LEFT$(L$,3)+"  "
160 FOR J=L TO L+15
170 M=PEEK(J):M$=HEX$(M)
180 IF LEN(M$)<2 THEN M$="0"+M$
190 L$=L$+M$+"  "
200 IF M<31 OR M=255 THEN A$="." ELSE A$=CHR$(M)
210 B$=B$+A$:NEXT J
220 PRINT L$;"  ";B$:NEXT L
230 REM...Next block or finish ?
240 ST=ST+256
250 PRINT:PRINT:INPUT "NEXT BLOCK OR FINISH (N/F) ";A$
260 IF LEFT$(A$,1)="N" THEN GOTO 50
270 END

```

LISTING 2.

```

10 REM...PF-KEYS...by Dom Swinkels.
20 IF PEEK(29)<>75 THEN NEW ON 7
30 CONSOLE0,24,0:CLS:COLOR7
40 PRINT"The standard PF-key contents loaded at power up are:":PRINT
50 KEY LIST

```

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```

60 ON KEY (1) GOSUB 2000
70 ON KEY (2) GOSUB 3000
80 ON KEY (3) GOSUB 4000
90 ON KEY (4) GOSUB 5000
100 ON KEY (5) GOSUB 6000
110 KEY (1) ON
120 CONSOLE 0,24,1:LOCATE 0,15
130 PRINT"The contents of the PF-keys are also shown on the bottom line using"
140 PRINT"CONSOLE 0,24,1. Press SHIFT to see PF6 to PF10.":PRINT
150 PRINT"These contents of the PF-keys can only be used in the command mode."
160 PRINT"This program is now running and the only PF-key turned on is PF1."
170 REM...Loop here until interrupted.
180 LOCATE 0,23:PRINT TIME$;" Press Z to exit.;"
190 A$=INKEY$:IF A$<>"Z" THEN GOTO 170
200 RUN 210:REM...This turns all PF-keys OFF.
210 END
2000 REM...Clear the screen, print PF-key labels and turn interrupts on.
2010 CONSOLE 0,24,0:CLS:COLOR 11
2020 LOCATE 0,25:PRINT" PF1-CLEAR SCREEN ";
2030 LOCATE 22,25:PRINT" PF2-UP ";
2040 LOCATE 35,25:PRINT" PF3-DOWN ";
2050 LOCATE 50,25:PRINT" PF4-LEFT ";
2060 LOCATE 65,25:PRINT" PF5-RIGHT ";:COLOR7
2070 KEY (2)ON:KEY (3)ON:KEY (4)ON:KEY (5)ON
2080 COLOR7:X=320:Y=100:PSET (X,Y):RETURN
3000 REM...Move up routine.
3010 L1=L1+30:FOR UP=1 TO L1:Y=Y-1:GOSUB 7000:NEXT UP:L1=0
3020 RETURN
4000 REM...Move down routine.
4010 L2=L2+30:FOR DOWN=1 TO L2:Y=Y+1:GOSUB 7000:NEXT DOWN:L2=0
4020 RETURN
5000 REM...Move left routine.
5010 L3=L3+30:FOR LEFT=1 TO L3:X=X-1:GOSUB 7000:NEXT LEFT:L3=0
5020 RETURN
6000 REM...Move right routine.
6010 L4=L4+30:FOR RIGHT=1 TO L4:X=X+1:GOSUB 7000:NEXT RIGHT:L4=0
6020 RETURN
7000 REM...Drawing routine.
7010 KEY (2)STOP:KEY (3)STOP:KEY (4)STOP:KEY (5)STOP
7020 IF Y<0 THEN Y=183
7030 IF Y>183 THEN Y=0
7040 IF X<0 THEN X=639
7050 IF X>639 THEN X=0
7060 PSET (X,Y)
7070 KEY (2)ON:KEY (3)ON:KEY (4)ON:KEY (5)ON
7080 RETURN

```

READER'S CARTOONS



Cartoon by Craig Delahoy



"Looks like Johnson's been playing ADVENTURE during lunchtime again!"

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ZX-81: 1K-16K programs include File, Othello. Send S.S.A.E. for price list to David Noble, 34 Murri Street, Blackheath, N.S.W. 2785.

MicroBee: Speed up kit, send \$8.00 inc. p/p to: L Latemore, PO Box 704, Sale, Vic. 3850. Ph (051) 44 2011. All parts and full instructions included.

For Sale: Tandy Pocket Computer with cassette interface and listing of two games. \$200. Ph. Steven (02) 607 3481.

Sorcerer 32K: Devpac, manuals, software. \$750 o.n.o. Godbout XX S100 32K Static RAM \$250. Hazeltine terminal \$100. Terry (02) 682 4649 a/h.

PC1500: With Printer and manuals, only 9 months old, suit beginner, cost \$570 will sell \$520. Still under warranty. Phone (07) 30 3314.

MicroBee 16K: Fully assembled, all manuals, software tape, plus 6 blanks. \$420. Terry (02) 623 1583 or b/h (047) 39 6102.

Wanted: Sinclair ZX-81 software to sell/swap. Second-hand keyboard + printer + unwanted, cheap books etc. P Carswell, 22 Brand Street, Bundaberg, 4670,

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Sell: Sorcerer programs, original tapes. Super Asteroids, Grotnik Wars, Bruce Chess game, Adventures 1, 7 and 8 and Touch Type Tutor. \$10 each. Cook, PO Box 95, St Marys, Tas 7215. Phone (003) 72 2111 b/h before 3pm.

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your ZX81 computer

By David Brudenall

IT IS interesting that Sinclair Research is promoting the new Spectrum as a direct competitor to the BBC micro.

Its advertising literature virtually claims the Spectrum is as good as, or better than, the BBC micro, but at a far lesser cost. The Spectrum is a nice machine, but it is not as good overall as the BBC machine.

The BBC micro, for instance, has higher resolution graphics, better sound, and a better keyboard. By now most of you would have heard the story that the most popular name for the Spectrum in the Sinclair Research office was "Not the BBC Micro!".

What all this is getting to is that this marketing strategy by Sinclair is rather irresponsible. People who can afford to buy a BBC machine but opt for the Spectrum instead will be missing out on some nice BBC features. For people who can only afford the Spectrum, however, it is a worthwhile machine.

The Spectrum is going to become a

very popular micro and will be quite adequately supported with software and hardware. Already the advertisements from Spectrum software vendors are appearing in the UK magazines.

Evidently the biggest problem with the Spectrum is its speed. It is still only as fast as the ZX81 in fast mode, and that isn't very fast when compared to other micros. The Spectrum's sound abilities aren't all that hot either. The sound is very quiet and the Spectrum cannot do anything else while it is BEEPing.

Nevertheless, I like the look of the Spectrum, and perhaps I will even get one eventually!

PEEK and POKE

PEEK and POKE are two of the functions which the newcomer to computing has the most trouble understanding.

I know when I was starting out with computing I often wondered just what PEEK and POKE were, and what they could

actually do for me. The truth is that quite often PEEKing and POKEing isn't necessary for many applications.

ZX81 statements like PRINT AT and PLOT can reduce the need for POKEing onto the screen most of the time. However, there are those occasions where PEEKs and POKEs are desirable or a necessity.

Here are two useful PEEK routines for the ZX81 owner. These are byte-counters (they print the amount of memory used up by your program not counting the PEEK routine itself).

To use it, simply type it in at line 9999, then if you want to see how much RAM your program has consumed, use RUN 9999 or GOTO 9999.

Byte-counter for ZX81 with 1K RAM:

```
9999 PRINT PEEK 16400 + PEEK 16401
* 256 — 16587
```

Byte-counter for ZX81 with 16K RAM:

ZX81 & Spectrum software

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9999 PRINT PEEK 16400 + PEEK 16401
* 256 — 17355

These routines also work with the 8K
ROM ZX81.

What's a USR?

Just what is USR? USR is a function
used to activate machine code routines
from BASIC. Don't worry too much about
USR unless you already know something
about machine code.

There is one peculiar little USR routine
which is quite interesting. If you have a
RAM pack fitted you might like to try this:

PRINT USR 1012

High-res graphics! That USR command
just wrecked up the entire character set,
but don't worry, type in NEW and press
N/L and everything will be restored.

Unfortunately the display won't repro-
duce on the printer, which would be nice.

While USR 1012 is activated you can type
in simple programs like 10 PRINT '(any
characters)'; 20 GOTO 10 (even though
you can't actually read what you're typing
in), and when RUN you should get some
interesting patterns! When PRINT USR
1012 is activated everything in RAM is
cleared so it's no use typing in the simple
pattern programs beforehand!

In a future column I will be explaining
PEEKing and POKEing to the screen in
more depth, and will suggest some poten-
tial applications (games are the most
common use) for such POKEs and
PEEKs.

ZX81 Crash Cures

AZUA member Byron Wetton reports
that some ZX81 crashes are caused by
vertically mounted resistors on the ZX81
printed circuit board touching the conduc-
tive surface on the underside of the top
half of the ZX81 case.

To cure these crashes you have to take

your ZX81 apart (there are screws hidden
under the rubber feet on the bottom of the
ZX81), and insulate the underside of the
top half of the case with plastic tape.

Another AZUA member, Jim Gray, re-
ports that Sinclair UK has claimed that
RAM pack crashes can be cured by apply-
ing lubrication to the ZX edge connector.
Try cleaning the edge connector with
methylated spirits, then apply some vas-
eline to both the top and the bottom of the
edge connector. Jim says it worked for
him!

While mentioning AZUA members, why
not a plug for AZUA too? If you want to
become a part of the highly acclaimed
Australian ZX Users' Association (AZUA),
send a 40 cent stamp (for our free intro-
ductory newsletter) to: AZUA, 19 Godfrey
Street, Campbell ACT, 2601. AZUA's
subscriptions have unfortunately had to
rise to \$12, or \$7 for 6 months, but it's still
the cheapest ZX club in Australia (as far
as we know, anyway!).

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magazine.

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your MICROBEE computer

by Richard Pakalnis

I POPPED into Applied Technology's showroom at Waitara the other day so I could pick someone's brain and supply you with some real, interesting and useful informative stuff instead of my normally introverted ego bash.

Remember last month when I finished off with the self test facility? I do believe some of you have had trouble getting it up on the screen. Don't despair. It's just a matter of dextrous skill. Press RESET and hold it down. While holding down RESET, press 'S' and hold it down. Sing *Waltzing Mat...No*. Don't do that. Now release RESET (still holding 'S' down) and *voila!* On screen will appear the word 'KEYBOARD'.

This is the keyboard test. Starting at the ESC key working from left to right, press each key in turn, using your normal pressure, to BACKSPACE; TAB through to RETURN and so on. Keep in sequence and don't hit two keys at once. The last key you hit is the SPACE BAR. If your keyboard is operating correctly a tick will appear and the MicroBee will go on to test the ROM and RAM packs and your other bits and pieces which are described on screen.

But what's this? Cassette and RS 232 are (X)'d. Just take your cassette plugs and short them across each other. Same for the RS 232. Bit of a fiddle but worth it if you're suffering from data transfer problems.

Cold starts seem to be a digital exercise for some as well. (Hold it. I know what you're thinking!) Press RESET down and hold it. Press ESC and hold it. Release RESET. BEEP! Your MicroBee is naked once again.

Micropolis Who?

Contrary to popular belief, the Micropolis disk drive will not be promoted as the MicroBee's major peripheral. The MPI-52 (Micro Peripherals Inc) has been chosen and will take a double sided 250K unformatted 13cm double density floppy. Price? By itself \$549. That's not bad in today's money.

To save you a phone call, here is the absolute, most up-to-date price list (effective 9th September, 1982) so you can buy more wings for the Bee: S100 Interface/Cabinet, \$299; Disk Drive, FDC, CPM 2.2, \$799; Add-on Disk Drive, \$549; MicroBee Conversion 16-32K, \$100; MicroBee Conversion 32-64K, \$155; Kaga Monitor, \$299; Black & White Monitor, \$139. Software in ROM: MicroBee Editor Assembler, \$49; MicroBee 5.1 BASIC Update, 92

\$20; MicroBee CP/M 2.2 on disk, \$200.

Graphics

Some good news for those who want to know all about programmable character generators but were afraid to ask.

Very shortly a tape will be released by Applied Technology which will be a teaching aid in PCG and Graphics Editing. Now don't start dashing for the phone and ask when it will be ready. Believe me, I'll let you all know when to place your orders. It's a few months yet. I'll review it as soon as it's available...

I wonder who out there picked the typographical error in the manual (the new spiral bound one) referring to the PCG Car Graphics. Page 106. Program line 140.

140 PRINT "LOOK....";GOSUB [Z] 2000 etc.

Anthony Callinan from Applied Technology asked me to apologise on their behalf. The semi-colon (;) should be a colon (:). If you're a budding programmer you don't need error messages this early in your career. You may say it's only a small thing but it's shown they care.

For those of you who are waiting for their new cases (and those of you waiting for their new MicroBees), please don't worry. I've been assured the Queen Bees at Gosford have been working their little wings off to get those back orders out to you all. They are on their way and will be with you soon. I've been waiting for mine, too.

Power pack problems seem to have cropped up around town. Some of them get so hot they melt the solder on the power rail. The problem is being addressed and the lookout is on for a new supplier. An Australian supplier I might add. You're Australian, we're Australian, Applied Technology is fiercely Australian. Buy Australian. Good on yer! (*You told me you were Lithuanian* — Ed)

Tutorials For Teachers

This is a message to all teachers who have been, or are about to be, involved in education with the MicroBee.

Applied Technology will be starting, very shortly, Tutorials For Teachers so that they can get the best possible use out of the MicroBee.

Completely without permission I'd like to reprint some copy from 'Microworld Report' which was issued earlier this year.

It said "...our major market objective for

the MicroBee was to produce a powerful, cost effective computer for the educational market.'. The article went on to say sponsors had collectively contributed \$120,000 to a fund to produce software and other support for the MicroBee in Educational applications. There are over 500 programs ranging from music lessons, the arts and typing skills to fundamental mathematics instruction. So teacher — be ready and don't be another brick in the wall.

Enough of this serious stuff. It's game time. I got away with a swag of game tapes while visiting the Hive at Waitara. I've spent a lot of time trying to figure out which one to load first...Think...Think...Concen...Yes, of course...

Concentration

The game of Concentration (anybody out there old enough to remember Terry Dear?) is a memory game which can be played by up to four people. The MicroBee can be one of the players if you wish.

The graphics in high resolution are excellent by the way. The screen displays 60 cards numbered from 1 to 60. There are picture cards laid face down and you have to match a pair. Different cards have different points allotted. There is a degree of difficulty from 0-9 and the higher the difficulty the better the computer memory of cards previously turned.

With four players and a cask of Killawarra Cabernet Sauvignon you soon forget whose turn it is, without trying to remember what cards are where. No problem. Names are input at the beginning of the game and each player is prompted and scores are kept.

If your girlfriend has left you because you glow in the dark, type in Merlin or Merle and you play the Bee. I like the game. Well worth \$7.95. What I don't like is the way it shows how my memory has been eroded by all this booze. I haven't gone past 0 yet!

Anybody Out There?

I don't want to seem picky but my fellow columnists seem to get mail from their readers. I feel quite inadequate not getting reader/user suggestions (be careful — I'm quite big).

If you've done something extraordinary with your MicroBee or done something really dumb, write to me c/- Waterloo (or it really will be my Waterloo) and tell me about it. This column is for you so use it up. □

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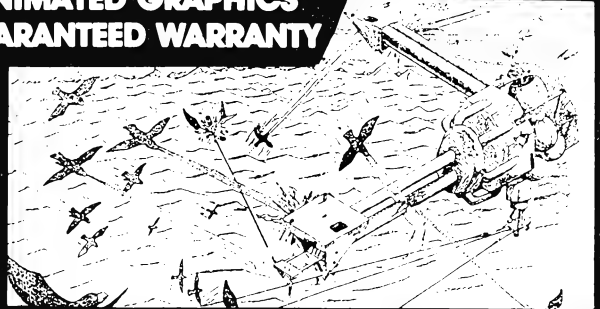
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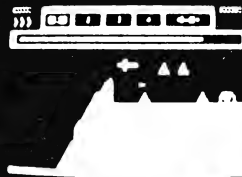
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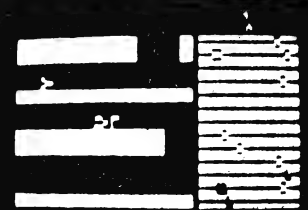
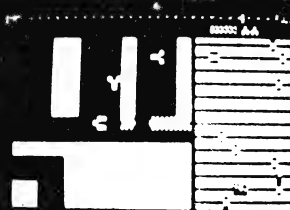
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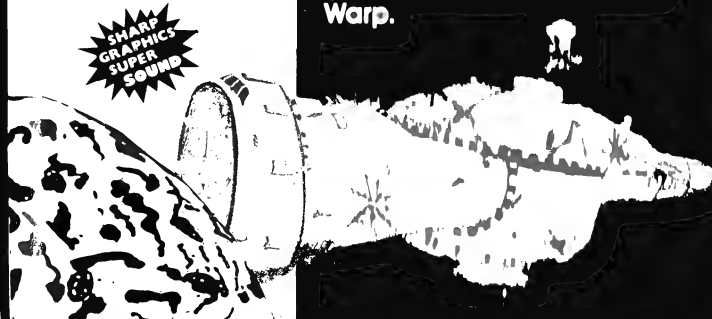
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TOTAL

your computer glossary

Absolute: Located at a fixed address in memory.

Access: To read or write from a location in memory, or a file, or disk.

Accumulator: The major register of a CPU, in which arithmetic and logical functions are performed. Some computers have several registers which can function as accumulators; in others some registers can perform a subset of the full set of operations.

Address: A memory location which can contain data or an instruction.

Algol: Algorithmic Language, an early computer programming language for mathematical applications. Widely used in Europe, embodied early structured programming concepts and was a precursor of Pascal.

Algorithm: A set of instructions which define a method of obtaining some result (usually mathematical). A cooking recipe is an algorithm, as is a knitting pattern.

Alphanumeric: Composed of either letters or numbers or both.

Analogue (Analog): Representation of a value by a voltage or some other measurable datum, rather than a binary or other representation based on counting.

Apple: The Apple 11 computer is a computer based on the 6502 microprocessor with an integrated keyboard. Noted for its colour graphics capabilities, which make it popular with schools.

Application: What you do with your computer.

Array: A set of values under a common variable name, which are accessed through a subscript. For example A[1] is the first item in array A, A[2] is the second, etc. A[N] is the Nth item.

ASM: Assembler. also a suffix added to assembly language file names to distinguish them from other files with the same name.

Assembler: A program which converts assembly language into its corresponding machine (or object) code, which can be executed by the computer.

Assembly Language: A language in which each machine code instruction is represented by a short mnemonic which is much more comprehensible to the programmer. For example, the 8080 machine code

```

[10010110]
in binary, is
[SUB L]

```

(subtract L from accumulator) in assembly language. Each line of assembly language becomes one machine instruction.

Assign: To make one thing equal to another, e.g. [A = B] assigns the value of B to A.

Atom: An indivisible component of a data structure.

Attribute: A property possessed by some object, such as a file. Often attributes take the form of restrictions, such as a file being read-only.

Backup: An extra copy of a disk, tape or file taken as a precaution against damage of the original.

Backus Normal form: A special language (a metalanguage) used to describe precisely the grammatical rules of another language.

Base: The lowest number inexpressible in a given number system.

BASIC: Beginners All-purpose Symbolic Instruction Code. Invented in 1970 at Dartmouth College By Kemeny and Kurtz as a teaching language, it has since been enhanced in its more exotic forms into one of the most sophisticated yet easy-to-use languages available on personal computers. Its major rival is Pascal, which has the added virtue of stressing structured program design.

BDOS: Basic Disk Operating System. The major functional component of the CP/M DOS.

Binary: The system of counting in 1s and 0s used by all digital computers.

Binary Search: A method of searching for an entry in a table by successively halving the table until all that's left is the desired entry.

Binary Tree: A form of data structure in which entries are tagged on at the end of the appropriate branches.

BIOS: Basic Input/Output System. The part of the CP/M operating system which is different for each machine and provides any special I/O routines for disks, terminal, printer, etc.

Bit: Binary Digit. Either 1 or 0.

Boot: To load the operating system into the computer from a disk or tape, either initially or subsequently after running a program.

Bootstrap: To use one short program to load a longer loader program which then loads the operating system.

Branch Instruction: A program instruction which causes the computer to jump to another instruction, usually fairly close by.

Buffer: An area of memory used for temporary storage while transferring data to or from a peripheral such as a printer or a disk drive.

Bug: an error in a program. Makes programmers itch.

Bus: A set of wires over which, data, addresses, or control signals are transferred between the central processor and memory or I/O devices.

Byte: A computer word eight bits wide. A byte in memory can hold a character or a binary number between zero and 255 (or — 128 and 127), or a computer instruction.

C: A programming language, developed at Bell Labs, which is particularly convenient for writing system utility programs.

Case Statement: An instruction found in some high level languages which allows control to pass to one of several subroutines depending on the value of a variable. For example, the BASIC statement

```
ON X GOSUB 100, 200, 300
```

will jump to line 100 if X = 1, 200 if X = 2, 300 if X = 3.

Call: A jump to a subroutine which leaves the return address on the microprocessor stack, so that when the subroutine is finished executing, control returns to where it left off.

CBASIC: A commercial version of the BASIC language, running under the CP/M operating system. Doesn't use line numbers on every line, and is compiled, rather than interpreted like Microsoft BASIC.

CCP: Console Command Processor. The part of the CP/M operating system that reads a command line and sorts out what it means.

Chain: To automatically run one program after another.

Character: A letter or number, or in some circumstances, a control code such as "carriage return".

Checksum: A running total of the characters in a file, recorded or transmitted with the file so that errors can be detected.

Code:

Absolute: Machine instructions which are intended to be loaded and executed in a particular area of memory.

Object: Machine instructions, as distinct from the source code from which it was generated.

Reentrant: Code which can be used by several users at once, keeping separate variables for each.

Relocatable: Code which can be loaded and run anywhere in the computer's memory.

Source code: A program written in assembler, or a high level language such as BASIC, which must then be assembled or compiled to produce the object code which can actually be executed.

Cold Boot: To start up a system from scratch, loading the operating system from disk or tape.

Cold Start: See Cold Boot.

COM file: In CP/M parlance a command file, that is, a machine code program that can actually be run.

Command: An instruction from the console for the system to do something.

Comment: A note added into a program to help the reader (or programmer) to understand its operation. Does not affect the program's execution in any way.

Compiler: A program which accepts as input a source file written in a high level language, and produces as output an object file containing the machine instructions which are actually executed.

Computer: Are you serious?

Concatenate: To join two strings together, one after the other.

Conditional: A test; for example, is X greater than Y: IF X is greater than Y
THEN GOSUB 500 (BASIC)

- or, if the carry flag is set, jump to location NEXDIG:
JC NEXDIG (Assembler)
Conditionals are one of the most powerful features of any computer language.
- Console:** The keyboard and screen from which the operator controls the computer
- Control characters:** Codes which perform functions like acknowledging correct receipt of a message or requesting retransmission of an erroneous message. Control characters are defined as part of the ASCII and similar codes.
- Copy:** To duplicate, usually for backup safety
- CP/M:** A disk operating system for 8080 and Z80 based microcomputers. Allows the user to store information and programs in named files, as well as managing disk storage and input/output functions. Other disk operating systems include TRSDOS (on TRS-80) and DOS 3.3 (for Apple).
- CRT:** Cathode Ray Tube. Usually refers to the screen of a video terminal or the terminal itself.
- Data:** Information to be processed by, or output from, a program.
- DDT:** Dynamic Debug Tool. A program that assists the user to find errors in machine code programs.
- Debug:** To locate and fix errors.
- Decimal:** Based on ten.
- Delete:** To erase.
- Device:** A piece of equipment such as a printer or tape drive which the computer uses.
- Directory:** A list of the programs on a disk (or occasionally tape) together with necessary information, such as length and location
- Disc:** A flat, circular magnetic surface on which the computer can store and retrieve data and programs. Is fast compared with tape particularly when access is not one item after another.
- Disk drive:** The mechanical assembly which rotates the disk and positions the read/write head.
- Disk Operating System:** A program which operates one or more disk drives automatically and manages the system.
- Display:** The computer's output device at the console, usually a TV-like display of letters and numbers; sometimes the computer can draw on the display.
- Double Density:** A method of recording twice as much information on a floppy disk.
- Dump:** To list out the contents of memory or a disk.
- Echo:** When the computer inputs a character from the keyboard, it then sends it back to the display so that you can see it was received correctly.
- ED:** An editor program; part of CP/M.
- Editor:** A program which lets you alter and correct source files and other documents.
- Erase:** See delete.
- Error Message:** Tells you something went wrong, and sometimes what.
- Execute:** To run a program; to follow its instructions.
- FIFO:** First in, first out.
- File:** A continuous collection of characters (or bytes) saved on a disk or tape for later reloading.
- Fixed Point:** Counting in integers only. Usually limited to small values, and restricted in accuracy, giving rise to ridiculous answers such as $9/5 = 1$.
- Flag:** A variable, sometimes a single bit, which can have only two values, used to indicate some condition.
- Floating point:** The kind of arithmetic used in scientific calculators.
- Floppy disk:** A disk, made of thin flexible mylar, and enclosed in a card jacket, which can be used for magnetic storage. There are two varieties; eight inch and 5¼ inch. These can typically store somewhere between 140,000 and 3 million bytes (characters).
- Focal:** Formula Calculator. A simple language, rather like a small BASIC, found on some mini and microcomputers.
- FORTRAN:** Formula Translation. One of the first computer languages, and beginning to show it.
- Function:** A sub-program that processes variables in some well-defined way.
- Garbage Collection:** The process of going through memory or disk space, reclaiming all the unused space.
- Global:** A variable which is known to all the parts of a program. See local.
- Grammar:** The formal rules of a language.
- Hard Disk:** A disk made of hard material, larger, faster and more fragile than a floppy disk, and capable of storing 70 million bytes or more.
- Hard Copy:** Printout.
- Hardware:** The bits of a computer you can kick, as opposed to the programs you can only swear at
- Hashing:** A method of reducing the size of a table which otherwise would have mostly empty entries.
- Hexadecimal:** The method of counting to the base sixteen. Or the method of splitting binary digits into groups of four, which is the same thing. In hex, you count: 0 1 2 3 4 5 6 7 8 9 A B C D E F 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F 20 21 22...
- Identifier:** A label, or the name of a variable.
- iff:** If and only if
- Index:** A variable which usually points to an entry in a table or list.
- Index Register:** A processor register which is used to access tables and lists in memory.
- Indirect Addressing:** Referring to a variable which actually contains the address of another variable.
- Input:** To get data into the computer.
- Instruction:** A step the computer can perform.
- Integer:** A whole number.
- Intermediate Code:** A special kind of object code which cannot be run directly on the computer, but must be interpreted.
- Interpreter:** A program which examines source code a line at a time, decides what it means, and then does it. Compare with compiler.
- Interrupt:** To electronically drag the computer away from what it is doing in order to respond to some time-critical situation.
- I/O:** Input/Output.
- Jump Instruction:** Normally, control proceeds from one instruction to the next, one after the other. A jump instruction passes control, not to the following instruction, but to some other. Jumps can be conditional.
- Kilo-:** Prefix meaning one thousand.
- Kilobyte:** 1024 bytes (Kbyte).
- Kilobaud:** 1000 baud (kbaud).
- Label:** A word which identifies the destination of a call or jump instruction, or simply identifies some location in memory.
- Language:** The set of instructions, and rules for stringing them together, which you use to instruct the computer what to do.
- Library:** A set of programs, or sub-programs.
- Line Number:** A number at the beginning of a line, which identifies it in a similar way to a label.
- Line Printer:** A high-speed printer for computer output.
- Link:** Part of a data item in a list, which tells the computer the location of the next data item.
- LISP:** A list processing language, much favoured by the artificial intelligence community.
- List:** A sequence of consecutive data items.
- Load:** To transfer some data or program into the computer memory.
- Locate:** To "fix" a relocatable code so that it will only run if loaded in a particular location.
- Logical Device:** A device as the computer "sees" it: what the computer regards as the "list device" may be one of several "physical devices", such as a line printer or teletype.
- Loop:** To repeatedly execute a sequence of instructions; part of a computer program that is so executed.
- Machine Language:** The binary codes the machine actually executes.
- Macro:** A user-defined sequence of instructions which can be inserted anywhere in a program.
- Macroassembler:** An assembler which can utilize macros.
- MBASIC:** Microsoft BASIC; the BASIC used in the TRS-80, PET, Apple 11 and so on.
- Memory:** Where the computer stores data and programs internally for fast access.
- Menu:** A display which offers the operator a choice of several alternatives.
- Microcomputer:** A small computer based on a microprocessor.

glossary

- Microprocessor:** The central processing unit of a computer, built into a single silicon chip.
- Mini-diskette:** A 5¼ inch floppy disk.
- MP/M:** A multi-user version of CP/M.
- NAD:** A name and address file maintenance program.
- Numerical analysis:** The art and science of number crunching.
- Object Code:** Machine code.
- Object File:** A file containing object code.
- Object Module:** An object file containing part of a program, ready to be linked to others.
- Octal:** The system of counting to base eight, or grouping bits in threes.
- Offset:** To load an object file somewhere it will not run, in order to edit or modify it.
- Open:** To give the operating system the characteristics of a file so that it can subsequently read or write it.
- Operand:** The number an operator (+, -, etc) operates on.
- all work. See Disk Operating System.
- Operator:** An arithmetic function or some other function which alters variables.
- Optimization:** Making a program work better (or faster, or using less memory).
- Output:** What the systems produces.
- Packed Data:** Data which shares the same address, and has to be unpacked before use.
- Page:** A length of memory, typically 256 bytes.
- Parameter:** A constant which sometimes has to be varied.
- Parity:** An extra bit on the end of a character or byte for error detection.
- Pascal:** A modern structured language which may eventually rival BASIC in popularity.
- Password:** A secret word the system may demand of you before allowing you access to certain (or all) programs or data.
- Patch:** A temporary (ha,ha) fix on a bug.
- Peripheral:** A piece of equipment the computer uses, like a printer, disk drive, or modem.
- Peripheral Driver:** A program which outputs data to a peripheral and controls it.
- Physical Device:** See Logical Device.
- PIP:** Peripheral Interchange Program. A CP/M utility for copying files between devices.
- PL.1:** Programming Language /1. A good general purpose commercial language.
- Pointer:** A variable used for indirect addressing.
- Polish Notation:** A method of separating operators and operands; e.g. + 5 4 is Polish Notation for 4 + 5.
- Poll:** To ask a peripheral if it requires service.
- Postfix Notation:** Also known as Reverse Polish Notation, this is similar to Polish; 4 5 means 4 + 5.
- Preprocessor:** A program which does part of a job to make life easier for the program which follows; e.g. a macro processor before an assembler.
- Printer:** Gets computer output down onto paper.
- Priority:** The resolution of which interrupt is serviced first if two should arrive at the same time.
- Process:** A program.
- Program:** A sequence of instructions which can be understood, and ultimately followed, by a computer.
- Prompt:** A message asking the operator to supply information.
- Queue:** A list in which entries are made at one end, and removed from the other.
- R/O:** Read Only; cannot be overwritten.
- RAM:** Random Access Memory.
- Random Access Memory:** The computer's internal memory which is used to hold running programs and data. The computer can both write and read RAM.
- Read Only Memory:** Memory used to store programs, which can not be erased or overwritten.
- Reader:** Paper tape input device.
- Read/Write Head:** The small coil which reads and writes on the surface of a disk.
- Reconfigure:** To reorganise the I/O or other aspects of a system.
- Record:** A set of related data items. For example, an employee's name, address, payroll number and pay rate would form a record.
- Recursion:** The ability of functions in some languages to call themselves.
- Redundant:** Not needed or taken for granted.
- Reentrant Code:** Code which can be used by several programs simultaneously, keeping separate data for each.
- Register:** A location in the processor capable of performing logical or arithmetic functions on the contents.
- Relocatable:** Capable of being moved in memory.
- Relocatable Object Module:** Part of a larger program consisting of many such modules, all linked together and located.
- Resident:** Permanently in the system.
- Reverse Polish Notation:** See Postfix.
- RPN:** See Reverse Polish Notation.
- Run:** To execute a program.
- Save:** To store a program on disk or cassette (particularly BASIC).
- Schedule:** To decide at what stage a process should run (of an operating system).
- Screen:** See CRT.
- Sector:** A section of data on a disk.
- Simulation:** Making one system behave like another.
- Software:** Programs.
- Source Code:** The original text form of a program.
- Source File:** A file of source code.
- Source Language:** The language the source code is written in, e.g. BASIC, Assembler, C.
- Sort:** To arrange items of data in order.
- Spool:** To output a file to a peripheral, usually either a printer or tape.
- Stack:** A list in which both entries and removals are made at the same end. A microprocessor usually has a hardware stack which is used to save subroutine return addresses, temporary storage of data, and to pass variables between subroutines.
- String:** A sequence of characters.
- Submit:** To put the system under control of a file of system commands.
- Subroutine:** Part of a program which can be accessed from several points within the program.
- Symbol:** The name of a variable or a location in memory.
- Symbol Table:** A table constructed by an assembler or compiler to give the addresses of all variables and labels in a program.
- Symbolic Name:** A label.
- System:** A collection of hardware and software, possessed of the property that the whole is greater than the sum of the parts.
- System disk:** A disk carrying the operating system.
- Teletype:** An electromechanical printer/keyboard.
- Timeshare:** Running several programs on a system simultaneously.
- Track:** The area under the read/write head during one rotation of a disk.
- Transfer:** To move data.
- Transient:** A program that is only in memory for a short time before being overwritten. Often, the only program that is not a transient is the operating system.
- Tree:** A list in which each data item may refer to several others.
- TTY:** See Teletype.
- Unix:** A multi-user, multi-tasking, multi-programming operating system, expected to appear on microcomputers before long.
- User:** One of the people connected to the computer.
- Utility:** A program of use to most users.
- Variable:** Named quantity that can take on different values.
- Verify:** To check that data written on a disk or tape can be read again correctly.
- Warm boot:** To reload the operating system a second or subsequent time.
- Word:** The amount of data fetched from one memory location. Typically one byte, but can be two on recent processors.
- Word Processor:** A system for manipulating, editing, printing and formatting texts files.
- WordStar:** A proprietary word processing program.
- Write Protect:** To remove the cover from the notch in a floppy disk so that it cannot be written on.
- Zilog:** Manufacturer of the Z-80 and Z8000 microprocessors.
- Z80:** A popular 8-bit microprocessor.

market directory

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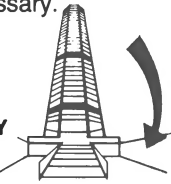
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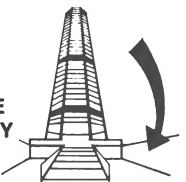
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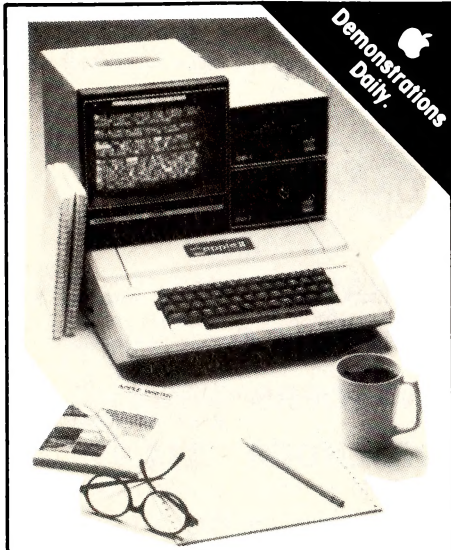
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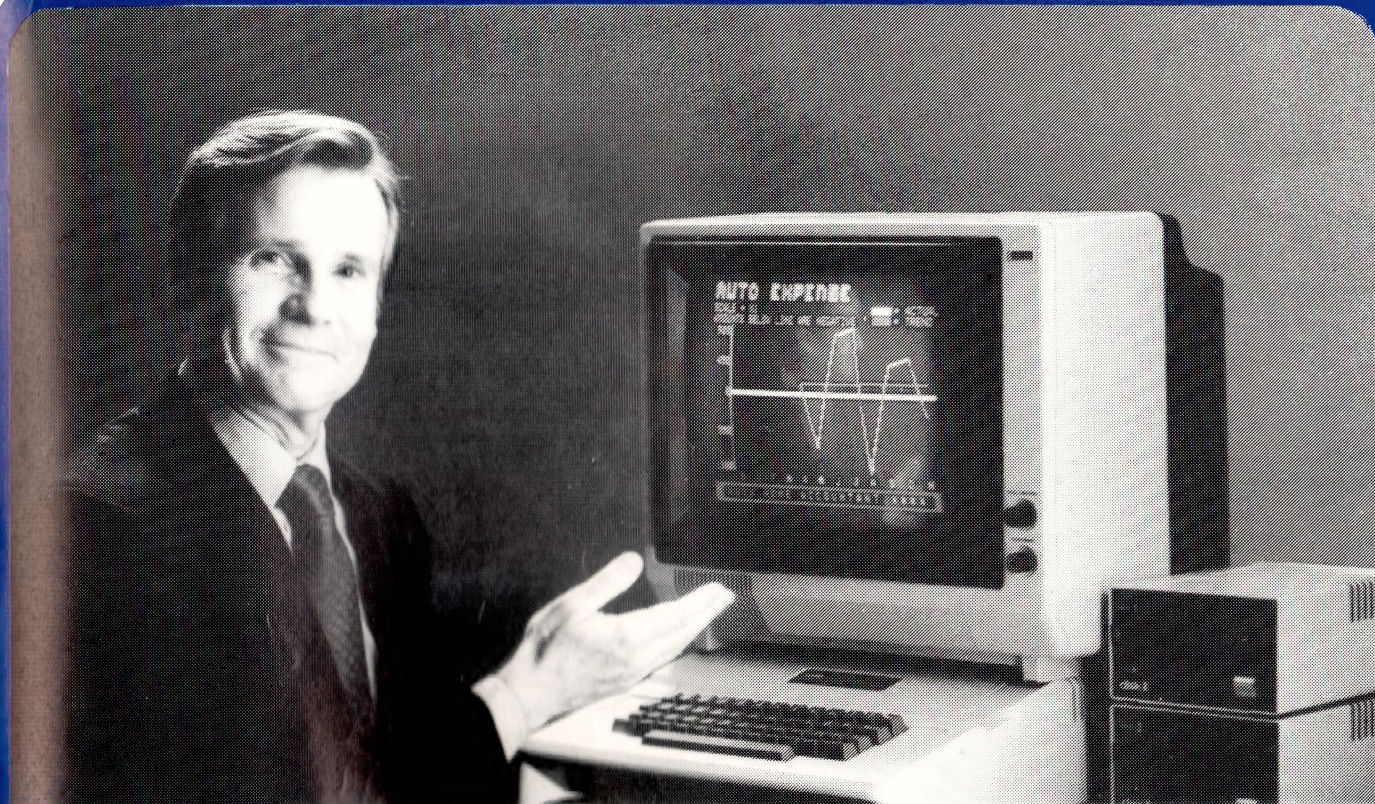
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