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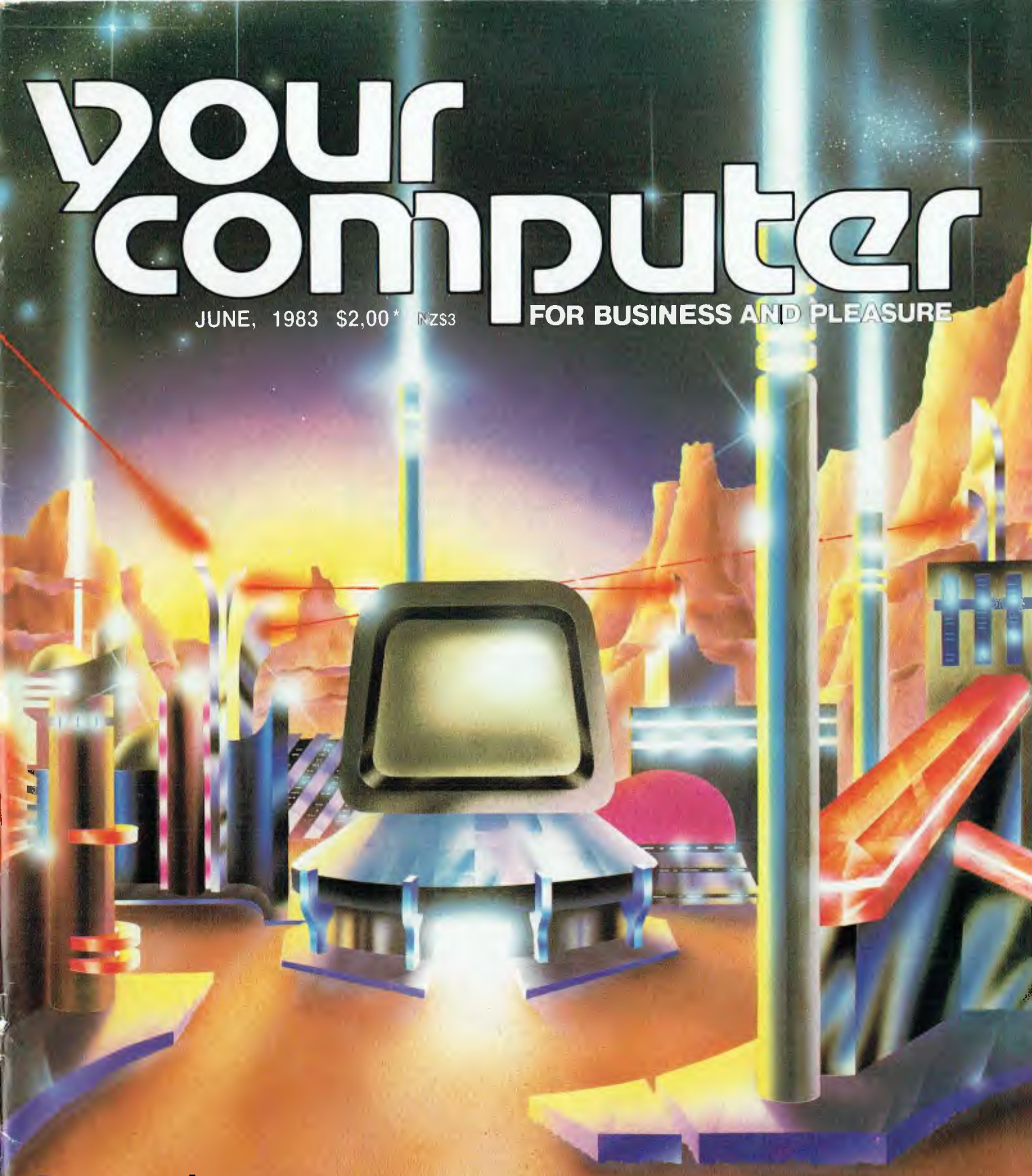

Special Preview

THE NEXT GENERATION

ISSN 0725-391

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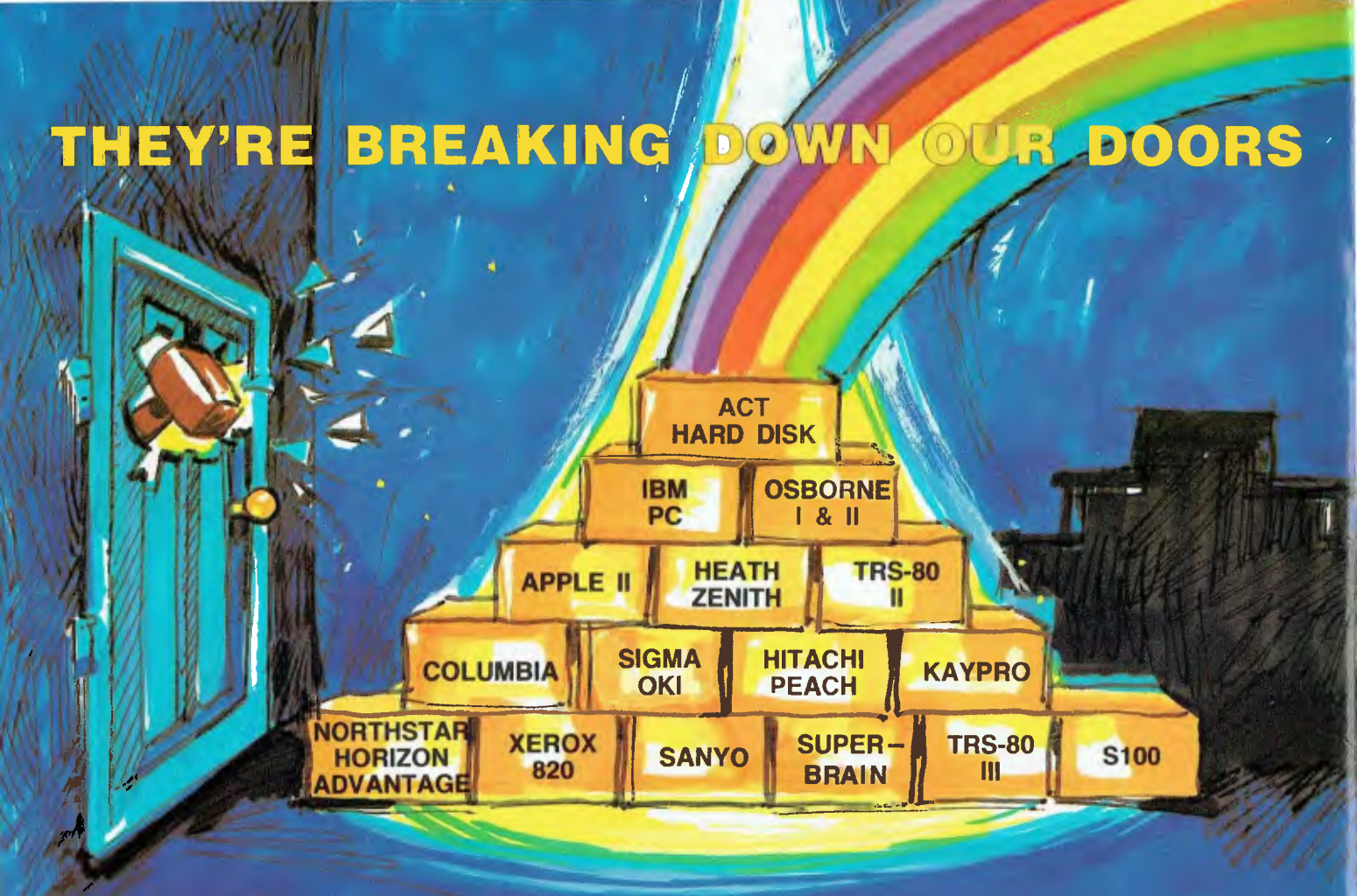
THEY'RE BREAKING DOWN OUR DOORS



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inside your computer

Vol 2, No 11. June, 1983.

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We've added new details to this regular section this month, so check it out. It's the page you read first if you want to contribute a story, write a program, ask a question, subscribe, sue us, or...

When micros rule the world....Les Bell and Bill Bolton have been crystal ball-gazing, and in this issue they present their views on our future microcomputers. See Page 20.

Are you being served? Lindsay Shapero takes a look at the new micro retailers on Page 28, while motoring journalist Phil Scott tells how a complete novice got into word processing, on Page 36.

next month

First, let us apologise for the last Pocket Programs special liftout – some of those tiny listings were unreadable.

The problem was mainly the selection of paper – an ordering error saw us printing the section on what would have had trouble passing for paper towels in a public toilet...this combined with small listings was just too much for the eye.

Next month we'll have another 16 page section full of programs, and we promise you the listings will be bigger and clearer.

editorial

THERE IS MUCH talk, as there rightly should be, about the social impact of computers. The popular and sensational press, unable to grasp the immediate implications of personal computing, are full of breathless predictions varying from delirious joy that mankind is freed from drudgery to utter gloom and despondency that we will all be slaves to machines at some (unspecified) time in the future.

In the latest crop of warnings by these journalistic merchants of doom, we are told that our children are becoming zombies who are unable to function when deprived of their addiction. Take away the computer and a child ceases to think, displaying withdrawal symptoms and apt to tempt the hand of fate by walking off the top of tall buildings or under trains.

In the meantime, with an adequate supply of computers administered daily by the local school, the kids are becoming anti-social, losing the ability to relate to other kids and adults; only able to deal with the machine.

What absolute and utter drivel! Where on earth do the editors of the Sunday rags get this kind of rubbish from?

Over the years, I've met a lot of kids who enthusiastically use small computers, at home or at school. They are virtually without exception bright, gregarious, of above-average intelligence and fired with enthusiasm to learn – not just about computers.

In my own youth, the story was similar – at the age of 12, my consuming passion was astronomy and at nights I could be found lying flat on my back in the middle of the lawn, picking out the constellations. Within a few months, astronomy had been replaced by ham radio, and cloudy nights no longer had quite the same impact.

It was the same with my friends, whose activities ranged from football to pet rabbits. In every case, the enthusiasm and intensity with which we pursued our hobbies would probably frighten a Sunday-paper hack to death! And, yes, whenever a pet rabbit got sick, the owner inevitably displayed "withdrawal symptoms", moping around the house and only caring for the animal until it got well.

In any case, this phase only lasted a few years, until we discovered girls – an experience which sometimes caused more damage to fragile young psyches than anything before. The same thing will undoubtedly happen to this generation.

So parents, don't be concerned if your kid's conversation is peppered with buzzwords. He'll grow out of it – and if he doesn't, you can always introduce him to the little girl down the street whose dad has just bought her a VIC-20!

– Les Bell □

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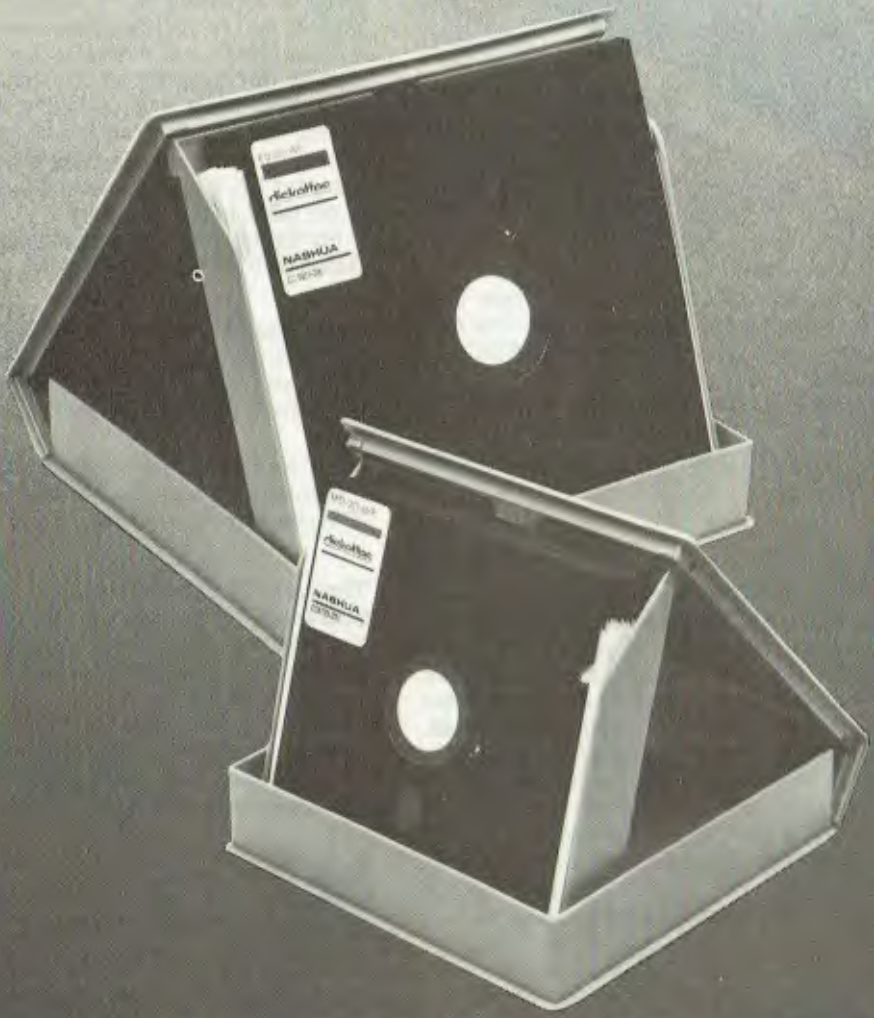
"Quality Circle" Diskettes



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your computer news

More Quality For Less Cash

DICK SMITH ELECTRONICS has announced the new Dick Smith VZ-200 colour microcomputer, priced at $199. The system incorporates colour graphics, sound, Microsoft BASIC and both RF and video output.

Features of the VZ-200 include eight kilobytes of inbuilt RAM, eight-colour graphics, 128 by 64 high-resolution graphics mode, 45-key automatic-repeating keyboard, and easy expansion with optional modules. □

Intelligent Modem

CASE COMMUNICATION SYSTEMS has launched a microprocessor-based modem, the CASE 440/12, which incorporates a multi-mode modem with error correction and speed conversion, plus integral auto-dial and auto-answer facilities.

In addition, CASE has released a low-cost intelligent Telex interface, which is claimed to reduce Telex transmission costs, speed-up message delivery and improve processing efficiency.

Called TLX, it enables any system with an ASCII asynchronous RS232 interface to send and receive Telex messages direct from a VDU, memory or disc. The unit provides automatic dialling and re-dialling or Telex numbers with full answerback checking.

For further information, phone David Hoad at CASE on (02) 438-2400 Sydney. □

Atari's Alternative Keyboard

FULLSTROKE KEYBOARDS for the Atari 400 personal computer are being manufactured by Flintech Computer Systems. These keyboards are fully compatible with the Atari 400 and are simple to install and remove. No modification of the Atari 400 is required.

Each keyboard is mounted in a sturdy plastic case with a metal base, and is supplied with complete instructions, cable and connector. The keyboards are priced at $90 each.

Also under development at Flintech is a 256-kilobyte memory system for the Atari 400, consisting of two cards. The first is the memory card itself, including printer interface, which is mounted externally to the Atari 400. It is connected to the computer by an interface card which replaces the existing Atari memory card.

The Atari 400 256-kilobyte memory system will cost under $400 and will be available by the middle of the year. For further information, contact Flintech Computer Systems, PO Box 450, Nelson Bay, 2315. □

Another Cheap Japanese...

A LOW-COST digitiser, priced from $1200 and designed for smaller system applications, has been announced by the D-Scan computer graphics division of Seiko.

Marketed in Australia by the TCG Group, the digitiser allows high-resolution (0.1 mm) graphics information to be input to any computer simply using the stylus pen or cursor. The digitiser is expected to be especially popular with users of the IBM-PC and Apple Lisa microcomputers.

Two models are available: the DT-3100, with an operating area of 307.2 by 204.8 mm, and the DT-4100 (384 by 384 mm). Both have four operating modes which can be set by control commands from the computer and six data transfers. Multiple formats provide easy access to any computer, and the standard RS-2320 serial interface provides simple connection of the tablet to the computer.

For further information, contact Mike Barraclough at the TCG Group on (02) 699-8300 Sydney. □

Electronic Toytime

ELECTRONIC and Computer Games and Toys '83, the first exhibition in this field for both the public and trade, will be held at the Sydney Entertainment Centre, Haymarket, from August 18-21.

For additional information, contact Lorna Miller, Industrial Presentations Australia, 4/389 Victoria Avenue, Chatswood, 2067, or phone (02) 412-4377 Sydney. □

The Law Of The Jungle

SURVIVAL OF the fittest in the competitive business community will be the theme for this year's Business Efficiency Fair to be held from August 9 – August 12, in Melbourne's World Trade Centre.

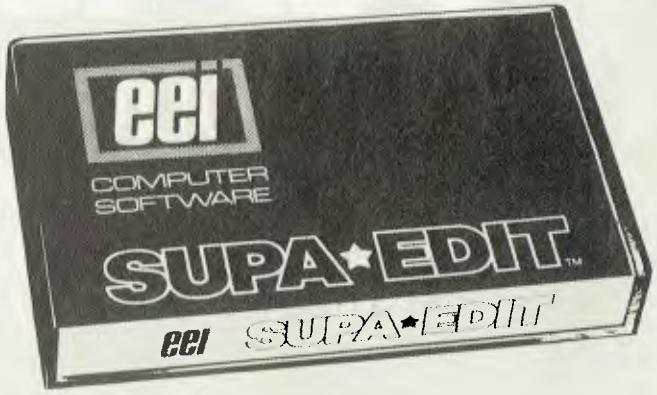
More than 50 companies will be displaying their specialised business equipment. Businessmen wanting to attend can receive complimentary trade passes. For further information contact Lee Jabara on (03) 857-8148. □

Supa Dupa Edita

SUPA EDIT, by EEI, is a powerful enhancement to Tandy Level II BASIC's EDIT and LIST commands, designed to suit the needs of the serious programmer/hobbyist.

It improves programming speed and is suitable for both Tandy TRS80 and DSE System 80, Model 1 and III, 16K, 32K and 48K tape-based system. A lower case driver is also included for Model 1 systems.

The introductory price is $14, including tax and postage. For further information contact Elite Electronic Industries, 36 Luxmore Street, Cheltenham, Vic 3192. Tel (03) 583-1201. □



The Added Dimension

THE DIFMASTER, a three-dimensional business graphics utility for IBM-PC users, has been developed by an American company, Starside Engineering. It accepts data stored in DIF (data interchange format) files created by VisiCalc and other popular spreadsheet programs.

Five types of graphics displays can be created: two-dimensional vertical bar graphs, three-dimensional vertical bar plots, three-dimensional contour graphs, scatter charts with linear regression, and schematic and flow diagrams.

All graphics can be saved to disk as binary .PIC files, and the package includes a modifiable graphics printer screen-dump routine in BASIC-A.

For further information, write to Starside Engineering, PO Box 18306, Rochester, NY 14618, United States. □

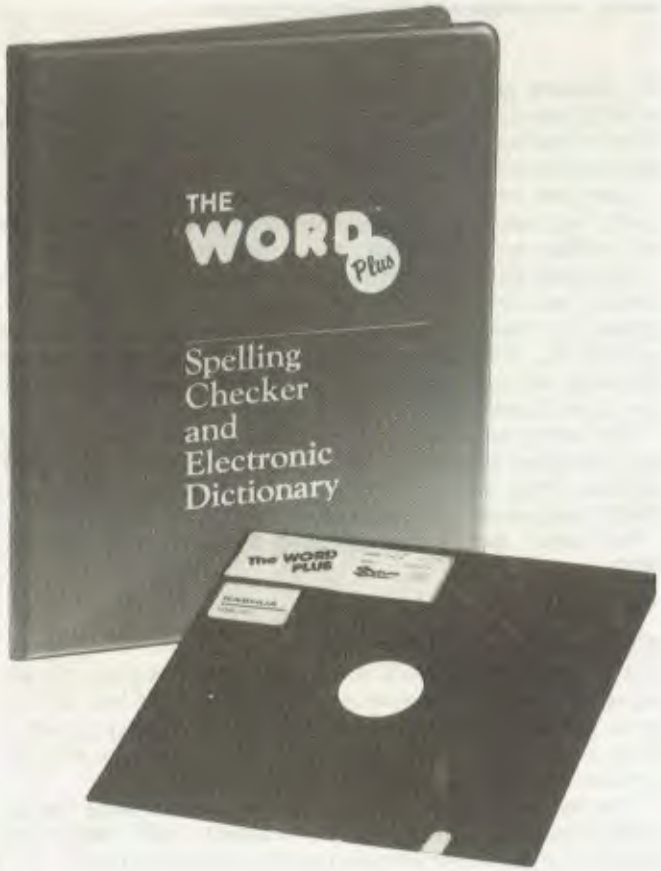
More Words And Better Spelling

EXCLUSIVE AUSTRALIAN distribution of Oasis' new dictionary program, The Word Plus, has been given to Sydney's Software Source.

The Word Plus is a series of integrated spelling check tools, which perform a wide range of spelling check and word analysis functions. Future releases from Oasis include a grammar checking package.

Software Source has also signed a sub-distribution contract for Oasis versions of the Spellbinder word-processing and office management system. The agreement has been signed with Sky Systems, Tel (02) 95 5503.

For further information telephone Software Source (02) 389 6388 □



Graphics Software For Osborne

TWO GRAPHICS software packages have been released for the Osborne personal computer by Aeon Software.

Graphics Pack 1 includes a graphics adventure/arcade game for the user who wants a little recreational computing. Also included is a graphics picture creator, to allow pictures to be drawn on the screen and saved on disk. Complete with comprehensive documentation, the price for the Graphics Pack 1 is $29.95 on disk.

The Osborne Graphics Slide System allows graphics and/or text slides to be created, saved on disk, and projected on the Osborne screen in any sequence. This system is simple to use and operate, and can be very useful for business meetings and show- window displays. The price is $89.95 on disk.

For further information, contact Aeon Software, Suite 2, 19 Godfrey Street, Campbell, 2601. □

Pirates Will Be Hung!

APPLE COMPUTER has been awarded a preliminary injunction against a Los Angeles distributor of Apple II copies.

Formula International, distributor of the 'Pineapple' computer has been restricted from copying or selling any of Apple's copyrighted software programs in the computer's memory circuits or diskettes.

In Australia, Apple has already been granted an injunction against a distributor of 'fake' Apples in Victoria and currently has a case pending before the Supreme Court.

In the US ruling, Judge Irving Hill concluded that US copyright statutes cover programs stored in a computer's ROM components, whether in source or object code. He said that Congress intended to include operating system programs such as Apple's under the protection granted by the copyright laws. □

Price Reductions

TANDY HAS reduced prices on the TRS80, aimed particularly at teachers and school users. The 16-kilobyte Model III TRS80 now costs $920, a reduction of $479.

In addition, $12,000 has been chopped off the price of an entire 16-student classroom Network III Controller, complete with twin-drive teacher unit, now retailing at $23,799.

Among other Tandy products which have been reduced, are the TRS80 Pocket Computer, 5 and 10 student classrooms, and an Upgrade for existing 16k Model III and Network II systems, to a full 48-kilobyte Network III student station. □

Games Of Skill

STRATEGIC SIMULATIONS (SSI) of the US, has released several new games for a variety of computers, costing between $34.95 and $59.95.

Knights of the Desert is for the Atari, Apple and TRS80. Cosmic Balance II – The Strategic Game is for the same systems minus the TRS80. Both games cost $39.95.

A new version of Galactic Gladiators is now available for the IBM-PC. The game requires 64 kilobytes with a colour video mode on the PC and comes complete with disk, rule book and player aid card for $39.95.

Three wargames, all compatible with the Apple IIe have also been released. RDF 1985, North Atlantic '86 and Computer Ambush – The Second Edition cost $34.95 for the former and $59.95 for the latter two. □

Stop wasting time program editing. Start VEDIT-ing!

If you spend hours a week working on a terminal or computer, editing programs and you're not using VEDIT full screen text editor, then you're working too hard! VEDIT's combination of wordprocessing, powerful macros and full screen (visual) mode will slash your programming and reediting time. Here's how VEDIT will help you get the job done faster:

- ☐ Blocks of your program can be moved or copied within a file.
- ☐ Automatic indenting for structured programs such as PASCAL or 'C'.
- ☐ Reformatting of paragraphs between set margins.
- ☐ Any portion of the text may be sent to the printer.
- ☐ The 'UNDO' key will 'undo' the mistake you just made – before it ruins your text.
- ☐ VEDIT is fully customisable to a huge range of terminals. (Write for a full listing)
- ☐ The powerful command structure includes search and replace, macro commands for repetitive command sequences and special functions.
- ☐ Sophisticated buffering enables editing of files larger than main memory.

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Anthony Tesselaar with the Archives III computer.

The Computerised Garden

TESSELAARS PADUA Bulb Nurseries in Melbourne, the pioneer of Australia's tulip growing industry, is using a computer to assist in management operations.

The nurseries have installed an Archives III to control mail order and flower wholesaleing activities. A programmer from Archives, David Moon, developed the system based on the company's requirements.

The Archives computer system used by Tesselaars comprises an eight megabyte Archives III, (including Winchester hard disk drives), Qume daisywheel printer, and Calidad short feeder, with single sheets used in the printer. ☐

Try Before you Buy Access

A NEW personal computer bureau offers users the opportunity to try computers before they buy, or to experiment with expensive peripherals they can't justify for occasional use.

Computer Access (Unit 5, 6 Pritchard Street, Wentworthville, 2145) has installed a number of machines which are available for rental on an hourly basis.

Principals Bill Hood, Michael McInnes (of Sydney Grammar School) and Bruce Kehlet, say their services will appeal particularly to small businessmen and teachers. The centre boasts an IBM PC, Dick Smith System 80, Columbia MPC running MP/M-86 with four dedicated terminals, and four Apples which can stand alone or act as extra terminals on the Columbia.

The centre also has a range of peripherals, ranging from fairly standard printers to exotica like music synthesizers and plotters. Other services include a lending library service and BASIC programming courses.

For further details contact Computer Access on (02) 636 3810. ☐

ICL Connects With Austpac

FOLLOWING EXTENSIVE testing, Telecom has given ICL approval to connect its communications equipment into the Austpac network. When Telecom allows user testing in two or three months time, ICL customers will be able to take immediate advantage of the new Telecom network.

The NIC is a single board microprocessor that plugs into the communications controller of all current VME 2900s and ME29s. For further information ring ICL on (02) 929 0411. ☐

Breezing Through The Accounts

BREEZE COMPUTERS has developed a cost-effective solution in its Breeze point-of-sale system. The system involves an Osborne microcomputer fitted into a neat assembly with a cash drawer beneath. A printer sits beside the system for invoices or to produce the monthly accounts.

This system enables a service-station owner or manager to keep control of their business by adding all the spare-time and after-hours accounting work to the point of sale cash register. Cash sales are dealt with as usual, but stored according to category.

For further information, contact Seahorse Computers on (046) 66-6506. □

Computerised Show Guide

FOR THE first time, computer guides will this month help visitors around Britain's Royal Agricultural Show. Eight computer terminals, at the entrances to the site, will provide print-outs showing the exact location of stands and exhibits.

The show's computer exhibition experts will offer advice on suitable software, as computers are seen as the fastest-growing development in British farming. □

When The Society Meets

THE NEW SOUTH WALES branch of the Australian Computer Society holds monthly meetings on the fourth Tuesday of each month at the Masonic Centre, corner Goulburn and Castlereagh Streets, Sydney, at 6pm.

The meetings feature guest speakers addressing a variety of computing topics. The meetings conclude about 8pm and include drinks and snacks.

The next meeting will be held on the June 28. The guest speaker will be Professor John M Blatt, of the University of New South Wales, who will speak on "Technological Unemployment Revisited".

For further details, contact Catherine Browne on (02) 290-3887 Sydney. □

Apple Changeover

APPLE Computer Australia will be moving to North Ryde so that all sales, distribution, service and support functions can be contained in the same offices, after the switchover from Electronic Concepts distributors.

For further information phone Vicki Staveacre or Lee McLean on (02) 241-3016. □

Pirate-proof Programs

CLAIMED TO BE the first 'pirate-proof' system available in the world, Parwest of Chippenham, England, have a numerical code which will protect the range of business and accounting software which it plans to offer for rental.

Security is built into the program – the data files contain a multi-dimensional numerical matrix which runs according to a set pattern. This sequence runs to pre-determined intervals. If the program is to continue, the user has to obtain the next few numbers by telephoning a Parwest office.

Without the extra numbers, which will only be given to certain customers, the program will lock and cannot be used. For further information write to Parwest Ltd, 18 Mary St, Chippenham, Wiltshire, England SN15 3JN. □

Hewlett Packard chose Spellbinder over all other CP/M wordprocessors.

Why?

Hewlett Packard conducted exhaustive research before selecting a CP/M wordprocessor program to run on their HP125 business computer. The result? Spellbinder was judged superior in all key areas. Here are some of the reasons:

Spellbinder is fully customizable. Function keys and cursor keys really work on Spellbinder! This means faster training and more efficient use.

The most useful and workable mailing list capabilities. Sort by post code then merge any individual information from a mailing list into text.

Powerful sorting facilities. Sort clients by income and then print out a list in order of income with telephone numbers. Sort alpabetically or numerically. Eg. Print up mailing labels for only NSW customers from an all states list and have them sorted by post code.

Note: These facilities are built in.
They are not expensive add-ons.

Boilerplating. The user can create entire documents by specifying the numbers of pertinent paragraphs on a master 'boiler plate' file and printing them in any order.

Advanced printing features. Includes the ability to print in two columns and to print multiple documents.

Forms generation facilities. Create a template that 'looks like' your invoice. Spellbinder will show you where to fill in the blanks – then print just the information on your pre-printed stationery.

Ease of use. The three interactive levels of help are fully customizable so they are right for YOUR system. You can even view other documents on your disk without disturbing your current text.

Arithmetical facilities are built in. Total your invoices, prices or statements automatically. Full 16 digit precision with up to 15 decimal places.

Full support. Software Source is dedicated to the support of this powerful package. A growing library of applications programs is available, from mail list entry to invoice generators.

Contact Software Source for further details and the name of your nearest dealer. Come and find out what real wordprocessing is all about.

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The administrator for the Arts Council of Australia, Simon Dawkins (middle), with Wang executives Tom Turner (left) and Steve Chambers.

Patron Of The Arts

WANG COMPUTER has become the corporate patron for the Arts Council of Australia, ACT Division, providing $150,000 worth of direct and indirect support to this Canberra arts organization over the next three years.

The support offered by Wang includes the installation of one of the company's new Professional Computers, which will assist in the Council's administration. The Arts Council conducts an extensive range of activities from promoting exhibitions, to "Sunday in the Park", a major community arts programme, attracting more than 100,000 people annually. □

Plastic Surgery For The S100

AED MICROCOMPUTER Products now supplies a 20 cm IBM-standard floppy-disk system for Applied Technology's DGOS S100 microcomputer systems. The CP/M 2.2 operating system and Microsoft BASIC-80 are both supplied free with each disk system, though this software would normally cost more than $600.

The system is compatible with the IBM single-density standard (lifeboat A1) as well as running double-density 256-, 512- and 1024-byte sectors automatically.

AED Microcomputer Products supplies the system in single- or double-drive, as well as single- and double-sided versions.

For further information, contact AED Microcomputer Products, phone (02) 681-4966 Sydney. □

Local Government Users

PROPERTY INFORMATION will be one of the major uses of the new computer system installed at the Beaudesert Shire Council, near Brisbane and the Gold Coast.

The Council has bought a Burroughs B930 central system, B20 microcomputer for word-processing, and the Wandek local government system software, totalling $217,000.

The new system will also be used for local government accounting, including payroll. Previously, various electronic accounting machines and a computer bureau were used, but these have now outlived their usefulness. □

How can I write better software, faster? Write it in BASIC/Z!

BASIC/Z. A new standard in compilers for the CP/M system. BASIC/Z is the most powerful implementation of the BASIC language on CP/M. BASIC/Z generates executable machine code compatible with 8080, 8085, Z-80 under CP/M 80 and 8086/8088 processors under CP/M 86 and MS-DOS.

Syntax testing as you type. BASIC/Z has a powerful program editor with built in syntax testing as you type. Time saving features include global search and replace, fifteen local edit commands and extensive debugging facilities. Line trace, error line retention, and the unique ability to 'single step' a program with a continuous display of selected variables are just a few of the features which will save you time.

Multitiered error handling allows your program to trap logical errors, including previously fatal BDOS errors. Only BASIC/Z can trap that 'BDOS ERROR ON A: READ ONLY' before it happens.

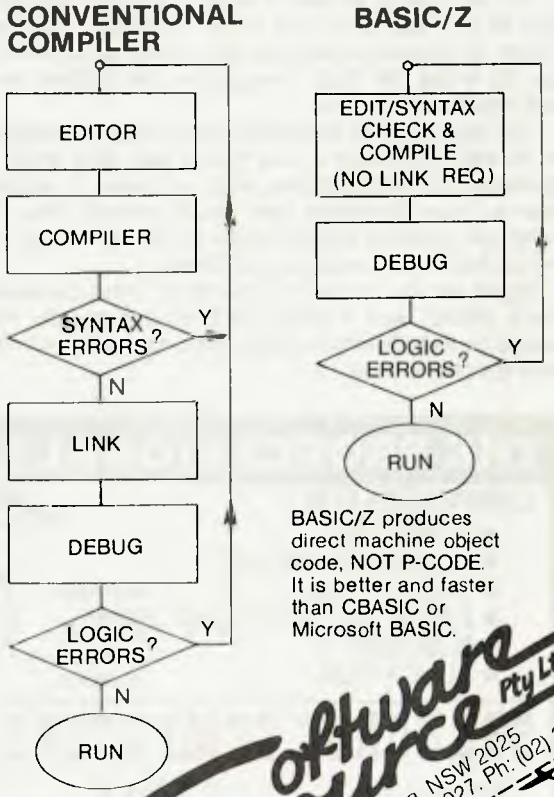
Printer/terminal customizing is built in. The runtime library of BASIC/Z (included in the package) includes installation routines for the majority of CP/M machines on the market. Your software will have near universal application without further modification. Just one set of programs will run on practically any hardware.

Unsurpassed accuracy. Floating point numerics with a range of 1E-61 to 1E+61, with a choice of precision from six to eighteen digits. All floating point maths are performed in decimal (BCD), avoiding rounding off errors.

Powerful executive functions aid programming. Using SORT, it can sort 2,000 elements in two seconds. User defined functions are fully recursive, support multiple arguments and may contain an unlimited number of statements.

No Royalties. BASIC/Z has no royalties nor runtime charges. The license agreement confers the right to distribute support software such as the BASIC/Z runtime module and the installation hardware configuration utility, subject only to specified copyright acknowledgements.

What does it all cost? BASIC/Z documentation & Software: $495* inc. tax. Available from your computer supplier of from Software Source direct. Available on 21 days approval (if software seal not broken). Or clip out the coupon and send in for further details.



BASIC/Z produces direct machine object code, NOT P-CODE. It is better and faster than CBASIC or Microsoft BASIC.

Software Source Pty Ltd

344-348 Oxford Street Woollahra, NSW 2025
PO Box 364, Edgecliff, NSW 2027. Ph: (02) 389 6388

Please send me further information on BASIC/Z.

Name.....

Address.....

Gloster's Spectrum Software

SEVERAL NEW software packages have been released by Gloster Software for the Sinclair ZX Spectrum personal computer. This model is the most up-dated of all the ZX systems, and Gloster has provided some extended relevant software.

The Display package handles more than 300 user-defined characters on screen at the same time. It allows display and printing to employ 64 alphas or numerics per line, and fast and smooth animation in BASIC is also possible. The cost is $14.90.

The features of the 48-kilobyte Protext package, which costs $24.50, include up to 88 full-sized characters per line on a standard Z printer, variable line spacing, right-margin validation, instant word search and 11 programmable text keys.

The 81Convert package enables the user to load ZX81 programs directly into the ZX Spectrum. However, many programs require no modification at all. The price is $14.90.

MatCalc is a spread-sheet calculator which can display up to 10 columns at once, using a 64-numerics-per-column option. It is also priced at $14.90.

For further information, contact Gloster Software, GPO Box 5460CC, Melbourne, 3001. □

BASIC Code Generator

OLIVETTI, manufacturer of the M20 personal computer, has announced a program generator package for that machine. The Oligen package, which is claimed to produce guaranteed bug-free code, accepts 25 high-level 'English' instructions which it then translates into MBASIC statements at a ratio of about 20 BASIC statements for each line of Oligen code.

The package is actually a suite of program generators: Oligen 50 is a data entry and screen formatting code generator, Oligen 60 produces database file maintenance code, and Oligen 80 writes the data manipulation, file retrieval and update and report-writing code.

The language can apparently be learned by people with little or no edp experience in less than a day, after which they can generate sophisticated data entry programs or reports in less than an hour. Programs that would normally take a week to write, and possibly another week to debug, can be completed in less than a day, according to Olivetti.

Oligen will run on the M20 Personal Office Computer (which costs $6990), and is priced at $500 per module. For further details contact Olivetti Australia, who have offices in each state (see the phone book...). □

Anpac executives John Lockley (far left) Andy Afair (second left) accept their Distributor Authorisation plaque from Digital Equipment's Frank Wroe (second right) and Ken Cooper.

Award-Winner

DIGITAL'S PROFESSIONAL 325 and 350 computers were awarded the 1983 Good Industrial Design Award at the Hannover Fair. Digital was one of 300 companies from 14 countries which competed in the award selection process. In addition, the DECmate II was recently placed on the Datapro Word Processing Honour Roll in the US.

Digital has appointed Anpac Data Systems as its first authorised distributor in Australia. The distributorship is awarded only to proven OEMs – those which market Digital equipment, with certain enhancements in specialised markets. □

Fun Guides To Computers

FOR EVERYONE who wants to learn about microcomputers – what they do, how they work, and how to buy one for the home or office – Apple Computers has published two colourful new guidebooks.

Peter Lundstrom's *A Personal Guide to Personal Computers* is a colourful and jargonless introduction to microcomputers. *Personal Computers in Business* introduces managers, professionals, and the small business owner to the personal computer as a business tool.

Both books are available from authorised Apple dealers. □

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ALSO AVAILABLE IN THE SAME BUILDING AT THE REAR IS STORAGE SPACE ON THE GROUND FLOOR, BEING 700 SQ. FT., WITH ENTRANCE FROM PARRAMATTA CITY COUNCIL CAR PARK NEXT TO PARRAMATTA POST OFFICE.

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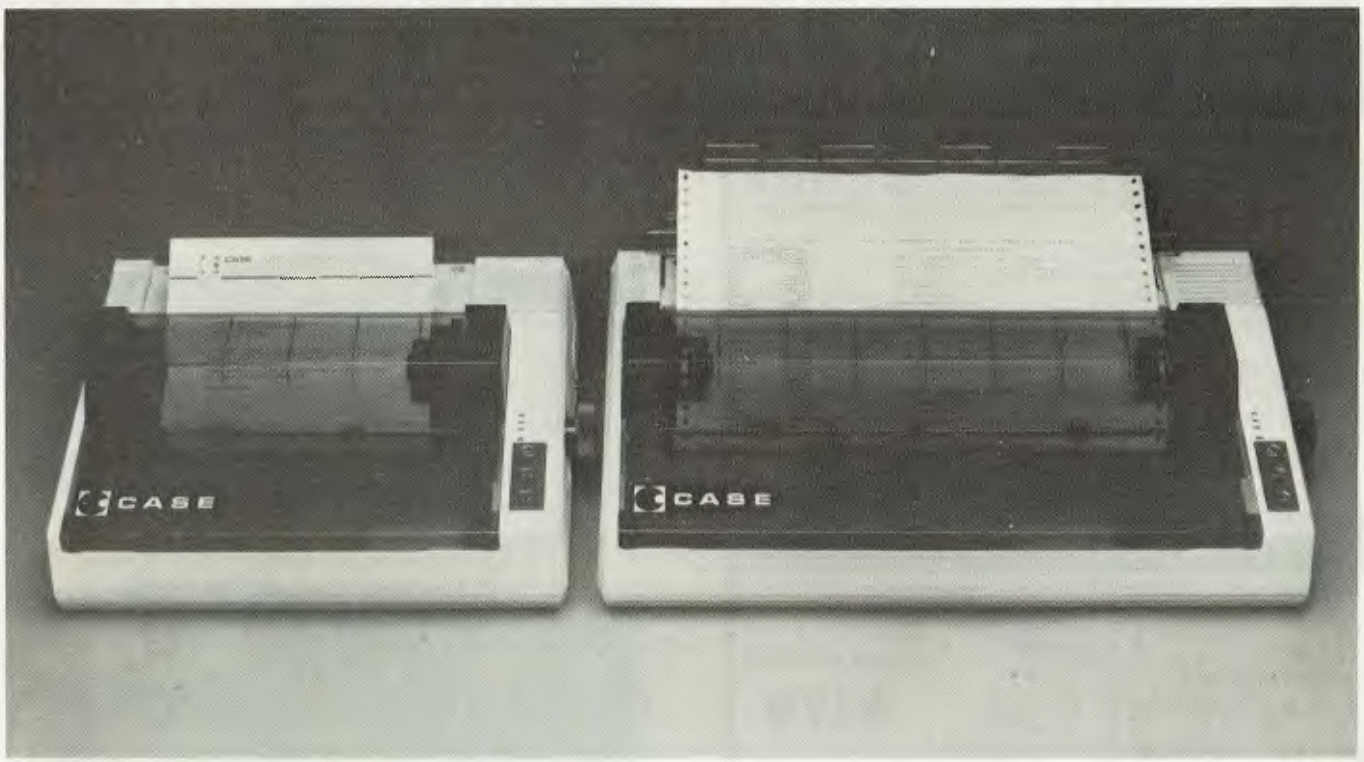

CASE has released two new models in its DP Series matrix printers.

If it weren't for their price, their capabilities alone would make them remarkable machines.

But at around 25% cheaper than their nearest competitor, they deserve your closest scrutiny.

The multi-function capability of the DP series enables use in a variety of applications. Alpha numeric or graphic printing, single sheet, roll or tractor feed paper.

The DP 500 Series can even produce proportionally spaced correspondence quality print.

Utilizing a bi-directional logic seeking mechanism, the printers operate at 100 CPS, with 80 characters per line on model 510, and 136 characters per line on the wider carriage 515.

After you've compared these two machines to others on the market, you'll have to agree with us. It's an open and shut case. For CASE.

For complete details on CASE DP Series 500 printers, contact your nearest CASE office.

CASE

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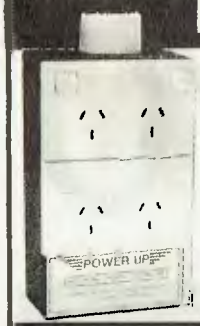

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BS-03 FINANCIAL MANAGER.....$19.95
provides accurate and formatted records for pesonal or business.

BS-04 FILE INDEX SYSTEM.....$19.95
store and retrieve name/address oriented records with your own relevant information.

BS-05 CARD INDEX SYSTEM.....$19.95
simulated card index system (date) for personal or business indexing or diary

BS-06 STOCKTAKE.....$22.95
stock on hand, value, mark up, etc.

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New Zealand School User

NEW ZEALAND'S Auckland Grammar School is buying a classroom set of 16 BMC800 microcomputers. The micros are networked on an MDL MX(6) computer, a locally built system which is extensively used in New Zealand Government, business and teaching institutions.

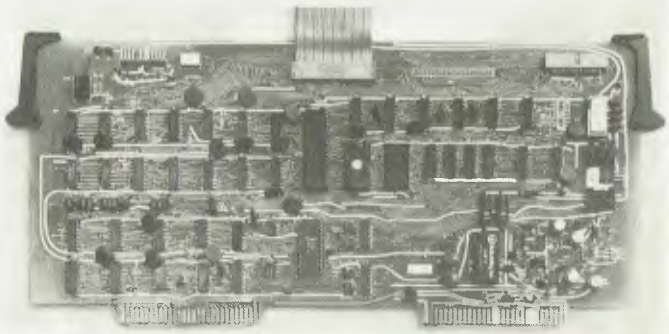
Each student will be able to print out his work simultaneously at the end of the class, and retain it on disc. Economics students can become familiar, in advance, with conventional business application software as a complete package is supplied with each BMC800 school installation.

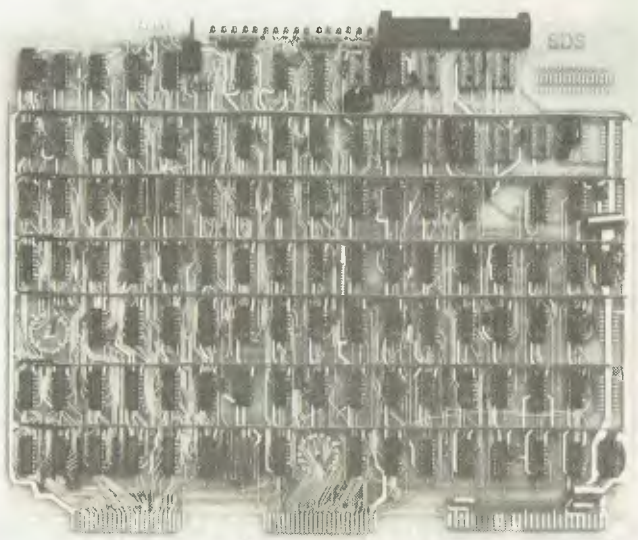
Teachers will write programs which will be used from fourth to seventh forms, in both computer awareness and curriculum subjects. In the future, computer courses may be provided during holidays and at night. The school also plans to put all administrative duties through the computer. □

High-Speed Printers

BDS HAS introduced a microprocessor-controlled printer system which gives users of HP 3000 Series computers printing speeds up to 1500 lines a minute. The HPC-33L, designed and manufactured by BDS Corporation, enables a wide variety of printers to be connected to HP computers.

In addition, a new microprocessor-controlled serial interface allows replacement of Hewlett-Packard's 2631B serial printer. The CSI-50/51 emulates the spooling capabilities of the 2631B and connects either directly or remotely via the multiplexer, allowing the use of printers from 200 up to 600 lines a minute, seven times faster than the standard 80 printer. □





Apologies, Apologies

IN LAST month's issue, on page 8 of this section, we gave the incorrect telephone number for Software Solutions, which is distributing the Nucleus Microsoft BASIC program generator.

For further information on this product, ring Malcolm Currey, Stephen Mathias or John Kelly at Software Solutions on (02) 92-0603.

Peter Endean wrote to us to point out an error he had included in his program Space Target, for the System 80. Line 05 should be deleted, and a new line – *60 CLEAR2000* – should be included.

This brings us to the sensitive subject of last month's Pocket Programs section. Due to a number of problems, including the wrong paper being used, many of the programs were "a little hard to read" (that sounds better than illegible...).

Anyone lacking the necessary magnifying equipment for some of those tiny, invisible lines can write in, enclosing a stamped self-addressed envelope, and receive copies of the specific program.

Next month we will have another bonus Pocket Programs feature, and we promise it will be legible! (But, dear contributors, do read our guidelines on submitting listings on the inside back page – *our* listings last month were legible, but the problems were multiplied in the case of poor originals). □

Yankee Seminar

THE YANKEE Group will be holding a seminar on July 21 and 22 at the Hyatt Kingsgate Hotel, Sydney. The topic is "The New IBM Evolution", and tickets are $495. The seminar will analyse IBM's directions: distributed data processing, telecommunications and office automation.

Future seminars include "Office Automation Battle: Automating Executives and Professionals", "Automating the Factory", and "New Generation of Personal Computer." For further information ring Trudy Daxner on (02) 399-8200. □

GASS For Fuel

CUSTOMERS OF ONE of Townsville's biggest service-station operators, Schmidt and Osborn, will soon be able use any or all of three outlets, receiving just one invoice at the end of the month.

Schmidt and Osborn are using a computer system known as GASS. Designed specially by Micol Management Systems, GASS stands for general accounting for service stations. The system drives the NCR 950 general-purpose terminal as a cash register and a computer. □

Anti-Glare Filters

THE ORDI-FLEX filter for cathode-ray tube screens is designed to help overcome problems with eye-strain, headaches, weariness and lowered productivity.

The black-matrix filter, constructed of durable nylon micro-monofilament fibres specially woven to give a columnating grid pattern, will reduce surface glare by 90-100 per cent, and reflected glare by 87-90 per cent of sunlight and fluorescent lights.

The Ordi-Flex filters are available in a wide variety of styles to suit nearly all CRT screens, including Tektronix storage-tube terminals.

For further information, contact Technical Imports Australia, PO Box 176, Crows Nest, 2065, or phone (02) 922 6833. □

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Commodore Interfaces

TWO PARALLEL interfaces for the Commodore 64 and VIC-20, have been introduced by Micro-Systems Development, of the United States.

The CPI, for the Commodore 64 and VIC-20, solves several problems, including converting serial-to-parallel, providing ASCII conversion, automatic line-feed and program legibility. It is also compatible with almost any program for Commodore's 1515 and 1525 printers.

The VPI is a less-sophisticated and cheaper version of the CPI, and is for the VIC-20 only. □

The Price Is Right

THE APPLE III microcomputer with 256 kilobytes of memory will be reduced to $3449. In addition, production of the Apple III with 128 kilobytes is to cease when inventories have been emptied.

However, software and service for the system, as well as kits to upgrade 128-kilobyte systems to 256 kilobytes, will continue to be available through authorised Apple dealers. □

Help For Radiology

RARS – RADIOLOGY Practice Accounting and Reporting System – is the only software package in Australia designed to meet the specific information management needs of Radiology practices.

Development of RARS took two years, and was carried out in close co-operation with the radiology industry. RARS is a multi-user system written in PL/I 80 using a relational database system for the storage of information. Operation system wise, RARS will operate without modification under TurboDOS, MP/M II and CP/M.

Not only does the system provide for storing and retrieving full patient information, but a special word-processor has been developed to aid rapid entering and editing of patient reports. Once complete, these reports remain on-line for upwards of five years. RARS produces various standard reports to summarise the practice's workload over a given period, as well as administrative reports such as banking sheets.

Medical Computer Consultants has sole distribution rights to RARS, as well as other medical packages. For further information phone Mark Fletcher of Medical Computer Consultants on (02) 527 3443. □

Colour Video Display Processor

A NEW VIDEO display processor, designed to interface between a microprocessor and a PAL video colour monitor, has been announced by Texas Instruments. The TMS9929A has four display modes – Graphics 1, Graphics 2, Multicolour and Text – and can display information in 15 colours.

In addition, using an advanced planner representation, three-dimensional objects can be simulated. Low-cost 16-kilobyte type Dynamic Memories are used for storage of the display parameters, and the TMS9929A does an automatic and transparent refresh of the Dynamic RAMs.

Special animation patterns, called sprites, provide smooth motion and multi-level pattern overlaying. Up to 32 sprites can be displayed on the screen at any one time. Interfacing has been optimised, allowing easy interfacing to most eight- or 16-bit microprocessors, using a minimum number of external components.

The chip can be obtained from the authorised Texas Instruments distributors, VSI Electronics and Rifa. The suggested price is $35.

For further information, phone (02) 887-1122 Sydney. □

The State Of The State

A COMPUTER SYSTEM installed in the Victorian Department of Management and Budget is giving a 33 percent improvement in the time and effort involved in receipting and recording the revenue entering the state coffers every day.

The system software, named SMACS (standard microcomputer accounting system), is running on a Micromation system with a 20-megabyte Winchester hard disk and twin 20 cm floppy disc drives.

By handling five different recording, audit and receipting functions from the one entry, the system has markedly reduced errors. It has also reduced the backlog of functions, such as the issuing of receipts, and produces a range of regular reports.

The system is being developed in three stand-alone or interactive modules – revenue, payments and invoicing/debtors. □

Voice Given To PCs

A PLUG-IN speech-synthesis module provides Hewlett Packard's Series 80 microcomputers with the capability to add up to 1500 words, phrases or sounds.

The HP82967A comes complete with software for reviewing, editing and creating needed speech output. The Speech Editor program makes it easy to incorporate speech into BASIC-language programs through the addition of commands such as "SPEAK" to the Series 80's operating system.

The HP82967A draws its power directly from the Series 80 mainframe, so no separate power supply is needed. The module will soon be available from authorized HP microcomputer dealers. □

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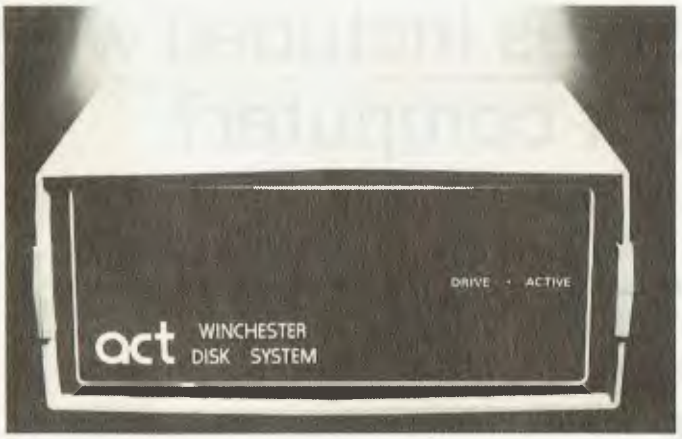

Hard Disks Throughout Australia

ACT'S WINCHESTER Hard Disk System is marketed as a complete sub-system, consisting of the hard disk, main controller board, power supply and cabinet. After twelve months of field testing, the unit can now be purchased nationwide.

The system runs on the Heath/Zenith, Northstar Advantage' and Horizon, Xerox 820, Osborne I and II, Superbrain, TRS80 II and III, Apple II, S100, Kaypro, Sigma OKI, Sanyo and IBM Personal Computer.

ACT's future plans include the ACT PLUS 5, a card for the IBM-PC, including serial, parallel and hard disk interfaces with memory and real time clock. Another project is the Octopus, a printer buffer which has serial/parallel/serial conversion and modem connection. For further information contact ACT at 75 Willoughby Road, Crows Nest, NSW 2065. □

Budget Video Monitor

AED MICROCOMPUTERS is selling a new video monitor for about $458 (including tax). The new display offers 22Mhz video bandwidth, plus a modifiable swivel and tilt facility.

The monitor can be used on any computer system that produces a one volt peak to peak video signal – for example, System 80, VIC 20, Sorcerer, Applied Technology's DGOS systems, or any computer that uses a video card.

There is space for a 270 mm by 320 mm Printed circuit card as well as a suitable power supply. This allows the monitor to be turned into a complete standalone computer or terminal with the addition of appropriate electronics.

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The display is capable of sharp display of 80-character by 24-line format, as well as 64-character by 16- or 32-line format and, due to the 22 Mhz bandwidth, is capable of good performance with a 132-character format.

For further information or a demonstration, contact AED Microcomputer Products on (02) 681-4966. □

Computing From $3 An Hour

AUSTRALIA'S FIRST microcomputer access centre has opened in Pymble, Sydney. The Micro Time Centre enables anyone to use a microcomputer for $3 an hour.

Equipment at the centre includes Apple, IBM-PC, Sirius, Osborne, and Columbia microcomputers, running a range of word processing, financial worksheet, information recording, entertainment and graphic systems. In addition, provision is made for individuals to write their own programs.

Tuition courses will also be held at the centre including an introduction to microcomputers, and basic programming, commencing 23rd May. For further information call the Micro Time Centre, 6 West Street, Pymble, Tel (02) 498 7167. □

First Computer Lab

FOR THE first time in Australia, a computer centre offering free access to the public was opened on May 9, in Stage 1 of the Power House Museum.

The "Lab" consists of sixteen TRS80 Extended Colour computers, which have been donated by Tandy Australia, and can accommodate up to 32 people in a class. Trained Museum staff explain the use of the computers, teach introductory skills and conduct special sessions for booked groups.

Sessions from the general visitor are held at 11.45am and 2.45pm on weekdays during the school term and at regular intervals during weekends and public holidays. For further information ring Rosanne Hunt on (02) 217-0136. □

Another Financial Modeller

A NEW financial modeller, for use by either small or big businesses, is to be released in Australia by Deloitte Haskins and Sells.

Known as PlusPlan, the package has been developed specifically for use on the IBM-PC microcomputer. It is a flexible program designed to solve a wide range of business problems.

It can prepare forecasts, cash-flow projections, budgets, consolidations, management reports, variance reports, financial models, investment appraisals and so on. Full accounting integrity is preserved through the use of normal double-entry bookkeeping methods.

PlusPlan thinks in terms of trial balances, debits and credits, charts of accounts, reporting periods, companies and other concepts familiar to the accountant. It handles up to 999 accounts, 200 periods, 200 companies and 26 versions.

Other features include password protection and built-in operational consistency checks. □

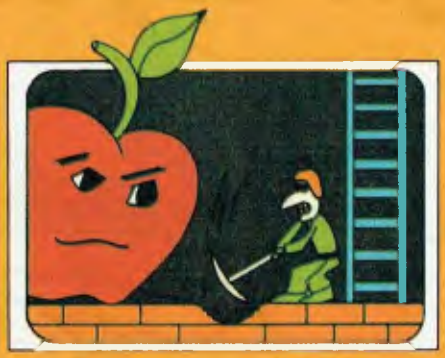
Yet Another Dick Shop

DICK SMITH has opened another electronics store, this time in the centre of Toowoomba, Queensland.

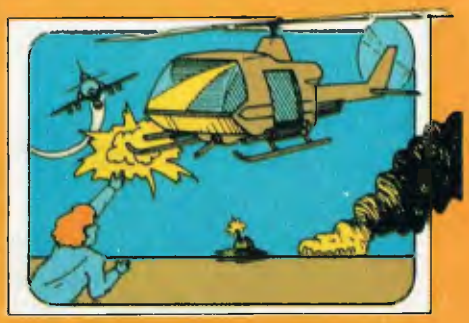
The shop is at the corner of Ruthven and Bowen Streets, Tel (076) 38-4300. Store manager Brian Marney will be pleased to assist you with any enquiries. □

VIC-20®?

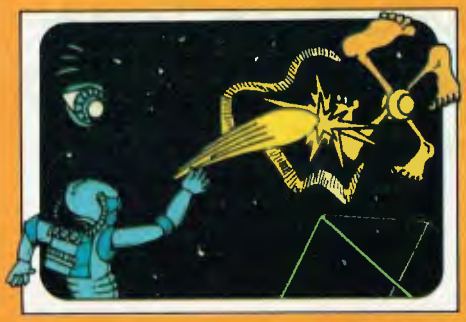
SERPENTINE



APPLE PANIC



CHOPLIFTER



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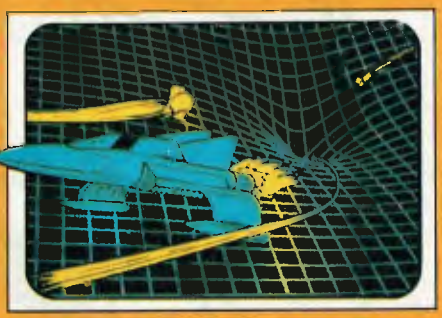

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Looking At The World Through Crystal Balls

We asked Les Bell what he thought the future of personal computers looked like, and he proceeded to demonstrate why his friends say he can talk the hind legs off a donkey...

THERE'S NO DOUBT that technology is moving faster and faster every year. If I may use economics as an analogy; inflation is the rate of change of value of the dollar. Well, not only do we have technological inflation, it's getting worse.

In this climate, where new computers appear every day, it's no wonder that fewer and fewer industry pundits are willing to place their crystal balls on the table and gaze into them. Nevertheless, what the managing editor demands, he usually gets, so here's my projection into the future...

Apples And Stars

The concepts illustrated in Apple's Lisa constitute a major change in the way we think about programming and using microcomputers. First, it introduces graphical operations to microcomputers in an easy and natural way - so natural that it is the preferred way of conversing with the computer.

The Lisa uses a small box on wheels called a mouse to position the cursor. By moving the mouse on his desktop, the user simultaneously moves the cursor to point to the object which he wants to work with.

Lisa's screen is completely graphic: while CP/M users think alphabetically sorted file directory listings are pretty smart, Lisa bypasses that inconvenience completely by simply displaying some small file folders with names such as "Alpha Project" or "Next Year's Plan". A file folder is effectively a hierarchical directory; opening it (by pointing at it with the mouse) will reveal files inside with names such as "Alpha Budget" or "Alpha Staff Listing" or "Memo re Alpha".

Lisa, therefore, provides one of the neatest features of Unix and similar operating systems – hierarchical files – without the user being aware that such a subtle concept is involved. He merely sticks all related files into the one folder, the same as he would in a paper office.

Two important points are involved here: first, the operating system behaves in the same natural way as the user would normally organise his work - it imposes no unnatural restraints. Second, the operating system is virtually invisible to the user: he's not aware that he is dealing with the operating system as opposed to a program. As far as he is concerned, he is working with Lisa, as a totally integrated machine or system.

The use of symbols, or icons, to represent files and activities helps to reassure the user, by providing a link with his old manual work environment. For example, a file is deleted by moving it into the wastebasket. What could be more natural?

However, Lisa poses a few interesting questions about the way users come to grips with using their computers. For example, once a user is familiar with his paperless office, and no longer uses a real wastebasket, the value of the icon as a reassurance is largely wasted. To what extent will the use of icons inhibit the user from grasping more sophisticated and more powerful concepts which are peculiar to working with computers?

There is no reason to believe that the program that is easiest to use is the most useful. For example, Multiplan is considerably more sophisticated and slightly more difficult to use, yet I'd wager the bulk of Multiplan purchasers are former VisiCalc owners – and the bulk of them would not have considered using a microcomputer a few years ago. Having mastered the basics of simple spreadsheets, they are now ready for more powerful concepts such as iteration – an idea that is virtually unthinkable with paper analysis sheets.

Nonetheless, the Smalltalk environment which is brought to fruition in Lisa is an important breakthrough. Though it has not been put to the acid test – going on sale to the public – its conceptual appeal is enormous. Other manufacturers are bound to follow with similar machines.

Integrated Software

The other major breakthrough which Lisa represents is integrated software. With integrated software, all the software works in the same way – no longer does the user have to operate the arrow keys to move the cursor in one program and Control-S,D,E,X in another. All operations are consistent.

What's more, the various modules which make up an integrated software package are able to share files. The communications module may be used to capture a portion of a database from a mainframe computer, and then the database manager module is used to produce some statistics from it. This information is then transferred to the spreadsheet calculator for analysis, and then plotted using the graphics module. All this is achieved without complicated file transfers through intermediate formats, or – horror of horrors – re-keyboarding.

Lisa provides full integration through its operation analogous to paper and scissors. Regardless of their type, documents can simply be cut and pasted with the hidden operating system taking care of all file transfers and reformatting.

New packages for the IBM-PC and other machines, such as Context MBA and Lotus 1,2,3, provide integration as described. VisiCorp is working on an integrated environment for its VisiCalc, VisiTrend and VisiPlot products. To be known as VisiOn, the package will provide the ability to open multiple windows on the screen and execute programs concurrently, with automatic file transfers.

MicroPro, of WordStar fame, is also working on a product which will integrate its various products under CP/M. Called StarBurst, it will be released later this year.

In the next year, we can expect to see companies with spreadsheet and similar programs moving to provide integration, by providing a shell around the operating system to support concurrent operation and windowing. Companies such as Perfect Software, which has written software in C and taken advantage of virtual memory techniques, are in a particularly strong position.

Project Management

While I'm on the subject of software, I'd like to predict that the next area which applications software developers will focus on will be project management. VisiCalc succeeded because it was a tremendously wide-ranging problem solver; virtually every businessman has a use for it.

Many managers work on projects, be they construction work or the launch of new products. The management of time and resources in such projects is amenable to computer solution, but more importantly, once the problem is solved, computer-generated reports can be used to communicate plans to the members of the project team.

An example of such a program is Milestone, which has already been reviewed in *Your Computer* and is now available from VisiCorp as VisiSchedule for the IBM-PC. I confidently predict a rash of such programs in coming months.

Portable Micros

As soon as I start any project, I run through the various tasks to be accomplished, and decide which of them can be computerised. The major limitation is not the suitability of the tasks for computerisation, but the feasibility of providing computer power on the spot, where it is needed. In other words, I could use my computer virtually 24 hours a day, if it was small enough to travel around with me to meetings and home at night.

I often get frustrated in the evenings at home. As I settle down after dinner with a glass of Carlsberg, my mind will

start to wander over the day's problems, and now that the pressure is off, my subconscious will throw up the solution to a thorny programming problem or another idea of where a bug lies. But without the computer at home, all I can do is make a note and wait till the following day.

Many other users experience similar frustration. It's not a case of being a computer junkie, it's a consequence of putting so much of your work on a computer. The solution is to have two computers – one at work and one at home – or to transport the computer between home and work.

The latter solution is more promising, as it is also available for outside meetings and other tasks. With the addition of a real-time clock and calendar with alarm functions, a portable microcomputer can take on many of the functions of a personal assistant. Portability adds a new dimension to the utility of a computer.

Therefore, I predict a new wave of briefcase-size computers, similar to the HP-75C, with the ability to handle word-processing for memos, spreadsheet calculations and able to run specialist programs. They must also have the ability to handle appointments and alarms, as well as storing telephone numbers and addresses. They may also offer facilities for professional time-accounting and similar functions.

Slightly larger in scale, I predict that virtually all the new IBM-PC compatible (and similar) machines will be portables with integrated screens. Already due for release are the Hyperion and the Compaq; Columbia is readying its model, and others are sure to follow. In fact, some observers predict that the next IBM release will be a portable.

Look also for briefcase-size portables with liquid-crystal graphic displays and 16-bit processors. One confident prediction I can make is of a less-than-briefcase-sized portable providing a Lisa-like Smalltalk environment, complete with icons, on a small liquid-crystal display. The machine will feature 256 kilobytes of memory, an integrated IBM-PC-compatible disk drive and thermal graphics printer, and plug-in ROMS for applications such as word-processing – all for, say, $5500 and by the end of the year.

CP/M-86 v MS-DOS

Despite Microsoft's protestations to the contrary, the CP/M-86 versus MS-DOS operating-system battle is not yet over. Both Digital Research and Microsoft have recently been upgrading their 16-bit operating systems, Digital Research adding true concurrency (multitasking) and Microsoft adding spooling and hierarchical directories.

Microsoft certainly has a marketing edge; it is a much brasher, higher-profile company than Digital Research, and has always been much more end-user oriented. On the other hand, Digital Research is a thorough-going implementor, and has made strong moves into the languages area, previously Microsoft's home ground. With the release of its Logo, Digital Research will assume a higher profile to end-users. And, of course, its GSX graphics kernel solves graphics problems for users of a whole range of microcomputers.

Graphics is a major bug-bear and the biggest area of incompatibility between microcomputers. While Microsoft's GW-BASIC provides similar graphics facilities on a number of computers, the commands are only available within BASIC, and not from other languages or applications programs. Digital Research's solution is GSX, a graphics kernel which complies with the ANSI X3H3 graphics standard, and is part of the operating system, available to all programs and languages.

Digital Research, then, is providing software and system development tools for software houses to use. Microsoft, on the other hand, is aiming at the end-users with the Multitools series of software. The real battle will come with the multi-user operating systems, as MP/M battles Xenix. Of course, there's never been anything to stop Digital Research buying its own licence for UNIX – I wonder why it hasn't?

In the meantime, software developers like VisiCorp are moving to plug gaps in their software's operating environment by writing their own operating-system extensions, and the logical result of this trend will be a VisiCorp operating system. If this happens, Microsoft will suffer more than Digital Research.

Disk-Formats Insanity

I foresee no standardisation in the area of floppy disks, other than the existing 20 cm SSSD standard. With the advent of 7.5, 9, 9.5 and 10 cm disks, it's just going to get worse. Though good and wise men have long pleaded for standards, the proliferation of 13 cm disk formats doesn't seem to have hurt the industry, which is selling as many machines as it can get its hands on.

The only people who have suffered are the end-users, who realise too late that they can't swap disks with Bill in the office next door, and must come to grips with the complexities and inconveniences of asynchronous communications to transfer files.

Unfortunately, the end-user exerts virtually no influence in the standards process, and manufacturers are quick to throw standards out the window in the name of improved performance. At least SofTech, which markets the UCSD p-system, has designed a machine-independent transfer format and utilities to support it.

Networks And Other Thoughts

Here are a few rather more contentious statements, with rather less hard evidence to support them.

The next year will see the release of a number of new network standards. IBM should release its local area network system, thereby challenging everyone else to beat them or join them. This year will start to see the acceptance of local area networks in large organisations, although dp managers will continue to fret and fuss over their inability to control networks.

Personal computer software developers will show new levels of professionalism as more mainframe people abandon that particular sinking ship. With the advent of cheaper (and more) mass storage such as Winchesters, accounting packages will start to provide such essential niceties as audit trails and full historical accounting.

This year should see the arrival of laser video disks as a read/write mass storage device. It won't be cheap. While I'm on the subject of video disks, expect some interesting developments out of the educational community involving computer-controlled disks.

Interest will continue in new languages such as Simula II, and people will start doing useful things in Smalltalk.

Home computers have just about reached their bottom limit on price. Rather than drop prices further, manufacturers will hold the price constant while providing more features such as more memory or better colour graphics.

Those are about all the predictions I can safely make without sticking my neck too far out. In any case, if only half those predictions come true, the next few years are going to be interesting anyway. . . □

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XE6705 DEATHTRAP
You must guide yourself around a maze avoiding the randomly appearing obstacles. But beware, if you hit one, its back to the start.

XE6710 BREAKTHROUGH
A familiar game where you must hit the ball with your bat and try to bash out the rows of bricks. The more you knock out the faster it goes.

XE6715 WORMSQUIRM
A two player game where you must guide your worm to avoid hitting the walls and to avoid running into your own tail, as well as your opponents. A fast moving game.

XE6725 PRINTER GRAPHICS
This is a unique program development to allow a hard copy reproduction on a Epson MX80 or Epson MX100, type 2 or 3 or any other similar dot matrix impact printer.

XE6735 EUCHRE
The well known card game, except you match your wits against the computer.

XE6780 BACUP
A program to assist you in making backup copies. Allows you to load in a file loaded at 300 baud and save it again at 200 baud or 1200 baud.

XE6790 ARTILLERY
Angles, parabolas and the effect of wind speed changes on the trajectory of a shell. Three modes of operation tutorial, game, competition for 2-6 players.

XE6795 CLOZE
Designed to develop reading skills. Looking ahead and guessing are encouraged. Contains 3 stories at approx the same reading difficulty. Suitable for senior primary/junior secondary.

XE6800 ESCAPE
Mathematics — full graphics and sound in a game situation to develop understanding of the order of operations and to develop skill in writing and solving simple equations.

XE6805 TANK BATTLE
A game for two players whose tactics is an important factor.

XE6810 TOWNS & CITIES — NSW
Deals with maps and the location of various towns and cities throughout Australia. This one is on towns in NSW.

XE6815 TOWNS & CITIES — AUSTRALIA
This program is similar to the above except that it deals with 40 major cities and towns in Australia. You are given a town name, and you have to point it out of the map. Then you are given a location of a town, and you must name it.

XE6820 NUMBER FACTS
Drill and practice of tables and number facts. Options cover all operations plus mixed parameters for addition and subtraction may be set. Speed is selectable. Suitable for individual or a small group.

XE6825 SECRET NUMBER
A comprehensive program in a challenging format which develops a child's understanding of the properties of a number (e.g. prime, composite, multiple, square, fibonacci, random etc.

XE6830 BATTLESHIP
The old game where the battleships have to be bombed and they are at certain places on the grid.

XE6170 ROBOT MAN
One of the most popular Microbee games, and is almost identical to the well known "Pacman". Super graphics and sound.

XE6175 HOUSE OF FRANKENSTEIN
A very challenging adventure game. Needs a 32K machine and can take weeks to resolve. Has built in game save facility to re-load the game and resume play from your last session.

XE6180 PERSONAL FINANCE
Having trouble trying to track down where your money is going? With this program you state how much money you had to pay, who it was paid to, when it was paid etc.

XE6181 FINANCIAL DIARY
Having trouble with your cheque book? or do you just want to keep tabs on your bank manager. This handy program helps you to keep tabs on your cheque book.

XE6200 PILOT
Getting bored with Basic and haven't got any money to get into Assembly language? Then this is the answer. Pilot is an easier language to learn making it easier for children to learn programming.

XE6205 WORK A BEE
WORK A BEE is a program which can actually write educational programs almost automatically! Any teacher with little or almost no knowledge of BASIC can insert details as to question and answer, number of tries, marks per question and other controls. Any CAI program can be saved and reused and subroutines have been included to enable the student to go back over his work, printing answers, avoid error traps etc.

XE6210 TURTLE GRAPHICS
A very clever program allows the student to use the MICROBEE to draw using high resolution turtle graphics. This is a very powerful graphics program which uses the PCG facility in the MICROBEE to its full extent.

XE6247 MATHS ADVENTURE
Adventure game with a twist. You must answer a maths question before you can proceed. But don't be fooled they are not easy, make sure you have a pen and paper ready.

XE6249 ESCAPE FROM COLDITZ
A two fold adventure game where the first mission is to assemble an escape kit. Once this is achieved you must then try to escape. A guard is constantly wandering around the grounds, so watch out.

XE6253 MONKEY MATHS
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XE6020 PCG TUTORIAL
A must for anyone interested in PCG graphics. Slowly goes through the Tutorial explaining every move and showing the finished product.

XE6040 CONCENTRATION
A family game involving 1-4 players to test your memory skills, like the TV game.

XE6050 CHESS
A game to test your wit with up to six levels of play. Has built in help feature. Can also solve Sunday Paper chess puzzle.

XE6060 TYPE — SOLITAIRE
Helps you to learn touch typing and also has a game called Solitaire to really test your skill.

XE6070 TARGET
A game in which you have a cannon at the bottom of the screen and the idea is to shoot down the UFO's. Nine levels of play.

XE6080 LUNAR LANDER
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XE6090 STARSHOOT HANGMAN
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XE6150 Z TREK
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XE6160 "ESC" KEY
A program to give you ease in making programs by single letter word entry. This is done by pressing the "ESC" key and the letter you want and up comes the command on the screen.

XE6220 BOGGLER
Ever played Boggle before? In this program the computer randomly selects the letters and also provides a three minute timer. The idea is to make words from adjoining letters.

XE6225 LEARNING CAN BE FUN 1A
Two learning games on the one cassette. Gorilla is a game where you have to answer a maths question before the barrel that the gorilla has rolled at the boy, reaches him. The other game is a fraction game also in graphics.

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XE6230 LEARNING CAN BE FUN 1B
Another two learning games. Munch is a game where you must steer your Pacman to the correct answer. TNT is where you must answer all the questions given before the bomb explodes.

XE6235 LEARNING CAN BE FUN 1C
Another two learning games. Adstar is a variation of Space Invaders where you must shoot at the ship with the correct answer. Square is where you must find the square of a number in order to destroy the hovering space ship.

XE6240 LEARNING CAN BE FUN 2A
And yet another two learning games. A-C is based on a well known little Allen Creature where you must move his head to the correct answer. M-Race is similar.

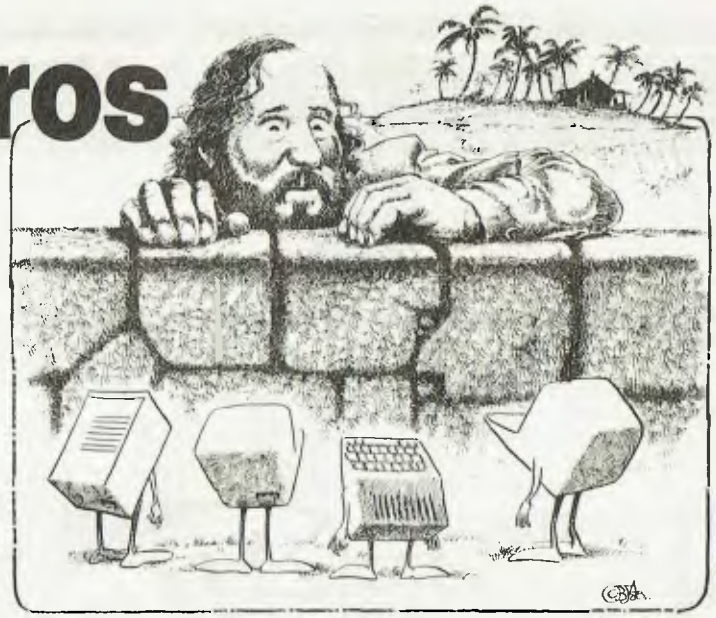
XE6245 CHASE PLUS
Several programs in one. Some that make interesting patterns on the screen. Another program that is similar to "Breakout" and a great graphic program where robots are chasing you in an electrofield maze. One wrong move and your zapped.

XE6251 KEYBOARD TUTORIAL
This program uses a mixture of text and graphics to show the user the effect of the keys like backspace, delete, return etc. It employs a friendly approach to remove the initial fear of using a computer.

XE6257 LISTING FORMATTER
Provides formatting for listing on a printer. Cleans up the listing so it is easier to read.

XE6755 CARD INDEX SYSTEM
This program simulates the card index system in that it nearly files a series of records, and the user can leaf through the file inspecting each record one by one.

When Micros Rule The World



Look out, 1984 – we're coming, ready or not! Bill Bolton takes a cautious peek into the not-so-distant future of the microcomputer...

WHEN I WAS first asked to write this story, I was very enthusiastic. I thought about all the truly enormous technological possibilities, and started to do some hard research...which, of course, included finding out what most of the industry gurus have to say about where computers in general, and microcomputers in particular, are going.

I hadn't read too many of those stories before I got the old "been there, done that" feeling. The predictions were admittedly different, but the style was the same as it had been back in the early days of micros, circa 1976.

So I dug back into my stacks of *Byte* (which, curiously, has carried very little long-term predictive material), *Interface Age* (it was worth reading in those days), *Kilobaud* and the like, and read some of the predictions made back in the mid-Seventies.

I don't intend to bore you with just how far off-course the great majority of those predictions were. (In fact, the only ones that were reasonably accurate were made by Adam Osborne, the founder of one of the most spectacularly successful microcomputer companies in the industry.) Mostly, however, the predictions were along the lines that by 1980 every home would have several small computers doing everything from mowing the lawn to educating the kids.

Well, here we are in 1983 and there's still no relief in sight for me in that fortnightly battle with that weed patch I laughingly refer to as a lawn. There are a lot more people using microcomputers today than in 1976 when I bought my first micro, but on the whole it's still people with a predisposition toward computers (either vocationally or as a hobby) who make up the bulk of computer users.

The technology to do all the things the 1976 writers predicted is certainly available, so why hasn't it happened? There's no simple answer (except perhaps "42"), but I believe the major reason is related to the nature of product-manufacturing and marketing. In short, the computer industry still hasn't been able to find out what is needed to make computers attractive to "everyone" – that is, to achieve the golden goal of at least one computer in every home (or at least every home that can afford one).

The great majority of people can see no earthly use for a computer in the mundane details of daily existence. To that fundamental question, "What will it do for me," the industry has only very poor answers. Computers are very good at manipulating numbers, but most people have a minimal need to manipulate numbers much at all. What needs they do have can mostly be met with $20 pocket calculators.

Now, a computer that would clean your shoes, say "No" to the bill collector, wash the car...well, that would be really useful. But while the hardware to do all these things is readily available, the software is non-existent.

The real problem is that computers can't "think" in any meaningful way, yet most of the things we'd like them to do require an awful lot of thought, even if it's that boring sort of thinking like remembering to wash the top of the car first and winding the windows up.

Until we understand a whole lot more about how humans think, it's unlikely that we'll be able to make computers do anything perceived as really useful by the average Australian.

What I'm trying to get at is that the stuff that makes up much of the content of "Future of Computing" articles in the popular press is just pie in the sky. Trying to predict the real world is much harder. Most of the people who can do it successfully are not telling you their predictions at all: they're quietly living off their considerable fortunes somewhere very sunny and pleasant, getting a lot of people to think up new ways to be nice to them.

Since I obviously haven't reached that exalted state (and really have no aspiration to), you may have by now guessed that whatever I have to say from here on in is said with a fair degree of scepticism on my part. However, it's my best attempt to look into the development paths that micros will follow for the next few years.

And So, The Future...

The 16-bit machines will dominate all market areas within 18 months. It won't cost any more to manufacture a 16-bit machine (even if it's a pseudo 16-bit machine based on an 8088) than it does to make eight-bit machines, so most manufactures will swing all production across to the 16ers.

The 16-bit software will get much, much better and we will start to see the promise of 16-bit machines really delivered.

The eight-bit software development will effectively cease – all new development will be for 16-bit machines.

Programming in Assembler will start to become a rarity. Almost all programming will be done in high-level languages.

The 32-bit machines will start to appear, but they'll take a long time to gain market acceptance. It's possible that there will be stiff market resistance at moving to 32-bit machines until everyone feels comfortable about 16-bit machines.

An industry standard, de facto or otherwise, for local-area networks (LAN) will finally emerge. It will probably come from IBM, and it will very quickly be

widely adopted. LAN support will be essential for business applications.

IBM will come under increasing competition as the largest computer company, but it will hold the top spot.

Japan will start to generate small but significant amounts of first-class home-grown software and, in the process, scare the hell out of the United States manufacturers.

Japanese microcomputers will start to decimate the United States micro-manufacturing market in the same way that Japanese cars, high-fidelity sound systems and cameras have. Too many American manufacturers will yet again stick their heads in the sand and not realise the threat until it's too late.

The Motorola 68000 series microprocessors will continue to be dominated by the Intel 86 family, which has more support, and the NatSemi 16000 family, which has better performance (the 6800 story all over again).

New printer technology which will replace impact technology and cheap, fast, letter-quality printers will become a reality.

New disk-storage technology using vertical recording will appear and take small disk-storage capacity to new heights.

The 20 cm disk systems will continue to remain the only generally useful disk interchange medium between microcomputers.

The 10 cm and smaller disk systems will appear in increasing numbers but it will take a while before there is any standardisation.

Networked microcomputers will dominate in the small to medium microcomputer area. In future, a small VAX-style machine will be the smallest viable minicomputer.

The educational software market will continue to show great promise but will fail to deliver the goods.

Over To You...

Okay, that's it. For those of you who are now feeling that you already knew all this, or that I'm totally wrong, you can write next year's article. We'll see how good your predictions are...

I believe that probably about 50 per cent of my predictions will come to pass. If I really knew which ones, I'd be putting a deposit on a tropical island right now! I certainly believe that, given the present position of the market, all the predictions are very real possibilities rather than pie-in-the-sky guesses.

Now that my credibility for the next couple of years has been put well and truly on the line, I think I'll just go back to writing nice safe articles about operating systems and communications and leave this predicting stuff to others. I wonder what *The Hitchhiker's Guide to the Galaxy* has to to say about predictions...hmmmm! □

Thus Spake Rudolph Langer

Rudolph Langer, of the Sybex publishing group, has been involved with computers for years. On a recent visit to Australia, he talked to Lindsay Shapero about the "iron age" of computers, Sybex and the future.

"WHEN I TALK about the early days of computing," says publisher Rudolph Langer, who did his computer apprenticeship for North American Aviation in the late Fifties, "I mean more than 20 years ago. But in some ways, things haven't changed at all – everything seems to be of a cyclical nature." Today, Langer is editor-in-chief of Sybex, the much-respected United States computer-book publishing company. He visited Sydney earlier this year, to attend the first annual Australian Personal Computer Show.

"In the early days," he recalls, "most of the experienced programmers were women. That was because when computers first came about, they were thought of as just another business machine, something like an adding machine.

"Therefore, the women in the offices were given them to master, and they quickly progressed to becoming programmers.

"At North American Aviation, where I first worked, the women – and, of course, the men – were already programming orbit trajectories, as we were making a bid for the Apollo space project.

"The systems we used were the IBM 704, 709, 790 and 1620. They were huge, filling the room, and cost three and a half million dollars each.

"Nowadays, an easily affordable computer with more power is available from any mid-range selection. Because of this, the days of *the* computer are gone – it's now *my* computer, or *your* computer." By the Seventies, women had almost completely dropped out of computer-programming – "Probably because by then it had become a sought-after profession, noticeably by men" – but they're now making a strong comeback, largely because of the growing popularity of the word-processor in the office environment. The cyclical theory...

Langer likes to expel much of the mystery that surrounds computers: "It's rubbish to say you have to be good at mathematics to understand computers – the important thing is to be willing to have a go.

"Frequently, people are motivated to learn about computers by watching someone they know use one, and thinking, 'If they can do it, well so can I.' Sybex didn't start out as a publishing company – it originally offered courses on all aspects of microprocessors and microcomputers to large corporations. However, the company realised there was a need to illustrate its seminars with books...and that's how the publishing side of the business started.

As editor-in-chief, Langer's job is to recruit new authors. The company uses both technicians who have a command of the English language and laymen who have enthusiasm for their personal accomplishments.

"Both types of writer need guidance for both the content and the style of their books," says Langer.

Will publishing become extinct?

"What many computer engineers don't realise is that a screen is just a screen. Even though it has been used as a substitute for paper, it really is a two-dimensional, free-feel thing.

"You simply can't read text from a screen – so far, they're not good enough. You'd go bananas.

"No, the book, as an entity, is going to be around for a long time. However, I think that when computers become so simple that you just switch them on and use them, then manuals will wither away completely." And as far as Langer is concerned, that day can't come soon enough: "I have a horror, a great dislike, of the traditional manual. I had to learn parrot fashion from them for years – they can twist the mind!" He is enthusiastic about the Australian computer market.

"The Australian market is closer to the American market than any other," says Langer. "Australians are really interested in results, rather more than the internal workings. I mean, do you know how an internal-combustion engine runs, or how to read and write music? You don't need to know those things to appreciate what they represent.

"The Australian Personal Computer Show, which was probably as large as the West Coast Computer Faire in California, surprised me with its size and popularity. There was also a wonderful amount of enthusiasm being generated, much more than you see in most European exhibitions.

"Australia is really set to speed ahead in the computer industry." □

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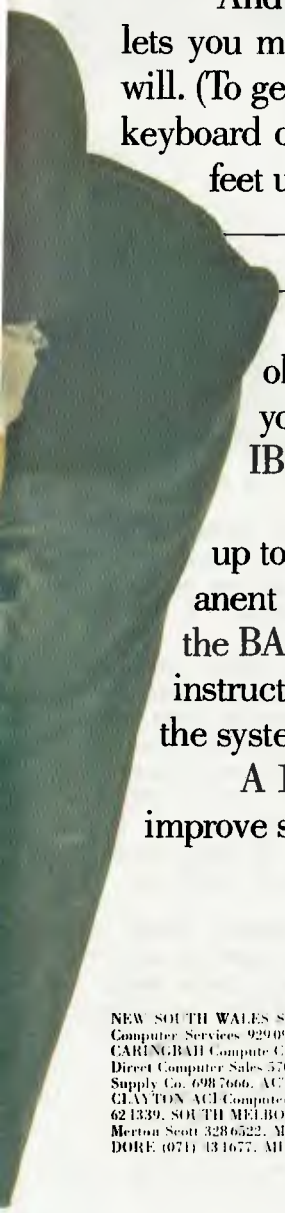

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Are You Being Served?

By Lindsay Shapero

Philip Dowling and Rod Becker, managers of Grace Brothers' computer department in the city.

Without much fanfare, the personal computer has taken its first steps out of the specialist shop into the mass-market departmental store.

EARLIER this year, a personal-computer department was opened in the basement of Myer's Market Street (Sydney) store, just along from the menswear department. However, within days of this event, the giant Myer chain announced that it was selling all but one of its New South Wales outlets – including the coveted Market Street branch – to archrival Grace Brothers.

At the same time that Myer was busy opening a personal-computer department in its Market Street basement, Grace Brothers was equally busy on the other side of town, opening a personal-computer "Business Centre" at its Parramatta departmental store.

The lack of publicity which these two openings attracted was not unrelated to the confusion that surrounded Grace Brothers' takeover of Myer. In fact, it was not until late-April, some two months after the openings, that the public-at-large came to terms with what the mammoth takeover meant: Goodbye Myer, hello Grace Brothers.

"First Floor, Socks And Computers . . ."

The concept of selling computers alongside men's trousers and television sets attracted more than a little scepticism from industry observers: were Myer and Grace Brothers seriously expecting their sales personnel to be capable of selling computers, a high-technology product that presumably requires more knowledge than flogging socks or television sets? And perhaps more importantly, was there sufficient demand (in departmental-store terms) for personal computers, anyway?

As it has turned out, the salesmen have proved to be up to the task, and the market is obviously there, for both centres are flourishing.

The trend of selling computers through departmental stores started in the United States, with such giants as Sears, Roebuck and Macy's. In Australia, departmental stores are obviously a very convenient way to shop, what with more-flexible business hours and attractive time-payment schemes. For example, Grace Brothers offers 90-day interest-free credit, lease finance on $10,000 upwards, as well as accepting the usual credit cards and, of course, cash.

Roger Davis, the national sales manager of Commodore, has been dealing with the Myer Emporium since October 1982, through its Lonsdale Street store in Melbourne. The staff there were primarily involved with handling the Commodore VIC-20 as a games machine, but are now doing courses on extended peripherals such as disk-based software.

"Previously, salesmen knew more about the product than the customer, but in some cases that's being reversed," said Davis. "We give full product training, with courses tailored to fit the individual store.

"The response from staff has been excellent – they're very keen and interested, and have occasionally been allowed to take the machine home on the weekend to practice."

Business Basement

Manager Philip Dowling and business-systems analyst Rod Becker are

running the computer department in Grace Brothers' Market Street, Sydney, store. They offer the IBM-PC, NEC Advanced Personal Computer, Panasonic JB3000, Apple 2E and the Osborne 1 and see themselves as selling "business systems for the electronic offices of the future." Dowling explains: "This is the first step at bringing together a total electronics office concept, as we sell electronic typewriters, computerised telephones and so on, as well as computers.

"In the next four or five years, we'll have totally integrated offices attached to a computer. Desk-top computers will be a necessity for the middle manager - unless he can cope with one, he'll be ill-equipped, to say the least." The atmosphere at Grace Brothers' Market Street centre is relaxed and informal. This is no accident.

"People can come in and chat to us about the system they want to use for a particular problem," says Rod Becker. "We want to be sure they're confident with their decision. In fact, we budget for seven to nine hours of discussion with each customer before making a sale.

"Jargon is banned on the shop floor, as it only frightens most people. We don't expect to close a sale quickly, as we research the alternatives for each customer. Basically, the software is vital – the hardware is only incidental." Eventually, there will be eight staff looking after the Market Street computer department: Dowling, Becker, a full-time technician and five sales people. IBM has held training seminars for the staff and technicians, and a two-week course was hosted in Melbourne by various suppliers. The suppliers have been on call, and representatives from all systems on display have assisted with staff and customer inquiries. There is an ongoing program for three or four nights a week, and staff is regularly involved in updates.

Apart from training staff, Grace Brothers also offers excellent facilities for training its customers. There is a special training room with eight computers for hands-on experience, plus a seminar room for lectures. Seminars have been scheduled for the next six months, and software houses will also be giving lectures.

Grace Brothers has established a full servicing operation, making the set-up unique in New South Wales. On-site servicing is undertaken by the full-time technician, and the standard warranties of return-to-base and first-level service are offered.

"We're not here to compete with the knowledge of someone with a PhD in Science," says Becker, "but to provide sales with as much information and guidance as possible. Our typical customers are the small- to medium-size business, the middle manager in a large business and, to a lesser degree, the technical student."

The Alien Presence

Grace Brothers' Business Centre at

Above, the lecture and seminar room in Grace Brothers' Sydney city store, with full facilities for 'hands-on' experience. Below, the city showroom which sells a number of systems, plus related software and publications.

Parramatta is a smaller operation, selling the Panasonic JB3000, IBM-PC and the new Osborne. The centre supplies computers plus related software and stationery.

"We've drawn a line between business and personal computers," explains manager Geoff Darnell. "It's essential that the business and home/entertainment markets are separated, as they have a totally different atmosphere. A businessman isn't going to want to come in and talk about a system, only to find himself surrounded by kids playing games. "Our target market is people who realise they need assistance and want more efficiency, with something easily affordable. With the total IBM system available for under $10,000, it's now accessible to the small businessman.

"Our procedure is to bring a buyer to a private room, and then to have a relaxed conversation about his business problem and find a precise solution. Of course, our objective is to sell, but the overall ambition is to sell the solution first, and the hardware second.

"Apprehensive customers can be helped if they are talked to in straightforward English.

"In addition, people can walk in and out of the business centre without being accosted – the set-up has been designed to be open. We see ourselves as consultants, available for any queries, regardless of a sale." The Metropolitan Computer College, an offshoot of Sydney's Metropolitan Business College, is running an introductory course for those who are about to, or just have, made the decision to buy a computer. "This course gives the overall impression of a computer, plus hands-on experience, under supervision," says Darnell. "We're currently discussing, with the college, a similar course which would be available in our store." Darnell reports an encouraging response to his new department, especially as it is an "alien" area for Grace Brothers. All servicing for computers sold by the Business Centre is done by the stores' own electrical servicing division.

Electronic Concepts' Rudy Hoess says his company, which at that stage was sole distributor of the Apple range of microcomputers, was pleased with the extra outlet for small business or personal computers: "We're very happy that companies like Grace Brothers are investing funds up-front in their showroom facilities. Most retailers can't do this, even though it definitely uplifts the industry.

"Many people in the computer world are pleased to see the stratification of the industry, and the entrance of retailers."

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Adequate Planning?

However, Wang Computer's national sales manager, Tom Turner, says he is worried that retail outlets could cause some problems for companies that aren't sufficiently organised: "In a large company, the middle manager may use his annual office budget to buy a desktop computer, without considering whether the system will interface with others already in the organisation.

"It is imperative that companies define a computer strategy. Top management must get involved in technology, the utility of the information it provides and the productivity of the people needing the information.

"A lot of people buy solely on the basis of cost – the most in terms of processing for the least dollars. However, they're only looking at the initial investment, not at the cost of management time, in making a particular system work."

Grace Brothers' Philip Dowling disagrees: "We usually find that when a company decides to spend money on a computer, there is co-ordination of that decision. For example, some customers made the decision to buy a machine four or five months ago, but waited for the release of the IBM-PC, or comparative systems, and software." To the man in the street, the availability of small business and personal computers through departmental stores can only be a good thing. The relaxed atmosphere in Grace Brothers' business centres will undoubtedly generate confidence for the buyer, and should help to open the new computer era to the general public.

Customer Protection

Meanwhile, an association of computer retailers has been formed, with the declared aim of protecting the consumer from retailers who provide inadequate support. Called the Australian Computer Retailers' Association, its first meeting was held in Sydney in March.

Association president Bernard Kirschner, who is manager of Computerwave, explains: "The association is connected with the Australian Retailers' Association. It's Australia-wide, with state councils which are members of an overall council.

"Out of the 160 letters of inquiry we sent out to prospective members, there have been 60 replies, 20 of which said they will actively support us – so the guys are keen. We're now working on a logo, for members to display in their shops, and a code of ethics. There'll also be a regular newsletter containing information such as details of faulty programs." Kirschner says the association will help the public differentiate between dealers who provide full support and those "who just hand out boxes and leave the rest to the customer." He says he is concerned Australian retail industry might be tempted to follow the American trend of supermarket-style stores that sell computer hardware and software without any back-up.

"A lot of computers were sold in Australia over Christmas, very quickly," he points out. "In many cases, people who bought them didn't get adequate instruction and, as a result, a lot of systems are sitting in cupboards.

"This can only damage the market, as these disappointed people will discourage their friends from buying computers. I'd hate to see the market go the same way as those vibrating weight-loss machines – selling like hot cakes, but doing absolutely nothing."

Members of the Australian Computer Retailers' Association are required to meet certain requirements. The fact that their businesses must be a year old is important, Kirschner says, because "any store that's survived the past 12 months must be well set-up." There are two classes of membership: retailers, who are voting members, and importers/distributors, who have no direct power. Membership is $100 a year.

For further details, contact Bernard Kirschner on phone (02) 235-2162 Sydney. □

MICROBEE

THE FOLLOWING PROGRAMMES ARE NOW AVAILABLE FROM MYTEK COMPUTING

MACHINE CODE TUTORIAL consists of eight interactive exercises designed for teaching machine code programming and related topics as they apply to the MicroBee computer. Only a general knowledge of the BASIC language is assumed. MACHINE CODE TUTORIAL is designed to bridge the gap between BASIC programming and being able to understand and use typical Z80 manuals.

MACHINE CODE TUTORIAL uses a unique double screen technique to display both the normal computer output and the tutorial on the screen at one time. This allows the student to use the MicroBee in the normal way, while the tutorial instructions appear in the lower half of the screen.

A Monitor is built into MACHINE CODE TUTORIAL

Topics covered include the following:

- Using the in-built Monitor: DUMP, ENTER, GO MOVE
- Writing and Running Z80 Machine Code Programs
- Nearly all Z80 Mnemonics
- Flags
- Hexidecimal-Decimal-Binary Conversion
- Assembly Language and Hand Coding
- Using the BASIC USR(x) Statement
- Instream and Outstream Vectors
- Screen RAM
- Cursor Control
- PCG and Programming Graphics Shapes
- Memory Map Explained
- ROM Read Latch
- BASIC Scratch Area
- 6545 Video Driver Chip Explained
- RESET Options
- Special GO addresses in the BASIC Language
- Z80 Speeds and Timing
- Undocumented Secret Z80 Codes
- Keyboard Scanning. Checking for More Than One Key Depressed
- Parallel and Serial Interfacing
- Cassette Interface and Associated Subjects
- Sound Effects Generation
- Format of BASIC Programs in Memory
- Speech Digitizing

BASIC TUTORIAL is a super teaching aid for any classroom. BASIC TUTORIAL is a set of nine interactive exercises designed for teaching Basic to the computer novice. No previous knowledge is assumed.

BASIC TUTORIAL uses a unique double screen technique to display both the normal computer output and the tutorial exercises at the one time. This allows the student to use the MicroBee in the normal way, while the tutorial instructions appear in the lower half of the screen.

To learn to drive a car, a student must get in and drive. Reading theory books help, but the real learning comes by driving. The same applies to computing. Books are no substitute for experience. These computer run tutorial exercises teach computing better than any other form of instruction.

DIGITALKER is a Computer Voice Storage & Retrieval System. Give your MicroBee a Voice! DIGITALKER allows the MicroBee user to store his voice in the computer as digital data which may be played back at some later time.

Simply load the DIGITALKER software, plug the DIGITALKER hardware into the I/O PORT and connect the DIGITALKER lead to the EAR plug of your tape recorder.

Once the voice has been recorded, it may be played back immediately or stored on cassette. The digitized voice may easily be incorporated into the users own programs without detailed knowledge of machine code. The DIGITALKER hardware is not required in order to play back the voice. Thus any MicroBee user may play back a voice previously recorded with DIGITALKER!

★ A Monitor program is included with DIGITALKER ★

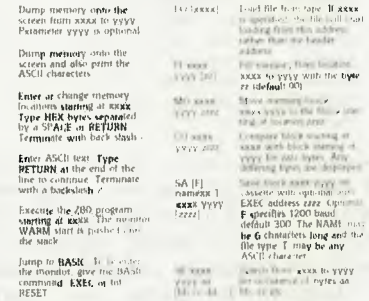
ASTEROIDS PLUS is the finest high resolution graphic arcade game available for the MicroBee computer. It features spinning 3-D point by point resolution graphics, shields, intelligent beings, guided missiles, black holes, high-score board and breathtaking sound effects. ASTEROIDS PLUS took more than 1,000 man hours to write and cost in excess of $20,000 to develop. You owe it to yourself to experience the best in arcade games on your MicroBee.

TOUCH-TYPE TUTOR employs one of the worlds most advanced methods of learning to touch-type. Most computer users are one-finger typists. As well as typing slowly, they contract eye strain by having to keep glancing between the keyboard and screen. TOUCH-TYPE-TUTOR quickly teaches the student to type without looking at the keyboard with a unique method of combining sight and sound. TOUCH-TYPE-TUTOR gives graded exercises and displays a keyboard on the screen. It also lights up the next key, flashes and beeps if any error is made and gives an accuracy rating. As well as all this, the words-per-minute rate is displayed and if the student does well, the MicroBee will actually compliment him in a human voice!

BEEZ80 is far from your average run-of-the-mill disassembler! Other than being a mere 4K long, able to disassemble at the speed of light and packed with options, BEEZ80 will display before your very eyes all those unknown instructions ZILOG never talk about! The author has been doing extensive research into the actions of the Z80 processor when confronted with the 700 or so undocumented (and so called "illegal") code sequences. Over 100 of these are VERY useful! Did you know you have extra 8 bit registers and a complete set of instructions to manipulate them? Did you know about extra rotate instructions?

MYTEK MONITOR provides the user with a System Level Interface which is a must for any application outside BASIC programming. A Monitor allows the user to display and change memory contents, move memory contents, save the load specified areas of memory to and from cassette, as well as fill, search and compare memory. MYTEK MONITOR loads into normally unused memory locations F400 through F7FF. Thus no valuable program space is used.

The following Monitor commands are available
Parameters enclosed in [square brackets] are optional.



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BEEZ80 Disassembler	$20.00
MYTEK MONITOR	$15.00

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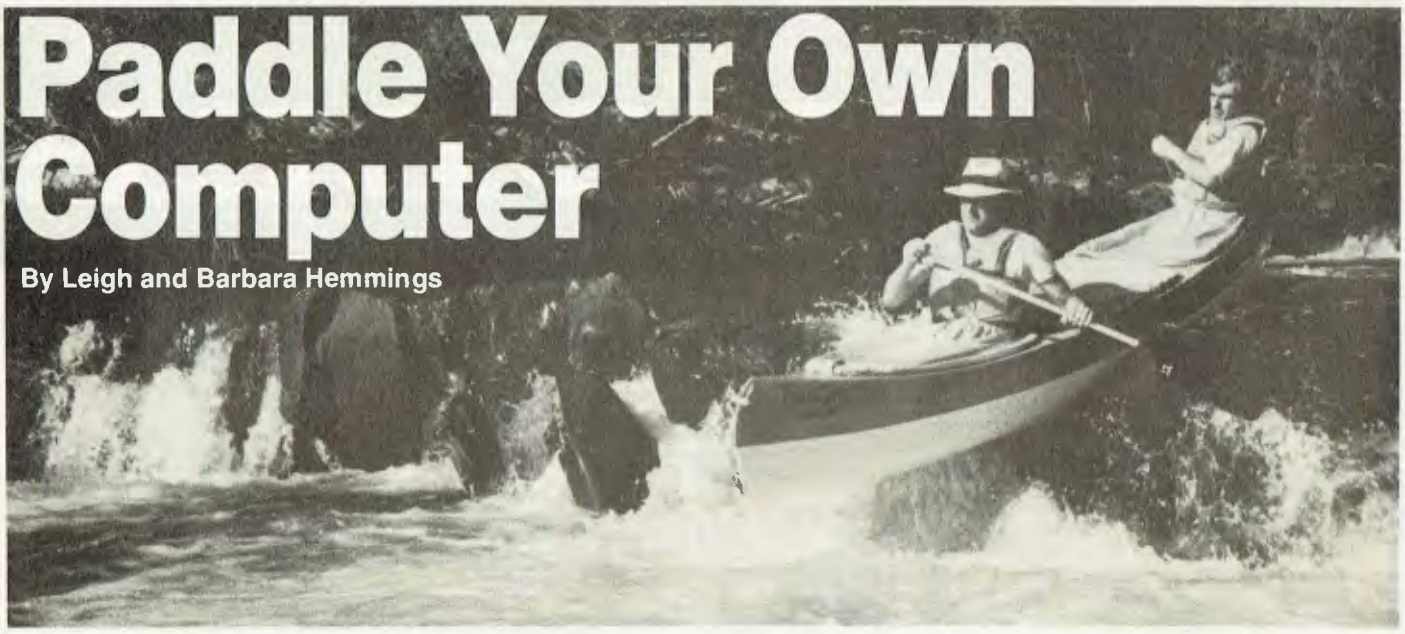

By Leigh and Barbara Hemmings

How the computer has help to keep a canoe-building company afloat in these troubled times.

KANGAROO

Item No.	Description	Quantity
RBASPLRW	POLYESTER LAM.RESIN WAXED	24.80
RPACINV/E	SELF ADHES.INVOICE ENVELOPES	0.60
RBASFCBB	FLOWCOAT BRUSH BEIGE	1.50
RBASMEKP-NF	MEKP HARDENER NF GRADE	610.00
RBASTALC	TALC POWDER	0.10
RBASSF10	AIREX FOAM 01/18 10MM	0.13
RBASSPA1	SEALANT POLYUR. ADHESIVE NO1	0.85
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RFAS4SSF4-14	1/4" X 7/8" S.S FLAT WASHER	12.00
RFAS3SSN4	1/4" S.S NYLOCK NUTS	12.00

IF WE TOLD you this list is only part of what it takes to make a Kangaroo, you'd think we'd gone "ga ga". However, this particular Kangaroo is just a bit special.

Along with its cousins, Emu, Wombat, Wobbygong and even a not-so-mythical Jumbuck, Kangaroo is a member of a range of glass-fibre and cross-link polyester canoes manufactured at Gloucester (New South Wales). The company, B Line, is set up to manufacture more than a thousand canoes each year, supplying the Eastern seaboard of Australia.

Each time a beautifully crafted canoe glides out of the factory, a simple piece of information is fed into the firm's computer. Just entering ACANKATW tells the computer that a canoe (ACAN), Kangaroo type (KA), colour tangerine on white (TW), has been constructed. The company uses recognisable codes, instead of just numbers, which makes life much simpler.

Once the information is entered, the computer then goes through every item in the Kit-Processing Report and deletes all the raw materials – more than 40 different items – used in its manufacture. So detailed is the list that it provides B Line with a totally updated stock file at all times.

B Line's managing director, Bill Payne, purchased a Small Business Computer (48 kilobytes, dual-drive 25 cm disks) and a Texas Instruments printer to take over the manual task of accounting. Prior to the arrival of the computer, the company was unable to extract any control data – it was always too late.

The Kit-Processing Report doesn't just give an exhaustive list of the items used in each canoe or kayak's construction – it also lists how the product is carried in stock and how much is used. Then it multiplies the cost and transfers the total to a raw-materials final cost. Labour costs and duty charges are also included, as are sundries such as abrasives and cutting blades. Finally, freight, load factor, sales tax, retail mark-up combine to make a retail price.

In fact, having a computer to do this is, in one sense, far too refined. If the computer handled the invoice directly, each boat would have a different price. For that reason, the suggested retail price is entered manually.

Though Payne is delighted with the refinements the system has added to his business, he has over the past four years come across a number of necessary improvements:

1. You need a machine with a "mile" of disk storage space.
2. You must know the method to store and delete information.
3. A good sales-tax system is necessary – namely, one that prints information by customer, product and columns per month.
4. It's essential to be able to set a budget, then access it for updates, as costs change during the financial year.
5. Budgets and sales histories should never end, to save having to start from scratch at the beginning of each year.

Payne points out that if you also want to be able to use the existing costing and nominate percentage increases foreseen, both for the product and for the cost, run a "What if?" budget. □

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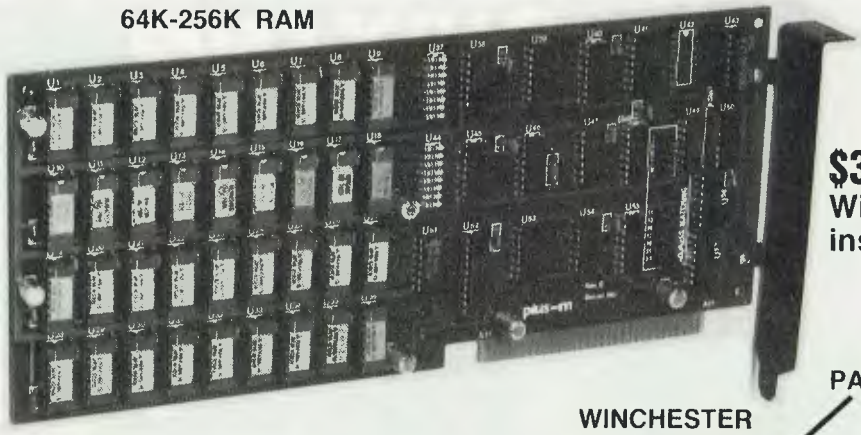

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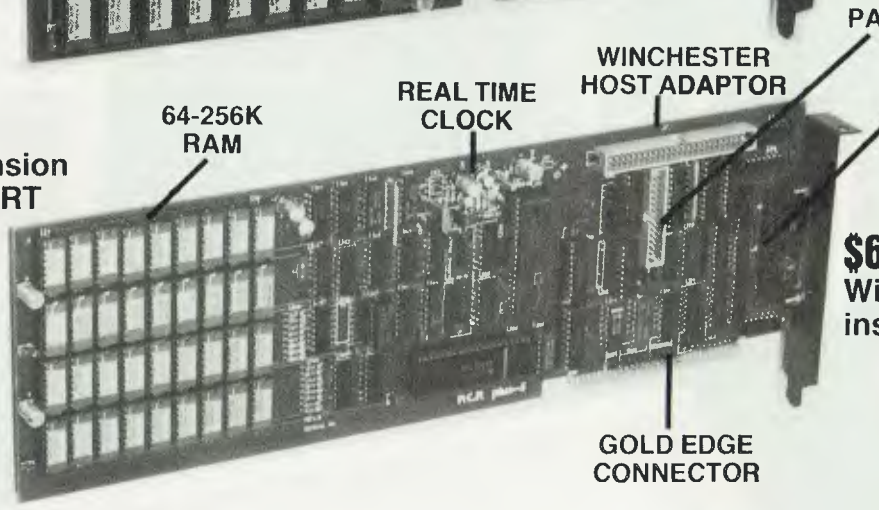

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Ouch! They Should Have Warned Me About That Last Step

By Phil Scott

ONCE UPON a time, which is the way all good stories begin, there was a man who joined words together for a living. He thought he was reasonably clever – verging on brilliance occasionally – although much too modest to blow his own trumpet.

This fella specialised in writing about cars and things, tapping out around 5000 words a week, 52 weeks of the year. That's two hundred and sixty thousand of them a year. Tap, tap, tap...day in and day out, on one of his four typewriters.

The pride of his motley keyboard collection was a vintage IBM golfball with about two million words to its credit.

Of the others, there was a pre-war Olivetti that needed kick starting, and a $79.95 Brother portable that he's used once and relegated to the bottom of a wardrobe, where it lay forgotten amongst a collection of smelly shoeleather and mothballs.

The one concession to modernity was another Brother – an EP20, the wafer thin job that was good for joining words together while sitting on aeroplanes, but not much else.

Then, on a fine and sunny morning, the IBM spluttered to a halt. It was pronounced terminal by the mechanic... history, cactus, gone away, deceased.

This posed a largish problem, what with deadlines and all. But even more worrying was the cost of a replacement. A cool 1400 smackers at a time when smackers were conspicuous by their absence.

Now this fella was of the opinion that hardware was the stuff you bought from Mitre 10 on Saturday mornings, and that floppy disks were an ailment of the spine, requiring chiropractic attention.

A Wet Wellington?

Hardly what you'd call a micro magician. Not by a long stretch. But the lad was nothing if not curious, so he pondered if a word processor might not be the solution to his problem.

He went out and bought a copy of *Your Computer*, read it, failed to understand the difference between RAM and ROM, secretly wondered if a cold boot was a wellington full of water, and threw his hands skywards in a gesture of defeat.

This was all too hard, but as a last resort he rang a long lost brother – a computer programmer by trade. Now brother advised succinctly to forget all that stuff about binary, BIOS, bits and buffers. Do take a look at a few micros, he said, they're not as mentally taxing as they seem to be.

So he made another telephone call. This time to his eminence Matt Whelan, a former motor noter himself, who graduated from crankcases and carbies to the managing editorship of this esteemed publication.

After lengthy consultation, the managing ed advised exercising the optic nerves and tactile senses at a shortlist of portable micros headed by the Osborne and Kaypro. This he did, at the most unlikely of outlets – the Myers emporium at Parramatta.

The salesman smiled a lot, said there was nothing to it and proceeded to demonstrate what he meant on an Osborne 1. Micraculously, a clear screen appeared and he invited our man to join some words together. Having done this, the sales chappie pressed a few buttons and those self-same words from the television set were sprayed onto paper at an amazing rate.

Then he gave a brief demo on editing the words, deleting stuff, adding a bit and getting the electronic brain box to space it so it looked real nice.

Okay, Emmachiset?

Dead simple. Bloody beauty thought the word joiner, this is just the ticket. Emmachiset?

A mere $2295 replied the salesman, and for that you get "all the software". Possessing a credit card from the aforesaid emporium, which obviated the need to find genuine folding brown notes, our man said he'd take one.

"You'll be needing a printer then sir?" said the salesman.

"Yeah, s'pose I will" said the man. "What about these Olivetti typewriters you can use with a computer?" he asked.

"Too damn slow" said the salesman, guiding the hapless lad to a dazzling display of daisywheels.

In five minutes he was shown four printers, settling on a Panasonic dot matrix job for a mere $1188 on account of it'd take single sheets as well as the continuous stuff. The bill was now $3483, but the credit card could handle it, and he had 60 days to find the dough.

But that wasn't the end of it, no sir.

Another eighty-five bucks for a printer cable, and that nice 12-inch amber screen was an extra too – at $322. Oh dear, the bill had reached monumental proportions – a total of $3890. Two and a bit IBM typewriters in fact.

Uttering phrases like "computers are the key to the future" and "a man's got to get his act together", the word joiner took a deep breath and handed over his plastic.

The bits were boxed up, a blue volume resembling the Old and New Testaments dutifully handed over (which turned out to be the workshop manual), and the salesman said adieu.

Not before flogging a box of word processing paper for $27. It was then that the man noticed a box of cassettes and a flip chart book entitled Osborne Start-Pac – Quick Self Instruction System. Foolishly he presumed this was part of the deal. After all he'd laid out the best part of four grand.

Not so, said the salesman, that'll cost you an extra hundred and something bucks. The word-joiner bunged on a tantrum and the salesman, peering over his shoulder, quietly slipped the boxed cassettes into the package and urged him to beat a hasty retreat.

And so began a nightmare that lasted four days and four nights, during which time the word joiner berated himself unmercifully for such folly. Experienced in the ways of the motor trade, of the showroom sliperoo and every salesman's trick in the book, he had nonetheless acted like a "wood duck". In the parlance of Parramatta Road, he had been easy meat, a dummy, a salesman's dream come true.

The remorse took on monumental proportions when he got his box of goodies home. Throwing the workshop manual away in disgust, he plugged in the cassettes and succeeded in getting his Osborne and the CP/M software talking to each other.

Beauty. But when it came to the bit called configuring the printer, the excrement hit the fan. There was no power lead supplied for the tricky Panasonic dot matrix. What the hell was a baud? And was the Panasonic a serial printer, a Diablo, a Centronics, or what? To the word joiner it was just a bloody printer.

Kill That Salesman!

So he skipped that bit, vowing to rip the salesman's arms off the next morning, and called his brother. This skilled computer expert explained a few things, and the man pressed on into the night, thinking dark thoughts while the computer told him he was stuffing it up a treat. Morning found the man sitting on the emporium's doorstep waiting to wreak revenge on the salesman.

But being a gentle soul, he accepted the lack of a power lead with grace and asked what sort of gizmo his printer was. The salesman told him it was all in the Panasonic manual – which it wasn't. So he rang Mr Whelan, who issued instructions of frightening proportions, and after half an hour of keying in codes, the printer was pronounced a member of the Centronics family.

Duly configured as such, the man plugged in his WordStar disc...and damn near lost it forever on account of no-one had told him about the niceties of write protection.

He spent an hour or two, head in workshop manual, before he figured out what those sticky little tags were, then formatted a set of blank disks and successfully copied his software.

This was a breakthrough, a turning point.

Several hours later, after battling with the complexities of control-QS and control-G (which he used a lot until he found control-T, and later, quite by accident, control-Y) the printer spewed forth it's first words.

But the $ sign looked suspiciously like a Yen sign, so yet another 14c was invested on a telephone call to the salesman. This purveyor of high-tech equipment made the word joiner feel like a prize mug. "Haven't you altered the DIP switches?" he asked, a tone of smug superiority in his voice.

"What's a DIP switch when it's at home", replied the man. Instructions were delivered, and the DIP switches fixed. Then it was two days of rote work, learning the Wordstar commands back to front. Imperfectly, we might add, as he is still finding new tricks like Control-QQB and stuff like that.

He did seek to simplify the process, spotting an ad for a Wordstar template, custom-made for the Osborne, in a mag called Portable Companion.

But nobody, not even Osborne Australia, knew where he could buy one... not for all the tea in China. And he tried to protect his investment too, offering money for a set of dustcovers for monitor, screen, and printer. But there were no takers. Not any of the computer shops, certainly not the emporium where he'd spent his cash.

The Good News, And...

Worse still, he couldn't buy, beg, borrow or steal a monitor stand to sit on top of the Osborne. They'd been advertised in the Yank magazine, but no-one sold them. In desperation he visited Mr Dick Smith where he found good news and bad news.

The good news was that Uncle Dick could sell him some plastic covers – they needed cutting about a bit and stitching up – but they were covers. The bad news was that his Panasonic print-

er, the one he'd paid $1188 to own, was on sale at Mr Smith's for $850.

Of course, it wasn't called a Panasonic, it was called a Dick Smith... but it was exactly the same unit. Later he found out it was really a C.Itoh Prowriter which every man and his dog was putting their own name on, and flogging for anything from $850 to $1500!

If they did that in the car game, he figured, they'd get shot.

After a couple of weeks, the man became reasonably proficient on his little computer and his nagging worries disappeared. He found he could write a lot faster because the Osborne could keep pace with his fingers and his brain. It also produced a cleaner result because editing was real easy.

Mind you, if he'd had to rely solely on the workshop manual, he'd have been in big bother. As a practitioner of word joining he found it a muddled, complex way of explaining things. Those cassettes were a godsend – as far as they went, because they didn't tell the full story.

So he soldiered on, picking up a bit here and a bit there, until one day, Mr Whelan asked him to write a story about this ordeal.

The moral of that story is that the micro-computer business is terrific at making its products, pretty good at flogging them, but downright hopeless at providing support for hapless mugs like him.

Understandably, perhaps, he thinks the salesmen are a little short on product knowledge – a fact confirmed by a recent return bout at the emporium. The young lady in attendance couldn't even operate the computerised cash register!

The word joiner still hasn't used his SuperCalc, his Mailmerge or his BASIC software. And he probably never will, because he figures he doesn't need them. But he's very pleased just the same.

Which is why he's steered two of his fellow writers into buying the same set of equipment... And why he wrote this story... □

The Wargame

Gregor Whiley and Peter Sandys take a look at Germany 1985, the latest computerised wargame from Australian designer Roger Keating.

GERMANY 1985, released by Strategic Simulations Incorporated on disk for a 48-kilobyte Apple II and costing $79.95, is a battalion-level simulation of conflict between North Atlantic Treaty Organisation (NATO) and Soviet bloc forces, occurring in 1985 and taking place, as you would expect, in West Germany.

There are two scenarios, Advance to Contact and Invasion. The first describes the initial meeting of the opposing forces and the second is a larger-scale affair as the name suggests.

In both scenarios, the opposing forces are more or less equal and the simplicity of the victory conditions – to control the greater number of town, village and airfield hexes – reflects this as well as the tactical scale of the game.

The game system is an extended version of that used in author Roger Keating's previous game, Southern Command. It is played on the hexagon grid system – each hex represents one mile – with the screen showing either a strategic map or one of the 12 tactical screens.

The game can be solitaire, with the computer playing either side, or two players. One excellent attribute of the game that is worth mentioning right from the start is the speed with which the computer carries out its portion of the game. Indeed, the computer will always be faster than a human player in completing a turn, and combat calculations are almost instantaneous.

Because it is a tactical game, each unit has a wealth of information associated with it. There are eight modes for describing the basic condition of each unit (defense, attack, transport and the so on) and there are eight different types of terrain.

Movement costs are affected by mode, terrain and the number of enemy units that can sight the moving unit. Seven different factors are calculated for each attacking unit and 10 for each defender. However, all these details are taken care of by the computer – all relevant information about your own units is displayed in the text window at the bottom of the page and is dynamically updated hex by hex.

The basic attributes of a unit – strength, efficiency, mode and movement points – are easily kept in mind, but they aren't known about enemy units...unless you're in combat with them, in which case the mode and an idea of the strength are revealed.

Realistic Style

This feature removes some of the artificial nature of traditional boardgames, where precise information on enemy units is usually to be had simply by looking through a stack of counters, and leads to a more realistic style of play. If at any stage the burden of staff work becomes too great, then you may turn over control to the computer and it will move and conduct combat with your units to the best of its abilities.

You can also give overall orders to individual units; the computer will carry out the details and return control to you. This means that a unit can be told simply to move to a general area of the board or to go and capture as many villages as possible without the controlling player having to plot each tedious detail. Manual control is achieved by three sets of keys: one can be used at any time to control speed and details of display, one is used outside the movement phase to scroll the map and examine units, and the third set looks after the movement phase. Since combat can occur at any time during a unit's move, and more than once if points remain, these are the keys most used.

Once you become familiar with the keys and with the optimal blend of automatic and manual control, a remarkable degree of flexibility is possible in choosing and executing options. However, this does take some getting used to – a process which isn't helped by the rules which, while being excellent and unambiguous as a reference, contain minimal tutorial help.

The printed chart of control keys and the map provided should be consulted often when first playing as they serve to orient the action. When trying to follow the computer's move in the solitaire version, remember that the movement speed can be controlled by the arrow keys.

The principal fighting units are the tank and mechanised infantry battalions. However, in order to perform effectively, they must be well backed up by artillery and air power. An attack by a single full-strength unit on another similar unit will result in losses to the attacker but not the defender. Since all combat is done on a one-on-one basis – that is, an attack on a stack is done as two attacks

To End All Wargames

on separate defenders, and attacks by a stack are done as two separate attacks – it is imperative that artillery, airstrikes or support fire from other tank or infantry units are used to soften up the defenders.

Other important points are keeping the elements of a division fighting together, for artillery fire direction and for reorganisation of depleted units. Since both sides have a rough parity in numbers, it is essential to conserve and rebuild units instead of throwing them away in the front lines.

A New Approach

The game process is quite unlike most traditional wargames. Each combat, as it is resolved by the computer, is an exquisitely tactical affair taking into account a large number of factors. How much detail the player considers is up to him, but most details about the enemy are either not known or are only a general indication. Thus, the player must develop a tactical sense for what is likely to constitute a successful attack.

Options for hidden movement and delayed movement and attack increase uncertainty, enhancing the realism of the game. At the same time, the player cannot neglect the larger, strategic situation. Control of roads, the overall balance of forces and especially the deployment of reinforcements are very important.

Since Germany 1985 is unlike most traditional boardgames, the only way to really gain the full benefit from the game system is to play a few games until the details sink into place – some facets of the game system are a bit difficult to fully understand the first time around, especially the air-power rules.

Germany 1985, like its predecessor Southern Command, is a new style of computer wargame. It is fast without sacrificing anything in the way of detail, due to the fact that it is written entirely in machine code.

The tactical simulation is realistic, the strategic factors are well balanced and the abilities of the computer are exploited to provide the speed and scope of tactical decisions. Most importantly, it is challenging and still fun to play. The only real failing is the rules, which don't give adequate tutorial-type help for what is essentially a unique game system.

However, this is something that most wargamers are used to coping with. Otherwise, Germany 1985 is a game which sets very high standards for computer wargames and is worthy of a place in your library.

As well as all this, Germany 1985 is only the first of three scenarios projected for this game system. The others, dealing with superpower conflict in the Middle East and the Baltic, are expected to be about half the price of the first game. And for all those who just know that they can do a better job, there will be a utility disk allowing you to design your own scenarios, something that all wargamers have wanted to do at some stage or another. □

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The Big Day

Wednesday, May 4, was a big day in the history of "Your Computer" - it was the occasion of the first Personal Computer of the Year award. Les Bell reports...

OUR REGULAR readers, God bless 'em, will be well aware that last month's issue was a special one, containing as it did an article revealing our choice of the Personal Computer of the Year. This special announcement merited special treatment, and so we decided to make the announcement on the morning of May 4, the morning that the magazine was expected to go on sale.

Incidentally, if you're wondering why your favourite magazine was late in appearing, that was the reason – though the magazine had been printed almost a week earlier, it couldn't go on sale until after the announcement.

The entire selection process was conducted under conditions of tight security; the judges were sworn to secrecy and the shortlisted computer companies were allowed to tell key staff but no one else. After the decision had been made, the article was handled by only five people before printing and, once the magazine came off the press, it was immediately sealed in polythene and stored under lock and key.

As the big day approached, the industry was buzzing with speculation. News of the award was now out, as we had invited representatives of a number of computer companies to attend the announcement, along with members of the computer press. The response, by the way, was tremendous – only one computer magazine failed to send someone(?!?).

The magazines were shipped to our distributor, with strict instructions that they could only be released on sale after 10.30 am on May 4.

However, all was not to go according to plan!

About eight o'clock the night before the award, I was sitting at home – in front of a computer, of course – writing my speech for the next morning, when the phone rang. It was our redoubtable managing editor, Matt Whelan, who sounded as though he had seen a ghost. "The magazine's gone on sale in Melbourne,"he croaked. "We're blown!"

Quickly, we pondered our options. The only Melbourne-based finalist was Barson Computers, which had two

machines on the shortlist – the Sirius 1 and the BBC Micro. The Barson people would be flying up the next morning – the only thing we could do now was get the magazine taken off Melbourne's Tullamarine Airport news-stand, otherwise they'd have some very interesting reading on the flight up to Sydney.

Fortunately, Julian Barson and his staff didn't see the magazine – or if they did, they sportingly made no mention of it!

By 8.30am on May 4, preparations were well under way. The various shortlisted computers were arriving at the Sebel Town House in Sydney, to be set up at the front of the ballroom under the stage.

At 10am, the guests were starting to arrive, and all the computers were set up and running their various demonstration programs. People were wandering around, inspecting the computers, trying to make their own evaluations and predict what the judges' verdict would be. At one stage, I'll swear I heard odds being given and a few private wagers being laid!

At 10.35am, we were off. With the judges on the platform, ready to face intense questioning, we started the proceedings. In a short speech, I outlined the background and purpose of the award.

Finally, the moment arrived. Jan Mackey, the award administrator, handed me a sealed envelope containing the result, and I announced that ... "The winner of the 1983 Personal Computer of the Year award from *Your Computer* magazine is the NEC Advanced Personal Computer."

Happily, the announcement was greeted with applause, though one or two jaws dropped in the audience. It is quite natural for product managers and sales people to believe that their product is the greatest thing since sliced bread – after all, you can't sell something you don't believe in – but there can only be one winner of an award like this, and so some disappointment was inevitable.

Following the presentation of the award to Jolyon Bone, marketing manager of NEC Information Systems Australia, and a short speech by Keiichiro Kagiyama, the new managing-director of NECISA, we opened the floor to questions. Surprisingly, there was only one – was there much pressure applied to the judges by the shortlisted companies?

Fortunately, we could report that all the companies involved were extremely sporting about the whole event. They were generous with their time and with the loan of machines and, though most fished for information about their chances, no pressure was ever exerted.

With the formal part of the proceedings over, I was able to mingle with the guests and get their reactions at first hand. The NEC machine was the popular choice; most of those present said they had predicted that it would take the award. The DEC was a close second, as it had been in the award – in fact, the opinion of the audience was quite similar to that of the judges.

The award was a unique event in bringing together so many members of the personal-computer industry, from competing companies. It was an enjoyable opportunity for many to compare notes over a few drinks.

The publicity machine, of course, was still rolling on. Derryn Hinch, on Melbourne's 3AW, was the first radio presenter to break the news, just before 11am, with a telephone interview live to the Sebel Town House. Other radio interviews followed, including 5DN in Adelaide, 2GB in Sydney and 4BC in Brisbane.

The newspapers were quick to pick up the story, with coverage in Melbourne's *Herald, The Sydney Morning Herald, Australian Financial Review, The Australian* and others.

All of this is good publicity for personal-computing generally. Hopefully, it will help to dispel some of the mystique surrounding computers, and foster the idea that everyone can have and use a personal computer.

Next year, the award will cover both hardware and software, with both a Personal Computer of the Year (PCOTY) and a Software Product of the Year (SPOTY). The announcement will probably be in March.

If the success of this year's award is any indication, it will be a gala affair. [□]

Top left, Les Bell gives an introduction to the award, with details of the judging system, and introducing the judges themselves. He then announced the winner — the NEC APC. Top right, Jolyon Bone marketing manager of NEC accepting the award and making a brief speech of thanks. He then introduced Keiichiro Kagiyama, the new Managing Director, who had just arrived in Australia. Above, big grins all round from the two triumphant executives, and Les Bell. Left, all the systems on the short list were on display, each programmed to show-off their best features. Next year, the award will cover both hardware and software, with a Personal Computer of the Year award and a Software Product of the Year award.

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How Graphit Fixed Negus

By Chris McEwan

Atari's Graphit colour-graphics package lacks a number of useful features, but it saved Chris McEwan about $5000. He explains...

I BOUGHT an Atari 400 microcomputer in February 1982 for my wife, who promptly called it Negus, after a widely known television personality who is both intelligent and handsome. Negus has 32 kilobytes, but is still limited to a cassette-drive.

I had hoped to buy an Apple III, in order to graph statistics from the Australian Bureau of Statistics, but my budget couldn't be stretched that far in 1982. The Apple III would have cost about $6000 – all up, Negus and Graphit have cost about $1000.

It should be made clear that though Graphit isn't complete, it's perfectly satisfactory for home use – it represents great value-for-money. Graphit and Spanish Language System (about $100) are the two major workhorse programs for Negus.

The two major limitations of Graphit relate to its lack of input/output functions. There's no function for printing the graphs, nor one for using a cassette or disk drive for data storage or retrieval.

What's more, there's no facility to link data from an existing program – for example, Statistics 1 into Graphit – or to re-use data for the bar chart in the pie-chart generator. Within the bar-chart and pie-chart generator, a maximum of three characters is allowed for names along the x-axis, or for the pie-chart segments.

The Atari people aren't fools – these limitations are directly due to the necessity to fit the program and its data into 16 kilobytes of memory. Remember, suppliers of software want to reach the widest possible market – the minimum memory configuration of an Atari is 16 kilobytes, so it's logical to supply programs that fit into that space. The Graphit program file fits into about 10 kilobytes, leaving some six kilobytes free for the data.

Despite its limits, Graphit does provide me with what I'm looking for – a daily, colour snapshot of the performance of the Australian economy. With the availability of 32 kilobytes, the extra features could be added fairly easily. (This is one of my projects for 1983.)

What You Get

Graphit comes on two cassettes and contains a suite of four programs: bar and pie charts; x, y line graphs; polar graphs; and three-dimensional graphs. The minimum memory required for each program is 16 kilobytes – the programs take less than 16 kilobytes, but there needs to be some memory for handling the data.

However, there is a catch: a minimum system (16 kilobytes) means that only one program at a time can be fitted into the memory at one time. The 32-kilobyte system fits the bar and pie-charts nicely.

Atari has a well-deserved reputation for quality documentation, and Graphit lives up to it: it comes with a 16-page colour manual that is comprehensive yet easy to follow. An interesting point, however, is that the published documentation is almost unnecessary – the documentation on the screen provides sufficient guidance for the user.

The bar-chart program offers 32 columns across the screen. Each column can contain up to three items of information, each of which is presented in a different colour. However, the name of each column is limited to three characters, and this can be a significant limitation. The user needs to keep a careful watch on labelling...

For my purposes, the labelling limitation isn't so drastic, because most of my column data is limited to days of the week, the months of the year, and the states and territories of Australia. All that data fits nicely in three-character fields.

It is delightful having 32 columns to play with. A useful technique for comparisons over time is to put the same month of consecutive years next to each other, so that the data for January 1981, 1982 and 1983 can be presented side-by-side, followed by the data for the three Februarys. The resulting bar chart presents a picture that is truly worth a thousand words.

The pie-chart program is generated in a similar way to the bar chart – it offers a 20-character title, three characters per field, plus a sub-title field of 20 characters.

The program doesn't mind whether the data you enter represents actual values, or whether it represents percentages – the program will calculate the percentage, anyway, and display the result along with the field name when the pie is drawn.

Here's a little mystery. Bar charts are like doormats – useful, but so common they're unnoticed. However, people are rivetted to the screen of a computer which is drawing a pie chart. Part of the answer concerns the powerful impact of communicating with pictures.

The x, y, two-dimensional plotting program offers these features: up to three graphs on the screen, all in the form of y = f(x); four plotting speeds (slow equals high-resolution and takes longer to draw); automatic scaling so that all the peaks of the plots appear on the screen; Resetting of the x-axis limits so the same formula can be plotted again with different limits; and Use of the joystick to move along the plots – pressing the firing button causes the value of the x and y axis, and the slope of the line, to be displayed.

The x, y plotting program is useful – no one should be without it. However, the program isn't for me because I rarely think in terms of a formula. Being a non-mathematician means I tend to think in terms of the x,y values – I want the computer to tell me the formula.

The polar plotting program is similar in facilities and functions to the x, y plotter. The significant difference is the nature of the plotting: the polar plotter draws circles, ellipses, petals, hearts, spirals – just about any curved shape that can be written with a mathematical formula. For a non-mathematician, it is a nice program to play with.

The three-dimensional plotter is the first program I have found that makes the brain of Negus work flat out for hours – Negus usually spends most of his time waiting for my keyboard input. The program adds a third dimension – the z axis – to the x and y axis; the formula is in the form of z = f(x,y).

The graph can be drawn at a slow or fast rate, depending on the resolution you require compared with the time you have available. The manual says very complicated three-dimensional plots can take several hours. I believe this program needs the POKE statement that turns off ANTIC, the television chip (POKE 559,0 for off, POKE 559,34 for on), allowing Negus to run about 30 percent faster.

Here's another slight mystery based, I believe, on the generation gap: I find arcade games fascinating, but far too fast. Watching Negus generate a three-dimensional graph is much more relaxing. I wonder whether watching the generation of a three-dimensional image could be used as a learning aid for people who have difficulty in seeing the relationship of objects in the space around them.

Graphit costs about $40 and it is, as far as I'm concerned, an essential program for every home with a computer. No matter what the computer, the owner should have access to graphing facilities. Atari's Graphit just happens to be well-designed, colourful and useful... □

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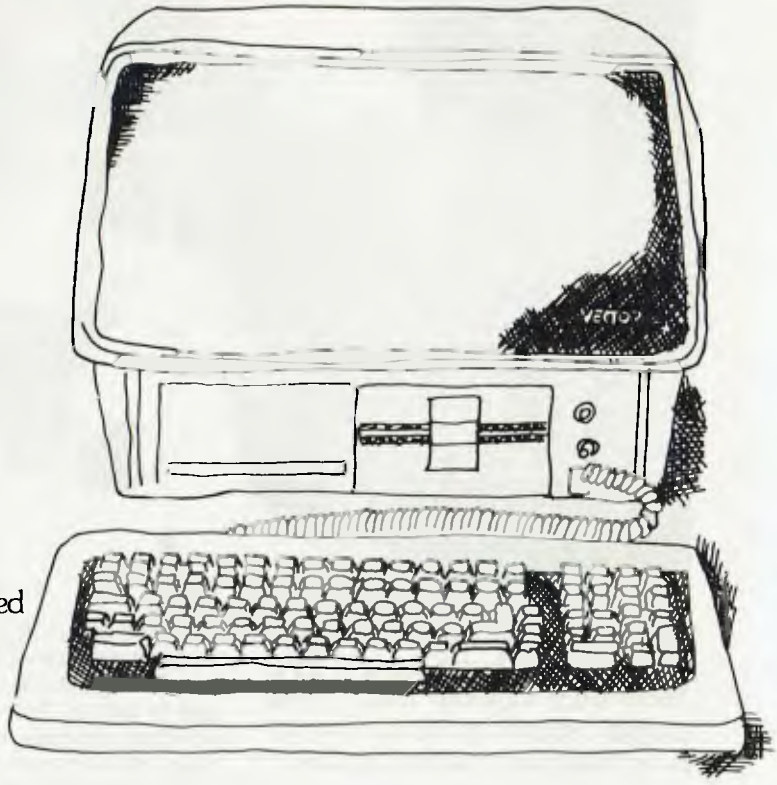

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The ABC of the BBC

By David Badger

Gladstone High School, in South Australia, has been using a BBC Micro since October 1982. David Badger reports on how the computer has stood the test of time.

GLADSTONE High School's 32-kilobyte BBC Micro is being used with a high-resolution green-screen monitor, a 400-kilobyte double-sided disk drive and an Epson MX-80 printer.

In addition, the school's commerce faculty has provided an Olivetti Gabrielle electronic typewriter, complete with a BBC interface, so letter-quality printing is also a reality.

After several months of exploring its potential, and writing software, we're impressed! The school has had part-time use of an Apple II over the past five or so years, and I would say that the BBC Micro is twice as good as the standard Apple (humble apologies to Apple lovers).

The features we like include:

1. The BASIC is fast, and has a wider range of commands than Applesoft.

2. The graphics, ranging from 160 by 256 to 640 by 256, offer higher resolution than the Apple and a more powerful range of commands.

3. Colour can be selected for text, background and graphics.

your computer

OWNER REPORT

4. Text and graphics can be readily combined on screen. The graphics is fully memory-mapped and, therefore, doesn't suffer the limitations that, for example, the Microbee has with its PCG (programmable character generation) approach to graphics.

5. Text can be displayed in either 20-, 40- or 80-column format, with upper- and lower-case. Characters beyond the wide range already available can be designed without too much trouble, and assigned to ASCII values 224 to 255.

6. There are 10 user-defined keys across the top of the keyboard, and five other keys can also be redefined by the user – this is very useful for repetitive input of commands or text.

7. A built-in clock and four-channel music synthesis are standard features.

8. The integer variables (A% to Z%) not only make for faster program execution, but aren't cleared from memory by running or loading programs, and so can be used to transfer data from one program to another.

9. The BBC Micro's editing system is much better than the Apple's. While it doesn't have some of the nice features of the Tandy TRS80 or the System 80, it's more versatile than the editing system that even those machines provide.

10. The documentation is very thorough. In a well set-out spiral-bound volume, it covers everything from simple programming for the novice to sophisticated, behind-the-scenes information for those into machine-language programming.

With the optimism born of much day dreaming, we had an ECONET interface fitted at purchase, so that when the powers-that-be pour the cash into our eager hands, we can extend the system to a multi-station network.

Now for the bad news. The screen isn't as rock-steady as it should be, presumably because the BBC Micro is electrically noisy. Any answers to that problem?

In addition, at this stage there is a distinct lack of software (stop smirking, Apple users!). This should improve greatly by the end of this year, with the schools of at least three states – South Australia, Tasmania and Western Australia – producing and providing a market for educational software.

Up till now, it has been a case of "write your own", which we've been busy doing here at Gladstone. So far, our emphasis has been on programs to reduce the tedium of several school administration tasks, but that's changing now toward programs for classroom use.

Gladstone High School has an elective program in which all subjects at Years 8, 9 and 10 (except for English, Mathematics and Science) are offered as seven-week or one-term electives.

This means that fresh subject lists have to be produced six times a year, a time-consuming task which in the past involved typing each student's name many times over. Now, using the computer, every student's name, together with details of birthdate, house, sex, town, class group and subject choice, is stored on disk and various lists can be produced using this data. It represents a very significant saving in time and paper-shuffling for our teacher-aids.

Students can book the computer during lunch or private study time, either for programming or to explore existing programs. When appropriate software becomes available, classroom use of the BBC Micro by teachers and students will have quite high priority.

With only one machine in a school of 240 students, we can't hope to realise all the potential which computer usage offers, but it's a start. Meanwhile, we still dream about a network, an RGB colour monitor and lots of good software. □

Good Vibrations

your computer

OWNER REPORT

Fed up with having to tip-toe past his Sinclair ZX81, Timothy Nickels fitted a RAM pack modification.

WHAT'S WORSE than the tiny no-tactile-response Sinclair ZX81 keyboard? If you don't know the answer, you probably don't own a Sinclair 16-kilobyte RAM pack. The answer is, of course, the notorious RAM pack glitch. If I had a dollar for every time my ZX81 – actually a ZX80 plus eight kilobytes of ROM – had gone off into its own little world due to some tiny vibration, I'd buy myself a computer complex and still have enough left over to invest in IBM...

The problem was compounded recently when I began work on a program in the *Star Trek* vein. At present, it's about 300 lines long, and it had come to the stage where I would spend a couple of hours modifying the program, postponing saving it until I have made that one last modification. Suddenly zappo! Start again.

I tried putting solder on the edge connector. That didn't help. I even tried clamping it to a piece of chipboard, with limited success. So I decided what was needed was a more drastic modification.

I sent away to Dick Smith Electronics for the necessary material. I bought 12 one-metre lengths of light-duty cable (one metre of each colour). Total cost, $1.20. Then I divided each cable into four equal lengths and stripped and tinned both ends of each one.

Now comes the part which many people will be loathe to do – cutting the edge connector plug off the memory. It's best to do this as close to the board as practical, then de-solder the cut-off pins left in the board.

After this is done, you should tin the pins on the edge connector plug. Be careful not to overheat these as you can loosen the contacts in the plug. Then it's simply a matter of soldering each wire, first to the connector and then to the memory board. (Be careful about heat here too, as it can damage the memory chips.) Make sure each wire is soldered on both sides of the board and there are no solder bridges across tracks or between wires.

I connected the wires one by one to avoid confusion. Once you have finished this, check everything for solder bridges and dry joins. When I first tried it out, I discovered I had bridged two tracks on the circuit board, and only eight kilobytes of memory was operating.

This had me testing voltages and checking connections for hours, until I looked at the memory connector and found that two of the contacts had become loose due to overheating. Once I had fixed this, the memory ran like a charm.

To finish off, all I did was to hold the wires together with a couple of pieces of tape, and tape up the place where the wires joined the connector and the memory. (These are the pressure points where the wire is under some stress and could break.) The reason I did not wrap the whole "cable" in tape was that I thought it might be less flexible, and defeat the purpose of having one. A neater person than I might use ribbon cable, but I didn't think it was worth the expense.

Since I completed this modification, I have had no trouble at all with the RAM pack. I can even lift the memory up and move it if necessary during operation.

Never again will I walk on tip-toe when I approach my ZX81, and never again will the screen go blank when I press the stop button on my recorder. □

The IBM-PC Getting To Know You...

By Lloyd R Borrett

Since the IBM-PC's Australian release, on February 9, the IBM dealers have been swamped with inquiries – so much so that very few of them have been able to spend enough time to become properly acquainted with their product. Questions remain unanswered...

I'VE SPENT a great deal of time and effort keeping in touch with what has been happening with the IBM-PC microcomputer in the United States, in an effort to find answers to many fundamental questions. Will one operating system cause my system's effectiveness to be put at risk? What's the best way to provide the hardware options I require?

I still don't have the answers.

Until such questions can be answered, it will be difficult to determine the correct hardware and software paths to follow. My advice to those of you who are about to buy an IBM-PC is to get the minimum possible hardware and software configuration, and then take your time to become fully acquainted with the system.

By the time you finish, you'll have a better idea of what additions you really need to reach your goals, and we should all be closer to knowing the solution.

Reference Materials

Though the IBM-supplied documentation is excellent, there are a number of other sources of information which should prove useful. These books and periodicals will assist you to answer some of those questions mentioned earlier.

Books: First of all, a book which any owner of a personal computer should obtain – *Don't, or How To Care For Your Computer* (Rodney Zaks; Sybex, 1981). It explains how to handle and maintain all components of a computer system, the computer proper, the CRT display, the diskettes, the printer and the magnetic tapes. The book is well-written and provides much useful information in addition to the "how to care for" details.

If you're considering buying any personal computer, then you will find *IBM's Personal Computer* (DeVoney and Summe; Que Corporation, 1982) valuable. This book has been written specifically about the IBM-PC and provides a good idea of how the machine fits in the scheme of things. Existing owners of the IBM-PC will also find some surprises.

IBM Personal Computer: An Introduction to Programming and Applications (Goldstein and Goldstein; Prentice-Hall, 1982) is an excellent self-instructing tutorial which gets the user acquainted

with the IBM-PC as well as PC BASIC. There are advanced sections on data files, graphics, word-processing and computer games. These, along with the large selection of useful application programs, make it a valuable book for readers of varying levels of experience.

No owner of an IBM-PC should be without a copy of the IBM-produced *Technical Reference Manual*. Here, you can find out how the components of the IBM-PC function and interface with each other.

Most IBM-PCs have been purchased along with a VisiCalc program. *VisiCalc: Home and Office Companion* (Castlewitz, Ghisausky and Kronberg; Osborne/McGraw-Hill, 1982) provides about 50 VisiCalc spreadsheet models that range from bond-portfolio management to estimating the cost of painting a room. Some models might be directly useful in business situations, while others are likely only to provide the inspiration for the development of more accurate and useful VisiCalc models.

Those of you with a passion for graphics should be able to get all of the technical details from *Fundamentals of Interactive Computer Graphics* (Foley and Van Dam; Addison-Wesley, 1982). However, above-average mathematics skills would be useful.

Another standard reference in graphics is *Mathematical Elements for Computer Graphics* (Rogers and Adams; McGraw-Hill, 1976). Though the title may sound a little intimidating, the book is excellent, and has BASIC listings for most of the fundamental graphics data-base manipulation algorithms as an appendix.

Periodicals: Though *Your Computer* has so far been the most helpful source of information about the IBM-PC published in Australia, it's not the only place to learn about the machine.

PC: The Independent Guide to IBM Personal Computers, Personal Computer Age and *Softalk for the IBM Personal Computer* are regular magazines totally devoted to the IBM-PC. (However, keep in mind that the IBM version of Softalk has a way to go before it will match the Apple version.) The advertisements in these three magazines are great value – each and every one has something to do with the IBM-PC.

Typing Tutor

I've often regretted that I didn't learn to type properly whilst at high school. When I first began to use a computer terminal, some eight years ago, I started to develop my own unique style of typing, using two thumbs and two index fingers. I've never made the time to learn to touch-type since, and I guess the majority of computer professionals and hobbyists would have a similar story to tell.

Instead of waiting for the introduction of voice input, I've finally decided to act by purchasing Typing Tutor, a program published by IBM/Microsoft. I've read nothing but good reviews of this product, and I have found no reason to disagree with them.

Not only does the program teach touch-typing and keep track of progress, but provision is made for a teacher to control and keep tabs on a class of up to 39 students. For those of you who can already touch-type, Typing Tutor will help you to build up typing speed.

Printers

As I wanted to use 38 cm paper and the bit-image mode, I purchased an Epson MX-100 III printer, which seemed the best choice, given that the IBM printer is an Epson MX-80. However, when I first ran the Calendar program supplied by IBM, I obtained this output:

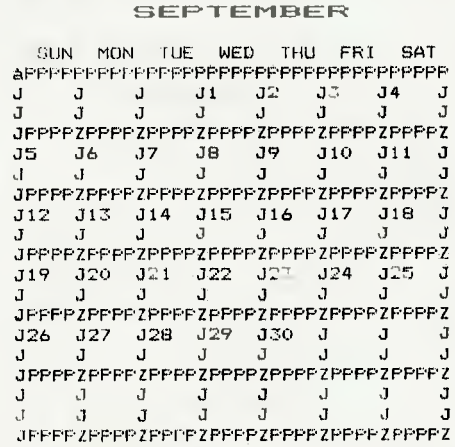


FIGURE 1

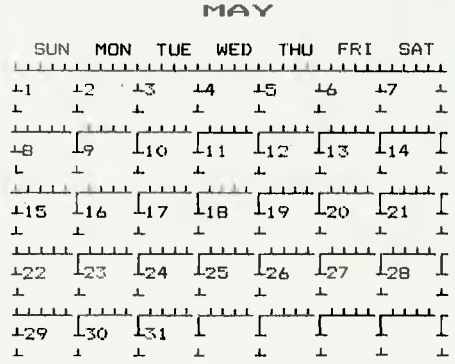


FIGURE 2

At first, I thought that I must not have set up the printer properly – after all, no one would produce output like that on purpose. However, all checks revealed that my printer was, indeed, set up correctly. A study of the program listing and the manuals revealed the problem.

IBM supports an extended character set which includes many special characters. The Calendar program uses some of these special characters to produce this output on the IBM dot-matrix printer.

In fact, the line-drawing character set for the monochrome display doesn't match the block-graphics character set on the IBM dot-matrix printer. The result is that you can't design forms on the screen and reproduce them on the printer. To add to the confusion, there are errors in the documentation, and the relevant pages are scattered over different manuals.

Most printers, including the Epson MX-100 III, only support the standard ASCII character set. In practice, there should be very few occasions when this limitation will cause any problems.

I felt that the calendar produced on the IBM dot-matrix printer was rather cluttered, and came up with a simplified version which has the added benefit of only using ASCII characters. By making the following changes to Calendar, you'll obtain the output shown in Figure Three:

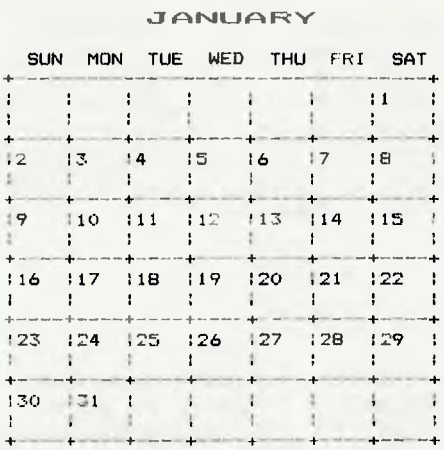


FIGURE 3

Change lines 1440, 450 and 1480 from:

```
1440 M$(1) = CHR$(192)+STRING$(38,208)
1450 T$ =       "CHR$(202) : M$(2)=CHR$(202)+T$+T$+T$+T$+T$+T$+T$:M$(3)=M$(2)
1480 T$ = STRING$(4,208)+CHR$(218) : M$(4)=CHR$(202)+T$+T$+T$+T$+T$+T$+T$
```

EXAMPLE 1

To:

```
1440 M$(1) = CHR$(43)+STRING$(34,45)+CHR$(43)
1450 T$ =       "CHR$(124) : M$(2)=CHR$(124)+T$+T$+T$+T$+T$+T$+T$:M$(3)=M$(2)
1480 T$ = CHR$(43)+STRING$(4,45) : M$(4)=T$+T$+T$+T$+T$+T$+T$+CHR$(43)
```

EXAMPLE 2 □

MicroBee Music, Part 1: The Tone Generator

By Milan Hudacek

This two-part series explains the principles of MicroBee sound-generation and explores some unusual application possibilities that you won't find in the user's manual. You will learn how to program sound-effects useful for your MicroBee games, how to expand the MicroBee tone range and how to construct your MicroBee Organ and MicroBee Synthesizer.

THE MICROBEE tone generator uses a single bit of port B of the programmable input/output interface. The speaker is connected to the output bit by a driving transistor. Clearly, there's not much hardware involved – that's why all the sound-generation relies upon software.

The obvious shortcomings of this approach are twofold: You can generate only single-voiced melody, and you cannot do anything else while playing, because the central processing unit (CPU) is fully occupied with handling your speaker bit. The actual tone generation is done simply by periodic setting and resetting of the speaker bit. Generally speaking, the faster you set and reset, the higher the pitch of the tone.

The shape of the resulting audible signal is approximately a square wave, as shown on this figure:

The frequency (pitch) of the tone is the reciprocal value of the period T, which is the sum of the Ton and Toff intervals:

frequency = 1/T = 1/(Ton + Toff)

For example, to generate the piano tone 'middle C', the required frequency is approximately 262 Hz and Ton plus Toff = 1/262 = 3.8 milliseconds.

The quality (timbre) of the tone is given by the Ton and Toff intervals ratio. The MicroWorld BASIC Play command always uses 1:1 ratio but we can experiment and create some interesting effects using variable ratios as well.

The loudness of your MicroBee is fixed and, unfortunately, cannot be changed by program independently from the timbre. (However, if you'd like to alleviate somewhat the roar of your machine, I recommend replacing of the resistor H27 in series with your speaker. Its original value being 27 ohm, I replaced it with a 100 ohm resistors and the headache ceased miraculously. The R27 resistor is located just under the right shift key.)

Now, let's try practically what has been said above – periodic setting and resetting of the speaker bit using the MicroWorld BASIC out command. The out command has this format:

OUT int1,int2

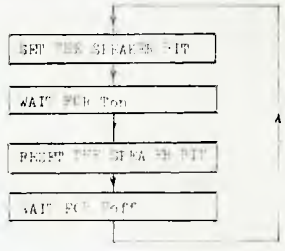
Int1 and int2 are integer expressions: int1 represents the output port address, and int2 is the data which should be output.

The address of your port B is 2, but what data should actually be output? If you don't use your RS232 interface, you can output 0 and 255 alternatively, toggling all eight bits simultaneously (255 decimal corresponds to 11111111 binary). If your printer or whatever is connected to your RS232 line, then the output data will have to affect only the speaker bit (D6) and not the RS232 output or DTR control line. The fastest way to find out about the "quiescent" state of the B port is to type in:

PRINT IN (2)

Your MicroBee probably responds with 184, which is the decimal equivalent of 10111000 binary. Setting the D6 bit (they are counted from right to left, starting with zero), we get 11111000 binary, which corresponds to 248 decimal. Thus, by alternating your port B output between 184 and 248, you toggle your speaker bit without your serial-connected printer going mad.

Now, try a simple program using the above described principle. The program will do this:



If the Ton and Toff intervals are preset, see what happens:

```
00100 INPUT "N,F ";N,F
00110 OUT 2,248
00120 FOR I=1 TO N
00130 NEXT I
00140 OUT 2,184
00150 FOR I=1 TO F
00160 NEXT I
00170 GOTO 110
```

After entering the run command, you have to input the N (Ton) and F (Toff) values. You can enter any number between 1 and 255, but even if you try N,F – 1 (the shortest interval possible), you'll find to your great disappointment that what you hear is a low-frequency clapping, instead of the expected music of spheres. (You should have expected that! Didn't you know that BASIC is too slow for audio-frequency handling?)

Notice that when you press any key on your keyboard, the clapping frequency lowers. This is because the BASIC interpreter checks, after each line of program, whether you've pressed the BREAK key (which you have to use to exit from our program). Whenever you press a key, you include a short sub-routine comparing the key code with the BREAK code – this prolongs the delays, and in turn lowers the frequency.
But don't despair. There exists an easy way to overcome the laziness of your BASIC – we shall discuss it later. Meanwhile, let's create some modest sound-effects with what we have learned so far. Here is a couple of them:

```
00100 REM RADIATION DETECTOR
00110 REM (PERHAPS SUITABLE FOR YOUR THREE MILE ISLAND GAME)
00120 IF RND(.5 THEN 150
00130 OUT 2,248
00140 GOTO 120
00150 OUT 2,184
00160 GOTO 120


00100 REM HEARTBEAT
00110 OUT 2,248:OUT 2,184:OUT 2,248
00120 FOR I=1 TO 250
00130 NEXT I
00140 OUT 2,184
00150 FOR I=1 TO 250
00160 NEXT I
00170 GOTO 110


00100 NAME-IT-YOURSELF-1
00110 FOR N=1 TO 30
00120 OUT 2,248:OUT 2,184
00130 FOR I=1 TO N
00140 NEXT I
00150 NEXT N
00160 GOTO 110


00100 REM NAME-IT-YOURSELF-2
00110 FOR N=1 TO 40
00120 GOSUB 180
00130 NEXT N
00140 FOR N=40 TO 1 STEP -1
00150 GOSUB 180
00160 NEXT N
00170 GOTO 110
00180 OUT 2,248:OUT 2,184
00190 OUT 2,248:OUT 2,184
00200 OUT 2,248:OUT 2,184
00210 FOR I=1 TO N
00220 NEXT I
00230 RETURN
```

Now, putting Assembler to work: The only way to implement audio-frequency bit-handling in microcomputers is to program the appropriate sub-routine in machine code, by using your MicroBee Editor/Assembler ROM. However, you don't have to own it to benefit from our "research", or even understand Assembly language, if you want to incorporate our sound-generating sub-routine intc

your BASIC program application.

The sound-generating sub-routine, to be most universal, has to fulfill these requirements:

1. Ton and Toff intervals must be independently presettable.
2. Tone duration must be presettable (but not necessarily independently).
3. The sub-routine must be able to be called from BASIC, using the USR function. Moreover, it should be relocatable to fit anywhere without the need of reassembling.

The USR function implemented in MicroWorld BASIC has this format: integer variable = USR (integer expression 1, integer expression 2).

The integer variable on the left is compulsory and denotes the fact that USR is a function and not a command. In our case, it will be a dummy variable because we don't need any value to be passed back from our sub-routine to BASIC.

The integer expression 1 is the address of the user program. We have three possible places to put out sub-routine:

1. Hires scratch pad (first 100 bytes from 0)
2. BASIC program area (see text)
3. Spare RAM (1024 bytes from 62464 decimal)

You cannot use the Hires scratch pad if you're going to use high-resolution graphics in your application program

You can use your "spare RAM" anytime if you don't mind disturbances on the screen during sound-generation – this is due to the hardware construction of your MicroBee and cannot be avoided. (The "spare RAM" is, in fact, an unused half of the PCG character RAM. When it's accessed, the VDU switches its internal data bus to the CPU data bus and cannot refresh the monitor screen. This isn't apparent normally if you just POKE or PEEK data in this area. Running programs here, however, causes trouble.)

Placing the sub-routine in your BASIC program area (2304 to 16383 for 16 kilobytes, 2304 to 32767 for the 32-kilobyte system) is dangerous – precautions have to be made for the sub-routine not to collide with your BASIC program and variables on one side and your strings and stack on the other. However, this might be the only way if you wanted to use Hires graphics as well.

(To be quite honest, we have yet another possible place for our sub-routine: in the mysterious illegal area under 2304 decimal. Part of it is used as BASIC scratch pad but there do exist gaps; probably 512-1023, 1112-1280, and so on. But don't tell anyone.)

In our initial experiments, let's place our sub-routine in the Hires scratch pad, starting with the address 0. The integer expression 2 of the USR function is passed to the machine code sub-routine in the BC register pair. In fact, it's optional, but we certainly have use of it. What about passing the Ton delay interval in B and Toff in C registers?

The remaining parameter to be passed is the tone duration. We shall pass it by POKEing it into a known address. Here is our long-awaited tone-generating sub-routine:

```
0000            00100       ORG 0
0000 2E00       00110       LD L,0          ;TONE DURATION (DUMMY VALUE)
0002 59         00120 LOOP0: LD E,C         ;LOAD 'OFF' INTERVAL COUNT
0003 50         00130       LD D,B          ;LOAD 'ON' INTERVAL COUNT
0004 3EFB       00140       LD A,248        ;'SPEAKER BIT ON' VALUE
0006 D302       00150       OUT (2),A       ;OUTPUT TO PORT B
0008 15         00160 LOOP1: DEC D          ;DECREMENT COUNT
0009 20FD       00170       JR NZ,LOOP1     ;LOOP FOR 'ON' INTERVAL
000B 3E08       00180       LD A,184        ;'SPEAKER BIT OFF' VALUE
000D D302       00190       OUT (2),A       ;OUTPUT TO PORT B
000F 1D         00200 LOOP2: DEC E          ;DECREMENT COUNT
0010 20FD       00210       JR NZ,LOOP2     ;LOOP FOR 'OFF' INTERVAL
0012 20         00220       DEC L           ;BUMP TONE LENGTH COUNTER
0013 20EF       00230       JR NZ,LOOP0     ;LOOP FOR NEXT PERIOD
0015 C9         00240       RET             ;RETURN TO BASIC
0000            00250       END
00000 Total errors

LOOP2  000F    LOOP1  0008    LOOP0  0002
```

The sub-routine is relocatable, as it uses only relative jumps.

The tone-duration value will have to be POKEd to the second byte of the sub-routine, which is the operand byte of the LD L, data instruction. (This is a very simple and innocent example of self-modifying code, and computer-science purists are already going to burn us at the stake. Nevertheless, I think that, considering our simple application, this is the most efficient approach.)

The sub-routine is quite short and the most convenient way to use it in a BASIC program is to use the DATA command and POKE it into the working area, at the beginning of your BASIC program.

It's now necessary to convert the hexadecimal object code produced by the Assembler into decimal. I've done it to spare you the toil, so all you have to do is just to type in:

```
00100 DATA 46,0,89,80,62,248,211,2,21,32,253,62,184,211,2,29,32,
253,45,32,237,201
00110 FOR I=0 TO 21
00120 READ D
00130 POKE I,D
00140 NEXT I
00150 INPUT "B,C,L : ";B,C,L
00160 POKE 1,L
00170 I=USR(0,B*256+C)
00180 GOTO 150
```

Notice how the Ton and Toff parameters are passed: integer expression 2 = Ton*256 + Toff. This is because we want to pass Ton in register B and Toff in register C. Multiplying by 256 decimal virtually equals to shifting by eight binary bits.

Now you can experiment yourself. After starting with the RUN command you have to enter B (Ton interval length), C (Toff interval) and L (tone length). All values should be entered in the range of 1-255 plus zero, which is actually equivalent to 256.

Exit from the program by hitting the BREAK key. Notice that:

1. The timbre of the tone changes if you change the B/C ratio, keeping B+C constant.
2. The tone duration does not depend on L only but on B+C as well. In fact, it's proportional to L*(B+C) because L is actually the number of tone periods.

You can already use this sub-routine for some nice sound-effects but there still remains a lot to be improved and a lot to be discovered. Meanwhile, as usual, some interesting effects for your perusal. Here are seven of them, combined in a single program. If typed in carefully and started by RUN command, it should produce amazing sounds until stopped by the BREAK key.

```
00100 REM ***** MICROBEE SOUND EFFECTS *****
00110 DATA 46,0,89,80,62,248,211,2,21,32,253,62,184,211,2,29,32,
253,45,32,237,201
00120 FOR I=0 TO 21
00130 READ D
00140 POKE I,D
00150 NEXT I
00160 REM ***** RANDOM EFFECT SELECTION *****
00170 ON INT(RND*8) GOSUB 200,290,350,420,480,540,600
00180 GOTO 170
00190 REM ***** EFFECT 1 *****
00200 A=INT(RND*30)
00210 T=INT(RND*100)
00220 FOR N=0 TO 2*T STEP INT(RND*20)+1
00230 M=INT(ABS(FLT(N-T)))
00240 POKE 1,A
00250 I=USR(0,(T+1-M)*256+M+1)
00260 NEXT N
00270 RETURN
00280 REM ***** EFFECT 2 *****
00290 FOR N=1 TO INT(RND*20)+1
00300 POKE 1,INT(RND*100)
00310 I=USR(0,INT(RND*256)*256+INT(RND*256))
00320 NEXT N
00330 RETURN
00340 REM ***** EFFECT 3 *****
00350 T=INT(RND*100)
00360 FOR N=1 TO T STEP INT(RND*10)+1
00370 POKE 1,INT(RND*100)
00380 I=USR(0,(T-N+1)*256+T-N+1)
00390 NEXT N
00400 RETURN
00410 REM ***** EFFECT 4 *****
00420 FOR N=1 TO 100 STEP INT(RND*5)+1
00430 POKE 1,20
00440 I=USR(0,256+N)
00450 NEXT N
00460 RETURN
00470 REM ***** EFFECT 5 *****
00480 FOR N=100 TO 1 STEP -INT(RND*5)-1
00490 POKE 1,20
00500 I=USR(0,256+N)
00510 NEXT N
00520 RETURN
00530 REM ***** EFFECT 6 *****
00540 FOR M=1 TO 30
00550 POKE 1,1
00560 I=USR(0,INT(RND*256)*256+1)
00570 NEXT M
00580 RETURN
00590 REM ***** EFFECT 7 *****
00600 T=INT(RND*100)
00610 FOR N=T TO 1 STEP -INT(RND*10)-1
00620 POKE 1,INT(RND*100)
00630 I=USR(0,(T-N+1)*256+T-N+1)
00640 NEXT N
00650 RETURN
```

Personally, I like the "Effect 1" most of all. I think it's a real marvel and I'll eat my hat if you don't like it. If you want to enjoy it separately from the others, just type in:

```
270 GOTO 200
GOTO 200
```

In the next article, we'll take a more theoretical approach to sound-effect generation and construct a powerful Assembly language sub-routine to produce glissando and Leslie effects. □

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Doomsday Mission is a split-screen machine language adventure, whose quality we haven't seen since Scott Adams.

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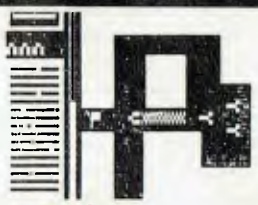

RALLY RACER

Beware! Mad Morgan, Crazy Harry and his hoodlums are on the prowl in a fantastic (32 screens!) of maze trying to track you down. Is your super charger fast enough! Your car remains in the centre of the screen while objects move around it! Your fuel is limited and you have to knock down 10 flags, but don't dispair. A grid scanner to your right indicates the position of your cars and your foes!

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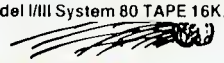

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Your shield energy reaches critical and the great mothership lurches into laser range . . . Your cannon's grind their way into her thick hull, but can they reach the EMPRESS in time and OBLITERATE her to atoms!

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- It's rapidly becoming the most popular mod to the 80 based machines. Hence the software backup will be enormous.
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All Aboard The Sym-1 Express

Designed as a single-board computer, the Synertek SYM-1 can be transformed into a "personal computer", writes Roy Hill.

IN EARLY 1979, Synertek Systems Incorporated introduced its SYM-1 single-board computer, based on the popular 6502 microprocessor. It was designed to be a direct competitor to Rockwell's AIM-65 and Commodore's KIM-1.

Synertek originally tooled up for a production run of 8000 SYM-1 microcomputers; to date, more than 25,000 have been sold, with the bulk of export sales being to Australia.

There have been several reviews of this board in popular electronics magazines, but these reviews have all failed to take into account the numerous optional features available for the SYM-1.

As a single-board computer (SBC), the SYM-1 is probably the best value-for-money evaluation board for the 6502 microprocessor – or for any other processor, for that matter. For $230, you get a 270 by 210 mm board (see Figure 1) containing the following features:

6502 processor running at 1 MHz.
One kilobyte of RAM (expandable to four kilobytes simply by plugging in extra 2114s);
An expansion port ("E" connector) for add-on memory boards, such as the 32-kilobyte Beta board;
Three 6522 VIAs (versatile interface adaptors), two supplied with the board;
6532 RIOT (RAM input/output timer) for control of the onboard B digit LED and hex keypad;
1420 baud cassette interface;
20 ma current loop and RS232 interface;
51 input/output lines, expandable to 71 by sacrificing the onboard LED and hex keypad;
Powerful four-kilobyte monitor program (complete with source listing); and
Reference manual and programming manual.

I currently have an EPROM programmer attached to my SYM-1, which I can use to program 2516, 2716, 2532, 2564, 2764 and 68764 Eproms, for a total hardware cost of $30 (ZIF socket, edge connector, switch and board). The remaining hardware is already on the SYM-1.

The hex keypad is one of the pressure-sensitive variety, with audible feedback for each keypress, using the onboard piezo element. This is slightly different to most evaluation boards, in that it allows many monitor instructions to be performed using a single keypress (see Figure 2).

Some of the more useful monitor functions are routines to fill a memory block with a selected byte, and another to verify a memory block – very useful for checking out memory chips.

The "block move" feature allows the user to shift blocks of data around in the memory, and the "mem" feature allows examination and modification of any RAM location. If desired, the output from the board can be directed to an oscilloscope, using the driver routine provided in the reference manual. This provides a 32-character display on a standard CRO.

The onboard piezo element can be driven by the timer on the 6532 RIOT chip and, by selecting suitable timing intervals, music can be synthesized on the "beeper". One of the demonstration tapes available for purchase allows the user to play either "Michael, Row the Boat Ashore", "Dixie" or "Ob-la-di Ob-la-da" on the beeper, together with a change in the sound of the instrument being synthesized.

Some of the games available on the same tape allow quite a creditable game of pontoon to be played, together with a poker machine and the ubiquitous Wumpus. All on the LED display, and with only one kilobyte of RAM...

I could continue waxing lyrical about the virtues of the SYM-1 as a single-board control unit or data logger, but perhaps its most exciting features are the options available for the SYM-1 to be used as a "personal computer".

The first requirement is to exchange the onboard hex keypad and LED display for a television monitor and Synertek's KTM-2 keyboard (see Figure 3). The KTM is available in two versions, 24 lines by 40 columns or 24 lines by 80 columns.

The major difference between the two – other than the column width – is that the KTM-2/40 can be used with an ordinary television set, while the KTM-2/80 needs a video monitor. The actual keyboard consists of 54 keys, which generate 128 ASCII characters and 128 graphic characters (see Figure 4 for the graphics character set).

Graphic and alphanumeric characters can be simultaneously displayed on the screen, using both normal and reverse video. A set of switch-selectable options for data-transfer rate, video-frame rate, parity, interview and truncate are supplied in the top left-hand corner of the unit.

The KTM also provides two input/output ports for serial communication. The main port is used to communicate with the SYM-1, while the auxiliary port can be used to drive a printer, modem and so on. I find it easier to reserve the auxiliary port for the future addition of a modem, and to use one of the 6522 ports on the SYM-1 to drive a parallel interface to my Epson MX-100.

These features, coupled with an eight-kilobyte Microsoft BASIC chip, convert the SYM-1 to a "standard" BASIC microcomputer.

A ROM version of a two-pass symbolic assembler (eight kilobytes) is also available for making assembly-language programming a pleasant task, instead of a bore.

A word-processing package is also available for the staggering sum of US$36 (no, that's not a misprint), written by the same person who developed the resident assembler/editor. This is a full-features word-processor, which has been used in the preparation of this article (see Figure 6).

Fortunately, the SYM-1 is supported by a very active United States-based users' group, through whom excellent software is available at bargain-basement prices. I've added an extended BASIC, cross-reference lister for assembly-language programs and a two-pass symbolic disassembler for less than $150.

The disadvantages of this unit are few, but they may turn off the beginner to computing. There is little available "commercial" software, such as games, VisiExtras and so on, but one issue of

the users' newsletter does provide a program for reading Apple tapes. Disc drives and an appropriate operating system are available, but, not being a masochist, I've never felt the need to scrap my two thoroughly reliable $80 tape recorders.

I have yet to buy, make or use a tape that I cannot read, though some initial hardware changes to the cassette-input interface were required. The layout of the SYM-1 positively encourages its owner to fiddle with such features as memory select, by suitably placed jumpers or by adding more ROMs.

The KTM keyboard provides a very large set of graphics characters, which can be changed fairly easily by an available software package to any desired characters – for example, electrical symbols.

One of the latest available packages (not the users' group this time) allows me to scroll through an assembly-language program, in the edit mode, forward or backwards, all at 4800 baud.

The distributor who offers the best prices and most support for this board is Energy Control, PO Box 6502, Goodna, 4300, from whom a current price list of boards and accessories is available. □

Figure 1

The SYM-1-1 with eight kilobytes of onboard RAM (two by four kilobytes, piggy-backed):

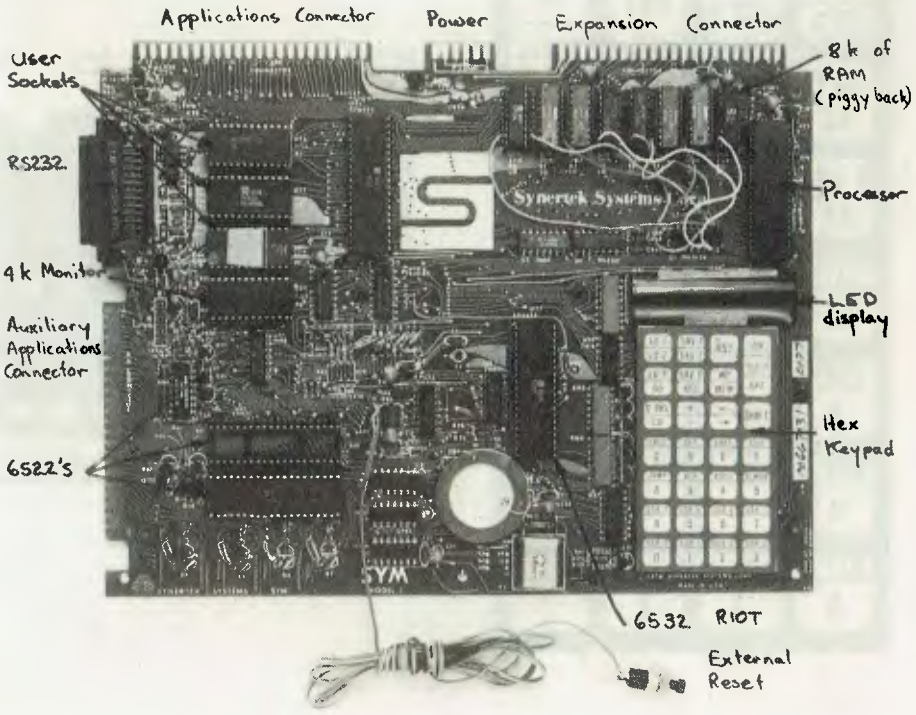

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Figure 2
The Hex keypad on the SYM-1-1:

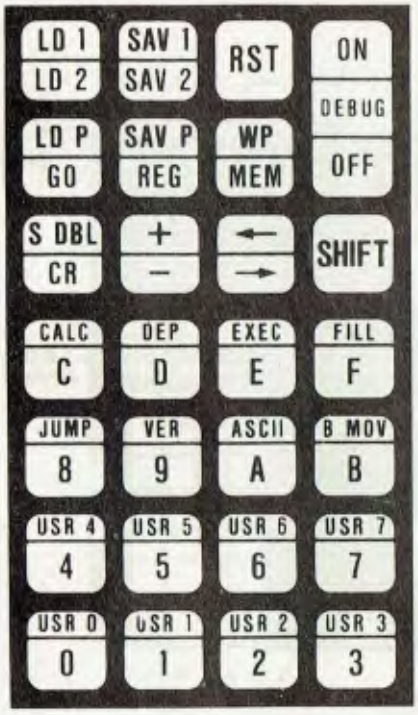

Figure 3
Synertek's KTM-2/80 keyboard:

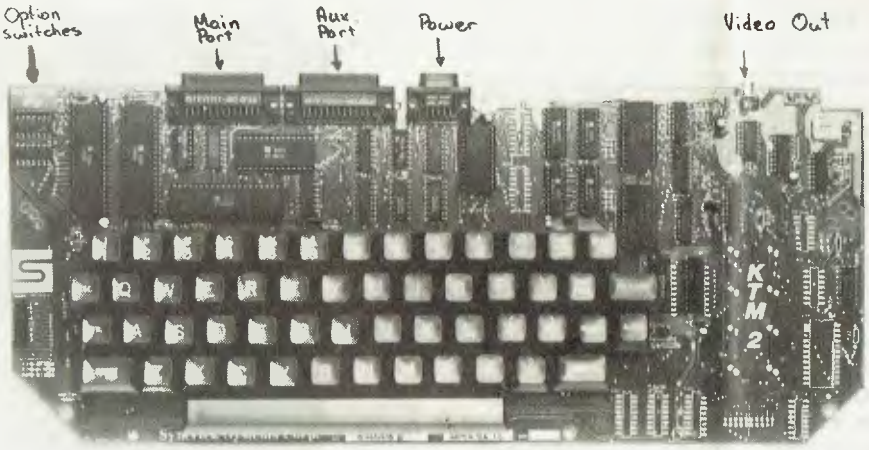

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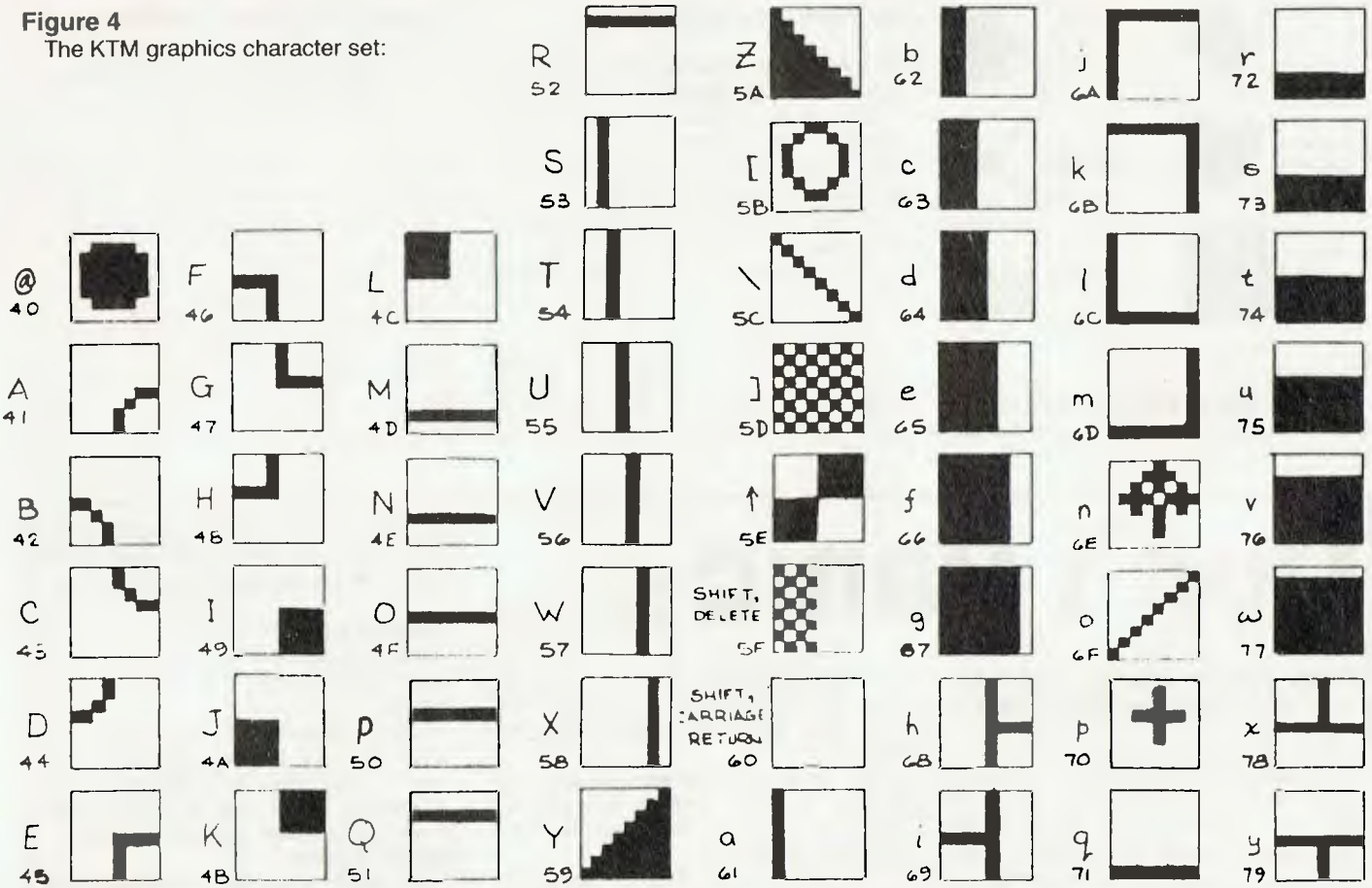
Figure 4
The KTM graphics character set:



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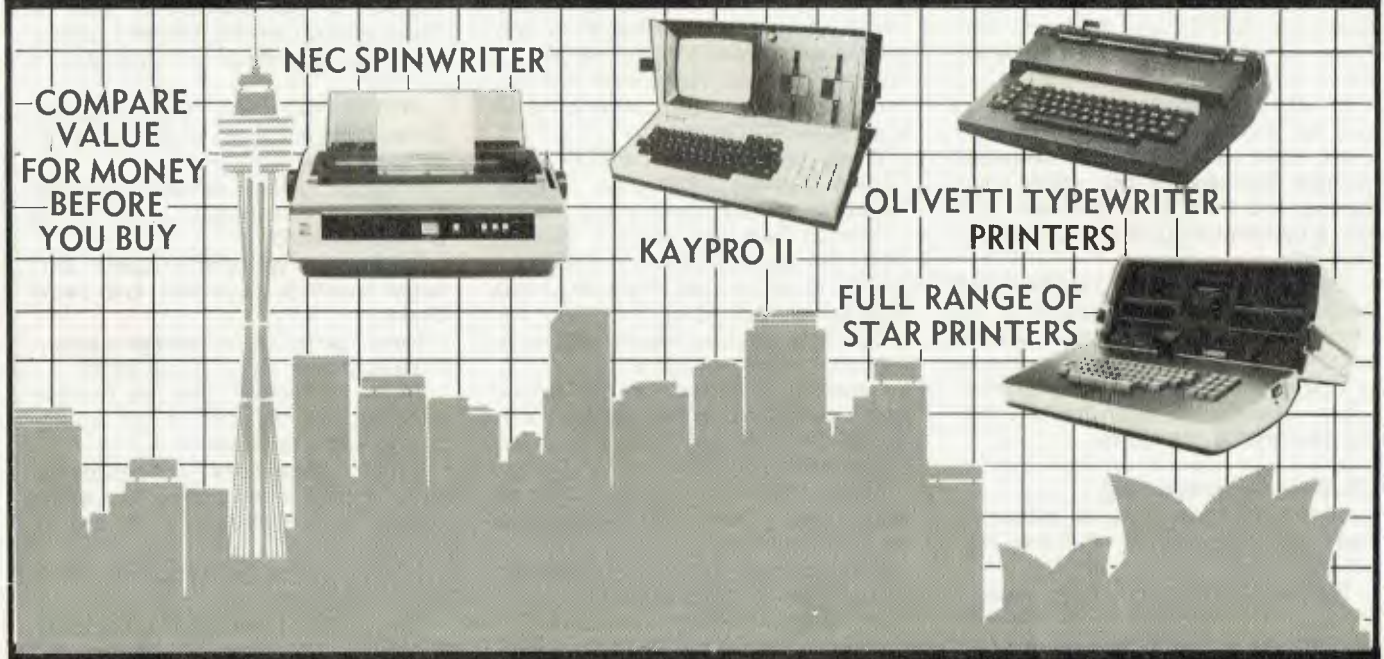

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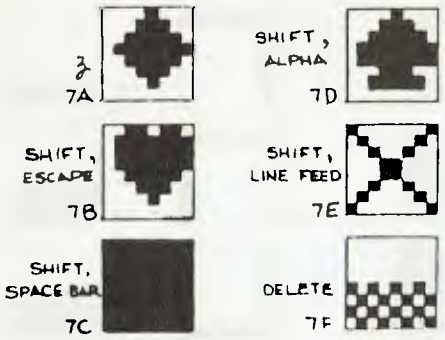

Figure 5
An example of the typed input to the SYM-1 for word-processing, and the actual output of the word-processor:

1380 A word-processing package is also available for the staggering
1390 sum of US$36 (no, that's not a misprint), written by the same
1400 person who developed the resident assembler/editor. This is
1410 a full-features word-processor, which has been used in the
1420 preparation of this article (see Figure 5).

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```
10 A$+""+"":DEFFNSI%(A!)=-((A!>32767)*(A!-65536))-((A!<32768)*A!)
20 K%=FNSI%(PEEK(VARPTR(A$)+1)+PEEK(VARPTR(A$)+2)*256)
30 IF INKEY$="" THEN 30
40 POKE K%,PEEK(FNSI%(PEEK(NEXT)+PEEK(NEXT+1)*256)) .PA

insert stringspace 1
10 A$+""+"":DEFFNSI%(A!)=-((A!>32767)*(A!-65536))-((A!<32768)*A!)
20 K%=FNSI%(PEEK(VARPTR(A$)+1)+PEEK(VARPTR(A$)+2)*256)
30 IF INKEY$="" THEN 30
40 POKE K%,PEEK(FNSI%(PEEK(NEXT)+PEEK(NEXT+1)*256
```

Don't Panic

By Garnett Znidaric

Thirty tips on how to make life with the computer more bearable.

IN THESE perplexing times, computers and "the chip" have become a way of life – our way of life, to be exact. My computer, for example, is used in business planning, parachute designing, receiving aerial-design analysis, theatrical lighting plans and, of course, word-processing.

I hope to pass on a few tips which I've picked up while building my own systems from numerous plastic bags full of components. I've presumed that most of you know something about our universal language, BASIC, and that you also have mastered the use of a soldering iron.

On the other hand, I suppose a good way to learn about soldering is to do as I did: make up a few boards averaging a mere thousand or two solder joints apiece, and then spend the next night and a half searching for a single dry solder joint...

During breaks in programming and hardware hacking (while waiting for the smoke and language to clear), I have accumulated a list of comments on construction hardware, and programming, which is invaluable when troubleshooting new boards or routines.

General Programming

Draw up a table listing all subscripts used with comments on what they represent.

Plan your program on paper, explaining a flow system (not to be confused with the useful flow-chart).

If you're designing screens, have plenty of blank video display maps on hand.

Always do a separate sample run on your BASIC version of a formula. Your version of logic may disagree with the computer's.

Decide whether you want the program to be portable. Writing for specific machines may be easier, but the marketability will be less.

Use sub-routines for any routine that has to be used more than once.

Remember that accessing sub-routines takes time.

Always place sub-routines after the end of the program with your data statements.

If need be, clutter your master copy of your program with REMark statements, even if you remove them from subsequent copies so as to reduce the required memory. Remember that REMarks provide human access to the alleged logic of a program.

When playing with PEEKs and POKEs, always note their original values in case you create a bug.

Analysis and disk-storage routines often use the first piece of data as a counter for the number of pieces of data to be analysed or stored.

Disk systems often require data to be entered one piece at a time.

Columns of figures can be aligned with a routine like PRINT TAB(30+X)A, where X is a variable dependent on the size of INT(A).

Always make a back-up copy. This includes saving portions of programs as they are completed.

Find yourself a good renumbering routine, save it and treasure it. In merging programs, it will prove invaluable.

Likewise, remember that your word-processor can be used as a valuable aid in editing programs.

With WP6502 as a word-processor for outputting a program to cassette, note that it has to be done in the print (view) mode with the serial port set to cassette.

Hardware Hacking

Flashing light-emitting diodes (LEDs) run on 5V and can act as power indicators.

Label everything as it comes apart or as you rewire it. In 12 months' time, your memory may fade – a drawing won't.

Soldered leads are a hassle, and break easily. Make up units as plug-together-modules.

Dry solder joints often constitute both the simplest, and hardest to find problems.

Very fine solder joints which carry a lot of current can overheat and fail.

If need be, wind your own secondary windings for your power supply transformer. The only point to watch is that the core of your transformer must be heavy enough for the intended current, and that the windings will also take the current.

With all electricity for a given system, remember that voltage drops with an increase in current.

Enclosed systems can get hot enough to cook on. Ensure your "chips" have enough ventilation.

In designing your own supplies, don't forget final-filter capacitors and safety diodes.

Never use a variable voltage supply – three volts might not hurt, but 30 will.

Zener diodes can often be incorporated to save systems if the polarity could become reversed.

Small cassette motors can provide the basis of good cheap cooling fans where general air circulation is all that is needed.

When in doubt, go back and start at the power supply.

The two most important points to remember in the areas of software and hardware is, simply, do it neatly and correctly.

With a bit of luck, it might work! □

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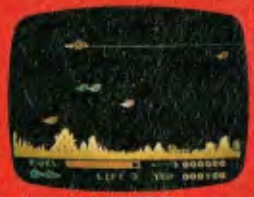
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Getting Friendly

By Jeff Richards

In the first of three articles, Jeff Richards introduces some techniques for making data-entry procedures as friendly as possible, within the limitations of a dumb terminal, with a fully developed example in MBASIC.

"USER FRIENDLY" is one of the newer computer buzzwords, and refers to the effectiveness with which a computer system interacts with its operators. Obviously, a user-friendly system will achieve a better work output than one that is "unfriendly".

The effectiveness of this interaction depends on several factors. In this article, one small aspect of user-friendliness will be examined, and some suggestions made that should have general applicability.

The area considered is operator interaction through the screen and keyboard during data entry, with CP/M programs written in Microsoft BASIC-80 (MBASIC). Similar considerations will apply to any system, but the suggested implementation may or may not be appropriate.

Three components go to make up effective screen-keyboard interaction:

1. Operator confidence in what the required data item is. (The operator should know what data the machine is asking for.)
2. Operator confidence in the machine's response to different data items that may be entered. (Uncertainty about whether a particular response is appropriate.)
3. Operator confidence in the ability of the machine to reject inappropriate responses.

To detail these points, here is a specific example. Consider a package for dealing with inventory control, invoicing and re-ordering. This system needs the date – one of the first questions asked when the system is powered up.

With the message PLEASE ENTER DATE on the screen and the cursor gently winking alongside, the required information is obvious. Or is it? Should the date be today's date, or the date that we wish to print on top of each invoice – they may not be the same.

If we enter today's date, will we get the chance to nominate a different date for the invoices, or should we pretend that today is actually the invoice date?

Even if we do get the chance to enter the invoice date, are there some restrictions if it is different from today's date? For instance, do the two dates have to be in the same month?

Finally, what would we get if we just hit RETURN?

Clearly, the above prompt should be a little more explicit. DATE FOR INVOICING = or ENTER TODAY'S DATE might both be a little less confusing.

Having consulted the manual to find the answer, the next question is how is the date to be entered? Possible forms (for June 30, 1983) would be 30/6/83, 30/06/83, 6/30/83, 06/30/83, 300683 or 30RETURN6RETURN83RETURN.

Actually, this is one of the easier questions to answer, since obviously any one package will have a standard date format that will be used exclusively throughout the system. (Those who suspect that this statement may not be quite correct must have been looking at some of the currently available inventory-control packages.)

One way to resolve the above dilemma is to try a few dates and see what happens. Effective operator interaction means the operator would be informed of an inaccurate response. The operator should be confident that if 6/30/83 is entered when the expected format was dd/mm/yy, the system will not go off into some limbo world of its own, attempting to put a name to the 30th month in the calendar.

Finally, the operator should have some confidence in the ability of the machine to respond in a sensible way to the input. For instance, will hitting RETURN in response to the date question mean that the machine will use the last date that was entered? Will accidentally entering a date of the month after the last date used cause the system to jump straight into some balance-forward routine to get ready for the next month? Will entering an obviously inappropriate date do some other irretrievable dam-,

age to the date already in the system?

Even with this simplest of examples, there are considerable possibilities for effective operator interaction. As the date entry procedure becomes more complex, the attention that has to be paid to user-friendliness becomes even more important.

Three important elements of screen processing should be obvious from this example. The first is to make the screen prompt as explicitly and accurately as possible. The second is to ensure that the data entered is checked thoroughly before being accepted. And the third is to be consistent.

A significant trade-off should also be evident. Providing the operator with a full description of the data required, suitable formats and the machine response to default entries, is likely to so overpower the operator that any increase in efficiency due to confidence will be consumed by the time required to read all the information about the data item. Obviously, consistency will help in this trade-off.

We're now in a position to determine the processing requirements if these criteria are to be met.

1. Each question must have a prompt. If possible, the form of the prompt should be indicative of the type of answer required, while the detail of the prompt should be a precise guide to the actual data item.

2. The prompt should indicate the format of the response.

3. It should be possible to provide messages, and re-prompt, in the event of an incorrect response.

4. Default responses, if not obvious from the context, should be specified.

In considering the implementation of these requirements, the constraints must also be considered. The constraint here is that the only screen-formatting command available is carriage-return. Though most terminals support many other screen-control commands, there is insufficient standardisation to be able to confidently hard-wire these codes into a program that will be widely used.

Other screen-control commands would permit more effective layouts; if they're known, or can be maintained in a status file, then they should be used. But the only thing that carriage-return cannot do is to set up the screen below the cursor line. Effective use of only one command also depends on fast screen response.

Let's look at providing prompts. If the form of the prompt is to give a clue to the type of response, then the standard BASIC prompt of ? is obviously not enough. Fortunately, it's reasonably easy to solve – following the prompt with a comma instead of a semi-colon suppresses the question mark. And if you don't want a prompt at all, the prompt string can be null. (See Table One.)

Such prompts are very limited. They must be string literals, so prompts that change as a result of the data in the program cannot be achieved in this way. For instance, if we are getting four lines of a customer's address, we might want the line number to be part of the prompt ... but the line number is the counter for the loop to input the data. The solution is to do the prompt with a print line, and to leave it out of the INPUT. Listing One shows the loop to achieve this:

```
Listing 1. String variable as prompt.

100 FOR I=1 TO 4
110 PRINT "Address Line ";I;
120 INPUT '",A$(I)
130 NEXT I
```

Notice the semi-colons in line 110. The first ensures the value of 1 is printed immediately after the end of the string literal "Address Line"; the second suppresses the carriage return at the end of the PRINT. The cursor will sit immediately after the value of 1 while the system awaits the input.

Obviously, even this simple example lacks some of the necessary features. First, we have no given indication of the type of data expected. One way to do this is to follow the prompt with an indicator. A useful rule is to use = where a piece of information is required, ? for a yes or no ("OK?"), while : might mean "select from the above list".

Secondly, Listing One gives no indication of default values that will be used if the operator hits RETURN. In the case of a request for information, like a line of any address, RETURN usually means a blank line. However, if the operator was editing the customer's details, then RETURN might mean "retain the existing information for this data item". In this case, the current value of the data item should be displayed.

Thirdly, this example gives no indication of how large the data item can be. It is most disconcerting for the operator to carefully enter a detailed street address, hit RETURN and have the system summarily reject the whole line and request it to be retyped in some shorter form.

Finally, if the data is rejected, there is no provision for re-asking the question at the same screen position – the best that could be done would be to ask the question on the next line.

In addition, it would be useful if all prompts in a data-entry sequence appeared in the same screen column – checking and reviewing entries is much easier if they are nicely lined up.

How can all these requirements be met within the limited screen-handling commands that we have specified?

The following example will assume we're editing a customer's name-and-address details. The values used assume an 80-column screen, but the procedures are applicable to any width terminal.

The first thing to do is to ensure that BASIC will not insert carriage-returns when they are unnecessary. The command WIDTH 255 will prevent BASIC from inserting carriage-returns unless specifically requested, and it should be included in the beginning of every program, along with the DIM and DEFINT statements. We must then build the prompt string, consisting of three elements. First, there will be a description of the data item required. Secondly, there may be information about the default value, and third there will be a response-type indicator.

The prompt string should be a fixed length to ensure that the responses are neatly lined up. The command *P$=STRING$(36,32)* would build up a prompt string of 36 spaces. To insert the data item information, we would use the command *LSET P$="Debtor Name"*.

To insert the default response, we could use *MID$(P$,15,20)=DS* and to add the response indicator, we could use *P$=P$,"="*.

Having built the prompt string, it's necessary to print it and position the cursor ready for the response. It's useful to clear the line of any data that may be on the screen.

PRINT STRING$(80,32);CHR$(13);

will do this. Then we want to print the row of characters indicating the maximum legal length of the response, and again return the cursor to the left. The command *PRINT P$;STRING$(L".");CHR$(13);* will achieve this. Finally, we should re-display the prompt and position the cursor ready for the response. The command to do this is *PRINT P$;*.

Now we're ready to accept the operator response, but remember that we don't want to echo the line feed, in case we reject the data and want to re-ask the question. The command to input a line of text, terminated by a carriage-return, but without echoing the CR/LF is *INPUT;"",I$*.

LINE INPUT could also be used, in which case the null prompt is not required. Note, however, that the comma, which is legal during a LINE INPUT, may cause errors if the data item is written to disk.

Having examined the data, we can determine whether or not it is valid. If it is, then the final step is simply to print a CR/LF and move on to the next data item. A single PRINT is enough.

If we decide to reject the data, three things must happen before the sequence is restarted. First, the operator must be warned; the terminal BELL is the best way to do this. Secondly, the reason for rejecting the data must be indicated. Finally, there must be a pause so the operator can work out what is going on. The sequence to do this is: *PRINT CHR$(13);"Too many characters. Please re-enter":*
CHR$(7);chr$(13);FOR DELAY =1 TO 1000:NEXT DELAY.

Notice that the CR/LF has still not been printed. When we re-start the procedure, the warning message will be deleted by the clear-to-end-of-line function that was simulated with *STRING$(80,32)*.

A full input routine that demonstrates these features is given in Listing Two:

```
Sample Data Entry Procedure.

10  DEFINT A-Z
20  WIDTH 255
30  DIM P$(4)
100 OPEN "R",#1,"MAIL.LST",80
110 FIELD #1,20 AS NAM$,20 AS ADR1$,
            20 AS ADR2$,20 AS ADR3$
120 FIELD #1,80 AS REC$
130 MAXREC=200:MINREC=1
140 REC=MINREC
150 P$(1)="Name"
160 P$(2)="Street Address"
170 P$(3)="City"
180 P$(4)="State  P.Code"
200 PRINT TAB(20);"Editing Mailing List Details"
210 PRINT:GOTO 240
220 PRINT " Invalid Record Number ";
                  CHR$(7);CHR$(13);
230 FOR DELAY=1 TO 1000:NEXT DELAY
240 L=3:D$=RIGHT$(STR$(REC),LEN(STR$(REC))-1)
250 PROMPT$="Reference Number "+"("+D$+") = "
260 GOSUB 700:IF I$="" GOTO 220
270 IF LEN(I$)>L GOTO 220
280 FOR I=1 TO LEN(I$)
290  IF ASC(MID$(I$,I,1))<48 GOTO 220
300  IF ASC(MID$(I$,I,1))>57 GOTO 220
310 NEXT I
320 IF VAL(I$)>MAXREC GOTO 220
330 IF VAL(I$)<MINREC GOTO 220
340 PRINT
350 REC=VAL(I$)
360 GET#1,REC
400 L=20
410 R$=STRING$(80,32)
420 FOR I=1 TO 4
430  GOTO 470
440  PRINT STRING$(39,32);
450  PRINT CHR$(13);" Too many characters.
       Please re-enter";CHR$(7);CHR$(13);
460  FOR DELAY=1 TO 1000:NEXT DELAY
470  PROMPT$=STRING$(36,32)
480  LSET PROMPT$=P$(I)
490  D$=MID$(REC$,I*20-19,20)
500  IF ASC(D$)=0 THEN D$=""
510  MID$(PROMPT$,15,36)="("+D$+")"
520  PROMPT$=PROMPT$+" > "
530  GOSUB 700:IF LEN(I$)>L GOTO 440
540  MID$(R$,I*20-19,20)=I$
550  PRINT
560 NEXT I
570 PRINT
600 PRINT TAB(25);"Details Correct ? ";
610 I$=INPUT$(1)
620 ON INSTR("NnYy",I$) GOTO 640,640,650,650
630 GOTO 610
640 PRINT I$:GOTO 210
650 PRINT I$
660 LSET REC$=R$
670 PUT #1,REC
680 REC=REC+1:GOTO 210
700 PRINT STRING$(79,32);CHR$(13);
710 PRINT PROMPT$;STRING$(L,".");CHR$(13);
720 PRINT PROMPT$;
730 INPUT;"",I$
740 IF I$="" THEN I$=D$
750 PRINT CHR$(13);PROMPT$;I$;CHR$(13);
760 RETURN
```

Some of the detail can be at the programmer's discretion. For instance, it may be preferable to print the default values at the extreme right of the screen and to accept input from a position towards the left, closer to the prompt. This also has the advantage that the screen doesn't look quite so sparse when there is no default data. This and similar adjustments are all possible within the above structure.

The actual print sub-routine expects three parameters. These are:

PROMPT$ – the prompt string;
L – the maximum legal length of the response; and
D$ – the default response.

It returns one parameter, 1$, which is the operator response.

Note also that some screens will not print a full line without inserting their own CR/LF. It may be safer to limit all strings to one less than the screen width.

This discussion wouldn't be complete without some reference to INPUT$(n). This function accepts (n) characters from the keyboard, without echo and without any editing. It is possible to use INPUT$() to do very effective "real-time" input verification; for instance, to reject an input as soon as it goes over the maximum length without waiting for the operator to hit RETURN.

Such techniques are beyond the scope of this article, but there is one simple use for INPUT$ – this is in accepting a single-key response to questions.

There are many circumstances where a single-key response is appropriate. One important use is in asking for confirmation that a previous step is correct. Frequently, an input routine should finish with the prompt DETAILS CORRECT?, where the only valid answers are Y or N.

Another important use for single-key entry is when the operator is asked to select from a list of items – for instance, at a menu of procedures. As a general rule, single-key entry should not be used during data entry, as it can become confusing to the operator if only some data-entry responses requires the RETURN.

The procedure for dealing with the INPUT$() function is quite straightforward. It's best used so that invalid responses are simply ignored – the response doesn't display and the system doesn't react. Listing Two demonstrates this use of the INPUT$() function and, incidentally, shows a convenient way of dealing with the problem of upper- and lower-case.

Notice that the DETAILS CORRECT? prompt has no default and no explicit reference to the appropriate response. This is assumed to be one of those prompts that is sufficiently common and consistent to permit considerations of brevity to override completeness.

Though the example presented here provides most of the features essential to effective operator interaction, the resulting code is still relatively compact. And though only carriage-return has been used as a special screen command, the implementation of other terminal features would not be difficult. Effective use of the clear-screen function easily improves the usual scrolling display.

The appearance of the display screen and the mode of operator interaction tend to be matters of personal preference, or even prejudice. But attention to the sort of items presented here can contribute a great deal toward the effectiveness with which non-technical operators can interact with a system. □

TABLE 1

```
Command          Display
INPUT I          ?
INPUT "No. ";I   No. ?
INPUT "No. = ",I No. =
INPUT "",I
```


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Christensen Protocol – The Manual

By Bill Bolton

MY ARTICLE on Christensen Protocols in the May Issue of *Your Computer* has certainly stirred up a lot of interest.

There have been a number of detailed queries on some aspects of the protocol and rather than try to answer them all individually it seemed better to give you the formal specification of the Protocol from its creator.

I was hunting around amongst some uncatalogued disks that I brought back from a recent trip to the United States and found the following description of the Protocol from Ward Christensen.

I rearranged and expanded the text slightly as well as massaging it a little to remove some minor obscurities but it's largely as Ward wrote it – so this can be considered the definitive description of the protocol; the "Manual" for Christensen Protocol if you like.

I think it complements the previous description quite well, so its over to Ward:

After several requests, I finally decided to put my modem protocol into writing. It had been previously formally published only in the AMRAD newsletter.

Definitions

First, some definitions. SOH has a value of 01H; EOT has a value of 04H; ACK has a value of 05H; NAK has a value of 15H; CAN has a value of 18H.

The transmission medium level protocol is: Asynchronous, 8 data bits, no parity, one stop bit.

The protocol imposes no restrictions on the contents of the data being transmitted. No control characters are recognised in the 128 byte data blocks. Absolutely any kind of data may be sent – binary, ASCII, and so on.

The protocol has not formally been adapted to a 7-bit environment for the transmission of ASCII-only (or unpacked-hex) data, although it could be quite simply by having both ends agree to AND the protocol dependent data with 7F hex before validating it. This is specifically referring to the checksum, the block numbers and their ones complement.

If you want to maintain compatibility with the CP/M file structure, that is, to allow communicating ASCII files to or from CP/M systems, you should follow this data format:

ASCII tabs used (09H); tabs set every 8.

Lines terminated by CR/LF (0DH 0AH)

"End of File" indicated by control-Z (1AH) – one or more

Data is variable length, that is, should be considered a continuous stream of data bytes, broken into 128 byte long blocks purely for the purpose of transmission.

A CP/M "peculiarity": If the data ends exactly on a 128-byte boundary, that is, with CR in 127, and LF in 128, a subsequent sector containing the control-Z End of File character(s) is optional, but is preferred. Some utilities or user programs still do not detect End Of File reliably without control-Zs.

The last block sent is no different from others: there is no "short block".

Message Block Level Protocol

Each block of the transfer looks like:

(SOH)(blk no.)(255-blk no.)(--128 data bytes--)(cksum)

in which: SOH is 01 hex; blk no. is a binary block number, which starts at 01, increments by 1, and wraps 0FFH to 00H (not to 01); 255-blk no. is the block number after going through an 8080 CMA instruction, that is, each bit complemented in the 8-bit block number (formally, this is the "ones complement"); and cksum is the sum of the data bytes only – ignore any carry.

File Level Protocol

File level protocol is common to both sender and receiver: All errors are retried 10 times. For versions running with an operator (that is, *not* with XMODEM or XYAM), a message is typed after 10 errors asking the operator whether to "retry or quit".

Some common implementations of the protocol use CAN, ASCII control-X, to cancel transmission (YAM does this for instance). This was never adopted as a standard because having a single "abort" character makes the transmission susceptible to false termination due to an ACK, NAK or SOH being corrupted into a CAN and cancelling transmission.

The protocol may be considered "receiver controlled", that is, the sender does not need to automatically re-transmit, although it does in the current implementations.

Receive Program Considerations

The receiver has a 10-second timeout. It sends a NAK on every occasion

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that it times out. The receiver's first timeout, which sends a NAK, signals the transmitter to start. Optionally, the receiver could send a NAK immediately, in case the sender was ready. This would save the initial 10 second timeout. However, the receiver MUST continue to timeout every 10 seconds in case the sender wasn't ready.

Once a block has started to be received, the receive program should allow one second for each character and the checksum. If the receiver wishes to NAK a block for any reason (invalid header, timeout receiving data), it must wait for the line to clear. See the "programming tips" section for ideas.

Synchronizing: If a valid block number is received, it will be:

1) The expected one, in which case everything is fine.

2) A repeat of the previously received block. This should be considered Okay, and only indicates that the receiver's ACK got glitched, and the sender retransmitted.

3) Any other block number indicates a fatal loss of synchronization, such as the rare case of the sender getting a line glitch that looked like an ACK. The receive program should abort the transmission by sending a CAN.

Sending Program Considerations

While waiting for transmission to begin, the sender has only a single very long timeout, say one minute. In the current protocol, the sender has a 10 second timeout before retrying. I suggest NOT doing this, and letting the protocol be completely receiver controlled. This will be compatible with existing programs.

When the sender has no more data, it sends an EOT, and awaits an ACK, resending the EOT if it doesn't get one. Again, the protocol could be receiver controlled, with the sender only having the high level 1 minute timeout to abort.

A Data Flow Example

Here is a sample of the data flow, sending a 3-block message. It includes the two most common line problems (or line "hits" as communications jargon puts it) – a garbaged block, and an ACK reply getting garbaged. The xx represents the checksum byte.

```
SENDER                                  RECEIVER
                                  times out after 10 seconds,
                        <----           <NAK>
<SOH> 01 FE -data- xx   ---->
                        <----           <ACK>
<SOH> 02 FD -data- xx   ---->   (data gets line hit)
                        <----           <NAK>
<SOH> 02 FD -data- xx   ---->
                        <----           <ACK>
<SOH> 03 FC -data- xx   ---->
   (ack gets garbaged)  <----           <ACK>
<SOH> 03 FC -data- xx   ---->           <ACK>
<EOT>                   ---->
                        <----           <ACK>
```

Programming Tips

The character receive subroutine should be called with a parameter specifying the number of seconds to wait. The receiver should first call it with a time of 10, then NAK and try again, 10 times.

After receiving the SOH, the receiver should call the character receive subroutine with a 1-second timeout, for the remainder of the message and the checksum. Since they are sent as a continuous stream, timing out of this implies a serious line glitch that caused, say, 127 characters to be seen instead of 128.

When the receiver wishes to NAK, it should call a "PURGE" subroutine, to wait for incoming data to stop. The sending end should read any pending character in its UART receive data register and throw data away immediately upon completing sending a block, to ensure that any line glitches weren't misinterpreted as a valid response from the receiving program. The transmit end will then be able to read the response from the receiving end which should arrive as soon as the receive end has detected the end of incoming data.

The most common technique is for "PURGE" to call the character receive subroutine, specifying a 1 second timeout, and looping back to PURGE until a timeout occurs. The NAK is then sent, ensuring the other end will see it.

You may wish to add code recommended by John Mahr to your character receive routine – to set an error flag if the UART shows framing error, or overrun. This will help catch a few more glitches – the most common of which is a "hit" in the high bits of the byte in two consecutive bytes. The checksum comes out okay since counting in 1 byte produces the same result of adding 80H and 80H as with adding 00H and 00H.

NOTE: This description does not include things which I am not familiar with, such as the CRC option.

Over To You

Well, there is the specification from the man himself. The protocol isn't hard to implement so keep at it, I know that some of you have started to work on implementations already.

If any aspect of the specification is still unclear, please let me know. I can't promise individual replies but will see what can be done about further informative articles to fill in the gaps.

I would estimate that several million Kilobytes of code get transferred between microcomputer systems around the world each day using the Christensen protocol. Certainly the efficient publishing of Your Computer would be impossible without it!

To get this article printed has involved AT LEAST two steps that involved modem transfers using Christensen protocol. □

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HEARD ON THE BUS

By Leon Yendor

THE LEARNING of all computer programming languages is really only done at the keyboard because paralleling the text with exercises protects against misconceptions being formed in the mind before an opportunity arises to see the error.

The truth of this statement doesn't deny that a really good textbook is necessary for an easier and faster assimilation of the techniques and grammar of a computer language – there are some extremely fine texts for most high-level compilers and interpreters, and even most assemblers.

C language is an exception. Its widespread use and success is due to the fact that it is the language of choice for a large number of systems programmers already experienced in the use of other programming tools.

Fortunately for would-be C programmers, this situation has been corrected with the publication of *Learning To Program In C*, by Thomas Plum, of Plum Hall Inc, the highly respected C and UNIX training establishment in New Jersey.

Until now, the standard reference for C language has been *The C Programming Language*, by Kernighan and Ritchie. This textbook remains the definitive standard. However, even though I, like many others, succeeded in being able to write in C by using this textbook constantly during early writing, it is hardly an in-depth tutorial for raw beginners.

This is where the strength of *Learning To Program In C* lies. Dr Plum draws on his considerable experience as an educator and the result is a book which, whilst never talking down to the reader, can lead the rawest beginner through the learning process to the level of fairly complex programs.

The construction of the book is also unusual: it is punched for a three-ring binder and the appendices are on pages which are perforated for removal to a separate binder – this means the answers to exercises are available for reference without losing your place in the main text. Being somewhat fastidious

about my valued texts, I'd rather have seen the publication bound as two volumes to save what I regard as vandalism; hopefully, the next reprint will be done this way.

As C is a language implemented on a great variety of machines and is capable of dealing with each at a very low level, there are several dependencies in various implementations. Whilst the author teaches techniques to avoid nonportability of programs, he does flag all machine, compiler and operating system dependent areas throughout the text and leaves room in the appendix for the individual to note the requirements of his machine environment.

Valuable information regarding the documentation and maintenance of programs is also thoroughly dealt with. Though I prefer a slightly different style of formatting of the program text for readability and maintenance, anyone adopting and consistently maintaining the style used by the author will have clearly constructed code.

Areas not covered by the text are of one main type: structures. Though straightforward structures are comprehensively dealt with, unions, bit-fields and self-referential structures are ignored. The concept of each of these is dealt with in Kernighan and Ritchie's book, but examples of their use are rather obscure for beginners. These data types, whilst requiring careful study, are extremely valuable in constructing tools like compilers, assemblers and the utilities much loved by microcomputer programmers. It is to be hoped Dr Plum will, at some future date, favour us by treating these subjects with the clear and concise approach he brings to the rest of the subject.

As an illustrative exercise in programming and documentation, Dr Plum presents a most complete case study: the writing of a program to play the gambling game blackjack. As a basis for the analysis of a programming job, it is sufficiently involved and complex to provide a meaningful view of the planning, development, documentation and maintenance of a project.

Complete listings and manual pages are provided, in the style of Bell Laboratories, and the reader is encouraged to compile and test the code. In fact, provided an included copyright message is left intact as a sign-on message, anyone may copy, modify and distribute the program.

If you use the C language for professional programming or in an environment where a number of programmers work on one project, you'll be interested to know that the publisher of *Learning To Program In C* can also provide *C Programming Standards And Guidelines*, which can be used to make sure of consistency and readable code. It comes in two flavours (U for UNIX and offspring, W for Whitesmith) and costs $US25.

The review copy of *Learning To Program In C* was provided by the publisher, Plum Hall Inc, 1 Spruce Avenue, Cardiff, NJ 08232, United States. Individual copies cost $US25; air parcel-post would be about $US10. Plum Hall Inc accepts American Express cards. □

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S-BASIC: The Best Of Both Worlds...Well, Almost

By Jeff Richards

One of the most significant recent developments in personal computers has been the increase in the variety of programming languages available. However, the introduction of languages such as Pascal, C and Forth has had little impact on the popularity of BASIC. Jeff Richards reports...

THOUGH frequently criticised, BASIC has managed to maintain its position as the most popular programming language for small computers, and it appears unlikely that this will change in the near future.

One major reason for the popularity of BASIC – Beginner's All-purpose Symbolic Instruction Code – is its flexibility. As there has never really been a "standard" version, manufacturers have quite happily extended BASIC to incorporate features of new machines or operating systems, and we now have commands to play tunes, display graphics and access disk files.

Each of these enhancements has been implemented within the overall structure of BASIC, so that conversion from one implementation to another is usually possible, though tedious. In many respects, incorporating changes into the language is preferable to resorting to PEEKs and POKEs and machine-language sub-routines.

The result is that modern implementations of BASIC provide a powerful programming language, at the same time retaining much of the simplicity and ease-of-learning of the original version. Recent versions include powerful structured commands like DO/WHILE and REPEAT/UNTIL.

However, there has always been one point that has prevented BASIC from being considered a true structured language – the lack of local variables.

While Pascal programmers might nod their heads in agreement, BASIC programmers will probably ask, "What's a local variable?" Local variables are ones which are defined and take on a value only within one segment of a program – they're *local* to that segment. Use of a variable of the same name in a different part of the program will have no effect on the value of the variable in the other part.

The importance of this may be difficult to grasp for the average BASIC hacker, especially since BASIC doesn't define its variables and doesn't divide its programs into separate parts. That is, until S-BASIC came along.

Structured BASIC

S-BASIC, for Structured BASIC, is a product of Topaz Programming. It is a compiled BASIC that supports local variables and two types of program augmentation, or "modules".

Incidentally, there is a version of BASIC released on Sanyo microcomputers that is sometimes referred to as S-

BASIC. This is actually Sanyo's licenced version of M-BASIC, and shouldn't be confused with S-BASIC from Topaz Programming.

S-BASIC appears similar to CBASIC (Commercial BASIC), but it is a superficial similarity. It shares with CBASIC the commands LPRNTER and CONSOLE to re-direct output from a PRNT statement, and it doesn't require line numbers. However, it compiles into a stand-alone object file that doesn't require a run-time package.

It is similar to M-BASIC (Microsoft BASIC) in some areas – for instance, in the range of functions provided and the method of string-handling. But it also has some unique features, such as three different types of input statements and a form of "sequential random" file access.

However, it's in the area of modular programming that S-BASIC differs from most other versions of BASIC. The simpler of the two modular constructions is the procedure.

A procedure is a set of statements that starts with "PROCEDURE name" and finishes with "END". The statements within the procedure are executed whenever its name is used in an S-BASIC statement. Procedures can be nested to any level.

So far, however, procedures aren't greatly different from ordinary sub-routines. In fact, S-BASIC procedures can be made to perform very differently from sub-routines. The difference stems from the fact that S-BASIC requires every variable to be defined before it is used. The definition simply describes the variable as a number, string or array. However, if a variable is defined within a procedure, then the variable is local to that procedure.

Any other variable definitions that use the same variable name in other procedures, or in the main program, have no significance for the definition within the current procedure – variables defined in different places that happen to share the same name are entirely different variables.

Modular Programming

Apart from relieving the programmer of the chore of thinking up unique variable names, this feature of S-BASIC opens the door to an entirely modular approach to programming. And, of course, a modular approach encourages a structured program.

The modular approach is supported by a compiler directive which permits modules to be extracted from library files and incorporated into the source code at compile time.

Therefore, standard procedures can be developed and saved in library files and programs can make calls to these procedures. The compiler will include them as requested during the compilation. Any variable defined and used within a procedure will not interfere with a variable of the same name in another procedure; this makes these modules truly independent.

Another feature of local variables is that they permit the use of recursive procedures. The compiler handles procedures by setting up code to push any

variable defined within the procedure onto a stack, and retrieving them at the end of the procedure.

Thus, when a procedure is completed, the stack has been restored to its previous state. If the calling procedure requires variables that it has defined, then they are available on the stack. This process applies even if the procedure calls itself – variables defined within the procedure are defined again, and the "old" values from the calling procedures are pushed on to the stack, to be retrieved as the nested procedures unwind themselves.

Recursive procedures that take advantage of this feature are largely a programmer's novelty. For instance, the S-BASIC manual demonstrates the equivalent of a one-line procedure to evaluate factorials. But there are some instances where recursion is the only effective way to solve a problem, and to have procedures call themselves can be a powerful tool in some circumstances.

Procedures can be set up that receive variables from the calling program. The syntax to do this is similar to Pascal or to BASIC functions. The calling program names the variables or constants to be used by the procedure. The description of the procedure includes some dummy variables, and the body of the procedure uses these names as surrogates for the actual values passed from the calling program.

For instance, a procedure to display a message at a certain position on the screen might be called with: *DISPLAY 10,20,MESSAGE*.

The procedure would be defined as:

```
PROCEDURE DISPLAY

(ROW,COL = INTEGER,T-
          EXT = STRING)
```

When called, ROW would be set to 10, COL would be set to 20 and TEXT would be set to the value of the variable MESSAGE. Statements within the body of DISPLAY would position the cursor to ROW and COL and then print TEXT.

It isn't necessary to explicitly pass variables to procedures. S-BASIC makes all variables defined at a higher level available to a procedure (unless the variable name is re-defined within the procedure). In this case, procedures operate like sub-routines, with the convenience of reference by name rather than line number.

Variable Allsorts...

So we not only have "local" variables (those defined within the current procedure) and "global" variables (defined within the main program) but there are also "semi-global" variables, which are "local" to the procedure that defines them and to any procedures that the defining procedure calls.

Functions are a variety of procedure. They have a variable type (integer, string, and so on) and are referenced as a variable. They are very similar to BASIC functions, except that any statement can be obtained in a function. For instance, a function may be defined that opens a data file and reads some information, returning the data as the result of the function.

As an example of the power of functions, the statement *A=RANDOM.READ('MAST',REF.NO,10)* might set A equal to the value of the tenth data item in record number REF.NO in file "MAST".

Functions and procedures, and their associated concept of local variables, make S-BASIC a language completely different from standard BASIC. But the change for the confirmed BASIC programmer isn't as hard as might be imagined, as the syntax is familiar and simple. Once the power of the procedures and functions is utilised, programming becomes easy.

S-BASIC provides additional features to support structured programming. There is the usual FOR/NEXT, ON/GOTO and ON/GOSUB, as well as the less usual REPEAT/UNTIL and WHILE/DO. In addition, there is a CASE statement, which can be used as a convenient replacement for ON/GOTO and ON/GOSUB. Line numbers are optional, and can contain alpha characters (though they must start with a number). It's quite easy to write large programs without a single line number, and the language seems to encourage this.

One casualty of the enhanced control structures is the FOR/NEXT loop. It is absolutely forbidden to jump out of the loop, as the control stack will still be set for the end of the loop, and it will be immediately restarted. This is a pity, as the FOR/NEXT loop can be a useful way to count through a number of stages until some condition is met that causes the exit. The solution is to use one of the other loop structures and to manually increment the counter.

Another Hassle

One other hassle for the BASIC programmer is that not only must all variables be defined before they can be used, but all procedures and functions must be defined before they are called. This makes S-BASIC programs appear upside down, with the simplest procedures first and the main program at the end. This sequence is also contrary to good "top-down" programming practice.

The range of intrinsic functions is adequate. It is more extensive than CBASIC but not as large as M-BASIC. Strings are pre-defined to a length of 80; if a longer length is used, it must be explicitly stated when the string variable is defined. Arrays of numbers, characters, and strings are supported.

In addition to integer, real and double-real numeric types, there is a special numeric type of FIXED which is stored as an 11-digit number with three decimal places, but is always printed rounded to two decimal places. It's specially useful for money values, saving a lot of effort in formatting printouts.

One unusual command is TEXT, which sends multiple lines of embedded text to the screen. This makes it particularly easy to set up screen displays. Multi-line comments are also allowed, but not multi-statement lines.

Sequential disk files are handled similarly to most other BASICs, except that both console and printer can be accessed as files. Random files use a syntax that is very similar to sequential files.

It's possible to read random-file records into a nominated location, and to redefine the data structure at that location (rather like the REDEFINE clause in COBOL), which gives a random-file access technique similar to M-BASIC. (This re-definition is available for any variable.) All disk-file data is stored in ASCII format, though variable type CHAR can be used to access data in hex format.

Program linkage is supported by a CHAIN (with COMMON) command, which will load and execute an S-BASIC program. There is also an EXECUTE command, which is used to invoke non S-BASIC programs (such as a sort) and to return control to the S-BASIC program, and a CALL statement to invoke memory-resident machine-language routines. The call can both pass variables to the routine and receive data back.

A Poor Manual

The manual for S-BASIC isn't as good as it could be. Though that isn't an unusual comment for software documentation, I've always felt that a manual was adequate if it just contained all the information needed – I could always extract the necessary data and re-arrange it myself.

Unfortunately, the S-BASIC manual isn't complete. It doesn't mention, for example, that array numbering starts at zero, rather than one (which isn't unusual), or that record numbering in random files starts at zero also (which is unusual). Also, the manual assumes the reader is familiar with both M-BASIC and CBASIC, concentrating more on what is unusual about S-BASIC rather than describing the language in detail.

Though each command gets a description, only some of them have exam-

ples, and many of the examples add nothing to the understanding of the command. The syntax descriptions and the summary are both arranged by type rather than alphabetically, which makes it very difficult to look up a particular command.

Compiling S-BASIC programs is easy. The simplest command is just "S-BASIC progname", but command sequences can be embedded that will control the compilation process and direct output as required. The manual has a good description of the memory usage of the compiled modules. There isn't a separate link phase, as the compiler automatically scans its own library and the default user library without prompting.

Compiler directives can be used to assist in debugging, with trace statements and line-number information available. The timing details show that S-BASIC produces a good compromise between speed of processing and size of the object file.

Overall, S-BASIC is a product well worthy of consideration. It has very effectively combined the simplicity and power of BASIC with the control structures and modularity of Pascal. It deserves to replace CBASIC in those applications where CBASIC has proved popular. For large and complex tasks, the availability of a compatible interpreter gives M-BASIC a distinct advantage.

But S-BASIC program development can be considerably speeded up by development of a comprehensive library of modules, so that the lack of an interpreter for debugging isn't the disadvantage that it might seem to be.

S-BASIC is available through most outlets that stock the Lifelines range, and also from your local President Group dealer. □

```
REM USED TO "PLAY" WITH RANDOM DISK FILES
var x,y=integer
var xdata=integer
files r(256)
if size("JUNK")=0 then create "JUNK"
open #0;"JUNK"
input "SEQ ON=0 OFF=1";x
if x=0 then record.sequential on
if x=1 then record.sequential off
input "0=READ 1=WRITE";x
input "RECORD #";y
if x=1 then begin
   input "DATA=";xdata
   write #0,y; xdata
   end
if x=0 then begin
   read #0,y; xdata
   print "DATA=";xdata
   end
goto 0
```

	S-BASIC	M-BASIC	CBASIC	BASIC-E
Compile Time	1:19	0:12	0:15	0:13
Link Time	-	1:39	-	-
Run Time	0:24	0:02	1:15	3:40
Object File Size	6 K	26 K	1 K	1 K
Run-Time Module Size	-	-	18 K	17 K

Comparative Times

THIS COMPARISON was run using one pass of the Sieve of Erastosthenes algorithm, described in the September 1981 edition of the American magazine *Byte*. The compiler options were selected to minimise the execution time. The latest version of M-BASIC will have a smaller object file size, but will require a run-time module. The times are in minutes; the corresponding time for interpretive BASIC-80 was 5:47.

```
$lines

REM XAMN Disk track and sector editor.
REM No warranty is made, expressed, or implied.

var     hl,de,bc,a_psw  ; cpu registers
        dph             ; location of disk parameter header
        block_size      ; cp/m logical block size
        max_tracks      ; number of tracks/disk
        seldsk          ; bios select disk
        settrk          ; bios set track routine
        setsec          ; bios set sector routine
        setdma          ; bios set dma address
        b_read          ; bios read sector
        b_write         ; bios write sector
        sectran         ; bios sector skew
        disk_number     ; disk number to examine
        = integer

var     crt             ; logical device
        list            ; logical device
        CR              ; ASCII CR
        BS              ; ASCII BS
        ascii_mask      ; ASCII mask
        bit_0_mask      ; mask used to look at bit 0
        true, false     ; true/false logical flags
        = integer

var     menu_selection  ; prompt return
        = char

var     r1, r2, r3, r4  ; Real number for computations
        = real

based   spt             ; sectors/track
        dsm             ; max data block number
        drm             ; number of dir blocks
        off             ; number of reserved tracks
        wboot           ; entry to bios
        dpb             ; location of disk parameter block
        skew_table      ; location of bios skew table (used by sectran)
        alv             ; pointer to allocation table
        = integer

based   bsh             ; block shift factor
        blm             ; block mask
        exm             ; extent mask
        ailoc_byte      ; used in searching allocation table
        = byte
        crt = 0                         rem S-BASIC device # for con:
        list = 1                        rem S-BASIC device # for lst:
        CR = 0DH
        BS = 8
        ascii_mask = 007FH
        bit_0_mask = 1
        true = -1
        false = not true

        base wboot at 1                 rem location of bios wboot entry
        seldsk = wboot + 0018H          rem set up bios entry address
        settrk = wboot + 001BH
        setsec = wboot + 001EH
        setdma = wboot + 0021H
        b_read = wboot + 0024H
        b_write= wboot + 0027H
        sectran= wboot + 002DH

        rem dma buffer for read/write sector operations
        dim byte sector(128)
        var loc_sector = integer
        location array loc_sector = sector
        dim base char file_chars(11) fcb_name(11)  byte_dm(15)
        dim base integer word_dm(7)

        based bios_return = byte                rem high order byte of a_psw only
        location var hl = a_psw
        base bios_return at hl+1

0seldsk input "Disk number (0,1,...,15) ";disk_number
        bc = disk_number
        call ( seldsk, dph, de, bc, a_psw )
        if dph=0 then 0seldsk
        base skew_table at dph
        base dpb at dph+10
        base alv at dph+14
        bc = loc_sector+1
        call ( setdma, hl, de, bc, a_psw )

        base spt at dpb
        base bsh at dpb+2
        base blm at dpb+3
        base exm at dpb+4
        base dsm at dpb+5
        base drm at dpb+7
        base off at dpb+13

        block_size = 1024*(2^(bsh-3))
        r1 = ((dsm+1)*(block_size/128))/spt
        max_tracks = r1 + off

        function physical_sec ( sectr = integer ) = integer
                if skew_table=0 then sectr=sectr-1
        end = sectr
```

A sample S-BASIC listing — part of a disk editor program.

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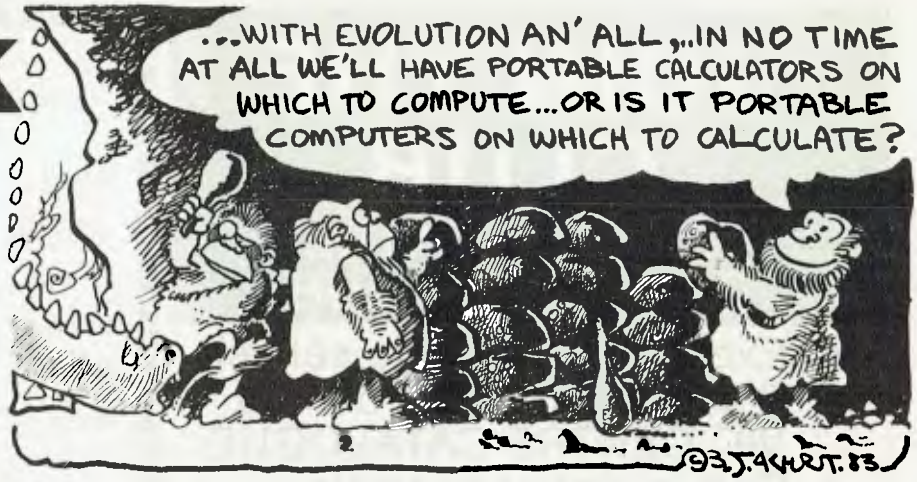
A Peek And A Poke



By Dr C D H Cooper

"IF IT CAN'T do Peek and Poke, then it's not a real computer," declared my young son when he saw my newly acquired Sharp PC1500 pocket computer.

Never mind that it can do an exciting version of Space Invaders with its fully programmable liquid-crystal display and inkey facility. Never mind that with the memory expansion unit it can be extended to 7.5 kilobytes of RAM. Never mind its reasonably comprehensive BASIC vocabulary. If you can't get inside the machine to examine and manipulate the memory location directly, then in my son's eyes it didn't merit the description "computer".

Well, the PC1500 doesn't Peek or Poke, does it? There is no mention of these instructions in the manual. Yet, just for fun, let's try entering PEEK 5. Goodness, it returns 255. No error message. Let's go to program mode and enter an instruction, such as PEEK 5. Notice that the cursor jumps across the whole word and codes it, and doesn't merely store the string of letters.

On discovering this, I experimented, PEEKing random memory locations. Mostly, it returned 255 but in certain ranges it returned various numbers from 0 to 255. I tried POKE 17000,31 followed by PEEK 17000. Yes, it returned 31, indicating that I had changed memory location 17000 to 31. I then began to experiment systematically... what follows are the results of a couple of days' effort in that direction.

The range of the Peek statement is 0 to 65535. These 65536 locations consists of three islands surrounded by seas of dummy locations each of which returns 255. The first of these islands starts at 16384 and extends to 18431 (further if the extra memory module is in place).

This contains the reserve memory and the basic program/data area. The second island extends about 4000 locations from 28680 and contains, among other things, several copies of the fixed memories. The third island (really large enough to be called a continent) extends from 49142 to 65535 and contains the ROM.

The following program explores the memory. In run mode, type in a number and press DEF K. This drops you off at that location. The display gives 10 characters, representing 10 successive memory locations, preceded by the position of the first of them.

The characters correspond to the numbers in the memory locations, using ASCII code, though in certain ranges these have been translated to the range 32 to 127 to make them more readable (see lines 50 and 60). Finally, to aid counting, blanks have been replaced by dots (line 70).

```
10: "K" AREAD N
20: WAIT 0: PRINTN; " ";
30: FOR I=0 TO 9
40: P=PEEK(N + 1)
50: IF P>127 LET P = P-128
60: IF P<32 LET P = P+96
70: IF(P = 32) + (P = 96) LET P = 46
80: PRINT CHR$P;
90: NEXT I
100: WAIT: PRINT " "
110: N = N+10: CLS: GO TO 20
```

Copies of the fixed RAM occur at other locations and changing any copy automatically changes the others.

BASIC program lines are stored as they appear in the program listing, except that BASIC key words are coded by 2 byte codes. For example: PRINT = pw, FOR = q%.

Negative exponents are represented by subtraction from 256. For example, an exponent of –2 is entered as 254. The sign is coded as follows: negative = 128, positive = 0. The 10 significant numbers of the number are grouped into five pairs and each pair of digits is converted to hexadecimal; that is, xy is stored as 16x + y.

The 16-kilobyte ROM incorporates a dictionary of keywords (starting at 49237), each followed by its 2-byte code. It is interesting to note that the keywords for controlling the printer/cassette interface are not on this list. This means that if you have purchased the computer alone, you are not paying for a memory that is cluttered up with commands you won't be using. All that

Locations of RAM and ROM:

	Memory	No of Bytes	Beginning
	TEMPLATE 1	26	16392
RESERVE	TEMPLATE 2	26	16418
RAM	TEMPLATE 3	26	16444
	REVERSABLE KEYS	110	16470
FLEXIBLE RAM	PROGRAM/DATA AREA	64	16582
	A$ - D$	64	30912
FIXED	E$ - O$	176	28752
RAM	P$ - Z$	176	29008
	A - Z	208	30976
ROM	BASIC INTERPRETER	16384	49152

seems to be included in the printer/interface itself.

Two further keywords which are recognised by the computer but not by the instruction manual are Call and OPN. Perhaps Call is used to run machine language subroutines.

Experiment with it if you will, but be warned: when I entered CALL 5, the machine went off being busy. Whether it would ever execute that single instruction, I don't know. What I do know is that the break key only operates when the current instruction has been executed and so was of no use here. I had to resort to the reset button to sort things out, thereby losing everything in the machine!

Pokeing Is More Fun

So much for PEEKING. What fun can be had POKEing. Marking various random POKEs, I stumbled on one with a rather surprising outcome. Enter POKE 28750,31. The computer has now temporarily come unhinged. Type E and you'll get O, press F and up comes R. Help! You'd better press the clear button. No good, we only get C on the screen. Switch off? That only produces TT. Changing mode merely gives an L. Several keys – for example, 4, J and * – produce ERROR 11 which can't be cleared by the clear button. The break key provides some respite as it acts as a clear, but your computer has now gone berserk.

Don't panic! You won't have to send your PC1500 back to Sharp for repair. You won't even have to resort to a reset. There is one key which can restore the computer to sanity without losing stored programs and data. I'll leave it for you to discover which one...

It isn't all that surprising to find that random POKEing can produce nonsense, but what did surprise me was something you may have noticed by now. While in the deranged state, a couple of strange symbols appeared between the words SHIFT and SMALL at the top of the display area. This is not some random mutation formed from the dot display: it was put there by the maker. What does it mean?

Suspecting that they could be Japanese characters, I asked a Japanese post-graduate student. She told me they were two letters in one of the Japanese alphabets which together made a word meaning that alphabet itself. (The word "alphabet" itself has a similar origin, coming from "alpha" and "beta", the first two letters of the Greek alphabet.) This suggests that there might be a mode in which Japanese characters can be entered and displayed.

Further evidence is supplied by the fact that memory location 28750 comes just before one of the fixed-string memories and that POKEing corresponding locations just before other fixed-string memories produces the same result.

One final discovery: STATUS 0 and STATUS 1 are explained in the manual. What about STATUS 2 and STATUS 3 (other values give error messages)? The numbers which are returned by those instructions appear to be memory-location numbers. They are and I'll leave it for you to discover their significance. It's not difficult. □

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Whatever your application – inventory control, estimating, costing, indexing, maintaining statistics, addresses – dozens of business and leisure applications.
As well as dBase II itself, with the Budget Plus you get Tutor - to help you get dBase II working to solve your problems and ZIP, a program that speeds and simplifies dBase II's operation.

OSBORNE 1 Standard Features.

Standard Hardware:
- Z80A™ CPU with 64K RAM.
- Dual floppy disk drives with 204K bytes storage each.
- 5" Green phosphor CRT with 52/80/100 column display.
- Business keyboard with numeric keypad and cursor keys.
- RS-232C and IEEE 588 Interfaces.
- Weather-resistant, portable housing.
- Operates on International voltages.

Standard Software:
- WORDSTAR® word processing.
- MAILMERGE® mail list.
- SUPERCALC™ electronic spreadsheet.
- CBASIC® programming language.
- MBASIC® programming language.
- CP/M® operating system.

OSBORNE 1 Optional Extras.

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Forth™: Forth is a high-level computer language in which the Osborne user can use the vocabulary provided, or extend it with his own words for specific applications. This language is ideal for controlling peripheral devices such as printers, cameras, timers and laboratory devices.
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OSBORNE
BUDGET PLUS

The Eagle Has Landed

Looking for a small computer to handle some basic accounting plus other office tasks? Les Bell examines a machine that could be the answer for you...

WHEN THE Eagle personal computer was launched on to the Australian market last year, it was with a public-relations fanfare like no other small computer has ever had. Journalists received a cassette-tape invitation which probably cost more to engineer than some of the Beatles' early hits, and the launch itself (which your humble scribe unfortunately couldn't attend) featured an audio-visual extravaganza said to rival *Ben Hur* in its epic grandeur.

Unfortunately, most of the press who attended were over-awed by the presentation and assumed that it was all hype and bullshit to mask a ho-hum product, and consigned the Eagle to oblivion. Which is why you may not have heard of it.

This is a pity, because the Eagle is really a good machine. And the audio-visual orgy is understandable when you consider that the designers of the Eagle originally built (and still do) computerised audio-visual equipment, and the Australian agent for Eagle is a subsidiary of ScottCom, one of the nation's largest audio-visual companies (and which, incidentally, has provided expertise and equipment for many other small-computer launches).

So it came to pass that the Eagle landed on my desk one morning, in the form of an Eagle II computer plus a File 10, which is a 10-megabyte Winchester disk drive. Along with the machine came a selection of software, including word-processing, spreadsheet calculator, BASIC and an accounting package.

The Machine

The Eagle is an all-in-one fully integrated box, with the exception of the hard-disk drive, which is an external option. It's styled rather like a largish terminal, with a full keyboard and numeric pad (which doubles for cursor control) at the base of the screen and, to the right, a pair of disk drives. The enclosure is made from a high-impact moulded material, and is neatly styled without looking too techno-futuristic and intimidating.

The keyboard has a number of extra legends on it; these are functions for the Spellbinder word-processor which is supplied with the computer. This use of dedicated keys for word-processing functions makes the word-processor very much easier to learn. Since it would be fair to say that about the most complex program on any small computer is its word-processor, that's quite significant.

The screen is a standard 80 by 24 green phosphor type with a silk-style anti-glare screen. It's quite pleasant and easy to work with for extended periods.

The disk drives have about 390 kilobytes capacity each, for a total of 780 kilobytes. The next model up, the Eagle III, offers double-sided double-density operation for a total of 1.6 megabytes, while the Eagle IV has a 10-megabyte drive as standard.

Inside the box (three guesses!), there's the ubiquitous Z-80A belting along at 4 MHz, with 64 kilobytes of RAM. There's also the usual selection of I/O ports for a printer or other peripherals.

All in all, the hardware is fairly standard in specifications. What makes it different is perhaps the quality of design and construction and the standard software.

The operating system is CP/M, but with a difference: Eagle Computers has provided a number of menu programs which automatically run on cold boots, so that the user doesn't have to know anything about CP/M.

For example, a typical menu will allow the user a choice of entering an applications package, or of backing up files, setting up various parameters and so on. The Eagle is a "soft" machine with parameters such as baud rates, handshaking and so on, not only software programmable, but alterable by the neophyte user. Once defaults have been changed, the new values are automatically written back to disk, in the BIOS or wherever.

The entire system is menu-driven, with the exception of the CP/M operating-system disk, which would normally be driven from the CCP command line. The CP/M supplied is fully configured for

Eagle's entry in the IBM-lookalike market — the 8086-based 1600 — shown at Data '83.

Specification and Report Card

Unit:	Eagle II			
Made by:	Eagle Computers			
Processor:	Z-80A			
Clock Speed:	4MHz			
RAM:	64 Kilobytes			
ROM:	Bootstrap/diagnostic monitor			
I/O:	Serial/parallel			
Languages:	CBASIC standard, other CP/M tongues as required			
Keyboard:	Full QWERTY, nice feel, special wp functions			
Display:	80 x 24 , green anti-glare, comfortable			
Graphics:	Not really			
Peripherals:	Printer			
Expansion:	10 and 40-megabyte Winchesters			
Best Points:	Nicely made,menus for neophytes			
Worst Points:	The cognoscenti hate wading through menus			
Ratings:	**excellent**	**very good**	**good**	**poor**
Documentation:				✓
Ease of use:	✓			
Functionality:		✓		
Support:			✓	
Value-for-money:			✓	
Extras Included:	10-megabyte hard disk			
Options:	Accounting Plus package			
Price:	$4995 including tax; File 10, $4			
Review Unit from:	Scomo Pty Ltd, 2 Lambs Road, Artarmon, 2064. Phone (02) 438 3032			

the machine, and – thank God someone's doing it right! – the BIOS source code is supplied. Therefore, should Eagle disappear overnight (which, I hasten to add, is not likely), the user can still get support for jobs like interfacing new peripherals.

By the way, the user who reads the BIOS should ignore the references to faders and similar A/V gear – the Eagle II has a brother which performs those kind of functions and they share the same basic BIOS.

In line with the current trend, the machine is sold bundled with a selection of general-purpose software. The word-processing package is, as I've already mentioned, the Spellbinder version, but with some special customisation for this machine. Several of the keys are specially labelled to call for Spellbinder functions, which saves having to remember some mnemonics.

Spellbinder is one of the more popular word-processors around, with some justification. It's an extremely powerful package, based more on mainframe editors than on word processors, with the accent more on power than on ease of use. Not that a user can't pick up Spellbinder in a few hours, especially on the Eagle.

Spellbinder includes a special macro language which can be used to write simple (and some not-so-simple) applications programs to do jobs like maintaining mailing lists, printing invoices and the like. It can do some interesting tricks, but as a programmer used to high-level languages and packages like dBase II, I tend to regard it as more of a curiosity than a serious language with

which to start running a business's accounts.

In any case, the Eagle is supplied with other packages which are more up to the job. The standard language is CBASIC 2, the classic commercial BASIC which has stood the test of the years, and which has only in the past year or so given way to MBASIC and the full CBASIC compiler, CB-80. Standard documentation is the Osborne/McGraw-Hill book on CBASIC by Osborne, McNiff and Gordon Eubanks, who wrote CBASIC. It's a good book, by the way.

For financial analysis, the spreadsheet package is Ultracalc, by Lattice (of Lattice C compiler fame). This package is not, strictly speaking, a VisiClone – it's actually a SuperClone, as it bears a remarkable resemblance to SuperCalc, though it has a few tricks of its own.

For example, in replicating blocks, you have to specify which field references are to be adjusted due to the relocation. With SuperCalc, this is done by answering a prompt. UltraCalc distinguishes between upper and lower case and will change lower-case references when they are moved, while leaving upper-case references unchanged.

On the whole, though, UltraCalc falls in the Visi/Super school of spreadsheets. While it lacks features compared with Multiplan and some bigger, more specialised packages, it is certainly adequate for simple and medium modelling, and has no features to which you could object.

An optional set of software on the Eagle is the accounting package, Accounting Plus. This suite set of software is quite comprehensive, with seven modules plus utilities. It consists of general ledger, accounts receivable, accounts payable, inventory, purchase order entry, sales order entry and point-of-sale modules. A payroll module is under development.

Though written in the United States, the package has had extensive treatment to Australianise it. One of the nice features is that the package comes with a set of files already set up for a hypothetical bicycle manufacturer, allowing the purchaser to experiment with the package and get a feel for its operation before going live on his own accounts. While the example company is set up for American accounting practices, and is therefore not as useful as it could be, it's still more than many packages provide.

Like the operating-system extensions, the accounting package is completely menu-driven and, in fact, it's hard to tell

Neat styling avoids the techno-futuristic look, and appears user friendly.

at what point you leave the operating-system menu program and enter the accounting system.

File 10

The optional 10-megabyte Winchester disk for the Eagle II is simplicity itself to install. It's just a matter of plugging in one cable and the power cord, and then switching on. If the Eagle II is switched on after the hard disk, it will boot off the Winchester, with the appropriate version of the CP/M BIOS.

On first power-up, the system assumes that you will want to transfer files off floppy disks onto the Winnie, so instead of booting straight into CP/M, it enters the first menu of a file transfer utility. This asks you which disks you want to copy and prompts for insertion of the right disks, copying across the various files.

As disks are copied across, the file-transfer utility keeps track of the packages you have put on the Winnie. At the end of the transfer, it builds the appropriate menu displays, so that when the Winchester boots up, the user is confronted with an expanded version of the menus on the floppy-disk system. Packages which have not been transferred do not appear as options on the menu – though they can be added later, if required.

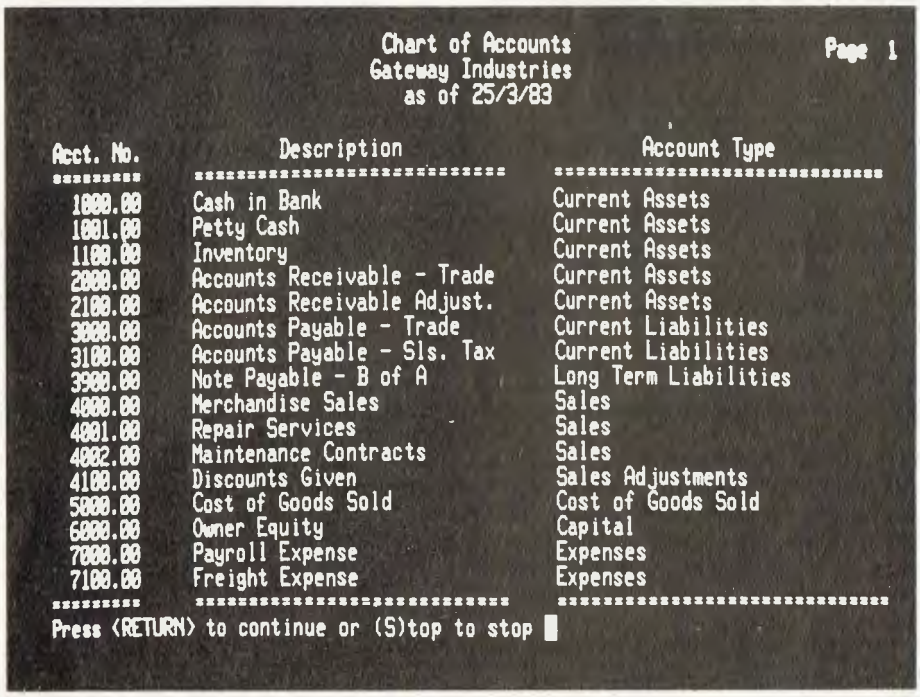
The Winchester is quiet and smooth in operation, and certainly saves a lot of disk changing in the typical day's operation ("Take out the word-processing disk and put in the spreadsheet"). It doesn't contribute very much in speed, though. I benchmarked the Eagle II floppies writing out the word TEST to a sequential file 3000 times, and they did it in 28.73 seconds – a result which is, by the way, about the same as the "new breed" of 16-bit machines, such as the PC-clones.

The same test, repeated on the Winchester, took 28.69 seconds, an improvement of four-hundredths of a second. So the justification for buying a Winnie is to get more capacity, not more speed, and that fits well with the Eagle's market as an accounting/business machine.

This leads me to sidetrack on to another point: some of the new multi-user machines which run UNIX lookalike operating systems rely heavily on the speed-of-operation of their disk systems to improve multi-user performance. With a 13 cm Winchester, quite possibly the disk performance just isn't there. Caveat emptor – let the buyer beware. (At least until I have time to investigate the matter a little more fully.)

Also available for the Eagle is a 40-megabyte hard disk, which should provide ample storage for even the largest set of accounts.

In summary, the Eagle is a well-thought-out package. Though it's not a spectacular machine when compared to microcomputers with colour graphics and other attractive features, the Eagle has impressed at least one Sydney computer store which sells those machines, to the extent that it uses an Eagle for its own accounting. The Eagle is well-built and offers good value-for-money, should be reliable, and is simple enough for almost anyone in the office to use. It's well worth a look. □



The machine is sold with a range of software, including the word processing package Spellbinder.

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The Further Adventures ...And Other Games

By Edward McArdle

AFTER READING my article in the September 1982 issue of *Your Computer*, reader W.W.Sweet wrote concerning clues for the Pyramid and Asylum games.

Pyramid 2000, from Tandy, has a remarkable resemblance to the original Adventure, including large chunks of description, but that game is now in the public domain, so this is allowable – if not original.

I have not played Pyramid 2000 at any length, so I can't tell readers a great deal, and probably shouldn't in the pages of a major magazine. As with most Adventure-style games, movement is by typing N, W, W, E, U or D, except for specific instructions, such as ENTER TUNNEL. You cannot pick up the bird statue unless you have the ... , and you cannot pick it up if you have the ... Why do you need the statue? In the original Adventure, it was a bird.

One clue might be given for Pyramid 2000. At one stage, you find a panel and, on opening it, you are transported back to the entrance. You can do this in reverse by typing OPEN PANEL as soon as you have picked up all the goods at the start of the game, and you will be transported into the heart of the pyramid. You may not have things you need, but you can get a look at other parts of this little world.

With Asylum, there is hope. Compshop, of South Melbourne, offers hint sheets for Asylum, Deathmaze, Escape from Traam and others, at no cost, though it might like return postage. However, be warned: even with hints, these games are not easy.

Some Advances

I have spent some time looking at how far I have progressed in some of the games I mentioned in my September article.

I have moved some further distance in Escape from Traam. Apparently, it is an established technique to blunder randomly about when all else fails, and keep LOOKing (this is also true for the upper floor of Haunted House). In the cave of Traam, you keep trying random

directions in the dark, looking or feeling after each move, until something happens. This doesn't rate a mention on the hint sheet, but you can't get anywhere without it.

I am stuck further on – and have been for some time – in a drain where gas kills me. The hint sheet tells me there is a tool near the start which will help, but since I can't find anything, this is no help at all.

Referring to the technique of trying random directions, I have the hint sheet for Deathmaze. There is one spot where you find a calculator, but cannot escape from the spot, so you have to quit and start again (direction is controlled by the arrows). To escape, you must press the left turn key five times, the right key four times, then the left key three times. Oh, how obvious! I feel no compunction about revealing this, as the odds of finding it at random must be approaching those of solving Rubik's cube.

A Tough Selection

With the prices of games growing, it has become very difficult to select from the vast range available. The size of the range is the problem: nobody expects the proprietor of a bookshop to have read all the books in his shop, but you do have the option of browsing through the stock until you decide there is something you like.

In a software shop, this sort of "browsing" isn't practical, unless there is a battery of machines available. The seller may say that certain games are very popular, but he is unlikely to have tried them all, and you certainly won't know whether you like a particular game until you have sat down and tried it for quite a while.

Two suggestions might alleviate the problem:

1: Computer retailers might advertise on in-store television by showing a video output of a game for 25 seconds, followed by five seconds with the name of the game and the make of computer. These would be cheap to make, simply needing a lead from the computer to a video recorder. By covering a lot of different games, these advertisements would sell both software and computers.

2: Libraries could lend software, the way they now lend cassette tapes. This would be straightforward with cassette programs, but perhaps more difficult with disks. Such a system would be ideal with text Adventure-style games (which are useless once solved), but good for arcade games, most of which pall after a time. Software vendors should like the idea, since libraries are not likely to indulge in piracy, and a sale to every major library in the nation would be a good deal for most games. As with books, a lot of people would still buy their own. More people would be encouraged to purchase computers if they knew software was available like this.

My Master Plan

Part of my intention in writing these articles (aside from fame and money) is to help overcome the problem of not knowing anything about a game before you buy, and I urge others to write similar articles for my benefit.

For those dedicated enough, *The Captain-80 Book of Basic Adventures* has the BASIC listings of 16 different Adventure-style games for you to type out. If you have ambitions of writing your own, the book gives some insight into how Adventure-style games work. Various magazines print listings from time to time. Some of them are good, but they require some dedicated (and accurate) typing.

The magazine *80-Micro*, devoted entirely to the TRS-80 computer, offers an unusual service: each month it publishes, on tape and disk, most program listings from the current magazine issue. The August issue is each year largely devoted to games, so it is one relatively cheap source of some fairly good games (if they were *very* good, they'd be sold commercially).

Creative Computing also devotes its August issue to games for various computers, but these are mostly reviews.

Instant Switch

I recently bought an Apple, partly to use a program I had seen advertised which uses 500-digit integer arithmetic, and partly because of the arcade games available. The colour graphics make it far superior to the TRS-80 Model 1 for arcade game use, and it has become popular with other members of the family, making it difficult to actually run the arithmetic program for any length of time!

Arcade games are quite expensive, so buying vast numbers of them is unreasonable. One I like for the TRS-80 is Swamp Wars, from Instant Software. This is on cassette, and loads like House of the Thirty Gables. You wander about nine islands, or screens, collecting transporters and killing nasty swamp creatures. You move continuously, by pressing the keyboard arrows, and shoot by pressing the shift key at the same time. I found these controls easy to use, and the game pleasantly easy. It is on sale at deForest Software.

Another TRS-80 game is Sky Warrior. In this, you fly a ship (an arrow) across mountainous terrain, and drop bombs on various things that are shooting up at you. If you run into a cloud, you are killed – which indicates heavy cloud or weak ships. Your only control is up or down, with the arrows, while the side arrows slow you slightly or speed you along, and the space bar drops the bombs.

I found the game awkward, having to use two fingers on the arrows and the thumb on the space bar (it might be better to forget the side arrows). It is fairly difficult: I put in some time before I managed to score at all.

Planetoids, from Adventure International, is one of the few Apple arcade games available on tape, and it includes simple (and successful!) instructions for putting it on disk. This is another version of Asteroids, and it is nowhere as good as, for example, Super Nova for the TRS-80, unless you happen to have three hands to operate the joystick and keyboard.

The remaining games are on disk, which partly accounts for the expense. Very few disks, with the exception of those from Adventure International, seem to allow for back-ups being made.

Fly Wars is another good game. You are a spider spinning a web to trap flies and caterpillars, while avoiding flyspray and other nasties. It's another game using only the joystick, and easy to play – but not easy to survive!

Congo also only uses the joystick. You are on a raft, trying to pick up survivors and reach a safe haven in 60 seconds. If you hit anything, you are sunk. You always drift with the stream, though pulling back on the joystick can hold you on the spot until the side of the screen catches you and pulls you along.

One last game to mention, and it's quite different: Ricochet is a thinking game more than a reflex game, and can be played human-versus-computer or human-versus-human. Each player has two cylinders to fire balls from and six barriers. At each move, the player may either fire a ball or move some of the barriers in any one direction (but not turn them).

What is tricky is that each time a barrier is struck, it rotates at right angles, so the problem is to calculate the path of your bullet as it ricochets back and forth. Points are scored for hitting barriers or your opponent's goalposts, and lost for hitting your own goalposts. If a ball enters your, or your opponent's, firing cylinder, that cylinder is out of action for a few turns. If a player loses both cylinders, or runs out of balls, the game is over. At this stage, the winner is the one with most points, so if you get a good lead it pays to put your own guns out of action.

Ricochet is an example of a new trend. It is on disk, and the disk is double-sided, with one side containing a version for one computer, and the second for another. It can be backed up, which is lucky because when you play the Apple version, the computer tries to write to the disk, which is permanently write-protected unless you feel like operating on it with a razor blade.

The Good Oil On Games

If you're thinking of spending much money on Apple games, it would be worth investing in a copy of *The Book of Apple Software 1983*, by Stanton, Wells and Rochowansky.

It costs almost $30, but contains reviews of every Apple program I have seen in the shops.

Most game reviews are from the point of view of expert players. However, if you read the description of a game you will know what you are buying; and if it saves spending your money on a game you don't want, it has paid for itself. Incidentally, it gives Choplifter the highest rating of any arcade game. □

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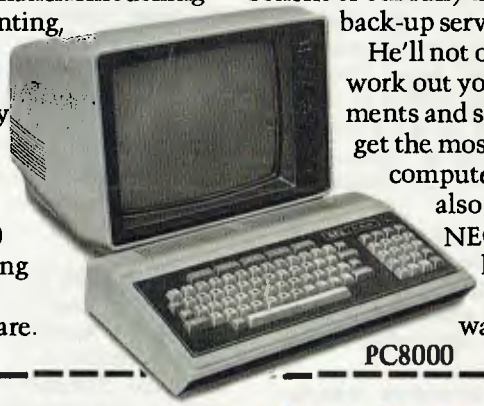

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C.B.-86	(B)
PASCAL MT+/86	(B)
CIS/COBOL 86	(C)
DRI C 86	(C)
PL/I-86	(C)
SSS FORTRAN 86	(C)
RASM 86	(B)
CONTROL-C BASIC	(C)
SUPER SOFT C 86	(C)
PASCAL/M 86	(C)
JANUS/ADA 86	(B)
Computer Innovations C 86	(B)

Telecommunications

I.E. Asynch-86	(A)
I.E. Bisync—80/3780	(A)
I.E. Bisync—80/3270	(A)
MODEM 86	(B)

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NEC

1983 *Personal Computer of the Year*

NEC's Advanced Personal Computer

By Jeff Richards

THE 18 keys of the Kaypro's numeric keypad and cursor control keypad are programmable to any character of the user's choice. This month we will look at the procedure involved in assigning specific values to these keys, and how they can be used in conjunction with the standard software.

The conversion procedure operates through a conversion table loaded into high memory by the monitor ROM. Codes generated by the configurable keys are identified by the keyboard input routine because they have their high-order bit set. The input routine converts these keys by looking up the conversion table and finding the entry for the corresponding key. In order to alter the value assigned to these keys, all that is necessary is to re-write the conversion table.

Table 1 shows the keys (1), their unconverted values (with the high-order bit set) (2), the memory location of the character to which the input routine converts the key (3) and the standard table value that is inserted by the system monitor (4). The cursor control characters follow the codes for the functions in the ADM-3A (which the Kaypro emulates) while the numeric keypad keys are their corresponding ASCII equivalents.

In order to change the functions of these keys, the table starting at FA35h had to be re-written. Listing 1 is an assembly language program that will reset the entries to the values contained in the table at the start of the program. It is in a suitable format for ASM (although it could be tidied up if a Z80 assembler was available) and the table entries have been selected to be useful for Perfect Writer, Perfect Calc and Perfect Filer.

The program is very simple. It loads the base of its internal table (103h) into register HL, the destination address into register DE and the count (18) into BC. It then copies (HL) to (DE) incrementing the source and destination, and decrementing the count until the count reaches zero.

If this program is created in a text file called SETUP.ASM then the command to compile it is ASM SETUP and to load it, is LOAD SETUP. To execute the program, simply enter SETUP. It will return to CP/M.

Table 1 gives the codes selected for the keys (6), the function they perform (7) and the address in SETUP at which they appear, if you want to patch the program rather than re-assembling it (5). Notice that the code for CONTROL function is the ASCII value of the function less 64.

To make use of the program even easier, it can be called through a SUBMIT file. For example, say it was to be used to set up the keys for Perfect Writer. A text file called PW.SUB to be used as input to the SUBMIT facility would be created. By typing SUBMIT PW the SUBMIT utility will be invoked. It will load the file called PW.SUB and proceed to execute the commands in that file, namely SETUP to configure the keys and then MENU to start Perfect Writer. If the SUBMIT utility is renamed, the procedure is even easier. For instance, renaming SUBMIT to RUN (REN RUN.COM=SUBMIT.COM) means that the command to initiate the whole procedure becomes RUN PW.

It may be desirable to reset the configurable keys to their default values when Perfect Writer is exited. In this case the SETUP.ASM file should be edited (under the name SETDN.ASM for instance) with the table entries set to the default values. PW.SUB would then have the line SETDN added to it, so the program to reset the keys to their default values would be automatically invoked when Perfect Writer returns to CP/M. Listing 2 shows this final state of PW.SUB.

The key options chosen for the example SETUP, do have some logic behind the assignments. The two command keys, control-X and ESC are next to each other, and keys with similar functions are adjacent. However, the actual arrangement chosen is open to individual preference. The idea of assigning these keys to particular functions has one interesting side benefit – these functions now auto-repeat when used with the CONTROL key. □

Listing 1 - Configuration Program
Create as text file SETUP.ASM

```
ORG     100H
DEST:   EQU     0FA35h
        JMP     BEGIN
TABLE:  DB      'P'-64  ;^
        DB      'N'-64  ;v
        DB      'B'-64  ;<
        DB      'F'-64  ;>
        DB      'L'-64  ;0
        DB      'D'-64  ;1
        DB      'G'-64  ;2
        DB      'U'-64  ;3
        DB      'F'-64  ;4
        DB      'R'-64  ;5
        DB      'S'-64  ;6
        DB      'Z'-64  ;7
        DB      'V'-64  ;8
        DB      'A'-64  ;9
        DB      'E'-64  ;-
        DB      'W'-64  ;,
        DB      'X'-64  ;ENTER
        DB      27      ;.
BEGIN:  LXI     H,TABLE ;HL = Source
        LXI     D,DEST  ;DE = Destination
        MVI     B,18    ;B = Count
LOOP1:  MOV     A,M     ;Source to A
        STAX    D       ;A to Destination
        INX     H       ;Source=Source+1
        INX     D       ;Dest=Dest+1
        DCR     B       ;Count=Count-1
        JNZ     LOOP1   ;Repeat if not zero
        RET             ;else back to CCP
END     100H
```

Listing 2 - Submit file.
Create as text file PW.SUB

```
SETUP
MENU
SETDN
```

Table 1 - Reconfigurable keys

1.	2.	3.	4.	5.	6.	7.
Up Arrow	F1	FA35	08	103	CTRL/P	Previous
Down Arrow	F2	FA36	0A	104	CTRL/N	Next
Left Arrow	F3	FA37	08	105	CTRL/B	Back
Right Arrow	F4	FA38	0C	106	CTRL/F	Forward
0	B1	FA39	30	107	CTRL/L	Redraw
1	C0	FA3A	31	108	CTRL/D	Delete
2	C1	FA3B	32	109	CTRL/G	Go Back
3	C2	FA3C	33	10A	CTRL/U	Repeat
4	D0	FA3D	34	10B	CTRL/F	Find
5	D1	FA3E	35	10C	CTRL/R	Read
6	D2	FA3F	36	10D	CTRL/S	Save
7	E1	FA40	37	10C	CTRL/Z	Page Previous
8	E2	FA41	38	10D	CTRL/V	Page Next
9	E3	FA42	39	10E	CTRL/A	Line Back
-	E4	FA43	2C	10F	CTRL/E	Line Forward
,	D3	FA44	2D	110	CTRL/W	Write
ENTER	C3	FA45	0D	111	CTRL/X	Command
.	B2	FA46	2E	112	ESC	Command

1. Key.
2. Unconverted key value,
3. High memory table address
4. Default table entry.
5. Location in SETUP programme.
6. Key-equivalent in SETUP.
7. Function.

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DIGITEX – a real winner

your CP/M computer

By Bill Bolton

DIGITAL RESEARCH has officially announced its long-awaited BASIC interpreter for CP/M-86. The new BASIC, called Personal BASIC, is said to run programs prepared with other popular microcomputer BASICs with little or no change – in other words, it's compatible with Microsoft BASIC. It is also claimed to be as fast as, or faster than, other 8086/88 BASIC interpreters.

Personal BASIC has enhanced debugging facilities such as a trace which displays the entire line of code being executed, not just the line number. New debugging features include breakpoints, variable trace and follow-variable modes.

Best news of all is the price! Personal BASIC will retail for US$150, less than half the price of Microsoft BASIC86.

It looks like Microsoft has some substantial competition in the BASIC interpreter field and just maybe it will start to do some more work on MBASIC to fix some of the more obvious "warts" (such as being able to save lower-case file names under CP/M) and put in extra features.

Personal BASIC is due out at the end of May. but I suspect it will probably not be available until the beginning of July.

Concurrent CP/M-86

I have had a chance to get into Concurrent CP/M-86 (CCP/M-86) recently on a system with high performance 20cm floppy disks, and I can tell you it provides a fantastic program development environment.

You can be debugging in trace mode and decide that it would be worthwhile having a look at the commented source for the program under examination...with CCP/M-86 it's just a matter of swapping the console to another task and firing up an editor to have a look at the source file while the debugger sits paused in the trace on the detached task. Or you can be editing a program on the console while a long listing gets printed out as a detached task: print spooling in any program without the need for a spooler!

For business users this means that you can be printing a large monthly transaction report while continuing to enter incoming orders, for example.

In terms of speed, concurrent I/O-bound programs appear to run at nearly the full speed you'd expect if you were running under CP/M-86. For concurrent compute-bound programs the speed seems to be proportional to the number of compute-bound tasks executing. If there are two compute-bound tasks executing, they both appear to run at a little less than half speed.

However, I find I rarely need to have more than one compute-bound task executing at once. Of course, having a fast CPU helps in reducing task-switching overhead.

A couple of new features have appeared, largely unannounced, in DDT86 for CCP/M-86. The new commands are:

SR Search for a string or series of hex bytes.
QI Get data from an input port.
QO Send data to an output port.

The CCP/M-86 version of DDT86 appears to work fine under CP/M-86 as well. It's still early days for me and CCP/M-86 – I still have to load my CCP/M-86 manually using a debugger and I think it may be a little while before the disk boot loader is under control.

The Great Comms Charge

The local modem supply scene is really starting to hot up. New modems in various configurations are here, or are soon due, from DataSat, Modem Technology, Woomera Systems, ElectroMed and Centre Industries – with more to follow.

Several of these are auto-answer models using the AMD modem chip. This should make it somewhat easier for new RCPM and CBBS systems to get going. You can look forward to reviews of some of these products in upcoming issues of *Your Computer*.

While I'm at it, I should mention the Dick Smith Dataphone. Since I reviewed the Dataphone modem all the units we bought at *Your Computer* have been back to Dick Smith several times for repair.

There has been a serious problem with the frequency setting pots drifting. DSE tried fitting several types of trim pots to our units before finally fitting two precision 10-turn pots in the critical area. Since the last trip to North Ryde our modems have been working without a hitch for a respectably long period of time.

If you are experiencing problems with your Dataphone I suggest you ask DSE to fit 10 turn pots to it.

Digital Research PL/I-86

I have just received PL/I-86 from Digital Research. The product looks good but I was disappointed to find that there is no description of any sort of the CP/M-86 interface routines (CPMDIO) and how to effectively use them with the product. At least with my old PL/I-80 documentation there was some mention of them.

This is particularly disturbing in that there are minor differences between the CP/M-86 (CPMDIO) and the CP/M-80 (PLIDIO) libraries. I have been trying to recompile some existing PL/I source files (that run fine under PL/I-80) with PL/I-86. I've been unable to get any of them running correctly so far.

If there are incompatibilities between PL/I-80 and PL/I-86, Digital Research should have a clear listing of them in the manual. The whole point about having a language implemented on several processors is portability of applications software. It should be the job of the language implementer to tell the users where the incompatibilities lie.

With CBASIC and CBASIC Compiler, Digital Research has given a clear statement of the (few) differences between the languages and examples of how to adapt programs.

To be fair I might add that the programs I've written entirely under PL/I-86 all compile and run fine so the problem is solely one of documentation.

And Pascal/MT + 86...

Another disappointment was in store with the SPP (Speed Programming Package) for Pascal/MT + 86. The manual supplied was for the CP/M-80 version and only gave a description of how to modify the terminal interface for the SPP editor on CP/M-80 systems.

The terminal interface installation for CP/M-86 turned out to be quite different. It took me quite a while to figure out what the correct procedure was and which files to use.

Firstly you need to modify the TCM.SRC file to agree with the screen control sequences for your terminal. This is then compiled using the Pascal/MT + 86 compiler and linked to the existing SPP files. The commands to install the TCM file are as follows:

```
MT+86 TCM
LINKMT TCM/F
```

This creates a new SPP.000 file which will allow the SPP editor to work correctly with your terminal. You need to have the TCM.KMD and SPP.SYM files on the same disk as the compiler and linker for the above procedure to work correctly.

I haven't been exposed to the SPP package before but it seems a particularly nice program development environment. As I have said numerous times

before, Pascal is certainly not my favourite language; however, when I do have to use it, MT+ is my preferred version.

The Pascal/MT+86 compiler is quite large and needs over 100K of memory to execute. The LINKMT linker can need up to 124K if you us all its features so in practical terms you need 192K or 256K of memory to properly support the compiler. Of course, you don't need this much memory to execute code generated by the compiler.

...And CBASIC Compiler 86

CBASIC Compiler 86 (or CB86 as it used to be called) is nice! I had no trouble bringing up all my 8-bit CBASIC and CB80 applications under CP/M-86. The CB80 only needed a minor adjustment to the program chaining scheme while the CBASIC programs occasionally needed some further small changes but they were all well documented and presented no problem.

For those of you who need an assembler to generate assembly language routines to link in with CBASIC Compiler 86 (CB86), DRI now has the RASM86 assembler available as a separate product under the name of "Programmer's Utilities". This assembler is included with the PL/I-86 package but not with CBASIC Compiler 86.

More DRI Languages

It looks like the C compiler from Digital Research for CP/M-86 is running late and now won't be available until July or August.

DRI has announced that several of its languages will become available for PCDOS later this year. Plans are for PL/I-86, Pascal/MT+86 and RASM to be made available.

The information I have specifically states availability for PCDOS rather than MSDOS. There are differences between PCDOS and MSDOS, so it's not clear whether the languages are only intended for the IBM PC market or for the broader MSDOS market. This is an extremely interesting development whichever way you look at it!

CP/M Graphics

As I write this I've just received the first APC release version of GSX-86, the Graphics System Extension package for CP/M-86.

I haven't had time to look at it in detail yet but hope to have more to say about it next month.

Digital Research said it was scheduling release of the GSS graphics support packages for the end of May in the US when I asked in mid-April.

A graphics interface for CBASIC and CBASIC Compiler is also coming, some time in July.

CP/M For The 68000

CP/M 68K for the 68000 micro processor has been released by Godbout and Sage.

I saw it running on a Godbout system at CP/M '83 and it looked and felt just like the other CP/M implementations.

There is at least one Sage system in Australia running CP/M-68K which I hope to have a good look at soon and give you a further report on its operation. I have a manual set for CP/M-68K and it seems to be well documented.

Meanwhile, if you are looking for some hints at getting CP/M+ up and running I suggest you look at the April issue of "Microsystems" magazine (available through newsagents). Dr Dobbs Journal is also carrying material on bringing up CP/M+ starting from the May issue.

Too Hard On MS-DOS?

Several readers have taken me to task for being too hard on MS-DOS when everyone else says how fantastic it is. Well, I just call it as I see it.

I'm not the only one who thinks Microsoft can do a better job than it has done so far. Ray Duncan has some interesting things to say about real problems with MS-DOS in the May issue of Dr Dobbs Journal. Would you use an operating system that can kill entire disk directories in a single swoop (especially when this can occur as result of something that Microsoft has claimed is a feature of MS-DOS – changing disks without having to relog them)?

Maybe MS-DOS 2 will be better...

The Australian Beginning

The Australian Beginning has changed hands.

The Beginning has the potential to be a first class communications utility but has been described as "dogged by controversy since its inception" by a local computer trade weekly. Perhaps now it will be better able to achieve its true potential.

One thing I would suggest to the new owners is changing the name to something more descriptive of the service offered.

I'll watch developments on the Beginning with great interest and hope to be able to report improvements soon!

PAMS News

Another new BBS system is on line in Sydney. I can't publish the number here yet as it is still somewhat experimental for the organisation involved but those who already use the existing services should find the number available somewhere in the message subsystems. This system is using the RCPM software but is only running as a message system.

A second full RCPM system is well advanced towards implementation in the Sydney area. Hardware has been obtained and a phone line installed. The SYSOP is now trying to get hold of a modem to put it on line.

The Melbourne RCPM proposal fell through and another attempt is now being made to get an RCPM system going for Melbourne. Any offers of help or hardware should be directed to Peter Jetson on the MICOM CBBS (03) 762-5088 who will co-ordinate the effort. Also new in Melbourne is an on-line "game" system called MAGE. I don't have the details but you can find them on the MICOM CBBS. You need to be a member of MICOM to use the MAGE system.

The Gippsland RCPM should be on line very soon. The SYSOP is buying a DataSat auto answer modem to get the system up and going. Bob tells me that the system will be on line "within minutes" of Telecom responding to his TS 72 form. First details will be on the MICOM CBBS and Software Tools RCPM no doubt!

For those of you who get impatient with the time it takes to get these new systems on line, just remember Hofstadter's Law: "Any project will take longer than you estimate, even if you take Hofstadter's Law into account." New Zealand may soon have an RCPM system too! Bill Dickson from the Auckland Micro Club recently had a good look at the Software Tools RCPM in action and took a copy of the RCPM software back with him.

Several new volumes of Australian CP/M software are now available for downloading from the Software Tools RCPM. Alf Champion has done a magnificent job on the catalogues.

Finally, I am wondering how much interest there would be in a series of articles on setting up an RCPM or other remote access system on a CP/M-80 microcomputer? If you are interested in this topic, let the magazine know and I'll see what can be done. □

your TRS80 computer

By Rod Stevenson

IN THE March issue I detailed how to remove the keytops from a Model I that suffers from keybounce.

I should have made it clear that if you've one of the later dished style and are suffering no problem there's no reason to try. For these switches are of a different operation; the same technique won't work, but then there's no need for any cleaning anyway!

Saving Time

Regular readers will know I don't bother much with the time-saving techniques promulgated for BASIC, since I believe that if one is writing in BASIC it's because there's a job to be done. And it's more important to get the job done than to have pretty and efficient code. In other words let the computer do the work for you, rather than expending extra effort yourself to make the computer's job easier.

However, a reader has taken the trouble to pass on a technique to me, so I repeat it here just in case the whole world does not think as I do. If there is a large number of variables to be assigned or evaluated within a BASIC program, our version of Microsoft BASIC will do it quicker if the most commonly used ones are assigned first, and if a statement declaring them is included before they're actually assigned.

DIM A, B, C, and so on will speed things up I'm told, although the actual speed-up is in the nature of milliseconds for each, so there will need to be a number of variables before the effect is noticeable.

Similarly with putting the subroutines at the start of the BASIC code, rather than at the end where it seems more natural. But then, a subroutine need not be at either end or the beginning – it can just as well be within the program, with of course provision made to prevent the program crashing into it and giving a 'RETURN without GOSUB' error.

STR$ Doesn't Strip...

It might be as well to point out that our version of STR$ (used to convert a numeric variable to a string variable so it can be manipulated using the powerful string handling provided in our version of Microsoft BASIC) does not strip the leading blank provided for a + or – sign. So that STR$(123) will have a LEN of 4. All that's necessary is to use RIGHT$ to strip off the leading blank by RIGHT$(A$,LEN(A$)-1).

The same technique can be put to good use to ensure that inputs have leading zeros if required, without assuming the user will input the required number of leading zeros. Add the highest possible number of zeros to the front by A$ = A$ + "000", then use RIGHT$ to take only the required number of digits.

Disk System?

The technique of checking whether the system has a disk connected by PEEKing the location of 14317 is not as reliable as it might be. This is the address of the disk controller, and it varies depending where on the disk the head is positioned and what it is doing. It can be either 0 or 255, which is what it will be if there is no disk connected.

A better technique to use (at least I have not yet been led astray be it) is to PEEK the contents of the address jumped to by one of the reserved words used by Disk BASIC. For this address will be changed from jumping to the L3

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error in Level 2 to the address of the routine in Disk BASIC.

Any reserved word will do; for example, PEEK 16723 will give 45 in level 2, but not in Disk BASIC. It is better than PEEKing (16396) which is the address of the break key, which might have been disabled wholly or partially and thus have a different value than its normal 201.

And this technique is necessary, I feel, to allow a to jump to the relevant subroutine depending whether there is a disk or not, so the program can be more transportable between systems.

Debugging BASIC

I must here endorse Les Bell's recommended use of dummy PRINT statements within a program to detect an error.

While our version of Microsoft BASIC does have the TRON function, it is so destructive of the screen display that I've seen many involved attempts to use it which could be replaced simply by the aforementioned PRINT instruction just before the error occurs – moving it backwards in the program until it is before the error; or, conversely, starting with it before the error has occurred and moving it on in steps until the error's origin is detected.

Keyboard Matrix

As the keyboard is memory-mapped, it is fairly easy to PEEK the relevant address to test if a key is being pressed. This is better than using INKEY$ which gives a result only as the key is pressed; if it is held down there is no result in INKEY$.

This is particularly useful in applications where the key is known, or is one of a small group of possibilities. To PEEK a memory location is much simpler and requires less code than to use INKEY$ and then test the result.

The actual addresses of the matrix and their values are given in most of the ROM manuals available – a good one is from Micro 80, advertised in this magazine. To include it all here would be too space-consuming, but to whet the appetite: PEEK(14338) will give a value from 1 to 128 depending on which key from H to O (alphabetically) is pressed.

While any of these ROM manuals are certainly not for the raw beginner, one doesn't need to be very far advanced to benefit from the wealth of information contained therein.

Arrow-Key Values

A matter of some confusion is the ASCII values returned by the arrow keys if one is using INKEY$ to detect them. The problem is that (unlike the other keys) what they give on the screen is not the value they give when pressed.

The following table will illustrate:

ARROW	unshifted	shifted	screen
left	8	24	93
right	9	25	94
up	10	26	92
down	91	27	91

An example of how to read the table: if you press the left arrow you will get the ASCII value of 8, if you want to print it to the screen you can PRINT CHR$(93).

However, as they are all at the keyboard address 14400 (together with the break, clear, and spacebar), a better way would be to use the PEEK technique described above. □

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COSMIC SOFTWARE

your MICROBEE computer

By Richard Pakalnis

HELLO AND welcome back. This month more tips and (I hate to say it) an apology for the incorrect listing of Hans Beilhartz's 17th line...

But before I do, I want to get something of my chest. Every month I receive a percentage of hate mail – letters that are so destructively critical they do not endear me to the writer at all. So let me state very clearly my feelings on this matter for the second time. This column exists as a forum for the owners of MicroBees so that they can help each other, get in touch with each other and, if I can't immediately answer a query, I'll get the information from a far more knowledgeable source.

So don't write letters full of adjectives you can neither spell nor understand. Instead why don't you sit down and write a meaningful article which my readers can use. Be critical by all means, but be constructive. Then and only then will anyone listen to you.

Ahhh! That felt good. Now we can get back to the business at hand...

Beilhartz' 17th Opus

A kind word for Hans. He wrote to me just after he realised that there was something missing from his 17th Line submission. So for those who are reading this for the first time here's the story...(sorry to those the second time around).

Last month we printed a program to display a 17th line on the screen. It is handy for the display of messages or status information and is not affected by scrolling or clear screen.

First, you type POKE 216,17, then RESET (warm boot)

Type in the following;

```
100 FOR A=0 TO 63
110 POKE 62464 + A, 32
120 NEXT A
130 INPUT A1$
140 FOR A=1 TO LEN(A1$)
150 POKE 62463+A, ASC(A1$(;A,A))
160 NEXT A
```

To get rid of the line completely POKE 216,16 then RESET – or a COLD START will reset back to normal as well. Hans apologises to all. I accept some responsibility for not checking further.

EDASM In Two Parts

Graham Hansen, of Carnarvon (Western Australia), wrote a letter in two parts, mainly concerned with the editor assembler ROM for the Bee:

"First, a request for information that may enlighten and inform others, and definitely relieve some of the frustration, caused by the manuals that came with the Bee. I'd like to find out about cold and warm starts: when returning from BASIC from the editor or monitor, using the B command, you automatically get a cold start and, therefore, lose any data, programs, source files and so on. The manual gives no clues.

"Secondly, for those with the EDASM fitted, you may or may not be aware that the manual could stand a little reviewing. Here are two corrections and four omissions from the monitor commands:

1: The block-move command M format, as per the book, is wrong. The format should be:

M xxxx yyyy zzzz

Move the object code beginning at address xxxx and ending at zzzz to now commence at address yyyy

2: The save command W: 'W' "name" M xxxx yyyy

Save the program "name" in machine language that starts at address xxxx and ends at yyyy. Note: This will be saved at 300 baud.

Now for the omissions:

C xxxx yyyy zz: Compare contents in address xxxx with that in yyyy and also for the next zz (in hex) bytes, up to 1B(hex) or 28(dec).

D "name" M xxxx yyyy: Same as W but at 1200 baud.

F xxxx yyyy zz: Fill address xxxx to yyyy with zz (00-FF).

X: Return to editor assembler.

"In addition to these, the command A in the format A xxxx seems to give the same result as the E command.

"Let me conclude by saying that the MicroBee is a very powerful and economical computer. Its value-for-money isn't equalled in the present offerings on the market, and the staff at Hornsby and Gosford are always polite and forthcoming with technical information.

"However, the overall impression of this Ozzie computer pales when the documentation is taken into account. With good documentation, this computer would be saleable in Japan."

Well done, Graham. I took your letter to Applied Technology's bosses and they agreed with your comments. Corrections have been made to later manuals and they suggested I devote a full column to machine-code programming the Bee using EDASM. I'll do just that very shortly, so be patient. Anyway, back to warm starts...

It's not possible to leave EDASM and make a warm start to BASIC because both programs may be using the same program area. A warm start can be made from the monitor using G 8021 ‹cr›. It is possible to assemble a program and store it on one kilobyte of spare memory at F400 (above the VDU). This program will not be retained with battery backup, but it will not be erased with BASIC. The BASIC program will then be able to call the program, using the USR function.

The G command should be used as follows: G 0500 ‹cr›. It must *not* be used on any memory under 400H as this is the scratch pad for EDASM. In other words, memory under 400H must not be used unless the user knows exactly what he's doing. Any attempt to type G 0100 ‹cr› will not work!

80 by 24 Can Or Can't?

Rodney Evans, of Canberra, asks whether the CRT controller can be reprogrammed to produce an 80 by 24 display and asks what happened to the Bee shop in Philip. He says it stayed open just long enough to sell him a MicroBee, then closed. (I didn't know there was that much profit in Bee's! – Ed.)

The answer to Rodney's second point is easy: another store opened in Weston, providing much better service. Need I say more?

Now, back to his first query: you can't convert any current 16- or 32-kilobyte MicroBee to 80 by 24 operation. The modifications would include a new character ROM, 13.5 Mhz crystal and another version of BASIC. However, Applied Technology is considering upgrading all colour Bees to operate at 3.375

Mhz with colour BASIC using this 80 by 24 option. Keep an eye on *Your Computer* news section...

Tandy Revisited

Remember the problems in March with Tandy line printers? Well, Sam Arnold, of Canberra, did and effectively solved a major problem in one keystroke:

"In reference to your MicroBee column in March, concerning the parallel interface with Tandy Line-Printer 7s: I've written a program to prevent the double-spacing of BASIC and EDASM prints/listings – that is, using LLIST, LPRINT, TYPE commands.

"This is much easier to implement than the hardware solution appearing in your column and I feel your readers should know about this alternative solution.

"The BASIC program, when executed, creates machine-language code to suppress the printing of CHR(13) and also updates one of BASIC's vector tables to reference the new print routine.

"Attached is the machine-code listing of the print routine and also a basic program to produce the necessary code for both the 16- and 32-kilobyte MicroBee (see Figure Three).

"To execute the program, run the appropriate BASIC program and, when ready to suppress double-spacing, type "USR(16128)" (for 16-kilobyte systems) or type "USR(32592)" (for 32-kilobyte systems). A reminder: Don't forget to type "OUTL #1" before printing."

```
FOR THE 16K MICROBEE...
-----------------------

ADDR   CODE     LINE    LABEL   MNEM    OPERAND

3F00            00100           ORG     3F00H
3F00 32FE3F     00110           LD      (3FFEH),A
3F03 3E11       00120           LD      A,011H
3F05 32B400     00130           LD      (0B4H),A
3F08 3E3F       00140           LD      A,03FH
3F0A 32B500     00150           LD      (0B5H),A
3F0D 3AFE3F     00160           LD      A,(3FFEH)
3F10 C9         00170           RET
3F11 FE0D       00180           CP      0DH
3F13 C8         00190           RET     Z
3F14 D300       00200           OUT     (0),A
3F16 76         00210           HALT
3F17 C9         00220           RET
0000            00230           END
00000 Total errors


TO GENERATE THIS CODE USING BASIC, TYPE..
-----------------------------------------

00010 FOR I = 16128 TO 16151
00020   READ J : POKE I,J
00030 NEXT I
00040 DATA 58,254,63,62,17,50,180,0,62,63,50,181,0
00050 DATA 58,254,63,201,254,13,200,211,0,118,201
00060 END


FOR THE 32K MICROBEE...
-----------------------

   ADDR   CODE     LINE    LABEL   MNEM    OPERAND

   7F50            00100           ORG     7F50H
   7F50 32807F     00110           LD      (7F80H),A
   7F53 3E61       00120           LD      A,061H
   7F55 32B400     00130           LD      (0B4H),A
   7F58 3E7F       00140           LD      A,07FH
   7F5A 32B500     00150           LD      (0B5H),A
   7F5D 3A807F     00160           LD      A,(7F80H)
   7F60 C9         00170           RET
   7F61 FE0D       00180           CP      0DH
   7F63 C8         00190           RET     Z
   7F64 D300       00200           OUT     (0),A
   7F66 76         00210           HALT
   7F67 C9         00220           RET
   0000            00230           END
   00000 Total errors


   TO GENERATE THIS CODE USING BASIC, TYPE..

   00010 FOR I = 32592 TO 32615
   00020   READ J : POKE I,J
   00030 NEXT I
   00040 DATA 58,176,127,62,97,50,180,0,62,127,50,181,0
   00050 DATA 58,176,127,201,254,13,200,211,0,118,201
   00060 END
```

Thank you Sam, that's just the sort of thing my readers want to see and for your efforts you will shortly receive, compliments of Dreamcards a MERLIN 32K Adventure game. One hitch though. I want a review ASAP.

New User Group

Another hive has sprung up, this time in Canberra. The Canberra Microbee Users Group meets every third Tuesday of the month at Woden Valley High School at 7pm.

Anybody wishing to inquire about the group should contact Hugh or Chris Gibson at the Microbee Computer Shop on (062) 88-6384 or at level 1, Coleman Court, Weston, 2611.

Hugh and Chris are avid Bee fans and can give you tremendous help. They do own the store, you know...

Just recently I received a letter from Mike Oborn in Perth. Regular readers would remember his letter from late last year, in which he stated he would like to start a user group in W.A. Well, he has done it! His first meeting was held in March, with another on April 10 with an attendance of more than 40.

The meetings are held on the first Sunday of each month, between 7pm and 9pm, in the seminar rooms of the Nurses Lecture Theatre at Sir Charles Gairdner Hospital in Shenton Park. No formalities, no newsletters, therefore no fees. Their aim is to allow contact between Bee owners, and have short discussions on various aspects of computing (such as machine language programming). So get in touch with Mike Oborn on 447 5366 (home) or 326 1571 (work).

The Drought Is Breaking

Yes, the drought is breaking. We're finally getting the first cloudburst of excellent software, and the rain-dancer is Mytek Computing from Western Australia.

A lot of you will know about Asteroids Plus already. Pooh! you say, not another game. Well what a game! Asteroids must be the best hi-res graphics arcade game on the market for the Bee. Rockets firing, sound effects, 3-D point by point resolution spinning squares, and whirling bits and pieces. Six hundred hours in the writing and only $22.50. You will not be disappointed.

At the time of going to press, Mytek has completed a machine code tutorial. I have received lesson one, and from what I saw, I truly feel that this computer-based self tuition programme (not program), will be the standard by which all others will be judged. The tutorial consists of eight interactive exercises designed to help you to get to know your Bee. You need a little knowledge of Basic (simple programming level) and even the complete novice will enjoy this.

The tutorial uses a split screen technique, so that the top half is your working area, and the lower half contains the lessons which are unaffected by anything you botch upstairs. A Monitor is inbuilt.

Topics include: writing and running Z80 machine code, PCG and programming the graphics shapes, memory maps explanation, sound effects generation, speech digitizing and lots, lots more. It should be available just about now. Mytek's range of software is starting to increase, and I will be presenting a review shortly of their BEEZ80 Secret Code Disassembler. The review is by Mike Newnham, who seems to have made disassembling Z80 code his life work. A more objective and searching review you won't get.

Next month I faithfully promise to reveal more about Merlin and Psychotec from Dreamcards. (Another excellent source of software for the Bee)...Time to go as I see the Editor pulling out his hair because I've run off at the mouth again. □

your VIC computer

By Andrew Farrell

BY THE TIME you read this, Commodore should have released a range of cartridges for the Commodore 64, including many of the original VIC-20 games, such as Gorf and Cosmic Cruncher. The 64 is receiving the same level of support from other software houses, with many titles now available on both computers.

In the future, I hope to be able to keep 64 owners up to date with new software. Most of the tips already mentioned will also work on the 64, which is very similar to the VIC-20 in some areas.

Gridrunner

Gridrunner is currently one of the biggest-selling cassette games in the United States, and looks set to do equally well here in Australia. Written in full machine code, Gridrunner provides plenty of fast action. The game is set on a large grid which is infested with chains of droids and protected by deadly X-Y Zappers. The player moves about the grid using the joystick to move up and down, as well as left to right.

There are various attack waves with increasing numbers of droids in each frame. Both sound and graphics are very well done. The high speed and complexity of the Gridrunner provide a very challenging game. Available on the VIC-20 and 64, it retails for around $19.95.

Also by the same author, Abductor is of the same standard, and will give a good player a sore thumb – the only way to keep up with the speed of the abductors is to choose a safe position and fire as fast as you can. Very fast and original for the VIC-20, plus joystick, it is available for around $19.95.

Jeff Minter, the author of Gridrunner and Abductor, has set a new standard for cassette software and one which will be hard to match. He has also written several other games for the VIC-20 and 64 which are worth checking out.

Paratrooper

Paratrooper is based on the game Sabotage for the Apple – the only main difference is that it runs on a standard VIC-20. The game is set in the battle grounds of World War II. You have control over a gun turret at the bottom of the screen, with the option of either guided or non-guided bullets. Above you, streams of helicopters cross the sky, dropping paratroopers in increasing numbers.

The paratroopers then slowly float to the ground, swaying from side to side as they fall. Paratrooper is a fine example of the potential of the VIC-20. My only complaint is the lack of progressive difficulty, although there are a choice of four levels of speed at the start of the game.

Paratrooper uses some interesting multi-part load techniques, which include using the screen area to temporarily store data before transferring it to the cassette buffer. Overall, an interesting game with exceptional use of bit-mapped graphics. Good value for around $19.95.

Gridrunner and Abductor are distributed by Progressive Software, and Paratrooper by Ozi Soft. For a standard VIC-20, I would rate all the above games amongst the best currently available.

Expansion

TJ Peripherals has recently released its own new expansion board for the VIC-20. The basic unit consists of one switch selectable expansion port and an additional eight kilobytes of memory. There is room for another 16 kilobytes of extra RAM and a second expansion port. The cost of a 24-kilobyte board with two expansion ports is around $165, making it about the cheapest way to expand your VIC-20.

The soldering and edge connectors are of a higher quality than some of the cheaper boards, and the entire unit is supported by sturdy rubber feet.

The three-slot expansion board, distributed by Ozi Soft, now includes a reset switch and improved slide switches. The reset switch is very useful, and may also be used in conjunction with the cartridge select switches, to remove or add cartridges without turning the VIC-20 off.

Graphics

As I mentioned last month, the VIC-20 is capable of bit-mapped graphics. The first step toward using this feature is designing your own character set. Our character set may be stored starting from any one-kilobyte block of memory, which is accessible by the VIC-20 chip.

We must also leave space for the screen and zero page, so as not to interfere with the normal operation of the VIC-20. This leaves us with several alternatives on a standard VIC-20; however, to start with, we will be using 512 bytes, starting from location 7168. This will allow us to define up to 64 of our own characters, as well as using some of the standard character set normally available.

To protect our new character set from being written over by BASIC, we must first move the top of memory below the start of the RAM which we will be using.

Most people use a series of pokes, but the easiest way is to open an RS-232 channel, using the command OPEN 2,2,2. This will automatically allocate a buffer area at the top of memory, and lower all the necessary pointers to make this area safe to use (usually for storing data for use with an open RS-232 channel). However, we can use this space for our character set which fits perfectly in the area set aside.

Game Reviews

I recently received a range of new games for the VIC-20 imported from England by Progressive Software Publishers. The games are all written in machine code and are available on cassette for around $17.

For the unexpanded VIC-20, Abductor must be the most played game in my library at the moment. The invaders attack in snake-like formations and attempt to abduct your men, who stand defenseless at the bottom of the screen. Your mission is to shoot them down...

It sounds simple, until you see the speed and agility of the attack. With each frame, the number of abductors increases and their attack pattern becomes more complex. If one of your men is abducted, the lethal remnants are tossed back at you.

The game ends if all your men are taken or all your ships are destroyed. After the third frame, you receive a double-blaster which fires two bullets together.

The speed, graphics and action of Abductor are amongst the best. It's guaranteed to give you a sore thumb – try beating 12,600.

Gridrunner is the biggest-selling game in the UNITED States at present, and is likely to be very popular here. The action is complicated and a great deal of co-ordination is needed to master the game.

The idea behind Gridrunner is original, though the shoot-'em-down theme is still there. A large red grid is displayed on the screen, upon which chains of droids buzz back and fourth. These are protected by X/Y zappers which shoot along the grid lines and are only one of the various ways that you can be destroyed.

When a droid is hit by one of your lasers, it turns into a pod which slowly changes until it eventually dies and releases a flash of energy along the grid,

which is also lethal. There are 20 distinct attack waves, with each one harder than the last. An extra gridrunner is awarded each grid you clear.

The documentation suggested a score of 100,000 was of reasonable standard. However, I haven't managed to stay alive long enough yet to get near a total half that size.

Both Gridrunner and Abductor are for an unexpanded VIC-20 and require a joystick.

Traxx is based on a similar arcade game of the same name and provides nine levels of play with various numbers of bugs. The objective is to form squares on the grid by joining the lines together.

The game, which requires eight kilobytes, is hard to control at first, but I found that removing the rubber from the joystick makes it far easier. It could perhaps be a little more imaginative, though overall it's highly entertaining.

Andes Attack is another version of Defender for the VIC-20, and requires eight kilobytes to run. Fast graphics and sound make it enjoyable to play – in fact, it's probably the best version around. It features scrolling landscape, smart bombs, thrust control and, of course, thousands of invaders. The creature to be defended is a small llama.

Both Andes Attack and Traxx require a joystick.

All the games I've reviewed are available for $17 from most Commodore dealers, or by writing to PO Box 436, Pymble, 2073. □

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OSBORNE

By Greg Stringer

DURING March, Dr Adam Osborne visited Australia to meet with local executives of Osborne Australia and some of Australia's leading Osborne dealers, to gain a better understanding of the needs of the Australian personal computer users. His presence in Australia is indicative of the way a lot of the American and European manufacturers of microcomputers are coming to appreciate the special needs of the Australian market place.

During his visit Dr Osborne also took the opportunity to address Sydney's Aus-borne user group at the Wentworth Hotel. A full transcript of his speech and the question and answer session are included in the Aus-borne user group magazine. The group is expanding rapidly and with the help of Delta Computer Company of Bankstown, now has access to the FOG (First Osborne User Group) public domain software library. To date there are over 900 programs available to all members of the group.

One of the more frequent enquiries of the MBASIC programmers is how to use random access file of more than 128 characters long. The answer lies in three flags that can be set when the the MBASIC interpreter is loaded. They are:

/F:n Where n is the number of file buffers to be allocated. MBASIC will allocate space for three file buffers to be open. If you wish to have from 4 to 15 files open at one time use MBASIC with the command MBASIC /F:n where n is the number of files to be allocated.

/M:n Will set the highest memory location that will be used by MBASIC. Some programmers will allocate some RAM memory above that used by MBASIC to store machine language routines or some private scratch memory.

/S:nnn This is the one that has causes all the trouble. This parameter is the one that will set the maximum length for random access files.

There is a new graphics program now available called Wizard of Osz. It provides a convenient and quick way to generate Osborne graphic screen displays. The utility will support 52 and 80 column graphic screens with all of the Osborne graphics characters available.

The program is easy to use with full cursor control and menu driven options. Features include graphics and text displays utilising high and low intensity, underlining and a status display showing accurate cursor positioning. A very useful set of utility programs included in the program will convert the pictures generated into data statements for inclusion in MBASIC or CBASIC programs with a format for assembler language programs.

Four extra utilities will allow a direct dump of the graphics to Epson MX printers as well as NEC PC-8023A-C, C Itoh 8510, Microline 82A, 83A, and IDS PRISM printers. Details of the program can be obtained from Delta Computers of Bankstown.

Assembler Example

Some users have asked for some examples of assembler language programs to try out. I have included a program written by Lauren Guimont which when run will provide a bitmap of the specified disk.

The program should provide a useful utility to show just where any available space lies on any disk. Also some of the procedures will give you some insight into how the Osborne keeps track of available space on a disk. The program is a public domain program and is an example of some of the software available to user groups.

```
;
;       BITMAP for CP/M 2.0+                    as of 7/11/80
;
;
;       Lauren Guimont
;       14211 8th Avenue South
;       Seattle, Washington  98168
;
;
;The bitmap idea is based upon Ward Christensen's original
;  bitmap program, which refused to run on 2.0+ systems.
;  After giving his program a quick going over with SID, I
;  decided it would be easier to rewrite it than to try and
;  patch it for 2.0, 2.1, 2.2.
;
;
;               ***** EQUATES *****
;
base    equ     0               ; 'normal' CP/M
bdos    equ     base+5          ; jump to bdos
wchar   equ     2               ; bdos console output
sdsk    equ     14              ; select disk
curdsk  equ     25              ; current disk
getalc  equ     27              ; get allocation address
diskpar equ     31              ; get disk parameters
fcb     equ     base+5ch        ; file control block
;
;
;
        org     base+100h       ; start of TPA
;
        lxi     h,0             ; clear HL
        dad     sp              ; load HL with CCP sp
        shld    oldsp           ; save it for later
        lxi     sp,stack        ; initialize our own sp
        jmp     start           ; bypass some subroutine
        ds      48              ; stack space
stack   equ     $               ; our own stack
oldsp   ds      2               ; old stack from ccp
;
inlprt: ;                       ; in line print
        xthl                    ; HL to stack...pointer to HL
inlprt1 mov     a,m             ; get a character
        inx     h               ; increment the pointer
        cpi     '$'             ; remark?
        jz      inlprt2         ; if so, prepare to exit
        call    conout          ; output to console
        jmp     inlprt1         ; go get another
inlprt2 xthl                    ; orig HL...sp at end of msg
        ret                     ; return to end of msg
;
conout  push    h               ; single character console
        push    d               ; ...output; 1st save all
        push    b               ; ...the registers
        push    psw
        mvi     c,wchar         ; bdos call
        mov     e,a             ; bdos wants it in E
        call    bdos            ; let bdos do it
        pop     psw             ; reinstate all registers
        pop     b
        pop     d
        pop     h
        ret                     ; return to caller
;
crlf    call    inlprt          ; use in line print
        db      0dh,0ah,'$'     ; ...fnc cr & lf
        ret                     ; return to caller
;
one     push    psw             ; save Acc
        mvi     a,'1'           ; print a '1' to console
        call    conout          ; do it
        pop     psw             ; restore Acc
        ret                     ; return to caller
;
zero    push    psw             ; save Acc
        mvi     a,'0'           ; print a '0' to console
        call    conout          ; do it
        push    h               ; save <hl>
        lhld    free            ; get nb of free blocks
        inx     h               ; add one free
        shld    free            ; store total free count
        pop     h
        pop     psw             ; restore Acc
        ret                     ; return to caller
;
;Binary to decimal output routine. Enter with 8 bit binary
;number in <A>. Second entry at BNDEC2 assumes 16 bit nb. in <HL>
;
bndec1  mvi     h,0
        mov     l,a             ;<HL> now has number
;
bndec2  push    b
        push    d
        push    h
        lxi     b,-10
        lxi     d,-1
bndc    dad     b
        inx     d
        jc      bndc
        lxi     b,10
        dad     b
        xchg
        mov     a,h
        ora     l
        jnz     bndec2
        mov     a,e
        adi     '0'
        call    conout
        pop     h
        pop     d
        pop     b
        ret
;
errl    call    inlprt          ; in line print
        db      0dh,0ah,'Nonstandard disk '
        db      'parameter block error'
        db      0dh,0ah,'$'
;
finis   lhld    oldsp           ; get CCP sp
        sphl                    ; retore it
        ret                     ; direct return to CCP
;
;We need a little internal storage
;
drive   ds      1               ; current drive
aldrv   ds      1               ; alternate specified drv
dpb     ds      2               ; disk parameter block add
tbtr    ds      2               ; total bits to read
alloc   ds      2               ; allocation address
blksiz  ds      1               ; block size code
free    dw      0               ; count of free blocks
;
;The actual start of it all
;
start   lda     fcb             ; get any alternate drv
        sta     aldrv           ; save it for later
        call    inlprt          ; in line print
        db      'BITMAP 2.2    AS OF '
        db      '7/11/80',0dh,0ah,0dh,0ah,'$'
        mvi     c,curdsk        ; get current disk in
        call    bdos            ; ...use from bdos
        sta     drive           ; save it
        lda     aldrv           ; get any alternate drv
        ora     a               ; any specified?
        jz      dpblk           ; if not, skip next
        dcr     a               ; less one
        sta     drive           ; save as drive to use
;
dpblk   lda     drive           ; get drive to bitmap
        mvi     c,sdsk          ; set call for disk select
        mov     e,a             ; bdos wants it in E
        call    bdos            ; let bdos do it
        mvi     c,diskpar       ; we want disk parameter blk
        call    bdos            ; get it, and.....
        shld    dpb             ; ...save it
        lxi     d,5             ; offset for total blks used
        dad     d               ; add it to HL
        mov     e,m             ; lsb into E
        inx     h               ; point to msb
        mov     d,m             ; get it
        xchg                    ; put it in HL...
        inx     h               ; alloc size = (dsm/8)+1
        shld    tbtr            ; ...and save it
        lhld    dpb             ; get dsk parameter blk add
        inx     h               ; ...and increment HL to
        inx     h               ; ...the 3rd byte
        mov     a,m             ; it has the block size
        sui     2               ; it will be 3-7 (make it 1-5)
        cpi     5+1             ; check for over 5
        jnc     errl            ; nonstandard size
        cpi     1               ; check for less than 1
        jc      errl            ; nonstandard size
        push    psw             ; save it
        call    inlprt          ; in line print
        db      'Allocated disk block size is $'
        pop     psw             ; get block size back
        sta     blksiz          ; save it for ckd
        lxi     h,512           ; set 1/2k counter
lp      dad     h               ; multiply * 2=1024
        dcr     a               ; less block size code count
        jnz     lp              ; loop till <A>= 0
        call    bndec2          ; print size in K
;
dpbend  call    inlprt          ; finish message
        db      ' bytes per block',0dh,0ah,'$'
        lhld    tbtr            ; total bits to read
        push    h               ; save it in the stack
        lda     drive           ; again to be safe
        mov     e,a             ; into E for bdos
        mvi     c,sdsk          ; reselect disk
        call    bdos            ; let bdos do it
        mvi     c,getalc        ; get the allocation address
        call    bdos            ; ..from bdos
        pop     d               ; tbtr from stack
        lhx     h               ; lock allocation up one
```

Continued on page 97

Free readers' classifieds

VIC20: Inovative Computing (30 games), intro. BASIC, Omega Race + Super Lander (cart's), Laser Blitz (Cus) New $143 Sell $100 NO PH.(02) 771 6045.

EPSON MX80F/T III: For sale, only 4 months old. $890 negotiable. Phone Alan, (03) 878 5881 ah, (03) 877 7038 bh.

ZX81: 16K RAM Pak for sale $130, ZX81 printer and power supply $130, Not only 30 programs for ZX81 $8, understanding your ZX81 ROM $8, Machine Language programming Made Simple For Your Sinclair ZX81, ZX80 $8, or the lot for $270. Phone Kyneton, (054) 22 22 92, evenings.

ZX81 Software Exchange System: Prices to rise soon. Get in quick! SSAE to, Peter McKay, R.S.D. Swan Hill, Vic, 3583.

MicroBee Programs: Send S.S.A.E. for free catalogue to David Fowler, 114 Kangaroo Rd, Hughesdale, 3166.

New TRS-80 Games Software: Adventure and M/L arcade games. For catalogue, write to Supersoft Software, 61 Cremin Street Upper Mt. Gravatt, 4122.

System 80 Software: Z80 disassembler (BASIC), Scott Adams Adventure 3, Tiny Pascal, Microsoft Editor/Assembler - plus, DBUG, DOS plus system operating system. All originals and include documentation. Phone Peter (002) 280758.

Big Board Double density controller: Uses WD1795 with support chips, plus into 1771 socket. No board modifications necessary, runs on 2.5 Mhz clock. software switchable for 5 or 8 inch, documentation, software and all details. Peter Gargand. PO Box 10, Aranda, ACT 2614.

Commodore 4032: FAT-40, 32K, 12in green screen, C/W data-cassette, manuals and over 50 games, adventures, programs, $899. (03) 277 5089.

MICOM: (The Microcomputer Club Of Melbourne) MICOM is a club catering for a wide range of computers and interests. MICOM can be contacted be writing to PO Box 60, Canterbury, 3126. The club meets on the third Saturday of each month at the Burwood State College on Burwood highway from 2 to 5pm.

For Sale: Full memory Exidy microcomputer, Olivetti daisywheel printer with spare ribbons, BASE2 dot matrix graphics printer, manuals plus free selection of extensive software. $3100, (03) 836 1252 or (03) 836 1389 ah.

MicroBee software: Send self addressed stamped envelope for catalogue to Tim Buchalka, 1 Arbor Street, Mount Gambier 5290.

MicroBee: EA COMPUVOICE plaintext to speech software (machine language) use from BASIC. Certified cassette $14.95, 8/45 Stonehouse Ave, Camden Park, 5038.

Card Reader: One CED card reader with interface card, suitable for use with Apple II computer. Excellent order. $450. Contact N. Witney, Rutherglen High School. Ph (060) 329483.

Hitachi Peach System: CPU, DSSD MPI disk drive and Controller Card, 16K RAM Card, PAL Colour Converter Card, Tandy green screen and approx $500 worth of software. Retail cost...$3500, selling price... $2300. Telephone (076) 358134 ah or write Middle Ridge Pottery, Nelson Street, MS 1082, Toowoomba, Qld, 4350. (Will consider offers for individual items.)

ZX81/16K Cassette Games: Galaxy Paranoids, Antimatter Zone, Moon Ranger, $8 each. (Inc p&p). Fast & Furious. R. Stockburger, 7/8 Norfolk Avenue, Port Macquarie, 2444.

Computer Rooms: Create your own micro get-away with a lockable, weatherproof, fully insulated shipping container. Set up your own hardware in one of these 20' x 8' x 8' units in your own backyard! Price from $1750 each, delivery arranged to anywhere. (02) 438 1736 (ah (02) 871 4662).

Calling All Atari Owners: If you own an Atari 400 or 800 computer, then contact me for information on the two Atari user groups that exist in Melbourne. Kelvin Eldridge, PO Box 173, 3073. Ph 4705027 ah.

VIC-20: Arcade, by Rainbow Software, ten new games for the unexpanded VIC-20 only $20. Send to Tony Mitchell, 27 Mudge St, Whyalla Norrie, 5608.

For Sale: 3 month-old Star Printer, Model DP8480 (Parallel). 80 cps with bi-directional printing. Friction and tractor standard. Price $400. Ph Adrian, (02) 634 6410 after 4 pm.

For Sale: ZX81 computer, 16K RAM. Fully connected typewriter keyboard. Imported filter to ease program loading. Flexible ribbon connector to stop RAM Pak wobble. Accompanying software and machine code book worth over $200. Total package worth over $670. Sell for $450. Stephen Burgess, 29 Sredna St, Tottenham, Vic, 3012. Ph, (03) 314 5623 (home), (03) 369 1355 (business).

Wanted VIC-20: In working condition, use for recording titles onto video recorder. Also data cassette and expander. Gil, (02) 923 9548 or 665 3793 ah.

Program Wanted: Apple Plot for Apple II new or second-hand. Write E. Leong, PO Box K594, Haymarket NSW 2000.

VIC-20: Arfon board, recorder, 8K expansion manuals, 20 games, joystick, $900 or best offer. 8/18 Knutsford St, Fremantle, WA 6160.

TRS-80: 32K Model 1, E/I, disk drive, green screen, disk editor/assembler, $150 software & all manuals. Worth over $2000, sell $1700 o.n.o. Phone (03) 848 6914.

For Sale VIC-20: Cassette Interface to Save/Load programs (including Commodore programs) using your audio cassette recorder. $39.50 plus $2.50 p & p. Canberra Computers & consultancy, PO Box 382, Dickson, Canberra, A.C.T. 2602. Tel, (062) 413746.

Programmers Needed for MicroBee: Good royalties & sales bonus' paid for good programs. Games, application & business programs needed. Contact Baartz Wetherall c/o Andrew Baartz, 7/21 Prince St, Randwick, 2031, Ph 398 4626.

Super 80 Users Group: This new group is starting in Perth. Contact either Garry Black, 19 Bendigo Way, City Beach, 6015. Ph (09) 385 8813, or Geoff Dixon, 13 Ardross Way, Noranda, 6062. Ph (09) 276 7662.

Compact switching power supply: Good condition. Input 240V. Output 5 Volts 20 Amps. Replacement value $350. Sell $80. R. Barrie, PO Box 363, Dee Why, 2094. (02) 938 1634.

TRS 80, System 80: software. Eliminator, Star Fighter, Star Flite, Penetrator, only used once $80 the lot. Ph 02 819 7821, Mark Gosbee.

Swap or Sell: TRS-80 software with TRS-80 or System 80 owners. My library includes, Cyborg, jovian, Frogger, Asylum II. Robert, Ph (03) 579 5748.

Green Screen Monitor: Unwanted present, never used, still packed. $180. Write to, J. Singler, 3 David Place, Edgeworth 2285, N.S.W.

New: S-100 option for System 80 interface plus 48K expansion card, $80 or $50 each. Call Tony after 5 pm, Ph. (07) 488451.

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Melbourne Super-80 Users Group: Meets second Friday each month in the Uniting Church Hall Canterbury Rd Heathmont. Enquires Hon. Sec. Victor Shuttleworth. (03) 723 2713. Open day for mini computer owners on Saturday June 18th.

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Ballarat computer Users Group: Meetings, First Wednesday of each month at 7.30 pm. Location, Various – refer to Publicity Officer, John Preston, Ph (053) 314363. The club caters for all tastes, and normally every meeting is devoted to a special topic, usually a specific personal computer which will be demonstrated either by an owner, or by a retailer. We also endeavour to supply a pool of knowledge to assist menbers with problems they may have.

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Club: The newest club for the Ohio Superboard has begun! For free introductory newsletter write to 27 McGown Road, Mt Eliza,3930.

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MicroBee/Atari: Swap your non-copyright programs – Games, utilities, etc. Phone (03) 741 5534 between 6-9pm weekdays, 2-9pm weekends.

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Wanted: ZX80/81's for wrecking write, quoting asking price and condition to K. Howell Box 405, Renmark, 5341.

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```
;
;We now have the total number of bits to read in DE, and
;  the address to start reading them at in HL for the
;  proper drive. So now let's print the bitmap.
;
;
bmap    mvi     c,48            ; 1's and 0's per line
        call    crlf            ; followed by a cr,lf
bmap1   inx     h               ; kick the pointer
        mov     a,m             ; get the byte
        mvi     b,8             ; it has 8 bits
bmap2   rlc                     ; runn'em through carry
        cc      one             ; carry set = print '1'
        cnc     zero            ; carry not set = print '0'
        dcx     d               ; decrement bit count
        push    psw             ; save the bit pattern
        mov     a,d             ; check to see if...
        ora     e               ; ...DE = 0
        jz      bmapend         ; if so, we're finished
        pop     psw             ; restore bit pattern
        dcr     c               ; decrement line count
        jz      bmap            ; new line if zero
        dcr     b               ; decrment bit count
        jz      bmap1           ; new byte if zero
        jmp     bmap2           ; finish this byte
;
bmapend pop     psw             ; not neccessar, but keeps the
        call    crlf            ; ...stack straight..send cr,lf
        call    crlf
        lda     drive           ;get drive used
        adi     'A'
        call    conout
        call    inlprt
        db      ': R/W, Space: $'
        lda     blksiz          ; get block size code
        lhld    free            ; get nb of free blocks
lpl     dcr     a
        jz      don             ; multiplied by size of block
        dad     h               ; times 2
        jmp     lpl
;
don     call    bndec2          ; print size of free space
        call    inlprt
        db      'k',0dh,0ah,'$'
        jmp     finis           ; restore things and GET OUT
;
        end
```

your computer services

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All Contributions: should include your name, address, and home and office phone numbers (in case we need to check details). Each page of your submission, and any material sent with it, should also carry your name.

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Contributions By Telephone: Contributors who have modems and suitable software (in the MODEM7/YAM mould – see our stories on Christensen Protocols in the May and June 1983 issues) can arrange direct transfer to our computers, or obtain special contributor access to the Mi-Computer Club Bulletin Board system, which is on-line 24 hours a day, seven days a week.

Style: All items should be typed (or printed) and double-spaced on plain white paper. We will only accept original copies – no photostats. Include your name, address, telephone number and the date on the first page of your manuscript (all manuscript pages should have your surname and page number in the top right-hand corner). Be clear and concise, and keep jargon and adjectives to a minimum.

Listings: Unless it is absolutely impossible, we want listings produced on the computer. This reduces the risk of error – if the computer typed it, the computer probably accepted it. Print listings with a dark ribbon on white paper, and try to format the output to a narrow (40-characters) width. If they can't be produced on a printer, borrow a good typewriter – hand-written material is likely to sit around the office for a year before someone can find time to type it all out for you! Please provide an account of what the program does, how it works and so on. Any comments on the program should refer to the address, line number or label rather than to a page number. Any comments on modifying the program to work on other machines will be appreciated. Try to include a printout of at least part of a sample run if possible.

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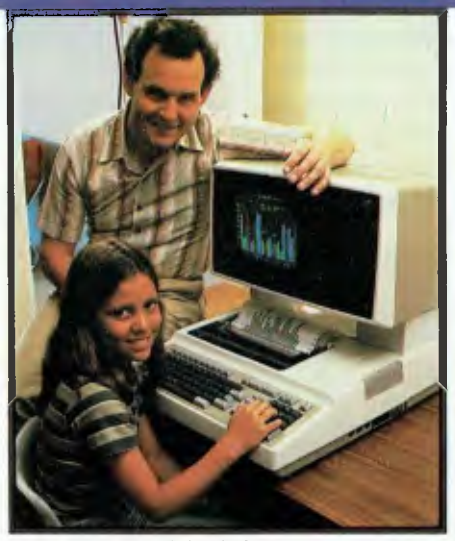

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DEALER ENQUIRIES INVITED

iNTERFACE

Newsletter of the Mi Computer Club

June, 1983

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Norma Jackson: Club correspondence
Order and subscription queries.

Much of this issue of Interface is devoted to letters from members - plus a revised product catalogue. As we've mentioned in recent issues, we've had two price rises from some suppliers since our last catalogue was sent out to members.

We've absorbed these rises in all cases, except where our cost price exceeded our selling price. We will continue to do that wherever possible with future price rises, but we have to catch up with the suppliers every now and then...

Prices have not risen at all on many of the products, and some other changes have been small. Hopefully, the new price list won't hurt too much!

We will continue to offer cut-price specials wherever we can, and will advise these, as usual, separately in Interface.

Some Specials, And New Products

Some members will note new categories for their machines in this catalogue; some of the ones not included yet will be soon, don't worry. It is proving a problem to supply software for some machines, as their distribution system is something of a 'closed shop'. However, we **are** working on it.

We apologise for recent delays in delivery of some products; we've been short on staff again, and several suppliers seem to have run out of stock of many items in the post-Christmas period. Things are returning to normal now.

Specials: We'll repeat, with some modifications, last month's special offers. The offer on **Nashua Diskettes** proved so popular, we ran out of stock very quickly. It was a "while stocks last" offer at the old prices, but this month we'll offer the same deal again, this time based on the new prices. That means 10 percent off on single boxes, 15 percent if you buy three or more at a time!

Also, you can still get beach towels and T-shirts at our "winter-special" prices - $9.90 for the towel, $4.50 for normal club T-shirt, $4.90 for the Adventurer T-Shirt.

Apple Owners: we still have plenty of our scoop-purchase copies of Grafpak and Phil's Cheap Editor, which we advertised last month at savings of up to 60 percent. Remember, you can have Grafpak for $39 (retail almost $100) and Phil's Cheap Editor for $29, or buy both at a staggering $55 all-up.

Machine/Disk Formats

Don't forget to tell us what your machine is when you order software. We need to confirm machine type, disk format (or cassette) etc. whenever there is a chance of ambiguity. CP/M users, in particular, need to tell us disk size and format.

Apple IIe users should specify this, as some programs are different for the new machine.

Bulletin Board

Very little new has happened with the bulletin board this month, but the next few weeks should be a different story.

YC Pocket Programs will be available progressively this month and, once the 'old' files have been up long enough for users to get what they want, we'll put new ones up from each issue as it is published.

A new version of the Board software should be running shortly, with a tidier log-in procedure, faster operation, improved message entry facilities and user name (rather than member number) addressing of mail implemented.

Your Opinions/Requests:

YC Contributions: Could you please forward me any information on publishing an article on the CBASIC2 interpreter. Would you please advise me of such things as the person to forward the information to, format of information and if it is possible to send it via my Dick Smith dataphone. Such things as payment would also be appreciated.

S D Thompson
Coffs Harbour

> See the inside back page of each issue for guidelines on contributions, and watch for a feature story giving more detail on the subject in the near future. At that stage, we'll also explain in detail how contributions can be uploaded to the Bulletin Board.

MicroBee Software: I am interested to know more about the club and especially the availability of software for my MicroBee and printers. So far (I've only been a member for two months) I've only seen information about Apple programs and T-shirts, etc. even though the back page has a large order form with "Key Number" columns etc. Is there a brochure showing all that you have available or do you only have the few items listed each month?

R John Cummings
Calala via Tamworth

> As you'll notice this issue, we regularly send a catalogue of products. However, this doesn't yet include the MicroBee (we hope to do so soon). We no longer stock printers, as we feel that type of product requires support (interfacing etc) we can't give properly.

Communications: I have a MicroBee (32K with Editor/Assembler and Modem). Is it possible to gain access to the Bulletin Board without a CP/M disk based system? The MicroBee would be used as an intellegent/dumb terminal for communication purposes and not for down loading programs etc into the MicroBee.

If it is possible, software will obviously have to be written especially for the MicroBee. Therefore could you please supply me the format/communication details to allow me to write this program.

Chris Hingee
Baulkham Hills

All you need to access the Bulletin Board is a machine which can send ASCII text from keyboard to modem, and from modem to screen. You could write this yourself, although we suggest AT's new comms/networking ROM is possible the easiest solution. The board's current protocols are: 300 bps, 8 data bits, 1 stop bit, no parity - pretty much a 'standard' for BBS systems.

System 80 Disks: I have been thinking that I'd like to expand my System-80 to a disk based system. I'd just like to know two things.

Firstly, since I've owned the System-80 for almost two years, I've accumulated various programs. I am sure I'll be able to convert the BASIC ones to disk but I am unsure of the "system" ones. Is there any way I can copy system tapes onto disk for faster loading?

Secondly, when buying programs from mail order and software companies, on disk, does it matter how many tracks your disk drive has? I am thinking of buying a 77 track drive.

Peter Huddy
Eastwood

Most Tandy Disk-Operating Systems (DOS) include utilities for converting from tape to disk, including system tapes. A certain degree of knowledge of the machine's workings is assumed. Not all tapes will convert (there is a degree of copy protection in some). Yes, you must always be careful to ensure the software you are ordering is provided on the correct disk format.

TRS-80 Support: Having just read the April issue of "Interface", and the opinions of Peter Endean (Miranda, NSW) regarding the lack of software for TRS-80 and System-80, I was a little surprised (I must admit) at your reply ... "member interest is these products has been non-existent".

Well perhaps everyone has fallen into my category ... for months I have avidly read through the catalogue, only to find Apple, Peach, Sorcerer and such like catered for. And wondered when the TRS-80 and System-80 were going to get a go! (In fact, I don't recall that they were ever in the catalogue, but I may stand corrected there.)

It seems to me that there are an awful lot of TRS-80 and System-80 users around and commonsense should dictate that at least some representation would be appreciated.

And while I'm about it, I have another "beef". Almost a year ago I write to MICC regarding starting a computer club here in Brisbane, and you kindly (per Laurie) replied by giving me names of members in my area. The club was subsequently formed and has been growing to the extent that we now have over 30 members.

I have twice written asking for imformation about possible use of slides or tapes (or whatever) at our meetings and their cost; also on what basis we could supply things like T-shirts, stickers - and my reply has been an absolute stunning silence. Forgive me for judging a little harshly, but I rather get the idea that the philosophy of helping to get chapters left along with Laurie and Keith.

And while our club (Computer Owners' Group) has written to other magazines to advertise our existence - and seen our name published in their regular Users Group list - we have never appeared in the "Your Computer" lists. As we were purportedly affiliated with MICC, I would hardly have thought it was necessary to make a special request to the magazine.

Mrs Betty Adcock
Brisbane. COG.

We have taken the point made in this letter and several others, and will be adding TRS80 software to the catalogue progressively. However, the range of products will depend on the support of members, as we have had TRS80 products in the past and found little interest.

Unfortunately, the concept of establishing chapters left before Keith and Laurie. Keith told us when handed over the club that this had died from almost total lack of interest. He did point out, however, that your determination and enthusiasm had provided the one success story in this area.

While the club has the help of magazine staff available to it, you do need to address the magazine directly for things like news items, club mentions and so on. The two are, basically, separate organisations.

PROBLEM CORNER...

I have two matters to raise:

1. Are there any cheap ([$100) Z-80 assemblers available for CP/M systems? I have made a number of enquiries and the cheapest I can find an assembler which accepts Z-80 opcodes is Microsoft Macro-80, at almost $300. I don't require anything fancy like relocating assemblers or even macros. A plain one like ASM would do fine.

2. How can I find out about public domain CP/M software, both what's available and where can I get it from. Also how can I find out about the CP/M users group (if it exists)?.

Mr B P Court
Mt Waverley

1. Not commercially, but there are a couple of free ones in the CP/M Users Group collection.

2. Try asking Melbourne Microcomputer Club's CP/M Special Interest group. CP/M Public Domain Software is available from Archive Computer Services in Brisbane. Archive also has printed catalogues. There is no joinable CP/M Users Group.

Apple Peeks: I have been programming the Apple II+ at school for over 6 months, I am a Year 11 student. I haven't progressed onto machine language yet and am now trying to make an Applesoft game. I know some pokes and peeks and calls, but I don't know all of them, I was wondering if you would send me a list of all the pokes and peeks and calls for the Apple II+ and what they do.

A P Snelson
Cobar

We're afraid we don't have such detailed information. This is the sort of information that gets 'picked up' over months or years of reading tips and studying other people's programs. A good source would be the specialist U.S. magazines such as Softtalk, CALL Apple and so on, many of which are available through local Apple dealers.

PLEASE NOTE:

All prices were, to the best of our knowledge (and discounting production errors), correct at the time of printing. Naturally, they are subject to change without notice, as is the availability of various products.

Please note that all orders are filled immediately stock becomes available, so you may receive products in separate consignments if some items are out of stock the day your order is received. We are at the mercy of distributors in some cases where stock is hard to obtain from overseas, and all we can do is wait for our back-orders to be filled.

★ Mi-Computer Club Catalogue ★

JUNE 1983

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COMMODORE 64

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