

# your computer

June, 1982

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FOR BUSINESS AND PLEASURE



**BIG BIRTHDAY ISSUE**



**FIRST LOCAL TEST - BIG BLUE'S PC**

**DEC - FULL DETAILS**

**THE GIANTS MOVE IN!** FULL INDEX TO YC'S FIRST YEAR • MORE, MORE, MORE POCKET PROGRAMS • EXTRA REVIEWS • BASIC FOR BABYSITTERS • BUSINESS MACHINES • COBOL • POCKET COMPUTING • PRINTERS • TUTORIALS



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A full index to *Your Computer's* first year, cross-referenced by category. You should have a copy of this!

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Our roundup of the latest in software and hardware, new and upcoming releases and happenings in the world of microcomputers.

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YC has laid its hands on one of the first IBM Personal Computers in the country. Here's what we think...

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As promised last month, here are a whole lot more pocket programs — more than ten pages worth for you to try this time, including ones for the VIC and the Peach.

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86-94

### Popular Systems

In fact, they're becoming too popular — we couldn't fit some in again this month! However, we do have most, including last month's missing items.

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### Readers' Services

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



Here it is, early or not...Les Bell examines the IBM PC for the first local test of this impressive machine. It's on page 20.



But if we were impressed by the IBM when it was announced, we didn't count on DEC's rapid retaliation. See Page 40.

## Next Month!

### Guilty, Guilty.....!

The forces of evil are conspiring, and so on: the printer reviews planned for this issue and mentioned on the cover have had to be held over. Abject apologies.

### More Business Machines

Part three of our business micro survey, with more full reviews.

### Pocket Programs Ride Again

Another series of reader-contributed programs for you to use.

# editorial

*IT'S SELF-INDULGENCE time, if only briefly: I have to take time out here to record the joyous (we hope you agree) occasion of Your Computer's first birthday.*

*Without patting ourselves on the back too much, I think it's fair to say Your Computer has set standards in its first year.*

*It has set standards in value for money, both with the cover price (at \$2, it remains unchanged from the first issue) and with an equitable editorial/advertising ratio that provides plenty of reading, on worthwhile subjects, every month.*

*It has set standards that have been acknowledged world-wide in its provision of useful and comprehensible tutorials for beginners. They have been acknowledged in a more concrete form than praise, too — Les Bell has been contracted by a major book publisher to develop these tutorial series into paperbacks that will be sold internationally.*

*It has set standards in editorial format, by sourcing virtually all material locally — quality material, written by Australians about the Australian user, seller, newcomer and the equipment available in this country.*

*It has set standards in several other areas, but perhaps the most important is in the level of communication with readers through the magazine's pages. We're taking part in the personal computer experience with you, not just reporting it to you.*

*We're not perfect, but we're a lot closer to it than we were a year ago when our first issue was acclaimed as a trend-setter. We're striving to make sure we're closer still by this time next year.*

*We believe you like Your Computer. Your often-voiced support is backed up by our sales, which are increasing overall despite a depressed national magazine market.*

*We're not into empty boasting, or making claims that can't be supported, but we believe you have made this magazine the clear leader — both in sales, and reader loyalty — in the personal computer market. We will be backing that statement up by submitting our records for independent audit.*

*When that is done our belief will become a factual, supportable claim. And anyone who wants to challenge that claim is invited to unlock their filing cabinets and let the auditors in...* □

**Matt Whelan**  
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## It's hard work running a small business.

Running your own show when it's on the smaller side can be really exciting. One minute you're the accountant, the next the Managing Director, Personnel Manager, and, yes, even the typist.

But there's just one problem. There are only twenty four hours in a day.

The new Monroe 8820 (Monty) advanced business micro-computer can cut your workload, give you more information and that extra valuable time, and more importantly, give you instant management reports so that you can more effectively control your business.

The 8820 is simple enough to master in minutes, yet sophisticated enough to handle your most complicated, time consuming business needs. Put it to work with new Business

Software and it will do all your accounting, word processing and time consuming clerical chores.

That's not all.

Unlike most other microcomputers, it can perform as many as twelve different tasks simultaneously and costs from \$7500.00 for the complete system including basic Software. That's around \$50 per week to lease.

B.C.S. will talk to you about your specific needs in English not in computer language. We are a professional person to person company and understand business needs.

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# your computer news

## ICL Makes Its Point

BRITISH computer giant ICL has set out to stake its claim to a share of the micro market with the release of the ICL Personal Computer, as well as an ambitious scheme for marketing through retailers, software and system houses and OEMs.

At a large launch at Sydney's Hilton, ICL announced its plans for aggressively marketing its new personal computing (and larger) products, which range from the ICL Personal Computer up to the ME29, a fair-sized mini.

Basically, ICL seems to be willing to sell anything it can through anyone it can get to flog it. While ICL's marketing strategy is obviously not as rough as that, the stores are going to be full of ICL PC's this year — the margins it is offering will see to that.

At the bottom of the line is the ICL Personal Computer. This is basically the Rair Black Box, with a bit of a rework done on it. The basic model sports a 3 MHz Z-80 with 64 K, dual minifloppies and CP/M. The matching terminal seems quite attractive too, and the combination does marvellous things with WordStar, Padmede accounting package and sundry other software.

The up-market models

come with a five megabyte micro-Winchester drive, and can take a lot more memory (up to 256 K), allowing them to run MP/M 2, which will be available in August.

The star of ICL's launch was the PERQ, which ICL sells under licence from Three Rivers Corporation, a group of ex-Xerox employees. The PERQ has the most stunning high-resolution graphics we have ever seen, with animation a snap. The processor is a custom built job which can execute over a million Pascal p-codes per second.

As an executive workstation, the PERQ is superb. The only problem is the price, which ICL is committed to reduce by 20 percent a year (if you have to ask the price, then you can't afford it, Mr Rockefeller).

Something that tickled our fancy was the DRS-20 distributed resource computer. Powered by anywhere between three and five 8085 microprocessors, this beastie has a separate processor for each system task, such as disk I/O, network I/O and so on.

The machine, which is itself a network, can be connected in a network, and each local net can be connected in a larger communications network — where will it all end?

A slightly baffling product was the new ICL WordSkil word processing system. Based on an earlier Nexos design, this machine uses the 8086 microprocessor, and ICL is arranging to put the new Concurrent CP/M-86 onto it, as well as network communications and some other goodies. This seems to be a sleeping product which is going to wake up and discover it's really a computer.

Pricing on all these products is competitive, so ICL seems to be serious about the micro market. □

## Rokenie Release

ROKENIE Computer Systems, Australian distributor for Southeast Micro Systems of the US, has announced three new products for the Australian market.

They are the SX-9 6809 computer systems, the DM-256 256K dynamic RAM board for the SS-50 bus, and VDISK, an extended memory, virtual disk system.

The SX-9 range is available in three models, from \$1194 to \$3723.

Software is available for disk operating systems, as well as business, accounting, inventory and word processing packages. Languages available include BASIC, extended BASIC, Pascal, C, COBOL and FORTH. □

## Database System

COMPUTER power has announced powerful enhancements to its database management system, AutoIndex. The new version, AutoIndex 2, is available for all mini or micro computers running the BOS/5 operating system.

AutoIndex records contain user defined keys, attributes and text fields. Simple, English language commands are used to search and retrieve information on key values and attributes. Multiple searches can be conducted using a variety of commands including the ability to save and, later, combine separate

sections. AutoIndex is a multi-user system.

Other notable features of the product are a label printing facility and the ability to interface the database for use in conjunction with other programs such as BOS/5 products AutoClerk (report generator) and AutoWriter (word processing).

BOS/5 is available on over 50 different computers. Amongst the most popular are DEC PDP/11, National Panasonic, North Star Horizon, Onyx and MicroMax.

Further details on all BOS/5 products are available from Computer Power, Micro-Products Division, 6 Bay Street, Port Melbourne, 3207. □

## TAO Newsletter

DEBORAH Morton, director of Sydney software company The Automated Office, has announced a microcomputer newsletter which covers topics of interest to corporate microcomputer users.

The current issue discusses the penetration of the established computer manufacturers such as IBM, Wang and Rank Xerox into the desk-top computer market.

The newsletter, originally published as a service to keep clients aware of trends in the microcomputer industry, has since attracted wider interest.

Deborah Morton said the newsletter is available free of charge by telephoning (02) 411-1892 or by writing to PO Box 490, Chatswood, 2067. □

## Sorcerer Communication

COMMUNICATION with the local databases, The Source or your friends on the Exidy Sorcerer is now a simple and painless experience, according to Sydney's Software Source.

Term (Terminal Communication Program) by Software Source offers message buffers, (which can be loaded to





and from disk, enabling you to transmit your password fast and efficiently to any data base), suppression of the echo on your screen if required (ensures confidentiality), transmission and reception at half or full duplex, and transmission from one micro to the next which can be interrupted by entering a chat mode while the integrity of incoming data remains intact.

Disk files can be viewed, incoming ASCII data can be reviewed, saved to disk or ignored.

Available at \$65, Software Source will provide copies on all Sorcerer disk formats.

For further information contact: Software Source, 89 Oxford Street, Bondi Junction, 2022. □

### Osborne In Australia

OSBORNE Computer Corporation has established an Australian subsidiary headed by Richard Graham, former general manager of Computerland Australia.



Osborne Computer Corporation Australia will be fully operational in July — marketing and supporting the company's unique computer and accompanying software throughout Australia.

The Osborne O-1 packages a complete business computer including display screen, disk drives and communications capabilities into a briefcase-sized unit weighing only 11kg and small enough to fit under

a standard airline seat.

The computer's low price of \$2595 includes some of the most popular and powerful software available — Wordstar word processing with MailMerge mailing list maintenance, SuperCalc electronic spreadsheet and CBASIC and MBASIC for programming; all operating under the CP/M operating system.

For further information

write to: Osborne Computers Australia, PO Box 690, Neutral Bay, 2089. □

### Corner Computer Store

COMPUTERMAX, on busy Pittwater Road at Brookvale, Sydney, is the newest addition to the growing number of 'friendly corner computer stores' where, the owners say, you will find old-fashioned service along with the latest technological marvels of the computer age.

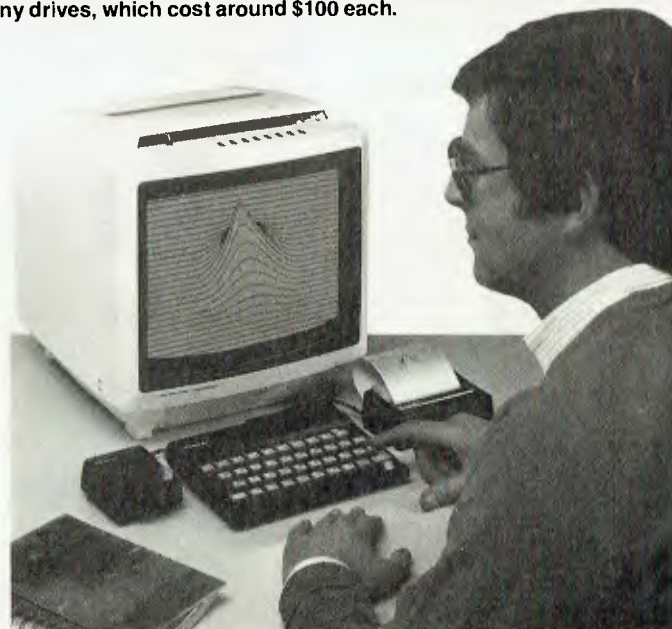
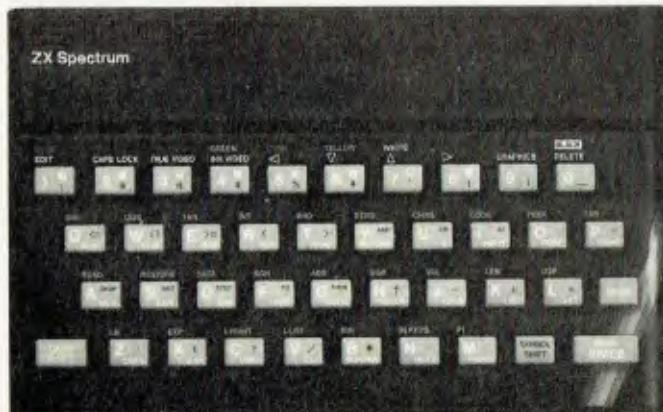
They say it is because of the high technological nature of computers, even the so-called 'friendly' types, that personal service is essential before, during and after the decision to purchase is made.

They see the personal computer is a servant that can save time, entertain, control or even guard your home 24 hours a day. Max and Hilary Leonard aren't quite up to the 24-hour level, but do offer personal service six days a week at their new showroom in Brookvale. □

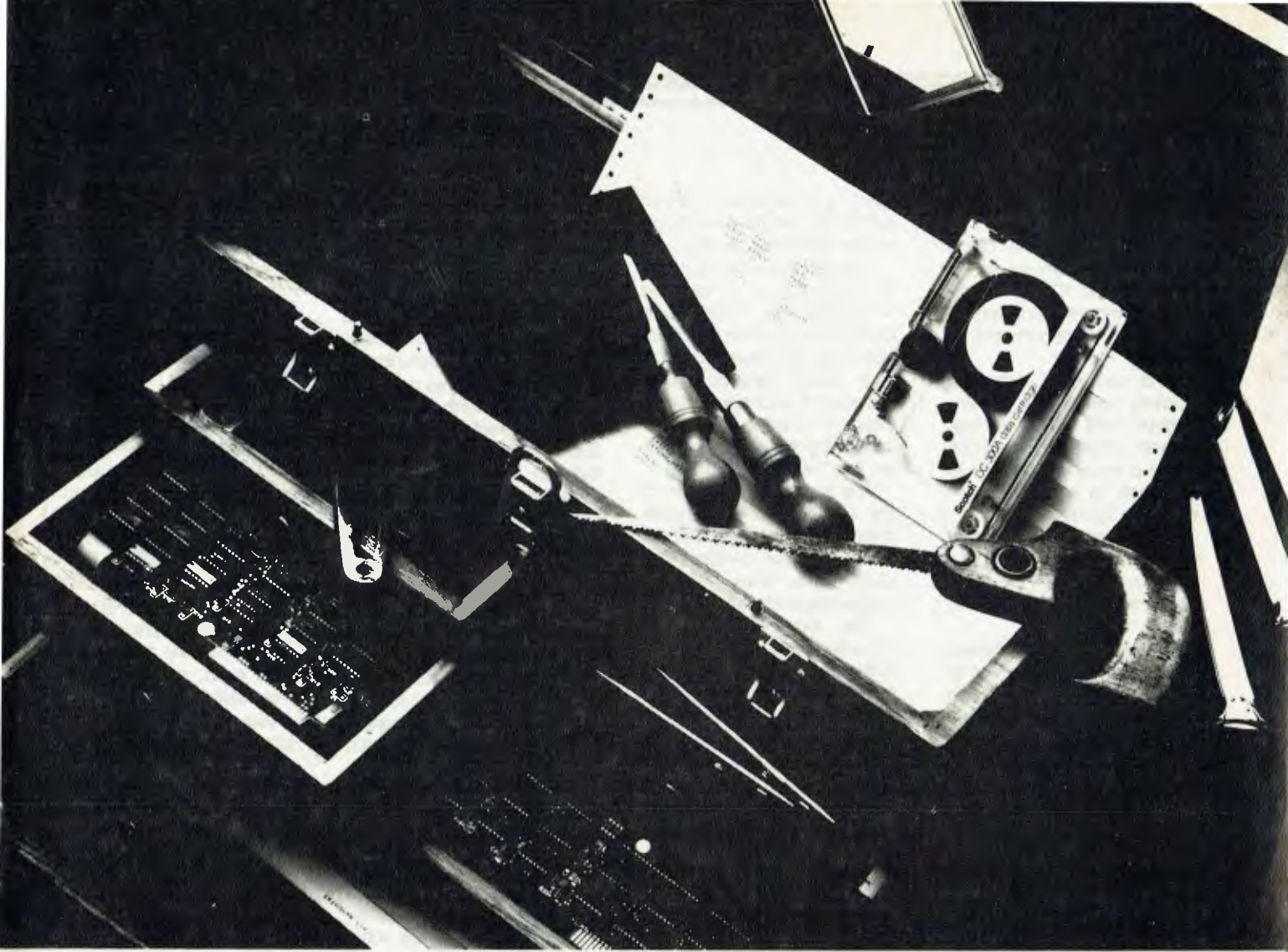


## The Sinclair Spectrum

Here it is: Sinclair's spectacular Spectrum, the high capacity, colour machine that sells in England for around the same price as a ZX81 with keyboard mod. As detailed last issue, the Spectrum has a 'proper' keyboard, high-resolution graphics, and 16K memory standard. A 48K version is available, as are 100K 'micro-floppies' (pictured at left). The machine can take up to eight of the tiny drives, which cost around \$100 each.







## When IBM<sup>®</sup> built their newest toolbox, they came to Microsoft for tools.

**Leadership.** When the world's leading computer manufacturer decided to enter the microcomputer world, they came to the leaders in microcomputer software: Microsoft. In fact today, Microsoft has provided more software tools for the IBM Personal Computer than any other software manufacturer.

**Why Microsoft?** Microsoft virtually invented microcomputer software when we put BASIC on the first personal computer. Since then, we've developed a full range of languages, utilities and operating systems. Software that has become a standard for the 8-bit world. Software that is becoming the standard for the 16-bit world. That's why the world's leader in computer hardware came to Microsoft, the world's leader in microcomputer software.

**Who's Who.** Microsoft has developed languages, utilities, and hardware for Apple<sup>™</sup>, TRS-80<sup>™</sup>, Xerox<sup>™</sup>, CP/M<sup>™</sup>, Atari<sup>™</sup>, and IBM. We have tools for your computer like the Ramcard, Softcard, Cobol, Fortran, TASC, muMath, Typing Tutor, Level III Basic, muLisp, and many more. For your nearest dealer, ring (02) 451-1490.

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### Micro Advisor

DAVID DIPROSE, owner of Computer Galerie in North Sydney, has been appointed consultant to ICL (International Computer Limited) to advise on developments in retailing.

"The advent of computer retailing has led to an enormous shift in awareness among small businessmen and a consequent change in approach to customer service," Mr Diprose says.

"There are now 138 microcomputers available in Sydney, of which 60 have been released since Christmas.

"The key to good retailing is to assist the customer to avoid bewilderment. This is done by marketing firm recommendations and hardware. The second is was the provision of reliable service."

Mr Diprose will advise ICL on these two key points. □

### Australian Option II

A MELBOURNE computer company is releasing a new locally designed microprocessor to fill a need it says is currently neglected by other Australian and US manufacturers.

The company, Microprocessor Applications of Box Hill, announced the single-board Option II, which provides a low-cost threshold for users who see a future need to upgrade to a multi-user system.

MPA managing director Terry Gray said his company first noticed the need 18 months ago, not long after winning preferred supplier status for Victorian technical schools with its Micromation range of systems.

"It became apparent that many users preferred to build to multi-user status gradually to ease the strain on capital funds, and to allow staff to become familiar with the simpler system," he said.

"So we set about designing a machine which provided a much lower cost entry-

point, and a clear upgrade path to a full eight-user Micromation system," he said

"Interestingly, as our development work proceeded we found that Micromation distributors in other countries also had the need of a low cost entry system. Many have since expressed strong interest in adding the Australian designed and built Option II to their product range."

The basic configuration of the OPTION II is a single-board Z80 microprocessor, and one inbuilt double-sided 20cm disk drive giving a megabyte of storage.

The benchtop or rack mounted unit also features 128K of RAM, CP/M operating system, standard RS232 and Parallel interfaces, Copy and File transfer programs, and the ability to run MPA BASIC — a batch card reader BASIC designed for schools.

Microprocessor Applications is at 48 Rutland Road, Box Hill, 3128; phone (03) 890-0277. □

### Radio Programming

THE proliferation of computing facilities in business, the professions and schools, and the prospect of being able to buy a desk-top computer to use at home, make many people want to know something about computer programming.

An initiation into the mysteries of programming is given in a course on BASIC programming that Jim Murray, of the University of New South Wales Computing Services Unit, will be broadcasting over the University's educational radio and television networks.

It comes in three parts, the first starting late in July, and runs over 14 weeks to the end of October, each lecture being broadcast twice in the same week, at 8pm on Mondays and 9pm on Fridays. Printed notes are provided, and students can come and test their programs through Radio University's computing

facilities at the University.

The fees are a modest \$22.50 for parts one and two of five radio lectures each, and \$20.00 for part three or four radio lectures. All parts include two televised lectures and two attended seminars.

The courses also come on cassette following broadcast, at \$8 per radio lecture, and \$30 or \$50 according to format for the televised lectures. Three sets of notes are supplied with the tapes, making them an ideal training medium.

Radio and Television University broadcast a broad range of courses for the continuing education of professional people on computing and other topics. For full details contact Radio University by phone on (02) 662-2691, or write to PO Box 1, Kensington, 2033. □

### Idiot's Guide

ILLUSTRATING Computers explains everything from the binary system backwards for people who don't really know what computers are except that they are evil and will one day take over the world.

The hand-printed text is interspersed with drawings both helpful and humorous. Readers can see vividly how hardware and software combine to form a machine of great resourcefulness, versatility and application.

It describes the way information is stored inside the computer and how that information is used by inserting what is called a program. Examples are given of the use of computers and microcomputers, and finally the authors take a look at possible future developments.

*Illustrating Computers* was written by Colin Day (a computer consultant at University College, London) and Donald Alcock (a consulting engineer).

For further information contact Pan Books, 55 Clarence Street, Sydney, 2000. Phone: (02) 290-2066. □

### WordPro Power

COMPUTERWARE has announced the availability of WordPro 2 Plus and WordPro 5 Plus, the highly regarded Professional Software word processing software — the best-selling software package on Commodore computers.

WordPro 2 Plus requires a minimum of 16K and is sold complete with both cassette and diskette versions and is fully compatible with CBM 2001, 4016, 4032 and 8032 computers. WordPro 5 Plus is for use on the CBM 8096.

The major benefit of WordPro 5 Plus is that it allows full use of five text areas of 169 lines each, a powerful word processing tool.

WordPro 2 Plus sells for \$239 while WordPro 5 Plus costs \$530 from Computerware at 305 La Trobe Street, Melbourne 3000; telephone (03) 602-1006. □

### Software Database

A NEW online information source for software marketed in Australia has been developed by Infogrow and added to ICIE, a public access database available on AUSINET, a national database network.

Its scope has now been expanded to include full descriptions of applications and systems software, as well as separate product lists and supplier contact information. A major component of the file is descriptions of DEC's systems, utilities and applications software for the PDP-11 series and VAX minicomputers.

This database is of interest both to intending purchasers of equipment and to owners of existing systems who wish to develop new applications.

The software file is a valuable addition to the directory of Australian databases on ICIE previously announced by Infogrow. Infogrow is at 49 Clarence Street, Sydney, 2000, (02) 29-8742. □





# Apple software from Micro-Educational

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VISIFILE	\$340.00
VISISCHEDULE	\$365.00
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**Radio Tutorials**

PRACTICAL guidelines for selecting a computing system for a small business will be the theme of a lecture series to be broadcast over Radio University, the educational radio station of the University of New South Wales, starting early in June.

George Foote, Senior Consultant with Touche Ross Services and Vice-Chairman of the NSW Branch of the Australian Computer Society, will present the series of six radio lectures plus two attended seminars.

The lectures will go to air twice in the same week, at 7 pm on Tuesdays and again at 8 pm on Thursdays, over Radio University's station VL2UV, and the seminars will be held in the evening at the University of New South Wales.

All-inclusive cost for the lectures, printed notes and seminars is \$20.

For the benefit of people who have had no previous experience of computers or accountancy, Mr. Foote will start by explaining the terminology used in the computer pages of the press, and provide a written glossary of the most common terms. He will then go on to cover:

- What is a computer - what can it be used for?
- What are your options? - what help can you get?
- Requesting a proposal from a supplier - and blocking loopholes in the contract.
- Planning and installation - and staff involvement.
- Recapitulation - and the ten avoidable pitfalls.

Radio University transmits on 1720 and 1750 kHz, and can be picked up in the Sydney metropolitan area on a radio adjusted to receive these frequencies. Enrolled students are given instructions on how to adjust their own radio, or they can buy a simple transistor radio already modified for \$8 from Radio University.

Following broadcast the

series will be available on tape at \$8 per lecture, or \$48 for the complete course. Three sets of notes are provided with the cassettes, making them an ideal training medium.

People looking for an introduction to COBOL will be able to do a course on COBOL programming late in June.

According to the course lecturer, Jim Murray of the University's Computing Services Unit, COBOL (Common Business-oriented Language) is still the most widely-used computer programming language for business applications. Students do not need any prior knowledge of computing to be able to do the course.

It will teach the basics of programming, using the COBOL language, in a series of ten radio lectures, combined with two televised demonstrations. Mr. Murray will set programming exercises and students can test their solutions on one of the University's computers. He will also conduct two attended seminars at the University.

This series will be followed immediately by another course entitled Structured COBOL, which follows on from the first course and studies more advanced concepts.

The radio lectures are timed for 7 pm on Mondays, and repeated at 8 pm on Fridays.

For more information contact the Division of Postgraduate Extension Studies, 16th floor, Mathews Building, University of New South Wales, telephone 662-2691. □

**National Conference**  
 MICSIG, the Microprocessor Special Interest Group of the Australian Computer Society, will hold a national conference and exhibition on microcomputer software in August.

The venue, the Australian







**Another "Superchip"**

Hewlett-Packard has announced a new memory chip containing 660,000 transistors on a single quarter-inch square piece of silicon.

The new chip, a RAM (for random-access memory), is three times as densely packed as today's commercially available circuit designs, HP says.

Together with a 450,000-transistor microprocessor chip and four other chips, the new memory chip forms a complete 32-bit computer system that HP expects to market in a new computer product in about a year.

Geoff Foley, systems engineer with Hewlett-Packard Australia's Instrument Group, said HP's tiny new memory chip — which contains one and a half times the number of parts in a jumbo jet — holds the most circuitry ever built into a single chip and

proven successful in testing.

Foley said the tiny transistors are packed more tightly together than ever before: only 40 millionths of an inch separates them. This tight packing decreases the distance that an electrical signal must travel when adding, subtracting, or processing information, greatly increasing the speed of the system.

HP's new six-chip system can process 32 bits (basic units) of information simultaneously, adding two numbers in 55 billionths of a second.

The high-powered processing system was designed over a period of several years by a team of engineers at HP's Engineering Systems Operation in Ft Collins. The very large scale integration (VLSI) design was made possible by new HP one-micron NMOS-III technology. □

**Join 'Em, And Beat 'Em.**

ADELAIDE'S Computer Imports has set up virtually on Tandy's doorstep with a new shop at 220 Morphett Street in the city.

When founder Brook Hill saw Tandy open there in March the temptation was apparently too much to resist and so he moved quickly to acquire premises and open up in less than three weeks.

"Tandy gave us our first big break when its pricing policies in 1980 and '81 allowed us to import from Singapore, Hong Kong and the US and still leave room for margin. We're now turning over half a million a year in micros and peripherals and haven't forgotten that Tandy's regular monthly mailings keep a stream of potential customers coming to its doors".

Computer Imports handles

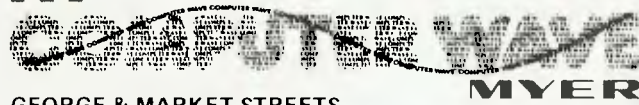
both Tandy and Commodore equipment and, since joining the Commodore dealer network in 1981, has seen sales skyrocket. One product to which it attributes this success has been the "Silicon Office" program which runs on the 8096 series Commodore with 96K of RAM memory and a megabyte of disk storage.

"This package essentially incorporates all the requirements of a modern office such as invoicing, stock control, control of debtors, word processing, mailing and so on in one easily modified package", says Hill.

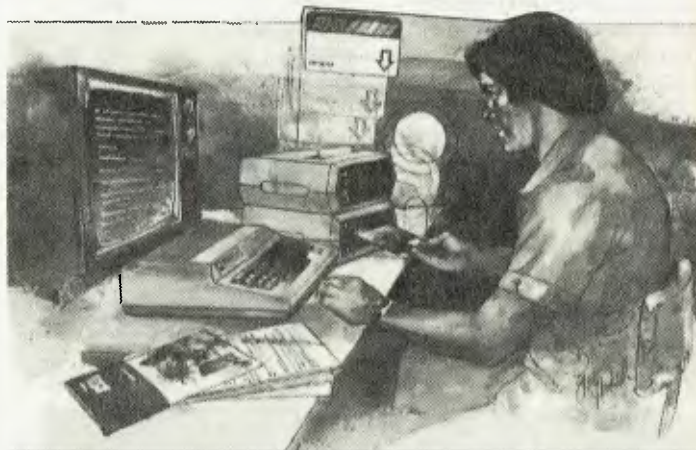
"We can now set up a suite of software packages to suit a small business in a matter of days when previously we would need to look at between 0.25 and 1.0 man years of programmer's time at \$25 to \$35 per hour." □

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We now not only have 250 plus items for ATARI, but also one of the best selections of Apple II and Apple III Software and Hardware in Australia.



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This compact device is connected to the printer port of your computer and both printers. Once installed your computer has access to either printer at the flick of a switch.

Comes COMPLETE with all connections attached, installs in seconds, a MUST for the serious operator. \$175.00. Ideal for the MODEL I, II or III.

## MEGABOX

Ever wonder how you can have more storage in your 5.25" system?

Now you can have up to a staggering 2.2 Megabytes of on-line formatted disk storage for your MODEL I or SYSTEM-80 and up to 3 Megabytes for the MODEL III or other systems with a disk controller, using a QUAD density drive network.

Why spend more on an 8" system?

Features: Single portable console, ONLY ONE connection to be made. FAST: 32 microsec byte transfer, expandable from \$595.00 for 185 Kbytes to \$2199.00 for 2.2 Megabytes.

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and others say that nothing is WRONG???

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NOTE: "Model I, II, refers to the TRS-80, a product of Tandy Corporation", and "SYSTEM-80 is a product of Dick Smith Electronics"

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010	FIRE TREK	110	FUEL PIRATES	412	THE ALIEN
011	TREASURE CARRY IN	111	PAK BOMBER	413	3D MAZE
012	HEAD ON	112	LASER BLITZ	414	CAROM
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017	VIC CUBE	205	BOUNCE OUT	502	DUNE BUGGY
018	MONSTER CHASE	206	MONSTER MAZE	503	SKI-RUN
019	LASER FIGHT	207	HOME INVENTORY	504	THE WORM
020	EUREKA STOCKADE	208	MATHS HURDLER	505	SUPER WORM
021	LUNAR LANDER	209	LOAN ANALYSER	506	COSMIC BATTLES
022	ROCKET COMMAND	210	CODE MAKER	507	SPACE DEFENSE
023	CITY BOMBER	211	CODE BREAKER	508	FROGGER
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**Archives Law Reform**  
COMMUNICATION with members and supporters is one of the hardest chores for voluntary bodies with small, dedicated committee.

One Victorian organisation has grasped the nettle and installed an Archives computer to take the hack physical work of its committee, and give it the ability to resume work on its original objectives.

Until recently the Consumer's Law Reform Association of Victoria was no exception to every other voluntary body, and the committee worked long hours at the typewriter, and at collating, binding or enveloping as an essential chore to keep the body's aims and ideals burning.

Their burden was further increased by the need to regularly update the Association's Conveyancing Kit, which is sold through newspapers and bookstores.

The Consumer's Law Reform Association was formed in 1977 to bring about changes in laws that unduly exploited consumers and, particularly those that inhibited commercial competition for the benefit of small sections of the community.

Chief amongst the Association's initial objectives was the reduction in home buyer's conveyancing costs, which, according to President Mr Dale Sedgeman, currently add an average \$616 to the cost of selling or buying a house. □

**Multi-Company Accounting**  
SYDNEY software company The Automated Office has released a multi-company general ledger software package for CP/M computers.

Michael Morton, TAO managing director and a qualified accountant, explained that the software is a powerful extension of the successful TAO General Ledger.

The package is designed for organisations which manage the accounts and annual returns of many companies or subsidiaries including tax agents, superannuation brokers, professional accountants and public trustees.

Apart from operating on inexpensive desk-top computers the package offers many attractive features including full integration with word processing for preparing annual returns, automatic accrual reversals, standing journals, account reclassifications and management reports.

Single copies are priced at \$1500 including a comprehensive 100-page manual. Detailed information may be obtained by contacting Michael Morton on (02) 411-1892. □

**Winchester Controller**  
WESTERN Digital's WD1000 Winchester Controller has made its Australian debut after a highly successful launch in the USA.

The WD1000 is a stand-alone, general purpose Winchester Controller, designed

to interface up to four Winchester drives to a host processor.

The drive signals are based upon the floppy look-alike made popular by Shugart's SA1000, Seagate's ST506 and other drives from Quantum, Tandon and MPI.

Communications to and from the host computer are made via a separate computer access port. This port consists mainly of an eight-bit bi-directional bus and appropriate control signals.

All data to be written to or read from the disk, status indication, and macro commands are transferred via this eight-bit bus. An on board sector buffer allows data transfers to the host computer independent of the

actual data transfer rate of the drive.

The WD1000 has been selected for use in major new systems coming from Tandy Corporation and TeleVideo Systems.

The design-ins represent current and potential orders for as many as 10,000 controllers, according to Chester Brown, director of marketing for Western Digital's Components Group.

"Tandy and TeleVideo are major forces in the small computer marketplace, so it's particularly gratifying to be chosen for their new hard-disk systems", Brown commented.

For further information contact: PO Box 114, Sandringham, Victoria, 3191. □

### Top 30 Apple Programs — May 1982

		Position Last Month
1	Star Blazer	Broderbund 7
2	Apple Cillin II	XPS Inc 4
3	Lemmings	Sirius - *
4	Jellyfish	Sirius - *
5	Minotaur	Sirius - *
6	Visicalc 3.3	Personal Software 1
7	D.B. Master	Stoneware -
8	Kabul Spy	Sirius - *
9	PFS	Software Pub. Corp. 3
10	Dos Boss	Beagle Bros 26
11	Audex	Sirius — *
12	Foosball	Sirius 25
13	Timezone	Online 6
14	Wizardry	Sirtech 5
15	General Manager	Online 13
16	Apple Panic	Broderbund -
17	Utility City	Beagle Bros 10
18	Master Type	Lightening 8
19	Typing Tutor	Microsoft 25
20	PFS Report	Software Pub. -
21	Alpha Plot	Beagle Bros -
22	Olympic Decathlon	Microsoft 17
23	Versaform	Applied Software - *
24	Microsoft Tasc	Microsoft 29
25	D. Midnight Magic	Broderbund 2
26	Visitrend/plot	Personal Software -
27	DB Master (H Dsk)	Stoneware - *
28	Apple Speller	Sensible Software -
29	Hadron	Sirius -
30	DB Master Utilites	Stoneware 23

\*New Program.

(Prepared By Imagineering)



A successful sandwich shop means more than cutting great sandwiches. It means cutting costs to the bone without cutting corners.

The NEC PC8000 personal computer makes it possible for the small businessman with no computer training, to analyse his business in every aspect.

This will almost certainly produce ideas as to how to make the business more efficient and profitable.

The NEC PC8000 personal computer has many kinds of application programs available.

You can get them from the store at which you buy your machine. With these you can do anything from basic book-

keeping to producing financial forecasts and trend analysis of your business.

The NEC PC8000 personal computer is designed and manufactured by NEC in Japan, where 10,000 a month are being manufactured and sold worldwide.

★★★★★

Application programs available include:-

2 Word Processors, Mailing List, Telecommunications, Target Business Planner, Debtors, Creditors, General Ledger, Inventory, Invoicing, Program Generator, Dbase II, Micro Modeller.

# NEC

TOKYO JAPAN

## PC 8000 series

**“WHEN IT COMES TO CUTTING COSTS THIS COMPUTER IS AS KEEN AS HIS FAVOURITE KNIFE.”**





# First Local Test: A Closer Look At The IBM



*While many people view IBM as the stereotypical corporate giant, where the machines dominate the people, its new entry into the personal computer industry shows the times are a-changing...*

BEFORE IBM announced its new personal computer, rumours had been flying around the industry for some time that a machine was in the offing. Industry observers even remarked that other manufacturers were withholding their own announcements until IBM had revealed all.

In the event, when the mainframe industry leader did show the new machine, people weren't exactly relieved, but at least it didn't seem to be as bad as they had expected. Many were surprised at the adoption of an 'industry standard' microprocessor, the 8088, and an 'industry standard' language, Microsoft BASIC. Indeed, the whole machine did not seem to have been cast in the IBM mold.

However, it has sold well; apparently better than IBM expected, for it seems to be having trouble in satisfying the demand. There can be little doubt sales of other comparable machines have suffered as a result. And other manufacturers have set about to follow IBM's lead, most notably in Japan.

On the whole, though, everyone seems happy enough about the IBM machine. Many other manufacturers take the view that IBM's announcement has 'legitimised' the personal computer: it's now possible to have one on your desk without being labelled a crank. To some extent this would have happened anyway, as the industry matured, but it seems IBM has paved the way.

What's the machine like, anyway? With a little help from Don Weir, of Customized Technology in Sydney, we were able to have a close look at the machine he brought in to do software development.

The IBM consists of a main cabinet, called the system box, with a separate keyboard and video monitor. The system box is quite small, not much bigger than an Apple, but is heavy, being built from cast components for the most part. Likewise, the keyboard is surprisingly heavy; there is no likelihood of this sliding around your desktop.

The front of the beige system box is either blank or contains one or two 13cm disk drives — the model we examined had one disk drive. At the back of the machine is the keyboard connector (DIN type), video connector and blank panels for extra boards such as the communications card and colour video card.

There's also an IEC connector and fuse for 110V power — we ran the machine on

an auto-transformer without any problems, though of course when the machine is released here it will run on 240V.

## Superb Keyboard

The keyboard is superb, with a positive feel and a clean uncluttered layout. The key clicks as it goes down in a very similar way to an IBM typewriter key, although the mechanism is very different.

At the left of the keyboard is a set of ten user-definable function keys, and on the right end of the main area is a combined numeric/cursor control pad.

Also on the keyboard are special functions keys for case lock, scroll lock, and so on. The only slight problem encountered was with the small size and inconspicuous positioning of the carriage return key, but a regular user wouldn't be worried.

The video display can sit on top of the system box. In our case, we used a standard Sanyo monitor, which worked fine. Don also had a colour video card in the system, but we used a monochrome (green) screen, and didn't have a look at the colour.

There is a thumping great (easy to find) on/off switch at the right rear of the machine. Inserting a disk and switching on will boot the system, performing a self-diagnostic test and then loading PC-DOS.

If no disk is in place the system will, after a short delay, decide it should just run



cassette BASIC and sign on with the appropriate message.

### Sounds Familiar . . .

When the DOS loads, it asks the user or the date, and then displays the system prompt, A> (sound familiar?). PC-DOS is CP/M-like in some ways, and rather different in others. For example, typing DIR will list files on the disk, but in a single-column format with file size and creation/update date, unlike CP/Ms four-across straight directory listing.

A number of utilities are provided for such jobs as formatting and copying disks, copying files, and so on. A curious program to find on the disk was a linker — without an assembler it's difficult to write linkable code. One can only presume IBM intends to supply some programs as linkable modules, allowing the user to combine them as required.

The major piece of software the new owner will use is the BASIC interpreter. This is broadly similar to Microsoft BASIC-80 version 5, although there are some syntactical differences, primarily in the way files are opened. Otherwise, it's close enough to MBASIC 5.2 to make translation a trivial task.

In fact, there are three versions of the BASIC interpreter. Cassette BASIC is permanently ROM-resident in the machine, and forms the nucleus for the other versions. Disk BASIC contains file-handling and other extensions, while the extended BASIC, BASICA, contains further high-resolution colour graphics and music-playing extensions.

In particular, the extended BASIC includes two different macro languages for graphics and music manipulation.

### Excellent Graphics

The DRAW command expects a string as its argument, which contains a sequence of commands to move a 'pen' up, down, left, right, diagonally or to absolute or relative coordinates. Further prefixes instruct the pen to move but not plot, move and return to the starting point, set angle, set colour, set scale factor and even 'GOSUB' to execute a substring.

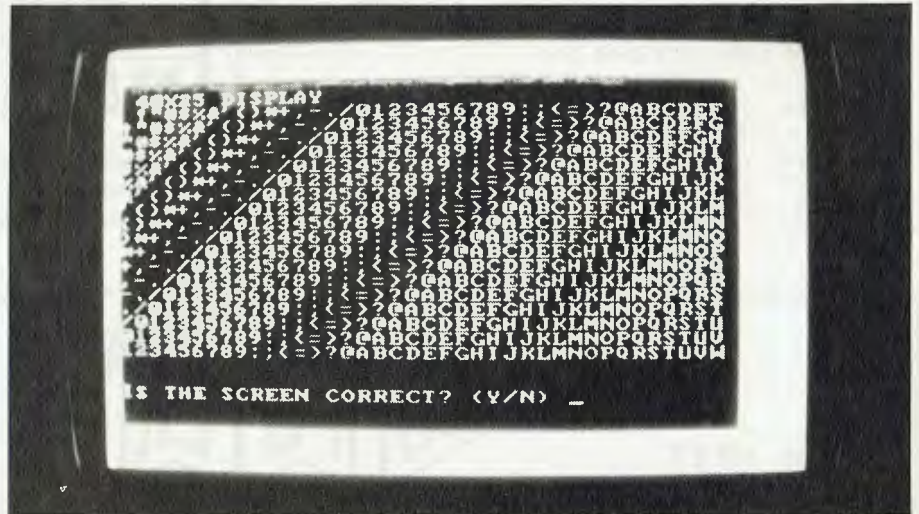
Using this macro language, it is possible to draw graphics extremely rapidly, and the string-handling functions of the language could conceivably be used to operate on shapes. Having drawn an outline, it can be filled in with the PAINT command (which is fascinating to watch).

The high resolution graphics are superb.

The music macro language works in a similar way, PLAYing strings of notes, rests and timing commands. A particularly interesting facility is the ability to play a tune in background mode, while the program continues to execute!

## Specifications and Report Card

<b>Unit:</b>	IBM Personal Computer			
<b>Made By:</b>	International Business Machines Corp.			
<b>Processor:</b>	Intel 8088			
<b>Clock Speed:</b>	4.77 MHz			
<b>RAM:</b>	16 Kbytes min, 256 k max, 64 Kbytes typ.			
<b>ROM:</b>	Bootstrap and self-test			
<b>I/O:</b>	Serial comms and parallel printer i/f			
<b>Languages:</b>	BASIC, Pascal, others under CP/M-86			
<b>Keyboard:</b>	QWERTY nice, with cursor/numeric pad			
<b>Display:</b>	40 × 24, 80 × 24 software selectable			
<b>Graphics:</b>	320 × 200, 16 colours			
<b>Peripherals:</b>	160 Kbytes/floppy disk			
<b>Expansion:</b>	Internal RAM, hard disk controllers and others			
<b>Best Points:</b>	IBM, 16-bitter			
<b>Worst Points:</b>	Slow BASIC, not yet available in Oz			
<b>Ratings:</b>	excellent	very good	good	poor
<b>Documentation:</b>	✓			
<b>Ease of Use:</b>		✓		
<b>Functionality</b>	✓			
<b>Support:</b>		✓		
<b>Value-for-money:</b>		✓		
<b>Extras Included:</b>	1 floppy, colour graphics			
<b>Options:</b>	N/A			
<b>Price:</b>	N/A			
<b>Review Unit from:</b>	Customized Technology			





Other functions include special communications commands which allow the user to access the interrupt-driven communications ports through BASIC, binary load and save commands, and DATE\$ and TIME\$ predeclared variables.

The graphics and music statements are shown to good effect in some of the demonstration programs, which play music and show the notes on a piano keyboard. The speed of operation of the graphics and concurrent music is reminiscent of assembly language code, rather than BASIC.

While many of these new statements are provided courtesy of the powerful 8088 16-bit microprocessor, its power has not been extended to the rest of the BASIC interpreter, and this is the most disappointing facet of the IBM.

Frankly, the major part of the BASIC interpreter seems to be warmed-over 8080 code which has been passed through Intel's CONV-86 program and not optimised for the 8088 at all (CONV-86 is a program which can convert 8080 assembly language into 8086/88 source code — though never particularly efficiently).

Our benchmark tests confirmed this. Editor Bell's dear old 1977 vintage 2 MHz 8080 completed a prime number benchmark in 2m 54.31s, while the IBM could manage only 1m 50.61s — a 57 percent improvement.

In other words, the IBM's 8088, running at 4.77 MHz, is roughly equivalent to a Z-80 running at 3 MHz.

This is confirmed by comparison with

## Table 1 — Benchmark Timings

### a) generate prime numbers from 1 to 1000

IBM PC:	1 min 50.61 sec
2 MHz 8080:	2 min 54.31 sec
6 MHz Z-80B:	45.7sec

### b) Write word "test" to disk 3000 times

IBM PC:	26.95 sec
2 MGz 8080 and Morrow:	35.89 sec
Discus controller	
6 MHz Z-80B and Godbout:	12.5 sec
Disk 1 DMA Controller	

the time for a Godbout system with a 6 MHz Z-80B to run the same program — 45.7s. Comparisons of disk speed show similar results.

We have seen other benchmarks, using assembly language, which show the kind of difference between the 8088 and Z-80 that one would expect between a 16-bit and an 8-bit processor — that the 8088 is much faster. Consequently, the only conclusion one can arrive at is that Microsoft's 8088 code is dragging the 8088 down.

Rumours abound of a new version of MBASIC to be released for the IBM, this time properly written for the 8088, and with a vast speed improvement. However, since Cassette BASIC is in ROM, this virtually makes it a hardware upgrade of which many users will never take advantage.

Just goes to show what a lousy guide to performance clock speed and word length can be, when working with a high-level language. And of course, the IBM con-

tains an empty socket for an 8087 Arithmetic Co-Processor chip, which will provide a vast improvement in number-crunching applications — for a price (the 8087 currently sells for around \$500!).

However, as Les never tires of saying (with a 2 MHz processor he has a vested interest), speed isn't everything. On ease of use and friendliness, the IBM rates highly. The manuals are excellent, a series of three loose-leaf boxed binders covering system operation, BASIC and DOS.

All three are very well written indeed, actually better than Apple's high standards. There's a certain traditional IBM style in evidence though, particularly in acronymic chapter headings like 'PDPs', which apparently stands for 'Problem Determination Procedures', but could have been more adequately and simply expressed as 'Troubleshooting'.

A huge amount of software is starting to appear for the IBM, with the release of such old favourites as WordStar, CP/M-86 and so on.

The new CP/M-86 release is particularly interesting, as it is the first appearance of Concurrent CP/M, a version which supports multi-tasking for a single user (print invoices in the background while playing games in the foreground!).

Overall, then, the IBM Personal Computer offers a well-designed package with a number of unique and powerful features. Microsoft's BASIC rather lets it down in the speed department, but its other features and the IBM support make up for that. □

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# Toshiba Tryout



*Many small business owners are looking for a fairly basic computer to handle very simple accounting functions — nothing fancy, just a good, solid reliable machine: the kind of thing computer hobbyists would scorn. Toshiba is set to take its fair share of that market with the T-200, reports Les Bell...*

As a 'lapsed' computer hobbyist, I still feel a fascination for gee-whizz machines with colour graphics, sound effects, and all kinds of plug-ins. From that kind of viewpoint Toshiba's T-200 just wouldn't score at all. Nothing. A duller machine is hard to imagine.

Fortunately, the businessman doesn't look at computers from that point of view; for him, the T-200 has some very good points indeed. It's a solid machine with a pleasing and easy-to-use screen and keyboard.

The T-200 basically consists of a main enclosure which holds the CPU, screen, one or two disk drives and the other bits and pieces which go to make up a computer. The keyboard is a separate unit, which is attached via a cable to the rear of the machine.

On lifting it out of the box, I was struck by two things; first its weight (it really is solidly built), and second, by the cables

which protruded from the rear of the machine.

Unlike most machines, there is no connector panel at the rear: the cables just run straight out of the machine through some grommets. I guess this reduces the possibility of cabling errors — it also means no extra cables are required with the T-200, a common trap for the unwary who then have to spend a small fortune on cables.

The two minifloppies on our review machine were mounted beside the screen, above the power indicator and brightness control for the screen. At the rear are the cable outlets, AC cord and a fan grille — nothing complex at all. Our machine had a mysterious third cable apart from the keyboard and printer cables.

After plugging in the keyboard and printer, we switched on and lo and behold! the machine worked first time. We booted up the CP/M operating system and everything was there and working.

Inside the machine is fairly standard. The processor is probably a Z-80 or 8085 running at a reasonable clock speed, and there's 64K of RAM in the box. These details are comparatively unimportant for the business user, and are likely to be significant to software developers.

The standard software for the machine includes a standalone implementation of Microsoft BASIC. This constitutes both the operating system and the language, and it is a system that has been used with

some success by other Japanese manufacturers. However, most, including Toshiba, are now concentrating on CP/M as the primary operating system.

The standalone BASIC seems to be very similar to MBASIC 5.2, with major differences in the area of file handling and I/O. The language comes with a package and utilities for indexed sequential file handling, which makes business applications a lot easier.

Other useful features include the ability to create turnkey disks which boot straight into the application program. This relieves the operator of having to key in the appropriate command line to set the program running.

Toshiba has accounting software for the machine written in this way, and it is very easy to use. We tried out the accounts receivable with invoicing. To start the program was a matter of inserting the system disk into drive A and booting the system. This then loads the BASIC and initial menu program; inserting the program disk into drive A will then load and run the debtors system.

Like most micro accounting packages, this one runs with program disk in drive A and data disk in drive B, and the first time the system is run, various control parameters must be entered to set up the data disk, — number of debtors, number of salesmen and so on.

The system has been well designed as far as operator entry is concerned, with the operator able to retain existing field



entries, over-write, cancel, and use the cursor controls to edit fields. This kind of editing facility makes data entry very easy.

The system provides a variety of reports, including a trial balance, overdue accounts, list of accounts which have exceeded credit limits, inactive accounts, account ledger, account sales, and name address, and telephone records.

Analyses of sales tax, transaction types, debtor groups, sales code dissection and salesman performance are also provided, as well as statements.

At the time we saw the package, the manual was still in preliminary form, and there were a few loose edges to tie up, but the package worked fine on the limited test drive we gave it.

For those operating under the CP/M operating system, the Toshiba also supports the Padmede business system. Written in the United Kingdom, this package has a few 'Englishisms' in its accounting terminology, such as references to the Nominal Ledger, but conforms to Australian accounting practices.

This package comprises invoicing, debtors, stock, creditors and general ledger programs.

In recent months, this system has acquired an excellent reputation. The documentation is of a very high standard, with examples, and the system is easy to use.

Some people are not keen on the heavily boxed and ruled displays which the system shows, but for a first time computer user, they probably look more reassuringly like forms than the more conventional computer screens.

Again, the system is menu driven, and uses a data disk in drive B. The general ledger is integrated with the other programs and all the programs produce a comprehensive range of reports.

Several other programs are available to run under CP/M on the T-200. For example, we first came across the T-200 when John F Rose demonstrated CalcStar to us on it, and it will also support WordStar and other products in Micropro's line.

In use, the keyboard felt good, with a logical layout. There are ten program-definable keys, and a couple of special function keys which are used by the Toshiba accounting programs. The screen display was easy on the eyes, though there was a slight drift on it, possibly caused by its proximity to another display.

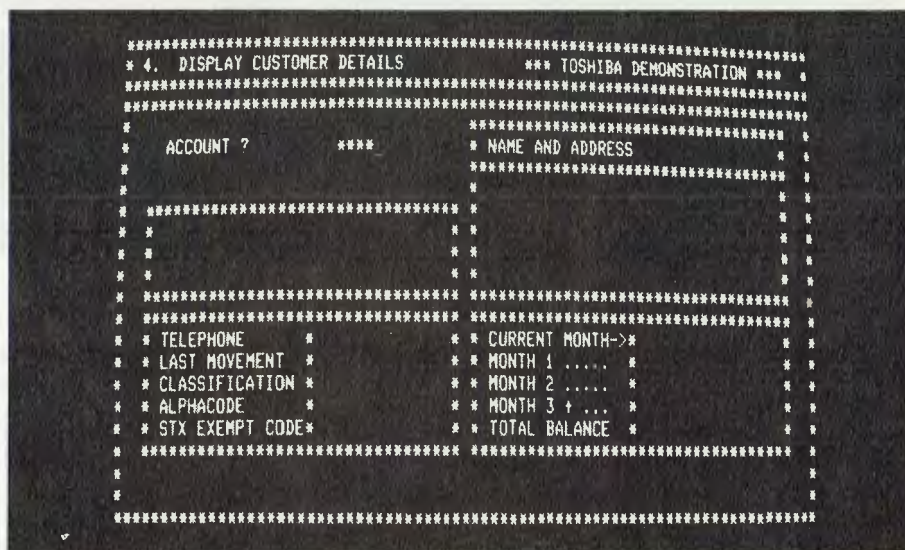
The printer supplied with the system was a C. Itoh (I think) under the Toshiba banner. A fairly quick, rugged printer; like the computer, short on fancy features, but more than adequate to get the job done.

Our review sample of the Toshiba T-200 was supplied by Toshiba Australia of North Ryde.

## Specifications and Report Card

<b>Unit:</b>	Toshiba T-200 Very Small Business Computer
<b>Made By:</b>	Toshiba Corporation
<b>Processor:</b>	Z-80 (prob)
<b>Clock Speed:</b>	N/A
<b>RAM:</b>	64K
<b>ROM:</b>	bootstrap
<b>I/O:</b>	serial, parallel
<b>Languages:</b>	BASIC, CP/M languages
<b>Keyboard:</b>	QWERTY, fair feel, user-definable keys
<b>Display:</b>	80 x 24, good quality
<b>Graphics:</b>	what graphics
<b>Peripherals:</b>	printer
<b>Expansion:</b>	N/A
<b>Best Points:</b>	wordman-like machine, solid construction
<b>Worst Points:</b>	N/A

<b>Ratings:</b>	<b>excellent</b>	<b>very good</b>	<b>good</b>	<b>poor</b>
<b>Documentation:</b>			✓	
<b>Ease of Use:</b>			✓	
<b>Functionality</b>		✓		
<b>Support:</b>	✓			
<b>Value-for-money:</b>		✓		
<b>Extras Included:</b>	<b>Accounting software</b>			
<b>Options:</b>	N/A			
<b>Review Unit from:</b>	Toshiba			





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# Commodore's Silicon Office



*The Electronic Office is the subject of much discussion amongst computer companies these days, but once you dig into it you find there's a lot of talk and not much action. LES BELL reports one small British company has made significant progress with its Silicon Office package for the Commodore.*

THESE DAYS, with the amount of software on the market, it is pretty well possible to do away with paper in the office. On my own system, for example, I have word processing, accounting, financial modelling, mailing list and other programs, and scarcely need to touch a piece of paper.

The big problem with this is that every program works in a slightly different way. Some expect carriage returns after every command input, some accept single key commands and every one has its own unique flavour and style.

While that's acceptable to a computer buff like myself with a binary brain, most computers have to be operated by real people, for whom this is quite a challenge.

Consequently, a major improvement would be a single program that could perform most of the functions outlined above, with only one set of commands and one 'style' to learn.

The Silicon Office is just such a program. With the assistance of a Commodore 8096 computer, this package provides database, word processing and communications functions that work in a consistent and easily-learned way.

Like most commercial software, Silicon Office works with two disks: a program disk, in drive 0, and a data or work disk in drive 1. Data disks are different from work disks; the former contain structured data files such as database files, while work disks contain sequential files for such applications as word processing.

On power-up, Silicon Office is loaded by simply pushing the SHIFT and RUN/STOP keys. The system automatically loads and presents a date prompt. The operator then enters the date.

## What Day Is It?

This brings me to the first of several interesting features of Silicon Office — its ability to calculate with dates.

Using the EV(aluate) command, the program can calculate days between dates and dates so many days before or after another date, with today's date simply being assigned the variable name TODAY. Best of all, dates are entered and manipulated in the form 12 May 82, not 12/05/82 or worst of all 05/12/82.

Once the date has been entered, Silicon Office is ready to accept commands. All commands are entered as two-letter

mnemonics, with optional arguments. Once the command is entered, and the CR key pressed, the line is redisplayed in its full form, and the CR key should be depressed again to execute the command.

For those, like me, who can never remember mnemonics until it's too late, the H(elp) command will display a help menu with references to the appropriate pages in the reference manual. This should be enough to jog the memory for, like many well-designed systems, Silicon Office has a simple and short series of commands.

Calculations are performed by the EV(aluate) command. For example, the line:

```
EV REVENUE = SALES QUANTITY * PRICE
```

will multiply sales quantity by price and store the result in memory location revenue. Arithmetic operators and functions include the usual stuff, as well as TAN, ATN, MAX, MIN, SGN and ABS.

The contents of memory are displayed with the DM (display memory) command. This produces a neatly formatted display of variable names and values, which will scroll if there aren't enough lines on the screen for the number of variables.

Values can also be input to memory locations using the IN(put) command. This will prompt the user and store the input value into memory.



## Database Management

Silicon Office incorporates quite a sophisticated database management system. A new database file can be created quite easily using the F(ormat)R(ecord) [filename] command. This will set up the system, ready to accept a record definition.

This is simplicity itself, as SO contains a very nice screen handler. The user simply draws a form on the screen using the cursor control keys and a few other simple commands, and from the layout of the form, the system is able to work out field lengths and names.

Once the file has been created, records can be entered using the IR (insert record) command. This allows the user to fill in the form he/she has just created. Full editing is provided.

The system has the ability to perform arithmetic using values from the current record of the database, using the EV command in exactly the same way as before.

In addition, the database can be searched either by key field (the first field on the screen) or on any field. The user can also scan through the entries on numeric or alphabetic order.

Records can be edited using the AR (amend record) command, which recalls the specified record to the screen, where it can be edited using the cursor controls.

The commands used to drive Silicon Office manually can also be combined into programs. The EP (edit program) command allows the user to construct a table of command lines which can then be executed automatically using the GO command. Loops can also be set up using the GO command, as well as the conditional command IF.

Sequential accessing of files is done through the NR (next record) command which will step through the database.

## Modular Programming

Programs can be saved on work disks, and as programs get larger and begin to exceed the allowable size, they can be broken up (good modular programming style) and chained together.

As well as numeric variables, SO can also use text (string) variables in a similar way to BASIC. These can be stored in calculator memory or database fields. The entire calculator memory can be stored to disk and later restored.

SO's word processor is quite sophisticated. It includes commands for justification, centering, underlining, headers, footers, find/replace, automatic date insertion, and other features that are usually only found in specialised word processors.

The word processor operates using similar commands to the rest of SO, but is a separate subsystem in which the more general SO commands will not work.

However, information from data files can be merged into documents for invoicing, direct mail shots and reports.

The print commands allow a considerable degree of latitude in setting up the print position and format. Printer control characters can also be embedded into documents for special effects such as superscripting or double width printing.

The system includes an extremely versatile report generator which uses some of the programming commands to perform totalling, subtotalling and other special facilities.

A major bonus in the package is the ability of the Silicon Office to communicate with other machines. The communications facility is very versatile, allowing the local operator to control the remote system and send disk files.

The overall impression I get of Silicon Office is that it is a versatile system indeed.

It is easy to use, and this is assisted by excellent documentation. There are two manuals, one tutorial in nature and the other a reference guide.

The reference manual includes information on transferring BASIC files into the system and other information for

sophisticated users.

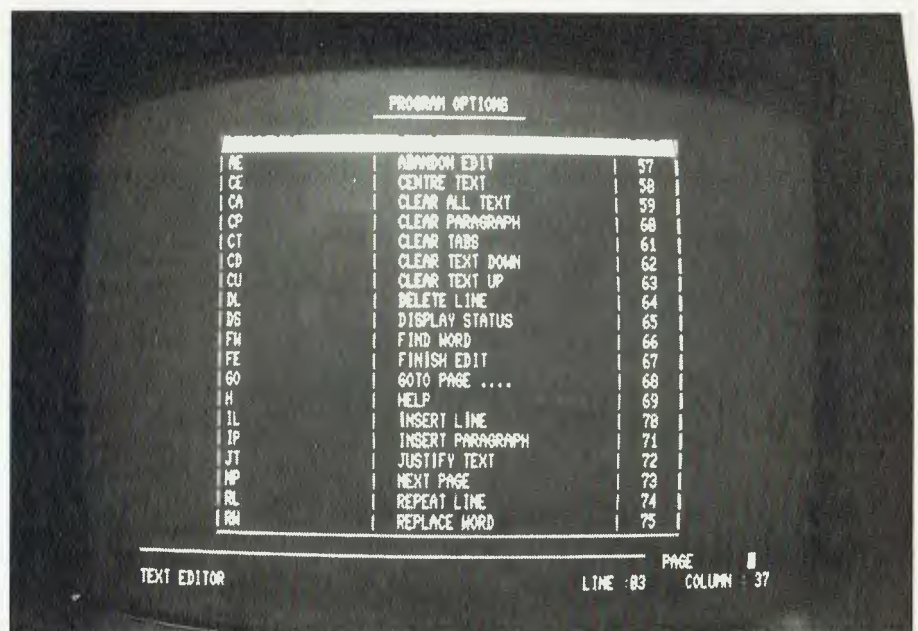
Both manuals are well written and organised, and were in fact edited and printed using Silicon Office itself.

Silicon Office runs on the Commodore CBM 8096 microcomputer. This has a full keyboard with numeric pad and a very good 80 column screen. A major plus of this machine is its 96 Kbytes of user RAM, in addition to 12K BASIC in ROM — without this much RAM, Silicon Office would never fit.

The matching disk drive has almost 600 Kbytes of storage per disk. This is connected through a GPIB (General Purpose Interface Bus) cable — unfortunately this is not as fast as a direct disk drive connection, so the disks were disappointingly slow. However, this was only a real worry when formatting a new diskette.

The overall construction of the 8096 is very good. It has a solid feel, and the keyboard had a good action. The matching printer also uses the GPIB interface, piggy-backing onto the disk connector.

The Silicon Office is a well thought out system. It is easy to use and to understand, and would work well for many small offices as well as departments of larger organisations. □





# The Professional System 80...



*Ever since Dick Smith first started selling his System-80 computer, he's been giving some other companies around town a hard time. Now he's set to do it in the business end of the market.*

MOST OF our readers will be familiar with the Dick Smith System 80 computer; in fact, many will own one.

The 'hidden secret' of the System 80 is that it is software compatible with the Tandy TRS-80; this meant that when it first appeared it was not a software orphan, while since then a considerable amount of software has been written for the System 80 in its own right.

Since it first appeared the System 80 has undergone a number of revisions and updates; the latest, the System 80 Business Computer, has updated firmware and some hardware changes.

The main keyboard is a standard QWERTY type with a good feel and beside it is a numeric keypad and a set of four user-definable keys.

The keyboard will operate in two modes; in one, the keyboard operates in capitals unless the shift key is entered, in which case it shifts to lower case — good for BASIC programming — while in the other it functions like a conventional typewriter, which is better for word processing and similar applications.

At the rear of the machine are the video, cassette and expansion interface con-

nectors. The cassette which used to be built into the System 80 has been replaced by the numeric keypad on the Business Computer, but very few owners would use cassettes anyway. Disks are essential for business applications.

The expansion unit contains sockets for an extra 32K of memory as well as a parallel printer interface and the floppy disk controller circuitry. Also available are an optional S-100 bus interface and an optional RS-232C interface.

Interestingly, the printer interface is mapped to either memory address 37E8H (a la Tandy) or I/O port FDH, and either one can be used.

The S-100 interface is claimed to allow memory expansion beyond 48K by using memory boards with bank select facility. A caveat may be in order here — the S-100 adapter is connected via a 50-pin connector, yet it has 100 lines, nearly all of which are utilised in the IEEE specification for the S-100 bus. How then can the expander be S-100?

To match the system, Dick supplies some neat MPI 40 track 13cm disk drives. There are two different types, depending upon whether the drive is at the end of the connecting cable or not (the last drive must have termination resistors for the cable).

With our review system, we ran a TEC F10-40 daisy wheel printer. This is a 40 character per second typewriter quality printer, with a full range of daisy wheel features, such as superscripting and sub-

scripting, double striking, and so on.

To complete the ensemble, a matching green phosphor or black-and-white monitor tops the computer.

With the expansion box plugged in, the system boots the disk on power up. The recommended operating system for BASIC program developers is NEWDOS/80 Mark II, an extremely sophisticated piece of software indeed.

However, for the basic business applications, no DOS is needed, as the applications programs boot themselves off disk automatically, using the MicroDOS operating system.

## SCAPs Off To Dick

SCAP stands for Stock Control and Pricing system, and is a quite sophisticated program which meets the needs of small to medium size companies by managing up to 1200 stock lines.

The system can provide a number of reports, including price lists and stock status lists. These reports may be for all items in stock or selected by number, by supplier, by status (out of stock, below minimum, on order, and so on). Reports can include month-to-date and year-to-date sales figures.

Interactive examination of stock levels is possible, as well as updating of records. Other menu items on the main menu include: new item entry, enter sales dockets, post sales dockets, enter goods received, enter orders placed, stock status sum-

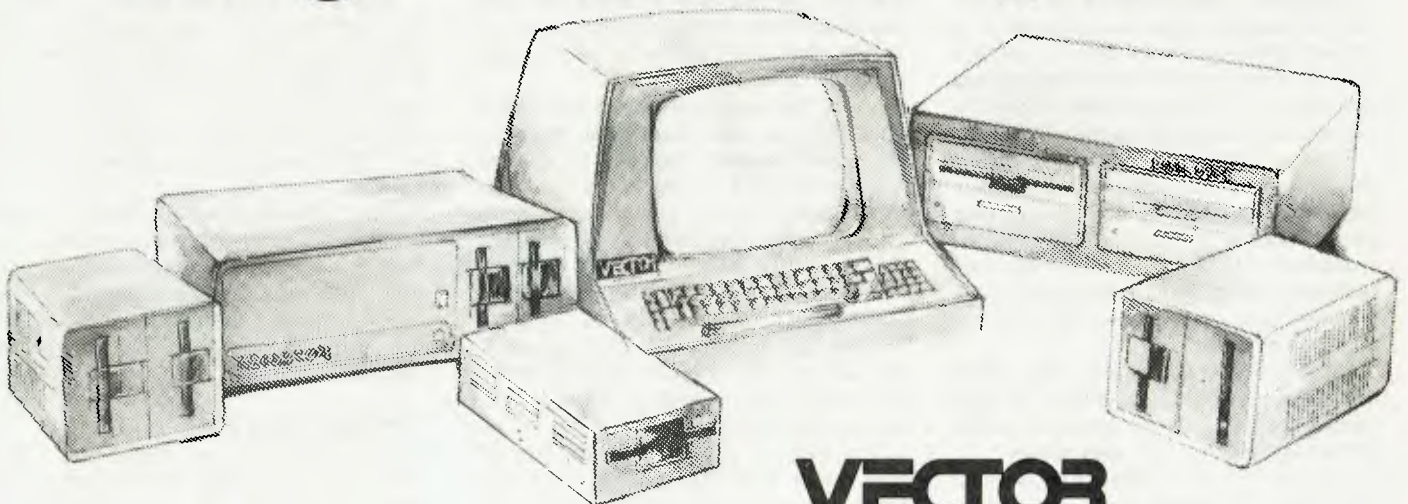
**Continued on page 112**



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# Manage Those Files— with FMS-80

Continuing his examination of database management systems, Les Bell this month looks at FMS-80.

LAST ISSUE I took a look at Ashton-Tate's dBase II, an assembly language relational database management program. This month's subject is a rather more sophisticated package, one which is somewhat more intimidating to the first-time user.

FMS-80 is not billed as a database management system, even though that's what it really is. The FMS stands for File Management System, and FMS-80 is actually a set of programs which chain to each other to perform various tasks.

FMS-80 is totally menu-driven, unlike dBase, which requires the user to know the commands and type them in on a command line. Once FMS has been invoked, and the user has typed in the date, the system presents the user with a main menu, from which subsidiary sections can be selected.

## Installation

As supplied, FMS-80 has to be customised for the user's system. Such customisation allows setting up of terminal parameters, done by selection of a terminal driver parameter file (or creation of a new one), as well as allocation of the disk drive data files will reside on and the various titles displayed by the system.

This last feature is especially important for systems houses and application programmers implementing a turn-key system for a client, as the client's name can be embedded into the system. Another nice feature is the ability to select one of three different date formats — US, international, or year first.

Several other options allow the system developer to set single or double spacing, disable operator intervention during sorts, printer widths and other parameters.

In fact, FMS-80 seems to be oriented towards system integrators and programmers rather than end-users, although the documentation claims it is intended for non-programmers (and it's certainly easy enough to use).

A thoughtful example of this is the provi-

sion for adding a help facility to the application through a help message file and generator. Using this, the programmer can supply the user with help messages at any point in the operation of his program.

The main menu allows the user to choose between file definition, file maintenance, file reports, utility, help, batch operation, a user menu and exiting the system. Usually, the user will first want to set up a file definition.

The FMS-80 definitions editor allows the user to name each field in a record, set its type, length and picture (similar to COBOL's picture, or BASIC formatting with PRINT USING).

As each field is entered, the file structure is displayed at the top of the screen, with the field being worked on in the middle of the screen and a menu of commands at the bottom.

Once the file definition is complete, one can quit back to the main menu. Normally, after entering a file definition, one must then enter a control definition, which specifies the key fields for sorts and indexes. A control definition can also contain a select definition, allowing sorts and selects to be combined.

Once the major and minor keys have been defined, and ascending or descending order specified, data can be entered into the file. This is done through the UPDATE option, which is selection number one on the FILE MAINTENANCE menu.

When this selection is chosen, FMS-80 will execute a submit batch file called UPDATE.SUB. This is supplied with the system, but system developers (or users) can replace the supplied version with a customised one, allowing faster or more convenient operation.

The use of submit files is common throughout FMS-80. The shell program which actually runs FMS-80 is rather like a souped-up version of SUBMIT.

UPDATE.SUB will firstly load and run TRANSACT.COM, which will input a batch of transactions, then a sort program sorts them into order and optionally prints

them before APPLY1 is invoked, applying them to the database. The final stage of the process is the creation of a new index file for the database.

The APPLY1 program will check transactions before applying them to the database, and will reject 'add' transactions if they have keys matching existing records, or 'change' or 'delete' transactions if they do not match existing records.

This batch-oriented operation is quite different to dBase II, which operates directly on the database. However, FMS-80 does have a direct query/update facility, which allows the user to directly access a file. This method of access does not provide any record of changes as does the batch update.

Once a file has been created, the next step is to use it to produce reports. The easiest way to do that is through the PRINT FILE choice on the reports menu. Without any selection criteria, this will simply print the whole file, in a columnar format.

Selection criteria are placed in a selection definition, which specifies the values which are used for conditional selection for each field, together with a logical connector (AND or OR). By using multiple selection criteria, linked together by ANDs and ORs, very complex selects can be built up.

The FMS-80 report generator allows the user to create reports in any required format, automatically performing calculations such as subtotals and averages. The report generator is quite sophisticated, allowing considerable flexibility of layout and titling.

## The Important Part

The most important part of FMS-80 is EFM, the Extended File Management language. This is a sophisticated structured language with the flavour of C, and which is compiled, not interpreted as is the case with dBase's language.

Programs are compiled with the command 'PREPARE filename', and ex-



ected with the command 'DO filename'.

The basic principle of EFM is that a program which opens one or more files for input will automatically loop, reading the first input file until it reaches the end of the file. Thus looping constructs are unnecessary, at one level, at least.

So a program can be written as though it only had to perform a transaction on the first record of a file, and it will automatically loop, performing the transaction on each record until it reaches the end of the file.

EFM's input and output statements allow any field to be read or written as required, with full consistency of type, record length, and so on.

Instead of using memory variables for calculations and temporary storage, EFM uses temporary fields, which must be declared at the beginning of the program.

EFM's statements include cursor movement, display, screen clear, data entry with optional upper case conversion, conditional statements and the dreaded goto. Subroutines are possible, and there is a switch or case statement to allow easy selection of multiple conditions.

EFM allows groups of fields to be referenced with one instruction, saving a lot of code writing.

The problem with EFM is that it is deceptively simple; there doesn't seem to be much to the language, until you start looking at the examples given in the manual, and realise that you must have missed something on your first skim through.

Any of CP/M's (or MP/M's) functions are accessible from within the FMS-80 shell. The shell behaves rather like CP/M's submit facility, by running a batch of programs in sequence, but it also will run a 'base program' when the list of programs is empty. Usually, the base program provides the user with a menu.

The shell also supports redirectable I/O a la UNIX. One gets the distinct impression that chunks of FMS-80 were written in C, or by a programmer with a predilection for C and UNIX. Several shell commands can be executed from with any EFM or assembly language or C program, sometimes with startling effects.

For example, shell function seven, 'Execute Command Immediately', causes the entire contents of memory to be written to a temporary disk file, and a CP/M command line to be executed. Upon completion of the called program, the memory image is restored, and control is returned to the calling program. The manual makes the point that this process is 'excruciatingly slow' on 13cm disks!

### The Good Book

The documentation is very thorough; the manual starts with an introduction to CP/M, explaining how CP/M's command line works. From there on, it is primarily tutorial in nature, with a reference section

in the second half of the manual.

For a system as complex as this, no manual is complete, and the user will have to learn primarily by trial and error. The FMS-80 manual assists this process with good examples.

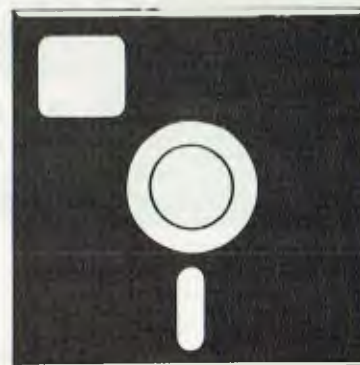
Overall, FMS-80 seems to be a sophisticated package indeed. Its programming language is supportive of structured programming techniques, and being compiled, runs pretty fast.

To compare dBase II and FMS-80, one would have to say that both are top-line programs, which can do a lot for any small or medium-sized business.

dBase II is probably better in a more interactive environment, perhaps where an owner-operator wants to generate lots of different reports, and doesn't mind learning by trial and error.

FMS-80, on the other hand, is probably more suited to fixed applications where only standard reports are needed and data entry is by inexperienced operators. FMS-80 seems to be particularly suited to

## your computer



## SOFTWARE REVIEW

software houses and developers.

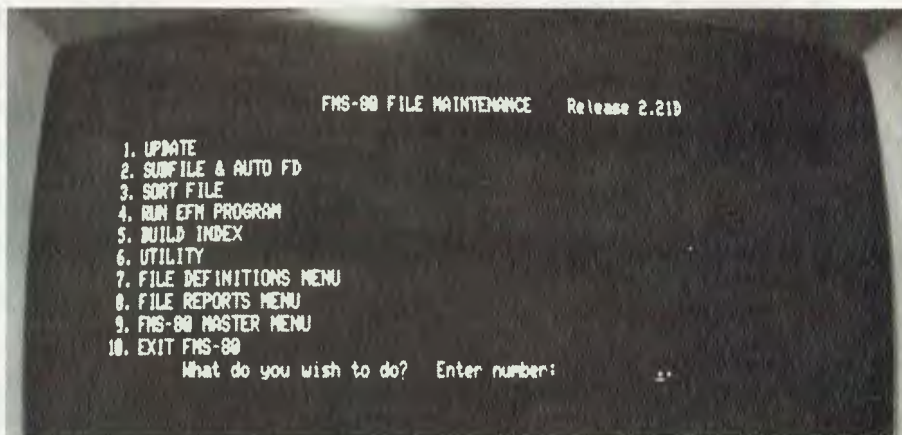
Our thanks to Monty Jaboor, of Cycom Systems in Melbourne, who loaned us copies of both dBase II and FMS-80 to make this evaluation. □

### Software Report Card

<b>Program:</b>	FMS-80 File Management System
<b>Made By:</b>	DJR Associates
<b>Useful for:</b>	Database management, accounting, list management
<b>Hardware Req'd:</b>	8080/Z-80 running CP/M

Ratings:	excellent	very good	good	poor
Documentation		✓		
Ease of Use		✓		
Speed		✓		
Functionality	✓			
Support		✓		
Value-for-money		✓		

**Review copy from:** Cycom Computer Systems, 178 High Street, Windsor, Vic 3181









# HEARD ON THE BUS

By LEON YENDOR

IN THE very first column I wrote for *Your Computer* I discussed bus standards and pointed out how manufacturers who devised their own unique interconnect systems could be trying more to prevent their customers buying competitive add-ins than to devise a superior system.

I have just received details from one user of such a system on just how expensive a 'cheap' machine can be.

He works for a government organisation with a limited budget for computers and was effectively forced to purchase a rather basic personal computer to handle calculations required for some experimental work.

I won't mention the brand, but you've heard of it and I must admit that if its minimum configuration is suitable for your application then it is reasonable value.

The problem for this user is the experiment has proven worthy of further development — and in need of more computing power and much more storage capacity.

To add this requires the purchase of a Winchester disk and he has found, to his horror, that a 10 megabyte unit made by (or rather for) the original manufacturer costs just a few dollars less than an S-100 (IEEE 696) system with three times the processor speed, 64K of low-power static memory, two double-density double-sided 20cm drives and a 20 megabyte Winchester.

He'll have to spend more to add a terminal, of course, and his coffee breaks won't be enlivened with games in living colour, but neither will he be locked-in again.

As he says, "You told me so!", but he isn't alone and to some extent there is the excuse that no one could foresee the increase in requirements.

The lesson for the rest of us is really that we should not be buying a machine which barely handles our present needs. This is true at all levels. A microcontroller in a machine is not suitable if every trick in the book must be used to handle the task when the design is specified, and it is just as crazy to buy the world's best minicomputer if next year a mainframe will be needed.

You may think that I am trying to generate a higher expenditure on equipment



but if you examine the case history above you'll find that what this is really about is spending less overall.

More to the point is that the above case refers to the expenditure of our taxes and we need to get better value than we did in the example quoted.

## Better Than Guessing

Guessing your future needs and buying to suit that guess is great if your guess is right and a disaster if your guess is way off, so you need to have a way of making better forecasts, right?

Wrong! What you really need is a way of ensuring that growing beyond your present equipment will not be too traumatic. If you follow the above advice you should not run into hardware limits before your computer has given you a reasonable return. The problem you then face at upgrade time is the software transplant shock.

If you write (or have written for you) your own code the way to reduce the cost of transporting your programs to a new machine is to make sure that they are written in a portable standard language and preferably are supported by an operating system which hides the hardware differences.

This means forgetting some of the most popular languages like Basic and Pascal. The standard versions of both of these are too restrictive to be of any use to anyone

to whom the cost of portability is significant.

It also allows the use of some which are of great sentimental value to their adherents, although I could never advise their use by those who don't already use them. (for example Fortran IV and Cobol).

The main thing is to be sure that you won't have to change the method by which you (or other users of your system) interact with the program and, where you don't own the source code, it might not hurt to ask the author or vendor what plans he has to support new machines which may be necessary for your operations in the future.

A little more buyer pressure may force some appropriate consideration of these problems by applications packagers. The smart ones do it already to maximise their own returns but at present the end-user has very little indication of whether or not this is true for most pre-written code.

## Bigger Is Better?

About the time this appears in print I'll be deep in the heart of Texas at the National Computer Conference. Once the show for the biggies only, it now features micros on the same floor as the mainframes and minis.

Maybe it is just as well that this trend started a few years ago or IBM might not have been able to display its PC. Having left the mainframe world several years ago myself I'll find it interesting to see how it handles the transition, especially when the first time it shows the 5150 is in the one state famous for its love of the biggest of everything. Does this imply Big Blue is only aiming to have the biggest micro in the world?

Other attendees from this area are warned not to miss my paper on How to Avoid the Forthcoming Silicon Shortage (or how the oil sheiks plan to continue to be rich by monopolising sand when the oil runs out).

As the conference starts at about the same time as we go to press for July look for a report in the August issue. There are sure to be lots of new toys on show and I hope to be able to report on the real ones as well as the prototypes trotted out to scare the opposition. □



# Reflections On A Reflections On A Mirror Mirror



*As the race continues to see who can get a computer with graphics on the market for under \$20, Victorian company Mirror Systems has taken a step forward with its new machine, the Mirror 2000. LES BELL reports...*

ONLY THIS morning I was idly wondering why it is that mirrors reflect from left to right, but not top to bottom.

You may have noticed that if you put a glove on your right hand, your mirror image has a glove on his left. But with shoes on your feet, your mirror image won't have his shoes on his head. Curious. Answers please, on a postcard, to...

The Mirror 2000 computer does not have any of these curious properties — thank goodness! Made by Mirror Systems, of Belmont, Victoria, the Mirror is a small 6502-based computer with a very low component count but very high performance.

The result is a machine that is ideal as an educational or home computer; it can do quite interesting things without breaking the bank.

The Mirror itself is printed circuit board about 38 by 27.5 cm, bearing a 6502 microprocessor (same as Apple and PET), 8K of RAM and either a machine code monitor in EPROM or Microsoft BASIC in ROM. At the front of the board is a full QWERTY keyboard, with proper 36

keyswitches; it is possible to touch-type on the Mirror.

Through the use of some very cunning circuit techniques the Mirror also includes a full graphics display. Instead of the conventional divider circuits and what-have-you in a video circuit, the Mirror uses the address bus of the microprocessor itself to do the timing and character generation, in a somewhat more sophisticated version of the ZX-80's video generation.

The standard display format is 44 characters wide by 24 lines, although it can be reprogrammed to 44 by 32 with a 5 by 7 dot matrix character set if required.

The character generator is, in fact, the first section of the monitor ROM, but other character sets can be set up in RAM and used instead. This means that multiple character sets can be used and, with careful design, some clever animation techniques can be achieved.

The Mirror 2000 Reference Manual includes a lot of material on the video techniques, though I'm still not sure I fully understand it — some tricky methods are used. The lack of a circuit diagram doesn't help, but then one can't give all the secrets away!

The manual gives details on setting up character generators in memory for various sizes of characters. My lack of familiarity with 6502 assembly language (coupled with a lack of time) prevented me from trying this, but the instructions seemed fairly clear, and easy to follow.

In graphics mode, the screen format defaults to 128 by 248 pixels, but it can be

reprogrammed to 256 by 256 pixels under user control.

Also on the board is a cassette interface for saving and loading programs; as this requires the processor's full attention, the video is blanked out while a program is loading.

Other expansion capabilities include a sound port (optional, do-it-yourself on the board, supplied on the all-up system), optional RS-232C printer port and an expansion connector for future peripherals and expansion.

The software supplied with the Mirror depends upon which version you buy. The basic unit comes with a machine language monitor, which allows the user to drive the machine at a basic level and write fast action games, and so on.

Early units were supplied with Mirror Systems' own BASIC in EPROM, but now production units have switched over to Microsoft 8K BASIC in ROM, with extensions by Mirror Systems.

The 8K Microsoft BASIC seems to have a lot in it compared to the last time I saw an 8K BASIC. It is supplied with a comprehensive manual from Synertek (manufacturer of the ROM), which lists the various commands statements and functions.

These include the standard BASIC functions, as well as DATA, DEF (user-defined functions), WAIT, ON...GOSUB, RND(X), USR(X), all the string functions and others.

This BASIC is really quite powerful, much more so than its small size would indicate. Mirror Systems has extended it



considerably with the addition of special graphics commands and a full-screen editor.

The graphics mode is set with the MODE command. MODE(1) sets graphics mode, while MODE(0) resets the screen to text. On power-up, the video RAM contains a random pattern which must be cleared using the CLS(X) statement: CLS(0) clears the video RAM to all black, while CLS(1) clears it to white.

Cursor addressing is available in both text and graphics modes, providing a facility similar to PRINT AT, through the use of the CURS(X,Y) statement.

The LINE(X,Y,A,B,C) statement will draw a straight line between two points (X,Y) and (A,B) in colour C (0=black, 1=white). This is probably the most versatile statement in the Graphics BASIC language, as it may be used for business graphics, gameplaying or whatever.

The CIRCLE(X,Y,A,B,N,C) statement draws a circle centred on (X,Y), with the circumference starting at (A,B). The integer N is the number of points forming the circle, and C is the colour, as before. To fully close the circle, N should be 8 times the radius; this allows drawing part circumferences.

PAINT(X,Y,C) will fill in an empty shape starting from the point (X,Y) in colour C (black or white, as before). The point (X,Y) must obviously be totally enclosed by line graphics, as otherwise the painting won't stop until it reaches the edge of the screen. The combination of CIRCLE and PAINT is great for drawing pie charts!

Incidentally, LINE, CIRCLE and PAINT are quite recent newcomers to the BASIC language, having only previously appeared on the IBM PC and Tandy TRS-80 Colour computers.

Graphics points may be set or reset by the SET(X,Y,C) statement, and read with the function C = POINT(X,Y). A nice touch is the implementation of smooth or 'soft' scrolling.

The SCROLL(C) statement, where C=1 to 7, allows the user to set the number of video lines which are scrolled up every 20th of a second (video frame). With SCROLL(1) used, scrolling is very smooth, reducing eye-strain.

The fact that the processor is used to generate the video timing signals reduces the time it spends on actually running BASIC, effectively reducing the speed.

This drawback may be circumvented with the VIDEO(C) statement; VIDEO(0) switches the video off, apparently speeding the processor up, and VIDEO(1) switches it back on again. If video is switched off, a PRINT or INPUT statement will switch it on again.

A full screen editor is provided, which allows the cursor to be moved anywhere on the screen by the control-U (up), D (down), L (left) and R (right) commands.

## Specifications and Report Card

<b>Unit:</b>	Mirror 2000
<b>Made By:</b>	Mirror Systems
<b>Processor:</b>	6502A
<b>Clock Speed:</b>	1 MHz (effectively reduced by video circuit)
<b>RAM:</b>	8K
<b>ROM:</b>	varies
<b>I/O:</b>	RS-232C, cassette, keyboard, and screen
<b>Languages:</b>	8K Microsoft BASIC in ROM
<b>Keyboard:</b>	Full QWERTY, nice feel
<b>Display:</b>	44 × 24
<b>Graphics:</b>	128 × 248 (standard)
<b>Peripherals:</b>	
<b>Expansion:</b>	8K RAM and colour video board (under development)
<b>Best Points:</b>	Graphics language, low cost
<b>Worst Points:</b>	Video slowing processor
<b>Ratings:</b>	<b>excellent</b> <b>very good</b> <b>good</b> <b>poor</b>
<b>Documentation:</b>	✓
<b>Ease of Use:</b>	✓
<b>Functionality</b>	✓
<b>Support:</b>	✓
<b>Value-for-money:</b>	✓
<b>Extras Included:</b>	
<b>Options:</b>	Synertek/Microsoft BASIC
<b>Price:</b>	<b>from \$379</b>
<b>Review Unit from:</b>	Mirror Systems, POBox 186, Belmont, VIC 3216

All that is required is to move the cursor to the appropriate point and type the corrections. A useful feature is the ability of control-F to copy the character under it to the bottom line — this allows the user to copy most of a line, omitting the parts in error.

The machine language monitor includes the usual commands for examining and changing memory, executing a program, and loading and saving tape programs/data. The manual contains several useful routines, including a section on programming the keyboard.

Also included in the manual is a comprehensive memory map, diagram of video RAM, expansion socket pinout, description of interesting locations in RAM and useful monitor entry points.

An interesting feature which the manual modestly makes light of is the real time

clock which counts hours, minutes and seconds as long as the video is running.

As mentioned above, several versions of the machine are available: a basic board (needs 5V 2A power supply), for only \$379, a fully enclosed model with speaker and cables at \$439, and a full system, with Microsoft BASIC, enclosure, speaker, cables and power supply at \$599.

The Mirror 2000 is an interesting little machine which offers high performance at very moderate cost. The inclusion of graphics commands into the BASIC is a first for an Australian-made machine, and the system has enough power to provide hours of amusement (or do some serious work).

Our review sample was provided by the manufacturer, Mirror Systems, PO Box 186, Belmont, VIC 3216.





# BASIC For Babysitters

By John Annable

AS A WORKING musician who rarely gets to bed on Saturday nights (or Sunday mornings) before 2am I found that I had a small problem.

My children (three, four and ten years of age) having had a refreshing twelve or so hours sleep developed the nasty habit of bouncing out of bed at 6.30 and demanding to be entertained, fed, and so on...

As natural parental feelings are somewhat dulled in such a situation I turned the problem over to my trusty ZX81.

"Right, buddy, everyone calls you a toy! Let's see if you can behave like one."

The two younger children were the main ones to be satisfied. They were no strangers to the keyboard, but soon lost interest when their infantile prodding simply resulted in the computer hanging up and doing nothing particularly stimulating. At this stage they were wont to raid the bicky barrel or continue with their mural on the kitchen wall.

The trusty 81 came to my rescue like a

champ. With a few simple programs the littlies can be entertained happily until their parents decide that the day has matured enough to be dealt with.

I'm sure the psychologists have worked out the ideal parameters for a successful toy and they probably go something like this:

- Brightly coloured.
- Interactive, with an instant, varied reply.
- Sturdy.
- No bits and pieces (this one is my addition, purely a value judgement on behalf of the parents).

Well, the ZX81 loses out on number one, but comes home well on the other points, so if we can just give those childish prods a welcome result our problem will be solved.

## The First Program

```
10 LET A = INT (RND*21)
20 LET B = INT (RND*31)
```

```
30 IF INKEY$ = " " THEN GOTO 30
40 PRINT AT A,B; CHR$( (RND*8) + 1)
50 GOTO 10
```

This program simply waits for a key to be pressed and then prints a random graphic character at a random location on the screen.

Line 30 is most important. If the machine goes ahead and prints its design on its own the child soon loses interest. The knowledge that the computer is obeying their command is what holds their attention.

The problem with the above is that after a while the screen becomes quite full and it is difficult for the little eyes to discriminate the new character so it looks like nothing is happening.

Add the following lines:

```
5 LET X = 0
45 LET X = X + 1
47 IF X = 20 THEN CLS
```



48 IF X = 20 THEN GOTO 5

An added dimension comes into play as the children enjoy the screen clearing as much as they do the characters being printed.

There are any number of variations to this idea. If the graphics figures are a little small then by adding the following they will be longer and more interesting:

```
42 PRINT AT A,B + 1;CHR$ ((RND*8) + 1)
43 PRINT AT A,B + 2;CHR$ ((RND*8) + 1)
44 PRINT AT A,B + 3;ETC, ETC...
```

Don't type it all — just edit line 40 and change the numbers.

I have found the biggest problem with computer programming is coming up with the ideas. As you can see there is nothing special about this; it is simply a new application.

### Next Program, Please

Having watched the display for a while they will get tired of it and demand something new. This is where big brother (the ten-year-old, not George Orwell's mate!) steps in and loads the next program.

```
10 IF INKEY$ = " " THEN GOTO 10
20 FOR J = 1 TO 20
```

```
30 PRINT "(YOUR CHILD'S NAME)"
40 NEXT J
50 CLS
60 GOTO 10
```

This program will print the child's name a number of times after a key is pressed. This then seems to spring up to the top of the screen and stretch down again at the press of another key. Interesting effects can be obtained by putting a comma after the name.

Finally with the use of the SCROLL command exciting things can be made to happen from the bottom of the screen:

```
5 LET A$ = " "
10 LET A = INT (RND*20)
20 IF INKEY$ = " " THEN GOTO 20
30 LET C$ = INKEY$
40 FOR J = 1 TO A
50 LET A$ = A$ + C$
60 NEXT J
70 SCROLL
80 PRINT A$
90 GOTO 5
```

This program reads the key that has been pressed then creates a string of random length consisting of that character repeated. This is printed at the bottom of the screen, scrolled up and then the computer then waits for the next inkey.

Once again this program can be ex-

panded to include graphics characters, the child's name or a special message.

As I said before it is the ideas which are the hardest to come by. I hope the above has stimulated you into preparing your own 'kindergarten' programs.

All that is needed is the IF INKEY\$ = " " THEN GOTO (Same Line). This will cause the computer to wait for an inkey. The program will then be activated no matter what key is pressed. (Apart from break — better tape that one over!)

To conclude I have to point out that in this application the ZX81 keyboard is ideal...no keys to break, no cracks for Vegemite or peanut butter to be jammed in and no danger of the kids being too heavy-handed!

Mum and Dad can rest in peace while the kids are entertained by the micro!

Why not put your imagination to work and come up with some interesting ideas to keep the kids amused. The programs can be expanded so that they can be educational. The children like to name the letter or number that they have called onto the screen.

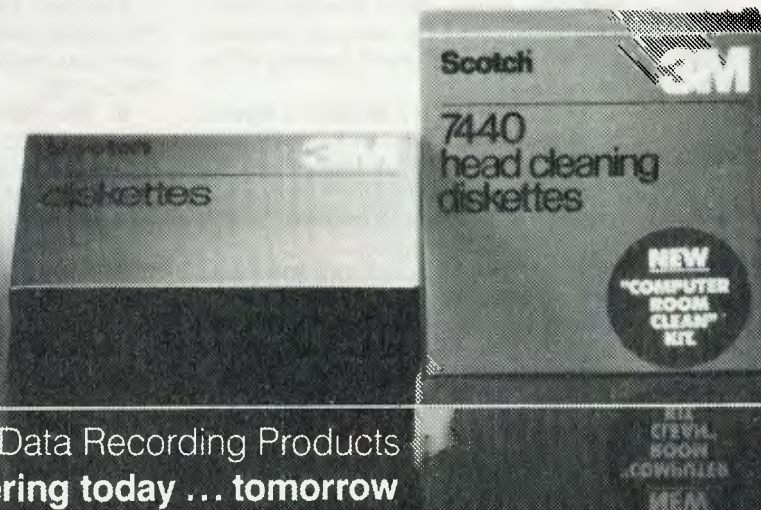
If you have a program to print large letters on the screen then this would also be ideal in this application, but make sure it will work with an inkey — littlies will not hang around long if nothing happens originally and once again your peace will be shattered! □

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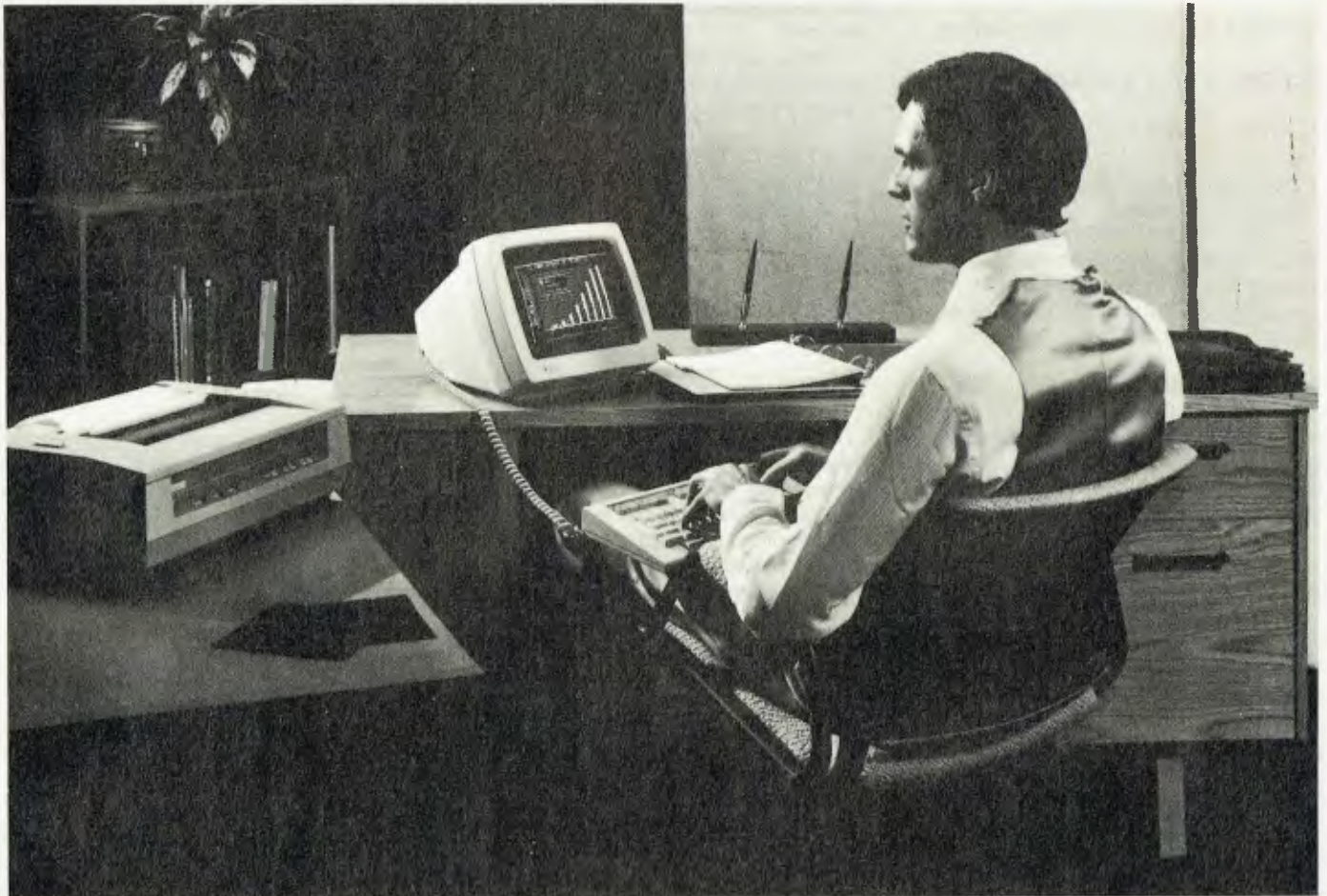
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3M 2156



# Delicious, Delectable, Desirable DECS



*The name of Digital Equipment Corporation is one which Les remembers fondly from his days programming the PDP-8, the world's first minicomputer. Now DEC has announced its personal computers — some say a bit late, but others would say better right than first...*

TWENTY-FIVE years ago a company was formed which started a revolution in computing; the revolution that set the trend towards smaller, cheaper computers. That company is Digital Equipment Corporation, of Maynard, Massachusetts, and its machine, the PDP-1, was the first step towards the minicomputers so common today.

DEC's major step towards personal

computers was the PDP-8, a small 12-bit computer which was inexpensive enough to be dedicated to running laboratory experiments. At last, every scientist and engineer could have his personal computer (at least, that's the way it seemed at the time).

The PDP-8 virtually became a legend, remembered with affection by many who worked with it. With the PDP-8, DEC's fortunes rose, and the introduction of the PDP-11, a 16-bit minicomputer, saw it scale even greater heights.

With the introduction a couple of years back of DEC's VAX series of superminis, it seemed the manufacturer's attention was concentrated on the bigger machines.

Not so, as the release of the new personal computers last month would indicate.

DEC has released three new machines. Although they share a lot of common parts such as cabinets, displays and key-

boards, the three machines are fundamentally different and are targeted at different types of user.

Each has a different processor, operating system and software, but they share a common mechanical design and overall philosophy.

At the bottom of the range is the 'Rainbow 100'. Don't let the cute name fool you: this is no toy or games machine. The central processor isn't — there are, in fact, two processors in there.

A Z-80A handles all disk I/O, while an 8088 looks after the screen and keyboard. Either can function as the main processor, with the other operating at the same time, as they have separate, private memory blocks.

The operating system is (dare I say this?) CP/M — with a difference. Instead of running CP/M-80 or CP/M-86, DEC has a custom hybrid version called CP/M 86/80 which will run Z-80 or 8086 prog-



rams interchangeably without the user knowing or caring which is which.

This will give the Rainbow 100 owner access to a huge range of software, including the new CP/M-86 versions of old CP/M-80 favourites such as WordStar et al. The operating system automatically senses which processor a program was written for and invokes the right one. Presumably that's easy, since Z-80 programs are named program.COM and 8088 ones are program.COM.

For those who are worried that the IBM PC might have something DEC owners would miss, the word I have is that a version of PC-DOS (alias MS-DOS, alias Seattle Computer's SB-DOS) will also run on the DEC machine.

The machine has 64 Kbytes of RAM as standard, and that is expandable to 256 Kbytes. Built into the cabinet are two 13cm minifloppy drives, each with 400 Kbytes capacity. Two extra drives can be added externally, and there's also a 5 Mbyte micro-Winchester for megalomaniacs.

The display is rather nice, and ideally set up for spreadsheet calculators and similar programs, with 132 columns, horizontal scrolling and other tricks. Although it is memory mapped (hence the dedication of the 8088 to screen), the screen looks to the programmer just like a VT-100, DEC's sophisticated terminal which is seen in all the best places.

The system excels at graphics. Optional bit-map graphics add colour or grey-scale capabilities with a resolution of 960 by 240 and eight colours or shades. The system seems to be pretty quick, too.

The keyboard is slim-line, with 105 keys, and what DEC calls 'Ergodynamic design'. Therefore it must be good...

Other features include serial ports, with two special communications programs. The CX program allows mainframe communication, including transmission and reception of disk files, while the DX program links the Rainbow 100 into DEC's DECmate office systems for block oriented document transfer.

Software for the machine will include the Select Information Word Processor, MBASIC, Microsoft's MULTIPLAN spreadsheet calculator (which, according to reports, is stunning), and the Mark Williams Company C Compiler.

Actually, when I spoke to DEC, opinions were divided (between the American and Australian sales literature) as to whether it would be Whitesmiths or Mark Williams C, but at the time of writing, I don't think Whitesmiths has released an 8086 C compiler.

The pricing on the system is good, with a basic box, 64K RAM, screen and keyboard listing at \$3720 excluding tax and duty, and CP/M-86/80 at \$290. Software pricing is also reasonable.

## Decmate II

For some time DEC has been selling a small communicating word processor/office management system called the DECmate. Based on the dear old PDP-8 in its single-chip form, this system has been extensively upgraded, redesigned and brought back to life as the DECmate II personal computer.

Designed for the desk of the high-powered corporate secretary who takes electronic mail and word processing as no less than her due, the II falls in the middle of DEC's new range.

Based on the same box, screen and keyboard as the Rainbow 100, the II uses a Harris 1620 microprocessor with 96K of RAM, the same twin disk drive, but quite different software.

The operating system, COS-310, together with DEC's DIBOL language, should find strong support from existing DEC OEM's, who can transfer their accounting and other applications packages onto the new machine.

The II's word processing software is based upon existing field-proven programs, and is easy to learn. Optional packages include list processing, sort, editor maths, list processing maths and communications.

In addition, the DECmate II will support additional 20cm drives, making it compatible with other DEC computers and word processing equipment. Both the CX and DX communications facilities are supported, while the AX comms option allows an unattended machine to exchange documents.

For those who hanker after CP/M, an optional processor card lets the machine run that operating system. DEC will offer a complete accounting system to run under CP/M at \$690, as well as MBASIC and MULTIPLAN.

DECmate II is priced from \$4280 including system box, dual disks, screen and keyboard, and optional CP/M auxiliary processor. Other options include graphics and mass storage expansion.

## Professional 300

The flagship of the line is really two machines, the 325 and the 350. The difference is in the system box, which in the 350 is a few inches wider in order to fit in a mini-winnie.

Both machines are based on the LSI-11/23 processor, a highly integrated version of DEC's super-successful PDP-11 minicomputer, and feature 256K of memory as standard.

The P/OS operating system is derived from the RSX-11 real time operating system for the PDP-11 and supports multi-tasking such as simultaneous word processing, invoice printing and communications.

P/OS does not use a special command

language; instead the user can select functions by moving the cursor on various menus. A computer based instruction course included with the operating system is designed to give the user familiarisation and practice with the machine, while the 'HELP' key can be used to provide help messages on the task being performed.

The 300s will communicate with PDP-11 and VAX computers; in addition direct Ethernet connection and DECnet support are planned for these machines. For developers of large software, a set of software development tools is available that will run on a VAX.

Applications can also be developed on the machine itself, using its BASIC which includes on-line HELP facilities, debugging facilities and graphics commands.

In addition, the 300s will run Visicalc and UCSD Pascal, both of which conform to P/OS standards, allowing integration into menus, directories and help messages used by the series.

The graphics software package for the 300 series conforms to the ACM Special Interest Group in Graphics. This standard, known as the Core Standard, is device independent, but DEC has extended it to include rectangles, circles, arcs and interpolated curves. Co-ordinates for figures can be expressed in either absolute or relative values. More than 20 commands allow users to specify colour, texture, brightness and other parameters.

DEC didn't mean to mention it, but let slip that an auxiliary processor is under development which will allow the 300 series to run CP/M. This means that those upgrading to this machine needn't leave all their software behind.

The Professional 325 is priced at \$4570, and the 350 at \$5720. The optional Winchester is \$4010.

## Looking Good

From what I've seen of these machines so far, and my knowledge of DEC as a company, I would say IBM is going to have a struggle on its hands for the top-line professional users. These machines are priced competitively, and their performance should outdo the IBM (though I reserve judgement until I've benchmarked them both).

Certainly DEC in Australia knows a lot more about these products than IBM seems to know about its own.

It is gearing up to support them locally, including the organisation of local software and support. First volume deliveries are due in September; until then it's strictly 'first come, first served'.

Every time a new computer comes out, I tend to be impressed and rave for a while. In this case, I think it's deserved. These computers are about the most sophisticated on the market today — any professional looking for a computer should check them out. □



# A Likely Latin

*Most people think of typewriters when Olivetti is mentioned, but the Italian office-machine giant does a lot more than that. Its latest venture is a new personal computer, and Les Bell took a look at the Australian launch.*

HERE IN Australia we are often unaware of just how huge some European companies such as Olivetti are. We see the American multinationals, but the Europeans seem to blend in much more and become part of the scenery.

It was only at the launch of Olivetti's new desk-top professional computer that I realised just how big the company was. With a group turnover of some 2887 billion lire and 53,300 employees, it dwarfs other microcomputer companies.

It is already the largest European manufacturer of office machines and information processing products, and ranks sixth in the world for sales in this sector.

In the eyes of an expectant world, therefore, it is about time Olivetti had a microcomputer on the market. This is particularly true when one remembers its earlier desk-top programmable calculators which pioneered that market.

For those who have been waiting, here it is: the Olivetti M20. Part of Olivetti's Line 1 series of computing equipment, the new machine will be followed by the M40 and M60, which will provide an upward growth path for users.

"This is the first personal computer of this calibre announced in Australia by a major supplier", said Ike Honigstock, managing director of Olivetti Australia.

"We expect our level of sales of this product will put us in the number one position at the professional end of the market".

I'm sure Mr Honigstock realises that won't be as easy as it sounds — there's a lot of competition out there — but the M20 certainly is a well-engineered and innovative machine which is in with a chance.

Based on the SGS-Ates version of the Zilog Z-8001, which is manufactured in Italy, the new machine offers a performance benchmarked at 30 percent better than its major competitors, according to tests done by Olivetti.



The single enclosure contains the processor with 128K of memory, keyboard, video circuitry, two disk drives and miscellaneous interfaces and power supplies. An ergonomically designed display sits on top.

The keyboard is clean and uncomplicated (I've seen Olivetti typewriters with more keys), and the top row can be user defined for use with applications programs. In addition, each key calls for a BASIC keyword, to speed program entry by one-fingered typists. Each disk has an unformatted capacity of 320 Kbytes, while the RAM can be expanded to 224K in 32K increments.

The video monitor can be tilted and rotated on top of the computer for maximum operator comfort (to coin a phrase). A monochrome version is standard, but a colour display is due for release shortly, which will offer display of four colours selected from a palette of eight. Resolution is 512 by 256.

An unusual feature of the display is the ability to split it into up to 16 windows, each of which can individually scroll and generally behave as a separate display.

The operating system, PCOS (Professional Computer Operating System), is loosely modelled on Unix, but with the notable omission of the C programming language on which Unix is founded. The

system language, instead, is BASIC — probably a reasonable choice in view of the scientific/technical/professional orientation of this computer.

The BASIC interpreter is Microsoft BASIC for the Z8000; much the same as MBASIC 5.2, allowing easy transportation of software.

At power-up, the PCOS nucleus, resident commands and the BASIC interpreter are loaded into the system, while the transient commands are left on disk and only loaded when requested. Transient commands can be made resident if required, using the PLOAD and PSAVE commands.

PCOS supports both sequential and random access files, as well as ISAM (Indexed Sequential Access Method) through a B-tree indexed file structure. The BASIC has also been extended to handle IEEE-488 control for instrument interfacing and sophisticated graphics commands.

Other software for the system includes Microsoft's MULTIPLAN spreadsheet calculator, a system self-instruction course, OLWORD word processing package, OLIENTRY data entry and management package, a sort/merge utility, scientific subroutines library and the MASTER macro language for computer aided instruction.



An interesting facility which many other manufacturers are still working on is remote batch terminal emulation, including 2780/3780/3741 emulation. Finally, for those who find BASIC a little restricting, Pascal will also be available soon.

For accounting applications, Olivetti has bought rights to the IMS suite of software, and this should have been transported on to the machine completely by the time you read this.

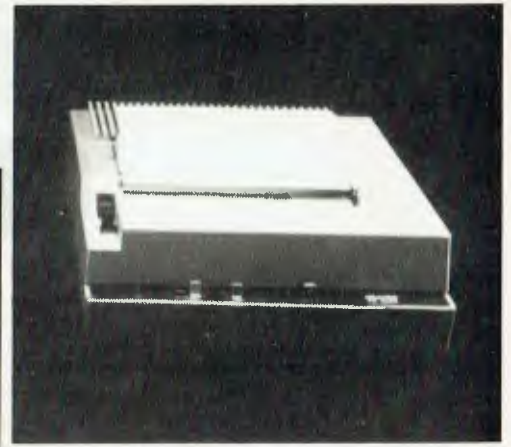
The operating system is single-user only, and single tasking, but considering the power of the processor inside the machine one would have to assume a multi-tasking or even multi-user version must be in the works.

Certainly Olivetti staffers just smiled knowingly when I asked them, and when you consider its windowing would be ideal for multi-tasking, I would say a multi-tasking version of PCOS must be on the cards.

Several printers are available from Olivetti to match the M20, ranging from a low-cost thermal printer to a 140 cps dot matrix printer.

The overall impression I get is of a solid and reputable machine, which will get the job done. Olivetti has a good reputation for after-sales service, so it will probably keep on getting the job done.

Olivetti says a typical set-up will cost around \$6,000.



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# Oh Hell, Not Another CPM Review!

*In one of Les's other lives he's involved in some fairly heavy project management, with a staff of 35 and distant deadlines which are difficult to meet. Casting around for management tools to help him, he discovered Milestone...*

WAIT! FOR those misguided souls out there who think CPM is the world's worst operating system, it's not.

CPM is, in fact, an acronym for Critical Path Method, a pseudo-mathematical system of scheduling tasks so as to complete a project in the minimum time.

Most engineers encounter CPM at university and then forget about it, like I did. They develop a thick-skinned disdain for people who spend their time playing with pieces of string on wall charts instead of getting on with the job.

Milestone is a computer program that changes that by doing everything the wall chart does and more.

But back to CPM, and its close relative PERT (Program Evaluation and Review Technique), for a moment.

The technique used in CPM (which was developed for the Minuteman or Polaris missile project, by the way) is to divide the project into separate tasks and thus conquer it. The idea is that although the overall project may be huge and unmanageable, each sub-task should be controllable, and by noting which tasks affect the overall completion date, and which are 'slack', resources can be applied in the most efficient way to complete the project.

Let me use building an aircraft as an example. This can be broken up into several separate tasks: construction of the fuselage, construction of wings, construction of tail assembly, installation of hydraulics, installation of electrics, structural testing, hydraulics testing, control systems testing, interior finishing, and so on (I know there's more to it than that, but we don't have all month...).

Figure 1 shows how those tasks can be linked together, with each task following those which must be completed before it can start. Note also that several tasks can continue at the same time, but that usually they combine towards the completion of the project. Each activity is marked with a duration, and from these can be

calculated the overall duration of the project.

As well as the completion date, most managers need a few extra pieces of information. As the project progresses, they need to know whether it is on schedule. They need to keep track of costs. They need to know whether a delay in one task will affect the project completion date.

From this last question comes the concept of a *critical path*. The critical path is the longest path through the CPM graph, and the one which has most effect on overall progress.

If a task on the critical path is delayed by a week, then the entire project is set back a week. On the other hand, an ordinary task may well have 'slack time' — that is, it would be completed before the next stage can be started anyway. Delaying such a task, and thus using up slack time, will have no effect on the overall project.

While CPM regards the project as a series of activities, each with a duration, PERT treats it as a series of events, and uses probability techniques to estimate the time required to complete an event.

CPM is best as a planning tool for complex projects, while PERT comes into its own as the project progresses and performance must be monitored.

## How Milestone Does It

Milestone shares some of the features of both techniques as well as the flavour of

Gantt charts (a means of plotting performance against time).

It is intended as a general purpose project planner, with two specific objectives: to help the planner clarify the task at hand and to help him communicate his ideas to his subordinates and superiors.

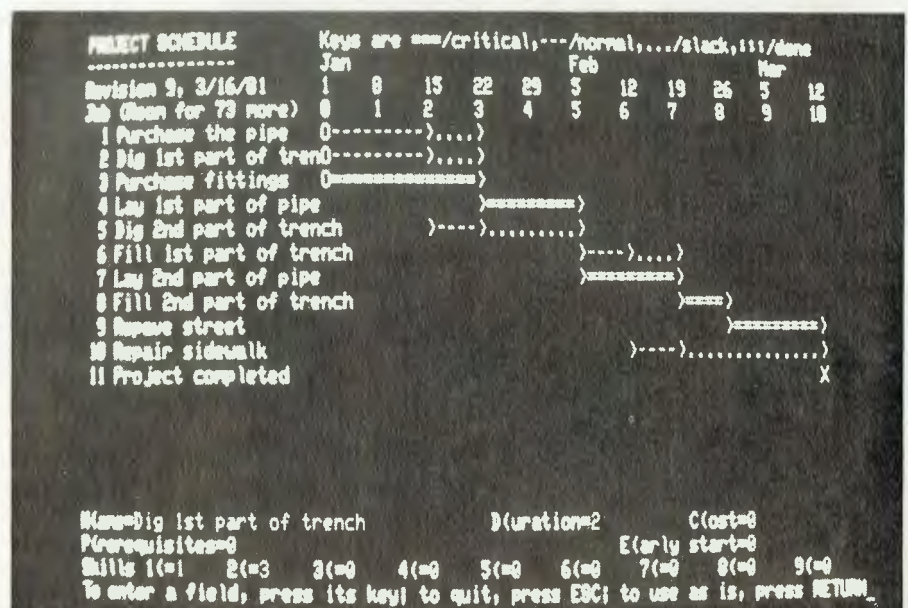
Unlike minicomputer CPM programs, Milestone is interactive, and it is possible to change a project's duration and see Milestone redraw the time schedule instantly. From the time schedule, it is possible to see which jobs are critical and cannot be delayed, which have slack time and can be delayed if necessary, and generally view the flow of work.

In addition, Milestone can prepare a detailed cost estimate for all manpower and direct expenses, and this can be shown on the time schedule as a guide to cash flow requirements.

All of this information can be updated and the situation reviewed interactively, allowing the user to investigate tradeoffs between manpower, time and dollars.

Milestone is a tremendously easy package to use. It was written in Pascal (either Apple or Pascal/m, depending upon your system) and makes good use of the interactive features of that language. All menu displays are fully explained, with one-letter selection of options, and the entire system is menu driven.

On power-up, Milestone reads a work file, and remembers the project you were





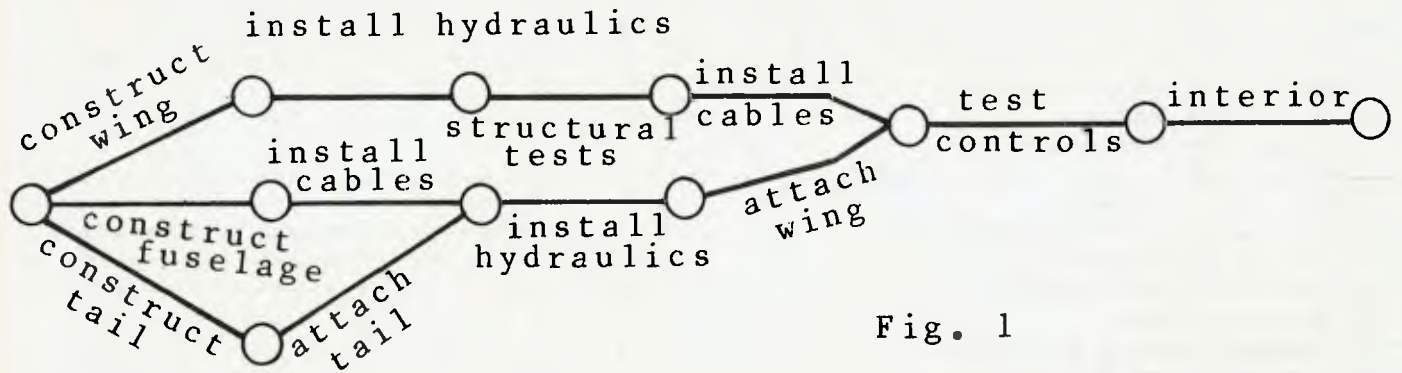


Fig. 1

last working on, the date, your name, and a few other details. Once these items are updated or confirmed, one can either create a new project or load another into memory.

The system then progresses to the main menu, which offers the user a range of things to do.

Most important is the option to modify the project in memory. There are basically four screens-full of information which define a project. First is the *Name, Description and Options* display, which defines the name of the project and its leader, time scale (can be hours, days, weeks, months, quarters or fiscal years), start date, direct and manpower cost units and whether or not the critical path is to be found and displayed.

Entering information into screens is easy. The letter identifying the appropriate data field is pressed, and the cursor moves to the right point; entering new data will automatically delete the old material. Moving on to the next field is just a matter of tabbing, while back-space will move back a field at a time. One can also escape without adopting the changes.

Next the manpower skills and costs are entered. There are nine categories of manpower, and each one is described and given a cost per man-time-unit (that is, man-hour, man-week or whatever). This information will be used by the program to estimate manpower costs.

The third screenful of information is only necessary if working on an hourly or daily basis. It consists of the working hours and days of the week, together with the dates of up to 12 holidays which will occur in the project period. When working on a weekly or longer timescale, this information is irrelevant and need not be filled in.

Several features make data entry particularly easy. For example, when entering dates, it frequently occurs that a date has already been entered, and you only wish to add a number of days, weeks or months to update the value.

Milestone allows the user to enter '+' or '-', followed by up to three digits, and then 'd' for days, 'w' for weeks, 'm' for months

or 'y' for years, and the program will automatically move forward or backward through time. That little labour-saving feature is surprisingly useful.

The final page to be entered is the time schedule display. This shows normal jobs, slack time, critical jobs and completed jobs as a time chart, with dates and weeks (or whatever) across the top.

the system suggests.

As jobs are entered, the screen will start to fill, so one will have to use the movement commands which scroll the screen vertically and horizontally after the fashion of a word processor.

In addition, the Home command can be used to redraw the screen with a specified job at top left, so that its dependent jobs basically follow down and across the screen.

As well as these commands, there is an alternate set which allows one to re-number all the jobs, sort them into time order, and display the manpower requirements and costs at the bottom of the screen.

Finally, as the project progresses, jobs can be marked as completed, which makes monitoring progress really easy.

The inputting of information is so easy it can literally be done at the terminal with no prior planning. Perhaps one of the biggest benefits of Milestone is the way it forces the user to clarify his own thinking and break down the project, all the while providing feedback to prevent the entry of erroneous information.

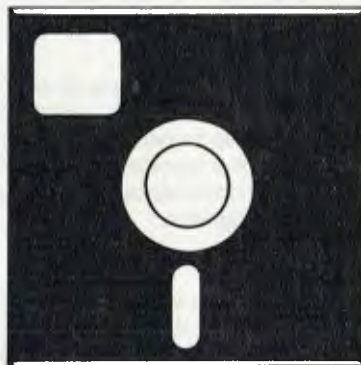
It is rather like working with a huge piece of paper, pencil and rubber — with the added advantage that the paper always stays neat and clear.

Once the manager has organised the project in his own (and the machine's) mind, the next step is to communicate that plan to others in the project team. For this purpose, Milestone will provide a number of different reports.

The most important, obviously, is the time schedule. As I write, I have a large, 40-week chart on the wall above me, with over 40 jobs on it. Because of the width of the chart, it is printed as a series of strips which can then be taped together. The result is neat.

The top of the chart gives the project name, revision number and date, as well as the name of the person who prepared it. Below that, the chart is basically the same as the appearance of the screen, except for the comprehensive weekly breakdown of manpower levels and man-

## your computer



## SOFTWARE REVIEW

At the bottom of the screen is a menu of possible commands.

This is the most important part of the program; really the heart of the matter. Jobs can be added to the chart or inserted into the main flow of the project, modified or even deleted.

A job is entered by filling in various details on a small form which appears at the bottom of the screen. The details consist of the name of the job, its duration, prerequisites (jobs which must be completed before this one can start), early start date (if there are no prerequisites) and the manpower levels required.

The job can be added (or inserted) anywhere in the project sequence, either before or after another job. The difference between adding and insertion is basically in the way the system deals with the prerequisites; in any case, one has the opportunity to edit the prerequisites which



Job Description	Jan									
	5	7	8	9	10	11	14	15	16	
1 Review prosecutor's file	0=====>	.	.	.	.	.	.	.	.	.
2 Interview agent	.	>=====>	.	.	.	.	.	.	.	.
3 Interview defendant	0----->.....>	.	.	.	.	.	.	.	.	.
4 Other agency collateral info	.	.	.	.	.	.	.	.	.	.
5 Wait for response	.	.	.	.	.	.	.	.	.	.
6 Follow-up prosecutor&agent	.	.	.	.	.	.	.	.	.	.
7 Verify information	.	.	.	.	.	.	.	.	.	.
8 Interview references	.	.	.	.	.	.	.	.	.	.
9 Evaluate data	.	.	.	.	.	.	.	.	.	.
10 Compute parole guidelines	.	.	.	.	.	.	.	.	.	.
11 Re-interview defendant	.	.	.	.	.	.	.	.	.	.
12 Staff case	.	.	.	.	.	.	.	.	.	.
13 Obtain stats	0----->.....>	.	.	.	.	.	.	.	.	.
14 Dictate report	.	.	.	.	.	.	.	.	.	.
15 Type report	.	.	.	.	.	.	.	.	.	.

- Symbol - Explanation
- >-----> Duration of a normal job
  - >.....> Slack time for a normal job
  - >=====> Duration of a critical path job
  - >:::::> Duration of a completed job
  - \* Job with zero duration
  - 0-----> Job with no prerequisites
  - >-----X Job with no successors

power and direct costs. At the very bottom corner (neat touch) there's a small chart explaining the significance of the various symbols.

The whole chart is *most* impressive.

Almost as important (some might say more so) is the job description report. This details, for each job, the duration, completion status, whether it is critical, slack time if it is not, prerequisites, manpower skills, costs, direct costs, and the earliest and latest start and finish times.

This report is probably most useful as a discussion or negotiation document. I found it useful in obtaining agreement and commitment from department heads to the timescales and staff levels designated.

The information gives a succinct overview of each job, and the responsible executive can argue his need for more time, staff or money — but as far as I'm concerned, if he gets them (or even if not) he is *absolutely* responsible for the completion of that job on schedule and budget.

An added benefit is that people tend to regard a computer-produced report as being somehow inviolate; they find it difficult to argue, as the report was prepared by the most sophisticated techniques (or so they think). After all, the computer is always right, is it not?

A columnar job report can be laid out by the user to show exactly as much (or as little) information as is required for a particular purpose. This report is very raw data indeed, and can be difficult to read; perhaps an interesting use for it is as input

to another program.

Another option allows output of all the reports without intervention, while the user can also send the reports to another file. This means that reports can be boiler-plated into other documents, for example, or fed to other programs.

### Getting It Up

Installing Milestone is easy. On an Apple system (for which the program is supplied on a UCSD Pascal disk), it's virtually a case of load and go.

On CP/M systems, with the wide range of terminals available, there's a bit more to it. By PRUNning CONFIG, the user can select his terminal on an extremely comprehensive menu (more terminals than I've seen on any other program), or if his terminal doesn't appear (as mine didn't), enter the control codes in from the terminal manual.

The remainder of the CONFIG program sets up the printer width and miscellaneous parameters — that completes installation.

To train the user in data entry, a program called *Learnhow* is supplied, which allows the user to try his hand without fear of damaging anything — not that he could easily damage Milestone data anyway.

My experience with Milestone has been all good. In managing a fairly large project with 35 staff and very tight timing required, it has proven amazing.

Before using Milestone, I had to have a lot of information mentally 'filed away'; with Milestone that data is now better or-

ganised and I have a much clearer idea of the project's progress. The project description report proved invaluable in negotiation with department managers — they all accepted the timescale estimates without argument, and so far have stuck to them.

Milestone has its limitations, of course, but they are not major ones.

First, in order to maintain high speed, job data is retained in memory, not on disk, and this limits the number of jobs that can be handled: a standard 64K CP/M system has room for 190 jobs, while an Apple can handle 100.

In practice, a project involving 190 jobs is an ideal candidate for a minicomputer CPM program, and the \$20,000 cost of such a program would not be an important consideration in a job that big!

Considering Milestone retails for little over one percent of that figure, it gives a creditable return in capacity.

Organic Software (the author) also very fairly points out in the manual that Milestone does not do resource levelling, resource allocation or probabilistic scheduling. That's most unlikely to be a problem for the average (or indeed, above-average) user.

There's no doubt Milestone is a sophisticated and elegant program with very real application in many professional offices. It is an imaginative, yet useful, application for a microcomputer.

Best of all, I have used it - in earnest - and it works better than I had expected. □



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#### EXAMPLE: PROGRAM LISTING

```
820 Q$ = N$; J = 1; QL = 157
830 IF J > QL THEN Q = 0; RETURN
840 QM = (J + QL)/2
850 IF Q$ < Q$(QM) THEN QL = QM + 1; GOTO 830
860 IF Q$ < Q$(QM) THEN QL = QM - 1; GOTO 830
870 Q = 1; RETURN
```

#### CROSS REFERENCE LISTING

2	830 FROM	850	860		
4	J.....	820	830	840	850
1	N\$.....	820			
2	Q.....	830	870		
3	Q\$.....	820	850	860	
2	Q\$(.....	850	860		
4	QL.....	820	830	840	860
5	QM.....	840	850	850	860 860

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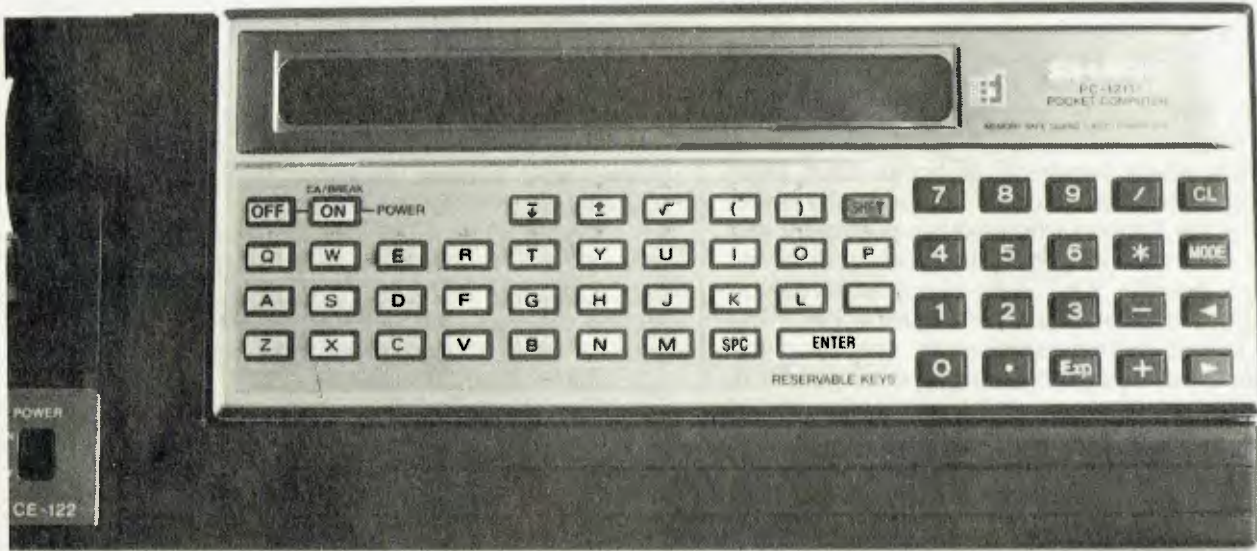
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# Pocket Power: The Sharp Twins Compared

By Stephen Wilbourne



I'VE USED a Tandy TRS-80 pocket computer (alias the Sharp PC-1211) for about four months, and was rather impressed by its capabilities — but when I saw the new PC-1500 in *Your Computer* (February 1982) I knew I had to try it out.

I've now had my PC-1500 for a week; this article presents a comparison between the machines from a user's viewpoint.

For a start, the keyboard on the PC-1500 is better spaced, and includes several extra keys. The most obvious are six keys immediately below the display, for the symbols !, ", #, \$, %, and &, which also double as reservable keys.

Both computers have four key modes: RUN, PROgram, RESERVE and DE-Fined. On the PC-1211 the MODE key is used to move through the four modes in sequence — to get from RUN to PRO requires one press, but to get from PRO to RUN requires three.

On the PC-1500 the MODE key selects either RUN or PRO only, avoiding the three-press frustration. The RESERVE mode is selected by pressing the SHIFT key before the MODE key, and the DEF mode is selected with a separate key.

The DEF mode provides immediate initiation of a labelled program. For example, a program line:

216: "E" : PRINT A

48

may be initiated in the RUN mode by using either RUN 216 or RUN 'E', or it may be initiated by using the DEF mode.

For the PC-1211, the DEF mode keystrokes would be SHIFT E. For the PC-1500, DEF E is entered whilst still in the RUN mode (entering SHIFT E on the PC-1500 would display an e, as the machine includes lower case characters.) On both machines the DEF mode uses the lower two rows of the alphabet keyboard and the equals and SPACE keys to provide eighteen definable keys.

The RESERVE mode feature allows frequently used phrases to be assigned to specific keys. On both computers the RESERVE mode is used to program the keys which may then be used in either the RUN or PRO modes.

On the PC-1211, the RESERVE mode uses the same keys as the DEF mode, these keys again being selected by first pressing the SHIFT key.

The RESERVE mode on the PC-1500 uses the six keys immediately below the display. Each reserve key may be used to reserve three times, a separate key being used to select which of the three is obtained when the RESERVE key is used. This (up arrow/down arrow) key selects the first, second or third item for all six RESERVE keys. A reminder label may be entered for each set, and displayed by using a recall key.

Providing you stay within the same RESERVE set, it only requires one keystroke to enter a RESERVE function, an improvement on the PC-1211 system.

When programming, I find it convenient to assign commonly used punctuation as the RESERVE keys, saving the need to use the SHIFT key. Another PC-1500 improvement is that RESERVE memory has been increased from 48 to 188 bytes, allowing greater use of this feature.

Also on the PC-1500, commonly used statements have been assigned to the ten keys on the top row of the alphabet keyboard (for example, INPUT to Q) and these are obtained by first pressing the DEF key. This avoids the need to use the RESERVE keys for these common commands.

Unfortunately, the PC-1500 keyboard is not labelled with these DEF mode commands, and one has to rely on memory or use an awkward plastic template. The provision of these commands allows some alternatives when programming, as abbreviations are accepted for most commands. The command PRINT may be typed in full, or entered as DEF W or P.

## More Memory

The PC-1500 has an overall memory increase, in addition to the RESERVE memory increase mentioned above. The program memory area is 1850 bytes on



the PC-1500 compared to 1424 bytes on the PC-1211.

In addition, a plug-in memory module is available as an extra to add a further 4K to the PC-1500, and Sharp says an 8K module is on its way. The PC-1211's biggest problem is that memory expansion is not possible.

The fixed memory area of the PC-1211 is 208 bytes, providing memories A to Z or A\$ to Z\$, where strings are eight characters in length (memories B and B\$ for example, occupy the same memory location.) The PC-1500 has 624 bytes of fixed memory, providing memories A to Z and A\$ to Z\$, where strings are now 16 characters long.

On the PC-1211, arrays are only possible in one direction, and need not be dimensioned: A(1) to A(26) occupy the same fixed memory as A to Z, and locations A(27) on take up program memory area.

The PC-1500 allows arrays to be established in two directions, up to 256 by 256. All arrays must be dimensioned, and take up program memory space. A(1) is a separate memory location to A. The fixed memories, however, may be referred to in array style @#1) to @#26) and @\$1) to @\$26).

The PC-1500 includes many more programming features than the PC-1211. Some that I have found particularly useful are:

- The wait command, which specifies the length of time a PRINT statement remains on the display. The PC-1211 allows only a choice between PAUSE for a 0.85 second flash or PRINT for a permanent display.
- The PRINT; command allows you to print on the display in addition to what is already there (i.e. without first clearing the display).
- A more versatile range of commands for specifying print formats. It is now possible to force scientific notation or commas after thousands. Formats may be specified using character strings. For example, you can define B\$ = "###.#" and then PRINT USING B\$ ; C
- Variables may be specified with two-letter names. On the PC-1211, variables are labelled with single letters or A(27) on.

Although the PC-1500 is designed to

run programs written for the PC-1211, when I tried to do so I found myself in error. To conserve program memory on the PC-1211, I had used implied multiplication throughout. For example, AB instead of A\*B. The PC-1500 won't accept this as it reads AB as the name of another variable.

There are several other features on the PC-1500 for which there is no equivalent on the PC-1211.

Character strings may be manipulated using the commands LEFT\$, RIGHT\$, MID\$, CHR\$, STR\$, VAL and LEN. The only string manipulation possible with the PC-1211 is the printing of only the left portion of a string by specifying a print format.

A real time clock, which may be used in programs, is included in the PC-1500.

The @ symbol acts as an automatic 'enter' instruction, so pressing the RE-SERVE key gives the display immediately.

The INKEY\$ function on the PC-1500 inputs any key pressed during execution into a specified character variable. This feature can be incorporated in a loop to direct a program. For example:

```
10: WAIT 10
12: PRINT TIME
14: B$ = INKEY$
16: IF B$
"A" GOTO 10
18: END
```





This program would provide a constantly updated time display until the A key was pressed.

It is possible to use the six RESERVE keys with the INKEY\$ function, but they must be referred to by their ASCII code.

These are not given in the ASCII code table in the PC-1500 instruction book, but they are used in some of the programs in the applications book. The RESERVE keys have ASCII codes 17 to 22.

The displays of the two computers differ

greatly. The PC-1211 display consists of 24 separate 7x5 dot arrays, one for each display character. On the PC-1500 the display is a 7x156 dot array, and individual dots may be switched to create complex graphics.

A final programming feature of the PC-1500 worth mentioning is the inclusion of the case statements ON GOTO, ON GOSUB, and ON ERROR GOTO. The latter statement directs the program to a specified line if an error occurs during execution.

### Running A Program

When running a program, the biggest difference between the two is speed. As an example, on this simple program:

```
310: FOR I = 1 TO 100
320: A = SIN I + COS I
330: NEXT I
340: PRINT A
350: END
```

The PC-1500 takes 34 seconds, while the PC-1211 takes 144 seconds.

Another difference when running a program is that the 1211 clears the display during execution. On the 1500, unless you direct otherwise in the program, the last display will remain while further execution takes place.

The PC-1500 has a much broader range of error messages. Unfortunately, the explanation of these messages given in the manual is not complete. For example using the line 310: IF A = 3 THEN B = A instead of 310: IF A = 3 LET B = A gives the message 'ERROR 19 IN 310' which the manual lists as 'Specified numeric value is outside the permitted range'.

### The Big One For Me

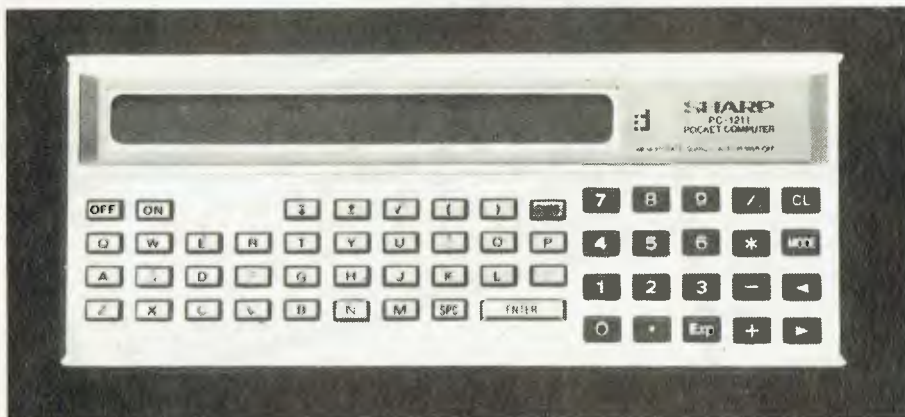
Overall the PC-1500 is a much more sophisticated computer than the PC-1211. I have not considered its printer, mainly because I have not been able to obtain one yet.

Considering the difference in capabilities, there is not a great difference in price between these two pocket computers. The PC-1211 costs around \$200 (\$250 if you buy it as a Tandy) and the PC-1500 cost about \$320.

However, one disadvantage for the PC-1500 is that Sharp does not intend to release a separate cassette interface, and you will need to spend about \$250 for the printer/cassette interface in order to store programs. A separate cassette interface for the PC-1211 is available for about \$30 (Tandy \$50).

This changes the price comparison of a useful computer/cassette interface to about \$230 versus \$570 for the PC-1500, and this difference may influence some people to buy the PC-1211.

For myself however, it's 'who wants to buy a used PC-1211?'





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After his 'Gentle Introduction to Forms Design' last month, editor LES BELL gets right into using those functions in his creation of a 'phone directory program. Despite the length of the listings, he sub-titles it *Designing a Simple Directory*.

# Basic for Birdwatchers

## Part VIII

A TELEPHONE directory isn't at all like a mailing list.

With a mailing list, you generally want to proceed sequentially through the file, using either all or a selected number of the entries. With a telephone directory, on the other hand, you generally want to look up just one entry, and you don't want to waste time doing it.

Wouldn't it be terrific if there was a way of just looking at a name, and going straight to the right part of the file.

Unfortunately, such a method does not really exist, but there is a technique which comes close. This is called **hashing**, and it is often used in BASIC interpreters, assemblers and similar language processors to provide fast lookup of variables in a table. We're going to apply the idea to this telephone directory to make lookup really fast.

Hashing is basically a way of applying a simple mathematical process to a **key**, in order to yield the ordinal position of the corresponding entry in a table or file. By key, we mean the field of information which we are going to use to retrieve data: in this case, a surname.

The process goes like this: looking at every second letter along the length of the name, we convert it to ASCII and add it to a running total, which we keep doubling. We then divide the result by the number of records in the file, and use the remainder as the position in the file; that is, the record number.

A suitable piece of code to do this might be:

```
10 K=0
20 FOR I=1 TO LEN(N$) STEP 2
30 K=2*K+ASC(MID$(N$,I,1))
40 NEXT I
50 K=K-FS*INT(K/FS)
60 IF K=0 THEN K=1
70 RETURN
52
```

### your computer



### tutorial

Having arrived at this record number, our job is not yet completed, however.

#### Avoiding Those Collisions...

A little thought will show that more than one name can still reduce to the same record number. And, of course, we might have two entries with the same name. For this reason, we have to design a **collision avoidance** strategy.

Before writing a new record into place, we read back the contents of the record to see whether there is already a name in place. If there is, then we just go on to the next record and try again.

Eventually, as the file gets very full, this hashing strategy will lose ground as we spend more and more time sequentially searching for the next record, but in the meantime we're ahead of the game.

Let's go ahead and write the program.

```
100 REM ** RANDOM ACCESS TELEPHONE FILER **
110 REM ** WRITTEN IN MBASIC V 5.2 **
120 REM ** 5/3/82 **
130 :
```

Next we define the functions we'll need for screen handling, as well as a couple of miscellaneous constants:

```
140 REM INITIALIZATION SECTION
150 :
160 DEF FNGXY$(X,Y)=CHR$(27)+"="
+CHR$(Y+31)+CHR$(X+31)
170 DEF FNHT$(A$)=CHR$(27)+" "
+A$+CHR$(27)+" ("
180 DEF FNLN$(L)=STRING$(L,95)
190 HOME$=CHR$(30)
200 CLS%=CHR$(27)+CHR$(26)
210 FS=250: ' FILE SIZE, ADJUST IF YOU WANT
220 TLX=100: ' TIME DELAY
```

Next, we start the program off by asking for the file to work on. The program automatically supplies the suffix '.TDR', and if no file name is given, uses the default 'TELE.TDR'. Then we field the buffer for the name and address information:

```
230 PRINT CLS$
240 INPUT "Telephone directory file";F$
250 IF F$="" THEN F$="TELE"
260 OPEN "R",#1,F$+".TDR"
270 FIELD #1,20 AS FN$,20 AS FC$,30 AS
FA1$,20 AS FA2$,4 AS FPC$,15 AS
FTEL$,19 AS FCT$
280 :
```

Having initialised the program, we're back with our old friend the menu. This time, however, we avoid the need to type 'RETURN' after making a selection, through the use of the INKEY\$ function. Your BASIC may not have this, or the WHILE function, so you can replace this piece of code with a standard input statement. An alternative to the WHILE construction might be:

```
400 A$ = INKEY$
410 IF A$ < "1" OR A$ > "7" THEN 400
420 REM CONTINUE
```

Notice also that we are now inputting a string, not a numeric variable, and must



...AFTER HIS GENTLE INTRODUCTION TO FORM LAST MONTH, EDITOR LES BELL'S DESIGNS IN CREATION OF A TELEPHONE DIRECTORY PROGRAM GET RIGHT INTO...



...AND REMEMBER YOUR ENTRY COLLISION AVOIDANCE STRATEGY!



...OBVIOUSLY, MY NAME GIVES ME A CLEAR HISTORICAL CLAIM TO SOVEREIGNTY OVER THE TELECOMAS, OR TELEBOM TO YOU...



...CONSEQUENTLY, A MEETING OF DISPLACED TELEBOM LEADERS.



HE'S NOT INTERESTED IN TELEBOM FOR IT'S OWN GOOD! ... NO! ... HE ONLY WANTS CONTROL OF THE STARTLING PRIZE SECTION!



AN S.E.C. POWER BLOCKADE WILL KEEP 'EM IN THE DARK!

AARRH... AN' WE'LL SEND IN THE WRAN. WITH A DETACHMENT OF MWS.&R.B. COMMANDOS TO CUT OFF THEIR WATER!... AARRH....



©B.J. AKERS '82...



convert it to decimal by using the ASC() function and then subtracting 48 (ASC(0)).

```
290 REM *** DISPLAY MENU ***
300 :
310 PRINT CLS$
320 PRINT "1 - Add name"
330 PRINT "2 - Delete name"
340 PRINT "3 - Create directory file"
350 PRINT "4 - Find name"
360 PRINT "5 - Find comment"
370 PRINT "6 - List file to CON:"
380 PRINT "7 - Quit and return to CP/M"
390 PRINT: PRINT "Enter choice:"
400 A$ = INKEY$
410 WHILE A$ < "1" OR A$ > "7"
420 A$ = INKEY$
430 WEND
440 ON ASC(A$)-48 GOTO 520,1310,920,
1550,1790,1090,480
450 :
```

Exiting MBASIC is easy:

```
460 REM *** EXIT MBASIC ***
470 :
480 PRINT CLS$: CLOSE: SYSTEM
490 :
```

Adding a name to the file is quite simple. First we get all the details for the record:

```
500 REM ** ROUTINE TO ADD A NAME TO FILE **
510 :
520 PRINT CLS$:"Add name to file ":FOR
I%=1 TO TL%: NEXT I%
530 PRINT CLS$
540 PRINT FNGXY$(1,3);FNHT$("Surname : ");
FNLN$(20)
550 PRINT FNHT$("First Name : ");FNLN$(20)
560 PRINT FNHT$("Street : ");FNLN$(30)
570 PRINT FNHT$("Town/City : ");FNLN$(20)
580 PRINT FNHT$("Postcode : ");FNLN$(4)
590 PRINT FNHT$("Telephone : ");FNLN$(15)
600 PRINT FNHT$("Comment : ");FNLN$(19)
610 PRINT FNGXY$(13,3);:INPUT N$
620 PRINT FNGXY$(13,4);": ";N$;
SPACE$(20-LEN(N$))
630 PRINT FNGXY$(13,4);:INPUT C$
640 PRINT FNGXY$(13,4);": ";C$;
SPACE$(20-LEN(C$))
650 PRINT FNGXY$(13,5);:INPUT A1$
660 PRINT FNGXY$(13,5);": ";A1$;
SPACE$(30-LEN(A1$))
670 PRINT FNGXY$(13,6);:INPUT A2$
680 PRINT FNGXY$(13,6);": ";A2$;
SPACE$(20-LEN(A2$))
690 PRINT FNGXY$(13,7);:INPUT PC$
700 PRINT FNGXY$(13,7);": ";PC$;
SPACE$(16)
710 PRINT FNGXY$(13,8);:INPUT TEL$
720 PRINT FNGXY$(13,8);": ";TEL$;
SPACE$(15-LEN(TEL$))
730 PRINT FNGXY$(13,9);:INPUT CT$
740 PRINT FNGXY$(13,9);": ";CT$;
SPACE$(19-LEN(CT$))
```



This is simply the screen-handling code developed last month. Next we calculate the hash key. This is used so often it's a separate subroutine at the back of the program:

```
750 REM CALCULATE HASH KEY
760 GOSUB 2040
```

Here's the subroutine:

```
2020 REM ** SUBROUTINE TO CALCULATE HASH KEY **
2030 :
2040 K=0
2050 FOR I=1 TO LEN(N$) STEP 2
2060 K=2*K+ASC(MID$(N$,I,1))
2070 NEXT I
2080 K=K-FS*INT(K/FS)
2090 IF K=0 THEN K=1
2100 RETURN
2110 :
```

It should look familiar. Next we take a look at the record we reckon is our target. If the first character of the name is a space, then the record is empty, and we're free to write into it. Otherwise, we just push on to the next:

```
770 GET #1,K: ' LINE 780 IS COLLISION AVOIDANCE
780 IF LEFT$(FM$,1) <> " " AND
LEFT$(FM$,1) <> ";" THEN K=K+1:GOTO 770
790 REM *** WRITE RECORD TO DISK ***
800 LSET FM$ = N$
810 LSET FC$ = C$
820 LSET FA1$ = A1$
830 LSET FA2$ = A2$
840 LSET FPC$ = PC$
850 LSET FTTEL$ = TEL$
860 LSET FCT$ = CT$
870 PUT #1,K
880 GOTO 310
890 :
```

Actually, in the code above, we also check whether the first character of the name field is a semicolon (;). The reason for that will be seen when we talk about deleting a record.

We mentioned that if the first character of the name field of the target record is a space, then it's okay to write over. But how did the space get there in the first place? Blank disks under CP/M for example contain E5H characters, not spaces; and if they've been written over before by another program there's no telling what may be there.

The answer is that we create the file in advance, and write spaces into the appropriate places. We already had to know the file size in advance for the hash calculation anyway, so we may as well create the file; it can't grow any afterwards. Here's the routine that does that:

```
900 REM ** CREATE EMPTY DIRECTORY FILE **
910 :
920 PRINT CLS$
930 CLOSE
940 PRINT "THIS WILL COMPLETELY OVERWRITE
ANY EXISTING FILE: OK(Y/N)";
950 GOSUB 2130
960 IF A$ <> "Y" AND A$ <> "y" THEN 310
970 INPUT "Name of file to create";F$
980 OPEN "R",1,F$+".TDR"
990 FIELD #1,20 AS FM$,20 AS FC$,30 AS
FA1$,20 AS FA2$,4 AS FPC$,15 AS
FTTEL$,19 AS FCT$
1000 LSET FM$=" "
1010 FOR I=1 TO FS
1020 PUT 1,I
1030 PRINT "#";
1040 NEXT I
1050 GOTO 310
1060 :
```

There's nothing particularly tricky about it. Note the use of a subroutine to get in a 'Y' or 'y' answer, again using the INKEY\$ function so that no carriage return is required. Here's the subroutine:

```
2120 REM *** SUBROUTINE TO RETURN Y/N
RESPONSE IN A$ ***
2130 A$ = INKEY$
2140 WHILE A$ <> "Y" AND A$ <> "y"
AND A$ <> "N" AND A$ <> "n"
2150 A$ = INKEY$
2160 WEND
2170 RETURN
```

Again, nothing particularly tricky, so let's press on with a routine to read the file and list it on the console device.

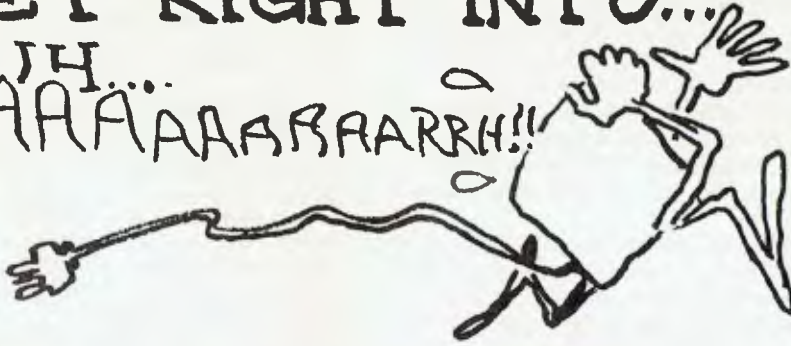
This is just like a sequential read, except that some of the records we read will be empty, and so we should not print them out. That's why, in line 1110, there's a check for an empty record and conditional jump to line 1260 (the NEXT part of the FOR loop). Notice, there's some more pretty formatting on the screen. Heck, if you've paid for it you might as well use it!



# GET RIGHT INTO...

...UH...

AAAARRRR!!



```

1450 PRINT FNHT$("Comment : ");FCT$
1460 PRINT FNGXY$(40,24);"Delete (Y/N)";
1470 GOSUB 2130
1480 IF A$ <> "Y" AND A$ <> "y" THEN
    K=K+1:GOTO 1350
1490 LSET FM$ = ";
1500 PUT #1,K
1510 GOTO 310
1520 :
    
```

Finding the entry for a particular name is really just a matter of hashing the name and reading forward from that point until either the name is found or a blank record is read:

```

1070 REM *** LIST FILE TO CON: ***
1080 :
1090 FOR I=1 TO FS
1100 GET #1,I
1110 IF LEFT$(FM$,1) = " " OR LEFT$(FM$,1)
    = ";" THEN 1260
1120 PRINT CLS$I
1130 PRINT FNGXY$(1,3);FNHT$
    ("Surname : ");FM$
1140 PRINT FNHT$("First Name : ");FC$
1150 PRINT FNHT$("Street : ");FA1$
1160 PRINT FNHT$("Town/City : ");FA2$
1170 PRINT FNHT$("Postcode : ");FPC$
1180 PRINT FNHT$("Telephone : ");FTEL$
1190 PRINT FNHT$("Comment : ");FCT$
1200 PRINT FNGXY$(40,24);: PRINT "Hit
    space bar to hold, ESC to quit";
1210 FOR IX=1 TO TLX
1220 A$=INKEY$: IF LEN(A$) = 0 THEN 1250
1230 IF A$ = " " THEN IX = 1
1240 IF A$ = CHR$(27) THEN 310
1250 NEXT IX
1260 NEXT I
1270 GOTO 310
1280 :
    
```

Line 1200 above is interesting — because this is going to the screen, not printer, we scroll quickly, but allow the user to hold everything by hitting the space bar, or alternatively, to quit by hitting the ESCape key. This section of code also incorporates a time delay to allow the user to get in before the computer's gone on to the next record.

Of course, there will be occasions when we will want to delete a name from the file, so we must provide a subroutine to do this. A simple method would be to confirm that the record being accessed is the one we want to delete, and then write a space into the name field. However, this approach suffers from a problem.

Our collision-avoidance scheme means that a record may be located several records after its hash-computed position. If the record in the hash-computed position is deleted in this method, when the find name routine reads that record it

will conclude that it is empty and display a 'not found' message, without checking the following record.

To get around this, we mark a deleted record with a semicolon, so that the name search routine knows to check the next record, and keep checking until the name is found or a blank record is read.

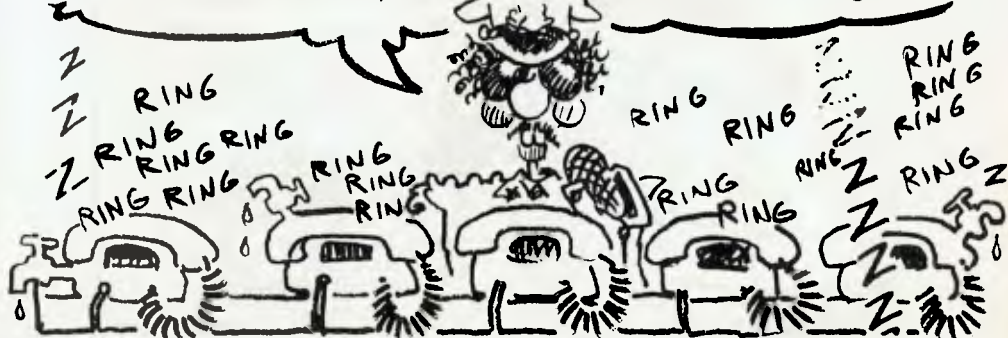
```

1290 REM *** ROUTINE TO DELETE NAME ***
1300 :
1310 PRINT CLS$;"Delete name from file"
1320 PRINT FNGXY$(1,5);:INPUT "Name to
    delete";N$
1330 REM CALCULATE HASH KEY
1340 GOSUB 2040
1350 GET #1,K
1360 IF LEFT$(FM$,1) = ";" THEN
    K=K+1:GOTO 1350
1370 IF LEFT$(FM$,1) = " " THEN PRINT
    CLS$;"Not found":FOR IX = 1 TO
    TLX:NEXT IX:GOTO 310
1380 PRINT CLS$
1390 PRINT FNGXY$(1,3);FNHT$
    ("Surname : ");FM$
1400 PRINT FNHT$("First Name : ");FC$
1410 PRINT FNHT$("Street : ");FA1$
1420 PRINT FNHT$("Town/City : ");FA2$
1430 PRINT FNHT$("Postcode : ");FPC$
1440 PRINT FNHT$("Telephone : ");FTEL$
    
```

```

1530 REM *** ROUTINE TO FIND NAME ***
1540 :
1550 PRINT CLS$;"Search file for name"
1560 PRINT FNGXY$(1,5);:INPUT "Name to
    find";N$
1570 REM *** CALCULATE HASH KEY ***
1580 GOSUB 2040
1590 GET #1,K
1600 IF LEFT$(FM$,1) = ";" THEN
    K=K+1:GOTO 1590
1610 IF LEFT$(FM$,1) = " " THEN PRINT
    CLS$;"Not found":FOR N=1 TO 300:
    NEXT N: GOTO 310
1620 PRINT FNGXY$(1,3);FNHT$
    ("Surname : ");FM$
1630 PRINT FNHT$("First Name : ");FC$
1640 PRINT FNHT$("Street : ");FA1$
1650 PRINT FNHT$("Town/City : ");FA2$
1660 PRINT FNHT$("Postcode : ");FPC$
1670 PRINT FNHT$("Telephone : ");FTEL$
1680 PRINT FNHT$("Comment : ");FCT$
1690 PRINT FNGXY$(40,24);"Hit space to
    continue, ESC to quit";
1700 A$ = INKEY$
1710 WHILE A$ <> " " AND A$ <> CHR$(27)
1720 A$ = INKEY$
1730 WEND
1740 IF A$ = " " THEN K=K+1:GOTO 1590
1750 GOTO 310
1760 :
    
```

## SOVEREIGNTY OVER THE TELECOMAS, OR TELEBOM TO YOU...





Finding a comment cannot be done by hashing, as file position depends upon the name, not the comment. Consequently, comments must be found by a sequential search, ignoring empty or deleted records:

```

1770 REM   *** FIND COMMENT ***
1780 :
1790 PRINT CLS$; "Find comment"
1800 PRINT FNGLY$(1,5);:INPUT "Comment
      to search for";CT$
1810 FOR I=1 TO FS
1820 GET #1,I
1830 IF LEFT$(FM$,1) = " " OR LEFT$(FM$,1)
      = ";" THEN I=I+1: GOTO 1820
1840 IF LEFT$(FCT$,LEN(CT$)) (<) CT$ THEN 1990
1850 PRINT CLS$;
1860 PRINT FNGLY$(1,3);FNHT$
      ("Surname   : ");FM$
1870 PRINT FNHT$("First Name : ");FC$
1880 PRINT FNHT$("Street     : ");FA1$
1890 PRINT FNHT$("Town/City  : ");FA2$
1900 PRINT FNHT$("Postcode   : ");FPC$
1910 PRINT FNHT$("Telephone  : ");FTEL$
1920 PRINT FNHT$("Comment    : ");FCT$
1930 PRINT FNGLY$(40,24);: PRINT "Hit
      space bar to hold, ESC to quit";
1940 FOR IX=1 TO TLX
1950 A$=INKEY$: IF LEN(A$) = 0 THEN 1980
1960 IF A$ = " " THEN IX = 1
1970 IF A$ = CHR$(27) THEN 310
1980 NEXT IX
1990 NEXT I
2000 GOTO 310
2010 :

```

That completes our first telephone directory program. It provides surprisingly fast lookup of a name, and reliable operation. However, there are a few points that should be noted.

Firstly, the hashing algorithm used is very simple, and could be improved greatly. For example, it uses only every second letter of the name, and is intolerant of spelling mistakes. During my tests

of this program I also noticed that the names were tending to cluster in the first half of the file, but perhaps the names I used were not a representative sample.

This program could be used as a 'test bed' for other hashing methods simply by modifying the hash subroutine. Remember, though, that the program cannot access a file created with another hash method.

Another point is that the file is not in alphabetical order. This is okay as long as you know a name exactly, but if you remember only that 'it starts with a B', then there is no way to predict, even roughly, where in the file it is stored.

Finally, to assist you in keying in the program, here it is in its entirety:

```

100 REM   *** RANDOM ACCESS TELEPHONE FILER ***
110 REM   *** WRITTEN IN MBASIC V 5.2 ***
120 REM   *** 5/3/82 ***
130 :
140 REM   INITIALIZATION SECTION
150 :
160 DEF FNGLY$(X,Y)=CHR$(27)+""+CHR$(Y+31)+CHR$(X+31)
170 DEF FNHT$(A$)=CHR$(27)+""+A$+CHR$(27)+""+
180 DEF FNLM$(L)=STRING$(L,95)
190 HOME$=CHR$(30)
200 CLS$=CHR$(27)+CHR$(26)
210 FS=250: ' FILE SIZE, ADJUST IF YOU WANT
220 TLX=100: ' TIME DELAY
230 PRINT CLS$
240 INPUT "Telephone directory file";F$
250 IF F$="" THEN F$="TELE"
260 OPEN "R",#1,F$+".TDR"
270 FIELD #1,20 AS FM$,20 AS FC$,30 AS FA1$,20 AS FA2$,4 AS
      FPC$,15 AS FTEL$,19 AS FCT$
280 :
290 REM   *** DISPLAY MENU ***
300 :
310 PRINT CLS$
320 PRINT "1 - Add name"
330 PRINT "2 - Delete name"
340 PRINT "3 - Create directory file"
350 PRINT "4 - Find name"
360 PRINT "5 - Find comment"
370 PRINT "6 - List file to COM:"
380 PRINT "7 - Quit and return to CP/M"
390 PRINT: PRINT "Enter choice:"
400 A$ = INKEY$
410 WHILE A$(<"1" OR A$ > "7"
420 A$ = INKEY$
430 WEND
440 ON ASC(A$)-48 GOTO 520,1310,920,1550,1790,1090,480
450 :

```

```

460 REM   *** EXIT MBASIC ***
470 :
480 PRINT CLS$: CLOSE: SYSTEM
490 :
500 REM   *** ROUTINE TO ADD A NAME TO FILE ***
510 :
520 PRINT CLS$;"Add name to file ":FOR IX=1 TO TLX: NEXT IX
530 PRINT CLS$
540 PRINT FNGLY$(1,3);FNHT$("Surname   : ");FNLM$(20)
550 PRINT FNHT$("First Name : ");FNLM$(20)
560 PRINT FNHT$("Street     : ");FNLM$(30)
570 PRINT FNHT$("Town/City  : ");FNLM$(20)
580 PRINT FNHT$("Postcode   : ");FNLM$(4)
590 PRINT FNHT$("Telephone  : ");FNLM$(15)
600 PRINT FNHT$("Comment    : ");FNLM$(19)
610 PRINT FNGLY$(13,3);:INPUT N$
620 PRINT FNGLY$(13,3);:" : ";N$;SPACE$(20-LEN(N$))
630 PRINT FNGLY$(13,4);:INPUT C$
640 PRINT FNGLY$(13,4);:" : ";C$;SPACE$(20-LEN(C$))
650 PRINT FNGLY$(13,5);:INPUT A1$
660 PRINT FNGLY$(13,5);:" : ";A1$;SPACE$(30-LEN(A1$))
670 PRINT FNGLY$(13,6);:INPUT A2$
680 PRINT FNGLY$(13,6);:" : ";A2$;SPACE$(20-LEN(A2$))
690 PRINT FNGLY$(13,7);:INPUT PC$
700 PRINT FNGLY$(13,7);:" : ";PC$;SPACE$(16)
710 PRINT FNGLY$(13,8);:INPUT TEL$
720 PRINT FNGLY$(13,8);:" : ";TEL$;SPACE$(15-LEN(TEL$))
730 PRINT FNGLY$(13,9);:INPUT CT$
740 PRINT FNGLY$(13,9);:" : ";CT$;SPACE$(19-LEN(CT$))
750 REM CALCULATE HASH KEY
760 GOSUB 2040
770 GET #1,K: ' LINE 780 IS COLLISION AVOIDANCE
780 IF LEFT$(FM$,1) (<) " " AND LEFT$(FM$,1) (<) ";" THEN
      K=K+1:GOTO 770
790 REM   *** WRITE RECORD TO DISK ***
800 LSET FM$ = N$
810 LSET FC$ = C$
820 LSET FA1$ = A1$
830 LSET FA2$ = A2$
840 LSET FPC$ = PC$
850 LSET FTEL$ = TEL$
860 LSET FCT$ = CT$
870 PUT #1,K
880 GOTO 310
890 :
900 REM   *** CREATE EMPTY DIRECTORY FILE ***
910 :
920 PRINT CLS$
930 CLOSE
940 PRINT "THIS WILL COMPLETELY OVERWRITE ANY EXISTING
      FILE: OK(Y/N)";
950 GOSUB 2130
960 IF A$ (<) "Y" AND A$ (<) "y" THEN 310
970 INPUT "Name of file to create";F$
980 OPEN "R",I,F$+".TDR"
990 FIELD #1,20 AS FM$,20 AS FC$,30 AS FA1$,20 AS FA2$,4 AS
      FPC$,15 AS FTEL$,19 AS FCT$
1000 LSET FM$=""
1010 FOR I=1 TO FS
1020 PUT I,I
1030 PRINT " ";
1040 NEXT I
1050 GOTO 310
1060 :
1070 REM   *** LIST FILE TO COM: ***
1080 :
1090 FOR I=1 TO FS
1100 GET #1,I
1110 IF LEFT$(FM$,1)="" OR LEFT$(FM$,1)="" THEN 1260
1120 PRINT CLS$:I
1130 PRINT FNGLY$(1,3);FNHT$("Surname   : ");FM$
1140 PRINT FNHT$("First Name : ");FC$
1150 PRINT FNHT$("Street     : ");FA1$
1160 PRINT FNHT$("Town/City  : ");FA2$
1170 PRINT FNHT$("Postcode   : ");FPC$
1180 PRINT FNHT$("Telephone  : ");FTEL$
1190 PRINT FNHT$("Comment    : ");FCT$
1200 PRINT FNGLY$(40,24);: PRINT "Hit space bar to hold, ESC
      to quit";
1210 FOR IX=1 TO TLX
1220 A$=INKEY$: IF LEN(A$) = 0 THEN 1250
1230 IF A$ = " " THEN IX = 1

```





```

1240 IF A$ = CHR$(27) THEN 310
1250 NEXT IX
1260 NEXT I
1270 GOTO 310
1280 :
1290 REM   *** ROUTINE TO DELETE NAME FROM FILE ***
1300 :
1310 PRINT CLS$;"Delete name from file"
1320 PRINT FN$Y$(1,5);:INPUT "Name to delete";N$
1330 REM CALCULATE HASH KEY
1340 GOSUB 2040
1350 GET #1,K
1360 IF LEFT$(FN$,1) = ";" THEN K=K+1:GOTO 1350
1370 IF LEFT$(FN$,1) = " " THEN PRINT CLS$;"Not found":FOR IX
      = 1 TO TL$:NEXT IZ:GOTO 310
1380 PRINT CLS$
1390 PRINT FN$Y$(1,3);FNHT$("Surname   : ");FN$
1400 PRINT FNHT$("First Name  : ");FC$
1410 PRINT FNHT$("Street     : ");FA1$
1420 PRINT FNHT$("Town/City  : ");FA2$
1430 PRINT FNHT$("Postcode   : ");FPC$
1440 PRINT FNHT$("Telephone  : ");FTEL$
1450 PRINT FNHT$("Comment    : ");FCT$
1460 PRINT FN$Y$(40,24);"Delete (Y/N)";
1470 GOSUB 2130
1480 IF A$ (<) "Y" AND A$ (<) "y" THEN K=K+1:GOTO 1350
1490 LSET FN$ = " "
1500 PUT #1,K
1510 GOTO 310
1520 :
1530 REM   *** ROUTINE TO FIND NAME ***
1540 :
1550 PRINT CLS$;"Search file for name"
1560 PRINT FN$Y$(1,5);:INPUT "Name to find";N$
1570 REM   *** CALCULATE HASH KEY ***
1580 GOSUB 2040
1590 GET #1,K
1600 IF LEFT$(FN$,1) = ";" THEN K=K+1:GOTO 1590
1610 IF LEFT$(FN$,1) = " " THEN PRINT CLS$;"Not found":FOR
      N=1 TO 300:NEXT N:GOTO 310

```



```

1620 PRINT FN$Y$(1,3);FNHT$("Surname   : ");FN$
1630 PRINT FNHT$("First Name  : ");FC$
1640 PRINT FNHT$("Street     : ");FA1$
1650 PRINT FNHT$("Town/City  : ");FA2$
1660 PRINT FNHT$("Postcode   : ");FPC$
1670 PRINT FNHT$("Telephone  : ");FTEL$
1680 PRINT FNHT$("Comment    : ");FCT$
1690 PRINT FN$Y$(40,24);"Hit space to continue,
      ESC to quit";
1700 A$ = INKEY$
1710 WHILE A$ (<) " " AND A$ (<) CHR$(27)
1720   A$ = INKEY$
1730 WEND
1740 IF A$ = " " THEN K=K+1:GOTO 1590
1750 GOTO 310
1760 :
1770 REM   *** FIND COMMENT ***
1780 :
1790 PRINT CLS$;"Find comment"

```

```

1800 PRINT FN$Y$(1,5);:INPUT "Comment to search for";CT$
1810 FOR I=1 TO FS
1820 GET #1,I
1830 IF LEFT$(FN$,1) = " " OR LEFT$(FN$,1) = ";" THEN I=I+1:
      GOTO 1820
1840 IF LEFT$(FCT$,LEN(CT$)) (<) CT$ THEN 1990
1850 PRINT CLS$;
1860 PRINT FN$Y$(1,3);FNHT$("Surname   : ");FN$
1870 PRINT FNHT$("First Name  : ");FC$
1880 PRINT FNHT$("Street     : ");FA1$
1890 PRINT FNHT$("Town/City  : ");FA2$
1900 PRINT FNHT$("Postcode   : ");FPC$
1910 PRINT FNHT$("Telephone  : ");FTEL$
1920 PRINT FNHT$("Comment    : ");FCT$
1930 PRINT FN$Y$(40,24);: PRINT "Hit space bar to hold,
      ESC to quit";
1940 FOR IZ=1 TO TL$
1950 A$=INKEY$: IF LEN(A$) = 0 THEN 1980
1960 IF A$ = " " THEN IZ = 1
1970 IF A$ = CHR$(27) THEN 310
1980 NEXT IZ
1990 NEXT I
2000 GOTO 310
2010 :
2020 REM   *** SUBROUTINE TO CALCULATE HASH KEY ***
2030 :
2040 K=0
2050 FOR I=1 TO LEN(M$) STEP 2
2060 K=20K+ASC(MID$(M$,I,1))
2070 NEXT I
2080 K=K-FS*INT(K/FS)
2090 IF K=0 THEN K=1
2100 RETURN
2110 :
2120 REM   *** SUBROUTINE TO RETURN Y/N RESPONSE IN A$ ***
2130 A$ = INKEY$
2140 WHILE A$ (<) "Y" AND A$ (<) "y" AND A$ (<) "N" AND A$ (<) "n"
2150   A$ = INKEY$
2160 WEND
2170 RETURN

```

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 WAS \$12.50 — SAVE \$3.00 ..... **\$9.50**  
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Another exclusive Dick Smith offer: purchase this kit and inspect it for up to 7 days. If, for some reason, you do not wish to go ahead and construct the kit, simply return it to us in original condition and packing (i.e. before construction has commenced) and with all instructions, cards, etc. and we will refund your money in full. What have you got to lose?

Designed in conjunction with Electronics Australia Magazine.



*This is what Reg Hesper, Technical Officer of Gladesville had to say about 'Super 80' "I enjoyed building the Super 80 project and felt it worthwhile, of immense educational value and quite easy to construct. It worked as soon as I turned it on and has provided many hours of enjoyment".*

Very Advanced design – but works with any TV set!

The 'Super 80' offers a specification that we believe just cannot be bettered at the price. It uses the popular Z80 Microprocessor IC, a professional keyboard and has direct RF output so that you can use the computer with any TV set (you don't need to purchase a special video monitor).

Easy to build

Even though we would not recommend this kit to the raw beginner, it is very easy to build. Any person who can use a small soldering iron and can solder neatly should have no difficulty in construction. This is because of the unique double-sided board design which means there is virtually no other wiring. The board is covered with professional 'solder mask'; this makes soldering much easier without the problems of bridges, etc. Once the components are soldered onto the board in their marked positions over 98% of the construction is completed. Even if you cannot get the completed kit to work, we have a special "Sorry Dick it doesn't work" repair service to assist you.

NEW lower price, higher specification - how is it done?

Most computers sold in Australia are manufactured in the U.S.A. where extremely high labour rates prevail - and you pay dearly for this on built up units. With this computer kit, you provide the labour and therefore save a fortune. And remember, this computer does not have a small toy-like calculator keyboard but a full size professional typewriter keyboard.

Advanced programming capability

The Super 80 Computer gives you a huge 9K of BASIC – comparable in fact, with the BASIC on our very popular Sorcerer computer (over 2000 sold) – and this machine sells for over \$1,000. Many other computers currently available do not offer as much BASIC programming capability as the SUPER 80 – it is obvious that by building it yourself you are saving real money!

Imagine how much you will learn!

Most computer enthusiasts can program a computer but would have absolutely no idea of how to build one. By building this kit you will learn both the technical side of construction, how it works and then how to program. What a fantastic background for the future. . . . .

Sectional construction

We have designed this kit not only for the serious computer user but also for first time users like the student or hobbyist. This is why we have a short form kit which may be added to as you build (and as you have the money!). For example, you may build the computer originally and operate it with 'BASIC on tape' and then add 'BASIC in ROM', add the S-100 and provide other parts at a later stage.

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# “Hotting-Up” Your ZX80!

By David Johnson

IT SEEMS a lot of people who have bought ZX80/81s are a little disillusioned by their performance. Just have a look at the For Sale sections of the electronic and computer mags.

I must admit I felt the ZX80 was the answer to my desire to own a micro-computer...well, here are a few of the modifications I have found useful.

First, having a display with black letters on a white screen causes poor EHT regulation in some television receivers, which then exhibit an effect called blooming. This causes the letters to appear fuzzy or out of focus. To overcome this there is an option built into the ZX80 that allows you to change the display to white letters on a black screen.

To do this remove all of the plastic rivets and carefully remove the cover and then the PC board; don't forget the three rivets in the middle of the board! Now turn the board over and you will see three points marked A, B, and C in approximately the centre of the right hand side. You will notice that only A and C are joined by a copper track. The mod involves cutting across this track with a knife and soldering a link between A and B.

## Can't Stand The Heat?

Now, how about the cassette interface...how often have you found that you couldn't load or store programs reliably? I found this a continuing hassle.

The problem is heat related, as admitted in The ZX80 Companion booklet and on the information sheets supplied with the cassette packs. This seems to be caused by two design errors. The 9V mains adapter that was supplied with my system measured 14V — which means a lot of volts have to be dissipated as heat in the 5V regulator on the PC board.

My solution to this may be a bit drastic for you. I pulled the mains adapter transformer apart and unwound some of the secondary windings to drop its output voltage. Another alternative is to use another

mains adapter that you may already own for your cassette player.

The other error is the mounting of the 5V regulator itself. Yes, it is mounted on a heatsink and is insulated from the board to try and keep the buffer transistor for the cassette interface cool. But this is not enough.

I added some extra fins to the heatsink which protrude through the 'supercharger hump' on the top of the case to allow more cooling, painted it all black and added some heatsinking compound to the underside of the regulator.

If you live in a city where Channel 0 is transmitting you will have noticed interference with your Channel 1 modulator. The video output feeding the modulator is at a high enough level to be fed straight into the video input of most receivers or monitors without a buffer circuit (if video input is available or can be added).

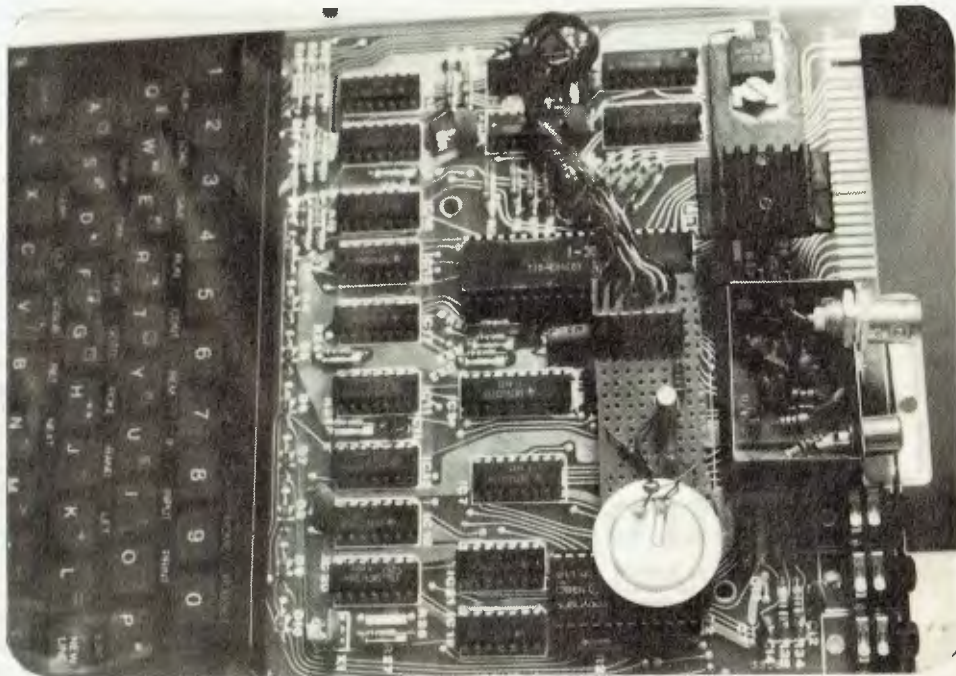
You will find that this will also improve

the resolution slightly. The video output socket can be mounted directly into the modulator for extra strength by cutting an appropriate sized hole, and connected to the flying lead entering closest to the rear of the modulator. This is the video input to the modulator. The earth connection is made via the metal chassis of the modulator.

## Another Keyboard Alternative

How often have you hit one of the little keys and wondered if it has actually made contact? Or you have been watching the screen to see that tell-tale vision flash and then lost your place on the keyboard or program?

Well, here is another mod that will give some tactile response. It involves adding a piezo buzzer that beeps every time a key is pressed. It is not quite as simple as the previous mods and since I own a ZX80 and not a ZX81 I can only give you a circuit





for the ZX80, but I'm sure it is also possible for the ZX81 with some thought.

In true ZX80 spirit I have made it as cheap but effective as possible — the total cost is less than \$5.

The piezo element is available from your local Tandy store, and the 7430 IC, transistor and so on from Dick Smith. This little circuit feeds the data lines from the keyboard into a NAND GATE (7430). When a key is pressed, one of the data lines goes low forcing the output of the NAND GATE high. This turns on the driver transistor of the piezo element; that is, it beeps. If you have any trouble with it not beeping try adjusting the base resistors.

Construction involves mounting the 7430, transistor driver, piezo element and other items on a piece of vero board.

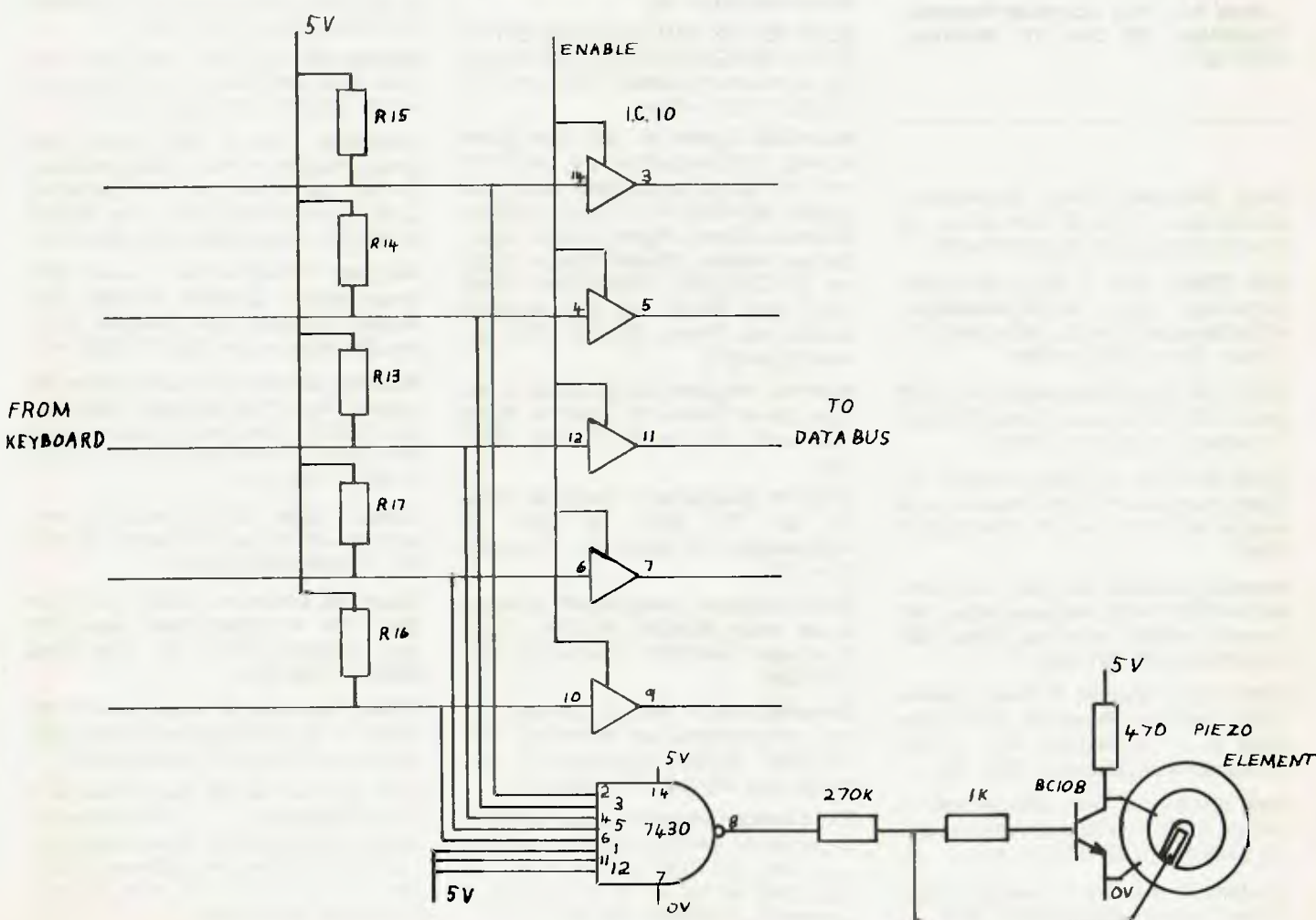
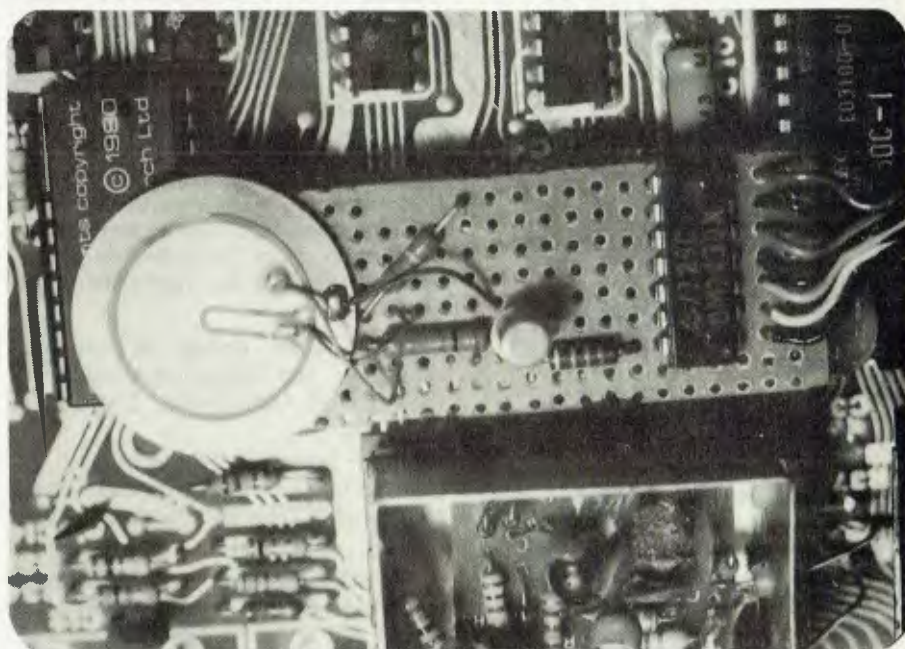
### A Silicone Job

Silicone rubber was used to mount the piezo element on the vero board and, due to the lack of any other mounting points, to mount the vero board straddled between the ROM and the Z80. Don't make the mistake I made, though, of putting a dab of silicone rubber in the center of the piezo element. This stops it from being able to beep. Took me a while to work that one out...

I made the connections to the main board directly onto the data strobe IC. This is not standard practice, but eases construction. As long as you tin all your leads and the legs of the IC first before

soldering them together, there should not be any damage done by excessive heat.

So don't discard your ZX80/81, or put it up on the shelf to gather dust — it will be faithful to you if you are faithful to it. □





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---

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**S100:** 16K Static RAM Cards, 2 (AT) \$120 each, 2 (QT) \$150 each, Clare C72 \$180. All tested. John (095) 31 1859.

**ZX80:** 8K ROM, 16K RAM. Invaders, ZX-chess, manuals 4K ROM, machine code manual etc. \$350. ono. Ph: Tim (050) 25 2947.

**Hewlett Packard 85A:** with I/O ROM, Matrix ROM, serial interface option, 16K memory module. Very new, \$5000. (02) 438 4322 or (07) 391 1969.

**ZX81:** (incl. adapter) 2 books, games (ZX81 Invasion, Breakout) \$250. Send letter to: J. Halkiadakis Flat 10, 160 Kangaroo Road, Oakleigh. 3166. Vic.

**Sell:** SHARP PC-1211 with cassette interface. \$180. SYSTEM-80 with Syspand-80. \$745. Ph: (076) 92 4231. A/H.

**System 80 printer:** (1 year old) \$330. Steve, Canberra (062) 46 5631. B/H. 62

**AIM65:** 4K RAM, Assembler, power supply, manuals, 3 rolls paper. One year old in original box. \$530. Ph: Mike (02) 30 7827.

**System-80:** 16K, TV programs and books etc. all for \$800. ono. Perfect condition. Ph: (08) 356 6580.

**OSI owners:** 32K RAM board, software, cassette recorders, books, instructions, manuals + more. Send SAE for list. J. Burns, 6 Banksia St., Townsville. 4814. Qld.

**Wanted:** Back copies of 'Dreamer' magazine (no longer published). J. Robinson, 8 Lions Court, Shepparton. 3630. Vic.

**Wanted:** Interested people to start VIC USER'S GROUP. Please contact Mike La Robina at PO Box 250, Kingsford. 2032. NSW.

**ZX-80 Machine Code Pack:** 6 great utility routines for the ZX-80, complete with Hex loader \$12 and SAE. Send M/O or cheque to Mark Wilson, 32 Eramosa Rd., Somerville. 3912. Vic.

**Super 80:** 16K RAM, S100 expansion interface, EPROM BASIC, box, power supply, manuals and cables. \$430. ono. Ph: (02) 638 7569. 5-11pm.

**Must Sell:** System 80, 48K RAM, green monitor, S100 expansion unit, two 5 1/4 inch disk drives, upper/lower case, dust covers, NEWDOS 80 V.2 and MicroDos. Software: Cosmic Fighter, Robot Attack, Galaxy Invasion, Meteor Mission, Eliza, etc. EXCELLENT CONDITION!! Retail price over \$3000, will sell complete \$2500. ono. Phone: (03) 221 7038 between 6pm-9pm.

**Wanted:** Programs for the Apple II, listings and/or disks only. Send to 'Apple Programs', PO Box 495, Burnie. 7320. Tas.

**ZX80 1K programs:** all under \$6. Send for list. Ph: (051) 74 3265, S. Athanasiadis, 63 Moore St., Traralgon. 3844. Vic.

**ZX81:** computer, complete with all leads, power supply, 8K ROM 16K RAM + \$130 of software. Sell \$360. T. Hagen. Ph: (03) 439 4095.

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**ZX81 Galaxy:** seven invaders, moving independently, each can bomb or crash into your base. (4K RAM minimum) \$15 + \$1 p&p. SAE for full list. K. J. Software, 8 Cawrse St., Elizabeth Field. 5113. SA.

**COMPUCORP 625:** Zebra Version 7.00 operating systems with manuals. Perfect working order. Offers. Ph: (063) 31 8467. B/H

**TRS-80:** Model 1 Level II BASIC 16K (just serviced by Tandy) \$500, plus green monitor (new) \$150; Tandy cassette plus leads \$50. Owner leaving Australia hence low price. Steve, Canberra (062) 46 5631. B/H.

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**Spacer:** a self relocating m/I utility which adds spaces to a BASIC Listing making it easy to read & debug, plus Compress, which removes spaces. \$13.50 (TRS-80 L2 or DISK). Dennis Bareis, 286 Lennox St., Maryborough. 4650. Qld.

**System 80:** with S100 expansion unit, 64K - \$900; MPI drives s.s. x 40T plus d.s. x 80T - \$800. Ph: (02) 908 1718. A/H.

**Complete:** Level II 16K TRS-80 with green phosphor monitor, Video Stabiliser, Hi-Res, dust covers and \$700 software. Cost well over \$2000 to buy new. Will sell \$1100. Ph: Robert Wilson (02) 587 3590.

**As New:** TRS-80 Model 1 Level II 16K, green screen, cassette, amplifier, dust covers, manuals. Sell complete \$875. ono. Ph: Mark Jacobs (02) 387 2838. A/H.

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**Cheap:** Apple II/X-80 programs, from 'vaders to tic tac toe. R. Skelton, 72 Park Rd., Katikati. New Zealand.

**Super 80:** computer. BASIC in EPROM 32K RAM. All sockets fitted, less S100 exp., manuals. \$400. Ph: John Read (066) 97 7396. A/H.

**Videx Videoterm:** 80 column card for the Apple. Soft switch and character set, original box. \$240. ono. Ph: (069) 22 5451.

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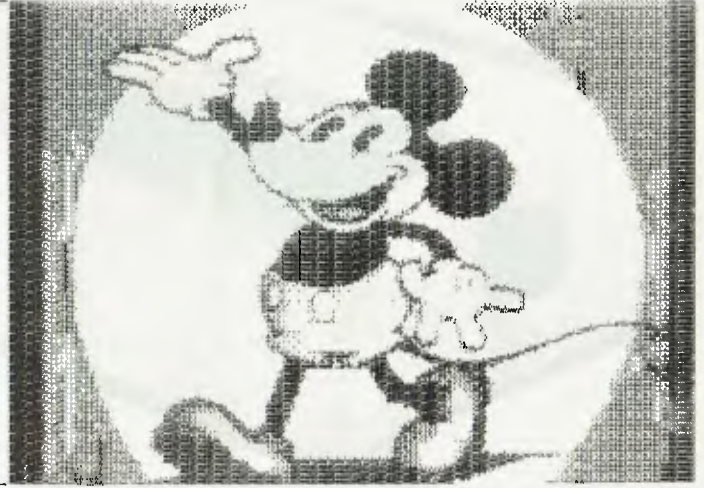
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# Off To The Faire

By Tom Booy



AN AMAZING 40,000 people, 600 exhibitors and 100 lectures made up this year's Computer Faire in San Francisco.

Computer buffs entering the exhibition centre must feel like kids at Christmas time; it's just as hard to decide which stand to see first as it is to pick which present to open.

To get the most out of this three-day spectacle it pays to plan in advance which lectures you want to attend and which suppliers you wish to see.

The first impression is one of utter bewilderment at the large crowds and the noise from synthesisers and space invaders.

Exhibitors' booths are spread over three floors and, because of space shortages, are even located in the hallways.

This was my second Computer Faire, so I had planned my visit a bit better than last year. My aim was to have a look at hard disks, find out as much as possible about Bar Coding, and have a close look at new operating systems.

Like most well laid out plans it didn't work that way; I could only find two hard disks at the entire show, nobody could give me anything concrete on bar coding and there were no new operating systems on the market!

So what was new? First impression: last year the show was dominated by TRS 80s and Apples, about 60 to 40; this year there were hardly any TRS 80s but Apple was still very much in the forefront.

The big surprise was the large number of Ataris, and other new machines: IBM, Rank Xerox, the Osborne, a large stand from Commodore and a number of machines with names I have never heard of before in my life.

There were more, and better, colour graphics, while some of the new space games make the old space invaders look like a Sunday afternoon's picnic. There were also more sophisticated printers, and one could spend days and days with the eight-colour plotters which are capable of drawing real works of art.

One of the greatest attractions are the bargains and it is obvious that many visitors do purchase vast quantities of equipment, software, books and magazines. One of the best buys was a small printer (\$US99.95) printing on 12cm wide paper, capable of quite good graphics. Another was a conversion for a TRS 80 Model III, from 48K to 64K, by taking out one of the chips and replacing it with a small board, for \$US145.

If you wanted to buy disks, the best thing to do was to have a look around and see what the prices were on various stands. Disks have a habit of becoming cheaper on the last day of the show — the lowest price I saw this year was \$1.20 for a 13cm disk.!

Like all shows it is Caveat Emptor, buyer beware; the \$1.20 disks were in blank covers without a name so it would be pretty difficult to complain if they were not good.

## The IBM Followers

It never ceases to amaze me: the moment a large corporation brings out a new machine, it also immediately creates a new cottage industry for the product.

The new IBM was supported by two new magazines dedicated to it, and the number of stands with bits and pieces for this machine was quite surprising.

I was lucky enough to have a play

around with the IBM. My conclusions included one very positive and one very negative point. What I liked very much was the editing facility — after a bit of practice you make the cursor fly around the screen to where you want it and make your corrections very fast.

The part I disliked was the buffered keyboard; the screen could be up to five characters behind the keyboard, and every so often you had to wait for the screen to catch up. The owner did tell me that this was not meant to be that way. He had sent it back twice for this to be corrected but so far IBM had been unable to do so.

Education is no doubt a large and mostly unexplored field in micros. There are, of course, a lot of programs teaching the traditional "three Rs" but I have not seen many programs teaching how to operate a DOS. Tandy has one, but that is a straightforward reading from the screen and you answer a few questions every so often.

Select Information Systems, I however, released its TeachM course at the show. This disk teaches the operator all the ins and outs of CP/M, one of the Disk Operating Systems I have not played around with.

When I got my hands on CP/M quite some time ago I took one look at the manuals which came with it, took probably an unjustified dislike to the letters and style of writing, and put it aside. Sometimes one cannot be bothered to read the manuals, so CP/M gathered dust on the shelves.

When I got the chance to try Teach/M I did this with very little knowledge of CP/M. All one had to do was to insert the



disk, close the disk door and you are off to your first lesson. There are ways and ways of teaching people something. Teach/M appealed to me because it took nothing for granted and only explained one command at the time.

You read one or two lines on the screen regarding the command. The screen will then show you a sample of the command format. With this format in front of you, you type it in yourself. When and wherever possible the computer will carry out the command as you typed it in. Next you are asked to do this without any assistance; if you do so correctly the command will execute. However, if you make a mistake, it is suggested that you do it again and you have a choice to bring the prompt lines back to the screen again.

You can also retype the command for another go; until you do everything correctly the program keeps on suggesting that you go back and have another try. You can continue as you wish to next command, or discontinue altogether.

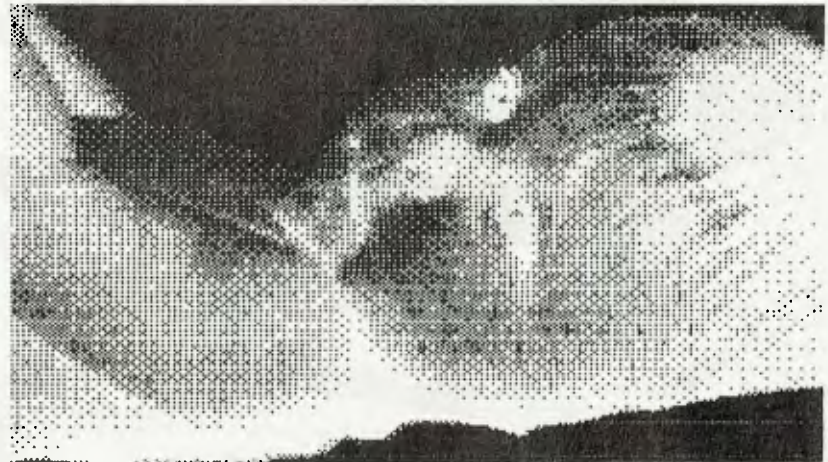
This method of teaching appealed to me and I'm sure there is a great future for this type of program.

The Faire is also a great outlet for the magazines, and there were dozens of them, new ones and old ones. You can divide them roughly into two groups: magazines devoted to a particular computer, and the general ones.

The product-supporting group had most newcomers. From memory there were three magazines supporting TRS-80, two for Apple, two started for the IBM, two started for Atari, and one for North-Star.

There was quite a large representation from the Californian educational institutions, some of them openly competing with private enterprise selling publications, programs and even memory boards.

All aspects of the industry were represented at the Faire; an association for program writers, hobby groups, groups of



people specialising in fields like medicine, education, engineering and so on.

Another important section of the Faire was the lectures one could attend. For some lectures you must register and pay a fee, for others you can just wonder in and out as you please.

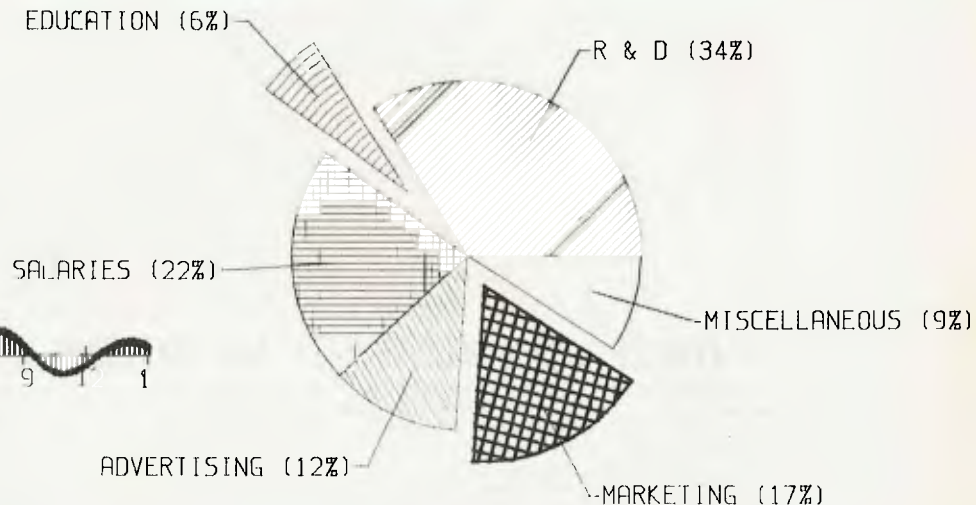
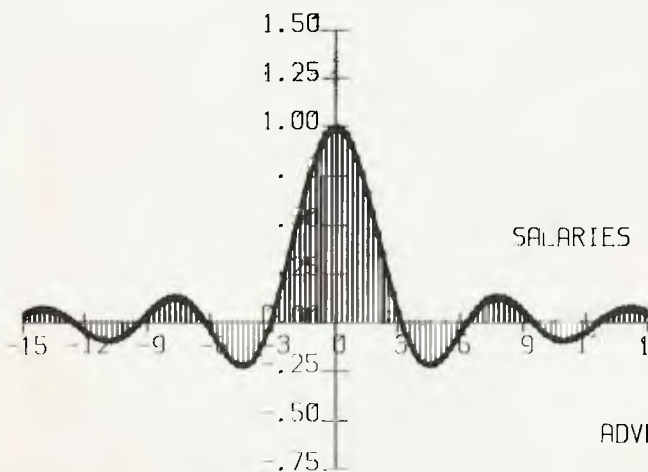
The subjects ranged from software piracy to "How to leave and compete with your Employer without getting sued" to "Microcomputer Application in Academic Medicine".

The show is masterminded by a character called Jim Warren. The nearest I

have come to him is by nearly getting run over by him on his roller skates: he travels that way, armed with a walkie talkie and is quickly on scene at trouble spots.

Warren and his team are full-time Faire organisers; they also run shows in other cities.

The San Francisco Show is their big effort every year. Anyone with any interest in the Computer world will find something to his liking at the Computer Faire.





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# GIANT

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### Apple Colour Graphics

By Scott Ditter

I HAVE recently purchased an Apple and have written a colour graphics program which might be of interest to other Apple beginners.

Two notes on the program:

- By changing the coordinates of the centre of plotting different designs can be achieved.
- By changing the STEP values different levels of detail are available eg. change the 4 STEP values to .1 then 4.

```
1 REM AUTHOR: S. DITTER
```

```
2 HOME
```

```
3 PRINT "CENTRE OF SCREEN IS (139.5,95.5)"
```

```
5 INPUT "PLEASE ENTER COORDINATES FOR  
YOUR CHOICE OF CENTRE";F1,F2
```

```
6 IF F1>279 OR F2>191 THEN PRINT  
"COORDINATES TOO LARGE, PLEASE  
REENTER CORRECT ONES.": GOTO 5
```

```
10 HGR2
```

```
30 FOR C1 = 0 TO 279:REM STEP 1 ORIGINALLY
```

```
31 H1 = H1 +1
```

```
35 IF H1>7 THEN H1=1
```

```
40 HCOLOR = H1
```

```
50 HPLLOT C1,0 TO F1,F2
```

```
60 NEXT C1
```

```
70 FOR C1 =0 TO 191
```

```
80 H1=H1+1
```

```
90 IF H1>7 THEN H1=1
```

```
100 HCOLOR=H1
```

```
110 HPLLOT 279,C1 TO F1,F2
```

```
120 NEXT C1
```

```
130 FOR C1=279 TO 0 STEP -1
```

```
140 H1 =H1+1
```

```
150 IF H1>7 THEN H1=1
```

```
160 HCOLOR=H1
```

```
170 HPLLOT C1,191 TO F1,F2
```

```
180 NEXT C1
```

```
190 FOR C1=191 TO 0 STEP -1
```

```
200 H1=H1+1
```

```
210 IF H1>7 THEN H1=1
```

```
220 HCOLOR =H1
```

```
230 HPLLOT 0,C1 TO F1,F2
```

```
240 FOR PAUSE=1 TO 1000: NEXT PAUSE
```

```
250 GOTO 30
```



## Economic Calculations...

By John Buetel

THIS program, which calculates your fuel economy for you, runs on my System 80 and Seikosha GP 80 Printer (mine wears the Dick Smith badge).

Along with the listing is a run which takes its

input from a holiday trip I recently undertook. I won't be offended if you do not have room, but thought some of the ideas could interest others with similar equipment.

```

10 CLS:PRINT"          FUEL CONSUMPTION"
15 LPRINT CHR$(14):LPRINT" * FUEL CONSUMPTION *":LPRINT CHR$(15)
20 PRINT:INPUT"HOW MANY FILLS OF PETROL";F
25 LPRINT:LPRINT"HERE WAS ";F;" PETROL STOPS"
30 A=0:D=0
40 FOR B=1 TO F
50 PRINT"          PRICE PER LITRE @ FILL # ";B:INPUT CL
60 PRINT"COST OF FILL # ";B:INPUT CF
63 Q#="FILL NUMBER ## AT ##.### PER LITRE COST ###.##"
66 LPRINTUSING Q#;B,CL,CF
70 C=CF/CL:A=A+C:D=D+CF
80 NEXT B
90 INPUT"SPEEDO READING @ START OF EXERCISE ";S1
100 INPUT"          SPEEDO @ END OF EXERCISE (LAST FILL)";S2
110 S3=S2-S1
120 PRINT:PRINT"          ON THIS TRIP OF ";S3;" KILOMETERS"
130 PRINT"YOU USED ";A;" LITRES OF PETROL WHICH COST A TOTAL
          OF #";D
140 PRINT:PRINT"THIS REPRESENTS A CONSUMPTION OF ";S3/A;" K.M'S PER LITRE"
150 PRINT"WHICH IS EQUIVALENT TO ";(S3/A)*4.54*.6214;" M.P.G."
160 LPRINT:LPRINT A;" LITRES OF FUEL WAS USED, WHICH COST A TOTAL OF #";D
165 LPRINT"          THE DISTANCE TRAVELLED WAS ";S3;" KILOMETERS"
170 LPRINT" THE CONSUMPTION WORKED OUT AT ";S3/A;" K.M'S PER LITRE OR ";(S3/A)*
.54*.6214;" M.P.G."
180 END
190 '-----
200 'FUEL CONSUMPTION IS COMPUTED FROM INPUTS OF PER LITRE COST AND FILL COST
210 'SPEEDO READING AT START AND FINISH ARE INPUT-----
    BOTH THESE FILLS PREFERABLY AT A SELF SERVICE PUMP
    TO ENSURE EQUAL FILLS
220 'THE PROGRAM RUNS A PRINTER AT THE SAME TIME AS THE SCREEN PRINTOUT
230 'DELETE LINES 15,25,63,66,160 165 & 170 IF THE PRINTER IS NOT USED
    
```

\* FUEL CONSUMPTION \*

```

THERE WAS 9 PETROL STOPS
FILL NUMBER 1 AT $0.359 PER LITRE COST $14.00
FILL NUMBER 2 AT $0.410 PER LITRE COST $16.00
FILL NUMBER 3 AT $0.331 PER LITRE COST $11.00
FILL NUMBER 4 AT $0.371 PER LITRE COST $12.30
FILL NUMBER 5 AT $0.425 PER LITRE COST $19.00
FILL NUMBER 6 AT $0.369 PER LITRE COST $18.00
FILL NUMBER 7 AT $0.385 PER LITRE COST $23.47
FILL NUMBER 8 AT $0.345 PER LITRE COST $15.00
FILL NUMBER 9 AT $0.359 PER LITRE COST $12.80
    
```

373.627 LITRES OF FUEL WAS USED, WHICH COST A TOTAL OF \$ 141.57  
 THE DISTANCE TRAVELLED WAS 2801.2 KILOMETERS  
 THE CONSUMPTION WORKED OUT AT 7.49733 K.M'S PER LITRE OR 21.1511 M.P.G.

68

## ZX80 Code Loader

By Mark Wilkinson

THIS PROGRAM provides a simple way of entering machine code routines into memory.

RUN the program and enter the starting address of the routine to be entered or edited. The following commands are then available:

**S**(step) increments current address  
**B**(back step) decrements current address  
**D**(decimal write) writes a 1 or 2 byte number into memory and alters the current address accordingly  
**H**(hex write) writes 1 byte of hex into memory then increments current address  
**ST**(stop) exits program.

### ZX-80 CODE LOADER

```

10 PRINT "ADDRESS?"
20 INPUT A
30 LET C=PEEK(A)
35 CLS
40 PRINT A;"=";CHR$(A/16+28);CHR$((A and 15)+28)
50 INPUT A;
60 IF A="ST" THEN STOP
70 GOSUB CODE(A)*10
80 GOTO 30
390 LET A=A-1
400 RETURN
410 INPUT C
420 POKE A,C
430 IF C>255 THEN POKE A+1,C/256
435 IF C>255 THEN LET A=A+1
440 LET A=A+1
445 RETURN
450 INPUT A;
460 LET C=CODE(A)-28
470 LET D=CODE(PLB(A))-28
480 POKE A,16*(C+D)
490 LET A=A+1
500 RETURN
560 LET A=A+1
570 RETURN
    
```

## ZX80 Wumpus

YOU'RE IN the entrance cave of a system of 13 caves in which sleeps the nocturnal malodorous man-eating Wumpus.

Your mission is to sniff him out and destroy him without being eaten. You should also avoid the bottomless pits,



which are fatal, and the giant bats, which are dangerous; the bats can pick you up and drop you at random in another cave.

Before each move you are given clues about adjacent caves:

*I smell a Wumpus* — Wumpus nearby

*I feel a draught* — pit(s) nearby

*I hear squeaking* — bat-cave(s)

You may then either move to an adjoining cave or, if you think the Wumpus is there, shoot into it. To move simply type the cave number. To shoot type a minus sign, then the cave number.

If you shoot into the correct cave, you may not necessarily kill the Wumpus. You may only wake him, in which case he will wander off to sleep in another cave (except cave-0, the entrance cave, which is too bright for his sensitive eyes).

This version of Wumpus (for ZX80 84K ROM only) squeezes into the standard 1K RAM. The program has 10 levels of difficulty and there are 13 caves. Cave-0 is the entrance cave and can be regarded as a "safety zone". Sometimes, at the harder levels, you may find yourself in a sub-system of the caves from which there is no way out; in this case type "X" to exit the program.

Note: when typing in the program: "TO" in line 420 and "\*" in line 1200 can be stored as one character by typing *shift 4* and *shift H* respectively.

### Explaining It...

#### Variables:

C(12): Array which stores information on the 13 caves

b0 to b12: set if there are tunnels to the corresponding caves

b13: set if there are bats in that cave

b14: set if there is a pit in that cave

b15: unused because it introduces negative numbers

A: Number of arrows the player has left

P: Number of the cave the player is currently in

W: Number of the cave the WUMPUS is currently in

J: In lines 320 to 410 J represents the status of the caves adjoining the player's cave ( C(P) ).

Lines 140-222 set up the caves

Line 160 determines the relative number of tunnels between caves

Line 200 determines the number of bat and pit-caves

Line 210 RND(RND(2)) means the ratio of bat-caves to pit-caves is 3:1

Line 250 clears bats and pits out of the wumpus's cave

Line 280 sends control to lines 1200, 2110 or 290 depending on whether C(P) is occupied by bats, pit or neither

Lines 290-400 print information about C(P) and its adjoining caves

Line 440 does not accept the input if the player is shooting without any arrows or if the player is trying to move or shoot into a cave which doesn't join C(P)

Lines 500-610 deal with the arrow shooting.

```

100 DIM C(12)
110 PRINT "LEVEL (1-10)"
120 INPUT S
130 LET A=15-S
140 FOR I=1 TO 12
150 FOR J=0 TO I-1
160 IF RND(S/2+9)>3 THEN GO TO 190
170 LET C(I)=C(I) OR 2**J
180 LET C(J)=C(J) OR 2**I
190 NEXT J
200 IF RND(A)>2 THEN GO TO 220
210 LET C(I)=C(I) OR RND(RND(2))**2**13
220 NEXT I
230 LET P=0
240 LET W=RND(12)
250 LET C(W)=C(W) AND 8191
260 CIS
270 IF P=W THEN GO TO 700
280 GO TO (C(P) AND 24576)/9+290
290 PRINT "YOU'RE IN";P;",";ARROWS="";A
300 PRINT "ADJOINS"
310 LET J=0
320 FOR I=0 TO 12
330 IF (C(P) AND 2**I)=0 THEN GO TO 360
340 PRINT " ";I;
350 LET J=J OR -4*(W=I) OR C(I)/8192
360 NEXT I
370 PRINT
380 IF J AND 4 THEN PRINT
      "I SMELL A WUMPUS"
390 IF J AND 2 THEN PRINT
      "I FEEL A DRAFT"
400 IF J AND 1 THEN PRINT
      "I HEAR SQUEAKING"
410 PRINT
420 PRINT "MOVE(MINUS TO SHOOT)"
430 INPUT J
440 IF A<1 AND J<0 OR (2**ABS(J)
      AND C(P))=0 THEN GO TO 430
450 IF J<0 THEN GO TO 500
460 LET P=J

```

470 GOT TO 260

500 CLS

510 LET A=A-1

520 IF W+J THEN GO TO 290

530 IF RND(S/2+9)<8 THEN GO TO 600

540 PRINT "YOU WOKE HIM"

550 LET W=RND(12)

560 PRINT "HIT NEW-LINE"

570 INPUT Z\$

580 GO TO 250

600 PRINT "DEAD WUMPUS"

610 RUN

700 PRINT "YOU'VE BEEN EATEN"

710 RUN

1200 PRINT "##BATS##"

1210 LET P=RND(13)-1

1220 GO TO 560

2110 PRINT "YOU FELL IN A PIT"

2120 RUN

## Sensitivity Analysis

By John H Crabb

THE ZX80 tends to be considered something of a 'toy' which cannot handle serious business applications.

While I accept that with limited memory it cannot, for example, deal with large numbers of transactions for, say, accounting applications, it seems to me that there is scope for special 'one-off' calculations which could be useful in business operations such as Break Even Points.

As BEP calculations are relatively commonplace I sought something rather more specialised while still being of importance in decision making and came up with Sensitivity Analysis. These useful tools have a wider applicability than BEP figuring, being more general — a sort of reverse or mirror image of 'What-if?' applications.

The particular program I ran on my ZX80 dealt with the following situation: Plant annual capacity 24,000 tonnes, Product selling price \$7.50 tonne, Contribution \$5.00 tonne, Project Life 10 years, Cost of Capital 7 percent, Investment \$50,000, Discount Factor 7.02 (from tables \$1pa for 10 years at 7 percent).

Requirement: calculate the sensitivities of the main components in order to rank them for possible effect on outcome of operations and hence the degree of attention that should be concentrated on each component by management.

As I have the old ZX80 with 4K ROM I encountered some snags but with a little thought these problems can be overcome. The particular snags were related to:

(i) Integer operations (not such a problem with



the ZX81 or a ZX80 with 8K ROM)

(ii) No Read Data capability — hence use Input or Let statements

(iii) lack of capacity (the + or - 32767 limit)

(iv) lack of a printer (hopefully arriving soon).

This latter point was really only a detail since the calculated results can be readily jotted down when read off the screen.

The lack of capacity was overcome by reducing all the figuring by a factor of 10, thus retaining the same relative sensitivity. Again, in the case of multiplication/division some agility was needed to retain the integrity of integers to the extent possible while not running out of capacity.

The accompanying printout was made via a mainframe. For comparison purposes the ZX80 Sensitivity Analysis results were as follows:

Mainframe	ZX80
Annual Capacity	11 10
Fixed Cost	13 10
Selling Price	7 14
Contribution	11 20
Life of Project	70 70
Investment	180 150
Rate (cost of capital)	442 442

Better results would be obtained on a ZX81 and I would like to see a ZX81 output of this program.

## LIST

```

100 LET A=2400
110 S = 7.5
120 C = 5
130 L=10
140 R=7
150 I=5000
160 F=10000
170 D=7
180 T=(F/100)*(100+R)
190 V=S-C
200 Y=A*C
210 M=Y-F
220 P=M*D
230 N=F-I
240 A1=T/C
250 C1=T/A
260 S1=C1+V
270 F1=Y-(F/100)*R
280 I1=I+N
290 M1=I/D
300 D1=I/M
310 F1=I
320 Y1=F+(F/100)*R
330 R1=38
340 L1=3
350 PRINT A1,C1, S1,F1,I1,M1,D1,Y1
360 A2 =((A-A1)*100)/A
370 S2=((S-S1)*100)/S
380 C2=((C-C1)*100)/C
390 F2=((F-F1)*100)/F
400 I2=((I-I1)*100)/I
410 R2=((R-R1)*100)/R
420 L2=((L-L1)*100)/L
430 PRINT,A2,S2,C2,F2,I2,R2,L2,
440 END
END OF FILE
BRUN

```

## OHIO Superboard II

By Jack Dikian

Maze trap is a game where you move your cross-head over as many gold pieces as you can before you are completely trapped by the closing maze. It will run on any 4K Ohio Super-board 2.

```

5      rem
6      rem: *****
7      rem *
8      rem *      MAZE TRAP
9      rem *
10     rem *      JACK DIKIAN
11     rem *
12     rem: *****
13     rem
14     rem  KEYS :x left,c up, n down, m right
15     rem
16     q=1: t0=216
17     gosub 1000 : u1=53383 : t=0 : f0sub 5000
18     poke 53480,219 : p=4
19     k1=53480
20     k=57088 : poke 532,1 : poke k,251
21     rem pole the keys
22     if peek(x)=127 then p=1
23     if peek(x)=191 then p=2
24     if peek(x)=247 then p=3
25     if peek(x)=251 then p=4
26     poke 530,0
27     f0sub 2000
28     if t=t0 then q=q+1 : goto 40
29     f0sub 3000
30     gosub 4000
31     if q > 0 then 70
32     poke 532,0
33     rem end of main
34     end
35     rem
36     fcr s=53379 to 54171
37     rem draw the maze
38     poke s,32 : next
39     fcr s= 53445 to 57465
40     poke s,161 : poke s + 20 * 32,161
41     next
42     for s=53445 to 54085 step 32
43     poke s,161 : poke s + 20,161
44     next : s1 = 0 : s3 = 0
45     for s = 53511 to 54023 step 32
46     s1 = s1 + 1 : if s1=3 then 1150
47     for s2=0 to 17
48     s3 = s3 + 1 : if s3=3 then 1140
49     poke s + s2,161
50     next
51     next
52     goto 1200
53     s3 = 0 : goto 1125
54     s1 = 0 : goto 1126

```



```

1200 s1 = 0 : s2 = 0
1210 for s = 53478 to 54054 step 32
1220 s1 = s+1 : if s1 <> 1 then 1260
1230 for s2 = 0 to 18
1240 poke s + s2,46
1250 next
1255 next
1256 goto 1300
1260 if s1 = 3 then s1=0 : goto 1255
1265 goto 1255
1300 s1 = 0 : s2 = 0
1310 for s = 53478 to 53496
1320 s1 = s+1 : if s1 <> 1 then 1360
1330 for s2 = s to s + 18 * 32 step 32
1340 poke s2,46
1350 next
1360 next
1370 goto 1390
1380 if s1=3 then s1=0 : goto 1360
1385 goto 1360
1387 rem end of maze draw
1390 return
1395 rem
2000 if p=1 then l1= -1 : goto 2500
2005 rem move the cross-head
2010 if p=2 then l1= -32 : goto 2500
2020 if p=3 then l1= 32 : goto 2500
2030 if p=4 then l1= 1 : goto 2500
2040 return
2045 rem
2500 u=peek(k1 + l1)
2510 if u=32 or u=46 then 2530
2520 p=p1 : return
2530 if u=46 then t=t+1 : p1=p
2540 poke k1+l1,219 : poke k1,32
2550 k1 = k1 + l1
2560 return
2570 rem
3000 f=int(rnd(1)*10)
3005 rem set maze traps
3010 if f < 3 then 3030
3020 return
3030 x=k1 - int (k1/32)*32 - 2
3035 f = f + 7
3040 on p goto 3060,3100,3160,3200
3050 return
3060 if x > 10 then 3070
3065 return
3070 l3 = peek(k1-f)
3075 if l3=46 then t0=t0 - 1
3080 poke k1 - f,161
3090 return
3100 return
3160 return
3200 if x < 15 then 3220
3210 return
3220 l3 = peek(k1 + f)
3230 if l3=46 then t0 = t0 + 1
3240 poke k1 + f,161
45 rem end of maze trap
3250 return

```

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# OHIO

```
3260 rem
4000 h = int(t/100) : poke u1 + 6, h + 48
4005 rem score system
4010 h1 = int(( t - 100 * h ) / 10) : poke u1 + 7, h1 + 48
4020 h2 = t - 100 * h = 10 * h1 : poke u1 + 8, h2 + 48
4030 poke u2 + 7, q + 48
4040 return
4045 rem
5000 poke u1, 115 : poke u1 + 1, 99 : poke u1 + 2, 111
5005 rem put writing on screen
5010 poke u1 + 3, 114 : poke u1 + 4, 101 : u2 = 53394
5020 poke u2, 99 : poke u2 + 1, 114 : poke u2 + 2, 101
5030 poke u2 + 3, 100 : poke u2 + 4, 105 : poke u2 + 5, 116
5035 return
```

## And One For The OSIC4...

By S Mason and K Perry

DO YOU WANT INSTRUCTIONS (Y/N)? Y

### OBSTACLE

THIS GAME RANDOMLY GENERATES OBSTACLES ON THE SCREEN. YOUR OBJECTIVE IS TO AVOID HITTING THE OBSTACLES AND THE TRAIL THAT YOU GENERATE. YOU SCORE POINTS FOR MOVING.

YOU PLAY BY MOVING ON THE SCREEN, FIRING MISSILES AND EXPLODING A SMART BOMB (ONCE ONLY). A MISSILE WILL DESTROY ONE OBSTACLE IN ITS PATH, BUT THEY ARE LIMITED IN NUMBER. THE HIGHER YOUR LEVEL THE LESS MISSILES YOU GET. THE SMART BOMB WILL DESTROY AN AREA AROUND YOUR LOCATION INCLUDING YOUR OLD TRACKS.

### KEYBOARD OPERATION

FOR MOVEMENT PRESS:-

A - TO GO UP  
Z - TO GO DOWN  
< - TO GO LEFT  
> - TO GO RIGHT  
? - TO FIRE MISSILES  
SPACE BAR TO USE SMART BOMB

ENTER A NUMBER TO CONTINUE?

```
3 REM OBSTACLE
4 REM SCREEN TITLE.
5 REM=====
6 GOSUB 8000
7 FOR I=1 TO 60:PRINT"***";:NEXT I
8 PRINT:PRINT"***";TAB(59)"***"
9 PRINT"***";TAB(25)"OBSTACLE";TAB(59)"***"
10 PRINT"***";TAB(59)"***":PRINT"***";TAB(19)"S. MASON AND K. PERRY";
```

# your computer

MAGAZINE

## HAS MOVED

WE ARE NOW AT:

140 JOYNTON AVENUE, WATERLOO (IN THE ESN BUILDING)

OUR NEW PHONE NUMBER IS 662 8888





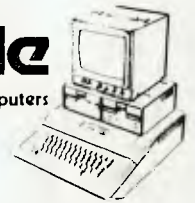
```

11 PRINTTAB(59)"*":PRINT"*";TAB(59)"*"
12 PRINT"*";TAB(22)"21 FEBRUARY 1982";TAB(59)"*"
13 PRINT"*";TAB(59)"*":FORI=1TO60:PRINT"*";:NEXTI
14 FORI=1TO10:PRINT:NEXTI:FORI=1TO5000:NEXTT
15 INPUT"DO YOU WANT INSTRUCTIONS (Y/N)";QS
17 IFQS="Y"THENGOSUB6000
18 PRINT:PRINT
19 GOSUB8000 :REM CLS
20 GOSUB4000 :REM INITIALISATION.
30 GOSUB3000 :REM INPUT LEVEL.
35 GOSUB8000 :REM CLS
40 GOSUB7300 :REM DRAW OUTLINE
50 REM
300 REM!***! MOVEMENT SECTION
310 REM =====
340 REM
365 GOSUB2000:FORI2=0TOCT:NEXTI2 :REM OBSTACLE
367 RA=RA+1:RX=RA:LP=L9:GOSUB5000 :REM POKE RATING
380 POKEK1,2:IFPEEK(K1)=0THENL3=U5 :REM MOVE UP
390 IFE=0ANDPEEK(K1)=16THENE=1:GOSUB7000:REM SMART BOMB
400 IFPEEK(K1)=DTHENL3=D5 :REM MOVE DOWN
405 IFPEEK(K1)=8ANDF>0THENF=F-1:GOSUB600:REM FIRE MISSILE
420 POKEK1,32:IFPEEK(K1)=RTHENL3=R5 :REM MOVE RIGHT
440 POKEK1,4:IFPEEK(K1)=LXTHENL3=L5 :REM MOVE LEFT
480 IJ=I+L3:IFPEEK(IJ)<>TSTHEN9000 :REM CHECK FOR CRASH
500 POKEIJ,SO:GOTO365
600 REM: SUBROUTINE FOR FIRING MISSILES.
610 REM: =====
620 RX=F:LP=L8:GOSUB5000:REM DISPLAY #MISSILES
630 IK=IJ
640 IL=IK:IK=IK+L3
660 IFPEEK(IL)=PLTHENPOKEIL,TS
680 IFPEEK(IK)=TSTHENPOKEIK,PL:FORI2=0TO5:NEXTI2:GOTO640
700 IFPEEK(IK)=S0THENRETURN
720 IFPEEK(IK)<>0BTHENRETURN
740 FORI2=1TO5:POKEIK,SO:FORI3=1TO7:NEXTI3:POKEIK,2
760 FORI3=1TO7:NEXTI3:POKEIK,3:FORI3=1TO7:NEXTI3,I2:POKEIK,TS
800 RETURN
2000 REM GENERATE OBSTACLES.
2010 REM =====
2020 RP=INT((I+RND(RN)*W+W2*INT(RND(RN)*L+1))
2080 IFPEEK(RP)<>TSTHENRETURN
2100 IFRP<MAANDRP>ITHENPOKERP,OB
2120 RETURN
3000 REM INPUT SECTION.
3002 REM =====
3005 PRINT:PRINT"INPUT RATING(1-7)? (1-SLOW)
3007 PRINT:PRINT"HIT (S) TO STOP"
3010 POKE530,1:POKEK1,126
3015 IFPEEK(K1)THENCT=PEEK(K1):F=126+CT*2:RETURN.
3160 POKEK1,8:IFPEEK(K1)=126THEN9999 :REM IF "S" THEN STOP
3180 GOTO3010
3200 RETURN
4000 REM *** INITIALISATION SECTION.
4002 REM =====
4007 L9$="SCORE":L8$="MISSILES"
4010 L9=53425:L8=53400 :REM POKE LOCATIONS FOR SCORE & MISSILES
4020 TS=32 :REM SPACE VALUE
4030 RA=0 :REM PLAYERS RATING
4040 RN=55 :REM RANDOM NUMBER
4060 II=53440:I=II :REM UPPER LEFT HAND VIDEO LOCN.
4065 W=63:L=27 :REM WIDTH & LENGTH OF OUTLINE
4070 K1=57088 :REM KEYBOARD PULLING POKE LOCN.
4085 L3=1 :REM SET MOVEMENT DIRECTION
4090 OB=33 :REM OBSTACLE
4095 W2=64 :REM SCREEN WIDTH

```

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# OHIO



# your computer

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## HAS MOVED

WE ARE NOW AT:  
 140 JOYNTON AVENUE, WATERLOO (IN THE ESN BUILDING)  
 OUR NEW PHONE NUMBER IS 662 8888

```

4100 MA=I+W+W2*L           :REM MAX POKE LOCN
4110 SO=161                 :REM POKE SOLID BLOCK VALUE.
4120 PL=43                  :REM POKE "+" VALUE
4122 U=64:U5=-64:D=32:D5=64 :REM KEYBOARD "U" & "D".
4124 R=128:R5=1:LX=2:L5=-1  :REM KEYBOARD ">","<".
4130 IJ=I+INT(W/2)+INT(L/2)*64 :REM START LOCN.
4199 RETURN
5000 REM POKE A STRING INTO LOCATION LF.
5001 REM =====
5002 RX$=STR$(RX)
5005 LE=LEN(RX$):LF=LP-LE
5010 FORJ=1TOLE:POKELF+J,ASC(MID$(RX$,J,1)):NEXTJ
5020 RETURN
6000 REM INSTRUCTIONS.
6005 REM =====
6010 PRINT
6020 PRINTTAB(15)"OBSTACLE":PRINT
6030 PRINT" THIS GAME RANDOMLY GENERATES OBSTACLES ON THE "
6040 PRINT"SCREEN. YOUR OBJECTIVE IS TO AVOID HITTING THE "
6050 PRINT"OBSTACLES AND THE TRAIL THAT YOU GENERATE."
6055 PRINT"YOU SCORE POINTS FOR MOVING."
6060 PRINT
6070 PRINT" YOU PLAY BY MOVING ON THE SCREEN, FIRING"
6080 PRINT"MISSILES AND EXPLDING A SMART BOMB (ONCE ONLY)."<
6090 PRINT"A MISSILE WILL DESTROY ONE OBSTACLE IN ITS PATH,"
6095 PRINT"BUT THEY ARE LIMITED IN NUMBER. THE HIGHER YOUR"
6097 PRINT"LEVEL THE LESS MISSILES YOU GET."
6100 PRINT"THE SMART BOMB WILL DESTROY AN AREA AROUND YOUR
6110 PRINT"LOCATION INCLUDING YOUR OLD TRACKS."
6120 PRINT
6130 PRINTTAB(10)"KEYBOARD OPERATION"
6140 PRINTTAB(10)"FOR MOVEMENT PRESS:--"
6150 PRINTTAB(10)" A - TO GO UP"
6160 PRINTTAB(10)" Z - TO GO DOWN"
6170 PRINTTAB(10)" < - TO GO LEFT"
6180 PRINTTAB(10)" > - TO GO RIGHT"
6190 PRINTTAB(10)" ? - TO FIRE MISSILES"
6200 PRINTTAB(10)" SPACE BAR TO USE SMART BOMB"
6205 PRINT:PRINT:PRINT
6210 INPUT"ENTER A NUMBER TO CONTINUE";QS
6220 RETURN
7000 REM EXPLODE SMART BOMB.
7002 REM =====
7005 IC=IJ:PO(1)=SO:PO(2)=TS
7020 FORI7=1TO2
7040 FORI4=0TO5:FORI3=1TO2
7060 IX=(-1)^I3*I4*64+IC
7080 FORI5=0TO10
7100 IY=IX-I5:IZ=IX+I5
7120 POKEIY,PO(I7):POKEIZ,PO(I7)
7140 NEXTI5,I3,I4,I7
7160 GOSUB7300:REM -REDRAW OUTLINE
7180 POKEIC,161
7200 RETURN
7300 REM DRAW OUTLINE.
7305 REM =====
7310 FORK=IIT0I1+W:POKEK,161:POKEK+64*L,161:NEXTK
7320 FORK=IIT0I1+64*LSTEP64:POKEK,161:POKEK+W,161:NEXTK
7330 RX$=L9$:LP=L9-4:GOSUB5005
7340 RX$=L8$:LP=L8-4:GOSUB5005:RX=F:LP=L8:GOSUB5000
7350 RETURN
8000 FORJ=1TO33:PRINT:NEXTJ:RETURN:REM CLS ROUTINE
9000 REM WE HAVE CRASHED SO CRASH AND DISPLAY SCORE.
9005 REM =====
9010 POKEIJ,188:POKEIJ-64,191:POKEIJ+1,192:POKEIJ+64,193
9020 POKEIJ-1,194:POKE530,0
    
```



# PEACH

```
9060 CE=INT(8.2-LOG(CT)/LOG(2))
9070 FORLL=1TO100:NEXT
9080 IFRA>RT(CE)THENRT(CE)=RA:INPUT"NAME";NAMES(CE)
9085 PRINT:PRINT
9090 PRINT"***SCORE**", "***HI-SCORE**", "RATING", "HI SCORER"
9100 PRINTRA,RT(CE),CE,NAMES(CE)
9110 PRINT:PRINT
9120 GOTO20
9999 POKE530,0:END
OK
```

## Peach Pools

By B M Sharif

MR SHARIF wrote the following letter to accompany his program, which is intended to encourage Hitachi Peach owners to start sharing their discoveries:

*Several months have now passed and I am still patiently waiting for a column on the Peach to appear.*

*Is there anyone else out there who runs a Peach, or anybody who known enough about*

*it to write in and offer help to people like me who are screaming for assistance. At the moment I don't know where to turn — certainly not to the manual which was written in 'Jinglish'; perhaps someone could re-write it in Strine.*

*Although software and the like were promised by Delta, nothing has yet been forthcoming and there do not seem to be any user clubs in evidence. It may be an idea to form a User Club and if there is anybody interested, I would like to know.*

*To start the ball rolling, I enclose a program (written for the Peach) to select Lotto and Pools numbers. It hasn't done me any good, but who knows...*

```
5 SCREEN0
6 WIDTH 60
10 REM
10 REM LOTTO & POOL SELECTIONS
20 REM
21 REM PREPARED FOR HITACHI MB-6890
22 REM BY BEN SHARIF (C) 1982
30 DIMA(56):B(56)
40 CLS:LOCATE0,3:PRINT"this programme was prepared "
41 PRINT"to select LOTTO or POOLS numbers."
50 PRINT"YOU ARE REQUIRED TO SPECIFY YOUR CHOICE"
60 PRINT"TYPE (1) FOR LOTTO. (2) FOR POOL."
61 INPUT"IF PROGRAMME IS NO LONGER REQUIRED, TYPE (3) ".0
70 ON 0 GOTO 320,90,650
80 GOTO 40
90 LOCATE0,11
100 INPUT"ENTER YOUR LUCKY NUMBER (POOL selection(s)) & WAIT ".LN:PRINT
110 RANDOMIZE(LN)
120 FOR X = 1 TO 55
130 A(X) = X
140 NEXT X
150 FOR Y = 1 TO 55
160 X=INT(RND(1)*55+1)
170 IF A(X)=0 THEN 160
180 A(X)=0
190 B(Y)=X
200 NEXT Y
210 LOCATE0,15
220 INPUT"STATE SYSTEM REQUIRED 11,12,13,OR 14":AZ:PRINT
221 PRINT"HERE'S YOUR POOLS SELECTION FOR SYSTEM ":AZ:PRINT
230 IF AZ=11 THEN PRINT"0.50c/GAME 165 CHANCES":PRINT:GOTO280
240 IF AZ=12 THEN PRINT"$1.50/GAME 495 CHANCES":PRINT:GOTO290
250 IF AZ=13 THEN PRINT"$4.00/GAME 1287 CHANCES":PRINT:GOTO300
260 IF AZ=14 THEN PRINT"$9.00/GAME 3003 CHANCES":PRINT:GOTO310
270 GOTO610
280 FOR A = 1 TO 55 STEP 5:PRINT B(A):" ":NEXT A:GOTO620
290 FOR A = 1 TO 55 STEP 4.56333:PRINT B(A):" ":NEXT A:GOTO620
300 FOR A = 1 TO 55 STEP 4.23077:PRINT B(A):" ":NEXT A:GOTO620
310 FOR A=1 TO 55 STEP 3.92857:PRINT B(A):" ":NEXT A:GOTO620
320 LOCATE0,11
330 INPUT"ENTER YOUR LUCKY NUMBER (LOTTO selection(s)) & WAIT ".LN:PRINT
340 RANDOMIZE(LN)
350 FOR X=1 TO 40
360 A(X)=X
```

## ATTENTION

**ZX-81 OWNERS  
(AND ZX80-8K ROM OWNERS)**

**Q** What is the first thing you should do after switch on?  
**A** Load in Gloster Software's **DATA PACK** — it takes only a minute or so.

Enter simple USR commands and —

- pass data to subsequently loaded programs
- save and load selected data via tape (no size limit) during program operation
- merge programs
- renumber program lines
- delete blocks of sequential program lines,

and, with the help of basic routines (included) —

- list names of established variables and addresses
- list names of saved programs.

**DATA PACK** requires 2K RAM Plus — \$19.50

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A wide range of games are also available. These include the popular **ADVENTURE IN TIME** — a full-scale adventure comprising approx 60K spread over five programs linked by data transfer (see review in YOUR COMPUTER April 1982) — 16K RAM — \$29.50.

Prices include postage. All software fully compatible with ZX81 & ZX80-8K and supplied on cassettes in duplicate. Correct loading guaranteed.

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**GLOSTER SOFTWARE  
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MELBOURNE 3001**



```

370 NEXT X
380 FOR Y = 1 TO 40
390 X=INT(RND(1)*40+1)
400 IF A(X)=0 THEN 390
410 A(X)=0
420 B(Y)=X
430 NEXT Y
440 LOCATE 0,15
450 INPUT"STATE SYSTEM REQUIRED 6,7,8,9,10,11,12":AZ:PRINT
451 PRINT"HERE'S YOUR LOTTO SELECTION FOR SYSTEM "AZ:PRINT
460 IFAZ=6 THEN PRINT"25¢/GAME = 1 GAME":PRINT:GOTO540
470 IFAZ=7 THEN PRINT"$1.85/GAME = 7 GAMES":PRINT:GOTO550
480 IFAZ=8 THEN PRINT"$7.30/GAME = 28 GAMES":PRINT:GOTO560
490 IFAZ=9 THEN PRINT"$21.40/GAME = 84 GAMES":PRINT:GOTO570
500 IFAZ=10 THEN PRINT"$53.00/GAME = 210 GAMES":PRINT:GOTO580
510 IFAZ=11 THEN PRINT"$116.50/GAME = 462 GAMES":PRINT:GOTO590
520 IFAZ=12 THEN PRINT"$233.00/GAME = 924 GAMES":PRINT:GOTO600
530 GOTO610
540 FOR A=1 TO 40 STEP 6.66666:PRINT B(A):" " :NEXTA:GOTO620
550 FOR A=1TO40 STEP 5.71429:PRINT B(A):" " :NEXTA:GOTO620
560 FOR A=1TO40STEP5:PRINT B(A):" " :NEXTA:GOTO620
570 FORA=1TO40STEP4.44444:PRINT B(A):" " :NEXTA:GOTO620
580 FORA=1TO40STEP4:PRINT B(A):" " :NEXTA:GOTO620
590 FORA=1TO40STEP3.63636:PRINT B(A):" " :NEXTA:GOTO620
600 FORA=1TO40STEP3.33333:PRINT B(A):" " :NEXTA:GOTO620
610 PRINT"":PRINT"SORRY THERE IS NO SYSTEM ":AZ
620 PRINT
630 PRINT:PRINT"Press any key for further selections"
640 X$=INKEY$:IFX$="" THEN640 ELSE40
650 END

```

## Basic Print Using

By P W Deckert

ALTHOUGH I am a Sorcerer Computer owner, I have decided to discuss a little trick in BASIC programming which should work on any BASIC.

The problem with BASIC is that unless you have a PRINT USING option included in your version of the language there is no end of trouble in getting a set of different length numbers to line up in a readable manner. The only way around it was to have complicated decision loops to place the correct number of spaces before the number to allow the decimal points to line up under one another.

However, by using the LOG function I have found there is an extremely easy method of getting the numbers to line up neatly under each other.

I have placed the LOG function into the DEFINE STATEMENT so as to make it easily accessible to the program's PRINT statements. Thus you have DEF FNT(X) = 6-INT(LOG(ABS(X))/2.30259) INT and ABS are also used to return an integer and also allow the use of negative numbers.

Thus, when used in the TAB function of a print statement it will line up the numbers as long as all other variables used in the TAB remain constant. For example TAB (A+FNT(W)) will line up W as long as A re-

mains constant. Type in the program below and play around with the TAB statements to see for yourself what the DEFINE statement will do to the printout.

To explain the demo program, part one gives a general picture to show how any length number will line up its decimal point with the number above. Part two gives a practical de-

monstration of the function's use.

For those whose BASIC does not have a define function the Equation  $6-\text{INT}(\text{LOG}(\text{ABS}(X))/2.30259)$  may be put into a LET statement just before the PRINT or place it into the actual TAB function. Also those BASICS that support LOG to the Base 10 can simplify the equation by only needing  $6-\text{INT}(\text{LOG}(\text{ABS}(X)))$ . □

### LIST

```

10 REM      The Function Defined as Log to the Base E.
30 DEF FNT(X) = 6-INT(LOG(ABS(X))/2.30259)
50 :
70 :
90 PRINT "      PRINTOUT Type One."
110 READ E
130 IF E=1E7 THEN210
150 PRINT TAB(10+FNT(E)); E
170 GOTO110
190 :
210 PRINT "      PRINTOUT Type Two"
230 READ E
250 IF E=1F7 THEN330
370 T=T+E
290 PRINT "      $"; TAB(5+FNT(E)) E
310 GOTO230
330 PRINT "      _____"
350 PRINT "      $"; TAB(5+FNT(T)) T
370 PRINT "      _____"
390 :

```



```

410 DATA 5.6,17.9,345.987,1234.7,12387.9,234567
430 DATA 555555,76543.9,6543.98,653.009,12.8765,4.87654
450 DATA 1E7
470 :
490 DATA 123.67,45.89,1234.67,5.09,7.90,4.05
510 DATA 1E7
530 :
550 END
READY

```

```

PRINTOUT Type One.
      5.6
     17.9
    345.987
   1234.7
  12387.9
 234567
555555
 76543.9
 6543.98
 653.009
 12.8765
 4.87654

```

```

PRINTOUT Type Two
$ 123.67
$ 45.89
$ 1234.67
$ 5.09
$ 7.9
$ 4.05
-----
$ 1421.27
-----

```

READY

## BASIC hard Copy: Formatted

By R D Greet

FOR OPERATING efficiency, programs written in BASIC should utilise multi-statement packing wherever possible.

However, adopting this approach can lead to problems when listing to a printer — long lines can wrap around and overprint a portion of a line.

Modern disk operating systems overcome this problem by allowing an absolute line length. This helps, but, the copy can still look untidy; words can be broken on overflow, and additionally, some do not indent overflow lines. This untidiness is due to a lack of 'intelligence'.

Some readers will say that better effect can be obtained by formatting the text during code generation, listed as formatted, and use a 'text packer' for the run time package. Quite true, but, this adds to the programmer's work load — surely an undesirable attribute.

The program listed here actually started out as a simple preformatter to enable the loading

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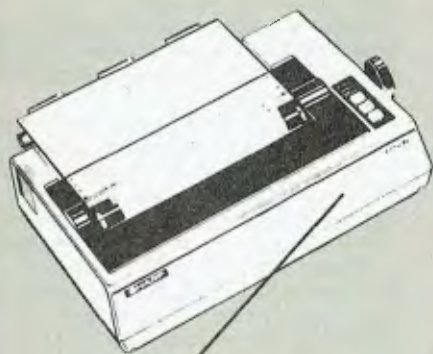
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### Printer (CE-332P)

Kind of character: 176 kinds (ASCII, symbols, artificial graphic patterns).  
Number of copies: 3 copies (including an original). Max 0.2mm.  
Paper width: 101.6mm-254mm (4"-10").  
Printing speed: 80 lines/minute.  
Printing capacity: 80/132 character/line intelligent.  
Power source: AC local voltage, 50/60Hz.  
Operating temperature: 5°-35°C (41°-95°F).  
Dimensions: 374(W) × 305(D) × 107(H)mm  
14<sup>29</sup>/<sub>32</sub>"(W) × 12"(D) × 4<sup>7</sup>/<sub>32</sub>"(H).  
Weight: 5.5kg (12.1 lb).

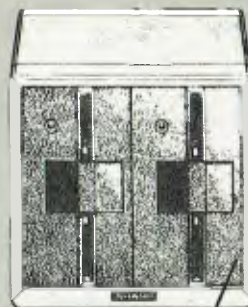


### Commands

User definable key set.  
Up to 20 keys of constants and statements can be defined.

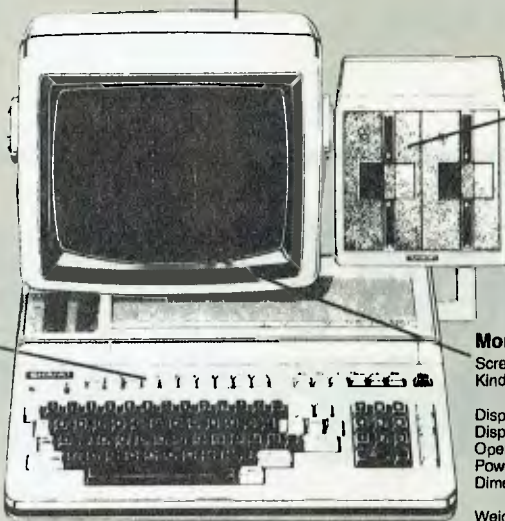
### Specifications

Program language: BASIC.  
Calculation capacity: Integer: -32767~32767.  
Real number: Mantissa part 12 figures. Exponent part -99~+99.  
Memory PC-3201: ROM 32K bytes (max 72K bytes). RAM 64K bytes (optional expansion inside the board feasible up to max 112K bytes).  
Electronic keyboard: 92 keys (ASCII, data entry, definable, function). Step sculpture, 64K input buffer.  
Editing debugging: Cursor control, left, right, home, insertion, deletion.  
Power source: AC local voltage, 50/60Hz.  
Power consumption: 40W (max).  
Operating temperature: 0°-40°C (32°-104°F).  
Dimensions: 450(W) × 350(D) × 100(H)mm  
17<sup>23</sup>/<sub>32</sub>"(W) × 13<sup>23</sup>/<sub>32</sub>"(D) × 3<sup>15</sup>/<sub>16</sub>"(H).  
Weight: 5.0kg (11.02 lb).



### Floppy Disk Drive — 8"

Memory capacity: 2MEG.  
Number of tracks: 77 2D/S D/D.  
Number of sectors: 26 sectors/track.



### Floppy Disk Drive — 5"

Memory capacity: 560K, 2 drives.  
Number of tracks: 35 tracks/side (2 sides/disk).  
Number of sectors: 16 sectors/track.  
Operating temperature: 10°-35°C (50°-95°F).  
Power source: AC local voltage, 50/60Hz.  
Outer dimensions: 189(W) × 334(D) × 184(H)mm.  
7<sup>1</sup>/<sub>8</sub>"(W) × 13<sup>3</sup>/<sub>32</sub>"(D) × 7<sup>1</sup>/<sub>4</sub>"(H).  
Weight: 7.1kg (15.6 lb).

### Monitor (CE-320C)

Screen size: 30cm (12") green monitor.  
Kind of character: Letters (capital and small), symbols, artificial graphic patterns.  
Display capacity: 80 characters × 25 lines.  
Display structure: 6 × 8 dot matrix.  
Operating temperature: 0°-40°C (32°-104°F).  
Power source: AC local voltage 50/60Hz.  
Dimensions: 325(W) × 315(D) × 278(H)mm  
12<sup>25</sup>/<sub>32</sub>"(W) × 12<sup>13</sup>/<sub>32</sub>"(D) × 10<sup>1</sup>/<sub>16</sub>"(H).  
Weight: 9.1kg (20.06 lb).

## — and as for Software:

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of program text into a word processor (but that's another story). During the course of development, however, it became obvious that the utility could provide a formatted print output that would surpass that available under LLIST, with some extra effort.

While the program was developed on a 48K TRS-80 running DOSPLUS 3.4 it has been written using standard DISK BASIC code: it should be directly transported to any system running Microsoft or equivalent code. RAM usage runs to 7.5K bytes (approx.) inclusive of string space allocation.

### Program Description

The program reads an ASCII format BASIC program that is resident on disk and produces an output list or output file(s) — or both, concurrently — in accordance with a line shortening algorithm (described later).

Program entry and initialisation occurs within lines 300-350. After the conversion file prompt has been answered, the main menu is displayed.

The (S) option was used extensively during development for debugging purposes, I have left it in only as a preformatted test option: when this option is selected, other options are bypassed.

The (H) hardcopy option will trigger a series of prompts — lines 430-460. An attempt has been made here for DOS/Printer compatibility. Put simply: if your DOS or printer is set for auto line feed answer the line feed prompt with the default, likewise, default if you are set for linefeed automatically on an LPRINT null (some DOSs will trap this condition and suppress output).

The (D) operation will generate ASCII output files with record lengths limited by the prompt option. The number of records can be answered with an appropriate number if you consider that the text is more than your word processor can handle.

The program will automatically generate output file names from the input filespec in the form 'filename'/bfn where n is the output file number. It follows then, that nine output files can be generated (*Warning*: — there is no check for duplicity).

Lines 500 — 530 are error traps: users on other systems may have to alter the code numbers.

Line 30 reads the first record from the input file and tests for a value from the two leading characters, if numeric it assumes that the file is an ASCII coded BASIC program text, otherwise the job is aborted.

Now for the main program loop:

Line 70 — an output line is generated with the line number right justified.

Line 80 — the output line is first tested for internal line feeds and if found lines are shortened to maintain integrity.

### Line Shortening Algorithm

Line 100 — the number of colons existing in a text line are summed and each position stored in array CP(ix).

Line 110 — finds the best fit condition within maximum length.

Line 120 — splits the output line.

Line 130 — displays the line.

Line 140 — variable 'O' is used as a bit map to control output function that occur in lines 150 — 280 inclusive.

Line 290 — sets up re-entry procedures.

In conclusion, this is only an interim answer: being a BASIC program it is not as fast as LLIST; however, reasonable throughput can be expected. The accompanying listing of the program was produced by the program.

```

10 :GOTO 300 ' FITBASIC 2.1
                                The Archer Bugtrap
20 ON ERROR GOTO 0
30 LINEINPUT#1,FI$:P1=1:NL=1:IF VAL(LEFT$(FI$,2))>0 THEN 70
40 PRINT TAB(10)"ERROR *** not an ASCII BASIC file"
   :FOR L=0 TO 1500:NEXT:GOTO 310
50 IF EOF(1) THEN CLOSE:GOTO310
60 LINEINPUT#1,FI$:P1=1:NL=1
70 OL$=STRING$(5,32):L=INSTR(FI$," ") -1:OL$=LEFT$(OL$,5-L)+FI$
   :FI$=""
80 L=INSTR(P1,OL$,CHR$(10))
   :IF L>0 AND L<CP(0) THEN FI$=RIGHT$(OL$,LEN(OL$)-L)
   :OL$=LEFT$(OL$,L-1):FF=1
90 IX=0:IF LEN(OL$)<CP(0) THEN 130
100 L=INSTR(P1,OL$,":"):IF L>0 THEN P1=L+1:IX=IX+1:CP(IX)=L:GOTO100
110 IF CP(IX)>CP(0) THEN IX=IX-1:IF IX>0 THEN 110
120 FI$=RIGHT$(OL$,LEN(OL$)-CP(IX)+1):OL$=LEFT$(OL$,CP(IX)-1)
130 PRINT OL$
140 IF NOT 0 AND 1 THEN 270 ELSE IF LP>0 THEN 180
150 LPRINT HT$ TAB(60)"PAGE "USING"###";PC=PC+1:LP=LP+2
160 IF 0 AND 8 THEN 170 ELSE IF 0 AND 4 THEN LPRINT:LPRINT
   :GOTO 180 ELSE LPRINT:GOTO 180
170 IF 0 AND 4 LPRINT CHR$(138) CHR$(138) ELSE LPRINT " "
180 IF NL AND 1 AND LP+4<MP THEN LPRINT OL$:LP=LP+1:GOTO 260
190 IF NOT NL AND 1 THEN LPRINT OL$:LP=LP+1:GOTO 260
200 LP=66-LP
210 FOR L=1 TO LP
220 IF 0 AND 8 AND NOT 0 AND 4 THEN LPRINT CHR$(138):GOTO 250
230 IF 0 AND 8 THEN LPRINT " ":GOTO 250
240 LPRINT
250 NEXT:LP=0:GOTO150
260 IF 0 AND 4 THEN LPRINT CHR$(138)
270 IF 0 AND 2 THEN PRINT#2,OL$:RW=RW+1:IF RW<MR THEN 290
280 IF 0 AND 2 THEN RW=0:F=F+1:MID$(EX$,4,1)=RIGHT$(STR$(F),1)
   :CLOSE 2:OPEN"0",2,F1$+EX$
290 NL=0:IF FI$<>"" THEN OL$="" "+FI$:FI$="":IF FF=0 THEN P1=7
   :GOTO 80 ELSE P1=6:FF=0:GOTO 80 ELSE 50
300 CLEAR500:DEFINT A-Z:DEFFNA$(S$)=CHR$(ASC(S$) ANDNOT 32)
   :DIM CP(30)
310 LP=0:PC=1:O=0:CLS:PRINT@88,"The Archer Bugtrap"
320 PRINT@214,"Basic List Reformatter":PRINT
330 PRINT TAB(10);:LINEINPUT"Filespec to be converted ? : ";F1$:F=1
340 ON ERROR GOTO 510
350 PRINT:PRINT TAB(10)"OPTIONS :
                                Screen Print Only <S>
                                Hard Copy <H>
                                Disk Copy <D>"
360 PRINT:PRINT TAB(10)"SELECTIONS :";:LINE INPUT S$
   :FOR L=1 TO LEN(S$)
   :MID$(S$,L,1)=CHR$(ASC(MID$(S$,L,1)) ANDNOT 32):NEXT
370 IF INSTR(S$,"S") THEN O=0:GOTO410
380 IF INSTR(S$,"H") THEN O=1
390 IF INSTR(S$,"D") THEN O=0+2
400 EX$="/BF"+RIGHT$(STR$(F),1)
410 OPEN"I",1,F1$
420 L=INSTR(F1$,"/"):IF L>0 THEN F1$=LEFT$(F1$,L-1)
430 CP(0)=70:PRINT TAB(10);
   :INPUT"Maximum Line Length (Default=70) ";CP(0)
   :IF CP(0)>122 THEN 430
440 IF 0 AND 1 THEN PRINT TAB(10);
   :INPUT"Software linefeed required (DEFAULT=NO) ";S$:S$=FNA$(S$)
   :IF INSTR(S$,"Y") THEN O=0+4:S$="" "
450 IF 0 AND 1 THEN PRINT TAB(10);

```

```

:INPUT"Linefeed required for null LPRINT (DEFAULT=NO) ";S$
:S$=FNA$(S$):IF INSTR(S$,"Y") THEN O=O+8
460 MP=60:IF O AND 1 PRINT TAB(10);
:INPUT"Maximum lines - page (Default=60) ";MP:IF MP>66 THEN 460
470 IF O AND 1 THEN HT$=" PROGRAM LISTING >>> "+F1$+" "+TIM
E$
480 MR=32767:IF O AND 2 THEN PRINT TAB(10);
:INPUT"Maximum records per output file (Default = NO LIMIT) ";MR
490 IF O AND 2 THEN PRINT TAB(10);:INPUT"Output Drive Number...";D$
:D$=":"+D$
500 IF O AND 2 THEN OPEN"D",2,F1$+EX$+D$:GOTO20 ELSE 20
510 IF ERR/2+1=54 THEN PRINT:PRINT"*** File not found...***"
:FOR L=0 TO 1500:NEXT:PRINT@320,CHR$(31):RESUME 330
520 IF ERR/2+1=65 THEN PRINT:PRINT"*** Bad Filespec.....***"
:FORL=0 TO 1500:NEXT:PRINT@320,CHR$(31):RESUME 330
530 ON ERROR GOTO 0

```

## VIC-20

### VIC-20 Combat

By Ric Kube

THIS IS a listing for a VIC-20 game I've adapted from a Pet program.

Basically, Combat is a game for two people: one uses function keys and the other person uses C, V, B, G, E, R, T to move.

Each has a tank and the object is to shoot your opponent to get 10 points. There are blockades and mines in the field (if you go over a mine, your opponent gains 1 point). The 'F' and up-arrow keys fire.

This program won't work with a Super Expander unless you make changes in the following lines:

Line 490: change A\$='f6' to A\$='1'  
Line 500: change A\$='f7' to A\$='2'  
Line 510: change A\$='f8' to A\$='3'  
Line 520: change A\$='f3' to A\$='4'  
Line 540: change A\$='f5' to A\$='6'  
Line 550: change A\$='f2' to A\$='7'  
Line 560: change A\$='f1' to A\$='8'  
Line 570: change A\$='f4' to A\$='9'

```

1 REM**COMBAT**
2 REM BY RIC KUBE, MAIKERIE, AUSTRALIA
3 REM FOR UNEXPANDED VIC-20
10 GOSUB 1000
290 GOSUB 900: PRINT"(clr)"
291 POKE 36879,93
300 FOR X= 0 TO 20
310 POKE 7680+X,100:POKE 8098+X,99
320 NEXT X
330 FOR Y= 1 TO 19
340 POKE 7680+Y,103:POKE 7701+Y,101
350 NEXT Y
360 FOR Y= 1 TO 19
370 FOR X= 1 TO 20
380 R= RND(1)*10
390 IF R>9.3 and R<9.75 THEN POKE
7680+22+Y+X,160
400 IF R>9.75 THEN POKE 7680+22+Y+X,90
410 NEXT X:NEXT Y

```

80

```

N,46:H=H+R:V=V+D:Q=90:GOTO 700
760 IF PEEK(N)=81 THEN SR=SR+1:POKE
C,Q:GOSUB 790:GOTO 450
770 IF PEEK(N)=87 THEN SL=SL+1:POKE
C,Q:GOSUB 790:GOTO 450
785 REM
790 Z1=PEEK(N+1):Z3=PEEK(N+22):Z4=
PEEK(N-22)
800 POKE N+1,42:POKE N-1,42:POKE
N+22,42
810 FOR X= 0 TO 50:NEXT
820 POKEN+1:POKE N-1,Z2:POKE N+22,Z3:
POKE Z-22,Z4
821 POKE 36878,15:POKE36877,255:FOR B =
1 TO 50:NEXT:POKE 36878,0
830 RETURN
835 REM
840 IF SL=10 THEN A$="LEFT"
850 IF SR=10 THEN A$="RIGHT"
855 POKE 36879,93
860 PRINT"(clr, 2 down) THE GAME WAS
WON BY THE ";A$;"PLAYER"
870 PRINT"ANOTHER GAME (Y/N)"
880 GET N$:IFN$="" THEN 880
881 IF N$="Y" THEN 890
882IF N$="N" THEN END
883 IF N$(">")Y" OR N$("<")N" THEN 880
890 GOSUB 900:GOTO 290
899 END
900 A$="":R=0:D=0:SL=0:SR=0:LM=32:RM=32:
RETURN
1000 PRINT"(clr)(7right)COMBAT(down,off,
black)
1010 PRINT"THE OBJECT OF THIS GAME IS TO
SCORE (R)10(off)POINTS"
1020 PRINT"YOU MAY SCORE A POINT IN TWO
WAYS. BY SHOOTING YOUR OPPONENT"
1030 PRINT"TANK OR IF YOU STEP ON A MINE
(blue)(black) A POINT IS SCORED
FOR HIM"
1040 PRINT"(left)A MISSILE WILL FLY OVER
A MINE AND DISINTIGRATE ON HITTING
AN OUTER WALL"
1050 PRINT"EACH PLAYER HAS 9 CON-TROLS.
(down) PRESS ANY KEY TO CONTINUE"
1060 GOT A$:IF A$=""THEN 1060
1070 PRINT"(clear)LEFT PLAYER"
1071 PRINT"(down) E R T"
1072 PRINT"(down) D F G"
1073 PRINT"(down) C V B"
1080 PRINT"(2down)RIGHT PLAYER"
1085 PRINT"(down) f2 f1 f4"
1086 PRINT"(down) f3 ^ f5"
1087 PRINT"(down) f6 f7 f8"
1090 PRINT"(2down)PRESS ANY KEY TO
(bright) CONTINUE"
1100 GET A$:IFA$=""THEN1100
1110 PRINT"(clear)TO MOVE PRESS THE KEY
FOR THE DIRECTION YOU WANT TO GO"
1120 PRINT"TO FIRE YOU PRESS THE 'F' KEY
FOR THE ' ' KEY"
1130 PRINT"THE MISSILE FIRES IN THE
DIRECTION YOU LAST MOVED"
1140 PRINT"LEFT TANK # (2down)"
1150 PRINT"RIGHT TANK 0"
1160 PRINT"(2down)PRESS (red,rev)ANY
(black,off) KEY TO BEGIN"
1170 GOT A$: IF A$ = "" THEN 1170
1180 RETURN

```

```

420 LV=10:LH=3:RV=10:RH=36
430 M=32
440 POKE 7903,81:POKE 7936,87
450 POKE 8126,SL+48:POKE 8133,SR+48
455 IF SL=5 OR SR=5 THEN POKE 36879,91
456 IF SL=9 OR SR=9 THEN POKE 36879,90
460 IF SL=10 OR SR=10 THEN 840
470 A$=""
480 GET A$: IF A$="" THEN 480
490 IF A$="C" OR A$="f6" THEN R=-1:D=1
500 IF A$="V" OR A$="f7" THEN R=0:D=1
510 IF A$="B" OR A$="f8" THEN R=1:D=1
520 IF A$="D" OR A$="f3" THEN R=-1:D=0
530 IF A$="F" OR A$="^" THEN 680
540 IF A$="G" OR A$="f5" THEN R=1:D=0
550 IF A$="E" OR A$="f2" THEN R=-1:D=-1
560 IF A$="R" OR A$="f1" THEN R=0:D=-1
570 IF A$="T" OR A$="f4" THEN R=1:D=-1
580 IR R=0 AND D=0 THEN 470
585 REM
590 IF ASC(A$)>130 THEN RR=R:RD=D:V=RV:
H=RH:P=B7:S=SL:M=RM
600 IF ASC(A$)<130 THEN LR=R:LD=D:V=LV:
H=LH:P=B1:S=SR:M=LM
604 C=7680+H+22*V
608 N=7680+H+R+22*(V+D)
610 IF PEEK(N)>80 AND PEEK(N)<90 THEN 450
620 IF PEEK(N)=32 THEN POKE C,M:M=32:
POKE N,P
630 IF PEEK(N)=90 THEN POKE C,M:M=90:
POKE N,P:GOSUB 790:S=S+1
640 H=H+R:V=V+D
650 IF ASC(A$)>130 THEN RV=V:RH=H:SL=5:RM=M
660 IF ASC(A$)<130 THEN V=LV:LH=R:R=L:D=LD:Q=81
670 GOTO 450
675 REM MOVEMENT
680 IF A$="^" THEN V=RV:H=RH:R=RR:D=RD:Q=87
690 IF A$="F" THEN V=LV:H=LH:R=LR:D=LD:Q=81
700 C=7680+H+22*V
710 N=7680+H+R+22*(V+D)
720 IF PEEK(N)=32 THEN POKE C,Q:POKE
N,46:H=H+R:V=V+D:Q=32:GOTO 700
730 IF PEEK(N)=102 THEN POKE
C,Q:GOSUB790:POKE N,32:GOTO 450
740 IF PEEK(N)=160 THEN POKE C,Q:GOSUB
790:POKE N,102:GOTO450
750 IF PEEK(N)=90 THEN POKE C,Q:POKE

```



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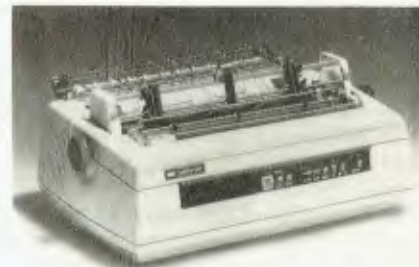
The design, specification and manufacture of these Spinwriters is undertaken by NEC in Japan. And it is NEC Information Systems Australia that imports, distributes and services the machines. The same company with the same high standards of design, manufacture, sales and service.

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# New Magic for the Sorcerer

By George Lindley

THE EXIDY Sorcerer's operating ease and capacity is nicely enhanced by two upgrade kits that can be user-installed at reasonable cost.

Sold by Creative Software (PO Box 144, Doncaster 3108), each kit contains two EPROMs, programmed to give the instrument a range of facilities not extant in the original design, and to amend certain design errors in the monitor.

One conversion treats the monitor, while the other concerns the plug-in BASIC ROM-Pac. Creative will make the changes for those willing to ship the instrument back and forth, but that can be the proverbial pain. The kits obviate such fuss — even the user whose electronics skill is limited to good soldering techniques can easily do the work, and save some money too.

With the monitor converted, CLEAR no longer produces a syntax error upon the next entry, and the RUN/STOP key works properly. REST may be made without ruining a program, and the monitor entered without typing BYE. The monitor can even accept most lower-case commands.

A memory-search in either hex or ASCII can be made, including the use of wildcards (unknown bytes in a sequence of known bytes). Such searched (or the entire screen) can be printed out upon demand.

All RAM, graphics area included, can be quickly cleared. If a machine-code program is to contain alphanumeric text, merely type in the characters and they'll be automatically encoded into ASCII, a feature that can be an enormous time-saver. Memory contents can be displayed in hex and ASCII simultaneously. Hence, any alphanumerics in memory can be read out directly.

Printer commands (ON/OFF) are available, as is a CHRIN (character-in) function. Original monitor commands such as Batch and Memory-Test have been omitted from the EPROM programming to fit in all of the newer, more useful ones.

On start-up, the top of RAM for a given Sorcerer contains 00H. This lets the monitor revisions be active. The user can lock them out by entering a non-zero byte into that address.

The conversions are compatible, and the ROM-PAC mod serves standard BASIC, Versions 1.0 and 1.1.

## For the BASIC Programmer

The BASIC ROM-PAC conversion yields the more common editing functions, such as character insertion and deletion, auto line numbering and line truncation — all as intrinsic commands, the way Exidy should have made them (line re-numbering is not included, but it can be loaded in from a utility tape furnished with the kit).

Other new, intrinsic features include token string search, selective line-listing, program recovery after, say, an accidental reset, block deletion of lines, saving and loading numeric arrays and the auto-execution of BASIC programs (if standard BASIC, Vers 1.1 is used).

Couple an audio amplifier to the parallel output port and the user alarm announces Sorcerer's moments of idleness, when the prompt is displayed. A program can also ring the bell (the new prompt, by the way, is "HELLO").

Using the tape utility, one can find a program line's address, delete useless spaces, merge programs from tape, and execute monitor commands from BASIC.

## Easy Installation

The installation instructions supplied with each kit are unambiguous and essentially complete, with the work straightforward and free from pitfalls.

To convert the monitor, the main circuit board is lifted from the case to allow the removal of the ROM-Pac holder, under which are the monitor IC sockets. The instructions show which circuit traces to cut, and where to put the few jumpers and the EPROMs. With its engine-room restored, the Sorcerer is ready for duty.

The small power supply board atop the rear of the main board remains mounted on it as the latter is lifted out of the case. The transformer's secondary leads are merely unplugged from the supply pcb first (is the power off?)

The top cover of the case is only lifted high enough to expose the ribbon cable connecting the keyboard to the main board below, and the orientation of the cable's plug and mating socket noted. Things can get reversed during re-assembly and, if the cover is raised too high, the plug pulls out before its position can be seen.

The BASIC ROM-Pac conversion is even easier. However, the instruction

sheet fails to reveal the secret of how to separate the Pac's plastic casing so that the Sorcerer surgeon can go in and do his work on the small pcb inside.

There are five holes in the side of the case opposite the paper label. Into each, a notched plastic pin is hooked. Starting with the two holes nearest the case's open slot, a pocket screwdriver is used to push the pins towards the slot. The seam around the case's edges is eased open with one's third hand (no real force is required to ensure success here!).

With the PAC open, the position of the pcb is noted, as it can be wrongly inverted later. As before, only a little cutting and jumpering is required. The ICs are replaced, and the case halves snapped back together.

The total time for both conversions should be around two hours or less. Tools needed are a Phillips screwdriver, a knife to cut the traces, and a small iron (15-25 watts). Very highly recommended for all such work is a 20-power jeweller's loupe to really see solder joints.

## Well Worth It

The Monitor Upgrade Kit costs \$59.50; the BASIC ROM-Pac Upgrade Kit is \$69.50 (user-installed prices, with postage paid).

The instruction sheets describing Sorcerer's new operations are adequate, but they should have been supplied in booklet form for greater longevity. The author noted only one operational flaw which, when allowed for, is no real Greek tragedy: When using the monitor's new routine to search past memory location 00FFH, the contents of that memory were altered.

The source files loaded from the taped utility can be awkward to call upon. A "GO 100" is entered to get the menu and, after a file is used, an autoreturn to BASIC is made. Yet one often needs to use a file repeatedly, and each time it means a "GO 100" again. One aspect of the line re-numbering facility (block re-numbering) did not work at all on the author's conversion. Not a calamity, but...

The original ICs and the new installation sheets should be saved so that, if one of the new EPROMs ever fails, the original design can be regained if desired. □



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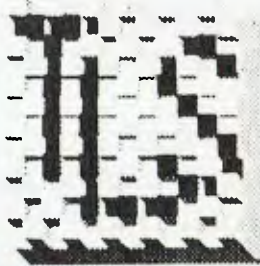
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# Nevada Cobol

*Despite the enormous popularity of BASIC and the growth of personal computers, most programs are still written in that hardy perennial, COBOL. Here's an interesting version for micros...*

WAY BACK in the 50's (remember?) the US Department of Defence and other government departments experienced a computer explosion. Transistorised computers were making their mark, but the big problem lay in the huge number of languages that were starting to appear.

At that time, we knew a lot less about language design — BASIC was just a glimmer in the eyes of Kemeny and Kurtz — and every manufacturer designed new languages to take advantage of the new whiz-bang features of each new computer (incidentally, much the same thing is in danger of happening today with whiz-bang graphics and sound on personal computers).

The result was chaos with a capital K. To reduce the problem, the DOD's technical people proposed that manufacturers should support a common language, and set about designing that language. The result, after several iterations, was recognisable as the COBOL we know and love(?) today.

We wouldn't say COBOL was fool-proof, because someone would take offence; nor would we say it seems to be designed down to meet the lowest common denominator of commercial programmers, because someone would hit one of us (probably the lowest common denominator).

On the other hand, many of the readers of this magazine are programmers by inclination, because they enjoy it, and would have little idea of the different world inhabited by programmers in large commercial installations.

In that world, each program is worked on, modified and maintained, throughout its life, by an average of *ten* different programmers. The programs are large, and operate on large files. Many programs will originally be written by a team of several programmers and analysts, and will not reflect the style or approach of any individual.

Tricky or sophisticated programming has only a limited place in this world. A program written by a hot-shot could cause horrendous problems for the average

your computer



## SOFTWARE REVIEW

programmer who has to maintain it next, so programs should work in obvious and easily comprehensible ways.

To assist in this, all programs have to be documented with annotated listings, flowcharts, operator manuals, maintenance manuals and a whole mass of other paperwork which most programmers regard as a waste of time and resent doing.

Plus, there are pressures to produce, to be accurate and effective — all accompanied by the inevitable honest-to-god mistakes, re-runs of screwed batches, and not being able to get time at a terminal to compile and test that program that was due out yesterday.

Most personal computer programmers are hot-house plants that wouldn't last a day in that world before screaming in frustration. It takes a special breed to churn out good software in that kind of environment.

In the midst of all this, COBOL works well. It's a batch-oriented, paper-and-pencil language; you write your program in your office, far away from a terminal, and once you've written it on the special coding forms, these are sent to be key-punched and compiled.

Sample runs of the program are returned first thing in the morning. Sometimes the program has screwed royally, and you have to debug it with the aid of an Abend dump, which is a printer listing of the contents of memory when your program was aborted. Other times, strategically printed variable values will let you know what's going on.

Frankly, it's a bloody miracle some programs run at all!

## The Language

COBOL is a basically simple language, based on English words. A program is made up of four **divisions**, each containing specific information.

First comes the **identification division**, which contains the program name and author.

Next is the **environment division**, which consists of two sections called the **configuration section** and the **input-output section**. The configuration section says which computer the program was compiled on, and which computer it will run on, while the input-output section, which can contain several **paragraphs**, generally describes the files used by a program.

The **SELECT** statement tells the computer what device the file will be on. Although when COBOL was first designed the devices included card readers, line printers, magnetic tape and drums, most microcomputers will only be equipped with floppy disks.

After the environment division comes the data division. Here all variables are declared — file variables first, followed by the program's working variables. COBOL uses **picture statements** to define the number of digits in a variable, whether it is numeric or alphanumeric, and so on.

Finally, the procedure division contains the program itself. The most noticeable thing about a COBOL program is its ease of understanding. Everything is spelt out, with almost no possibility of misunderstanding.

```
0001 IDENTIFICATION DIVISION.
0002 PROGRAM-ID. WRITEFILE.
0003*CREATES A FILE OF FIXED LENGTH RECORDS
0004 ENVIRONMENT DIVISION.
0005 CONFIGURATION SECTION.
0006 SOURCE-COMPUTER.
0007     8085-CPU.
0008 OBJECT-COMPUTER.
0009     8085-CPU.
0010 INPUT-OUTPUT SECTION.
0011 FILE-CONTROL.
0012     SELECT FILE1 ASSIGN TO DISK
0013         ORGANIZATION IS SEQUENTIAL
0014         ACCESS MODE IS SEQUENTIAL.
0015 DATA DIVISION.
0016 FILE SECTION.
0017 FD FILE1
0018     LABEL RECORDS ARE STANDARD
0019     VALUE OF FILE-ID IS OUT-FILE-NAME
0020     BLOCK CONTAINS 1 RECORD
0021     DATA RECORDS ARE 0-RECORD.
0022 01 0-RECORD.
0023     02 SEQ PIC 9999.
```

```

0024 02 REC1 PIC IS X(156).
0025 02 SEQ2 PIC 9999.
0026 WORKING-STORAGE SECTION.
0027 01 OUT-FILE-NAME PIC X(14)
0028 VALUE "B:RANDFILE.DAT".
0029 01 X1 PIC 9999
0030 VALUE 0001.
0031 PROCEDURE DIVISION.
0032 BEGIN.
0033 DISPLAY "Enter output file name: ".
0034 DISPLAY OUT-FILE-NAME WITH NO ADVANCING.
0035 ACCEPT OUT-FILE-NAME.
0036 OPEN OUTPUT FILE1.
0037 MOVE SPACES TO O-RECORD.
0038 BEGIN2.
0039 MOVE X1 TO SEQ.
0040 MOVE X1 TO SEQ2.
0041 ADD 1 TO X1.
0042 DISPLAY O-RECORD.
0043 WRITE O-RECORD.
0044 IF X1 IS = TO 201
0045 GO TO EDJ.
0046 GO TO BEGIN2.
0047 EDJ.
0048 CLOSE FILE1.
0049 STOP RUN.
0050 END PROGRAM WRITEFILE.

```

Figure 1 shows a short COBOL program, which simply writes 200 records to disk, creating a random access file. Note that although the organization and access mode are given as sequential in the program, this does not preclude random access by other programs as the record length is fixed.

The program starts off with the identification division, and then leads into the environment division. The compiler isn't going to do much if you claim your program is intended to compile on a Flugelstein Computer Works Q001 computer; it's there for the programmer's information.

The file control section performs a similar function to a group of BASIC's OPEN statements (except it doesn't actually open the files). In conjunction with the file



section of the data division (which is rather like BASIC's FIELD statement), this describes the file structure of FILE1, and says what the record length and fields will be.

The file section also allocates the fields of the output record, in the section beginning 01 O-RECORD. This sets up field SEQ to contain 4 digits, REC1 to be 156 characters of alphanumeric information, and SEQ2 as 4 digits.

The working storage section declares and initialises the variables used in the program: OUT-FILE-NAME is set to be B:RANDFILE.DAT and X1 is initialised to

1. The procedure division, as discussed above, is the program proper. We don't know what to say about it: it's so self-explanatory it's not funny.

A couple of points are worth mentioning, though. Line 0035, DISPLAY OUT-FILE-NAME WITH NO ADVANCING. is equivalent to the BASIC line PRINT OUT-FILE\$;. ACCEPT OUT-FILE-NAME. will input a string value to that variable, but if only carriage return is depressed, it will retain the existing value. This very neatly allows default file names to be supplied by the program.

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## Specifications and Report Card

<b>Unit:</b>	Nevada COBOL
<b>Made By:</b>	Ellis Computing.
<b>Useful for:</b>	Commercial Programming
<b>Hardware Req'd</b>	8080/85/Z-80, running CP/M

Ratings:	excellent	good	well, maybe	poor
<b>Documentation:</b>		✓		
<b>Ease of Use:</b>	✓			
<b>Functionality</b>	✓			
<b>Support:</b>	✓			
<b>Value-for-money:</b>	✓			
<b>Extras Included:</b>	Applications software book			
<b>Options:</b>	Disks of software			
<b>Review Unit from:</b>	Archives Computer Services, Qld			

ACCEPT and DISPLAY are roughly equivalent to BASIC's INPUT and PRINT, and are extensions to the original COBOL standard to allow user interaction via screen and keyboard.

### Nevada COBOL

Nevada COBOL surprised us. It is *fast*. We used the RENUMBER utility to add line numbers to a program, and it read the file, renumbered the program and wrote it out to disk again about as fast as TYPE could later list it!

The compiler itself is a multi-overlay two pass compiler, and is also pretty quick. We had thought the compiler would drag

along, wading through all that source code, but it zipped through; it was probably the fastest thing we've seen since BDS C.

The compiler generates threaded native code for the 8080 microprocessor, which is loaded with a run-time loader and support package.

Despite its low price, Nevada COBOL is a fairly useful (and complete) subset of ANSI-74 COBOL. The full language has more reserved words than anyone can possibly remember, so that most programmers probably work with a favoured subset which is pretty close to Nevada's anyway.

It includes conditional compilation of debugging statements, the copy statement for library handling, hex non-numeric literals, the record description elements PICTURE, PIC, REDEFINES, VALUE, FILLER, SYNC, USAGE, OCCURS, the picture characters A X 9 B O / V Z, . \* + - \$ CR DB, interactive ACCEPT/DISPLAY and other useful features.

Files can be random or sequential, with fixed or variable length records. Up to 12 files can be open concurrently.

To support Nevada COBOL, there is an applications software book which shows several applications, including budget planning, personal financial reporting, a precobol macro processor (written in COBOL?) and labeller.

A bonus for software developers is the Ellis Computing policy of allowing free distribution of its run-time package with distributed object code.

Our feelings previously had been that languages vary along a line of applicability. At the one end are languages that kill the programmer and are easy on the machine, at the other end are those that are easy on the programmer and hard on the machine.

We've had to change our minds about where COBOL sits on that line. The Nevada COBOL compiler generates quick code, and the language is simple and easy to use.

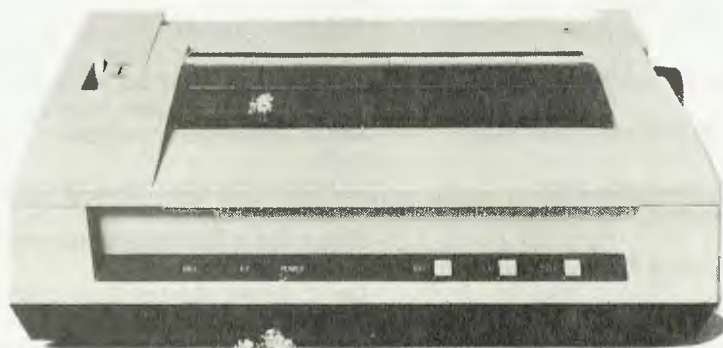
If you want a custom package written by a commercial programmer, this may be the language he should use. Already, because of Nevada's fast disk I/O, we're wishing we hadn't used Pascal for one particular project!

Versions of Nevada COBOL are available for use with CP/M, PTDOS and TRS-80 Model 1 CP/M. Our review copy was supplied by Archive Computer Services, of Brisbane.

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**Killer Satellite**, ZX80, BASIC, Your ZX80 Computer, John Batty, January 1982  
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THE RANGE of Apple games is rapidly expanding, so I've tried to review as many as I can this month.

Even if I am enthusiastic about a game I might not purchase it myself — it may be similar to one I already have.

My purpose in reviewing them is to give you an idea of what's on offer, and I do try to forget about games I already have and look at each new one individually.

## Home Business

One program that seems to have been overlooked by us in Australia is the Personal Finance Manager program put out by Apple Computer through its Special Delivery Software label.

PFM is a home budget program that allows for up to 200 entries in a year — in effect, a mini cash-book program. I have used it ever since it became available at Christmas time.

It allows you to keep detailed information on all cheque transactions, deposits, cash and credit card expenditure.

One of its powerful features is the ability to set a budget at the beginning of the year. As you spend money the program can indicate whether or not you have exceeded your budget and if so in what areas.

If you cannot allocate further funds to cover these budget excesses you can then cut back spending in other categories.

A graphical display of budget activity is possible with month-to-date and year-to-date expenditure summaries. These summaries are expressed as a percentage as well as an actual figure.

If you have any doubt about whether or not you have made an entry, paid a bill or whatever you can sort and search all data by month, entry type, budget category, amount, cheque number or whether or not you have earmarked the entry as a tax-deductible item.

This last feature is a particularly helpful one on its own, as you can print out a full report of all claimable expenditure.

All data is able to be backed up and two disks are supplied. A 48K single drive system is all you need. Price is around \$75.

## War Gaming

Strategic Simulations has released three new games for the Apple — pursuit of the Graf Spee, The Road to Gettysburg, and Shattered Alliance.

The latter is currently available in Australia for \$62.50, while the others are expected to retail for about the same.



Greg Stringer and Greg Willey are reviewing the first two, and we hope to have an extensive review for the next issue. Preliminary opinions, for those who can't wait, are good.

## More Wizardry...And Mazes

The second scenario of this fantastic game, called Knight of Diamonds, has been released in the United States.

To quote the advertisements: 'Barbarians gather, preparing to sack the city of Llylgamyn. News that the mighty staff of Gnilda has been reclaimed by its earthgod creator has travelled fast. Protected for a thousand years by the power of the wondrous artifact, and now defenceless, Llylgamyn is doomed, unless you can help!'

An in-depth review will be on the way once a copy has been secured.

Another new one, Microwave is a maze game with a difference. In it you have to move through a maze to collect various items such as wrenches, powerpacks, knives and so on. Your goal is to collect all items — at which time you can then proceed to the stairs for the next level.

The longer you take to collect these items the greater the risk of you being caught by the monsters who are multiplying. Capture, need I remind you, means instant death.

During the whole escapade there are musical routines which are very effective. When you come down to the last man and the monsters are closing in on you it's reminiscent of an old silent movie during a chase.

The more powerpacks you pickup the more Microwave beams you can set up to destroy the monsters or stop them following you. Apart from the monsters, you are advised to avoid the unexploded bombs — represented by hand grenades.

Microwave has a joystick option. Another thing I liked was the fact that

Microwave was not too difficult to start with — there is nothing worse than playing a game which destroys your confidence in the first 10 seconds (yes, I'm a poor loser!).

Labyrinth is a variation of Hyperhead On and Jawbreaker mixed with Crossfire. As in Hyperhead On you can gain points by moving around the board crossing over the small dots in the various mazes. Your goal is finding and freeing four humans trapped in rooms of the maze.

From an overview you can see all of the maze and by either the keyboard or joystick you direct the blue diamond around the maze. After you release the four men trapped an X appears on the far side of the maze; if you reach this point you descend to the next level.

You have three lives and a limited amount of firepower; you need it all. From the centre of the maze spring all sorts of undesirables such as Trappers, Scourges, and maybe a Minotaur or two.

Your mission is also to stop these aggressive individuals from destroying you. If you are successful in destroying one of them you will be rewarded by the great war god with an extra two missiles (the strong always get stronger).

As further testimony to the capitalist principle, as you get to another level you are also awarded an extra life. You will need it.

## The Snake Bytes!

In Snakebyte you control a snake that meanders around the screen. The object is to eat all the Apples, without running into yourself — and as the snake consumes more Apples it gets longer.

A good one for the kids, but not for me.

Another one for the younger members of the Apple family, being both educational and entertaining, is Duelling Digits — a superb game by Broderbund.

The aim of the game is to shoot the numbers (or operands) that are constantly changing on the screen. After you successfully score a hit the 'victim' is yours.

You have to then take the number to the bottom of the screen, where you deposit it on a line — and finally you have to use the numbers to create an equation that must be true (for example,  $34 \times 4 = 136$ , or  $235 + 34 - 5 = 264$ ).

If you complete the equation successfully you are given a score; if not, you start again.

The challenge is that you have to play against a partner (or the computer) who is also building up his score. Time is of the essence, so it is extremely useful as a



teaching aid.

Finally there is also the problem of being shot at by the opposition — he scores ten points for each hit! Each of you has ten lives.

### Conflicts And Soft Talkers

Prolific war-gamer Roger Keating, who writes locally for the international market, is at it again (he must have been a Napoleon in a past lifetime).

Roger showed me a copy of his new war game (it's now two he's working on) — he spent a day and a half developing it, but it will take another two to three months to polish it up for release! It's a one- or two-player game.

The biggest feature is that it is easy to learn the rules and play, yet the more you play the better your strategy will be. It looks like it will be a good one.

Imagineering is now importing Softalk magazine and distributing it to dealers. It

is worthwhile grabbing a copy, as it has some excellent software reviews.

### Rotten Apples

It never ceases to amaze me how owners of other computers constantly have to find faults with the Apple and ignore the failings of their own equipment (including one-eyed cats).

As owners we know more about its faults than anyone else as we have to live with them or learn how to get around them. Maybe it's the old Australian concept of knocking anything or anyone who is on the top (insecurity).

I remember one person criticising it by saying that the only good thing about the Apple was its software, expandability, and public acceptance!

Maybe Apple is 'the standard by which all others are judged'.

### Peter Who?

Finally, my cover has been blown — so

now I can have my picture in the magazine (the image is courtesy of the guys at Computerland).

Imagineering has indicated my association with City Personal Computers by nominating me and CPC as dealer of the month.

For those who might ask, I'll say it first. While I have acknowledged CPC in some of my reviews it is only because I have borrowed products from the company to review. It also gets demo copies of software before the release (like Duelling Digits) which helps me keep up to date.

Other vendors are more than welcome to send me copies to review. Hopefully I will also receive copies direct from the American software houses like Strategic Simulations has done (this is a strong hint to Gary Carlston of Broderbund!).

On the public side, any suggestions or hints or tips that I can include or act upon (except jumping) will be welcome. □

# Colouring The Apple

ONE THING that has always bothered us about the office Apple is the price of peripherals — you can spend more filling the eight expansion slots than on buying the machine itself.

It's clever marketing (something like picking up on the roundabout as well as the swings), but can be dispiriting for the new owner who thought his pride and joy could do everything.

It can be even more dispiriting when you find that Apple's parts list (locally, at least) refuses to record anything under \$200, especially when some of the items are less than the ideal. The Apple communications card is a perfect example; you can't get an intelligent communications program to run with it because there isn't an error register, and to change baud rates you have to make a hardware modification.

Most owners find out California Computer Systems' similarly priced card has all the missing features — after they've run into problems with the Apple card . . .

It's left to the aftermarket manufacturers to fill the gap, and fortunately they do, as the competition is bringing prices into line. Apple owners must cringe when they see some of the advertisements in American magazines, however, as that level of competitiveness hasn't been

seen here.

They can relax. The local influx has started. Surprisingly, though, it isn't American but British gear that is stirring the local market.

Imagineering, probably Australia's largest independent importer of Apple software and peripherals, has launched the Digitek line of expander cards at prices that, for once, seem entirely reasonable.

Digitek's 16K RAM card sells for \$112, its serial interface for \$135 and its parallel interface for \$136. It has a Z80 card for an amazing \$149, although we're a bit wary of the implications of that one — it comes without the CP/M operating system.

We've just tried the PAL card which, at \$145, would make the official Apple card look uninviting even before you realised the Digitek's output was noticeably better.

The low price isn't a result of corner-cutting, either — one of the first things you notice when you start unpacking these cards is the constructional quality. The boards are neat and well put together, with socketed chips, and the whole thing is carefully packaged with a quality manual detailing installation instructions.

It is easily installed in a matter of minutes, although we do advise you to read the instructions carefully — if you connect the video input the wrong way around, you can do some damage to the Apple's video circuitry.

It has an RF modulator on-board so you can plug straight into the family television, run direct video to a monitor, or both.

—Matt Whelan



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# Understanding Assembler — Part V

After a brief digression to talk about communications programs, this month Les returns to more general applications, such as memory fills, block moves and searches. . .

AS YOU come to write more and more assembly language programs, you will generally find there are certain building blocks that occur again and again.

These include filling a block of memory with a particular byte or pattern, moving a block of memory from one location to another, and searching for a particular word.

## Filling memory

Filling memory with a pattern has many uses. For example, many computers, such as the TRS-80, MicroBee and so on have memory-mapped video: that is, the contents of a block of the computer's memory are displayed on the screen. Clearing the screen is a matter of writing spaces into every location of the video RAM.

This is done by loading the character to be written into the accumulator and then using the MOV M,A instruction to repeatedly write it to memory. For example:

```

; Block fill routine
;
      org      0100h

start equ    0f000h      ;start of block
finish equ   0f07fh      ;end of block
char  equ    20h         ;char to fill

fill: lxi    h,start     ;h ← start of block
      lxi    d,finish+1
loop: mvi    a,char
      mov    m,a         ;store it

```

```

inx    h                ;point to next location
mov    a,e
cmp    l
jnz    loop             ;not equal, keep looping
mov    a,d
cmp    h
jnz    loop             ;not equal, keep looping
ret

```

When assembled, the code looks like this:

```

; BLOCK FILL ROUTINE
;
0100          ORG      0100H

F000 =       START EQU  0F000H      ;START OF BLOCK
F07F =       FINISH EQU 0F07FH      ;END OF BLOCK
0020 =       CHAR  EQU  20H         ;CHAR TO FILL

0100 2100F0  FILL:  LXI    H,START      ;H ← START OF B
0103 11B0F0          LXI    D,FINISH+1
0106 3E20      LOOP:  MVI    A,CHAR
0108 77          MOV    M,A          ;STORE IT
0109 23          INX    H            ;POINT TO NEXT L
010A 7B          MOV    A,E
010B BD          CMP    L
010C C20601      JNZ    LOOP          ;NOT EQUAL, KEEP
010F 7A          MOV    A,D
0110 BC          CMP    H
0111 C20601      JNZ    LOOP          ;NOT EQUAL, KEEP
0114 C9          RET
0115          END

```

This version is ORG'ed at 0100H to suit a CP/M system, but others will place it wherever convenient. In practice, however, this routine will probably form part of a larger program and will be called as a subroutine.

An alternative approach is needed when you know the start of the block to be filled, and its length:

```
; Block fill routine version 2
;
    org    0100h

start equ    0f000h    ;start of block
length equ   80h      ;length of block
char  equ    20h      ;char to fill

fill: lxi    h,start    ;h ← start of block
      lxi    d,length
loop:  mvi    a,char
      mov    m,a        ;store it
      inx    h          ;point to next location
      dcx    d          ;decrement de
      mov    a,e
      ora    d
      jnz   loop        ;de not zero, keep looping
      ret
```

Note this version is rather shorter than the first, largely because of the elimination of the compare instructions. In this case, we load DE with the length of the block to be moved, and count down from that value to zero.

The test for zero is accomplished with just two instructions (mov a,e and ora d), which will leave the zero flag set if both d and e are zero.

Block fills will work considerably faster if the transfer takes place to a 256 byte boundary, particularly if the block length is 256 bytes.

In this case, one need only start the fill with HL set to xx00, and increment it until L is 00 again.

```
; Block fill routine, 256 byte block
;
    org    0100h

start equ    0f000h    ;start of block
char  equ    20h      ;char to fill

fill: lxi    h,start    ;h ← start of block
loop:  mvi    a,char
      mov    m,a        ;store it
      inx    h          ;point to next location
      mov    a,l
      ora    a
      jnz   loop        ;L not zero, keep looping
      ret
```

Similar techniques can be applied to block fills of other lengths.

### Block Moves

Block moves are a little more complex than block fills. In the case of a block move, one usually knows either the beginning and end of the source area, and the beginning of the destination,

or the beginning of the source and destination, and the length of the transfer.

For the first case, here's a possible solution:

```
;block mover

    org    0100h

soubeg equ    0120h    ;beginning of source area
souend equ    0130h    ;end of source area
dest   equ    0f000h    ;beginning of destination

move:  lxi    h,dest
      lxi    d,soubeg
      lxi    b,souend

loop:  ldax   d        ;get character
      mov    m,a        ;store in memory
      inx    d          ;increment d
      inx    h          ;and h
      mov    a,e        ;compare bc to de
      cmp    c
      jnz   loop
      mov    a,d
      cmp    b
      jnz   loop
      ret
```

This version will move any length of block to any non-overlapping destination.

If moving a 256 byte block of data up one byte, for example, then the block move should start with the last source byte and move it to the end of the destination area, then move downwards through memory from there. A little paper-and-pencil experiment will reveal why.

If the length of the block is known, life can be made a little easier:

```
;block mover, where block length is known

    org    0100h

source equ    0120h    ;beginning of source area
dest   equ    0f000h    ;beginning of destination
length equ    20h      ;length of block

move:  lxi    h,dest
      lxi    d,source
      lxi    b,length

loop:  ldax   d        ;get character
      mov    m,a
      inx    d
      inx    h
      dcx    b
      mov    a,c
      ora    b
      jnz   loop
      ret

    org    source
    db    'The quick brown fox jumps over the lazy dog.'
```

This uses the same trick to compare bc for zero as was used in the earlier block fill routine.

A common requirement is to move 128 bytes of data. This is



particularly common in disk operating systems, which deblock longer sectors into 128-byte 'logical sectors' in a buffer, and then have to move the result into the destination area. Here is one way of doing this:

;block mover, 128 byte block

```

    org    0100h

source equ 0120h    ;beginning of source area
dest   equ 0f000h   ;beginning of destination

move:  lxi    h,dest
       lxi    d,source
       mvi    b,128

loop:  ldax   d      ;get character
       mov    a,a
       inx   d
       inx   h
       dcr   b      ;register decrement sets flags
       jnz   loop
       ret

       org    source
       db    'The quick brown fox jumps over the lazy dog.'
```

These block move routines are one easy way of displaying messages on the screen of a memory-mapped video board, for example. Of course, the exact length of the message must be known in advance, which is rather tedious. A better way of doing this is as follows:

; message display routine. Block moves a message until '00' byte encountered

```

    org    0100h

pos    equ 0f024h    ;position where message displayed

display:
       lxi    d,msg    ;point to message
       lxi    h,pos    ;point to video display
loop:  ldax   d      ;get char
       ora    a      ;test for zero
       rz     ;return if zero
       mov    a,a    ;else store in display
       inx   h      ;increment hl
       inx   d      ;and de
       jmp   loop    ;and do again

msg:   db    'The quick brown fox jumps over the lazy dog.'
       db    0
```

This is just a special case of a more general problem, that of finding a particular character.

Without the instructions involving the hl register pair in storing characters to video, this routine could be used to search through a character string looking for a particular character. When the routine returns, hl is pointing to the character.

Typical modifications of this routine would include skipping over a number of letters to find the space that marks the end of a word, or searching for particular characters.

Next month, we shall move on to string searching and pattern matching.

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# your ZX81 computer

By David Brudenall

IT IS becoming a habit of necessity amongst 16K ZX81 (and ZX80!) owners to record safety copies of programs at intervals during the typing in of the program, especially if it is a lengthy one.

This is usually necessary because the ZX81 or ZX80 with RAM pack attached is prone to sudden inexplicable crashes, which are the source of much frustration and misery amongst ZX owners.

This brings me to a tragic tale which occurred recently: I was in the process of typing in a rather long program, and was just about half way through it when I decided that it was about time I executed a safety dump to cassette. I dug out a cassette, and just as I was about to load it into the recorder I rather clumsily dropped it onto the ZX81's keyboard. Presto! Instant crash.

The jolt must have loosened the connection between computer and RAM but anyway I was left facing a blank screen, and no amount of cursing or thumping of the break key would reproduce my program. And so ended that night's computing effort — I went and read a book to console myself!

No doubt almost every 16K ZX81/80 owner could tell a similar, or worse, tale. These extremely annoying system crashes are one of the most common complaints, second only to tape loading difficulties.

There is a wealth of cures to the problem of ZX crashes, everything from rubber mats between computer and table, to prevent static discharge, to solder on the PC board's edge connector 'fingers', to supporting the RAM pack on a piece of cardboard.

Likewise, there are hundreds of different 'curses' to aid loading programs from cassette to computer. I have found, however, that the volume setting on the cassette recorder is far more critical than the manual lets on.

When loading a program into your ZX81 turn the television's sound on, and adjust the volume level on the cassette recorder until the clearest, sharpest sound is heard. Always record a program at least twice (preferably three times) on a cassette, in case the first one doesn't work. Also, ensure that the tape recorder's heads are clean (that's a must!), and de-magnetised, if possible. Lastly, make sure you have a good connection between computer and cassette recorder (check the plugs aren't loose, and so on).

ZX80 owners may find the above hints will apply to them, too.

As promised, it's club plug time, and so

I'll tell you a bit about AZUA's history and activities.

AZUA (The Australian ZX80/81 User's Association) was established around July/august last year, and the first issue of its newsletter, consisting wholly of ZX80 material, was launched in September.

Since then the club has grown considerably, and in February 1982 we featured the new ZX printer in the newsletter. Inevitably, over the months, the old ROM ZX80 has taken a lesser and lesser share of AZUA's pages, but thanks to a handful of unflinching 'Old Faithfuls', ZX80 programs still appear (thank goodness!).

The club itself is run essentially by only two people: the assistant editor David Vernon and myself (editor). Regular (or almost) features of the newsletter are: reviews (software), programs (of course!), an editorial, and the latest in gossip columns, 'Dimensions', hosted by David Vernon.

The usual issue is about 12 or so A4 pages in length. If you're interested, send a 30c stamp (for postage) to: AZUA, 19 Godfrey Street, Campbell ACT, 2601, and you will get one of our highly acclaimed introductory issues.

Now on to this month's program. This one is a mini-adventure, 'The Caves Of Krull', and you'll need a ZX81 or ZX80 with the update 8K ROM, and at least 4K RAM.

The idea of the game is to venture into the mysterious caves, then escape with as much treasure as you can without being killed by the assortment of ghastly monsters that have taken up residence there.

Note that the only way to get treasure is to kill monsters. Every time you fight with a monster it's likely that the monster will wound you somewhat, so Hit Points are deducted. Once your hit points reach zero you're dead.

After you've typed in the program, RUN it, and an inverse 'L' will show up in the bottom left-hand corner. At this stage you must input these numbers, pressing NEW LINE after each one:

3 31 33 31 30 33 22 12 22 21 13 21 30 10  
20 33 12 12 1 20 13 2 1 3 11

Now you can play the game. As soon as it is finished, don't play another one — input N so the program stops and delete lines 30, 110, 120, 130 and 140.

Now SAVE the program and in future use GOTO 1 instead of RUN, or you will lose all the variables above that you have just put in.

Just one last thing: when you're inputting the numbers, make sure you do it in

the order shown, or else the game won't work. Don't leave any out, either (there should be 25).

```
DAVID BRUDENALL 12-3-82
SAMPLE RUN:
*****THE CAVES OF KRULL*****
INPUT YOUR WEAPON
```

```
-----CLS-----
YOU ARE AT THE ENTRANCE TO THE
CAVES OF KRULL.
YOU CAN GO...
```

```
-----CLS-----
YOU ARE ENTERING A DARK PASSAGE.
TO THE WEST YOU CAN SEE THE GLOW
OF DAYLIGHT. TO THE SOUTH YOU
CAN'T SEE A THING...
A BATTLE-VALKYRE ATTACKS YOU.
DO YOU ATTACK (A) OR RUN AWAY (B)?
(JUST PRESS APPROPRIATE KEY.)
```

```
-----CLS-----
YOU ATTACK WITH YOUR AXE
-----CLS-----
YOU WON.
YOU GET THE TREASURE WORTH
$1683
YOU CAN GO...
```

```
SOUTH
WEST
-----CLS-----
YOUR FOOTSTEPS RESOUND EERILY
THROUGHOUT THE DARK PASSAGES...
YOU CAN GO...
```

```
NORTH
SOUTH
WEST
EAST
-----CLS-----
```

```
A SMALL, TIMID GNOME ATTACKS YOU
DO YOU ATTACK (A) OR RUN AWAY (B)?
(JUST PRESS APPROPRIATE KEY.)
```

```
-----CLS-----
YOU ATTACK WITH YOUR AXE
-----CLS-----
YOU'RE DEAD. TOUGH LUCK.
```

```
YOU MANAGED TO ACCUMULATE
$10600 IN TREASURE, BUT
IT'S NO USE TO YOU NOW.
ANOTHER GAME? (PRESS Y OR N)
```

```
-----CLS-----
THE SMALL, TIMID GNOME
SAYS GOODBYE.
```

```
10 REM *****CAVES OF KRULL****
20 REM **BY D.BRUDENALL**
30 DIM A(25)
40 LET L=1
45 LET G=10
50 LET T=0
60 LET H=10
70 DIM U(10)
80 FOR I=1 TO 10
90 LET U(I)=INT (RND*25)+1
95 IF U(I)=1 THEN GOTO 80
100 NEXT I
110 FOR I=1 TO 25
120 INPUT A(I)
130 PRINT A(I); " ",
140 NEXT I
150 PRINT "*****THE CAVES OF
KRULL*****"
160 PRINT
170 PRINT "INPUT YOUR WEAPON"
180 INPUT U$
190 CLS
200 IF L=1 THEN PRINT "YOU ARE
AT THE ENTRANCE TO THE CAVES OF
KRULL."
210 IF L=2 THEN PRINT "YOU ARE
ENTERING A DARK PASSAGE. TO THE W
EST YOU CAN SEE THE GLOW OF DAYLI
GHT. TO THE SOUTH YOU CAN'T SE
E A THING..."
220 FOR I=1 TO G
230 IF L=U(I) THEN GOTO 1000
240 NEXT I
250 IF L<>1 THEN PRINT "YOUR FO
OTSTEPS RESOUND EERILY THROUGH
OUT THE DARK PASSAGES..."
```



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```

500 IF L=1 AND T=0 THEN GOTO 300
505 PRINT "YOU CAN GO..."
510 PRINT
530 LET Z=A(L)
540 LET NS=INT(Z/10)
550 LET EU=INT(Z-NS*10)
560 IF NS=0 THEN GOTO 590
570 IF NS<3 THEN PRINT "NORTH"
580 IF NS>1 THEN PRINT "SOUTH"
590 IF EU=0 THEN GOTO 620
600 IF EU<3 THEN PRINT "WEST"
610 IF EU>1 THEN PRINT "EAST"
620 PRINT
630 PAUSE 4E4
640 POKE 16437,255
650 LET D$=INKEY$
660 CLS
670 LET D=CODE D$
680 IF D=51 THEN GOTO 750
690 IF D=56 THEN GOTO 780
700 IF D=60 THEN GOTO 810
710 IF D=42 THEN GOTO 840
720 PRINT "SORRY, I CAN'T UNDER
STAND YOU TRY AGAIN..."
735 PAUSE 200
736 POKE 16437,255
738 CLS
740 GOTO 500
750 IF NS=0 OR NS>2 THEN GOTO 6
70
760 LET L=L-5
770 GOTO 300
780 IF NS=0 OR NS<2 THEN GOTO 6
70
790 LET L=L+5
800 GOTO 300
810 IF EU=0 OR EU>2 THEN GOTO 6
70
820 LET L=L-1
830 GOTO 300
840 IF EU=0 OR EU<2 THEN GOTO 6
70
850 LET L=L+1
860 GOTO 300
870 PRINT "VERY SORRY, BUT THER
E'S NOWHERE FOR YOU TO GO IN THA
T DIRECTION."
880 PAUSE 200
890 POKE 16437,255
895 CLS
900 GOTO 500
1000 LET K=INT(RND*5)
1010 LET A$="VAMPIRE"
1020 IF K=1 THEN LET A$="GIANT"
1030 IF K=2 THEN LET A$="TROLL"
1040 IF K=3 THEN LET A$="BATTLE-
VALKYRE"
1050 IF K=4 THEN LET A$="SMALL,
TIMID GNOME"
1060 PRINT "A ";A$;" ATTACKS YOU
"
1070 PRINT "DO YOU ATTACK(A) OR
RUN AWAY(B)? (JUST PRESS APPROPRI
ATE KEY)"
1080 PAUSE 4E4
1090 POKE 16437,255
1100 LET N$=INKEY$
1110 CLS
1120 IF N$="B" THEN GOTO 1300
1130 PRINT "YOU ATTACK WITH YOUR
";U$
1140 PAUSE 300
1150 POKE 16437,255
1160 CLS
1170 LET H=H-INT(RND*4)
1180 IF H<1 THEN GOTO 2000
1190 PRINT "YOU WON."
1200 LET E=INT(RND*2000)+500
1210 PRINT "YOU GET THE TREASURE
WORTH ";E
1220 LET T=TIME
1230 LET G=G-1
1240 GOTO 500
1300 LET J=RND
1310 IF J>.6 THEN GOTO 2000
1320 LET L=INT(RND*25)+1
1330 PRINT "WELL DONE - YOU ESCA
PED - BUT NOW YOU'RE LOST..."
1340 PAUSE 200
1350 POKE 16437,255
1360 CLS
1370 GOTO 300
2000 PRINT "YOU'RE DEAD. TOUGH L
UCK..."
2010 PRINT
2020 PRINT "YOU MANAGED TO ACCUM
ULATE ";$;" T;" IN TREASURE, BUT"
"IT USE TO YOU NOW."
2030 PRINT
2040 GOTO 300
3000 PRINT "YOU HAVE ";T;" IN T
REASURE."
3010 PRINT
3020 PRINT "YOU HAVE ";H;" HIT P
OINTS LEFT. DO YOU WANT TO ENTER
AGAIN? (PRESS Y OR N)"
3030 PAUSE 4E4
3040 POKE 16437,255
3050 LET N$=INKEY$
3060 CLS
3070 IF N$="Y" THEN GOTO 505
3080 PRINT "ANOTHER GAME? (PRESS
Y OR N)"
3090 PAUSE 4E4
3100 POKE 16437,255
3110 LET N$=INKEY$
3120 CLS
3130 IF N$="Y" THEN GOTO 1
3140 PRINT "THE ";A$
3150 PRINT "SAYS GOODBYE."
    
```

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# your TRS-80/SYSTEM 80 computer

R.G. Stevenson

THERE IS a continuing flow of inquiries about the success of the extra 32K I have in my keyboard (making a total of 48), and the potential problems predicted.

The theory is that heat and inability of the power supply to cope will overcome its reliability.

In the almost 12 months I've had it, the only problem has been a faulty RAM chip which went bad soon after installation. But then this can happen any time, whether in the expansion interface, keyboard, or wherever. Even in our past hot summer I had no problem with heat (although I wasn't using it on the extremely hot — 45 degrees C — days.

I've always had a degree of heat from the vents at the back of the keyboard, and any increase is not readily noticeable to the hand. Certainly there is no heat generated from the underneath slots as some have theorised — indeed, I keep a 'prompt' card under it for addresses and the like so I don't clutter up my tiny mind with such trivia!

My particular unit is just the extra chips piggy-backed onto the existing RAM, with the extra decoder similarly fitted and connected as necessary.

I do know there are various schemes around: the reason for selecting this way was that it is virtually a duplication of the circuitry in an expansion interface, and thus seems logically appealing.

I imagine any of the others will be just as reliable, although necessarily more expensive. If you install the chips yourself this way you should have change from \$70.

There is a theory that having the memory in the keyboard is more reliable because of the lack of connecting cables, but whether this is academic or real is beyond me. I do know though that there are some who choose to go this way even though they do have an expansion interface.

Possibly what is seen as a power-interface problem that causes disks to reboot is in reality a memory problem — the CPU may just 'get lost' if it can't access the necessary memory.

The many I know who have this trouble have cleared it absolutely by installing gold contact on the keyboard edge-connector. I've not done so myself, but I have filtered the power to the printer (Olivetti typewriter) and interface separately from the CPU to fix the extra characters that were being sent to the printer; simply toroids and capacitors stuffed in the back of a Kambrook power block.

Another question often asked is why do

I want 48K when I don't have disk? And, doesn't it take too long to load from tape?

The whole thing that is overlooked until you're in the fortunate position of having memory to spare is just that — it *is* spare. What I find extremely useful is to be able to scatter utilities through it to enable me to debug more easily.

Or do *your* programs always work perfectly first time? When 'fiddling' assembly (and even most of my BASIC has assembly routines) I find it most useful to have in memory together such things as: EDTASM+ without having to squash ZBUG to preserve memory; MON-3; DBUG (not the Tandy one, a really excellent debugger from Intersoft, distributed by Micro-80) as well as the machine code I've loaded into memory.

For BASIC use I add PACKER, and RNMD. Yes I know some of these have overlapping facilities, but with plenty of memory I'm able to use what I consider the best (and easiest) routines from each.

All this has been in answer to the continuing flow of questions I've had on the same subject. Others I've answered privately, so if you've a need, don't hesitate. My address is on the Clubs page — and it is nice to find that I do have a reader!

## The Best Assembler

EDTASM+ is readily acknowledged as the best assembler currently available in Australia for tape-based TRS Systems.

But the facility for assembling into memory seems to be a common ground for misunderstanding. While certainly it will provide its own ORG, and one can find out where it will be by the 'O' command, it is also possible to provide a manual ORG, then assemble into memory by setting the switches 'IM/AO'. I always do this so at least when it bombs I know where to find it! But, seriously, if you're going to record it on a tape as a SYSTEM file, presumably you'll want it at a particular place for later use?

The other point not appreciated is that it won't assemble into the operating system, even though there is RAM there, and a SYSTEM program will load there. If you try you will get a 'bad address' message. So I think you will just have to live with this and do it via a tape-load, having excited EDTASM by 'B'. Of course you'll still have EDTASM with the source code intact to go back to — as you'll know if you've read the manual the entry-point with text is 17283.

Why would one want to assemble into the operating system? The obvious reason is to intercept the keyboard scan at 4016H, but there are others. More of this later.

## Academics And Logic

Perhaps the fact that computing is a technical-type hobby is the reason it seems to abound with academic advisors and practitioners. Or perhaps it's a failing of mine that I'd rather produce code (assembly or BASIC) that works than looks pretty and follows machine-logical rules that are human illogicalities.

I consider the computer is the ideal one to be doing the routine 'hack' work, not me.

An example: My favourite way of accessing a machine language routine from BASIC is to keep it in a string (or dummy REM statement to make it system-independent) and use VARPTR to find out where it is before calling it.

To do this I create a string by ...FOR I=1TO???: READ A\$:A\$=A\$+CHR\$(D):NEXT... which neatly gets the values out of a DATA line and builds a string.

The academic objection is that it may invoke 'the garbage collector' into operation when string space approaches fullness. Perhaps it does, but the extra second or two I've not noticed, and the ease of the concept and indeed the coding is worth it to me anyway! But then I don't enter in computer time-trials such as some clubs conduct. Not that I berate such events at all, just that I think such refinements are nothing but confusing to the beginner who's trying to grapple with this new Beast and its BASIC language.

Another example: counting from zero instead of one. Yes it's true that computers do, which is their nature, but we humans don't, which is also our nature! So at the expense of a lost number, I avoid creating a potential trap for myself.

It seems to me that this is the whole basis of the argument as to whether the next century will start in 2000 or 2001. Did our present calendar system start on January 1, 0000, or January 1, 0001? Actually neither, because of people 'messing' with it and introducing new calendars in the middle-ages.

But if we don't even know what year it is, how much more likely is the trap of starting to count at zero? Yes, I know assemblers (including myself) start counting at zero, but generally a beginner does not dive right into assembly, so he has a real 'feel' for things computing by the time the zeros approach.

Yet a further example is the use of integer numbers just for the academic reasons that they're quicker and save memory — they do, but the legibility suffers.

And I won't repeat here my earlier advice about using meaningful variable



names to make your code readable to others — and to yourself at a later date.

### Using Flow Charts

No, I don't use flow charts, either for BASIC or assembly. What I do use is pseudo-code — an English description of what is to be done by the code I'll write.

The reason for bringing this up here is the seemingly large number who have guilt-feelings because they don't use flow charts, and who struggle to make things harder for themselves because they think they ought to.

I'd suggest that if you must have a flow chart, for whatever reason, draw it after your program works by your usual writing method. But naturally if you do use flow charts in writing, rejoice in your ability.

### Why Talk Hex?

This is another question I'm regularly asked; let me admit right here that I don't know. I do know that it's not very satisfactory to say that we do because we find it more natural and when one gets to a certain stage one just makes the transition into fluent hexadecimal speech.

Certainly there are lapses into decimal, when it is natural to do so — such as addresses that must be input (in level two anyway) as decimal. I do know it can be most annoying to have someone ask 'what's that in hex?', but believe me it's not just a display of false superiority.

I could give all sorts of valid reasons: it's easier to remember hex than decimal; hex is closer to binary than decimal; hex is absolutely necessary for an understanding and appreciation of some (a lot) of the finer points of assembly.

But the real explanation is that when you're ready you will; remember this when someone asks you 'why talk hex?'

### Winning At Lotto?

Lotto number generating programs are probably the most common firsts to new computerists, so I won't list one here.

Indeed, the only variation seems to be the method of checking for generation of the same number within the same game. Probably the simplest I've seen is to use an array to hold each number as it is generated, then check if that number regenerates (such as ...X=RND(40) : IF

A(X)=0 THEN...(continue, else generate another).

But really, what brought this subject up was the number of times we've all been asked to have our computer predict a winning sequence (even if it was possible, who'd want to take the gamble out of it?).

The answer lies in a study of probability, not of computing. For, unless there is something 'irregular', every number has an equal chance of being picked. The fact that the number next to it has been previously picked doesn't at all lessen its chances.

As humans, we'd regard with suspicion a sequence such as 7, 8, 9, if presented as a random one. But indeed 16, 16, 16, can be a perfectly valid random sequence. All of this goes to explain that our computer is not some magical machine — it simply does what it's told!

If you find this subject intriguing I'd suggest a study of your local library's books on probability. Would one think that when 25 people are chosen at random there is a better than even chance that two of them will have the same birthday (not the same age, though)? □



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**THE S100 SPECIALISTS**

# your PET computer

By Errol The Cat

I HAVE been in a state of euphoria since finally receiving my VIC-20. Oh, what joy! What masters of genius are our Commodore friends. Truly, this would have to be the best value micro on the market today.

I'm sure many of you have read the VIC reviews and noted all the technical specifications. I shall not bore you by going into these details again.

The VIC comes complete with RF modulator, power supply, cables and operation books. The instructions are concise and easily understood — even for my simple feline brain.

The manual would have to be the best I've seen for a long time. It gives a step-by-step instruction on the various wonders of the VIC with little programs for you to input and see the miracles in action.

Perhaps the VIC's only limitation is its 22 by 23 screen display. Rumour has it, though, that Commodore is producing a ROM which will alter this to 40 by 24. I personally don't find the existing screen limiting and there are some sneaky ways of getting around it.

There are a variety of programs available in both tape and cartridge form — mostly games and a few applications. Some local software houses are developing VIC programs like EBS (Dubbo) which has a Debtors System/data Capture program and BS Microcomp (Melbourne) which has the CASS File (a small record-keeping system).

The applications packs are very good — the Programmers Aid Cartridge (a programmer's toolkit), Super Expander which gives High-Resolution capabilities, and the Programmable Character/graphic Editor tape.

All in all, there is more than enough to keep the average Cat occupied for some time and as the VIC has been so successful overseas, we should see a wide range of software reaching Australia soon.

The VIC Datasheet with counter (an improvement on previous Commodore cassettes), the VIC single disk drive with 170K capacity and the VIC printer (80 column, 30 cps) are good value add-ons and come complete with cable connections.

At the back of the VIC is an expansion port for one cartridge. This can be either a game pack, memory upgrade or interface cartridge. If you want to access more than one cartridge type, you must get the VIC Expansion Board which allows you six extra slots.

I will say no more on the VIC for the moment. Suffice to say I'm rapt and be-



lieve the VIC is a must for any computer learner.

## New PET Treats

I recently met a lovely couple — Mr and Mrs John Kyle-Price. John is responsible for the new 'Silicon Office' Business Software Package.

The Kyle-Prices came from good old Pommie Land. John is a founding partner of the famous Bristol Software Factory and created the OZZ Data Management Package.

Silicon Office uses the Commodore 8096 System. It is a complete business package incorporating word processing, record keeping, communications and user programming capability which links everything together.

This user programming allows anyone with a minimum of computer know-how to set up specific programs. Hence, you can include accounts, payroll, statistical analysis, stock control and so on to your own specifications within the one package.

The program is contained on two standard floppy disks and comes complete with two of the largest manuals I've ever seen for one package. There is no way anyone can say they don't have enough documentation.

Once loaded the program disk may be removed, enabling database disks to be inserted and worked on. The result is that without moving from the machine the operator can, for example, enter and invoice a week's sales (while each customer's record and company stock files simultaneously adjust themselves), calculate and print invoices, check for overdue debtors, print and send repeat

invoices, noting the fact on their records, edit, address and print form letters with address labels to accompany the invoice...in short, one complete and comprehensive book-keeping operation, updated and cross-adjusted.

When the operator has finished, the machine may be plugged into a telephone and the entire day's transactions transmitted to another 8096 Silicon Office System anywhere in the world. To complete the same amount of work previously, even with computer help, an operator would have to change software packages many times.

The Silicon Office word processor is a real beauty. Naturally, it includes all the usual word processing features but for the first time on Commodore you have multiple-column on-screen formatting with each column justifying itself independently of others. There is also a provision for letter-spacing within the justification, so that instead of blocks of white space between words in a given line, the letter-spacing is extended slightly to decrease the spacing impact on the eye.

Silicon Office is very much a total package and a forerunner of its kind for future business software. It took John two years to complete and, incidentally, two months of that time was spent solely on software protection.

The package is being successfully marketed in Europe and the States. The Kyle-Prices believe Australasia is an important market for their product and have made two trips to date to support it. Such support is unusual from an overseas software supplier and an action which I thoroughly applaud.

Silicon Office is not cheap — it costs \$1500 — but if you think of how many individual packages you would need to buy to achieve the same results, it becomes a cheap alternative.

Do go and see Silicon Office at your nearest Commodore dealer. Even if the package seems too vast for your needs, just seeing it gives you an insight into what can be done with a micro.

## Catty Comments

Big Brother has clamped down on Student Exemption Certificates — no computer can be bought by a student ex tax for any reason. Now that computers are affordable by most, the software cost is ridiculous. Truly "life wasn't meant to be easy"!

The great battle between Commodore



and the PET inventor, Chuck Peddle, is going well for Commodore. Poor Chuck had to return \$4 million worth of shares. It must be getting Sirius.

Some Commodore well wishers sent me the enclosed letter:

*Dear Sirs, here are some useful tips for Tandy computer users — Sandringham Tip, St Kilda Tip, Lower Plenty Tip and Frankston Tip. Signed, Peter Pot.*

Some people have a strange sense of humour.

I've recently been given some goodies to examine by people who help to make the Commodore product even better for you, the user.

## PETDISK II

John Guidice of The Microcomputer House in Sydney imports the PETDISK Series. PETDISKS come in a variety of sizes from the 540 13cm single drive, single sided, double density 143K unit to the 877 dual drive with 590K using 20cm floppy disks. I had the 540 model to play with.

The first surprising point upon unpacking a PETDISK is how light and compact the unit is. The second is the manual, which is very explicit and intelligently written.

First, you have to install the plug-in interface to get your disk operating system. This does not interfere with any feature of your Commodore. You remove one of the BASIC ROM Chips and place it in the interface board. Then you position four wires with clips into place, plug the interface into the empty ROM socket and you're off.

The operating system uses 2K of your computer's memory and you can have up to three drives hooked on simultaneously.

The system disk must be in Drive 0 when you start up; a simple SYS command activates it. You have a choice of two command sets — the BASIC set uses load, save and so on with each command preceded by an exclamation mark, while the other set is the machine language monitor DOS.

The PETDISK supports relative, sequential and index sequential files. You can also make backups easily even with just the one drive unit. The copy disk utility lets you specify Drive 0 as both the source and destination drive. The computer loads the disk into memory, then writes it back once you've inserted your new disk.

I guess the most amazing feature of the

PETDISK is its speed. We ran a little test, timing how fast it would save 64K of data.

The PETDISK did it in 5.6 seconds — compared to 90 seconds on the Commodore 8050 IBM drive and just over six seconds on our 12 megabyte Winchester Hard Disk!

It's fast because the PETDISK doesn't have to go through the IEEE port — it loads directly into memory. The format is IBM and that, in a vague way, is its only downer because it does not support Commodore-written software.

I was skeptical when John gave me the PETDISK, having been biased towards the Commodore 2031 single drive. Boy, did I get a surprise. The PETDISK is ideal for the hobbyist, and it's cheap. So ring John Guidice on (02) 699 6797 or talk to your local Commodore dealer.

## VIC Software

Your favourite magazine sent me some VIC software to peruse which made a potentially dull weekend into a fun one.

The seven games and the one application program came from VIC Soft in Gosnells, WA. I believe VIC Soft has about 100 titles on cassette — haven't they been busy bees! I'll make a brief synopsis of the ones I saw.

**Seawolf:** Is a 'shoot-em-up' game. You, the submarine, try to sink all the battle ships that go across the screen. Someone commented that they might like to change the name to 'Falkland Islands'.

**Minefield:** Written in BASIC, is a game of logic. By following the computer's clues, you stealthily pick your way from one end to the other of a highly flammable minefield.

**Super Lander:** Is not as the Commodore VIC cartridge but more like Lunar Lander. You have to guide your craft into a number of landing areas.

**City Bombers:** Uses some clever graphics. The object is to flatten a city with bombs before you collide with the tallest building.

**VIC Trap:** Is like Wrap Trap but assumes you have a joystick which I didn't so I couldn't play it.

**Alien Blitz:** Is a cleverly written machine code Space Invaders. I say clever because the writers fit it into 3.5K.

**VIC Cube:** A Rubic's Cube simulator. I haven't mastered the original yet so had no success here. I enjoyed trying.

**ViCalc:** This calculator program gives a number of memory spaces which can be displayed simultaneously. By using vari-

ous commands, you can quite easily do reasonably complicated calculations such as compound interest and mortgage.

ViCalc was the only program with an Instruction Book. However, you don't really need one with the others. All the programs loaded up first time — a pleasant change.

The games all use the VIC's colour and graphics to full effect and I was well pleased with my entertainment. Pity I had to send them back. I guess I'll just have to buy my own.

## The Programmer's Toolkit

Someone thought I needed some help with my programming.

I've come a long way from the days when my first program consisted of PRINT "HELLO FRED" x 10. The intended result was ten lines of HELLO FRED, instead I got a zero. I had better luck with a 'fori=1to10' and a 'next' statement. But gees, it's a drag ferretting through all those syntax errors, renumbering the lines, finding a string, and so on.

It was my birthday in April (I was one year old), so I got a programmer's toolkit. I might have preferred some fresh fish but it's been very therapeutic using the extra 10 commands my toolkit gives me.

I now have at my fingertips AUTO, DELETE, RENUMBER, APPEND, DUMP, FIND, STEP, OFF, HELP and TRACE. The toolkit fits snugly into an empty Commodore ROM socket and is enlivened by a SYS command.

My programs have definitely improved in content and speed and so should yours, regardless of what type of PET you have. The programmer's toolkit should be available from your local Commodore dealer.

## More Catty Comments

Who has egg on its face? Yes, Commodore has done it again with a little power pack hang-up. There are some ropable dealers about!

As yet the sales tax folk are unresolved about software. Seems some enterprising computer people confused them with technical jargon after they recently claimed all off-the-shelf software was always subject to 17.5 percent tax. The matter is being referred to Canberra — we respectfully await their deliberations.

Who said Commodore dealers were mundane? One Tasmanian is a candidate for the State Parliament. It just goes to prove that all politicians are salesmen at heart.

# your TI 99/4 computer

By Shane Andersen



WITH THE TI99/4A computer soon to be released in Australia (hopefully late June), the users' groups have decided to conduct a nation-wide incentive program to get more software for Australian users.

As of the June 1, we are conducting our members' 1982 National Software Awards.

Every entrant will be a winner, and will receive a diploma showing they contributed software for this event. Plus the winners of the three sections will receive a number of other prizes, and we will arrange to have their winning entries distributed commercially both in Australia and overseas.

The three sections are:

- Business Programs (such as record keeping, filing, personal finances, home management).
- Brain Games (educational/thought-provoking games).
- General Games (any type, such as/or similar to arcade games).

The judging will be done in Sydney in late October. The competition will close on the 10th of that month.

The judges (city co-ordinators) would envisage that better programs would use the full capabilities of both the 99/4 and 4A computers, like graphics, sound, speech, joysticks, and/or printer. Both TI-BASIC and Extended BASIC programs are acceptable.

The rules for this competition are:

- 1) Programs taking up all of the standard memory must have complete and understandable documentation, otherwise instructions are to be included into the program.
- 2) All programs should include REM statements (single line) stating briefly what each section of the program does.
- 3) Only TI-BASIC or Extended BASIC can be used for this particular competition, but the use of Pascal, Assembler, 108

logo or forth can possibly be used in next year's National Software Awards.

4) Software should be on either cassette or diskette, and should be accompanied with a printout of that program. If the author does not have a printer, he/she should contact their local city co-ordinators, who will provide them with such.

5) Everyone who is a member of the Australian network of 99/4 user groups may enter, and this includes the co-ordinators. However, during the judging, a co-ordinator shall not judge his or her own work.

6) Judges decisions are final, and no correspondence shall be entered into.

Application forms can either be obtained from each of the city co-ordinators, or from the national co-ordinator (yours truly), at PO Box KX101, Kings Cross, NSW 2011.

We are looking for a good response to the 1982 National Software Awards, and we believe it will be a good way to encourage our members to write programs.

## Weight Control And Nutrition

I recently had the pleasure of sampling a new diet module for the 99/4 computer; in fact I think I could really put this one to good use. With a body which is about a stone overweight, I set out to give this product a real going over.

This module (ROM pack), adds 30K of memory to the computer and works in conjunction with a printer which will provide you with a print-out of a diet covering three meals a day plus snacks, for a complete week (for the duration of the diet until the required weight is lost).

The computer asks for your name, sex, actual weight, date, target weight, target date, and then a huge variety of different kinds of foodstuffs are supplied for you to either say yay or nay to, depending on your taste — there must be about 100 different types of meals in six categories.

The computer will then tell you the recommended calorie consumption plus the target consumption.

The Weight Control and Nutrition program provided me with a complex daily diet, and the beautiful thing about this program is that you can eat just about everything you like, and the computer will tell you how much and how often you can have what you like, and still lose weight in the process.

The meals suggested by the program are nutritious, although they're not designed for those with special dietary requirements, and the recipes demand a

chef who is willing to venture into the unknown.

Fortunately the deviations from standard diet fare are pleasant. All in all, the program is easy to follow and average weight loss is about two pounds a week.

Diet data (how much weight is lost, new menus, and so on) is entered weekly and can be recorded on cassette or disk. Quick copies of the recipes and menus can be printed (for the refrigerator door, of course!).

This module retails for just under \$60 and is well worth the outlay.

NAME: SHANE A.

SEX: M

ACTUAL WEIGHT: 187 LBS

DATE: 04/18/82

AGE: 33

HEIGHT: 5 FT 11 IN

TARGET WEIGHT: 177 LBS

TARGET DATE: 06/28/82

RECOMMENDED CONSUMPTION:  
2393 CAL TO 2570 CAL

TARGET CONSUMPTION:  
1981 CAL

ENERGY REQUIREMENT: SHANE A.

AT YOUR CURRENT WEIGHT  
AND LEVEL OF ACTIVITY, YOUR  
BODY USES ABOUT 2393 TO 2570  
CALORIES EACH DAY.

TO REACH YOUR TARGET OF  
177 LBS BY 06/28/82, YOU  
SHOULD CONSUME ABOUT 1981

CALORIES EACH DAY.

SHANE A. MENU TOT  
BREAKFAST REVIEW 534  
SUNDAY

\*FOOD ITEMS\* PORTION # CAL  
ORANGE 1 MED 1 63  
LOWFAT MILK 8 OZ 1 120  
BACON 2 SL 1 85  
WHOLE WT BREAD 1 SL 2 140  
COOKED GRITS 1/2 CUP 2 126



# market directory

## ZX Disassembler

This incredibly fast, compact and versatile machine-code program will decode any specified area in memory (RAM or ROM) to the standard Z80 instruction mnemonics.

The ZX Disassembler is an invaluable programming aid for the ZX81 (or ZX80 w8K ROM) which speeds up the development and debugging of any machine-language program.

A self-loading utility that occupies only 2K of protected memory, this amazing disassembler allows optional control of the ZX Printer, and can coexist with any BASIC program — a must for ALL ZX80/81 owners!

The program is supplied on cassette, and includes comprehensive documentation, for only **\$19.50** (incl P+P) from:

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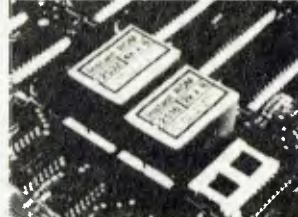
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I'VE BEEN stuck on my back in hospital for several days after an operation and I decided to use the time to review some of the computer text books that have influenced me over the years.

I pick up on a lot of good ideas that I'd forgotten but there was one outstanding one. Its from the book *Elements of Programming Style* by Kernighan and Plauger (McGraw-Hill), an excellent book but hard going if you don't understand FORTRAN or PL/I.

The book is a discussion of what makes good programming style and has many, many examples of both good and bad style.

One test the authors suggest can be applied to any code is the 'telephone test'. The basic premise is that if the code is clear and concise it should be easy to read out loud to someone else who is familiar with the programming language used.

Well, I decided to try out the 'telephone test' on some of my code. The results were interesting though hardly surprising in one respect.

I found that most of my assembler code was okay, most of my C code was also okay as was my CBASIC/CB80 code; however, the great proportion of code written in Microsoft BASIC failed the test badly, even when I had tried to write the MBASIC code in a reasonably structured way.

The next move was to attempt to rewrite the MBASIC code to make it pass the test but after spending a considerable amount of time I abandoned that experiment as a lost cause.

The conclusion: it seems clear to me that languages that truly support structured programming will 'lead' you into writing clearer code, even if you don't put a lot of conscious effort into it. Languages that inherently don't support structured coding techniques will tend to encourage sloppy programming.

## MBASIC — Where To Next?

MBASIC has become the almost universal offering with most 8-bit microcomputer systems. It may be called TRSBASIC or Applesoft or whatever but deep down all the Microsoft-authored BASICs have a common heritage going back to the original Altair BASIC.

IBM has introduced its PC based on the 8086 family of microprocessors and several of the Japanese manufacturers are set to follow suit but the dismaying situation at the moment is that the IBM PC BASIC appears to be just a translated MBASIC with a few extras added.



The relatively poor performance of this 8086 BASIC compared to Apple BASIC seems to support this argument. The extra bits which would have had to have been coded in 8086 code from scratch seem to run quickly but the translated parts are slow compared to what should be achievable on an 8086/88.

Does this mean that we will be stuck with just another translation of MBASIC on all the new 16-bit machines? I hope not, but unless we start complaining about it now that may be the way things go!

## Memory Drives

I've just been doing a reshuffle of my hardware associated with getting the Bulletin Board going and have just received lots of new goodies.

Finally the memory drive under CP/M 2.2 has been implemented. A memory drive (or MDRIVE) is a block of memory configured to look like a disk as far as CP/M is concerned.

The advantage is very fast operation due the lack of rotational latency associated with disk drives. Rotational latency is the time wasted while waiting for the specific sector you want to access to come under the disk head. The MDRIVE is also beautifully quiet.

The disadvantages are that a megabyte of memory is still much more expensive than a double-sided floppy disk and controller and that the storage is volatile — the data is lost when the power goes off.

I have only 192K (minifloppy users eat your heart out) in my MDRIVE but that is enough to hold an assembler/compiler, source and output files; all I need to achieve the speed benefits of the MDRIVE.

I PIP the file into the MDRIVE, do the

task at MDRIVE speeds and then PIP the result back to a floppy or hard disk for storage or use. I'll give you a fuller report on the effective speed increases over double density floppy disks when I've had a bit longer to do some meaningful measurements, but some quick tests with MAC on a large assembler file pointed to it being at least four times as fast.

As a comparison my hard disk is only about 1.5 times as fast (assemblers aren't as disk I/O bound as you might think).

In my system the extended memory is actually the main memory when running CP/M-86 but rather than let it go to waste when running CP/M-80 it can be put to good use in the MDRIVE.

My MDRIVE was implemented based on software from G&G Engineering in California. The same software is commercially available for S-100 systems from Godbout/compupro in the United States or from their dealers locally. The Godbout MDRIVE uses standard 24-bit addressing memory cards and requires that you have one of its 8085/8088 CPU cards.

Another US offering is called the Semidisk and is a single plug-in S-100 card that is said to work with any CPU. The price of memory is continuing to drop dramatically so I think we can expect to see MDRIVES appearing for many 8-bit systems over the next year.

Every time I mention them to Applied Technology, Owen Hill's eyes light up and he gives me a sly smile...does this mean an MDRIVE for the Microbee?

Amongst the new hardware was a Godbout dual CPU with a 7Mhz 8085 on board; I didn't even know they existed. What are the odds on a 10Mhz 8-bit processor within two years?

Also of interest was the Godbout Disk 1 with extra boot routines in the onboard ROM for the 8086 CPU card...it can't be far off now.

## Concurrent CP/M-86

Well, the battle of the 16-bit operating systems just hotted-up again. Digital Research is ready to release a second version of CP/M-86 suited to multi-tasking applications.

Using the same real time nucleus as MP/M-86, concurrent CP/M-86 allows a single user to run multiple tasks on his 16-bit system. The console can be divided into a number of 'windows' which show output from various tasks.

Details are still a bit sketchy but this product seems set to top MS-DOS in the lower end 16-bit market. Stay tuned for details.



### CP/M-80 Version 3

Yes, folks, it's still in the works...some-where. Gary Kildall says you can blame it all on IBM — if it hadn't introduced the PC we would have seen CP/M 3 months ago.

Apparently many of the CP/M 3 project team were diverted onto the Concurrent CP/M-86 project so DR would have a competitive OS for the PC. Oh well, maybe by this Christmas...

Another recent offering from DR is XLT-86, a source code translator from 8080 assembly code to 8086 assembly code.

Does it work? Well, yes and no. First off there are a number of limitations which complicate the translation process. You can only translate source code which will produce a maximum of 6K of object code, so big programs have to be done in many smaller chunks and put back together again.

The translation is only done on the 'main line' code, so if you have lots of 'if assembler directives in the 8080 program, only the enabled ones get translated.

However the program does endeavour to eliminate some redundant code sequences in the translated code that other

translators leave in and produces an excellent analysis of flag usage in the 8080 source code.

I tried it on some of my programs. A couple of simple programs ran right through without problems, were assembled with ASM86 and executed correctly. Some more complex programs required work before XLT86 would accept them and more work before ASM86 was happy but they did end up running.

I then tried a large 8080 disassembly of a sorted directory utility. Eventually got XLT-86 to accept it, however, and ASM86 to assemble it. It executes correctly when run under DDT-86 but not when run by itself...

Along the way I learnt quite a lot of new things about 8086 assembler programming (like how to handle the segment registers properly) and a few of the traps in translating programs. XLT-86 has limitations but even with some additional hand optimisation and adjustment it is still much, much faster than trying to do a hand translation and it is an excellent learning tool.

### The CP/M Bulletin Board

First, my apologies for the delays in getting the service running. My unexpected time in hospital and following recovery threw the bulletin board plans badly out.

The system has been on-line to selected test users while the bugs were ironed out and the problems with using American programs on Australian communications systems resolved.

Telecom has also been rather slow in giving final approval. By the time you read this the system should be fully functional.

To obtain information on how to get onto the system send a large (A4 size) SSAE to:

CP/M Bulletin Board  
P.O. Box 80,  
Newport Beach, NSW, 2106.

The conditions outlined last month are still applicable.

### Feedback

Send your questions about CP/M to Bill Bolton, CP/M Column, *Your Computer*, PO Box 2, Waterloo 2017. No guarantees that your question will get answered in the column but I will try. □

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mary, backup data disk, and end program.

Information stored on each stock item must include item number, description, selling price and quantity on hand, and may optionally include ADN code, bulk price, sales tax code, cost price, location, minimum balance, quantity on order and supplier.

The sales tax option in SCAP allows correct calculation of gross profit margins, taking the Australian sales tax system into account.

The SCAP manual is comprehensive in its explanation of the program, and describes the procedures to be used when setting the system up, customising it, and so on. The manual contains a listing of the program to allow later modification and the addition of extra features such as calculation of sales tax payments.

In much the same way as Osborne accounting software is not supported by Osborne and Associates, SCAP is primarily supported by software consultants, a list of whom is available at Dick Smith stores.

### Invoicing System

The Invoicing System can be used independently, but is an ideal add-on for SCAP, with which it interacts.

The program will automatically generate invoices with your company name and address printed at the top, with automatic dating and numbering of invoices. It performs all calculations such as multiplying price by number of units sold and totalling the prices.

By entering quantities sold as negative, the program will automatically generate credit notes. At the end of each session, the program can print two reports: one showing customer name, invoice figure and other data; the other a tax and revenue totals summary.

When the program is used with SCAP, only the item number and quantity need be typed in, as the program will fetch the price, description and other information from the SCAP files, simultaneously updating the SCAP sales docket posting file.

Like the SCAP manual, the documentation for the Invoicing System is excellent, and includes a program listing, allowing customisation by the experienced programmer.

### Word WORP...

WORP-9 is not the latest in a series of Star Trek games, it is in fact a word processing program for the Business Computer. The program will handle files up to 10,000 characters in length in a machine with 32 Kbytes of memory, and with 48K this increases to 26,000. Larger files can be manipulated by breaking them into sections.

WORP-9 has two modes of operation:

<b>Unit:</b>	<b>System 80 Business Computer</b>
<b>Made For:</b>	Dick Smith Electronics
<b>Processor:</b>	Z-80
<b>Clock Speed:</b>	N/A
<b>RAM:</b>	16K-48K
<b>ROM:</b>	16K
<b>I/O:</b>	printer, serial port (option)
<b>Languages:</b>	BASIC
<b>Keyboard:</b>	QWERTY, numeric pad
<b>Display:</b>	64 × 16 u/l case
<b>Graphics:</b>	Chunky graphics
<b>Peripherals:</b>	Expansion box, disk drives
<b>Expansion:</b>	Optional serial port, S-100 (?) bus
<b>Best Points:</b>	Compatible with TRS-80
<b>Worst Points:</b>	5 mains plugs

<b>Ratings:</b>	<b>excellent</b>	<b>verygood</b>	<b>good</b>	<b>poor</b>
<b>Documentation:</b>			✓	
<b>Ease of Use:</b>		✓		
<b>Functionality</b>			✓	
<b>Support:</b>		✓		
<b>Value-for-money:</b>		✓		
<b>Extras Included:</b>	N/A			
<b>Options:</b>	NEWDOS/80 disk operating system			
<b>Review Unit from:</b>	Dick Smith Electronics			

command mode and enter/edit mode. These are toggled by the F1 key. In enter/edit mode, text can be rapidly typed in without regard to layout, line endings, and the rest as the print is 'tidied up' during the print phase. During entry, mistakes can quickly be corrected by backspacing and retyping, or left to be corrected later.

The editor has the usual selection of commands for cursor movement, text insertion, deletion and a search command. A holding buffer is provided for block moves.

The print formatter supports justification of text and proportional spacing, as well as adjustable margins and page length.

An interesting and unusual feature is the provision of a name and address file and the ability to merge names and addresses into letters. The name and address format is fixed at five lines, and may

not be suitable for more sophisticated direct mail applications, but is a good general purpose tool.

Once again, the manual is of good quality, and includes a glossary of technical terms. There is also a cut-out template which identifies the programmable function keys.

In general, the System 80 Business Computer represents good value for many small businesses. Although it is limited in disk capacity, it can be used to good effect in getting inventory and accounts receivable under control, while doubling as a word processor.

Because the manuals for SCAP and the Invoicing System contain source code, the programs can be modified and tailored to individual requirements, so that one is not completely helpless in the face of software problems. Altogether, a well put-together system. □



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  - ★ Password Protected Files.
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