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Cover Photography
Peter Beattie
The picture shows Dean Vujasinovic, aged 5, using Explore Australia from Dataflow (see 'Out of the cot ', page 24).
Office Services
Alison Tait
Bulletin Board OFF LINE
Subscription Enquiries
(02) 693 6666
Advertising Sales
National Advertising Manager:
Susan Earles
NSW
David Mitchell
180 Bourke Rd, Alexandria 2015.
Tel: (02) 693 6666, Tlx: AA74488
Fax: (02) 693 2842
Advertising Production
Patrice Wonlnick
OFFICES
Editorial:
180 Bourke Rd, Alexandria 2015.
Tel: (02) 693 6666, Tlx: AA74488
Fax: (02) 693 2842
Victoria
Virginia Salmon,
221A Bay St, Pt Melbourne 3207.
Tel: (03) 646 3111,
Fax: (03) 646 5494

Western Australia
Des McDonald,
48 Clieveden St, North Perth 6006.
Tel: (09) 444 4426, Fax: (09) 381 3115
Queensland
Mark Lewis
180 Bourke Rd, Alexandria 2015
Tel: (02) 693 6666, Tlx: AA74488
South Australia
Michael Mullins
98 Jervois Street, Torrensville 5031
Tel: (08) 352 7937
New Zealand
Scott White
Rugby Press
3rd Floor, Communications House,
Parnell, Auckland.
Tel: (09) 796 648, Tlx: NZ 63112
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NEXT MONTH INCLUDES . . .

Saving, maintaining and protecting your data – data security – is always a worry, but it should never be a headache. Starting in September, a new series of articles will cover all aspects of security, from simple hardware maintenance to encryption. And we have the second part of our annual education feature – we look at over 100 educational packages for the most popular machines.

Unfortunately, the fires of fate prevented our bringing you the monitors story this month, but we'll have it ready in September for those looking to upgrade that old eye strainer. On a higher plane, Tom Moffat will philosophise on hacking and Miroslav Kostecki offers a 'Taste of Artificial Intelligence.'

Computers, kids and education . . .

Computers are playing an increasingly important role in the education of our children, but which computers are being used in our schools? And, how successful is teaching pre-schoolers by computer? These are two areas we examine in the first part of our annual two-part education feature.

FEATURES

A Wyse decision? 16
John Hepworth put two *extra*-ordinary machines through their paces.

Out of the cot . . . 24
Small children can learn how to operate the computer from as young as two years old. But, their success depends on your approach.

The Galois Algebra Package 30
Here's a new piece of Australian software designed for use in teaching and research in algebra at the tertiary level.

Taking out a contract 32
Do you know what computer equipment is being used in your local schools? (You should if you're thinking of buying a machine for the kids to use at home.)

Artificial Intelligence 42
To act intelligently, a computer must be able to acquire information. This process is called machine learning: Tim Hartnell presents a simple example.

Database Data 46
In the second part of our survey, Steve Keen covers Enable, Open Access, Smart and Ability Plus – all databases which are part of integrated software suites – as well as Rapidfile and AskSam.

REVIEWS

Desktop Publishing 56
Tim Hartnell came to several conclusions about GEM, Byline and First Publisher (while Matt had several thoughts of his own) . . .

FoxBase+ 65
Faster, more features and cheaper than dBase III+.

Baler 66
Security and economy are two of the best reasons for buying software. John Nicholls a product that offers both to commercial 1-2-3 users.

Laptop Lowdown 68
By definition, you can carry a portable anywhere, but that hasn't meant that you could read the screen anywhere. Jan Roberts reports on two new portable read-ables – the Tandy 1400LT and Multitech Super 5.

Two from Tandy 74
Tandy is out to make a name for itself with the new 1000 TX and 1000 HX.

INSTRUCTION SET

Behind HyperCard – Part 2 80
In Part 1, Stewart Fist looked at object hierarchy and the way messages were passed up through the system. This month he creates a new stack and starts you Hyper-talking.

Making QuickBasic Libraries 88
Building frequently used routines into libraries improves programming speed, and program readability and maintainability.

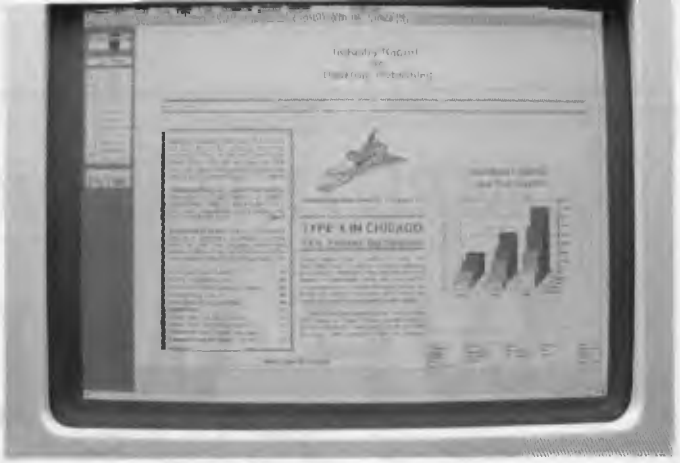
Hardware hacking 90
This month Tom Moffat tells how to switch the clock speed of a Turbo PC, either by software or hardware control.

PUBLIC DOMAIN

New Products 96
This month's new products include Mac WordPerfect, a PC communications program called SwitchLAN, the Sprint XT, Saturn 10 modem and a mouse cleaner.

The Prophet 103
The Registry continues to zip along, with between 30 and 50 per cent of listed systems changing each month.

Your Amiga 109
Gregg Faulkner hopes they have Amigas wherever we all end up . . .



Your Amstrad 111
Test your trigger fingers with a 'reaction tester', a graphics program for the 464/6128, and some hints on overcoming incompatible disk formats when using CP/M software on the PCW.

Your Atari 116
A new graphics package for the Atari ST range – Spectrum 512.

Microbee File 118
A biology lesson on the relationship between 'Bees and Apples, or to be more specific, 'Bees and Macs (the variety of computer, not what you put on with your wellies).

IBM Underground 123
John Hepworth discusses two faithful friends – D.COM and WHEREIS.COM.

Your IBM 128
More memory with a cable which connects an external floppy disk drive to the 37-pin connector on the rear panel.

Your C64 132
Ian Allen prefers to play strategy games with some degree of intelligence – such as Reach for the Stars.

Your Apple IIGS 135
In the first of a new column, Terry Cass offers a wealth of tips and reviews, while hinting at the future of the GS.

Your Mac 138
Fourth Dimension, HyperCard and the annual Apple Developers conference . . .

Your Apple 142
At long last Apple Computer seems to have rediscovered a corporate commitment to promoting and developing the Apple II line.

Cursory Glance 146
A new video security system that scans residents in a 2000-person, singles-only apartment complex near Hollywood (trust the Yanks to turn it into a marriage bureau!).

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MATT WHELAN

EDITORIAL

For better or worse . . .

A COMMENT by Steve Keen in YC's June issue has just caught my eye: 'As for myself,' he said, 'unless dBase IV is a world ahead of its ancestors, I ain't gonna study dBase no more!'. He was commenting on the clear superiority of ZIM over dBase III Plus, and I couldn't argue with a word he said.

However, that conclusion is a little dangerous. It may be fair for those who know enough about database managers to make their own choice, but for the newcomer it could be a case of telling them what's good without telling them what's good for them.

Let me explain. I have used dBase for (too) many years – since the early days of dBase II – and I can think of few times in its history when there hasn't been a better database package than dBase. Yet despite the superior competitors, I still recommended dBase as the database manager of choice.

Perhaps more important is the fact that, despite its superior competitors, dBase is the product that is still with us today – and still leading the market, probably more convincingly than ever. Meanwhile many of the 'superior' products are just barely remembered names.

I conduct dBase seminars, and in those I am heavily critical of several aspects of dBase's performance and capabilities. So much so, in fact, that I am often asked whether I recommend some other package instead. Never. dBase has too much going for it, if for no other reason than weight of support in the marketplace.

The same is true of any 'market leader', but in the case of dBase it's stronger than any other package I can think of. If you pick a 'better' package, life may be easier for a while. Until you find its limits, or its limitations. At that point, where do you turn for help?

There is an answer for every problem you might have with dBase: there are user groups, courses, books (enough to fill a library – perhaps it's time for a book telling you how to select a book on dBase?), support products, compilers, technical support conferences on electronic mail systems, and so on. And while it may be fair to say dBase is 'bad' enough to *need* such support, the fact is the support is there.

A complete industry has been built around the dBase standard, and it's not going to go away. Nor are these companies going to devote their efforts to other products when they have a guaranteed large market for their dBase add-ons.

Further, if you really need the help, dBase experts are thick on the ground. (Some of them are just thick, of course, but that's another story . . .). For the corporate buyers, this knowledge base and availability of expertise is vital.

The dBase language has become something of a standard, and competitive interpreters and compilers abound. The heavy competition has forced a dramatic raising of standards in recent times, and dBase IV has taken up the challenge in grand style. With more than two million dBase owners out there (I guess that makes four million-plus users counting the pirates), it's hard to see another package taking over its place in the market unless IV is a complete shambles, which I seriously doubt.

Remember *The Great Database Search*, YC's series looking for a successor to dBase II as king of the database managers? dBase III didn't win it, yet we're still using dBase for the magazine's work. And, I suspect, we will be for a long time to come.

No, we don't just stick with dBase – in fact most of our work is done with Clipper. But we are sticking with the dBase language (and all of Clipper's extras will be there in dBase IV). We have also produced systems in other packages, like DataFlex, so it's not just an unwillingness to learn something new which keeps us with dBase.

The reality is the database market is more clearly defined than perhaps any other – dBase is the standard, for better or for worse, and as a long-term runner it's the best bet. It's only people (like Steve) who know that, and understand why, who should feel comfortable about choosing a different package.

JAKE KENNEDY

YOUR COMPUTER

Intimations of mortality...

WELCOME to 'Your Computer', the column. I'll be using this space to tell you about ourselves, fill in the background to some of the stories, and offer some comments and advice, if I can. I originally planned to describe our own 'desktop' publishing system in this first column – it was developed on an 8/16-bit CompuPro running Concurrent C/PM interfaced to a 30-terminal Harris typesetter (mostly through the ingenuity of Matt Whelan) – but that's pointless now, since the system went up in smoke last Saturday night.

The photo shows the YC office on Monday morning: Robert's desk to the left (that Multitech on his desk survived – somewhat embarrassing was the fact that the machine was loaned to us by Wendy Giles of DSE while a hard disk was being put in Robert's: see Wendy, we *did* have a fire and *weren't* playing one of those interactive games that got out of control.) That pile of glump in the lower left corner of the photo is soggy ceiling insulation mixed with unfinished art, photos and drawings for this issue. (If the lead article in this issue *isn't* on monitors, it means we couldn't get them organized for new photos in time – whether it is or not: well done, Robert! It couldn't be very pleasant seeing two weeks' of your work wasted, and then trying to do it all again in three days.)

In the lower right corner of the photo is Allecia's desk. Under that distorted piece of ceiling laying on it, is a Harris-emulating IBM, whose keyboard and monitor were melted. But the hard disk survived and, in a new box, is the one this column was typeset from. That melted blob against the wall is a Kokasai terminal connected to the CompuPro.

Behind the photographer is the remains of my office. And the remains of our picture files and much of the preparatory work for upcoming issues. And the soggy, burnt remains of seven year's worth of *Your Computer*. My Cleveland AT didn't survive, but the guys at 3M were able to recover everything off the hard disk. We're still waiting to hear the fate of the Tandon Datapac machine Barson's had loaned us for review.

Next to my office was the computer room, which contained a collection of CompuPro's (why are we still struggling with 8-, 16-, and 32-bit data busses when they'd perfected the S-100?!) and YC's Bulletin Board machine, a President AT with 60 megs of hard disk and a 40 meg Alloy tape back up. RIP. (Needless to say, the Bulletin Board is off-line for the time being, but we should have some good news in that department shortly.)

It's all just a reminder that nothing – ideas, computers, traditions, people – is mortal. And that's all we should expect from them. Enough of Wordsworth..

P.T. Barnum

Barnum (P.T., of circus fame) had a more practical approach to life with his 'one's born every minute' philosophy: an example of which was thrust at me when I logged onto MCI mail to pick up Howard's 'American Graffiti' this month. We've reproduced the message exactly as found, except for effacing the user's identity number to protect any itinerant 'suckers'.

For a variety of reasons, messages like this raise a spectre. And that spectre is becoming increasingly real as this type of message appears more regularly on Bulletin Boards and networks, in software packing and even as part of the software. Aside from wasting expensive connect time and the general irritation factor, there are moral issues involved. So let's have a competition to find the most offensive example of blatant, irritating, out-of-place commercialism in the Australian computer world. And, to ensure that entrants are of the highest standard and not motivated by commercial acquisitiveness: first prize is a box of melted 8-inch floppies (with CP/M software) autographed by the staff of YC; second prize is two boxes.

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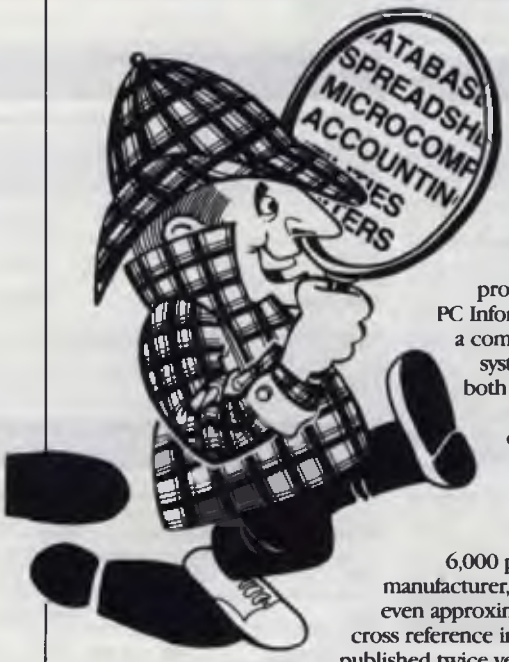

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Educational hardware I have known and loved

As people all over the world have discovered, few things can match computers and their associated hardware and software as educational tools. This month's theme reminded me of some of the lessons I've learned from things electronic.

My initial discovery of how educational and fascinating electronic hardware could be came via my friend Jack's phone. As a curious youth, I had exhausted the obvious possibilities of phones early on – what happens if you disconnect the phone? What happens if two phones dial each other at the same time? What does a voltmeter say about the voltage on the phone line? And so on.

Thanks to indulgent parents, Jack had his own phone, with 'unlimited' service (there is no local call fee within areas of New York City). We were zany youth – not for us the mundane adolescent prank of ordering pizza for someone else. No sir. We did grown-up things. Practicing sales calls, for example: 'Hello, I'm calling from the Pet Protection Company of New York City. Do you have a pet bird? Yes? Well, we're having a special sale this week on birdcage fire escapes. Would your pet be able to escape if there were a fire in the house? If you really love your pet, you'll want to buy the birdcage fire escape to protect – what did you say your bird's name is? Oh, Tweety – to protect little Tweety ...' The self-locking garbage can was also a perennial favourite: 'This week only, we're selling a self-locking garbage can ... that's right, it can be locked from inside, to protect your garbage from burglars or animals prowling in search of food ...' There were also a few delightfully macabre ones involving mortuaries, cemeteries, and so on. Readers with adolescents in the house will recognise that I do not exaggerate in recounting these. After all, how many adults retain the capacity to create this kind of inspired nonsense?

Now, you're all thinking, 'What's educational about that?' The answer is, the reactions of people. We worked very hard at sounding serious while we sold these wonderful devices. Additionally, my friends and I were all junior scientists, the US then was very much taken with the creative goofiness of the Candid Camera television show, and we justified our activities by explaining it as 'conducting

HOWARD A. KARTEN

AMERICAN GRAFFITI

sociological research.' (Anyway, that's the line Jack's parents were willing to swallow.) The thing about our activities that was hysterical as well as educational was how some prospects saw through us, while others took it all seriously.

Another piece of educational hardware we used was an electromechanical calculator our school had. Our school was the beneficiary of a wave of concern about the state of education in mathematics and science that swept the US in 1957, shortly after the Soviets launched Sputnik. My high school received a Friden electromechanical calculator, thanks to a rare bit of sensibility by the US Congress called the National Defence Education Act.

The Friden was a fairly sophisticated (for its time) desktop calculator. It contained at least 100,000 tiny gears and springs (or so it seemed), all of which made noise while they moved. With a little elementary knowledge of mathematics – for example, repeating fractions like $^1/_{11} = 0.090909\ldots$ – you could cause the calculator to play a simple tune, as the gears and wheels spun around. Another friend was fascinated by telemetry. In retrospect, I'm not entirely sure if it was the word or the concept. In any case, perhaps as a result of watching too many science fiction movies, Roger was intrigued by the idea of using a computer to process data generated remotely. Secretly, the thing that fascinated him the most was explosives. Thus, the idea of building a rocket that would generate some remote 'data' to 'process' was a natural (Of course, simply attaching a transmitter to Rover's collar seemed far too easy.)

We didn't learn much about processing data transmitted from a remote site, because Roger's calculation skills were not always trustworthy (this was, obviously, in pre-pocket calculator days) and he'd miscalculated the amount of propellant the rocket needed, and it went a wee bit too far. Its 're-entry' three or four miles away caused some mild anxiety (and one or two quick religious conversions) to the patrons and management of a dirty book store, but we did learn a very important lesson: the general public was not ready for the idea of computer-processed remote data. (At least, I think that's the lesson we learned.)

These days, of course, educational computing is somewhat better organized, more focused, and in many ways (alas!) safer. Probably the three major risks are cramps in the gluteus maximus as a result of sitting in front of a VDT too long, overdosing on junk food in the process, and/or running up an enormous telephone bill, from dialing too many remote computer services and bulletin boards.

(Educational computing by children and adolescents may pose a largely unexplored risk for parents: if the kids learn their logic too well, they'll see through the poor logic of the arguments adults use so often – with kids, as well as with each other.)

Perhaps if we got a bit less serious about computers . . . we could help today's kids in that most serious of all pursuits – getting ducated.

Today, computers are an important part of education, though sadly (perhaps understandably?), they're fulfilling only a tiny fraction of their potential. Often, working on their own, kids do an enthusiastic job of educating themselves on computer-related matters. In this, they show an impressive maturity. For example, one enterprising young chap in my neighborhood was able to learn the Personal Identification Number I use to access my long-distance phone service, via some creative hacking and a 'demon dialer' program he'd written himself. Although his work caused me some minor inconvenience, my annoyance was tempered somewhat at seeing some of myself in the lad. (Lest he get off totally without penalty, I later bribed two neighborhood kids to jam a potato up the tail pipe of his car.)

Another example of computer creativity and inspiration occurred last year, a few towns away. A high school kid, a budding hacker who was so entranced with his high school computing course that he failed to shower often enough to please some of his teachers, was reprimanded by the principal. Enraged, the student used the knowledge he'd gained to perpetrate some minor computer prank on the principal. When that worthy failed to see the humour in the escapade, the student escalated, strategically placing into a few databases and bulletin board systems some information about the law's interest in the principal's excessive fondness for sheep. At last report, the principal claimed that *l'affaire* computer was quite educational for *him*: 'Some of these computer kids are just too strange to tangle with. From now on, I'll not interfere with their creativity,' he said.

Overall, though, computers in educational establishments are not the panacea the computer vendors had claimed they'd be. Vendors don't necessarily bear the responsibility for this. So many educators carry around adult phobias, and so often seem uncomfortable around computers The result is that they manage to communicate fear, or indifference, and the hardware on hand goes grossly underutilised.

So it is, too, with the 'touch screen' computers which are starting to proliferate in another area within education, museums. There are several sad elements here. The displays are often unimaginative, and *never* speak to the kids in their own idiom – including humour All too often, the hardware is suitable for office environments, but not rugged enough to stand up to use by dirty six- and seven-year-old fingers. (Note to any museum directors who are tuned in today: consider purchasing some of the hardware the Defence Department approves for use in the battlefield.) And when you watch the kids use it, they rarely try to respond in an unexpected way – say, with a letter instead of a number, or with a fraction instead of an integer, and so on

I've pondered this situation often, and I suspect I know the problem. As kids, we regarded the things around us as toys first, and in the process of playing with them, we learned lots. Lots! For many leading lights in computing – for example, Messieurs Gates, Jobs, Wozniak and so on – their toys, as kids and adolescents, were computers. When we become adults, we stop seeing computers as toys and see them as tools, as representative of work Perhaps if we got a bit less serious about computers, and encouraged more play, we could help today's kids in that most serious of all pursuits – getting educated. □

WILLIAM OLSON

CANBERRA COMMENT

Tax attacks software

The Australian Tax Office recently released a ruling which taxes most software. Until now a 20 per cent sales tax applied to off-the-shelf software. However, packages which were modified, developed in-house or supplied by consultants were not taxable.

The Australian Information Industry Association (AIIA) has asked the Tax Office to suspend the new tax pending talks with the Commissioner of Taxation, Trevor Boucher.

The Executive Director of the AIIA, Bob Mounic, believes the new ruling discriminates against the information industry. Mounic says that the tax ruling is contrary to the intention of the original sales tax. He believes the government is attempting to extend the tax because it overestimated how much money the original software sales tax would raise. The Tax Office thought it would rake in about $100 million from software sales tax. However, reports now suggest it could receive less than $20 million.

The present confusion over sales tax on software began with the 1986 budget. The government tried to transfer the tax from floppy disks or tapes and put it on the contents of the disk or tape.

In recent company audits, tax inspectors have been nosing out trivial modifications to software as well as querying the role of consultants in software development. The Tax Office seems intent on taxing computer installation maintenance, upgrading and staff training in software programs.

The AIIA hopes meetings with Senator Button, the Minister for Industry, Technology and Commerce will resolve the problem.

Copyright headaches continue

A recent report for the Prime Minister's Department from the Australian Science and Technology Council raises questions about Australia's present copyright laws. The report says with new expert systems there might be problems identifying the creator or author. The amended Australian Copyright Act of 1984 covers computer software as a literary work.

However, courts may now need to decide how much of a program must change before it is legally a new program. Also, if more than one person contributes to a software program, who is the legal owner? This applies particularly with a knowledge based system where one person may design the software shell while another fills it with expert knowledge.

Employees of software companies might also be in a tricky situation. The copyright law says that the employer owns copyright not the employee. However, other literary works apart from software, have traditionally contradicted this idea. For example, a professor who writes a book usually owns copyright, not the university where he or she works. Again, famous artists or composers, even when commissioned to produce a special piece, still keep the copyright. Software could be tested in court on a similar legal basis. Software programmers could win the legal right to keep copyright of a program even when they were paid by another person or company for developing it.

Apple push in Canberra

Apple is making a determined bid for extra government business in Canberra, according to Jim Willis, director of Approved Systems (a Canberra Apple supplier). Willis explained that Approved Systems has been selling Apple Macs to the Federal Government for two years and its Apple business has expanded dramatically. Overall, Willis said that Apple wants around a third of the corporate market.

Approved Systems approachs its government contracts with a complete service. It specialises in LANs for the Mac and Mac II with its installation crew wiring up the Macs as part of the deal. Approved Systems general manager, Martin Robertson, said that the company will have nothing to do with suppliers who dump a heap of terminals at an office then disappear. All those untidy network cables seen hanging off light fittings around offices are not Approved Systems' style of business. One advantage of wiring up a Mac network is using ordinary telephone cable.

Robertson believes Macs are selling well to the government because Apple has never deviated from its original Mac style software which still runs on the latest Macs. Apple is trading over the current confusion with MS-DOS and OS/2.

As well, Apple has never experienced the clone problems IBM has because only half the Mac system is on the disk. The rest is in the Mac itself.

Robertson said that Mac Appletalk eliminates problems encountered when several PCs are linked to one printer. Appletalk queues up the print orders, allowing each operator to see where they are in the queue. No manual switching is necessary.

Macs are big now in the Federal Bureau of Mineral Resources, the Department of Trade and the Taxation Office, which uses Macs for designing forms. Other Mac users in Canberra include the Australian Defence Force Academy, the Defence Department and the Australian Archives. The Government Printer uses a Mac system to drive the presses so other government departments find it easy sending their Mac disks with PageMaker straight to the Government Printers.

Willis says Apple still make occasional marketing errors. For instance, Approved Systems has a stack of copies of Flight Simulator which Apple wanted to give away with each Mac. Robertson said that from a business point of view it reinforced a games machine image – the sort of problem Atari has. Approved Systems kept the Flight Simulator disks unless the customers specifically asked for them. However, Apple still has to fight off its education image when tendering for government contracts, Willis said.

A problem every computer business faces when selling in Canberra is that the hardware is on government contract, while the software is not. This delays orders because government buyers need three quotes before accepting a contract.

The Mac SE with colour is the most popular Apple sold in Canberra. More than 80 per cent of Canberra buyers want colour monitors.

Robertson says that often the hardest people to convince in some government departments are DP managers who think they know it all However Approved Systems usually finds the DPs know little about Macs and what they can do.

Willis believes the next step Apple will take is the talking Mac. This will feature a glass top desk with a screen for an electronic diary and electronic mail. The talking Mac will take dictation on a screen which will rise from the desk top on voice command. □

RECORDING YOUR EXPERTISE

There are thousands of people around Australia who can't see this page, and need to delve into technology's bag of tricks before the words are anywhere near intelligible. These people are blind or have severe visual impairment, which means that glasses no longer help (if they ever did).

Gregory is one of those people; he's also a a nineteen year old data processing student at a TAFE college in Newcastle. He can't simply pick up a text book for his next assignment or exam – his vision is so severely impaired that the book is little more than a blur . . . forget the words and diagrams.

But students like Gregory have an alternative. They can call on the Royal Blind Society's Student and Special Request Library to provide an audio version of the text on cassette. This is no mean feat when you consider the last text book he required was *Advanced Structured Cobol*, which runs to some 420 pages.

The Royal Blind Society and other similar organisations around Australia use the services of volunteer narrators who record all or part of these book in their own homes.

Ted Hulbert of Austral Data Networks in Sydney is one of the narrators. Ted's last assignment was to record *MS-DOS: Advanced Applications* by David Lien, for a computer hobbyist with visual impairment. He also narrated 140 pages of the *Cobol* book for Gregory.

Ted's background in computers is important when it comes to conveying the meaning of what he's reading. A knowledge of the industry is handy for pronunciation, knowing the importance of syntax in program listings and understanding terminology (*Do I say or spell 'MS-DOS'; how is 'AIX' pronounced?*).

Not every volunteer narrator can be accepted – a fast clear reading voice is a must. Most narrators start using their own cassette decks which must have a good quality microphone – 4-track reel-to-reel tape recorders provided by the RBS are also used for special projects.

Once the text has been recorded and checked, it's copied onto a cassette for use on a specially developed player called a Talking Book Machine. This allows up to six hours of narration on a C-90 cassette.

Tim Noonan, Technical Support Officer with the RBS, using a Talking Book Machine with the audio version of the user manual.

There are currently over 50 computer books already held in the RBS Talking Book Library, ranging from user manuals to heavyweight texts – magazine articles are also popular as a source of current information. Other recordings might be for one-off use by a student or visually impaired computer operator.

If you have a cassette player (with a good microphone), and would like to volunteer as a narrator, please contact the Royal Blind Society on (02) 747 6622, or the corresponding organisation in other states. Narrators are required for a number of fields, besides computers and high technology.

The RBS is also undertaking a computer training program for blind and visually impaired people, thanks to IBM, which has handed over six PCs. As well, the whole computer industry is being encouraged to pitch in with more applications that open up computing to the visually impaired.

Some of the recent developments will go on display at the Technology in Focus exhibition at the Enfield, NSW, headquarters of the RBS on August 24 and 27, 1988. This will include the latest software, optical scanners, voice synthesisers and a newly developed braille computer. □

Pauline Cuffe, volunteer narrator, recording for the Student and Special Request Library.

FEATURE

A WYSE DECISION?

The Wyse PC 386 and Wyse PC 286

Jaded John Hepworth put two extra-ordinary machines (and monitors) through their paces . . .

AFTER TESTING PC after PC, AT after AT, one gets rather jaded. When machines arrive that are out of the ordinary, though, I sit up and take notice. Recently two such machines arrived. They were the Wyse PC 386 Model 3216, and the Wyse PC 286 Model 2108. With them came two outstanding monitors – the WY700 very high resolution monochrome monitor and a Wyse EGA monitor.

A look inside

Looking inside either machine one is greeted by a layout rather different to most PCs. As always, the power supply is at the right rear and the disk drives are towards the right front. In most PCs there is a mother board running from the rear of the machine to the front, and from the left to the power supply. In both the 386 and the 286, the motherboard runs from the left side to the power supply, but only from the rear halfway to the front. Even then it has few of the usual electronic components, and mainly holds slots for expansion cards. The components normally found on the motherboard are found on plug-in CPU and memory boards, including the usual central processor chips, a 80386 in the 386 and a 80286 in the 286. As the motherboards have few intelligent chips on them, they are called passive motherboards, and primarily provide the connections for various boards plugged into its expansion slots.

The 386

The 386 system unit came in grey sheet steel case. At 540 *x* 430 *x* 150 mm it is much the same size as most desktop ATs. It would normally sit on a desk with a monitor on top (the case is quite strong enough for quite heavy monitors) or can be stood next to a desk on its end, tower style, without much risk of it toppling. A floppy disk drive is at the top right and a blanking plate for another drive is beneath it. Hidden behind the front of the case is slot for a third drive, which could be used for a hard disk but which was empty on the test machine.

To the left of these three drive bays is space for two more half height drives. In the lower of these was the 40 megabyte hard disk drive. The test machine had a 1.2 Mbyte 5¼ inch floppy and a 40 Mbyte Seagate ST251 half height hard disk. The 1.2 Mbyte floppy did write files to a 360 kilobyte disk which could be read on a PC, but running Norton's DiskTest program on the floppy when in the PC indicated that the data was somewhat suspect – which is quite normal when the narrow track written by a high capacity drive is read on a normal drive.

At the left side of the front panel is a LCD with backlighting. The LCD normally shows the time and the clock speed. Beneath it are three buttons. Pressing the left button toggles the display so that it shows the date and clock speed. The middle button toggles a bar chart indicating CPU activity, and the right button toggles the clock speed from 16 to 8 MHz and back. The LCD also serves another function. While the floppy drives have a LED to indicate that a disk access is occurring, none is visible on the hard disks. The LCD uses the character in the rightmost position to indicate that a drive is being accessed. To the left of the LCD is a keylock which secures the cover and disables the keyboard.

While there is nothing visible on the left or right sides, there is much of interest on the rear panel. From left to right are the power supply and the covers over the apertures for expansion slots. The power supply has a three-pin inlet socket, a power switch on the rear panel and a power outlet for peripherals like monitors, again fed via the power switch. The fan opening is also on the rear panel, and sucks air from inside the case and exhausts it to the rear. While this air flow path is found on most PCs and ATs, and avoids subjecting the sensitive electronics to the waste heat from the power supply, it does mean that airflow in the machine is uncontrolled and unfiltered. Also on the rear panel are the openings for nine expansion slots.

Opening up the case by removing five screws at the rear, four along the side and then sliding the top forward, reveals a strong and rigid folded sheet metal chassis with all components well aligned, well fitted and secured. The passive motherboard has ten expansion slots. Six of these are 16-bit slots and another three are 8-bit slots. These nine hold boards in the normal vertical plane, running from front to rear of the machine. The tenth slot runs from left to right across the front edge of the motherboard and holds a disk drive controller board horizontally in front of the motherboard and in the same plane, beneath the other expansion boards.

One of the expansion boards is the CPU board, located in the leftmost slot. It carries the 80386 processor, and has sockets for either a 80287 or 80387 maths co-

processor. It is, in fact, two boards. One has a 16-bit edge connector plugged into the slot, and the other is a daughter board mounted on the CPU board.

Next to the CPU pair of boards is the primary memory board. On the test machine this had 1 Mbyte of memory, and room for a second megabyte. As the passive motherboard only has 16-bit edge connectors, a bridging board is used from the top of the CPU board to the top of the memory board to give a 32-bit data path from the CPU board to the memory board. Additional memory boards can be fitted to take total memory to 6 Mbyte.

In the rightmost slot is a card with two serial and one parallel ports. On its rear panel are connectors for one 25-pin parallel and one 9-pin serial port. The 9-pin connector for the second serial port is mounted on the back panel of the CPU board and wired back to this same card.

The power supply has a three-pin inlet socket, a power switch on the rear panel and a power outlet for peripherals like monitors, again fed via the power switch.

The 286

The 286 system unit is similar in principle to the 386, but differing in detail. At 380 *x* 430 *x* 160 mm, it has a noticeably smaller footprint than the typical AT or the Wyse 386. The backlit LCD display is at a 45 degree angle instead of across, and two more push buttons flank the date/-time and CPU usage buttons. These are a reset switch, and a push button for power on/off. Bays are provided for three half height drives, one above the other, at the right hand side of the machine. The drives on the test machine were a half height 1.2 Mbyte 5¼ inch floppy and a Seagate ST225 21 Mbyte hard disk. At the rear are the covers for the expansion slots, the power inlet and outlet and the fan on the power supply.

Figure 1. *The Wyse 386 has a 40 Mbyte hard disk and 1.2 Mbyte 5¼ inch floppy drive. The LCD on the front panel shows the time and the clock speed, which is switchable from 16 MHz to 8 MHz and back.*

Figure 2. *The Wyse 286 has a noticeably smaller footprint than the typical AT or the Wyse 386. The backlit LCD display is at a 45 degree angle and two more push buttons flank the date/time and CPU usage buttons – these are a reset switch, and a push button for power on/off.*

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Removing four screws along the sides and three across the back allows the cover to be slid forward. The chassis is sturdily fabricated from sheet steel and nicely finished Again a passive motherboard is used, though with six 16-bit slots and two 8-bit slots The CPU board, and a daughter board piggybacked off it, are in the left hand slot. The disk controller is in the right slot, nearest the power supply. The controller allows for connection of two hard disks and two floppy disk drives. Next to the disk controller is an 8-bit board for the serial and parallel ports and next to it is the video board, a fairly standard EGA unit.

The daughter board has 512 Kbyte of memory, and sockets for an additional 512 Kbyte, using 256 Kbyte chips.

The daughter board has 512 Kbyte of memory, and sockets for an additional 512 Kbyte, using 256 Kbyte chips. Jumpers in the middle of the CPU board are adequately accessible (provided not too many other boards are installed) to set the memory addresses of the chips on the CPU board, and allow the fitting of most memory expansion boards. A readily accessible socket for an 80287 maths co-processor chip is central on the CPU board. The 80286 is run at 8 MHz, and performs almost exactly as does a standard AT. Unfortunately, the ST225 hard disk fitted was rather less speedy than that on most ATs, and had a performance more commonly found on XTs.

Keyboard

Both machines use the same keyboards, which are in three tones of grey. The layout is generally in the IBM enhanced style, but with subtle variations like placing the Escape key at the top left. Above the numeric keypad are labelled indicator lights for Num Lock, Caps Lock and Scroll Lock.

The home keys have moulded-in bumps, allowing easy adaptation by touch typists. The keyboards has a light touch, but with a positive over-center action and no suggestion of being hair-trigger. There is only a slight click when a key bottoms or hits the case when returned to the up position. The keyboard used a coiled cord with a miniature plug reminiscent of the US style telephone plugs.

Regular readers will have discerned that I am not in love with the IBM 'enhanced' layout, but I am coming to accept it even though I prefer the old PC keyboard. My reaction to the Wyse keyboard is the same.

Figure 3. *The Wy700 monitor has a 280 x* 200 mm screen It can be used as a high resolution (up to 1280 *x* 800 pixels) white monitor, as a CGA or as an IBM monochrome monitor.

Video

The 386 was fitted with a WY700 monochrome and matching video board, while the 286 had an EGA monitor and video board, though they could easily be swapped from one machine to another. The WY700 video board is again two boards, with a main board and a daughter board piggybacked to it, while the unidentified board in the 286 was a conventional single board.

The WY700 monitor has a large screen, 280 *x* 220 mm, but is otherwise as small as is practicable for a monitor of its screen size. Like most current Wyse monitors, it tapers dramatically behind the screen surround, with a very compact extension housing the electron gun. The main body of the monitor is connected to a slim base via a built in swivel and tilt mechanism. The video and power inlet are on the base and not the main monitor body, as is the power switch. This does allow the cables to be neatly installed without tangles and tugs when the monitor is moved, but it does make the power switch hard to reach and as a result I turned the power on and off at the system unit switch and left the monitor switch permanently on.

The WY700 screen is paper white, and has three modes of operation. As far as software was concerned it can appear as a very high resolution white monitor, as CGA (showing colours as shades of grey) or as an IBM monochrome monitor, again displaying in grey. Resolution is absolutely fantastic, up to 1280 *x* 800 pixels.

Selection of CGA is done using the normal MODE command from DOS. MODE CO80 selects 80 columns in CGA emulation and MODE CO40 selects 40 columns. MODE MONO selects the IBM monochrome emulation. The emulations appear perfect, and all software that I tried on them ran without problems.

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The high resolution modes are selected using utility programs, or by the drivers provided on disk for a range of programs to enable them to use high resolution. DOS commands like DIR, and programs that put characters on screen, can show up to 50 rows by 160 columns when the utility programs are used to set the video board.

Looking inside either machine one is greeted by a layout rather different to most PCs.

Drivers for high resolution modes with several popular packages are on a utility disk supplied with the video board, and these include drivers for Lotus version 2, Autocad, GEM, Windows and others. Lotus in 50 rows and 160 columns was small, but sharp and quite readable, while Ventura could be read easily when displaying extremely small type on screen.

All high resolution boards require the hardware manufacturer to provide the drivers for various software packages so that the high resolution mode can be used, but here if a driver is not available the MONO of CGA modes can be used, and is quite acceptable. This is a great advantage and one that overcomes the problems of getting special drivers for every software package that comes your way.

The WY640-1 EGA monitor and board has the same general appearance as the WY700, but with a fatter electron gun extension. The screen size is 280 *x* 220 mm high, and a brightness control is hidden in the lower right corner of the screen surround. Again a swivel base is fitted, but in this case the incoming video and power cables are terminated directly into the monitor body and not into the swivel base. Colour is excellent, and sharpness good, and all the standard EGA demonstration and test software ran perfectly.

OS/2

OS/2 was not available for the machines when tested, but I am assured that it will be in the future. If OS/2 is essential to you, it would be prudent to wait and see it running your choice of programs on the machine before parting with your dollars.

BENCHMARK		PC	Wyse 286 EGA	Wyse 386 WY700	Model 80
BasicBench (sec)	1	1.32	0.33	0.11	0.16
	2	5.00	1.37	0.55	0.66
	3	12.19	2.97	1.16	1.50
	4	12.47	3.03	1.15	1.59
	5	12.62	3.29	1.32	1.71
	6	24.38	6.04	2.42	3.07
	7	39.71	9.72	3.90	5.11
	8	37.73	9.56	4.17	4.83
CORETEST					
Disk Size		49	21.4	43	73.4
Cyls		614	614	819	70
DataTrRate kB/s		227.40	165.5	163.00	797.00
AvSeek ms		34.20	68.9	29.60	34.70
Track-track ms		9.40	20.1	7.30	13.70
PerfIndex		2.96	1.78	2.83	6.33
NORTON	SI	1.00	7.7	18.00	17.60
	DI	2.30	1.9	2.50	3.20
	PI	1.40	5.7	12.80	12.80
BBBMARK (sec)		27.19	7.15	2.96	3.59
LOTUS (sec)	Load	70.29	NA	14.27	13.86
	Recalc	22.53	NA	2.45	2.67
	Save	61.78	NA	8.74	12.51
CBSIEVE2 (sec)		146.48	37.41	13.45	14.32
dBASE II					
St 1		917.50	287.45	122.45	127.60
St 2		490.50	240.45	165.90	145.20
St 3		561.90	276.25	182.05	171.50

Table 1. *Benchmarks – the first column in the table gives the results for a standard 4.77 MHz PC (albeit one with a very fast disk drive) and the last is for an IBM Model 80. The benchtests revealed that the 386 and the Model 80 are overall much the same in speed, with one shading the other a little on individual tests. The slow hard disk did hamper the 286, and as a result on tests that mixed CPU and disk tasks it was only twice as fast as that PC with a fast hard disk. Users could do well to specify a larger or faster disk drive if buying this unit. I could not run the Lotus benchmarks on the 286 as it had only 512 Kbyte of memory and the spreadsheet simply would not fit. Note: the PC used for comparison had a hard disk over twice as fast as an XT. When looking at the results of benchmarks that involve the disk, like Coretest, Lotus load and save, and the dBase benchmark, the improvement over an XT is actually better than shown.*

Documentation

The system units each came with two manuals. A 70 page installation and assembly manual for each completely describes the system, its options and the manner in which it is set up, operated and expanded. It is a model of clear text, good and relevant illustrations, and valuable data. A MS-DOS manual, this time of 110 pages, gives details primarily of the use of DOS with tree structured directories, and of setting up a hard disk.

The actual commands of the particular dialect of DOS are listed, but only with two to five lines on each and lacking valuable detail. The user is referred to a program called HELP which can give syntax and other details on individual DOS commands when run from the DOS prompt. While such programs are useful, I would have preferred far more detail in the manual. The WY700 monitor and board have a manual about as big as the DOS manual, and this is mainly aimed at programmers. Installation of the high resolution drivers supplied on disk is covered by README files on the disk.

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Compatibility

Compatibility of both machines with standard PC software was excellent. Amongst the programs run were Flight Simulator and Jet, which were both a little faster than on a PC; Laplink and Brooklyn Bridge, which ran at full speed and did not have to be slowed down as they do when run on a Model 80; Knowledge Network, Norton Utilities, Norton Guides, Norton Editor, Norton Commander, Norton Utilities, PC FIle, PC Tools Deluxe, Turbo Pascal 4, Telix, Quick Basic 4, Lotus 1 and 2, Xtpro, Mouse Systems Mouse, PKARC, PKXARC, Whereis, Dosedit, Microsoft Word 4, plus a great range of benchmark and other programs. Windows 2 ran well on both. Windows 386 ran well on the 386, though only having 1 Mbyte did limit the number of virtual machines that could be invoked.

Two areas did cause problems. Disk manipulation software like Norton Utilities could be run on both machines, could access the floppy disks on both but could only access the hard disk on the 286. On the 386 the hard disk was formatted as one 40 Mbyte partition. Quite expected, as few such programs can cope when tricks are played with DOS to get over the DOS 32 Mbyte limit. Word is that Norton and Mace have issued, or soon will, new versions of their programs to cope with large partitions. Games were another story. Flight Simulator and Jet could be started from the DOS prompt, and ran well at about at the correct speed. Several other games were either far too fast on either machine, or did not like the EGA board.

The decision . . .

The two machines that I looked at for this review are from a group of no less than six Wyse PCs, and even then the video and hard disks are from a range of possibilities. The range with passive motherboards include 80286 machines with various footprints and 8, 10 and 12.5 MHz clock speeds, and the 80386 machine with a 16 MHz clock. Both test machines look rugged and apparently reliable, and both appear well built. The 386 with that WY700 monitor is fast, effective and easy to use, while the 286 is compact, and with the addition of a faster hard disk, very attractive. In each case, most users will find very quickly that they need more than the standard memory. As sockets are provided this is not a major task or expense. Wyse suggests that the use of plug-in CPU cards will allow future upgrading, and in a time when new CPU chips and higher clock speed are announced almost daily, this could be good insurance for the future.

At a time when flimsy junk is becoming more and more common, buying a Wyse PC could be a wise decision. □

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Out of the cot . . .

and into the computer!

Small children can learn how to operate the computer from as young as two years old. But, as Dof Dickinson relates (while debunking a number of myths), their success depends on your approach.

ANY COMPUTER-OWNING parent knows what fascination the family PC holds for the toddler. Like the stereo, this machine offers an Aladdin's Cave of buttons to push and even a spacebar to wrench off (as happened to a friend of mine). But there is a world of difference between bashing the keyboard to see just how angry mummy can get, and a small child learning and understanding what it's doing with a computer.

You can, with a little spare time and enthusiasm, teach your toddler or young child by using your computer. For the past eighteen months I have coached seven children aged between two and four on a computer. All of them have made tremendous progress in reading and typing; in fact, all of them surpassed our expectations.

The first thing we had to ascertain was just how young any child could start. One was ready at eighteen months, another unable to concentrate until age four. This simple rule applied to them all – as soon as the child understands that pressing the keyboard affects what happens on the screen, it is ready to learn. This may seem a basic enough concept to an adult, but to a child it is not.

David, for example, at age four was enthused by the computer. He leapt into the chair and started pressing wildly on the spacebar. He stared hopefully at the screen waiting for something to happen and continued his frantic pressing. His mother and I tried patiently to explain that the computer couldn't understand what he wanted.

Then, his mother remembered: 'He does it at the supermarket with the games machines,' she said. And immediately we understood his reasoning: his notion was that the computer knew what he wanted to do (in case of the games machine, fire at the enemies) and all he had to do was to keep bashing away at those buttons. It took David two sessions to unlearn this novel approach!

Sally started on the computer at age three and a quarter. She was more than competent and it's probable that she would have been ready a year earlier had we caught her. Many of the early learning programs we used involved her typing her name at the start and this she enjoyed tremendously. An interesting thing happened the week after she started learning. Sally started to take a real interest in words. The fridge at home had magnetic letters on it. She took them down and started arranging them in patterns. Within two weeks she could make the names of everyone in her family. She then got hold of the family's mechanical typewriter and started typing out combinations of letters on it, preferably ridiculous ones!

'What does this say?' she'd ask and present a string of jumbled letters and laugh in delight as her older brother would try to pronounce 'dfncjsieopa' or a similar word. She wanted to write words using the computer more than play with the graphics program we had for her – words were more exciting. Sally was the first child who learned to type before she could write. This worried us a little at the time as it seemed unnatural. But we're used to it now. All the children learn to type very quickly – it is, after all, a skill their generation needs.

Who needs a pencil?

But there's more to it than that. Many people assume that because young children can't write using a pencil, reading and writing are beyond them. Not so! Their mental ability develops faster than the fine motor skills and co-ordination needed to form letters with a pencil. They can easily press buttons to type words, they can easily press a delete key to make corrections when they could not co-ordinate the movements with a rubber to do the same.

Using a keyboard to write is fine just as long as parents also hand out plenty of coloured pencils for their children to play with, too. This way they are used to operating with traditional writing equipment and ready to start writing with a pencil once they have developed the skill to do so. Contrary to what you might think, we've also found that once they have used the computer to recognise letters, children are able to create them with a pen far more easily.

One unsolved concern is that young children use the hunt and peck method to type – we cannot at the moment envisage boring them by trying to teach them to type. However, once they are confirmed 'hunt and peckers' will they easily convert to typing using all their fingers? We know that few businessmen ever do, and that the mouse is making the keyboard less of a hurdle to computing, but this is still a point to bear in mind.

Apple IIGS

Girls are better!

Another aspect to teaching young children is timing. Any longer than ten minutes on the computer is too long, it's also clear that they learn better if they use the computer in the morning and not late afternoons when they are tired and find it hard to concentrate.

Concentration is important too. Some children are perfectly able to understand what the computer is and what they are asked to do, but they cannot apply themselves to do it for more than a few seconds. Among the group I have taught, the girls seem to be able to concentrate better than boys and start at an earlier age

Imogen is a two-and-a-half year old who applies herself enthusiastically to learning on the computer and is only frustrated when we drag her away from it. She considers ten minutes not nearly long enough! Lani, her three-and-a-half year old friend glazes over after two minutes and looks eagerly out of the window at the swings in the yard. The minute any child loses interest, even for a second, we send them off to explore what has interested them. We never force them to stay. They all learn happily and at their own pace.

The boys I have taught seem to develop concentration a year after the girls – a three-year-old girl can learn at the same rate as a four-year-old boy.

Why did Imogen (two and a half) develop powers of concentration so early? A possible solution could be that her mother confessed to having found her a handful at 'happy hour' as a tiny baby – 'Between the hours of four and five, she was a nightmare. She grizzled and cried at the slightest thing. So I said to myself. Right, I'll attack this a positive way. I sat down with her for that hour ever night and played with her. Mostly stacking cups, duplo, blocks – you know the sort of thing. I'd hide a block in a cup and she'd find it, I'd sort the blocks into piles of each colour and say to her, this is blue, this is red and so on. I felt really as though I was wasting my time since she couldn't even talk at the time. But you know, she sorted her colours out at 18 months, as soon as she could talk. Maybe there's more going on inside those baby heads than we think! Whatever, it sure got us through happy hour without grizzles.'

Don't push – praise!

One of the most important aspects to teaching a child using the computer is your approach. Don't push – praise! The most success we've had is when we tell children every single answer on their first session and show them where to press the buttons. When they do press the button, we cheer. Very quickly the small hand is batting yours away, 'No, I can do it' And they can, remarkably quickly too. Keep going and Praise! Praise! Praise! Also, never assume anything is beyond their grasp, we've made that mistake!

We start with simple letter and number recognition programs and then move on to creative programs as soon as we possibly can. The software for young children is usually oriented towards drill and practice, so you need to be there all the time livening it up. Don't imagine that the

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computer will become some kind of electronic childminder while you nip off to do the ironing.

When purchasing software for your children, look for programs that are open-ended and allow as much input as possible from the children. Many simply ask for a yes/no response, but some allow children to build up patterns and pictures of their own and to be quite creative in what they do. Also look for programs which demand that children use a minimum of keys to operate them. Programs that use a mouse seem the ideal solution, but there's a problem. Children in the age range I've taught can't co-ordinate moving, dragging and clicking a mouse because their hands are too small to fit over it. They're happier pressing keys.

In all honesty, most of the software is not designed for children under age 5. If only developers would produce programs that allowed parents to have more say on which words are spelled instead of generally providing a standard spelling list that can't be altered. We've seen ones with American spelling which is no good – the words on offer were also inappropriate: igloo, quail and so on – great stuff, but words like mummy, dog, cat and daddy suited our needs better.

Rewards are often poor, too. Some programs bring up 'Well done, you got all the answers right' – these children can't read yet! The best ones bring up a smiling face and provide a little tune as a reward.

There are also programs which refuse to reward unless all the answers are correct; this is also inappropriate to the age group. Littlies need constant encouragement and praise to maintain their confidence to use the computer. It should not be perceived as something that 'tells them off' if they get answers wrong.

Another problem is programs with an element of tension in them. One program made children move a duck around a maze, but a hunter appeared and took pot shots at the duck. It scared them and they didn't want to play it any more.

We can only assume that software developers don't trial their programs with real children or even offer them to parents and teachers to appraise. The kind of programs you use are your decision and depend on your type of computer. Early Games, and Easy as ABC are a couple of ones we've found useful now we're using an Apple Mac – but there are a few sections that require the use of a mouse. However, these programs are available for most machines and look excellent in full colour on the Commodore. MacDraw can also be used once children can control the mouse – tricky!

You have to be there helping with the options though and generally steering them to keep their mouse in the drawing area. There's a heap of good stuff in the kindergarten age group (mostly written by teachers) for the Microbee, especially Storymaker which the littlies love Other programs we've used are: Cherry Maths, Toady, What's the time, Mr Wolf? Let's Eat Worms, Counting House, Old MacDonald's Farm, Shapes and many more. All machines have their kindergarten software. But to be honest it's less the quality of the software, than your qualities of enthusiasm, patience and *praise* that count.

The software for young children is usually oriented towards drill and practice, so you need to be there all the time livening it up.

The September issue of *Your Computer* will feature a catalog of educational software for all age groups, drawn from a number of suppliers – programs to suit most brands of computer will be covered.

Never say to a child, 'Now which key is it? No, that's wrong, try again, no it's the curly one next to the 7, come on, you can do it, up there on the right, no, I said the right...' Young children don't necessarily perceive 7 as being 'like 1, but without the line'. And if they don't get it right first time, show them the answer and praise them for pressing the right key. Don't agonise over it, they are terribly unsure of themselves and will lose confidence very, very quickly. They'll also think of computing as a subject which has right and wrong, rather than an enjoyable fun time with an adult during which they get to look very grown up and press all sorts of buttons.

Don't worry about them learning, worry about them enjoying themselves. They'll learn faster than you can imagine. Imogen learned the entire alphabet and the numbers 1 to 9 in two weeks flat. Sally was remarkably quick too. Ben, a three-year-old is well on his way to doing the same.

A few interesting observations have been made about their learning numbers or letters. Numbers 1, 4 and 7 are most often the first ones that the children remember. Not surprisingly 5 and 8 are confused in the early stages, as are 9 and 6. But they soon sort it all out. The letters, all 26 of them, seem easier to learn. Perhaps this is because we give each one a meaning by saying 'D for Daddy' and that little memory tag helps.

What have we achieved?

What have we achieved with our children? We have taught them to read and type, recognise shapes and numbers and how to use a computer to create their own art and 'stories'. Some people have watched the children at work and said: 'Well, they're going to be really bored when they get to school, aren't they?' This attitude implies that we should hold our children back, even though they are desperate and more than able to learn just so that they fit in with a prescribed school curriculum When one of our children asks us how to spell mummy, should we say, 'I'm sorry you'll have to wait two years to learn that at school!' These are not 'superkids', they are average children who have been given an opportunity to learn Learning comes easily to the very young, they persistently beg us for information about the world. They nag us to use the computer and they hate it when their turn is up.

Why miss these important years? When will they ever display such enthusiasm to learn again?

What role has the computer played in these children's learning? It's likely that they could have learned the same information using traditional methods, but we would have had to be far more dedicated teachers to create the excitement of the computer and to make the responses as easy for the children. In particular we could not have taught them to spell and type words because they would have needed to hold a pencil to do that.

The computer not only stimulates a child to learn, it also stimulates the parent to teach. And that's important to tired mums and dads who have already had a hard day at work. Computers open our eyes to our children's abilities and provide them with an opportunity to learn that their parents never had – don't let yours miss out! □

The Galois Algebra Package

AMSEC consultant David Hunt reports on a new piece of Australian software designed for use in teaching and research in algebra at the tertiary level.

THERE ARE many applicable parts of mathematics that are not as well known as techniques, such as systematic integration, taught in calculus courses. These include topics in linear algebra, numerical analysis and statistics. In recent times it has been acknowledged that there are many other useful mathematical skills to be gained – for example, knowledge of various parts of discrete mathematics. It has also become apparent that much algebra and number theory that has lain untouched for decades, except by the pure mathematician, is again very relevant – particularly to applied mathematicians and computer scientists.

There are now available a variety of computer packages which can be used as an aid to teaching mathematics and as a research tool for the practitioner. The micro computer package Galois is one of these and has been developed by a team in the mathematics department at the University of Tasmania. The sort of algebra on which Galois can be used has recently made a transition from Pure to Applied Mathematics because of its importance in cryptography and the theory of error correcting codes. Galois is specifically designed to support teaching and research in those parts of algebra and number theory which emphasize calculations in 'modular arithmetic' and 'finite fields'.

The finite field is an interesting concept which should be better known. For example, 'arithmetic modulo 5' is carried out on the numbers 0, 1, 2, 3 and 4 with addition and multiplication worked out by adding or multiplying as usual, then dividing by 5 and writing down the remainder. For example, $2 + 4 = 1$ (modulo 5), and $2 \times 4 = 3$ (modulo 5). That is: the remainder when we divide 6 ($= 2 + 4$) by 5, is 1; and the remainder when we divide 8 ($= 2 \times 4$) by 5, is 3. This gives the addition and multiplication tables –

+	0	1	2	3	4
0	0	1	2	3	4
1	1	2	3	4	0
2	2	3	4	0	1
3	3	4	0	1	2
4	4	0	1	2	3

x	0	1	2	3	4
0	0	0	0	0	0
1	0	1	2	3	4
2	0	2	4	1	3
3	0	3	1	4	2
4	0	4	3	2	1

Since the whole numbers are referred to as the 'integers' this object is referred to as the 'integers modulo 5' It forms a 'field' since it is closed under addition, subtraction, multiplication *and* division(!) in the same way as ordinary (real or rational) numbers are.

AMSEC

This review was prepared for AMSEC by David Hunt of the Mathematics Department at the University of New South Wales. AMSEC is an Australian software evaluation group with consultants in the workplace, in schools and in tertiary institutions around Australia It can be contacted at PO Box 140 Hurstbridge 3099 Vic. or PO Box 1339, Armidale 2350 NSW.

Note that 5 is a prime number; that is, the only positive whole numbers which evenly divide it are 1 and 5 itself. (Similarly 3 and 7 are prime, while 6 is not, since it can be evenly divided by 2 and 3 as well as 1 and itself It turns out that the number of elements in a finite field must be a prime number like 3, 5 or 7 or a power of a prime like $27 = 3^3$, $25 = 5^2$ or $2401 = 7^4$.

To construct fields whose number of elements is a prime power is a little harder. For example, to construct a field with 25 elements, consider expressions of the form $a + bx$, where each of a and b is 0, 1, 2, 3 or 4 and $x^2 = 2$

In this field, $(4 + 2x) + (3 + 3x) = 2$ and $+ 2x)(3 + 3x) = 2 + 2x + x + x^2 = 4+3x$. (To see this, use the tables above and the fact that $x^2 = 2$.)

Uses of Galois

In recent years a variety of applications of finite fields and number theory have emerged in communications and electrical engineering. The two most well known are in public key cryptography and error correcting codes. In these days of instantaneous electronic funds transfer, security is becoming increasingly important. One public key cryptosystem depends upon the fact that it is not computationally feasible to factorize the product of two suitable large primes numbers, say each 50 digits long. Galois will tell whether a number is prime or not – indeed it provides a next prime utility. For example, Galois will tell you in 13 seconds that the next prime after $2^{61} + 1$ is 230,584,300,921,396,967 and that the next prime after 10^{50} is $10^{50} + 151$ in about 6 minutes. It will, of course, factorize smaller integers. For example, it will factorize a 15 digit number with 2 prime factors in about a minute, and a 17 digit number with 2 prime factors in about 11 minutes.

Much of the theory of error correcting codes revolves around polynomials with co-efficients taken from finite fields, in particular from the integers modulo 2 (a field with just 2 elements). Calculations are then performed modulo an irreducible polynomial; that is, a polynomial which cannot be written as a product of two simpler polynomials. (In the case of the field with 25 elements given above, the irreducible polynomial was $x^2 - 2$.)

Galois provides a utility for producing an irreducible polynomial of any degree. As with prime numbers it has a 'Next' Irreducible facility and found the next irreducible polynomial after $x^{55} + x$ (with co-efficients from the two-element field) in ust four seconds.

A few years ago I worked on a problem which involved performing certain calculations in all fields with 3^N elements for N up to 120 I tried to repeat the work using Galois and certainly I was able to reconstruct the required fields in a reasonable time. The next stage could not be carried out in Galois in practice due to lack of a programming language. Certainly if Galois is to be widely used as a research tool then it will be necessary to provide data structures and allow for iteration In my case, a do-loop ranging over all elements of a finite field would have been useful

In mathematics there are many problems or questions that can be reduced to concrete calculations in order to answer them. Sometimes these calculations consist of solving a set of linear equations and occasionally calculating an integral. More often though it is necessary to calculate in a less well known, though still concrete, domain such as a specific 'group' or 'ring' – perhaps, one may wish to calculate 'invariants' of geometric objects to show that they are different. Galois can be directly used in those cases where the calculations are to be done in one of its available domains.

The domain

To use Galois, an IBM PC, XT, AT or compatible, MS DOS 2.0, 640 kilobytes of RAM and a fixed disk or dual floppy disk drives are required. A special version is available at no extra cost for use with an 8087 mathematics co-processor. Galois is menu driven and the main menu asks you to select Calculator, Utilities or Command Mode. The next menu in each case asks the user to select a domain. In much of mathematics the domain or set from which numbers are to be taken is either the integers, the rationals, the reals or the complex numbers. We are aware of the need for all of these in solving successively the equations $x + 2 = 0$, $2x - 3 = 0$, $x^2 - 2 = 0$ and $x^2 + 2 = 0$. In Galois the available domains are the integers, the integers modulo N, any finite field, as well as polynomials in one and two variables and matrices with co-efficients in the first three listed domains.

The integers are not restricted to the range − 32767 to + 32767 or some other hardware related limit but are 'arbitrary precision' – in practice, integers with hundreds of digits can be readily manipulated. To calculate in a finite field the user must specify a prime, called the characteristic of the field, and an irreducible polynomial over the integers modulo p. Of course, another part of Galois will calculate the required polynomial for the user.

In practice

When one receives Version 1.0 of a new software package one expects the worst – indeed, often version 2.7 is totally unusable! In this respect, Galois is exceptional – the hard disk version worked first time! Unfortunately the dual floppy version did not work at all (due to a missing file) so I cannot report on comparative speeds.

The menus are easy to use and follow an easy to understand overlay structure with Escape being the standard method of moving back to the previous menu. The natural first attempt at use is to try out the Calculator mode. I found this to be too similar to a hand held calculator in that the operands (+ ,*,/,- and so on) do not appear on the screen at all. I suggest that the method of printing all algebraic expressions on the screen, as in Macsyma or Scratchpad II, is preferable. For example–

```
3+          3**
2=    or    2=
5           8
```

is preferable to –

```
3
2
8
```

The calculator produces some unexpected answers when integers modulo N are used. In the integers modulo 168, Galois correctly reports that 24*7 = 0, that 1/11 = 107 and 11*107 = 1. However, Galois reports that 1/35 = 0, which would be better flagged as 'undefined'.

Utilities

A wide range of Utilities is provided for each of the domains described above. For the integers these include Greatest Common Divisor, Least Common Multiple, Factorization, Primality Test, Find Next Prime and the Chinese Remainder Algorithm For polynomials with co-efficients taken from the integers modulo N there are 18 utilities including Irreducibility Tests and Solving congruences. Linear Algebra utilities are provided for integers modulo N including finding the determinant, rank and nullspace of a matrix and for solving linear equations. The utilities are very easy to use, even for the inexperienced, with the Utilities mode equipped with a nice menu structure and prompts at the bottom of the screen. I managed to crash the system only once!

For more experienced users a Command mode is provided. This provides access to the same utilities without having to go through the menus The user can also perform intermediate computations on the Calculator by pressing one key. You enter the calculator with the same domain assumed and Escape then returns you directly to the Command mode. Short versions of the commands are available, for example, gcd, factor and eval.

Conclusion

Galois is a timely, inexpensive addition to the range of mathematical software available for a PC. It is easy to use, has a comprehensive 96 page manual and appears to have few bugs. The only major deficiency in Version 1.0 is the lack of a programming language However, it can be used in many ways and often performs complicated calculations in a surprisingly short time. For example, it will factorize $x^{105} - 1$ into 10 irreducible factors in seconds. □

Product Details

Product: Galois Algebra Package
From: R. Lidl, R.W. Matthews and R. Wells, Department of Mathematics, University of Tasmania, GPO Box 252C, Hobart 7001 Tas.
(002) 20 2101
Price: $115 for a single copy, $440 for a site licence

Taking out a Contract

– our schools and their computers

Do you know what computer equipment is being used in your local schools? Or, how it got there? Sharon France reports on seven different answers to those questions (and the answers are an excellent guide if you're buying a 'computer for the kids').

Figure 1. For those after more power and capacity, the AT clones approved by the Department in Queensland include the Cleveland Classmate.

FOR SOME TIME, it has seemed that knowledge of computers in education was kept by a select few. The resident school expert collected all of the departmental circulars, attended all of the inservice courses and showed up, alone, at the computer education conferences. The resultant expertise was then doled out sparingly to other teachers and even more sparingly to parents. The expert therefore directed the flow of dollars when the time came to purchase new or more equipment.

How many parents actually know what computer equipment is in their children's schools and how it managed to get there? Keyboards, printers and monitors do not spontaneously generate, nor do they stray in from the fields. For all of the hard work by P&Cs there must be some rationalisation behind why a certain computer takes pride of place in the classroom over another, except for the palliation that 'Ms Flossie, the computer person, said so!'

You will be pleased to know there is an answer to this dilemma. Well, not quite one answer, but seven separate answers or solutions – corresponding to the number of State Departments of Education which, in fact, look after our schools' computer education needs.

It is amazing to discover, not only the diversity of equipment recommended by the various departments, but also the detail. Some States give an across the board recommendation for five or six brands, while others get down to the nitty-gritty and recommend a particular machine from a range, and in a certain configuration (for example, Brand X dual disk drive with colour) for a specific subject in the curriculum. There is one common thread, at least for the most part, and that is each State calls for tenders from computer retailers. Successful companies are then said to be 'on contract'.

Because of their buying power, Departments of Education in the various States expect and are offered discount deals on computer equipment. This is over and above the 20 per cent tax free exemption which is available to all education institutions.

Let's have a look at what is currently going on in each of our nation's localities, and what contracts are out on what machines.

Victoria

The Victorian Department of Education has two contracts – one for General Purpose machines and one for Special Purpose applications. For the General Purpose area, the criteria involved for selection of hardware include versatility, software availability and the specification that the machine in question must have or run suitable examples of a word processor, Logo, a database and a spreadsheet. (*The latest version of Logo was reviewed in YC, August '87.*)

Given these criteria, the machines currently on contract in this state are the Apple IIe and Apple Macintosh Plus, the BBC Master Compact and Master 128 machines, the Microbee 256TC and the IBM JX, the latter being the only occupant in this section which runs under MS-DOS. These machines are recommended for use as general machines across the curriculum from Primary – Year 12.

Obviously, the Special Purpose category has different selection criteria – as the application becomes more specific, so does the machinery specifications. Five curriculum areas are defined under this grouping. The first, Publishing, draws an obvious contender, the Macintosh (recommended software being Ready-Set-Go), and a number of other highly powered, capable machines – the Atari 1040, the Pulsar DWS88 and the Barson XT (for the latter two, the Ventura publishing software is recommended).

For Music, the second special curriculum area, the Atari 1040 and the Commodore Amiga 500 are the Department's recommendations. As for Art and Craft, the Amiga 500 again makes a show, along with the Macintosh Plus. For Graphics Communications or Computer Aided Graphics, three computers are recommended – the Barson Turbo XT, the Pulsar DWS88 and the Apple Mac.

The last area is probably the most fascinating, and certainly the most fund consuming. For Video and Media, the Department recommends the Amiga 2000, and the Fairlight CVI. For those of you not in

Figure 2. *The Archimedes, from Barson Computers, brings the power of RISC to education in Western Australia. This interesting new machine was reviewed in YC, March '88.*

Figure 3. *For video and media work, one of the machines recommended by the Victorian Department of Education is the Fairlight CVI (Computer Video Instrument) – this is the educational model mentioned in the text.*

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_____

_____

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Figure 4. The Commodore 64 is one machine chosen by the Queensland Department of Education in its General Multi-purpose Curriculum for the Primary school (Years 3 to 7). The main thrust behind the selection of the machine was the need for good software, and the belief that a colour system was most appropriate for the early years of learning.

the know, the Fairlight CVI is a pretty amazing piece of computer video equipment, costing $8955 to schools. This is a special price (10 per cent less than the tax exempt price) and Fairlight are tendering a scaled down version of the CVI to schools for half the price of the current model.

So what does this all mean? The recommendation carries with it a reasonable amount of weight, which means that schools are not left to fend for themselves entirely. Schools qualify for a tax exemption and in some cases, there are even further discounts, making a particular machine perhaps more attractive. The Department will not recommend a machine unless the supplier guarantees support.

Internally, there is support for the hardware by the Department, in the form of regional consultants and publications. From what I can gather, software reviews used to be churned out at a fair old rate, but current staffing levels precludes this concentrated activity. The Department still, however, produces material for schools including 'Software Case Studies' and 'Bits on Software'. The latter comes in a looseleaf form (allowing for easy updating) and is machine specific.

The contract for Victoria comes up for renewal every 12 to 18 months, typically around June/July. This year, the contracts have been extended to the end of the year, with a new listing expected in early November. It must be pointed out that the Victorian schools are not compelled to buy contract machinery. The Department simply evaluates what is available and recommends courses of action. Drawbacks for schools forging their own paths and buying non-contract equipment includes a lessening in the amount of support available from the Department and the question marks over the reliability of non-preferred suppliers.

South Australia

The Department of Education in South Australia does not have a contract as such for computer equipment for schools. Schools are able to purchase any machine, except when the monies being used are from a government grant, such as those made to 'disadvantaged schools'. In this situation they are encouraged to purchase machinery which has been reviewed and recommended by the Department. In this way, adequate support can be afforded to the school by the Department.

In general, schools have considerable freedom of choice, but it seems that there is a concentration of Apples and BBCs throughout South Australia. There are historic reasons for this trend.

In 1978, tenders were called by the SA Education Department for computer systems to be loaned to schools. In stepped the major corporations, including Hewlett-Packard, Wang, and Apple (with its Apple II range replete with bundled software, printer and dual disk drive capacity). These machines were made available to schools for one month. Not surprisingly, at the end of the trial period, many schools bought the devils they knew.

1982 saw the purchase of more Apples by schools to compliment their existing equipment. In this year, the Department called for a tender for Local Area Networks (LANs) which was won by BBC with its Econet set-up. This system did not tie in with existing Apple machinery, but that was not the intention.

In 1984, a national price reduction by Apple attracted more buyers from SA schools. However, in this year, the BBC grew in strength and was seen as a solution to Secondary education needs. The Primary schools were also interested. This year also saw a tender called by the Department, with the Commodore 64 being recommended on the strength of two of its software packages – Bank Street Writer for word processing and Logo for problem solving.

Another tender in 1985 saw the recommendation of the Amstrad 6128 for schools which had not purchased computer equipment to date. A further recommendation in 1986, took a more specific path, with the Apple Macintosh being recommended for publishing, and the IBM JX recommended for computing studies.

The Department supports its recommended hardware choices by producing software for all of the machines mentioned, under the banner of Satchel Software. This Department, like those in other States has had to cut back on internal software reviewing. It still, however, manages to channel software to schools for review, the results of which are published electronically on the Department's own messaging database and on the National Software Co-ordination Unit data-base.

Tasmania

The Tasmanian Department of Education has a resolved approach to its computing needs, seeing it only necessary to renew contracts every four or so years. There are two separate areas dealt with by the Department – General Classroom use and Administration.

It is estimated that 80 to 90 per cent of all schools in Tasmania run BBC microcomputers in their classrooms. The majority of the remainder would most certainly be Apples (currently the Apple IIGS is recommended along with the BBC Master Compact). This is how it has been in Tasmania since 1982, with recommendations for the 1986 tender supporting the existing players.

There is very much an air of unity and direction from the Tasmanian Department of Education. The Department not only negotiates bulk purchase deals for its schools, it also runs in-service courses, provides consultants for schools and develops school software for the supported hardware.

Perhaps the king-pin which ties the whole thing together is the fact that Tasmanian schools are all able to link into TASNET, a central network which provides access to communal software and is the key communications network for schools. TASNET also provides a certain amount of administrative functions, however ifs primary aim is to share published material and resources for classrooms.

On the School Administration side, the Department recommends two MS-DOS machines – the Olivetti M240 and the NEC Powermate, both of which have been evaluated in terms of school administration software.

Queensland

The Queensland Department of Education has what can only be described as a meticulous approach to its computing needs. There are three major areas of concern – machines for General Multi-purpose Curriculum, Information Processing and Special Applications.

General Multi-purpose Curriculum. This area is divided into four sub-groups according to age and special needs. For the first group, Early Childhood (or Pre-school to Year 3) the Department has recommended the Apple IIe and the BBC Master Compact colour systems. Similarly, for the Primary school (Years 3 to 7) these two machines are recommended and are joined by two more colour systems – the Commodore C64 and 128D systems. The main thrust behind the selection of these machines was the need for good software, and the belief that colour systems were most appropriate for the early years of learning.

Secondary (Years 8 to 12) sees a mixture of 8-bit and MS-DOS machinery. Recommended for this age range are the Apple IIe and BBC Master 128 (both monochrome with dual disk drive capacity), the Photon PC88, the Cleveland Classmate XT range and the President Turbo PC88 range.

The last sub-group sees a return to colour. For Special Education, the Department has recommended the Apple IIe colour and BBC Master 128 systems.

Information Processing. This area is the sole province of MS-DOS machinery. Recommended XT clones come from the Photon PC88, Cleveland Classmate XT and President Turbo 200 PC88 ranges. A school needing this type of equipment is encouraged to decide on the configuration most suitable for them – monochrome or colour, floppy or hard drive.

For those after more power and capacity, the AT clones approved by the Department include the Cleveland Classmate AT and the President AT 200 ranges and NEC APC IV Powermate 1 and 2.

Special Applications. As has Victoria, the Queensland Education Department has seen fit to evaluate and recommend computer equipment for specific areas of the curriculum. Four are listed under the banner of Special Applications. For word processing and foreign languages, the Department has recommended the Microbee 256TC. Although the 256TC is only a recent machine, one of the Microbee range has held this position for four years.

Figure 5. *The BBC Compact is one of the machines prefered by the Victorian department of Education for the General Purpose area. These machines are recommended for use as general machines across the curriculum from Primary – Year 12.*

The Amiga 500 has been recommended for the Art and Video Production curriculum area, and has held this recommendation for the past two years. However, in the last year, the Apple IIGS has been added to the ranks for this part of the curriculum.

The Department even caters for students and teachers who may need to undertake computer related work at home or perhaps in the field. On contract for the first time are Portable MS-DOS machines, for these specific purposes. The favoured brands are the Toshiba T1200 and the NEC Multispeed, both of which boast battery powered flexibility.

The final area of special applications is Materials Production, which encompasses the production of special project work, students notes and publishing, which necessitates the use of simple to use computer equipment which will turn out a reasonable product. The Department could not look past the Macintosh Plus and the Macintosh SE for their renowned Desk Top Publishing prowess.

The Queensland contract is one of supply – the companies who have won a favourable evaluation, are contacted by individual schools who order the pieces they need. Accordingly, the Department has selected companies and equipment which can be adequately supported by either dealer or company outlet networks which can service this large state. The contract for Queensland is renewed on a yearly basis, usually at the end of the calendar year.

Support from the Department comes in the form of software reviews (published bi-monthly in SUGAR – Software Users Guide to Available Resources), and in the field computer consultants. A certain amount of original software is commissioned and written for the department and is supported by Department generated teaching materials.

Apart from this ongoing commitment, the Queensland Department of Education has also dabbled in special computer literacy programs over the years. For example, the mid '80s, saw 3,500 Sperry units bought and distributed to schools across Queensland in order to teach keyboard and basic communications skills. The software chosen for this venture included the Perfect series of software and a typing tutor.

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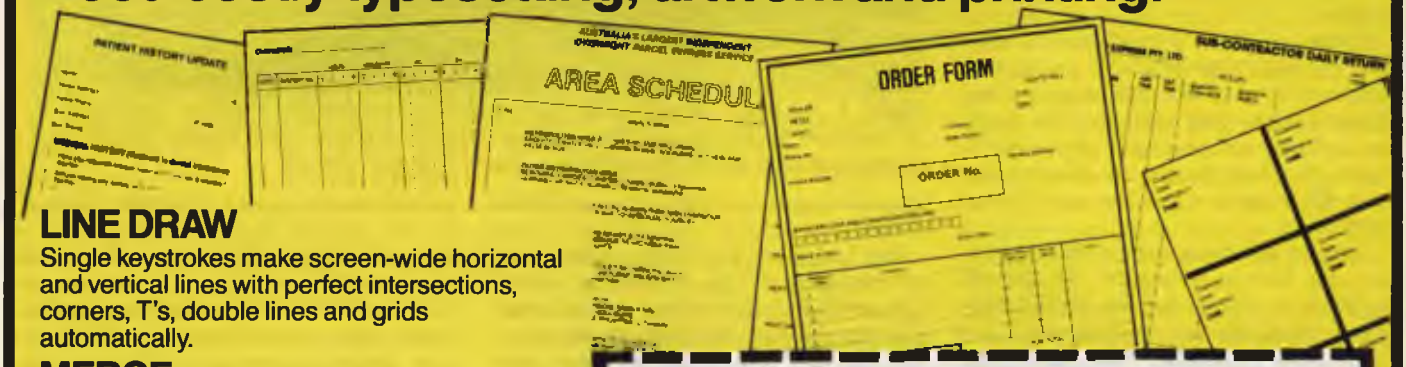

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Western Australia

After many years of centralised decision making about computer education, the WA Department of Education has decided on a more de-centralised approaeh. This, I must point out, is not just for computer education, but is an across the board decision for all areas of the curriculum in WA. This is in the process of being phased in and will mean that a total of 29 district offices will have closer contact and control over what happens in their respective areas. The Department, however, as a centralised authority, will continue to play a part in computer education but more in a supportive rather than directive way.

Evaluation of machinery has taken place every two years and the items which are currently on contract are as follows: the Nimrod XT (a local IBM clone), the BBC Master Compact, the BBC Archimedes, the Apple IIGS and Macintosh and the Microbee 256TC. Schools in WA are encouraged to buy contract equipment, which the Department will continue to service (via the Building Maintenance Authority) after the supplying company's warranty has expired. Monies budgeted by the Department and granted as computing funds to schools must only be spent on preferred machinery, while funds generated within the school may be spent on contract or non-contract equipment, as the school sees fit.

To the end of 1987, there were only two machines on contract in WA. These were the BBC Model B for Primary schools and the Microbee range for the Secondary sector. Horizons have widened in 1988 to include the aforementioned equipment including Apples and an IBM PC compatible.

With the decentralisation, a majority of districts will appoint a computer consultant to service and support the schools in their area. The Department is also involved in software development, particularly re-writing or converting software to run on the latest BBC machines which seem to be particularly prevalent in the Primary Schools. The Department also produces a magazine called WESREV which is a vehicle for software reviews and updates on the use of computers in WA schools.

New South Wales

The Department of Education in NSW has just announced the computers which have been successfully tendered for 1988/89. This is after a roll over of contracts from November 1986 which saw Apple, BBC, Microbee and Atari, sharing in the Department's favour for the past three years. There are no surprises in the successful contractors for 1988/89, with the four aforementioned suppliers having parts of their ranges commended for use again in NSW schools. The machines in particular are as follows: from the Apple ranks the Department has recommended the IIe and IIGS from its base Apple range, and three varieties of Apple Macs – the Plus, the SE and the Mac II. BBC are represented by two machines – the Master Compact and the Master 128. Microbee was also successful with two of its range in NSW. They are the Microbee 128 Overdrive and the 256TC. Last, but certainly not least, the Atari 130XE represents the 8-bit end of the range recommended for use in schools.

Figure 6. The IBM JX is the only machine in the Victorian Department of Education's General Purpose area that runs under MS-DOS.

As you may have noted, there are no MS-DOS machines which have been mentioned thus far. The MS-DOS arena is highly competitive and the Department is seriously considering contenders who will be able to meet 'the affordable entry point' desired by schools. The School Administration area, is meanwhile relying upon the outcome of the Government Supply Department's tender to see if the selected machine will be suitable for this rather specific area. If not, a new tender will be called.

There is one more tender in the offing by the Department, and that includes all machinery not discussed so far – or to couch it in other terms – new technology. We shall have to wait and see what turns up under this banner.

The NSW Department of Education affords its schools sound support for the equipment which it places on the preferred contract list. If a school buys a machine on contract, the Technical Services section of the Department will fix any faults or problems when the machine runs out of warranty. On a regional level, the Department has computer consultants

who are on tap to provide advice on both hardware and software for schools under their jurisdiction.

Software evaluations are produced by the Department by a network of reviewers out in the field. These are subsequently published and distributed to the various regions where they are printed and finally distributed to individual schools.

Further support by the Department comes in the form of technical notes and teaching notes and ideas about software for teachers. The Department is currently stoking up its software writing area, with Venture Writer (a Microbee version on the Story Writer theme) being one of its latest productions.

ACT

The ACT seems to lack a cohesive computer education policy as far as preferred equipment is concerned. Evaluations of computers for schools, carried out by the ACT Schools Authority, in the early 1980s saw Apple clearly preferred over the others. This has stuck, with an estimated 90 per cent of schools in the ACT having Apple equipment.

It seems that Canberra schools are free to decide their own fate, which is not so bad, considering that ACT schools (as part of a Commonwealth department) are able to buy materials listed on any or all of the State contracts across Australia. The ACT also does not have to re-invent the wheel, and so takes advantage of the software evaluations and publications generated by the other States. It does, however, participate in some software evaluation and produces its own publication 'Computers and/or for Education'.

Canberra is also the home of the Curriculum Development Centre, which is a separate body to the Schools Authority. Although not entirely relevant to the hardware thrust of this article, it is worth mentioning here, that the Centre is currently administering a project, the National Software Co-ordination Unit, which allows all States to share in a massive data base concerned with reviews of educational software.

	NT	NSW	WA	Qld.	Tas.	SA	Vic.	
Apple IIe, Apple IIGS Mcintosh Plus, SE, II	G	G	G	S G	G	S G	S G	Apple
Master Compact, Master 128, Archimedies, XT Turbo, Econet		G	G	G	G	G	S G	BBC/Barson
Amiga 500, Commodore 64, 64C, 128D	G			S G		G	S	Commodore
1040,130XE		G	G				S	Atari
256TC, 128 Overdrive		G	G	S			G	Microbee
C128						G		Amstrad
Powermate, Multispeed APC Powermate, 1+2				S	A			NEC
JX						S	G	IBM
Classmate XT range Classmate AT range				S G				Cleveland
PC88				S G				Photon
PC88 range Turbo AT 200 range				S G				President
T1200				S				Toshiba
XT			G					Nimrod
DW588							S	Pulsar
M240					A			Olivetti
CVI							S	Fairlight

Table 1. *Computers recommended by the various State Departments of Education. G = recommended for General use; S = recommended for Special applications; A = recommended for Administration. The machines listed for South Australia reflect historical decisions. Note – the ACT draws from the recommendations made in each State.?*

Northern Territory

The Northern Territory is too small to go through the same tendering processes as the larger states, there being, for example, only 30 secondary schools in the whole Territory. But this does not mean that the children's computer education suffers from lack of interest or commitment by the Department.

Computer suppliers recognise the opportunities in the Northern Territory and regularly beat a path to the Department's door with their latest offerings. The NT Department of Education has a committee which evaluates the machinery available (including field and site testing), and coupled with relevant considerations (local support, price, hardiness of the unit) this committee makes recommendations to the head of the Department. A list of preferred machines is then drawn up. The current preferred list includes the Apple IIe, the Apple Macintosh and the Commodore Amiga. Funds provided by the Department for computer education must be spent on equipment on the preferred list. Funds generated within a school may be spent as the school sees fit (for example, on an IBM which runs specific software for a special need).

Because this Department does not go through the tendering system like other states, it does not stick to a rigid time scale as far as recommending machines is concerned. The Department is ever vigilant, watching for equipment which will fit their criteria.

However, like the others, the Northern Territory Department of Education supports its schools in the use of computer equipment by providing regional computer consultants, reviewing software and publishing a newsletter called Compu-Talk NT.

The main thrust behind the selection of these machines was the need for good software, and the belief that colour systems were most appropriate for the early years of learning.

In conclusion . . .

So, that is the state of play, so to speak, for computer hardware across Australia. As you can see, there is very definitely more than one answer to the question 'What hardware do we buy for our school?'.

Which State has the right plan? What are we trying to achieve with computer education? Why is there so much fuss over one curriculum area, and because it commands so much attention, shouldn't it be managed on a national level?

Computer education is still pretty much the 'new kid on the block' as far as schools are concerned. Since it took over from the over-head projector as the latest in classroom gee-whizzery, there has been nothing to surpass the computer as a modern teaching tool. Computer education is also a notorious consumer of funds, and inherently is under scrutiny by those concerned with purchasing such costly equipment. Because it involves ongoing expenditure, the whole area becomes emotion charged. Was the right decision made? Can we change horses mid-stream? How many computers is enough for our needs? Shouldn't we use some of the money for the school's gym?

At least we know we are getting somewhere. Computer education has progressed over the years from education about computers to education with the aid of computers. The early hacking days which struck all computer fanatics (writing Basic code to create pictures and rote-learning all of the chip serial numbers in your favourite micro) has been replaced with a new age where we have become utilitarian. We need to do something and this piece of equipment will help us to achieve it, with a minimum of fuss. We no longer have to know how and why the computer does what it does. We just need to know that it will do it and do it well.

Figure 7. *The Photon PC88 is one of the machines recommended by the Queensland Department of Education for use in information processing and by Years 8 to 12.*

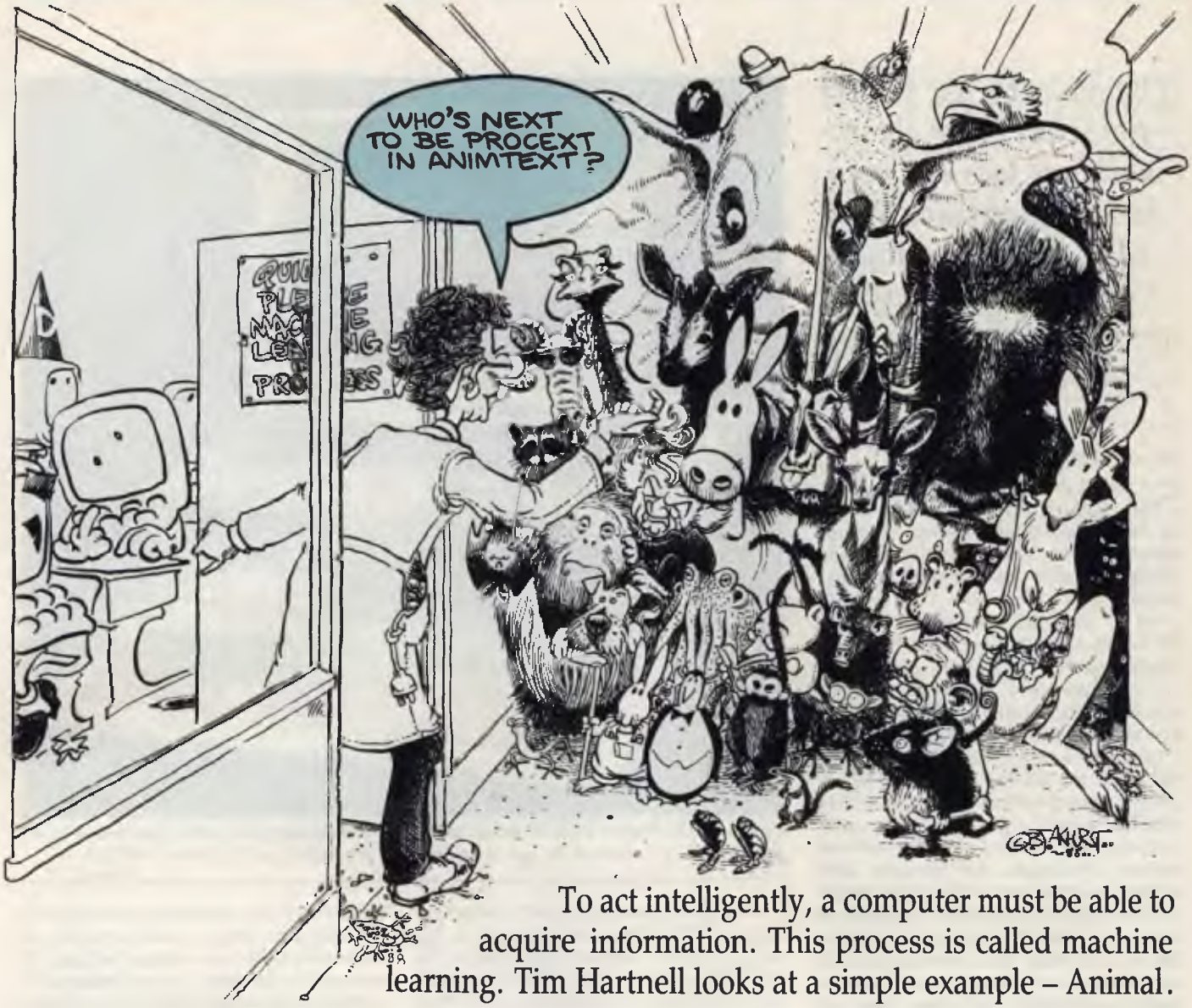
What do we need to do with computers in schools? I believe that we need to follow, in schools, what is happening in the big, wide world outside. Children need to be introduced to the technology that they will encounter when they leave school. Computer literacy is fast becoming another necessity of life, along with 'normal' literacy and numeracy. We do not need to know what is inside the machine which we use to type our essays. We do not need to understand how the music program we are using places each of the pixels on screen to form the notes and treble clefs, no more than we need to know the intricacies of how a car works, before we can drive it. We just need to know how to respond to the program appropriately.

Therefore, what schools need to do is to keep abreast of technology as best they can. Computers in schools need to be able to perform along the same lines as those being used in industry.

It seems strange, therefore, that most of our State Departments of Education, with the marked exception of Queensland, are not actively and aggressively pursuing the MS-DOS area, when those in industry for some time have been saying that the 8-bit machine is obsolete. The computer world is finally responding to the old hackneyed desire of 'user friendliness' with pictures, icons, graphics and symbols.

Industry is converging upon the Macintosh precedent – the graphics oriented computer environment. Departments of Education are also responding to this and will, in time, reflect what is happening in industry. There are already signs of this – Macs and IBM PC clones three years ago would not have rated a mention.

Each State has historically been responsible for its own education and it is not surprising to see State priorities being reflected in the computer education area. I believe that each locality is doing its best with available resources. The single issue which grasps computer education by the throat and holds it firmly in position is funding. Could a national co-ordination of computer education do anything to alleviate this? That is another story. □



To act intelligently, a computer must be able to acquire information. This process is called machine learning. Tim Hartnell looks at a simple example – Animal.

ARTIFICIAL INTELLIGENCE

IN ORDER TO act intelligently, a computer must be able to acquire information about the world around it. Much research is underway in the Artificial Intelligence (AI) field into ways to make this acquisition of knowledge more efficient.

The general term 'machine learning' is given to the processes involved in both 'teaching' a computer new information, and to the means by which a computer 'finds out for itself'. In this article, we'll be looking at a simple example of machine learning. Our program, Animal, can learn – on a somewhat idiotic level – to distinguish between some five hundred different animals. It starts a run knowing only about a kangaroo, but can be taught as many animals (up to 500) as you can be bothered to teach it.

(I've found, in fact, that it is very amusing to run this program as if it were called Politician, and get it to distinguish, for example, between the Prime Minister and the Leader of the Opposition. But I'll leave that up to you.)

In the early days of AI research, it was hoped that programs with 'general intelligence' could be developed; programs which would know all about the universe, life and everything. Plans swiftly became more realistic, as the difficulty of even telling a machine all about a game like noughts and crosses became evident.

As Randall Davis from Stanford University in the US points out, more recent research efforts in AI 'have stressed the use of large stores of domain-specific knowledge as a basis for high performance. The knowledge base for this sort of program . . . is traditionally assembled by hand, an ongoing task that typically involves numerous man-years of effort.' 'Domain-specific' knowledge is information which is related to one clearly-defined subject, such as 'rules of chess' or 'breeding habits of big, red kangaroos'.

Our program is 'domain-bound' in that

it shows an obsession with animals, and totally indifference to (and ignorance of) everything else. However, it does display – on a very primitive level – another feature of machine knowledge highlighted by Davis, the concept of meta-level knowledge. 'This takes several forms . . .', explains Davis, 'but can by summed up generally by saying that a program can 'know what it knows'. That is, a program can not only use its knowledge directly, but may also be able to examine it, abstract it, reason about it, and direct its application.' Our Animal can use its knowledge to check answers from a human being against its inner store, and knows not only 'what it knows', but when it doesn't know. And when it detects such ignorance, it asks a question to expand its knowledge.

Black Boxes and AI

The term 'black box' is given to any system into which inputs can be fed, and from which some kind of meaningful output is received, but the processes by which the output is created are unknown to the operator of the system. Many AI programs (in fact, many computer programs) are black boxes, and intentionally so. Just as you do not need to understand the mechanism of the internal combustion engine to turn your ignition key, you do not need to understand such things as the distribution of sample means in order to use a statistics package on your computer.

In the book *The Hitch-Hiker's Guide to Artificial Intelligence*, the authors point out that the idea of a black box 'has been used in many psychological theories of human and animal learning . . . [and] we can write [computer] programs which mimic this kind of learning . . .' When we do this, we are in effect saying that 'we do not mind too much what method we use to get the machine to learn as long as the machine actually does learn.'

Now, while all this is very well in theory, it is somewhat difficult to imagine how we would write a program which would learn without explicitedly spelling out the means by which the learning would take place, and the mechanism by which the new information would be stored and accessed.

In Animal, we take the simplest possible way. We store the names of the animals in one part of an array, the questions which differentiate between them in another part of an array, and link them, so a 'yes' answer to a question held in one part of the array tells the computer which

```
10 REM ******************************
20 REM ---------- ANIMAL -------------
30 REM ------- Tim Hartnell ----------
40 REM (c) Interface Publications 1988
50 REM ******************************
60 REM Engage CAPS LOCK before running
70 DIM A$(1000):N=1
80 A$(1)="KANGAROO"
90 A$(501)="DOES IT JUMP"
100 REM ******************************
110 REM ------- MAIN LOOP ------------
120 REM ******************************
130 CLS
140 PRINT
150 IF N=501 THEN PRINT "MEMORY BANKS FULL":PRINT "CANNOT LEARN NEW ANIMALS"
160 PRINT
170 PRINT "THINK OF AN ANIMAL":PRINT
180 GOSUB 580:REM DELAY
190 PRINT "IS IT A";
200 T$=LEFT$(A$(N),1):GOSUB 520
210 PRINT A$(N);" [Y/N]?"
220 REM  E will end program
230 REM  L will list all animals known
240 INPUT W$
250 IF ASC(W$)<97 THEN 270
260 PRINT:PRINT "*** Engage CAPS LOCK & press <RETURN> ***":INPUT T$:GOTO 130
270 IF W$="E" THEN PRINT "OK, A.I. DEMO OVER!":END
280 IF W$="L" THEN GOSUB 630:GOTO 130
290 IF W$<>"Y" AND W$<>"N" THEN 240
300 IF W$="Y" THEN PRINT "MY INTELLIGENCE IS OBVIOUS":GOSUB 580:GOTO 130
310 M=N
320 M=M-1:IF M=0 THEN 380
330 PRINT A$(M+500);" [Y/N]?"
340 INPUT W$:IF W$<>"Y" AND W$<>"N" THEN 340
350 IF W$="N" THEN 320
360 PRINT "IT WAS PROBABLY A";:T$=LEFT$(A$(M),1):GOSUB 520
370 PRINT A$(M):GOTO 490
380 PRINT "OK, WHAT WAS IT";:INPUT Z$
390 IF N=501 THEN PRINT "MEMORY BANKS FULL":PRINT "CANNOT LEARN NEW ANIMALS"
400 IF N=501 THEN 490
410 PRINT:PRINT "GIVE ME A QUESTION WHICH WOULD"
420 PRINT "BE TRUE FOR A";:T$=LEFT$(Z$,1):GOSUB 520
430 PRINT Z$;" AND WOULD"
440 PRINT "BE FALSE FOR A";:T$=LEFT$(A$(N),1):GOSUB 520
450 PRINT A$(N)
460 INPUT Q$
470 N=N+1
480 A$(N)=Z$:A$(N+500)=Q$
490 GOSUB 580
500 GOTO 130
510 REM ******************************
520 REM -------- 'A' OR 'AN' ---------
530 REM ******************************
540 IF T$="A" OR T$="E" OR T$="I" THEN PRINT "N ";:RETURN
550 IF T$="O" OR T$="U" THEN PRINT "N ";:RETURN
560 PRINT " ";:RETURN
570 REM ******************************
580 REM ---------- DELAY -------------
590 REM ******************************
600 FOR J=1 TO 1000:NEXT J
610 RETURN
620 REM ******************************
630 REM LIST KNOWN ANIMALS & QUESTIONS
640 REM ******************************
650 PRINT:PRINT "THE ANIMALS AND QUESTIONS I KNOW ARE:":PRINT
660 FOR J=1 TO N:PRINT A$(J),A$(J+500):NEXT J
670 PRINT:PRINT:PRINT "HIT <RETURN> TO GO BACK TO MAIN PROGRAM"
680 INPUT Z$
690 RETURN
700 REM ******************************
```

Listing 1. *Animal can be taught to distinguish between some five hundred animals.*

element of the array contains the relevant name of the animal. It is brutally straightforward, but works a charm.

Evaluating Performance

An expert system is a computer program which has learned its expertise from a human expert (or experts). This expertise can be used – in theory at least – by non-experts. But how do we check how well such a system has learned? If we have a weather-forecasting expert system, and it says it will not rain for the next month in Melbourne, it would be relatively easy to check the validity of the data the system had acquired to reach that conclusion, and to test the conclusion itself.

'A primary direction for research and development of expert systems has been the acquisition of knowledge from the expert,' write Sholom Weiss and Casimir Kulikowski in *A Practical Guide to Designing Expert Systems*. 'Less attention has been given to finding effective methods for validating a system's knowledge base and evaluating its performance.'

There are no such problems with our primitive 'learning engine'. At any time you can check not only the animals which Animal knows, but the questions it uses to differentiate between the animals about which is has stored knowledge.

Running the program is simplicity itself. Examining the following sample run will tell you everything you need to know about the program –

```
THINK OF AN ANIMAL
IS IT A KANGAROO [Y/N]?
? N
OK, WHAT WAS IT? ELEPHANT

GIVE ME A QUESTION WHICH WOULD
BE TRUE FOR AN ELEPHANT AND WOULD
BE FALSE FOR A KANGAROO
? DOES IT EAT PEANUTS

THINK OF AN ANIMAL
IS IT AN ELEPHANT [Y/N]?
? N
DOES IT JUMP [Y/N]?
? N
OK, WHAT WAS IT? QLD CANE TOAD

GIVE ME A QUESTION WHICH WOULD
BE TRUE FOR A QLD CANE TOAD AND WOULD
BE FALSE FOR AN ELEPHANT
? IS IT TAKING OVER AUSTRALIA

THINK OF AN ANIMAL
IS IT A QLD CANE TOAD [Y/N]?
? N
DOES IT EAT PEANUTS [Y/N]
? Y
IT WAS PROBABLY AN ELEPHANT

THINK OF AN ANIMAL
IS IT A QLD CANE TOAD [Y/N]?
? Y
MY INTELLIGENCE IS OBVIOUS

THINK OF AN ANIMAL
IS IT A QLD CANE TOAD [Y/N]?
? L

THE ANIMALS AND QUESTIONS I KNOW ARE:
KANGAROO        DOES IT JUMP
ELEPHANT        DOES IT EAT PEANUTS
QLD CANE TOAD   IS IT TAKING OVER AUSTRALIA

HIT <RETURN> TO GO BACK TO MAIN PROGRAM
```

You can see from this sample run that the program begins by knowing about kangaroos, and nothing else. It is very simple to teach it about other animals. To find out what it knows, you enter L (for list) when asked the first question after you have been told to 'think of an animal' If you enter E (for end) at this point, the program will say OK, A.I. DEMO OVER! and stop.

Once you've taught it about Queensland cane toads, elephants, kookaburras, koalas and the rest, try getting it to differentiate between your least favourite politicians, or your friends. Your belief in the potential of artificial intelligence will be immeasurably strengthened.

(If you can't be bothered typing in the program, send me $2 and a formatted 5¼ inch disk, and I'll send you a copy of the program for the IBM PC and compatibles, along with a selection of programs featured in recent articles in *Your Computer*. My address is Tim Hartnell, 34 Camp Street, Chelsea 3196 Victoria. □

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DATABASE DATA

In the second part of our survey, Steve Keen covers Enable, Open Access, Smart, and Ability Plus – all databases which are part of integrated software suites – and Rapidfile, a single file database. Plus – AskSam, which heralds an entirely new concept in databases.

THE TWO BEST-KNOWN integrated packages, Framework and Symphony, don't even rate a mention in this 'integrated suite' of packages. The databases are the weakest links in those otherwise very powerful programs. Framework's database is a simple list manager, suitable for mail-merging with its excellent word processor, useful for some financial manipulations; if you combine it with the spreadsheet and Framework's programming language. But it doesn't rate against Q&A, or Reflex, let alone standalone relational databases like dBase. Symphony has similar limitations.

An integrated package has to address four or five needs, a standalone database only one; and an integrated program with a strong database might well be weak elsewhere. But many people still succumb to the temptation to get all their software needs fulfilled from the one fount, and many programs advertise themselves as capable of the challenge. As such, they are fair game.

A full power database must have relational capability – the ability to link two or more database files. An invoice database must be able to refer to a customer database when a customer name or code is entered, and automatically extract that customer's address and discount.

In this respect, there are two ways that integrated packages can compete with dBase. They can provide identical facilities via a programming language which the user has to manipulate to link the files. This approach means that the main advantage of integration is 'buy four for the price of one'; the extra applications come effectively free, while you still have to work hard to make the database work. Or they can attempt to simplify the linking of files, making it easier for you to get immediate results but perhaps resulting in a bit less flexibility.

All four integrated packages reviewed here took the latter approach, with varying degrees of success. Only one also took the former route, providing a fully fledged relational language from which you can design your own application.

ENABLE

Enable offers word processing, spreadsheet, graphics and telecommunications in addition to a database, so its price compares favourably – so far as breadth of features are concerned – with major databases like dBase III+. However not everybody needs the power (and associated difficulties) of a full database package. Enable certainly isn't targeted at the top end or system developer market.

At the system level, Enable is a fairly attractive 'point and select' menu system. If you choose DBMS, an additional menu pops down listing the options of Design, Build, Interact and Report. While the menu system makes it easy to get going initially, it becomes very cumbersome in application.

Design offers three options: definition of the database itself, of an input form, and a report form. Database definition is heavily prompted, and guided through a series of menus. You can choose quick entry of a new field definition, in which case all you need supply is the field name, type of entry allowed, and its length. Detailed entry includes specifying whether an index is to be used with the field, the default, minimum and maximum values, whether the field is required, a template and any error messages for out of range entries.

The detailed option also includes Enable's method of linking files together. You can specify that a field will be plucked from another database – the contents of a field in one database (the price in an invoice database, for example) can be derived from another database (the product database, for example), if you specify that the data for that field is to come from an external file.

Enable thus handles the relational task of getting a product name from the operator, going to the product database and trying to find a product of that name, and (if it does) entering the relevant price into the invoice, without any programming. However the linking procedure is cumbersome. You have to define one field in the main database to store the record number of the secondary database, then define a formula linking the desired field to the secondary database.

In my trial database, as soon as a product name was entered, its price was copied onto the form by Enable; likewise the customer discount was taken from the customer database. An invoice taking both price and discount into account was automatically generated as soon as quantity was entered.

More complicated links between databases, such as updating a customer's outstanding balance by adding up the outstanding amount on all invoices, or doing a global update of all invoices from one lump sum payment from a customer, are not possible from the database definition alone. Such procedures are the responsibility of the Update command, which comes under the Interact DBMS menu option.

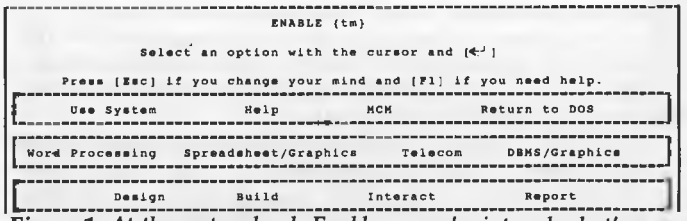


Figure 1. At the system level, Enable uses a 'point and select' menu system. If you choose DBMS, an additional menu (shown above) pops down listing the options of Design, Build, Interact and Report. Design offers three options: definition of the database itself, of an input form, and a report form.

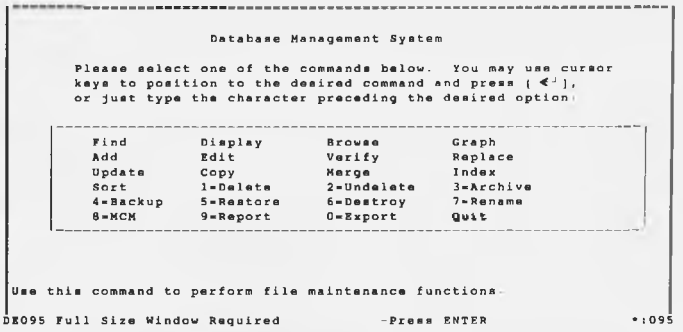


Figure 2. Most Enable functions are governed by a database menu, accessed through the 'Interact' option from the DBMS main menu. Most of the commands generate a form covering the database and index to use, and conditions on records to be checked. If you choose Find, for example, Enable presents you with a standard form on which you must specify the database to search, the index to use, and the condition.

Between the data definition and the Update menu, you could use Enable to construct a fairly competent two or three file application to control activities like invoicing and accounts payable.

General data functions

Most Enable functions are governed by a database menu with about 20 options, accessed through the 'Interact' option from the DBMS main menu. Most of the commands generate a form covering the database and index to use, and conditions on records to be checked. If you choose Find, for example, Enable presents you with a standard form on which you must specify the database to search, the index to use, and the condition (CUSTOMER = 'Anderson'). This system works relatively well, but it is not as straightforward as filling in a blank input form, the system which is used by Open Access and Ability Plus.

Enable only lets you index a database on one field at a time, whereas most stand-alone relational databases allow you to assemble indexes based on multiple fields. This allows the construction of unique indices for customers, products and the like using their names, without having to resort to product or customer codes and the like, and results in a much more natural interface for data entry. Enable's single field index limitation forces you to use product and customer codes.

It will import directly from Lotus, but not from dBase, which gives an idea of its target audience. As a relational database, it is a step up for someone who has been relying on the meagre database powers of 1-2-3; but it will hardly displace dBase.

Reports

Enable supports both columnar and free-form reports from its menu system. Columnar reports are rigid, but easily constructed. You simply specify the database, the index to use (if any; a preferable alternative, given Enable's inability to index on multiple fields, is to pre-sort the database), and limitations on the records to be output, the fields to include in the report, and the report title.

Enable's free-form report, like its database, allows you to extract information from other databases, and create fields whose contents are the result of calculations. In addition you can create proper headers and footers, which are not supported by the columnar report.

The power of Enable's database forms can be extended using its procedural language. This includes commands such as Updatekey and Checkkey which allow dynamic links between two databases for data entry. For example, if you enter a new customer name into an invoice database, that customer name will be automatically entered into the customer database if the field includes an Updatekey command.

OPEN ACCESS

I would willingly use Open Access' database ahead of dBase's, and in some simpler applications, I could even prefer it to ZIM. It is pitched at a higher market than Enable. Open Access was apparently built with relational power from the outset. Open Access's menu system is far superior to that of Enable. In addition to the menu driven method of driving your database, Open Access also incorporates IBM's SQL, and the two methods of data query – menu and SQL – can be used concurrently.

Open Access has a quite attractive and well-designed windowed user interface. The main menu occupies the upper right hand corner of the screen, overlaying that corner of the main screen display. Once the database is activated, its main menu overlays the middle bottom of the screen, with the previous database view occupying the bulk of the screen.

The major relevant commands are shown either on the menus – where 'point and pick' and 'type the first letter' select options – or on a bottom of screen prompt line. However the command keys are specified by their program names rather than by the function keys which invoke them. Fortunately, help about the relevant keys is available from F1, and there is a reference card (a proper keyboard overlay would be better still).

Database design is integrated with form design in Open Access. Name tags for fields are entered by typing, while fields are entered by pressing Select (F9). Field attributes include whether a field is to be used as a Key field, type, and justification, as well as several kinds of evaluated fields. These include autoincrement – which is vital for adding fields such as employee numbers, product numbers and so on – and dependent, which means that the entry is made from a formula.

Like Enable, Open Access lets you build links between files when you first define them, rather than having to manufacture them on the fly through matching index files, as dBase III forces you to do.

Open Access does it with a facility which guarantees that entries in one database 'must match' entries in another. With an invoice system, for example, it is essential that the customer name must already exist in the customer database. Equally, there's no sense entering a subject classification for a library database when the subject doesn't exist.

Figure 3. Once Open Access' database is activated, its main menu overlays the middle bottom of the screen, with the previous database view occupying the bulk of the screen. The Browse command simultaneously displays a list of records and a particular record in detail.

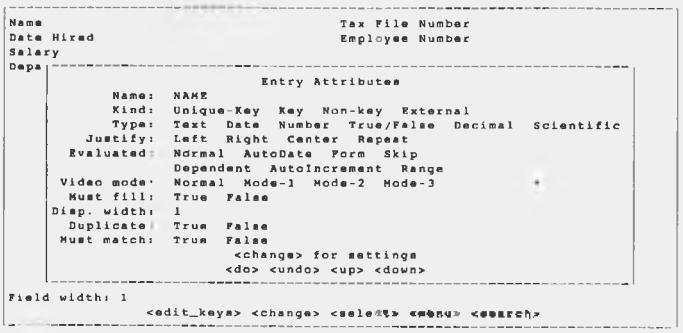


Figure 4. The programming language in Open Access works on sets of data which obviates writing error checking code.

Once a 'must match' field has been defined in Open Access, if the operator makes an entry which doesn't match, a window pops up showing the allowed entries. The operator can then select from the list, edit or enter a new customer name (for example) into the external database.

Where the entry does match, the 'external field' facility pulls in details from the external database when entering information into the current one. So, having entered an product name into an invoice, Open Access will automatically enter the relevant price.

The overall effect is the same as for Enable, but the execution is far better, particularly with the pop-up window of available choices from the external database. That takes about twenty lines of programming to achieve under ZIM, and ten times that under dBase.

General data operations

Open Access' Browse command has 'borrowed' and enhanced a useful feature from Reflex – the simultaneous display of a list of records and a particular record in detail. One half of the screen shows a column of entries from about twenty records in the database. The other half shows all the fields in the currently highlighted record.

The advance over Reflex is that the field which is displayed in the column is automatically shown in sorted order: if you highlight the name column, your records are displayed in name order; highlight date, and they are displayed in date order. You can also search for a particular record from the Browse menu, insert new records, and edit old ones.

Searching uses either a form, into which you enter selection criteria, or SQL, where the query can either be entered from the keyboard or from a command file. The SQL option enables searches of multiple databases, and the set created can be edited as a unit, thus affecting several files simultaneously.

Open Access displays considerable flexibility for a menu driven database system. While in Browse mode, you can insert, delete and modify records; a previous SQL request can be easily edited without returning to the main menu; you can print, to any desired printer or to a file, at any time. The integration between SQL and Open Access's menus is excellent.

Report Generation

Open Access breaks report design into several segments: the report header, a header for each group of records, the record itself, sub-totals for groups, the footer, and totals for the whole report. Each is designed on a separate 'page' of a report design module. In each page you can place either text or fields wherever you desire, with the program showing you the X,Y location in the top right hand corner of the screen

Fields can be easily moved about the report using the select key, which makes design of a multi-line report a breeze.

Unfortunately it is not possible – as it was with Enable – to report from numerous files simultaneously. To get an output which does link several files at once, necessitates Joining databases. Joining employs SQL to extract data from several databases when records match on various criteria – customer and sales data matching on customer name, sales and product data matching on product name. This is similar to dBase, though one extension of joining provided by Open Access is that any modifications to the joined file actually changes fields in the original databases.

Open Access includes a tabulation option similar to that in Reflex, which allows you to see how one field varies depending on the entries in two others.

Unlike dBase, Open Access's language normally functions with sets of data. If you specify a condition (such as 'Overdue = True'), then Open Access will make a set of all your records where the customers are overdue. The language lets you process those records sequentially, as you would with dBase, but since it has taken care of selecting only records which are overdue, you do not have to include error checking code to ensure that the current record is actually overdue.

The language includes support for windows, with the ability to frame minor windows within main ones, and special characteristics, such as PROMPT and TITLE, with specific functions which can be called by other aspects of the programming language. Windows overlay the previous screen, and can be removed restoring the screen to its previous condition – making them an excellent vehicle for menus (which the program also supports) and updating of related files – as is done by the menu system when a new entry is made into a 'must match' field

Open Access's developer environment is considerably richer than that of dBase. In addition to set construction, built in support for windows and automated menus, there is the batch command, which lets you group the many command files for an application into one set, and then globally update a variable name, print all files with one command, and so on. During testing a program can be listed in one window, with its output in another.

Open Access's language has multi-user facilities for use on a network, with file and record locking and in addition the facility to lock groups of records – something not found many standalone databases.

The rest

Open Access is clearly a serious database contender, with as much muscle as any of the standalones and generally much higher user support. Its physical 'constraints' match its software power: it supports up to 2 billion records per file, 100 fields per record, as many as 100 indexes per file, and up to 8 databases can be linked in a single SQL command. But what about the rest?

Open Access deserves serious consideration by anyone whose primary need is for data processing and analysis, and who can make do with a relatively simple word processor (which does a good job of mailmerging), but would like a strong spreadsheet; the program's graphics are superior to 1-2-3's and offer several novel options that aren't even found in the Magician or Harvard Graphics.

SMART

In its database module at least, Smart does not live up to its name. It has a clumsy user interface, an inadequate way of handling fields, and a patchy means of relating databases. Smart's menu system is relatively complicated. Menus appear at the bottom of the screen; to choose them, you move between options using the space bar or first letter. It omits the customary cursor keys point and pick method.

The problem is that there is not just one main menu but five. The first appears when you load the database; the other five can be toggled through progressively as you press the backslash key, or by pressing the numbers 1 to 5. In addition, the complexity of the menus varies depending on whether you have selected confidence level 1, 2 or 3, with 3 involving as many as three times as many commands as the default level 1. A total of 51 commands reside on the 5 main menus!

This forest of commands could have been adequately organised by pop-down menus with 5 main options, since Menu 1 is related to file management, 2 to multi-file operations, 3 to windowing, 4 to disk maintenance and 5 to system parameters.

Essentially, Smart is a command driven program with a menu driven interface (which you can access by choosing a higher confidence level and enter commands directly). One danger with such systems is that it can take an awful lot of keystrokes to generate each required command, and generally Smart succumbs to the danger. Take the Goto command: in dBase, 'goto 6' will take you straight to record 6. But in Smart, goto controls not just record movement, but movement between windows and files as well. If you choose to goto a record, you have the options of the Next, Previous record, or a specific number. If you choose a number, you can at last type the number record you want. The full Smart command is 'goto record rec-number 6', which is verbose in anyone's language.

Database design

Smart separates the task of file and form design, rather like dBase. Database design is reasonably simple, with the program guiding you through required attributes beginning with whether a password is required and whether fields are to be fixed or variable lengths, and ending with the entry of key (index) fields. These can include multiple fields, which makes it possible to design unique keys using ordinary names.

Form design begins with writing the mandatory labels, then inserting fields by pressing F7. Once inserted, a field's attributes can be changed between no attributes, read only and mandatory

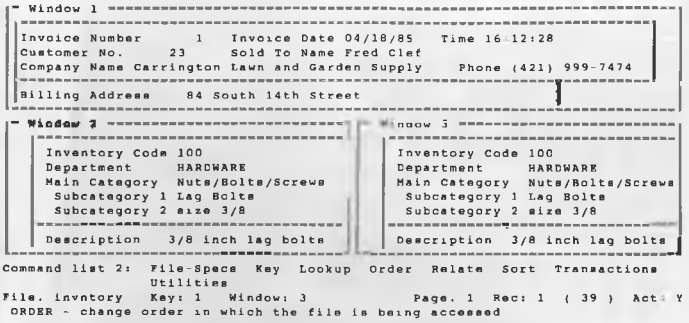


Figure 5. If you are entering data into a Smart file which has lookup fields, it is necessary to load both databases into separate windows, load the separately stored lookup information, and ensure that the source file is 'in key order by the link field'.

by pressing Alt-F7, while a data range can be defined using Alt-F8.

Data entry is an option on the first of the five menus. After selecting it, you have to nominate the database and then the screen to use. Dates can be entered by typing F2; this works on any field, not just a date field (which is a bit superfluous).

Smart supports a browse mode, as well as 'scrolling', which lists each record in the file, one at a time, with a specified time interval for each.

The Find command is more cumbersome than the goto, and is the first indication of Smart's clumsy way of handling fields. Most databases find on a command like 'Find Name = 'Smith' and Overdue = 'True'. Smart refers to fields by their number, so its command begins 'Find [field number]'. Next you have to enter whether you are after a specific match, greater or less than, or a partial match, then the data sought, and finally the direction of searching, and whether to ignore case or not.

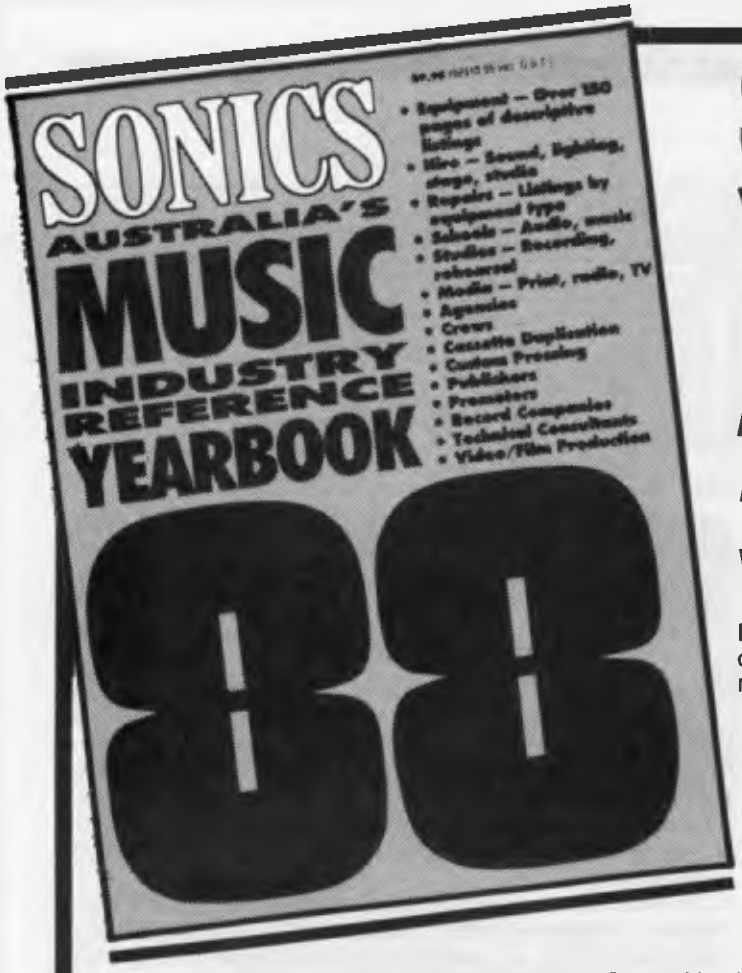
It does not support Boolean searches of multiple fields – like the first example above. You can search for multiple fields, but only if they contain the same information – the manual gives the example of a database with three fields for product code, all of which could contain the number 100. Frankly, such a database is badly designed: if there is a possibility of more than one product code, then all product data should be stored in a separate, related database (Smart supplies an example of the former type of file, which limits you to no more than three products per invoice). Smart thus offers a facility which is only of use to people who design inept databases, while omitting a feature which is essential in any well designed database.

Reports

Unlike Open Access, Smart's report module lets you report from two databases simultaneously. However its implementation of this feature is both awkward and rigid. A report can have two segments: a form segment, with fields located wherever you want them, and a table segment, with a columnar layout One database can supply the form component, while another supplies the table.

When placing fields or text on the report, you first have to specify the space into which the field or text will go by cursor pointing. The program supplies no information to guide whether the space you have chosen is wide enough for the field, even though a list of fields to choose from is displayed. You would be advised to have your field definitions with you when defining a Smart report.

Multiple files are linked using a lookup command. Smart's



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lookup system is designed using a cascade of menus, but it is fairly easy to follow. Actually making use of the feature is another matter. With Open Access and Q&A, if you are entering data into a file which has lookup fields, the program automatically seeks out the referenced file and extracts the required information With Smart, you have to load both databases into separate windows, load the separately stored lookup information, and ensure that the source file is 'in key order by the link field'.

Open Access does all that without any of the bother, as soon as you choose the data entry option for a file which references other files.

Smart has a programming system of sorts, which it calls 'project definition'. It is closer to a macro system, with the program remembering your keystrokes and playing them back to you at a later date. In addition there are some commands which you can insert into the macro using a word processor, which add prompts to the macro's execution, conditional execution of macro components, procedures and so on. While it adds some sophistication to Smart, it certainly lacks the finesse of an SQL or dBase style programming language.

The rest

If your primary need is data processing, Smart isn't in the race against Open Access or Ability Plus. On other fronts, the Smart system doesn't look so bad. A cursory glance at its word processor shows that it can do footnotes, allows multiple fonts, and can merge graphics with documents (including printing text and graphics side by side), though the graph is not displayed on screen (which Ability Plus can do). The spreadsheet looks like the old Multiplan, with its numeric labels for columns and rows, but the program can support multiple spreadsheets which can be linked, and its graphics are quite high quality. However, like their database counterparts, the Smart word processor and spreadsheet have an awkward interface with five main menus.

ABILITY PLUS

Ability Plus is significantly cheaper than the rest of the packages reviewed here, which should be taken into account particularly when comparing it to Open Access. That said, it offers a highly credible relational database which should cover most of the needs of small businesses and also be relatively easy to set up. It does not offer the same power as Open Access with its pop-up windows, and it is not as good at handling one-to-many links (one customer, many invoices), but it offers workarounds for this which are adequate, given its price.

Ability Plus' initial user interface is a columnar display of its different types of files – databases, documents, spreadsheets, graphs – plus DOS drives and directories. To create a new database, you highlight New in the database column and press return; using an existing database is equally simple.

After that, the program is largely Function key driven, with most of the functions residing in a menu which lies beneath F2, 'commands'; in effect F2 takes the place of Lotus's backslash key. Actual commands are selected in the point and pick fashion, or by pressing the command's first letter.

Database definition makes full use of Ability's WYSIWYG word processor: it's quite easy to have centred headings, underlined field names, and boldfaced fields, which results in a computerised form very similar to the paper form it supersedes.

Text can be entered anywhere on the page (in contrast to Smart, which insists that you first mark a region for any text entry), and then manipulated using the word processor. The defined field is signified by a grid pattern on screen.

Formulas can be entered to define a calculated field, or to relate a field in your form to another database. The latter allows one way and two way links, using formulas such as 'Product/Prodname', where the first half signifies the file and the second half the field in that file.

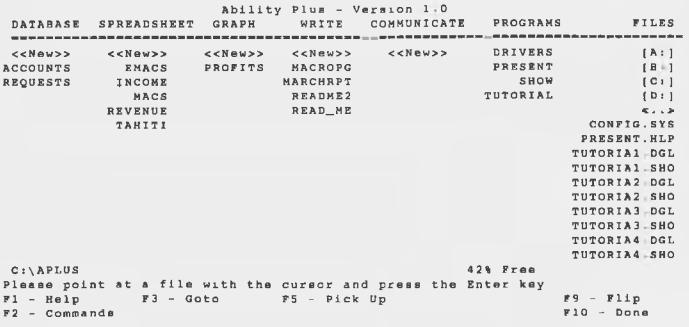

Figure 6. Ability Plus' initial user interface is a columnar display of its different types of files plus DOS drives and directories. To create a new database, highlight New in the database column and press Return.

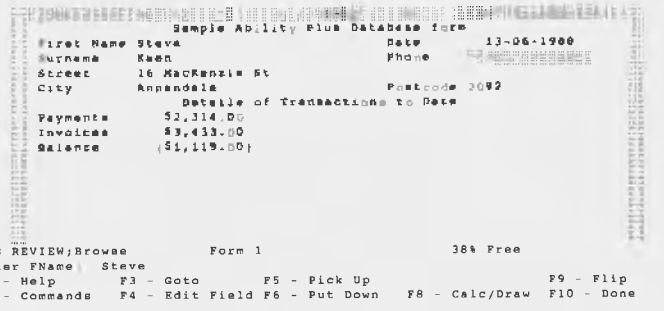

Figure 7. Ability does not have a list or browse mode – instead it uses the predefined form for all activities, including single record 'browsing', searching and jumping to particular forms.

General data operations

Ability does not have a list or browse mode which gives a columnar display of all records. Instead it uses the predefined form for all activities, including single record 'browsing', searching and jumping to particular forms. To search for a form fulfilling specific criteria you enter the conditions into a blank form, using relational operators in each field such as = and >=, with the pipe signifying an 'or' condition and the ampersand providing the 'and'. The fact that you enter your conditions into a form automatically provides a feature absent from Smart, enquiries of multiple fields at once (as in 'balance < 1000 and overdue=true').

Three sorts of reports are supported: form, summary or mailmerge. Form reports simply reproduce the on-screen forms on your printer. Summary reports produce columnar listings of each record; all you do is specify the order in which you want the fields to appear, and provide column headings, header and footer, if required. Summary reports can also provide breaks, and perform subtotals, counts, and basic statistical functions.

Mailmerge reports provide the maximum layout flexibility (al-

lowing a record to have its fields printed on more than one line), and integrate directly with Ability's word processor to produce standardised letters. You design a mailmerge document using the word processor's powers, but including fields from specified databases or spreadsheets where you wish variable information to occur.

The rest

One of Ability Plus' best features is its integration with the other modules. You can enter a database field into a word processed document or a spreadsheet, and load the database into a second window. As you scroll through the database, the entry in the document changes to suit. Likewise, if you edit the field data in the document, the database is automatically updated.

The word processor itself is a quite high standard WYSIWYG program, which can display graphs and spreadsheet excerpts on screen Its mailmerge is excellent. The spreadsheet is a worthy match for 1-2-3 – which is the bottom line these days. The graphics are better than 1-2-3's, but not in the race against Open Access, let alone Harvard Graphics or The Magician.

The integrated wars

Open Access offers a database which can stand proudly next to specialist databases such as dBase. Ability Plus comes second to Open Access in the integrated database runoff. It offers good form design, simple data entry, comprehensive search capabilities, and a not too complicated method to relate two files together. While it has nothing to match Open Access's SQL and pop-up windows from other databases, it is significantly better designed and consequently easier to drive than Enable, which otherwise matches it in features. Smart's database is awkward and inadequate.

Open Access thus looks the way to go, but unfortunately its companion word processor is significantly underpowered. Ability Plus offers a better word processor, but it still does not match a Word Perfect (or Framework). Solving your software needs will at best be a two hit job: Open Access for everything except word processing, and a special purpose program for the written word.

RAPIDFILE

Rapidfile is Ashton-Tate's single file database. Except for a few quirks, Rapidfile is probably easier to use than it is to describe. It is a menu driven program, which borrows features from both 1-2-3 and Framework. The menu is brought up using the backslash key, *a la* Lotus; the menu itself is pop down style with 'windows', *a la* Framework. In addition, there are function keys which have the same function wherever you are in the program.

Generating the menu with the backslash key is a bit superfluous, since without the menu you can't do anything (such as enter new records or edit old ones) anyway, except move about the database using the movement keys.

The user interface includes a number of control key combinations, with mnemonic cues, which reduce an operation that might take 6 keystrokes using the menu to a 1 keystroke operation.

File creation generates a columnar layout, similar to that of a spreadsheet, with the only options being the field type: text, date, numeric, calculated or report. The latter is one of the program's quirks Most databases produce subtotals of fields when you define a report Rapidfile defines report fields which stores the subtotal, count, maximum, minimum, running total or percentage of specified fields (such as sales) whenever the figure in a linked

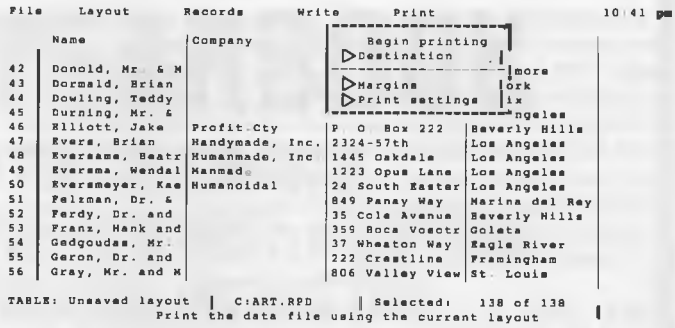

Figure 8. Rapidfile is a menu-driven program – the menu is brought up using the back slash key a la Lotus; the menu itself pops down a la Framework. The function keys have the same function wherever you are in the program.

field (such as State) changes The file has to be sorted in the order of the report field for the report figure to be accurate.

Data entry

Rapidfile employs a quirky selection of control key combinations to copy data from previous records, and enter date and time. Blank records are appended to the end of a file as you move the cursor down, inserted above a selected location by Ctrl-Ins and below by Ctrl-A, while Ctrl-Return saves the RAM-based file to disk (as with Framework).

While the maximum length of any field is 254 characters, Rapidfile creates an associated memo file whenever you wish to add more than 254 characters of text to a field entry.

Part of Rapidfile's appeal is that it automatically generates three of five standard formats for displaying and employing a database: table, form, and mailing labels. More manicured tables, forms, labels, quick reports and full reports require some design work, assisted by Rapidfile's pop-up menus with choices of available file names.

Searching in Rapidfile is akin to the procedure in Reflex, where you specify search criteria on a table showing the fields down the table, and different levels of 'match criteria' across. If you enter 'Bugnall' in the surname field for match criteria 1, and 'Peter' in the firstname, you will retrieve the records for Peter Bugnall. Entering the surname in match criteria 1's column and first name in the second column will retrieve all people with a last name of Bugnall, and all those with a first name of Peter.

It is slightly more complicated that entering alternatives on a blank copy of the form, but it does allow for a more flexible search.

Overall assessment

Rapidfile's apparent target audiences in the USA were users of PFS:File, and Lotus 1-2-3 PFS:File has a much wider appeal there than here, courtesy of the old days when the Apple IIe dominated the US market, and PFS:File was the main database available on it. Here its main competition would be Q&A and Reflex.

Rapidfile is fast and relatively easy to use, and it does include a passable word processor in the price. But you can do as much and more with Q&A (apart from the columnar listing of records) in the database area, and Q&A's word processor can compete happily with standalone packages Faced with a choice between the two, I'd go for Q&A. Reflex also matches Rapidfile in its more analytical functions, and is much cheaper again.

ASKSAM

When I have to explain what a computer database is to a computer neophyte, I always begin with the idea of a table, with each-column storing a particular kind of information and each row containing information about a particular individual. It's easy to visualise, and by and large it is how databases are actually constructed.

That model is fine for numbers and textual data of definite length, such as personal and company names, but it is hopeless for lengthy bits of text. In fact, conventional databases handle text so badly that they have probably convinced many users that text and databases are contradictory concepts.

AskSam makes it clear that the contradictions were the product of design limitations in the earlier crop of databases, rather than any inherent incompatibility of words and records. It handles text brilliantly, yet without sacrificing the ability to handle numbers and fields like a 'normal' database.

At the basic level, AskSam is much like Memory Mate. You can enter and search for text in free form records, tag particular records, enter reminders and so on.

However there are two ways in which AskSam takes a quantum leap past the cheaper Memory Mate – its implementation of fields within a free form database, and Hypertext.

AskSam makes it clear that the contradictions were the product of design limitations in the earlier crop of databases, rather than any inherent incompatibility of words and records.

Most databases treat text as the contents of a particular type of field. AskSam reverses the process. It treats fields as particular types of text in an otherwise free form database. You simply type text in, in any fashion you desire. If you precede a line of text with a label and a square bracket (like 'Name['), all the text on that line is taken as being part of the 'Name' field (multiple line fields are also possible).

You can search for a name in several ways now. As with Memory Mate, you can type in the text you want (say 'Smith') and every record with the word 'Smith' anywhere in it will be selected, including 'Smith & Sons' in a company name field (AskSam also supports substring searches, whereas Memo will only search on full words). Two words typed next to each other are connected by a figurative 'and'; so long as both occur in the record, the record will be shown. AskSam can also do searches based on the proximity of one word to another within a record. Vicinity searches will select only in the two words are adjacent words, or in the same field, line, sentence or paragraph.

That's just the basic level. Once a template ('name[, 'Street[, City[, Income[...') has been entered and used in records, it can be used to sort or index your database, to extract formatted reports consisting of specified fields only, and even to perform mathematics, including date calculations.

AskSam commands can be stored in a program (which true to the program's philosophy are stored as records), with the first word in the record, preceded by a colon, indicating the program's name. One of the most obvious applications which AskSam will do easily that most databases fail is in maintaining a bibliography. Create templates to store journal articles or book details; fill in the details; write a program to sort and extract the data you want as a formatted bibliography.

You can have as many different field types and record types as you like in an AskSam database, unlike conventional databases which restrict you to one set of fields per file. One style can suit names and addresses, another books, another product data. Up to ten different record templates can be stored as Alt-Function key combinations. Type the key, and the template – now akin to a form design in a conventional database – appears on screen.

AskSam can import information from a current database using text files, using either a fixed number of lines or a record delimiter to mark off separate records. Importing my current Memory Mate database into AskSam was easy. Since both programs have variable length records (and do not, strictly speaking, use fields), they both use a special character to 'delimit' one record from the next The best approach, with a database in dBase or similar format, would be to design a 'mailing labels' oriented report, with each different field preceded by an appropriate label-[combination.

AskSam's second quantum leap is the flavour of the month on the MacIntosh, Hypertext. The manual describes this fairly simply as the power to use ordinary AskSam records as 'point and shoot' menus. At its most flexible, it allows you to highlight any word in a record, and go to every other record which contains the same word in the database. This can be either completely unstructured, or limited (and accelerated) using the indexing powers of AskSam so that only records with the word in a specified field are retrieved, and these occur in a desired order.

A programmer can use Hypertext to link different files together, automatically invoke other programs, such as printing reports, locating overdue accounts, collating a bibliography. It doesn't yet have the graphical power of Hypertext on the MacIntosh, but that is in the development pipeline.

If only AskSam's manual was as well organised as the program itself. It starts with an explanation of the major menu options, in a fashion which fails to emphasise the key features of the program. Next comes the settings for options and means to reorganise files, long before it is obvious to a new user why you might want to reorganise files.

AskSam's most obvious strength is with textual databases, but its ability to handle numbers and dates means that it is not restricted to this area. Its programmability and Hypertext takes it several leagues beyond textual confines, making it a superb way to organise information, whose full power will only become evident after persistent use.

The only other package which may do what AskSam does is Lotus' yet to be released Agenda. It will be interesting to do a side by side, once Agenda is available, to see which is the more powerful management tool. □

dLetter

dLetter, the newsletter for serious dBase II and III users, is distributed free of charge with subscribers' copies of *Your Computer*. Regular features include dLatest (which covers updates and add-ons), dBriefing (reader's problems), dTips (usage tips), and Dear Dele (features of dBase).

Datumbases

In the July issue, Steve Keen covered four low-price offerings: Memory Mate, Q&A, Reflex and Dac Easy Base. In September, he will focus on dBase III+ and its clones, while also taking a look at a novel product which puts a relational database into Lotus 1-2-3 – Silverado. And, 'real soon now', we should see an *alpha* version of dBase IV for review by Matt dWhelan

Product Details

Product: Ability Plus
Distributor: Micro Australia
55 Blaxland Rd, Ryde 2112 NSW
(02) 736 3299.
Price: $429

Product: AskSam
Distributor: Software Suppliers
7 Avon Rd,
Nth Ryde 2113 NSW
(02) 888 1955
Price: $665

Product: Enable
Distributor: Optsoft
9/261 Old Northern Rd, Castle Hill 2154 NSW
(02) 680 3930
Price: $1220

Product: Open Access
Distributor: Software Suppliers
7 Avon Rd,
Nth Ryde 2113 NSW
(02) 888 1955
Price: $1200

Product: Rapidfile
Distributor: Imagineering
77 Dunning St,
Rosebery 2018 NSW
(02) 697 8666
Price: $674

Product: Smart
Distributor: Sourceware
586 Pacific Hwy,
Chatswood 2066 NSW
(02) 411 5711
Price: $1500

Table 1. *Included in the table are basic check points that should be considered if you're looking for a database. Exactly what you need will depend on what you want to do with the data, so work that out before you go shopping. This is not meant to be a definitive list of databases, but simply a comparative guide; for example, so many 'integrated' packages offer a database, that we've selected only a few of them; and time (and a lack of response*

	Memory Needed	Maximum Fields	Variable Length Fields	Maximum Text Field	Maximum Record Length	Maximum Records	Maximum Open Files	Maximum Indexes	Network Version	Price
AskSam** Software Suppliers, (02) 888 1955	256	No Limit	Yes	1600 chars.	4 Billion	4 Billion	1	No Limit	No	$575 ex tax
Clipper Imagineering, (02) 697 8666	256	1024	Yes	32K	RAM Dep.	255	255	15	Yes	$1175
Corporate Retriever Q Com, (07) 839 3544	512	21	Yes	No Limit	No Limit	No Limit	10	N/A	Yes	$2500 ex tax
Dac Easy Base* Mace Software, (07) 870 3600	256	60	Yes	256 chars.	255	No Limit	255	No Limit	Yes	$99.95
Database Access Software Suppliers, (02) 888 1955	256 - 384	100	Yes	80 chars.	32 Megabyte	32 Megabyte	8	100	Yes	$800
Dataease Dataease, (02) 327 8162	384 - 512	255	No	255 chars.	4000	65,500	32	255	Yes	$1250
DataFlex Aust. Micro. Soln. (052) 21 1300	384	255	Yes	255 chars.	16K	65,500	15	10	Yes	$1242
DataPerfect WordPerfect, (02) 498 7155	192	80	Yes	32,000	16 Million	16 Million	7	32	Yes	$978
dBase III Plus Imagineering, (02) 697 8666	256 - 384	128	Yes	254 chars.	4000	1 Billion	15	7	Yes	$1225
Enable** Optsoft, (02) 680 3930	384 - 640	254	No	254 chars.	254	65,500	No	10	Yes	$1220
Enterprise System Amsnet, (075) 531 1734	256	216	No	N/S	2048	32,000	7	16	Yes	N/S
Foxbase+** Intesoft/Resolution (03) 523 9700	360	128	No	4000	1 Billion	1 Billion	48	21	Yes	$695
Guru Intelligent Nexus, (03) 598 7411	640	255	No	65,000	65,500	No Limit	45	No Limit	Yes	$10,800

from some suppliers) precluded listing every product. Those products marked with a single asterisk were reviewed in our July issue; those with double asterisks** are reviewed in this issue. Prices are quoted for single users versions only, since the cost per user for network versions can vary considerably with the number of stations. Most of these databases are sold nationally – give the distributor a call for a dealer close to you.*

Knowledge Man/2 Intelligent Nexus, (03) 598 7411	640	256	No	65,000	65,500	No Limit	45	No Limit	Yes	$1295
Memory Mate* Imagineering, (02) 697 8666	256	No Limit	Yes	4800	4800	No Limit	1	No Limit	No	$119
MDBS III Intelligent Nexus, (03) 598 7411	256	32,000	Yes	131,000	16,400	No Limit	No Limit	No Limit	Yes	$6560
Open Access II** Software Suppliers, (02) 888 1955	256 - 384	100	Yes	78	32 Megabyte	32 Megabyte	8	100	Yes	$1200
Paradox Tech Pacific, (03) 690 9055	512	255	Yes	255	2 Billion	2 Billion	No Limit	No Limit	Yes	$1158 ex tax
PFS:File Imagineering, (02) 687 8666	256 - 320	512	Yes	3200	53,760	29,500	1	1	Yes	$448
Power-Base Eclipse Software, (02) 713 2322	384	64	Yes	40 chars.	1600 Bytes	65,500	10	6	No	$895
Q&A* PC Extras, (02) 319 2155	512	2182	Yes	1678	16,700	16 Million	1	115	Yes	$665
R:Base V Microsoft, (02) 452 0288	512	800	Yes	4K	1500K	No Limit	80	No Limit	Yes	$1358
Reference File Logo Distribution, (02) 819 6811	140	64	Yes	64 chars.	4K	255	1	64	No	$226
Reflex* Imagineering, (02) 697 8666	384	128	No	254 chars.	32,500	65,500	1	N/S	No	$209
Smart** Sourceware, (02) 411 5711	256 - 320	255	Yes	1000 chars.	1 Million	1 Million	99	15	Yes	$1500
Tas+ Business Tools, (08) 211 7922	380	No Limit	Yes	254	10,254	65,000	16	16	No	$230
VP-Info Pantek, (03) 836 9633	256	512	Yes	254 chars.	256	65,500	7	7	No	$250

PRINTRIX

More Power To Your Printer. Uses batch processing techniques to handle desktop publishing. Text files prepared by your favourite word processor can have commands embedded to tell PRINTRIX how to format each page in minute detail. It uses easily customised layout files to add fonts, page format- ting & graphic insertions. Accepts both FONTRIX graphics and standard graphic files. Greeking is now supported for on screen checking of page layout and shape. Apple II version now available. **$445.**

FONTRIX

WISIWIG Desktop Publisher. For business, studies or fun graphics. Allows expression of ideas, larger than screen workspace uses the full resolution of printer, NOT just the screen. Eleven fonts supplied & over 160 more available. FONTRIX can typeset from keyboard or directly from ASCII textfiles and can handle text and graphics from other programs. **$395.**

WENDIN-DOS

Opperating System. A self-bootable MS-DOS workalike that is multi-user & multi-tasking. Compatible with MS-DOS file structure. **$225.** WENDIN-DOS developers kit now available includes libraries written in assembly and includes source code. **$225.**

C86PLUS C

Programers Compiler. Applies artificial intelligence to produce highly optimised code. This version benchmarks 20% faster than Microsoft & 70% faster than C86 v2.3. Includes functional equivalent to most UNIX V libraries & implements the latest ANSI C library features. Over 250 library functions source level debugger support, optional assembly language output, 100% ROMABLE code. Optional assembly language output, shared file & network support. **$595.**

INTRODUCING C

Learning Process for C. An extremely useful educational tool or do-it-yourself C language package. Includes a 300 page manual with examples, references & tutorial, for fast learning, guides the user through the steps of programming C, teaching structured style, fundamental logic and techniques. **$325.**

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Fax (02) 938-4287

GEM, Byline and First Publisher

Tim Hartnell has been desktop publishing with three of the well-known packages under $1000 and came to several conclusions (while Matt had several thoughts of his own)...

IT SEEMED a relatively simple assignment. 'Review these three desktop publishing programs,' the editor said. 'And do it from the point of view of someone who's only had experience with the cheapest publishing programs, and wants to spend less than $1000'. It was not simple. It was not even particularly pleasant.

The three programs were GEM Desktop Publisher, Byline and First Publisher. Installing them was a pig, learning them was a bit of a worry, and using them ranged from a joy to almost total frustration.

GEM Desktop Publisher

I have been a sporadic GEM user for the past four years. In that time, I've come to regard it as an ingenious – but ultimately flawed, and unnecessary – attempt to model the Mac interface on a PC. The current implementation of GEM runs more quickly than the initial releases of the package and GEM Desktop Publisher seems to me to offer a far more intuitive approach to DTP work than the other two packages we're looking at here.

Most importantly, it is the only one of the three programs which approaches the process of designing pages in a way which, to me, seems both reasonably intuitive and quick. You work by producing rectangles, 'drawing them out' with the pointer/-cursor, then filling those rectangles with text or pictures, as if it was a Macintosh package.

I still refuse to use my Mac for anything more than the minimum amount of text entry (I type my text in on WordStar on the PC, strip it back to an ASCII file with a personally-modified and souped-up version of the Public Domain program WS-DOS, then port it across to the Mac for prettying-up with the software/hardware combination MacLink, all to avoid having to type on the Mac's inadequate keyboard). However, once the raw text is over on the Mac, 'typesetting' it, and laying it out, becomes a joy.

Given that prelude, you can perhaps appreciate why I value the GEM package. It *feels* like the Mac. Once you get over the horrendous installation process, you'll find that producing pages is a pleasure with GEM, but only if you have a hard disk system.

Although GEM Desktop Publisher will work with two floppies, it seems to take forever to start up each time. You first need to install GEM Desktop, which involves running the GEM Startup disk, and when that stops whirring, replacing it with GEM Desktop and when that stops whirring, replacing it with your laboriously-produced Applications (in drive: A) and Documentation (in drive: B) disks.

By contrast, on a hard disk system, you just type in GEM PUBLISHR and the whole thing gets underweigh.

A far more serious limitation with the GEM package when running on a twin-floppy system is a limitation which is extraordinary – when running GEM Desktop Publisher on a twin-floppy system, you cannot print anything from within the program! So, if you want to do a trial printout of a page you've just created in order to see what it looks like, you have to save the page or pages, exit from the publishing program, and evoke To Output from the Desktop program to print it. Once you've done all that, you have to reload the publisher program, and reload the document you're working on in order to modify it.

Installing the GEM program was the most difficult of the lot. It seems a tiny matter, but apart from the 11 disks required, the installation program insists that the FORMAT command on your DOS disk be called FORMAT.COM and refuses to continue if it is not. Although I discovered, much later on, that my now-discarded DOS 2.01 does call it FORMAT.COM, the version of DOS 2.11 I use calls the file FORMAT.EXE. The only way I could install GEM was to abort the process and use the rename command to modify (*horrors*!) my DOS disk and then restart the procedure. It still didn't work, so I aborted once again, formatted a further two floppies in advance of re-running the installation process, and then started again, and ignored the Format failure report which came up twice.

The documentation, in both the installation and operation sections, tells you to call one of your two working disks Publisher Documents. All the on-screen information refers to a disk called Publisher Data. There is no reason why a user of this program should be expected to realise that, in GEM-speak, 'data' is the same word as 'documentation'. Even the 13 Kbyte READ.ME file did not reveal this vital fact. In the end, I labeled the disk Publisher Data/Documentation which seemed the most sensible way to proceed.

I know that both the name of the FORMAT file, and the documentation/data confusion are pretty minor points, but ei-

ther of them would have been enough to ensure that many people could not even work the program. As I have version 2.2 of this program, you would have imagined that, by now, Digital Research would have at least got the manual and the disks to coincide more closely.

Once you get past these installation hurdles, the GEM package comes into its own. It is suggested that, whether you're working with twin floppies, or a fixed disk, that you prepare your text in advance on a word processor. Although you can, of course, modify the text slightly when laying out the page, and can add headlines and so on, the package does not really provide a very useful 'word processor'. It is simpler and faster to prepare your text, save it – along with any pictures you're going to use – and then pull it in when needed.

Figure 1 shows a typical GEM Desktop Publisher page being produced. It is very simple indeed. You draw rectangles on the page to enclose your text and images, and then just load them in from disk. The loading procedure is quick (a comment you'll appreciate when you read the review of First Publisher below) and simple. To draw your rectangles, and to work on a page, you can put the whole page on the screen as shown here, or a 'full size' view, showing the text and picture just as it will be when printed (see Figure 2), or even enlarge the view to double its real size.

Learning the rudiments of the program will take you the best part of half a day. A solid and clear introductory section in the manual leads you through the creation of a good-looking, and fairly complex, two-page document. Once you've created this document, you'll be able to tackle pages of your own quite confidently.

And following through with this tutorial page creation will teach you a couple of vital facts are not highlighted in the manual as much as they should be. First of all, to select the material you are to load in, you click on the name of that file which appears in the window about half way down the left hand side of the screen (it is headed B:GEMPAGES in Figure 1). The important thing, and the one which took me two hours to discover, is that you change the extension of the files which are to be selected (so files ending in .GEM are pictures, in .TXT are text, and .GWD are fully integrated pages), by clicking on the double triangle in the extension line (the line which says *.GEM in Figure 1).

The second important fact I learned creating the tutorial document, and one which by itself would have boosted the GEM package to the top of the list, is that the rectangles you draw on screen to hold headlines, text and graphics, 'remember' the order in which they are drawn. Each rectangle drawn – even though it is only formed of semi-transparent dotted lines on screen – takes priority over all earlier ones. So, when I put a rectangle down which encloses a picture of a PC (as

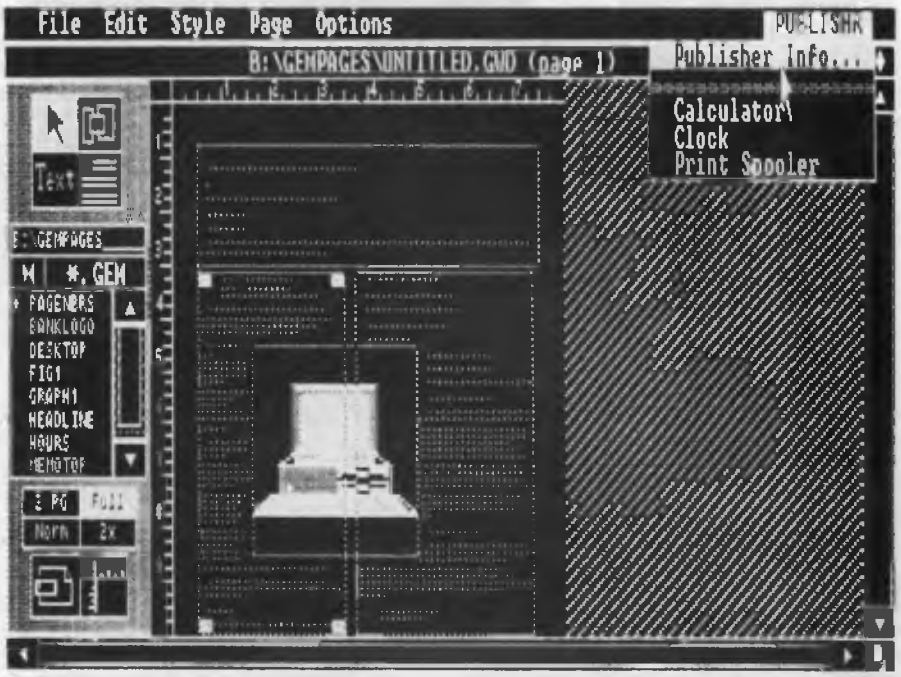

Figure 1. A typical GEM Desktop Publisher page being produced. Rectangles are drawn on the page, enclosing your text and images, and then loaded from the disk.

Figure 2. A 'full size' view of a page produced in GEM Desktop Publisher, showing the text and picture just as it will be when printed.

shown in Figure 1), I laid it on top of the others, which meant the text (held in earlier, lower priority rectangles) automatically, accurately, and extremely quickly, moved 'out of the way' of the picture, to flow around it. I moved the picture to several different positions on the screen once I'd discovered this, and the text rearranged itself in two seconds or less (and this on my tired old 3.7 MHz machine) to be around the picture.

I also discovered one unpleasant fact when using this program on floppy disks. A completed page is a very large file indeed, and after I'd struggled through the tutorial to create my first masterpiece, I tried to save it, so I could exit from the program to print the page out. However, if there isn't enough room on the disk, the program tells you this after you've told it to save the page. The program has not been written so that it tells you in advance that your document is larger than the disk space. This means that you lose the page. You need to abort the whole thing, clean out enough files to make space for your document, and start all over again. This also means that your data/distribution disk should contain nothing but the raw text of your document and the images you'll need. Leave the rest of the disk blank to hold your great work. (To be fair, I should have been warned, as this situation is covered in a two-page 'release note' provided with the documentation.)

So, laying out a page on the GEM package consists of putting your text and images on disk in advance, drawing rectangles to hold them (making sure rectangles for illustrations are created last of all), then manipulating both the rectangles' sizes and positions, and in modifying the text to make use of the typefaces provided. Two fonts are provided on the standard package (Swiss and Dutch, in plain, bold and italic, and in sizes ranging from 10 point (about the size of the text you're reading now) to 72 point (big fat headlines an inch high). Additional fonts can be acquired separately. Fairly obviously, the package can use images created with any of the other GEM packages, such as Draw Pls, Graph, Word Chart or Paint.

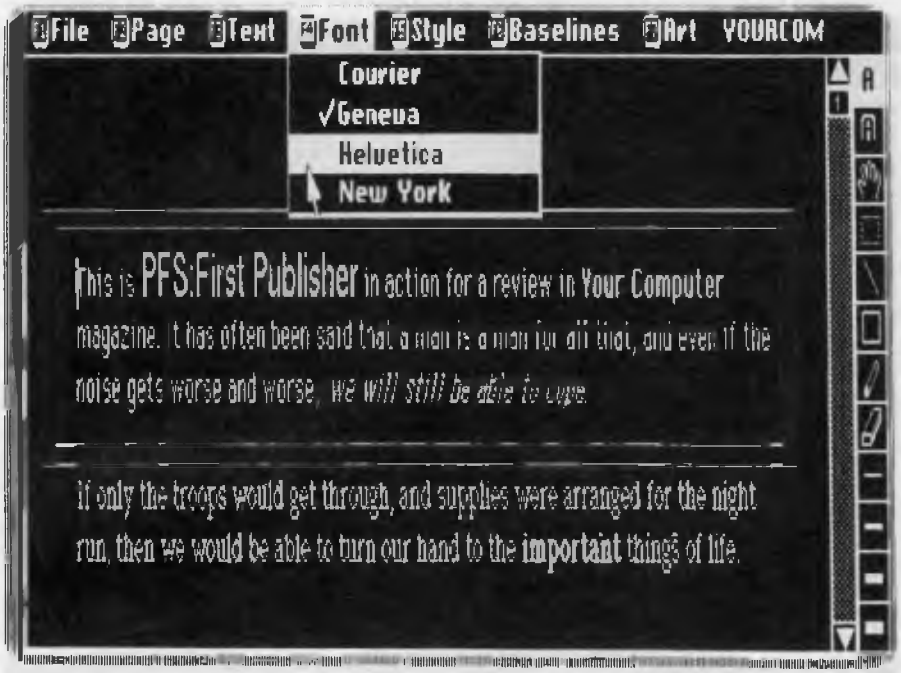

Figure 3. In PFS:First Publisher you modify text by highlighting it and selecting one of the four fonts provided.

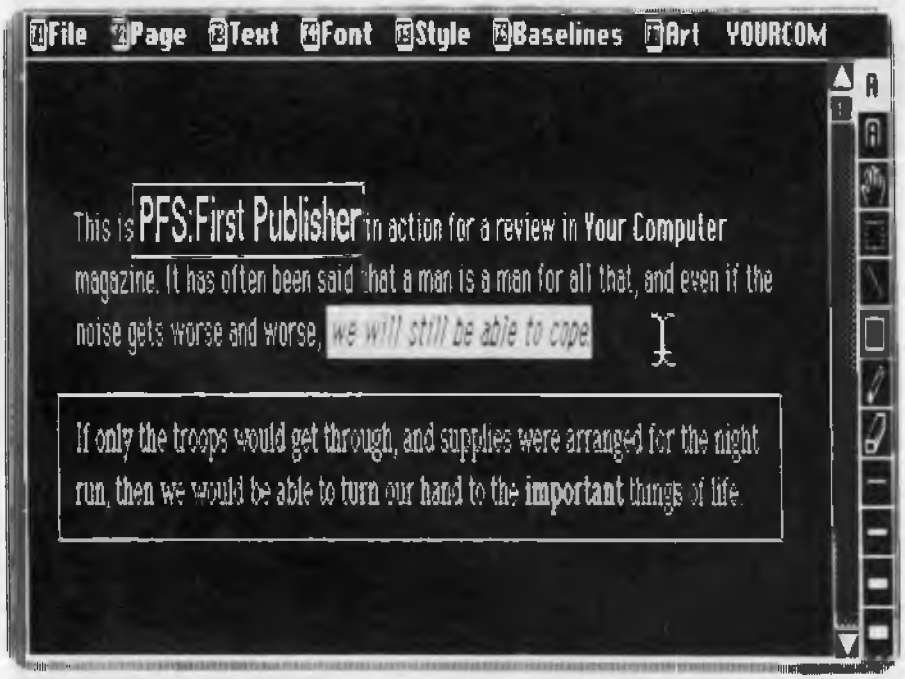

Figure 4. It's easy to put rectangular borders around words or paragraphs with PFS:First Publisher; the words 'we will still be able to cope' are highlighted in preparation for changing the font or style.

PFS:First Publisher

PFS:First Publisher (from the folks who brought you First Choice, Professional Write, Professional File and so on) is the cheapest of the three. To my mind, it is also undoubtably the worst of the three. This is not because it does not provide the facilities available on the other two packages, but simply because the implementation of these facilities is so diabolically slow you will almost be celebrating your *own* bicentennial before you've finished creating your first four-page newsletter.

There are, however, some bright spots. Installation of First Publisher was the least painful of the three programs. Only 3 disks were needed (compared with the 11 demanded for the GEM package and the 8

for Byline) and it took much, much less time to get the program running than the other two did.

However, when I ran First Publisher my heart sank. Hadn't I seen this program somewhere before? The whole screen design, the available typefaces, even the cursor shape seemed distressingly familiar. I exited from First Publisher, scuffled through my disk file of old things 'what I don't think I want but had better not wipe the disks just yet' and found Personal Publisher, which I reviewed unfavourably some time ago (August '86, actually) in *Your Computer*. Yup. It was the very same program. Only the name had been changed to protect the guilty.

My main criticism of Personal Publisher, when it was just about the only DTP package available for the PC, was the it was very, *very* slow. Loading in a text file is a nightmare. It loads in one word at a time, prints that word on the screen, goes back for the next word, prints that on the screen. You can actually see them appear, one by one. Chunk. One word. A tiny pause. Chunk. Next word. Another tiny pause. And so on. When I tried to produce a single page for my original article, it appeared to take some five minutes to load in the few hundred words which occupied less than a page.

'Oh well,' I thought, 'they've had a couple of years to work on it. The code has surely been optimised to some extent.'

I compared the lengths of the main file. Personal Publisher was around 160 kilobytes, and First Publisher is just 10 Kbyte bigger. I think the extra 10 Kbyte is mostly cosmetic, changing the opening screen and so on. I found no evidence during the time (which was both unpleasant and, I admit it, somewhat brief) I fought the package for this review that any substantial effort had been made to correct the design faults which lead to the original program disappearing very quickly and quietly from the scene.

So, given that preamble, what do you get for your hard earned stuff? The answer is simple. Enough. Enough features, that is, to produce fairly good, short documents – if you have the patience.

Up and running

Running the program on a hard disk system, especially a system which runs faster than the standard PC, reduces the pain of the program considerably. So you may well find it easier (and faster) to use than I did, if your system boasts a hard disk, and/or a 'go faster' mode.

Like the other packages reviewed, you call in text from a file on disk (or type it in directly on the screen), modify it by highlighting the text, then selecting a font (four of which are provided with the program: Courier, Geneva, Helvetica and New York), a size (9 point to 36 point, though not all sizes are provided with the range of fonts) and a style (plain, bold or italic).

The program treats text and graphics as though they are on separate transparent sheets, which lie 'on top of' each other. When you're working on a graphic screen, the text fades out a little, and *vice versa* when working with text. As with the GEM package, it is easy to get the text to wrap around your graphics, but it is dismally slow. You can also put rectanguar borders and the like around words or paragraphs (as I have around PFS: First Publisher and the second paragraph in Figure 4, which also shows the words 'we will still be able to cope' highlighted so the font or style can be changed).

First Publisher takes a leaf from the Macintosh songbook and provides 'clipboards' where you can store text and graphics temporarily while deciding where you want to put them. You can, for example, delete a paragraph from the screen by 'putting it on a clipboard' and later 'pasting' it into a different part of your document.

First Publisher also allows you to see – if you so choose – the 'baselines' on which the text and graphics sit. You can change the spacing of these to get your text to take up more or less space and thus manipulate it to occupy exactly the space you determine, in a way which is not provided on the GEM package.

You get a number of useful tools when manipulating graphics such as the ability to save and load pictures, move such images around the screen, invert them, magnify them to make find adjustments, and modify the overall size of the picture. This flexibility, like all the other good features of the program are, however, offset by the dismal slowness with which the whole thing works.

If you're a patient soul or your PC runs like a First Fleet ship before the wind, or both, you'll find First Publisher acceptable. But remember it is the cheapest package of those I am looking at, and in the field of DTP, remember WYPFIWYG (What You Pay For Is What You Get).

Byline

Our third package, from Ashton-Tate, gives the impression of being the most upmarket of them all. It does not clunk and grind like First Publisher, it allows you to run it without having first to load in an operating system like the GEM package, and it allows you to actually print a document from within the program.

However, it exacts a slight penalty for all this. Byline assumes you are a very

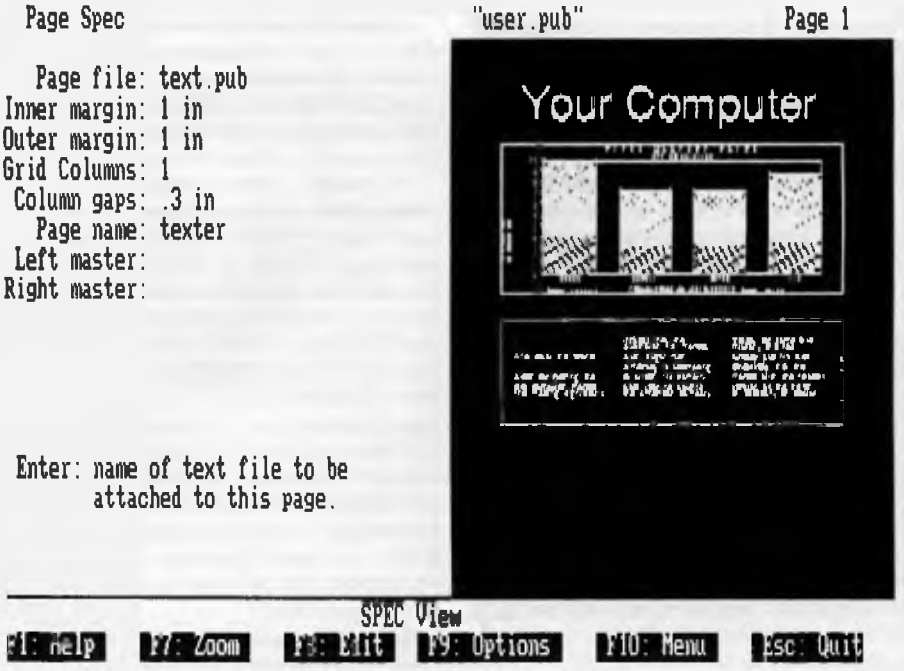

Figure 5. When you're working with Byline, you see your page on one half of the screen, and details about that page to its left. You can also have two facing pages displayed.

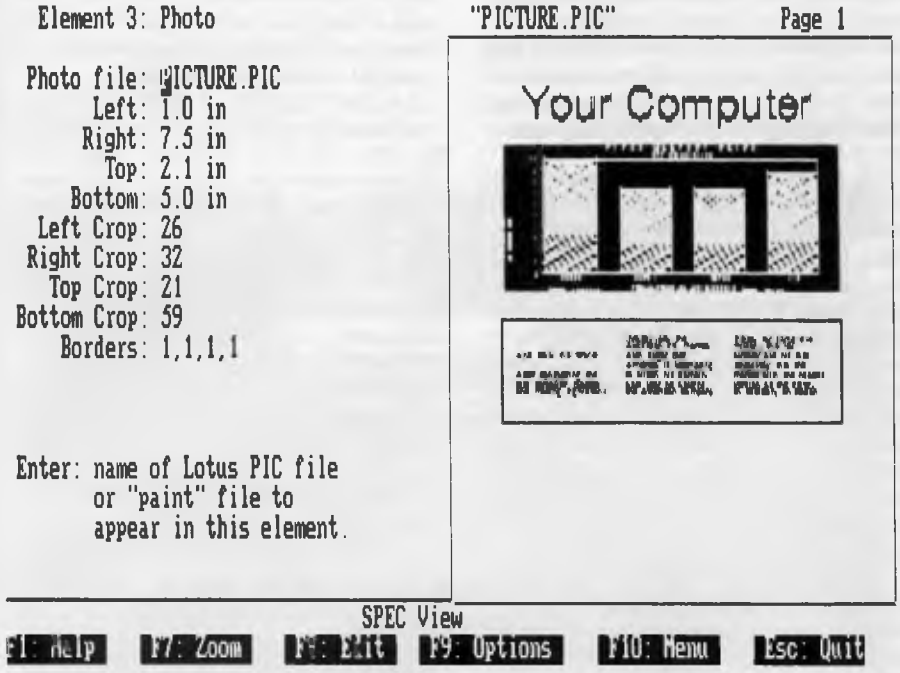

Figure 6. In Byline, to select a specific element, in contrast to having the whole page selected, you press the Tab key. If you press it twice, the picture will be selected.

dumb monkey. Or at least Ashton-Tate's demented lawyers think you are. Every time you run the program, the world's most childish response frame appears on the screen. Believe it or not, to get the program to start, you are first presented with a deft summary of the 'software licence' for the program. Then – and this is the 'kindergarten school of the computer monitor' stuff- you read: 'If you agree to these terms, put Byline Working Disk 2 in Drive: A, and put your DATA disk (for Publication files, Text files and so on) into Drive: B. If you agree, you press the Home key and the program itself begins. This is probably the most asinine opening screen I have ever seen on a program. It is legally meaningless, and does nothing but frustrate!

But we can live with the stupidity of American lawyers. What is the program itself like? Installing it is another exercise in helping the makers of floppy disks to become rich You need eight formatted disks to get underway, two or more hours and a degree in executive patience. Once you've installed the program – and I had none of the problems I experienced with the GEM package when installing Byline – it is fairly easy to learn to use.

'Because Byline works the way you do, you don't wast time with a mouse or a new graphics environment,' says the blurb on the package. 'Familiar keys and predictable operations mean that desktop publishing it no longer just for full-time graphics artists.'

Although I have no idea what 'because Byline works the way you do' means, it is obvious that the designers of the program spent a lot of time thinking about how a DTP package should integrate painlessly into a working office environment

It assumes, rightly enough, that you're already likely to be pretty well locked into your current word processing package, and may well have a number of text files you want to use. Byline takes text directly (not just in ASCII format) from practically all of the major word processors. In addition, when you modify that text within Byline, and then save it, it is saved in the same format in which it was created That is, if your original file was typed in WordStar or MultiMate, the modified text file within Byline will be saved in WordStar or MultiMate, so you can massage it further within your word processor. Of course, if you prefer, you can type your text within the program itself.

Byline also assumes that your very modern paperless office will be awash in graphics which are needed within documents, so the program takes – with narry a hiccup – graphic files from such programs as PC Paintbrush, Lotus and Symphony.

Whereas the other two packages we've examined work hard to produce a Mac-like appearance, Byline takes its own route, without departing from the dictates of What You See Is What You Get. When you're working with Byline, you see your page on one half of the screen, and details about that page to its left (see Figure 5); you can also have two facing pages displayed at once, if you insist. The program takes a unique approach to organising pages and working on them. You do this by selecting portions of the page – like a picture or a headline – and then work on that selected portion. The selected part of the page is shown in inverse video.

The page shown in Figure 5 contains three elements – a headline (*Your Computer*), a picture below it, and a text block below that This Figure shows what you see when the whole of the page is selected. The name of the file ('user.pub' in this case) is shown at the top of the screen, along with the number of the page being worked on The page itself is shown as the solid area, and the information to the left of this tells you a great deal about your page.

To select a specific element, in contrast to having the whole page selected, you press the Tab key. If you press it twice, the picture will be selected (see Figure 6). The name of the picture file is shown (PICTURE.PIC) and the specifications of that picture are shown to its left. To change the size of the picture, you just move down the specifications – using the arrow keys – to the one you want and type in any change you want. For example, if you wanted the picture shown here to start two inches in from the left hand margin (in contrast to the one inch shown), you'd just type a 2 over the 1 after the word Left.

Similarly, when working with a text block, like the one shown in Figure 6 below the picture, the number of columns, the border (if any) around the text block, the type face, the style which is being followed, and so on, are all controlled by changing the specifications.

You can see how different this is from the other packages. Whereas you work with them directly on the relevant element (that is, you highlight a piece of text, then pull down a menu and then click on the change you want), with Byline you usually work at one remove, by modifying the specifications, and then seeing these changes effected.

This is, in many ways, a more accurate

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Dr Geoffrey Lewis. *In 1965 he was selected by IBM to demonstrate the new System 360. He was selected following a sensational score of 150 out of 120 in a university test for mathematical aptitude. He was awarded the extra points for exceptional problem solving ability and in the next ten years nobody else got more than 75 marks. He has applied his problem solving ability in producing four software packages written for Australian conditions.*

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DEMO PACKS

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way of working, than by using your eye and a mouse. If you're interested, as I suggested before, in producing pretty straight, businesslike reports, rather than wildly creative newsletters and advertisements, and especially if you have a lot of text and/or graphics files which you want to use, then Byline is a package which deserves your consideration.

First Publisher takes a leaf from the Macintosh songbook and provides 'clipboards' where you can store text and graphics temporarily while deciding where you want to put them.

Conclusion

I know it's pretty frustrating, but I really can't say 'Package X is the best one; buy it'. It's not that I'm afraid to do that – I've squealed on crappy software in the past, and am sure to do so again, just as I've praised some products to the skies when I think they've deserved it. And I know it would make your choice much simpler if I came down firmly in one camp or the other.

But, and this is a but that really matters, the decision as to which is the 'best' package depends on several factors which only you know about: how much cash you're willing to splash; what equipment you have; how patient you are; and what you want to do with the software when you've got it. That said, let me share my gut reactions –

Conclusion One – unless cost is your first priority, it's hard to find many reasons for suggesting you should buy First Publisher. Although it is simpler to install and use than the others, it is more limited, and is depairingly slow. If you're rich, have a hard disk and want to be fairly creative in your DTP work, or if you own an Amstrad PC, I'd suggest you seriously consider investing in the most expensive of the three, GEM Desktop Publisher. If your system does not have a fixed disk, and you mainly want to produce straightforward, professional-looking business reports and the like, take a good look at Byline.

Conclusion Two – don't expect to be able to produce anything worthwhile until at least the second solid working day with any of the programs. In contrast to NewsMaster (a much more limited package, but *much* simpler to get running; when I reviewed it in YC, Jan. '88, it took me just 70 minutes from first startup to my first complete page being printed), the installation process for the three packages was a time-consuming nightmare. I would not have been able to install the GEM package at all from the batch file provided (due to some apparent errors in it), unless I had known exactly what was going on, and could interrupt the process and do some fiddling (a procedure which many newcomers to computers would have found impossible). The other two were installed without undue trouble, but each took a fair amount of time and patience.

I was installing them on a bog-standard, IBM twin-disk PC, figuring that testing the programs on an unimproved system of this type was the fairest way to do it. Mountains of preformatted disks were needed for copying the supplied master disks and installation (seven disks for the GEM program, and I really should have had eleven, if I had followed their instructions exactly; three for First Publisher; and eight for Byline).

Once the programs have been installed (and this will take you from 50 minutes to 3 hours, if you're very careful and lucky), it will take at least another 3 hours of careful concentration to learn even the rudiments of the package. However, once you're past those initial hassles, your speed of operation should increase quite markedly; working with your chosen system will become increasingly productive and pleasant.

Conclusion Three – No matter what the publicity says regarding these three packages, DTP work with a PC seems destined to remain a poor cousin to working on the Macintosh. If you need to do a lot of DTP, in a professional environment, please consider the Macintosh route, even if the rest of your installed PC base is IBM-compatible. If your DTP is only a small part of the work you do, or you're just producing newsletters for a school, club or church, stick with the PC.

Note that all three packages – along with most other DTP software for the PC – have several features in common. In all of them you load text and images in from disk to areas of your page specified in advance. You can see the whole page on screen as you work with it, and can enlarge the view for a detailed closeup. Finally, on two of them (GEM and First) you change the typeface in which text appears by 'highlighting' it (that is, you 'drag' the cursor – usually a vertical line of some sort *through* the words to be changed, and they reverse out, to be white words on a black background), and then select the typeface you want from a selection which appears on a drop-down menu. A slightly different, but analogous, procedure is used with Byline.

It's also important to note that while all three programs can be operated without a mouse (and Byline cannot be operated with one), I feel that both the GEM package and First Publisher are unwieldy and impracticable for non-mouse owners to use. All programs are available either on 5¼ inch or 3½ inch disks.

The important differences between the packages lie in the ways the areas for text and images are created, the speed with which material loads in from the disk, and the ease with which modifications can be made. All three packages seemed to me to be fairly similar in terms of the way in which the image on screen appeared on the printer. That is, it seemed very much a case of getting on paper what you saw on the screen. This was true for all three programs I reviewed. □

Product Details

Product: GEM Desktop Publisher
From: Digital Research
Distributor: Micro Australia
15 McDonald St,
Mortlake 2137 NSW
(02) 736 3299
Price: $782 taxed

Product Details

Product: PFS:First Publisher
From: Software Corporation
Distributor: Imagineering, 77 Dunning Ave, Rosebery 2018 NSW
(02) 697 8666
Price: $190 taxed

Product Details

Product: Byline
From: Ashton-Tate
Distributor: Imagineering, 77 Dunning Ave, Rosebery 2018 NSW
(02) 697 8666
Price: $595 taxed

"Looking Down" on Low-end DTP

Matt Whelan has his own thoughts on these three packages . . .

I am still not sure there is such a thing as 'low-end' desktop publishing – hell, with the number of high-end word processors around, 'cheapie' packages just shouldn't have a chance.

The word processors do a better job in many cases – and are often more suitable for people who have been convinced they need DTP.

DTP combines art, typography and technology – and you can't do that on the cheap. No way! So – I decided to accept Jake's offer of providing a counterpoint to Tim's article. After all, if Tim's brave enough to use these rotten things on floppies, I really should do anything I can to help out.

Right, First Time

Tim and I looked at the packages separately, and we won't get to see each other's opinions until you do – but I cheated a little and made Jake divulge Tim's 'winner'. You know what? He's right, and he doesn't even know the best reason why.

Because I always run late with my stories, I got to try a later version of GEM Desktop Publisher, running under GEM Version 3 – and the new one has a major improvement Tim didn't get to find out about.

What's so special about it? Well, it's the first low-end product that can do anything useful with a Hewlett-Packard style laser printer – which represents better than 85 percent of the PC-based DTP market.

Byline treats them as dismally as GEM once did, but the latest GEM version comes with bundled BitStream fonts. These are font outlines, which you can 'build' to a range of sizes and styles – and font support is the answer to a H-P user's prayer.

Previously you had to shell out more than the cost of GEM Desktop Publisher to get a half useful range of soft fonts, and doing anything with them was so difficult most people didn't even try. One of the reasons for Ventura's success is that it came complete with LaserJet fonts, but even its range is well down on the potential supplied by the BitStream bundling.

Output the Key

If it wasn't for this font support, I wouldn't care much for GEM Desktop Publisher – I found it moderately boring when I tried the earlier version. But now, at least, I can accept it as an alternative to the top-end packages for those whose needs aren't as complex.

Tim and I looked at the packages separately, and we won't get to see each other's opinions until you do – but I cheated a little and made Jake divulge Tim's 'winner'.

I won't even talk about First Publisher: it's a mildly improved version of a dog of a program, Clickart Personal Publisher. I don't care how many times they change the brand name (this is the third), I'm not going to change my mind about it!

Byline, on the other hand, is worth thinking about – especially for a dBase dGenerate like me. On first appearances, Byline is the classiest product of the three – but appearances can be deceiving . . .

Byline is almost a godsend for dBase-equipped offices: a DTP program that reads dBase databases directly, allows your data to be 'mailmerged' into a publication, and offers high-quality printer control over database output, is just what we've always wanted. If it was a better DTP program, it would be perfect!

Unfortunately, Byline falls down in the one area where it should shine – printer control. Even though it handles a wide range of printers, including the major lasers, it doesn't do it particularly well. As a database publishing accessory, it is 'A Good Thing'; as a desktop publisher, it is decidedly mediocre.

A clue to Byline's shortcomings comes immediately you attempt to select a font for a PostScript printer: it has four fonts available, exactly the same number offered for 'lesser' machines like the H-P LaserJet. Peculiarly, these are not the four basic fonts expected of a PostScript device (Times, Helvetica, Courier and Symbol), but a mixture of the advanced font set of the Apple LaserWriter Plus (Bookman), plus the more standard fonts.

Limiting us to the basic PostScript font set (all PostScript devices are expected to have these) would be more understandable – as it stands, it indicates a software limitation in Byline rather than an acceptance of any hardware limitation.

Likeable

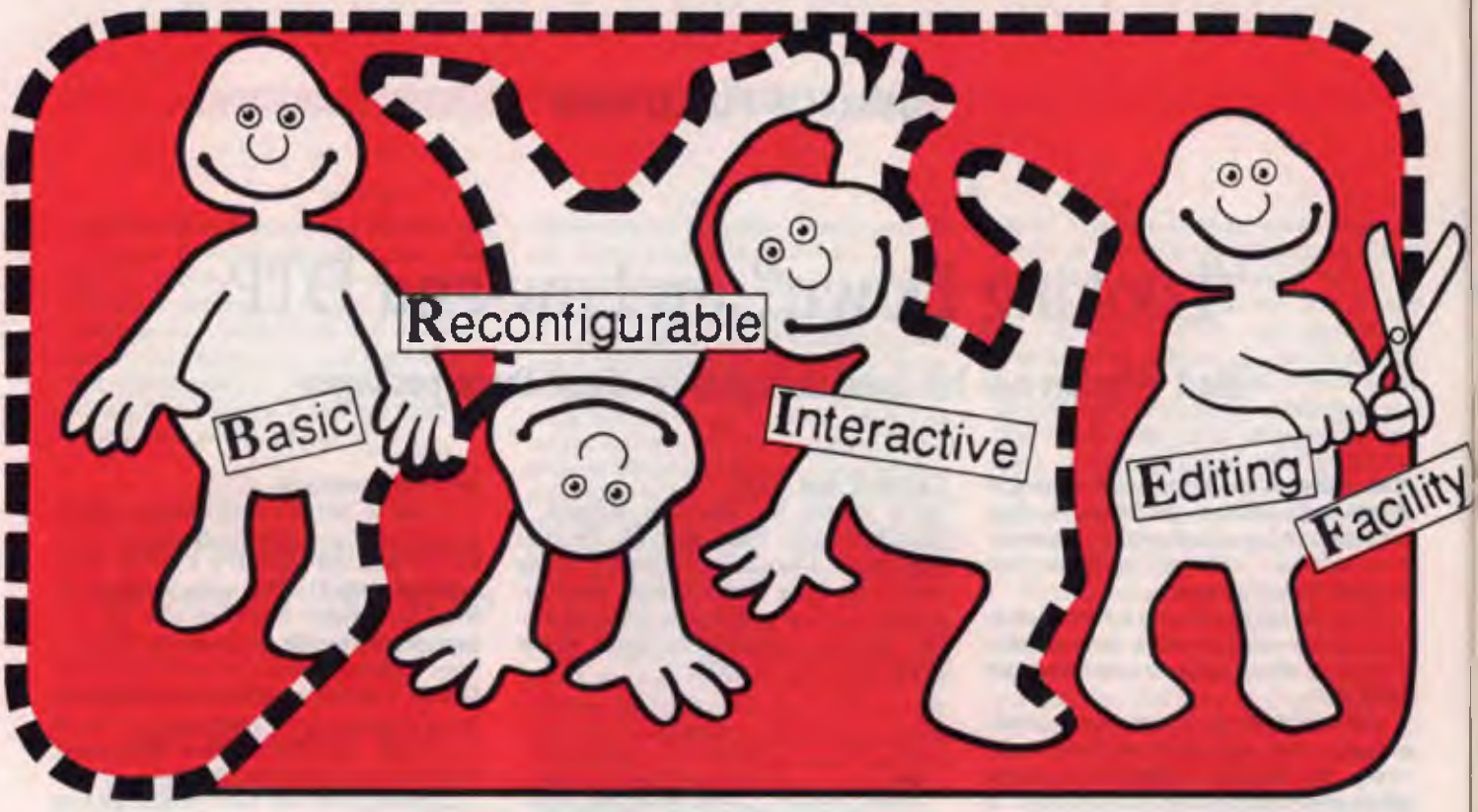
Regardless of its limitations, Byline is a likeable product. It avoids a mouse-based interface in favour of a more 'traditional' IBM-style user interface and, surprisingly, it works. First-time DTP users brought up on IBM style machines may in fact be more comfortable with it!

The built-in word processor is better for text entry than those in the other packages, too, allowing you to zoom in to a full-page view of a standard text-style word processing screen with on-screen display of bold, italic and so on.

At this point you can call up the structure of any of your dBase databases and 'load' field descriptors, nominating such things as whether to move onto the next record when reading the field. Thus it can be used effectively for dBase reporting, and multi-item documents like company or departmental phone lists.

Unfortunately, its lack of printer control lets it down. Unlike GEM, Byline makes no allowances for flexibility with H-P soft-fonts, and treats big-memory, multi-cartridge Series II machines and the crippled original base LaserJet almost equally.

Ashton-Tate would have been better off calling this one a Database Publisher, rather than a Desktop Publisher, until the new (and supposedly significantly improved in this critical area) version drops on us 'Real Soon Now.' □



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Windowing. BRIEF's windowing capability is unmatched. The only limit to the number of windows you can open is the size of your screen, the ease with which you can move text between them is incredible. If you find yourself working on multiple files, windowing could save you a great deal of trouble.

Multitasking Support. BRIEF works with most common multitasking programs. You can compile while you edit.

Template Editing. BRIEF can save you countless keystrokes by letting you type in abbreviations and expanding them to entire programming constructs. (procedures, loops, conditionals, etc.) Your parentheses will always pair up.

Regular Expression Search. Have you ever had to translate a program from one language to another? BRIEF has an unparalleled pattern-matching facility that's tailor made for complicated translations.

Undo. BRIEF's power doesn't lead to more mistakes. In fact, the Undo facility makes messing up virtually impossible: there is no command affecting your text that cannot be undone. (BRIEF has other safety features, like autosave and backup files, as well.)

BRIEF Version 2.1 can be swapped in and out with a single keystroke, allowing immediate compilation with even the largest compilers: Microsoft C5.0, Quick C, Turbo C, Lattice C, dBXL, FoxBASE+ V.2, Clipper, etc.

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FoxBase +

Not only does FoxBase provide superior performance and have additional, desirable features over dBase III+ – it is also cheaper!

FOXBASE+ IS ONE OF several compilers for dBase III+ source programs It was developed by Fox Software of Ohio in the US Of the several I know of, FoxBase+ reportedly gives the best performance. Many applications software developers use dBase III+ for program development, and then compile with Clipper

I tried Clipper briefly, submitting the PSU programs for compilation. Clipper produced many compilation errors, and was unable to producing a working program without considerable changes.

In passing, I should mention that there seems to be a number of resellers of Foxbase+, but only BS Microcomp, of those I approached, was willing to provide a demonstration; one discounter went so far as to tell me: 'We sell software real cheap. We don't provide support for it.'

The application I was developing was required to record timesheets and produce a variety of records; files were constructed to record data about clients, approved applications, and the people doing the work. It is expected that the workers may work on more than one project in a time period, and that there would be more than one record of work on an individual project within the time period.

Reports were to be printed on an Hewlett-Packard LaserJet Plus printer, with printed borders, and featuring shaded barcharts. The reports required quite a deal of computation, both in accumulating consolidated figures reflecting the amount of work done each month, and to calculate the bounds of various bars and lines to be drawn in the reports.

Using FoxBase+

One can use FoxBase+ as a dBase III+ replacement. It can compile dBase source programs at run-time. This causes a small delay when it begins execution of a program, but the program then runs much faster than it would under dBase. FoxBase can also use the dBase configuration file during initialisation.

Inside, the manual does mention some dBase III+ facilities which are not implemented. Of these features, I have used one: the SET CATALOG statement. This feature causes dBase to maintain a catalog of the database files, index files and so on. FoxBase+ simply ignores the SET CATALOG statements; this means that the program will execute successfully, unless it uses the catalog directly. (On the other hand, Clipper refused to even compile the program containing the set catalog statements.)

My programs represent a fairly respectable compatibility test, since I use most of the features of dBase III+. They have been run successfully with only three modifications: FoxBase+ found an extraneous ENDIF statement in one program, missing ENDIF statements in others.

As a dBase II programmer of some experience, I use a lot of statements like @ $+1,25 say Clipper choked on it: FoxBase handled it with ease.

Before I obtained any product for evaluation, I recognised that there are some features of the programs which would make it difficult for a compiler to improve the execution speed. In most languages you can code a construct such as ServiceUnits(10) to mean the tenth element of a one-dimensioned array called ServiceUnits dBase has no such facility. However, it has a facility called macro substitution which can be used to have the same effect. With a sequence of commands like this –

```
n = 1
do while n < 10
  x = ltrim(str(n))  && Instructions like
                        these two are required
  y&x = 0               && for every access
                           to an element
  n = 1 + n
enddo
```

A sequence of variables called y1, y2, y3 ... y9 is defined and initialised. This requires a large number of instructions to be executed, and does not lend itself readily to compilation.

To test the performance improvement, I timed the production of one of the PSU reports. I timed it twice with dBase III+ and then with FoxBase+. The second execution was quicker in each case because of some disk cache software I use: on the second execution all the records were in buffers. The times (in seconds) were 50 and 48 for dBase; 15 and 14 for FoxBase+.

Unlike dBase III+, FoxBase+ implements arrays. By using these, I would expect execution speed to rival that of programs written in Pascal, PL/1 or other such languages. Use of this feature would probably justify the purchase of FoxBase+ without taking into account its other benefits.

Differences

Foxbase+ is larger than dBase III+. This means that it requires more disk space to store it, and it requires more RAM during execution. I had to reconfigure my disk cache software to make more room for FoxBase+ to run.

Since FoxBase+ has more facilities than dBase III+ (run-time compilation, dimensioned arrays and others I've not mentioned), this is to be expected; 640 kilobytes of RAM is adequate

FoxBase uses a different index structure from dBase III+ When FoxBase+ encounters a dBase III+ index, it dynamically builds one of its own (with a different file name). This allows dBase and FoxBase to be used alternately on the same data. However, neither product maintains the other's index files. This means that either only one product is used to update the data, or indexes need to be rebuilt from time to time.

Of course, having bought FoxBase+ there is little need to use dBase III+ again (unless you are a software developer who needs to be sure the programs will run with dBase).

Summary

I have not tested all the facilities of FoxBase+. Those I have tried work fine. I could not identify any compatibility problems with FoxBase+. It provides superior performance and has additional, desirable features over dBase III+. It's also cheaper than dBase III+ or Clipper. □

Product Details

Product: FoxBase+
From: Fox Software, Ohio, US
Review copy from: BS Microcomp, 576 Lonsdale St, Melbourne 3000 Vic. (03) 670 8451
Price: $695 taxed (single user); $995 taxed (multiuser)

BALER

Lotus 1-2-3 worksheet compiler

WHEN I TORE tore the brown paper wrapping off Baler I didn't know what to expect; the first thing that caught my eye was the name of the local distributor: Vaporware – *Vaporware*? Surely they're not serious? Vaporware is the term given to software that is announced before it is finished, in some instances even before it has been started!

But, Baler, from Brubaker Software in Indiana, *is* real. The binder calls it a 1-2-3 compiler and the manual calls it a worksheet compiler. A good description comes from the Introduction to the manual, which reads (with minor alterations) –

'Baler allows you to convert your Lotus 1-2-3- worksheet . . . into a stand-alone program which operates in a similar manner. The template is one you created in Lotus 1-2-3 and saved using the /File Save command. In developing the spreadsheet you wrote formulas, or algebraic expressions, to define your spreadsheet. You used powerful Lotus 1-2-3 commands to establish formats for input areas and report areas, and to develop a working, bug-free (you hope) program.

'Baler converts that 1-2-3 spreadsheet into high-level source code, which is in turn converted to a 'machine-language program' by the Basic compiler, in an automated process. Because your standalone ('baled') program is in compiled Basic, you can realize many benefits that are not possible in Lotus 1-2-3.'

Clear enough? Well, then, don't read page 12 of the manual which asks 'Really what is Baler?' and then answers 'First of all, it's not really a compiler. It is a code generator, but of a particular nature.'

OK, so Baler is a compiler but it isn't really a compiler. Actually that is about par for the manual, which spells everything out in excruciating, unreadable detail. Even by the standard of computer manuals this one is bad, because it tries to combine a tutorial and reference manual together. Everything you want to know is there, but you may have to search a bit to find it.

Security and economy are two of the best reasons for buying software: here's a 'Vaporware' product (reviewed by John Nicholls) that offers both to commercial 1-2-3 users . . .

Why use Baler?

Security is one good reason. In Lotus 1-2-3 there are a number of features to stop someone changing your spreadsheet: you can protect ranges and you can hide columns, but a knowledgeable user can easily circumvent these precautions. If a formula is in an unprotected cell, it is easy to overwrite the formula accidentally. With a compiled program, accidental changes are virtually impossible.

Economy is another reason. If you design a 1-2-3 program that is to be used by a number of people, each of them must have their own copy of 1-2-3. With Baler they don't need to have 1-2-3, as you are able to make and distribute as many copies as you like of the compiled program. In a large firm this could mean significant savings.

Using Baler

Baler is contained on five 360 kilobyte disks, and is installed on a hard disk by a simple Install program, or you can do it manually. The automatic process is straightforward and doesn't change any existing files, although you can do more complex things such as changing the environment space or changing colours if you so wish.

Whether you need to make any changes to an existing 1-2-3 spreadsheet is the vital question if you are to use Baler. Possible changes are set out in detail in the manual and on the sample worksheets provided. Although they appear complicated at first, they are logical and should give you little trouble. In brief, the rules are –

1) Unprotect any cell into which the user has to enter data. Protect any cells into which the user should not enter data.

2) Put numerical data, including zeroes, into any cell which can sometimes hold numerical data.

3) Put alphabetic characters, a to z, into any cell which can sometimes hold alphanumeric characters.

4) Change any formula which causes a cell to be used sometimes for characters and sometimes for numbers.

Once you have prepared your spreadsheet, the use of Baler is quite straightforward. You need first of all to go through a set of menus providing a wide range of choices. These provide for whether to use Lotus error checking, whether to allow overwrite cells, what audit reports to provide, whether to create an .OVR or a standalone .EXEfile, and whether to eliminate certain features from the program. If you elect to remove some of the features you save memory in the program.

Running Baler is simple, as all the processes are automated. On my first attempt my system froze halfway through, and not even a Ctrl-Alt-Del would allow me to continue. I never discovered what the problem was, but after that the program ran without any problems. On the small worksheets I was using, 'baling' (linking and compiling) took only a few minutes, although the manual warns that large programs may require more than an hour.

When you look at the new program it doesn't appear all that different, although there certainly are differences. One is that

you can no longer move the cursor to areas outside what were the edges of the spreadsheet. To enable someone else to run your program; you need to copy seven or eight files to disk. Depending on the size ofthe program, more than one 360 Kbyte disk may be required. However as we said earlier, you do not need a copy of Lotus 1-2-3 to run the new program.

Some Lotus commands have been changed, others are not supported, and there are some new commands. The range of available commands is shown on the Lotus-like menus, so the changes are easy to see. You may be interested in some of Baler's new advanced macro and keystroke commands –

{btab}: Shift-Tab (Back Tab) key,
{tab}: Tab key,
{BORDERSOFF}: Turn off Borders,
{BORDERSON}: Turn on Borders,
{ESCAPEOFF}: Disable the Esc key,
{ESCAPEON}: Enable the Esc key,
{SAVEPROFF}: Cause /FS not to save .PR? file,
{SAVEPRON}: Cause /FS to save .PR? file,
{SLASHOFF}: Disable slash commands, and
{SLASHON}: Enable slash commands.

Menus

If you carry out the steps outlined, you will finish up with something that still looks like a Lotus 1-2-3 spreadsheet. If this is not to your liking, you can use the dreadfully named program Menuize.wks to convert the Lotus-style menus into a more conventional full-screen menu. It is not one of those clever little pop-up menus that pop up at unexpected places, but is a functional, no-nonsense offering.

The benefits of Baler, as useful as it may be in its own niche, are restricted to those who develop Lotus 1-2-3 spreadsheets for commercial purposes, either for other individuals in the same organization, or for sale. In either case, there are the obvious advantages mentioned above in protecting the program from unauthorized alteration. Of course, it also avoids the unnecessary purchase of additional copies of 1-2-3 when the user will only be extracting or adding data, but not otherwise altering the spreadsheet. □

Product Details

Product: Baler
From: Vaporware, PO Box 286
Guildford 2161 NSW
(02) 632 8841
Price: $775 taxed

```
                    COMMAND ELIMINATIONS MENU

CODE     COMMAND                                          STATUS

A        Format & Label /RF /WGF /RL /WGL /RM /RS
B        Range Protect and Unprotect /RP /RU
C        Define Data Table /DT
D        Data Sort /DS                                    Eliminated
E        Data Fill /DF                                    Eliminated
F        Data Query /DQ
G        Data Distribution /DD                            Eliminated
H        DIF File /F#                                     Eliminated
I        {RECALC} and {RECALCCOL}                         Eliminated
J        Graph /G                                         Eliminated


Enter/PgDn to continue, Esc/PgUp to go back, CODE to toggle elimination
```

Figure 1. *Baler's Command Eliminations Menu allows the user to eliminate certain 1-2-3 capabilities from the 'baled' program. Not only does this improve the security of the data, but it can save on disk space and simplify use.*

```
The limits on the number of cells are:
    Total number of cells: 17399
    Value and variable label cells: 8156
If these numbers are less than 32000 and 15000, you can increase
    capacity by running the BALER on a system with more memory.
Pass 1 ...
Pass 2 ...
Doing Initial Sort
Working...
Sort Cell Table ...
Output Data Files ...
Creating DEBTS.PR1
Creating DEBTS.PR2
Output BASIC Source ...
Detect Formula Patterns
Pass 3 ...
There are:
          45  Value Cells.
          28  Label Cells.
          17  Fixed Labels.
         147  Input Cells.
Shrinking File BDEBTS.BAS
Creating Compile/Link Batch file CLDEBTS.BAT
```

Figure 2. *Baler's onscreen report. The program reads the input file (Debts.wks) on Pass 1. Passes 2 and 3 are used to generate Basic code and data files. Shrinking compresses the generated Basic calculations and Baler then generates a batch file to compile the source code and to link the various object modules into a standalone program.*

LAPTOP LOWDOWN

The Tandy 1400LT and Multitech Super 5

You can carry a portable anywhere, but that hasn't meant that you could read the screen anywhere. Jan Roberts reports on two new portable read-ables . . .

THE NEW Tandy laptop, the 1400 LT, a gleaming white XT machine with a superb blue on silver screen, while the Super 5 from Multitech is a supercharged rival for the top-range Toshiba AT laptops; both are IBM compatible. Note that *this* Multitech is an established Melbourne-based importer with no connection to the large Taiwanese manufacturer which has recently changed its name to Acer (and whose desktop machines are distributed by Dick Smith Electronics).

The manual describes the Super 5 as an 'EC-8610 from EI-EN Enterprise Co Ltd in Japan', but I've seen what seems to be the identical machine with the same specifications advertised as the Jaeger 220 from Quartz Australia.

The Tandy comes in a pristine white case with a handle that folds away underneath. At 5.8 kg it's a little heavier than some portables, but otherwise it has standard laptop dimensions, 36.8 *x* 31.8 *x* 8.9 cm.

On opening it, I was immediately struck by the positioning of the disk drives — they faced me from under the screen, just like IBM's own Convertible laptop. This is a much easier to use position than on the side and you can see which drives contain disks, although, for a while, I found myself poking disks absent-mindedly at the side the machine! The screen, when folded down, will also protect the drives from dust, flies and spiders.

There is one minor design problem with this. The Tandy has sockets to take an external standard IBM type keyboard and an external monitor; with side-mounted disk drives, there would be no reason to open the screen if these were connected — it's desktop tidiness versus easy use: make your choice.

When you turn on the machine, another really good feature becomes evident. It

Figure 1. *The Tandy 1400LT has a superb blue and white (monochrome) screen and comes with 768 Kbyte of RAM as standard. Note the convenient positon of the disk drives.*

has a superb EGA (but monochrome) screen — certainly one of the best I have seen on a laptop.

It is backlit and bright with blue characters on a soft greenish silver background. If you adjust the contrast wheel, the screen changes to white on soft purple, to light blue on dark blue, then finally to invisible blue writing on blue — all glare free! If you adjust in the other direction, you get gold writing on very light blue. This change also occurs if you alter the angle of screen.

Tandy provided me with a demonstration disk for Webster's New World Writer (reviewed in YC, Feb.'88) which fully utilizes the screen's potential. The menu screen had both silver and light blue writing on blue, plus blue and light green words on mauve. This was attractive and easy to read, but the control bar at the bottom was mauve on blue and not so easy to read. When I adjusted the contrast to turn the writing from mauve to silver, it became hard to read other parts of the screen. The software stretched the excellent screen's capabilities just a little bit too far!

The layout of the keyboard is fine with its 12 function keys in a line alone the top and a cursor pad on the lower right. But I would score the keyboard as the machine's greatest weakness, nonetheless. It had an oddly springy touch and felt toylike — the bounce was too strong and quick.

Standby. . .

Between the keyboard and the screen there's a row of LEDs indicating whether or not Caps, Num or Scroll Lock were on, whether the battery is low, and a special Standby LED. This latter light is a good idea — the Tandy can be set to automatically switch itself onto 'standby' after a period of non-use. In Standby mode, the batteries will maintain programs and documents in memory for 11 hours. This helps conserve both batteries and screen. (The screen obviously can wear out — Tandy notes that new backlights can be purchased if the writing becomes too faint.)

The left side of the machine has no controls, the right side contains the on/off switch, the screen contrast dial and a well-recessed switch to switch the a: drive between an external disk drive or an internal (it's a lot easier to use the alternative method of a special keyboard command to switch between the two).

At the back there's a fine array of ports — all hidden behind a long, protective panel that tilts up. A hole in the panel accomodates the power lead. From left to right there is a power socket then another over-protected switch to toggle an external monitor on and off (once more, the keyboard command is easier).

The supplied transformer for use with Australian mains current plugs directly into a wall socket and is so large that it obstructs an adjacent socket I much prefer a cable attachment from the transformer to the wall plug.

Next to these is comes a parallel Centronics port then a port for an RGB monitor and a port labelled 'video' which accomodates a composite monitor. A serial RS232 port, an external disk drive port and one for an external keyboard complete the list. There is also space for an optional modem card and for an expansion bus. The optional expansion box takes standard IBM-type cards.

This is a generous array of ports and should meet most needs.

On top of the back of the computer at the left, there's a slide opened battery compartment. Tandy estimate 3 years as the life of the re-chargeable battery with 4 hours per charge. A screw under the battery pack allows the adjustment of speaker volumne.

On the right side of the top at the back, there's a ventilation grid, which would let in dust and spilt liquids — it's a pity for otherwise the machine is very well dust-proofed.

Setup

To access the Setup program, type Ctrl-Alt-Ins (I prefer Sharp's way of doing this with a dedicated Setup key.) Setup gives you a range of options: F1 toggles time delays to the Standby program; F2 toggles between the builtin screen and an external colour or monochrome monitor while F3 switches the external keyboard on and off.

Figure 2. *The Super 5 has a screen resolution of 600 x 400, a quick 20 megabyte disk and an 80286 processor — just right for laptop publishing!*

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F4 toggles between the internal modem and the RS232C port. This means you cannot use, say, a serial mouse and the modem at the same time. F5 toggles between a direct connection to the modem from the phone line and a connection via an acoustic coupler to an ordinary phone handset.

F6 is unique in my experience among laptops. It allows an external display controlling card to toggle on. This would allow an ECG card to control a high resolution monitor via the external optional expansion box. F7 toggles the clock speed between 4.77 and 7.16 MHz.

The mother board, which uses an NEC V-20 processor, allows for the addition of a maths co-processor if you have to do much number churning with your laptop.

The 1400LT comes with 768 kilobytes of RAM. The 128 Kbyte on top of the main 640 Kbyte is automatically configured as a ramdisk. It outdoes the NEC Multispeed in this, as the Multispeed deducts the 128 Kbyte ramdisk from its main 640 Kbyte (but the Multispeed has much extra built-in software).

I found the machine boots up with reasonable speed, although it sometimes refused to read a disk at the first try, reporting 'not ready', the second try always worked.

Keyboard

The Tandy has an FN key to toggle some of the keys between functions, but it can be awkward to use since it meant having to hold down two widely separated keys in order to scroll a document up or down, for example. Num Lock is turned on with FN-Del, But unfortunately, as with many portables, there doesn't seem to be an equivalent of the keypad plus and minus which are essential to such programs as Microsoft Word (for outlining), Framework and SmartKey.

In all, the Tandy 1400LT is a machine well-worth consideration if you're in the laptop market, but I think its higher price will disadvantage it in competition with its natural rivals, the Sharp and the NEC Multispeed (with its new, improved screen).

The Super 5

The Super 5 is, for me, the ultimate deluxe laptop for anyone who wants everything in a laptop, except for one big snag: it cannot run on batteries. While it's more expensive than the Tandy, it's also faster — it's price has been set to pitch it well under the Toshiba plasma-screened AT laptop machines, which it competes with very well.

Its outstanding features are its built-in ECG screen and its quick (36 ms access) 20 Mbyte hard disk. It weights 6.4 kg but is smaller than the Tandy, at a neat 32 *x* 32 *x* 9.4 cm.

While it's more expensive than the Tandy, it's also faster — it's price has been set to pitch it well under the Toshiba plasma-screened AT laptop machines, which it competes with very well.

Inside it runs on an 80286 processor at 10 MHz. There is room for a maths co-processor. It has all the power needed for laptop, desktop publishing and comes with an unused half-slot for expansion. The Super 5's 3½ inch drive reads and formats 1.4 Mbyte disks as well as the standard 720 Kbyte.

When you open it up, you find a large screen over grey typewriter keys elegantly surrounded by black function keys. There is one unusual extra key — a non-ASCII key next to the space bar. The numeric keypad, which, like the Tandy, uses a diamond cluster of the alpha keys, toggles on and off. I prefer the Multispeed and Sharp laptop layout with a separate numeric pad. It is often inconvenient to have to loose access to a third of the alpha keys.

When you switch it on, the plasma screen lights up with orange letters on a slightly orange, dark grey with a definition of 600 to 400. Until I got used to it, the fan was loud enough to be distracting. In front of the screen's hinge are LEDs for power, Caps, Num and Scroll Lock, HDD (Hard Disk Drive) and FDD (Floppy Disk Drive) access, and Non-Ascii.

Along the front there is a long pull-out handle, the whole width of the machine. the floppy drive is located on the right side. At the back there are two RS232C serial ports, (so you can use a mouse and a modem at the same time), a parallel port and a port for an external floppy drive. There is also ventilation for the fan and a power switch. The power is switchable to the lower voltage supplied in the USA.

A metal plate under the power supply hinted at other possibilities. On reading the manual I discovered that it is here that you slide in the optional 2 megabyte ramdisk card.

In operation I found programs (some needed configuration for EGA) ran with ease. I used it for a while with WordStar 4 and with DeskMate also resident, and had no problems. It also ran Microsoft Word with no problems — and it handled business graphics superbly!

Setup

The Setup program configures the disk drives and screen. The drives can be set to be wither high density 'or not'; the machine can be set to run two hard disks (one external), although Multitech, for some reason, do not supply an external drive.

The screen can easily be changed between EGA, CG40, CG80 and Monochrome. However when I followed instructions in Setup to change the time on the clock, it double checked with me, all seemed fine — but to my amazement, both times it finally said 'No changes made'! I double checked — and it did not correct the time. I tried repeatedly to get it to work with no luck; presumably there is some esoteric rule that I didn't follow.

The Super 5 came with 640K memory with an optional 2048k extended memory. Apparently the system can manage up to 15,360K.

Altogether, with a few minor reservations, it proved to be a most excellent machine for all who can afford it. If you want desktop publishing on a laptop, this may well be the machine for you. But you must remember that you cannot operate this laptop away from a powerpoint. □

Product Details

Product: Tandy 1400LT
Distributor: Tandy Australia,
91 Kurrajong Ave, Mt Druitt 2770 NSW
(02) 675 1222
Price: $3299 taxed

Product Details

Product: Super 5
Distributor: Multitech Computers,
15 Catalina Dr, Tullamarine 3043 Vic.
(03) 338 3911
Price: $5905 taxed

TWO FROM TANDY

The 1000 TX and 1000 HX

Tandy is out to make a name for itself in the home and classroom with these two new machines. . .

The Tandy 1000 TX

THIS COMPUTER IS advertised as being a breakthrough in 286 technology, and the most affordable 80286 powered PC compatible in Australia. As with many advertising statements, it is true, sort of, but don't be mislead. It is PC compatible, and it does have an 80286 processor, but it is not an AT compatible computer. For a true AT compatible, Tandy market the HD 3000 with a 20 megabyte hard disk for $7499. It also has a fast XT compatible with an 80286 processor for $3290 (without the hard disk) The 1000 TX is a lot cheaper, and it is aimed at the small business, home user, and classroom user.

In standard configuration, it has 640 kilobytes of RAM, a 3½ inch, 720 Kbyte floppy disk drive, and sufficient space for a second drive or a 20 or 40 megabyte hard disk. What you end up with is a mixture between an XT and an AT. The machine is blessed with the speed of the 286, and can run at 8 or 4 MHz, but the five internal expansion slots are XT compatible. Included in the price are MS-DOS 3.2 and GW Basic, and Tandy's Personal Deskmate 2 'productivity' software. The monitor is extra, and you can choose between several monochrome and colour models to suit your requirements for resolution and price. The review machine had an optional CM-10 RGBI colour monitor, which displays 640 *x* 200 graphics.

Figure 1. *The 1000 TX from Tandy has an 80286 processor running at 8 MHz. Personal Deskmate 2 software is included in the basic price.*

The TX runs as an IBM compatible so that your standard software will feel at home and can make use of the speed. The BIOS is a Phoenix, so there should be no problems running standard software, and this was borne out with the review machine, as I had it running WordStar in conjunction with Norton's Commander and SideKick without any problems. Norton's System Information gives it a Computing Index relative to an XT (= 1) of 7:1, which is fairly fast. The review machine was also fitted out with an optional 5¼ inch drive,

a serial mouse, and a fitted internal modem suitable for accessing Viatel and bulletin boards.

The system unit is enclosed within a solidly built, moulded plastic case with a smallish footprint. At the front are sockets for the keyboard and two joysticks, as well as a red reset button. There is also a volume control next to an earpiece socket. These sound controls are part of the three-voice sound circuit which can be accessed by music commands within the Deskmate 2 software. At the rear are sockets for the monitor, serial port and parallel port, and a composite video connector. The power switch is located on the right hand side of the system box at the rear. Fan noise from the unit is loud enough to be annoying if you are sitting in front of it for any length of time. This is a problem that is found in many computers on sale, and it's surprising that it hasn't been eliminated yet. The parallel port is a card edge connector type which which means that if you want to connect a printer, you have to purchase a non-standard parallel printer cable, from Tandy, of course.

The keyboard is not as wide as the standard IBM version, which saves further space on the desktop However, it also means that the keys are placed in positions that may seem awkward to those who are used to one of the standard layouts. The keys have a firm springy feel and typing at speed is not a problem, although for serious touch-typists, the location bumps are missing. The keyboard, like the system unit, is solidly constructed, but it does make a fair amount of mechanical noise. This would be a plus for those who like to have the keyboard respond more like a typewriter than a computer. The keys are laid out with the 12 function keys at the top, and the numeric keypad to the right with the Alt, Hold, Num Lock and Home keys squeezed in between the alpha keys ands the numeric keys. The scroll keys are also inserted in an inverted-T in the same space, making things a little crowded, but quite functional. At first, you might tend to hit the Home key instead of the Right Arrow key. The two Shift keys are narrow, and the Caps Lock is in a place that I don't like – right next to the narrow, right Shift key. What is missing is a Scroll Lock key and the ability to use the numeric keypad as cursor keys. According to the literature, there is a universal keyboard adapter that can be purchased from Tandy that enables IBM compatible keyboards to address the TX 1000.

Inside the system box there is room for expansion with 5 XT compatible slots, space on the mother board for a 128 Kbyte RAM expansion (bringing the total to 768 Kbyte), a socket for a math co-processor, and a slot for an optional Smartwatch clock/calendar. The startup procedure is the same as for any IBM clone: with the system disk in drive A: the computer is switched on and MS-DOS (Version 3.20) appears on the screen. The display is CGA with enhancements, and will handle 640 *x* 200 graphics in 4 colours, or 320 *x* 200 in 16 colours. The CGA standard is unfortunately still with us, but an EGA card could be installed in one of the expansion slots to make use of the higher resolution.

Figure 2. *The keyboard of the 1000 TX is a space saver, but the unusual layout takes getting used to.*

Personal Deskmate 2 is an ambitious conglomerate of applications and accessories such as calendar, database, text utility, worksheet, note pad, calculator and phone directory, all crammed onto one 3½ inch floppy. There is even a paint program and a music program, as well, in case you get bored – all of which gives the impression of value for money when you buy the machine. (There must be a lot of people who have received a mild shock when they have unpacked their 'budget' computer to find that they cannot actually do anything with it until they go out and buy software – some clones we have heard of don't even include DOS in the price!). Personal Deskmate 2 addresses this rather well.

Once the computer is unpacked and you have all the bits connected, within a very short time (and a little help from the manual), you can have the computer play a great little tune by Bach. You can fairly quickly learn how to use the mouse, how to change the screen colours, make a few notes to yourself and access the calculator. Deskmate has the potential to make the first time user comfortable and gives a taste of what PCs can be used for (and, at the same time, show some of the limitations). But for any serious word processing (beyond making notes), a real word processor is needed. Deskmate could be used as a starter-kit, adequately performing tasks such as letter writing until the user felt that a full-featured word processor was necessary.

The other features such as the personal database, dialer, and calendar should remain useful without the need to purchase any additional software to deal with these

Magazine on a disk

Australian PCM is a monthly magazine on a disk for Tandy 100 and 1000 series users; it comes with 'printed support.' The disks are full of helpful programs and many of them are suitable for IBM compatibles as well. For Tandy Portable users, bar code printouts of programs are also available. For subscription enquiries contact: *New Rainbow Publications, PO Box 286, Broadmeadows 2292 NSW*

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tasks. Documentation for Personal Deskmate 2 is overkill. The manual is a 460 page tome with a chapter for each of the applications. Most of the time the same procedures are carried out when accessing various applications from the menus. The manual complicates things by repeating these same procedures again and again, and by an over-zealous detailing of every action. Usually we have reason to complain about manuals because they are too sparse or too technical for the average user, but this is a case of over-compensation. When it comes to actually using Personal Deskmate 2, it is quite a powerful box of tricks. For example, the Calendar can access a daily events screen, and it is possible to 'cut and paste' between applications. Other documentation that comes with the Tandy is quite well written and easily understood. As well as instructions on how to set up the computer, there is a section that explains the basic DOS commands, and there are quick reference guides to give information on DOS and Basic commands

Overall, the 1000 TX is a bit of a mixture . . .

The Tandy Intelligent Modem fits into a half card slot and provides V21 300/300 baud and V23 1200/75 baud. The package is manufactured in Australia and includes VTEX 2 software for accessing Viatel and bulletin boards. Documentation for both of these is separate from the Tandy computer documents and not as easily grasped. The VTEX 2 manual relies on too much technical material for the average user, and the actual process of setting up the software on the computer through following screen prompts was much easier than reading the manual. Once set up, the modem and software provided access to Viatel and bulletin boards without any problems.

Overall, the 1000 TX is a bit of a mixture, but if you are after a bit of extra speed, perhaps this is the answer With Personal Deskmate 2 included in the purchase, most of your immediate software requirements are catered for. My only real gripes are with the noisy fan and the non-standard keyboard layout. The price could come down a bit though, with no frills ATs available for under $2000 at time of writing.

Tandy 1000 HX

This is a cheaper version of the 1000TX, with an 8088-2 processor instead of the 80286. This machine has one remarkable feature in that it departs from the usual practice of booting from a system disk: all of the system commands are resident within the computer's ROM (Read Only Memory), and this simplifies startup routines to the extent that programs can be chosen from a menu. When the computer is turned on, the user is quickly presented with a directory of executable programs on the disk in drive A:. The program is selected via the cursor keys, function keys, or through the MS-DOS prompt.

This means that with Personal Deskmate 2 (supplied with the computer) on a disk in drive A:, users can enter their favorite applications without having to worry about disk swapping and typing in commands: all they have to do is turn on the computer and make a selection. Once Deskmate is running, the various modules such as calculator, diary, notebook or paint are easily accessed via the mouse, arrow keys, or function keys. This makes computing accessible to a wider range of users, and although the operating system is still a far cry from a full windows/mouse environment as found in the Macintosh and Amiga operating systems, it is a compromise that Tandy presumably hopes will find favour in homes and classrooms.

The 1000 HX in its standard form is supplied with 256 Kbyte RAM and one disk drive. In this configuration the HX is adequate for most purposes, and with the system commands in ROM, it is possible to run the computer with only one disk drive without too much swapping. The review machine came loaded to the hilt with options: an extra 3½ inch drive, a serial interface, serial mouse, memory expansion to 624 Kbyte, a Smartwatch chip and a joystick. Monitors available are the same as for the 1000 TX, and the parallel printer port is the same non-standard edge connector type. The HX has the system unit and keyboard combined into a sturdy plastic case with the disk drives (very conveniently) facing the front, side-by-side. The monitor is best placed on its own platform, since the system unit is not really built to support it. With this arrangement, the keyboard can be placed at a comfortable position as well.

The keyboard has the same layout (with the same disadvantages mentioned above) as the 1000 TX, and the display is the same CGA with enhancements. The fan did not seem to be as loud as the TX,

Figure 3. The standard 1000 HX, with the keyboard attached to the system unit, has one disk drive and MS-DOS commands in ROM.

however. Internally, the HX can be expanded in a limited sense, using Tandy 'Plus' boards. These include a memory expansion board and a serial port adapter. The 8088-2 processor can run at 7.16 or 4.77 MHz. This is faster than a standard XT, and only slightly slower than the 1000 TX. An optional 5¼ inch disk drive can be attached externally.

With the MS-DOS system commands in ROM, the power-up process is very quick. The computer makes use of a third 'drive', much the same as a ramdisk, which is called drive C. The sys files as well as the command.com and autoexec.bat files reside here along with an internal driver and the menu screen that appears after you switch on the computer. All subsequent system commands are instantly dealt with without the need to insert an MS-DOS system disk. For commands that are not already in ROM, there is an MS-DOS disk supplied that can be used in the usual way. This system has many advantages, and one disadvantage: once the system commands are placed in ROM, they are there to stay, which means that future versions of MS-DOS can only be accessed via the disk drives. So it is version 2.11 of MS-DOS that you get with the HX. It is possible to change the set-up using a menu which covers such variables as whether or not you want memory diagnostics and prompts for date and time on startup, and where the system should look for an autoexec.bat file. All of these options are saved in EPROM so that they are not affected by turning off the power.

All of the IBM compatible software I tried ran successfully. This is a computer that should find acceptance in the home and in classrooms where it is necessary to run MS-DOS software (or Personal Deskmate 2) without the worry of working out how to respond to MS-DOS prompts and avoiding those unhelpful error messages. If you do decide to use it in the usual way, it is a simple matter of selecting the MS-DOS prompt from the startup menu. □

Product Details

Product: Tandy 1000 TX, 1000 HX
Distributor: InterTan Australia Ltd
PO Box 254, Mt Druitt 2770 NSW
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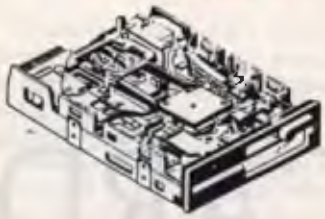

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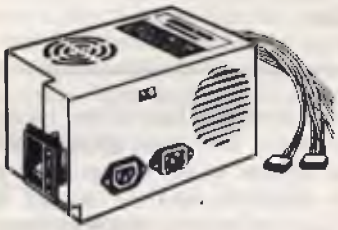

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BEHIND HYPERCARD

Part 2

In Part 1, Stewart Fist looked at the general structure of HyperCard, the object hierarchy, and the way in which messages are passed up through the system. Now, let's create a new stack . . .

IN PART 1, We saw that messages were read and acted upon by message-and function-handlers which created some activity or, in turn, passed a new message through the system, or were acted upon by HyperCard itself. Let's create a new stack and see how much script is automatically generated.

First, go to the New Stack bar in the File menu and create a stack called Trial. Don't forget to knock out the check box which says 'Copy current background' – we don't want a background at this stage.

Now let's create a background ourselves. Go to any card in the present demonstration stacks. Virtually all of them have a Home icon that we can copy by choosing the Button tools, selecting, then copying the button. Jump back to the first card in our new stack, select the Edit menu, set the Background to ON, then paste our Home icon into the background.

You can now add a couple of your own fields and decorate it with a few MacPaint-type boxes or lines – whatever takes your fancy. Now, after switching off the background mode, you should create a few new cards so that you have something to play with.

At this stage, have a quick look through the scripts in the object hierarchy of the Trial stack. You'll find nothing in any of them (Stack, Background, Card or Field) except for the Home button which contains a three or four line 'handler' which is waiting for a 'mouseUp' message, at which time it will transmit a 'go to Home' message.

This lack of script handlers is what you would expect, if you think about it. Apart from the Home button, we haven't created anything that initiates an action, or awaits a message. Everything else we can do with this stack needs to be done through the menu bar, and these create commands that are all handled by the top management level of HyperCard itself.

Although there is no script attached to most of these new objects (stack, backgrounds, cards, fields and buttons), they have each been provided with an identity – even if you didn't bother to name them. If you pull down any of the Card Information boxes from the Objects menu, you will find both a stack-order number, and an ID #. If you add or delete cards from the stack, the order number can change, but once the ID is allocated it remains the same for the life of the program.

Time field

Let's create a Time field in the same way as we did the Home button. Go to the Home Card, select the Field tool, click on the Time field area at the bottom left of the card to select it, then copy this field through the Edit menu. Back to our new stack then paste in our Time field and try it.

Hisses and boos! Nothing works. There's no time in the field. Why? If you go back to the Time field on the Home Card to look at its script you'll find that there isn't any. The messages labeled 'time' come into the system at the second-floor level.

Remember: only the mouse messages (and a few special cases) arrive at the lowest Buttons and Fields level of the program, therefore if you are going to intercept 'time' messages from the clock, the script has to be at the Card level at least. (Note: 'time' is a function)

If you jump up to the Home Card script you will find the right handler there –

```
on idle
 put the time into card field "Time"
 pass idle
end idle
```

If you can remember back to Part 1, I explained that the 'idle' message was constantly being sent by the system when it was in a wait-state. So this 'handler' is saying: 'Since we've got nothing better to do, put the time message up on the screen inside the card's Time field. Then pass on the idle message (some other part of the system may need it), then end this handler.'

It is worth reiterating that this handler doesn't need to be at the field level – even though its effect is to place a variable in the field. The handler doesn't even need to be at the Card level – it could just as easily be at the Background or Stack levels.

So let's go back to our new background and type this handler into our new Trial stack. If we put it into the Card information, then the time will only come up on that one card but we want the time to be on every card in the stack (this is why we pasted our field into the background – rather than the card).

So we will copy the handler into the Background script making one modification. The second line must now read:

```
put the time into background field "Time"
```

You'll now find that the clock works perfectly, and it'll appear on every new card in the stack, as long as that card uses the same background (with HyperCard, it doesn't have to!).

Now let's get tricky! If you select and copy this Time field again, then paste it into one of the Cards in the stack at the Card level, you can get two clocks working on the same screen – one on the Background and the other on the Card. You'll need to add an (almost duplicate) handler to the Card script with the second line rewritten to:

```
put the time into card field "Time"
```

Note that on this occasion we specify 'card' field.

If you don't specify either card or background, then background is assumed for fields (it's vice versa for buttons). Note also that we now have two quite different fields called Time, which is not wise, but the system can handle the potential confusion as long as they exist on different levels. Much better practice would be to rewrite the second handler lines to direct the time variable to card/background field ID *xxxx* – then there can be no ambiguity.

Flexibility

Hypertalk is a very flexible language. There are many superfluous words often included in HyperCard scripts simply to help with clarity. There are also alternatives and condensed versions of commands and keywords.

For instance 'go' and 'go to' are the same, and you can say 'go home' or 'go to stack "Home"', it makes little difference – although enclosing the name of the stack in quotation marks ensures that it won't be confused with some variable, or whatever, that might exist with the same name.

HyperCard treats upper and lower case the same but, by convention, you should use uppercase to make joined words more readable (like: mouseUp).

You can also address an object in a variety of ways. For instance you can name a card "Mabel" if you want to, and then issue the command 'go to card "Mabel"'. Or you can specify a card as the 'second card' in the stack, or as 'card w', or as 'card ID 2439'

But I digress. Back to our example. The third line in the clock handler was:

```
pass idle
```

– in both the Card and the Background script. Go into your Background script and delete this line. You'll find it makes no difference. Now delete the line from the Card script. You will find that the Background clock stalls. It can't increment because the message 'idle' is being intercepted at the lower Card level, and not being passed on.

This is a very graphic illustration of the way HyperCard's object hierarchy works – and how messages are absorbed and used, and/or passed on through the system to higher levels.

Incidentally, I am not recommending that you put a time field into every HyperCard background. It's OK if your stack is going to be read-only, but if you attempt to write to a field on a card with such a time-field already in place, you'll find that your cursor suddenly disappears once every minute.

What happens is, that the time-field takes control of the cursor automatically to insert the updated time, and you will have to laboriously reposition the cursor and click to get it back into the writing area each time

Modular

Within an object's script, messages are also handed down on a modular basis. The message is tested against the first handler, then the second, then the third ... and so on. Each handler consists of a number of discrete elements – usually automatically indented in the script to make them easier to read.

The most basic form of handler is three lines of code like:

```
on mouseUp
  go to stack "Home"
end mouseUp
```

The first line must begin with either the keyword 'on' which identifies a message handler, or 'function' which identifies a function handler – so these lines are called 'message indicators'.

Functions are inbuilt mini-programs which can calculate averages, extract characters from a string, and so on – they always return some value to the handler which called them. We'll look at functions later, here we are dealing only with message handlers.

The last line in the structure must begin with the keyword 'end' (end-of-handler indicator) and be followed by the handler name (here, mouseUp) which must be the same as the handler name on the first line. These are the 'book-ends'!

When a message reaches an object it is checked against the handler(s) in the script, and if the message-name matches a handler-name, the lines following are executed in order until the 'end (handler-name)' line is reached.

There can be any number of execution lines between the 'on *xxx*' and the 'end *xxx*' lines, but it makes sense to keep them short, if possible. You can always call another handler if need be – just like a GOSUB in Basic.

Let's look at our simple example above under the microscope. The message 'mouseUp' comes into the system at the Button/Field level, directed at a particular button (dependent on the cursor position). Since the message-name 'mouseUp' matches the handler-name in the first line of the button's handler ('on mouseUp'), the subsequent line(s) are executed and the command statement ('go to stack "Home"') is issued through the system as a message-in-reply.

The original message ('mouseUp') doesn't go any further in the system unless the special statement line 'pass mouseUp' is included in the handler.

Normally, if none of the objects in the chain have a handler-name that matches the message-name, the message will flow right on up to the top level, which is HyperCard itself. Hypertalk has a whole series of command interpreters which are virtually built-in handlers, and these initiate action at the top program level.

But not all system messages or commands have a handler within Hypertalk itself. For instance mouseUp doesn't mean a thing at the Hypertalk level (unless the cursor is within a field) – which is why you can click your mouse button until the

cows come home, but nothing will happen unless you are on a button, a field, or a menu area – in which case the message will probably be passed to a handler in a script at the appropriate level.

HyperCard knows which button to direct the mouseUp message to, because it has some sort of a cursor-location/message-direction functional unit built-in at the top level. This unit also issues a series of cursor position messages all the time you are moving the mouse.

As your cursor entered a field or button area, it issued a 'mouseEnter' message, then a constant stream of 'mouseWithin' messages, and finally when you leave the area, a 'mouseLeave' message.

Target

The term 'target' in HyperCard has a special meaning. If a message is sent to a button then this is the 'target', even if the message is not interpreted by the button's script but passed on to a handler at a higher level in the hierarchy.

'Target' is a function that remembers the entry point into the hierarchy. Try this handler at Background or Stack level:

```
on mouseWithin
 put the target
end mouseWithin
```

The word 'the' in the second line is mandatory unless you add parentheses after the word 'target' – as in 'put target()'.

'Target' is a function, and functions are identified either by the word 'the' before the function-name, or '()' after. If there are any parameters they go between the parentheses, in order, and separated by commas.

In this handler we didn't need to say 'in the message box' at the end of line two since this is assumed (it's the default) if nothing is specified. But for clarity and consistency sake we should probably make this line:

```
put target() in message box
```

Bypassing

As you can see the hierarchy of HyperCard is all-important, however you can bypass the strict order in a couple of ways. The 'send' command short-circuits the system by sending messages directly.

For instance if you are at Card 3 in a stack and the handler issues a message line:

```
send "mouseUp" to button 3 or card 15
```

– the message will travel there directly, bypassing any 'mouseUp' handlers in between.

Let's get back to some practical examples. Create a button on a new card in your Trial stack and link it to the Home Card, then modify the script to read:

```
on mouseUp
  send "go to Home" to HyperCard
end mouseUp
```

You will see that the button still acts the same as if you'd left the middle line:

```
go to Home
```

All that 'send' command has done is to leap-frog all intervening stages and issue the command directly to HyperCard at the top of the hierarchy. There is, however, a difference between the two handlers. With the 'send' version you can no longer intercept the 'go' message by placing another 'go' handler at a higher level.

Try this line between mouseUp handlers:

```
send "go to Home" to stack "Phone"
```

– then watch the top window bar (which shows the stack name) when you click on this button. It jumps to the Phone stack first, then to the Home.

The concept of the hierarchy of objects that I illustrated in Part I with a five-storey building plus a basement (for Buttons and Fields) is actually a bit too simplistic. Apple themselves have also been carried away with over-simplifying the concepts, with the result that some of the explanatory material in the draft manual is misleading and sometimes downright incorrect, so be warned!

Let's write a series of simple handlers to check out the hierarchy of HyperCard. You should know by now what would happen if you created a button and wrote in the script:

```
on mouseUp
 go next card
end mouseUp
```

If you clicked on this button you would swap to the next card. Now write the same script in at the Card level.

Apple's manual says that if you now click on any button youwill jump to the next card – but, of course, that is only true if the button doesn't have any mouseUp handlers attached – and most of them do. Clicking on a button is what buttons are primarily for, and so buttons usually have a mouseUp handler of some sort – and very rarely will these have the line 'pass mouseUp'.

So, try clicking outside a button. It sometimes works, and sometimes doesn't. If you are on an area of the card or background not covered by a field or button, then your click will take you to the next card. But if the cursor is within a field, there will be no action, and if it is within a button area with a mouseUp script attached, then this action takes precedence.

This illustrates a very important point. When you think about it, the mouseUp message isn't being generated by the mouse – except in the mechanical sense. The message comes from within the HyperCard program, and it must flow through a couple of secondary stages in the program in order to be directed to a particular button or field

Somewhere within the program (at the highest level of our hierarchy) there is a functional unit of code which is checking the position of the cursor, and recording whether the pointer is within, or outside, screen areas which delineate fields, buttons and menus.

When you click in a field area, the program allows you to begin to write text within that area. So the mouseUp message must be intercepted by a top level handler within HyperCard itself, and it is this signal that causes the pointer to change to an I-beam in preparation for entering text. This handler does not pass the mouseUp message through, so it can't be used to activate a handler at the Card level.

The same applies whether you add the above handler to the background or to the stack. Clicking within a button area means that the mouseUp message is intercepted by the button script (in most cases) while, within a field or menu area, it is intercepted by the HyperCard program itself

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Names

Don't get carried away by the need to use pre-defined terms like mouseUp or startUp as handler names. Obviously a standardised set of words has been established so that command routines can be built into the program and so that keyboard and mouse events have a fixed nomenclature, but when you are writing your own script you can use any handler name you want – including those already used as commands and in-built functions. Just remember the hierarchy!

Here's an example. In a button script you could write a handler:

```
on mouseUp
 xyz
end mouseUp
```

Then higher in the hierarchy (say, Stack level) you could have:

```
on xyz
 go next card
end xyz
```

It works perfectly. The mouseUp message flows down from HyperCard and causes an 'xyz' message to be sent from the Button level. The message flows up through the hierarchy and, in turn, causes a 'go' message to be sent (together with its parameter 'next card') from the Stack level This triggers the action at the HyperCard level. It's actually a circular flow of control.

You'll find a lot of these author-invented messageNames used in Hypertalk: words like 'getHomeInfo' which are descriptive of the job they are being called upon to do. You aren't limited only to the set messageNames specified by the program's creators.

When a non-HyperTalk messageName (like 'xyz' or 'findNextCard') is used in a handler line without a parameter it simply calls another handler into action, somewhere higher in the program, as if it were a sub-routine.

This handler would be executed, and if it triggered another handler into action, it too would be executed. Finally, after the chain of events had come to a stop, the control would revert to the original handler, and the next line in the handler would then execute, in turn.

There's an exception here. Any line beginning with 'pass' must be the last line before the 'end' line. Once the original message has been 'passed', the remainder of the handler ceases to function.

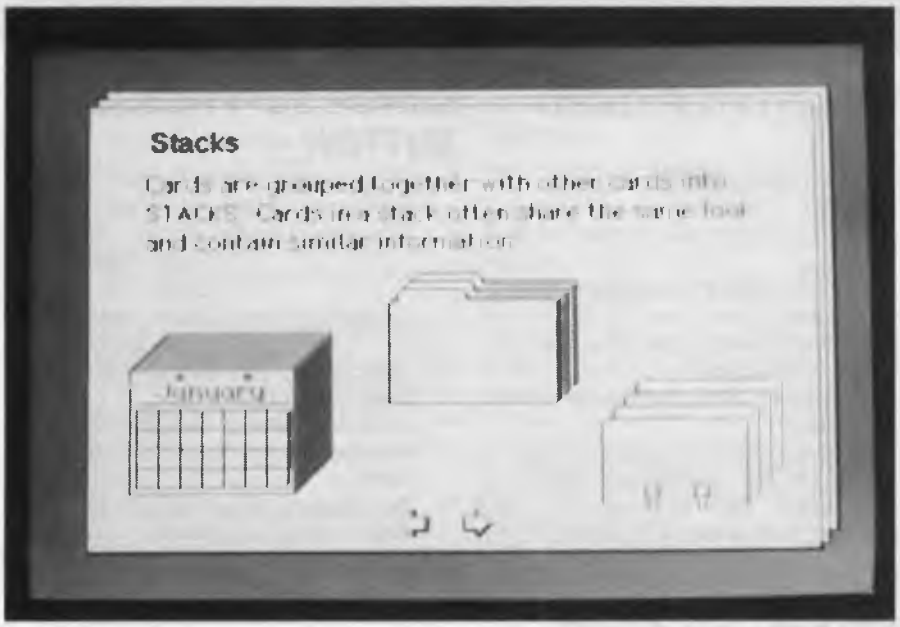
In the example above, the execution of the program would move down the Button script, then from the xyz line it would effectively GOSUB to the Stack level handler which issues the 'go' message, then to the HyperCard level to make the change, then return to the 'end mouseUp' line of the Button handler.

The chain of handler actions could, in fact, jump a number of stages further away and still return. Handlers can call other handlers, which call other handlers – but control will always return to the source of the sub-routines to complete the original handler before the regular pattern of flow through the object hierarchy is re-established.

With most sub-routines these secondary handlers will usually be in the same script, and there's one slight oddity here. The message being sent from the Button (or any other object) flows, first of all, through its own script – from the beginning – before traveling on up the hierarchy.

So it doesn't matter whether the secondary (sub-routine) handler appears in the script above, or below, the primary handler The message will still find the handler and create any action, then execution will return to the next line of the primary handler.

There's a danger here in that you can turn messages back on the handler in an infinitely oscillation – like loudspeakers feedback through a politician's microphone Recursion is possible, but it must be used with discretion □



HyperCard commands to try

Sandwich these commands between mouseUp or mouseEnter lines and see what they do. To automatically create a dialog box, then add any input to a variable called 'It', try this –

```
Answer "question"
Answer "question" with reply1 or reply2
Ask "question"
Ask "question" with defaultAnswer
```

Here's a handy routine –

```
Open file fileName
Close file fileName
```

Using this command, HyperCard will get whatever is in source (a field, for example) then execute it as a command –

```
Do source
```

For the equivalent of a mouse selection –

```
DoMenu menuItem
```

It's also worthwhile experimenting with: find, get, go, hide, show, play, put, read, write, send, set, sort, type, and wait. And, experiment with the keyboard: ArrowKey (up, down, left, right), EnterKey, FunctionKey, ReturnKey, TabKey; and the CommandKey, the OptionKey, and the ShiftKey – these last three are functions and therefore return values which can be put in message box, or used in some other way

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Making QuickBasic Libraries

As Jeff Richards relates, building frequently used routines into libraries improves programming speed and program readability and maintainability.

REUSABLE ROUTINES are a critical part of any software development system. To be able to call on pre-written, pre-tested routines to perform standard tasks not only speeds the program development cycle, but it also makes the programs easier to read and debug, and introduces an important degree of standardisation across different programs.

With QuickBasic, there are two different approaches to constructing re-usable routines. The simplest approach could be labeled 'Basic modules'. With this technique small, independent routines are written in QuickBasic and saved as separate files. They are written as functions or subprograms, and would probably be tested by constructing a main module that passed suitable arguments and examined the returned results. Once tested, the main module is deleted and the routine saved under a suitable file name.

When a program being developed needs the routine it is read into the QuickBasic environment and becomes part of the text of the program. The declaration of the function or subprogram is automatically included in the main module, and the routine can be edited if required. Because the text of the module has become part of the program, the program can be saved, compiled (either from the environment or from DOS) and executed without needing to consider that it uses a pre-written module.

Library modules

The next level of complexity could be called 'library modules'. These routines might start life as simple Basic functions and subprograms, but then they develop in utility and reliability to the stage that they are used frequently, but are never re-tested, altered or even examined.

When they are being used like this there is little point in having the Basic source code repeated in every program that needs them, and it would be convenient to be able to use the routines simply by referring to them, without the need to physically copy them into the program. A further refinement would be if groups of such routines could be combined in one file, so that we reduce the number of separate files that we need to keep track of.

The process goes something like this: QuickBasic is used to convert the Basic source code statements into a file that is in a form called 'object code'. The code in this file is not executable, but it does contain all the information needed to produce executable code, without any unnecessary information left over from the original Basic statements. The advantage of object code is that modules can be combined during the process of creating an executable program. QuickBasic can be instructed to access these object code modules and combine them with the code it produces when compiling your program, so the program can call on the routines in the pre-written modules.

If this was all that happened there would not be much point in converting your Basic procedures into object code modules – it would be only a little slower and slightly less convenient to keep the routines in Basic and insert them into your program as needed. However, object code modules have two advantages.

Firstly, several object modules can be combined into one file, called a library, and a single instruction can be used to tell QuickBasic to consult the library file and use the object code modules it needs. Managing one file that contains a number of routines is much easier than managing a separate file for each routine.

Secondly, because the object code format is standard, routines written in other languages – Assembler, for instance – can be mixed with the routines originally written in Basic, and they can all be combined into one library file. Therefore, a small number of library files can contain dozens or even hundreds of pre-written, tested routines, perhaps originally coded in a variety of languages. By simply nominating the library file to QuickBasic these routines become immediately available to the program.

The routine is an integer function that returns TRUE (–1) if the number passed to it is evenly divisible by two, or otherwise returns FALSE (0). It will be called ISEVEN and will be created in a file called TESTINT. The reason for using a file name that is different from the function name is to emphasise that several functions can be included in one file. The file TESTINT will be included in a library called MYLIB – again the difference in names emphasising that the library might contain object code from a number of files. To create function ISEVEN in file TESTINT, enter the following code –

```
FUNCTION ISEVEN% (I%)
  ISEVEN% = (I% AND 1) U 1
END
```

QuickBasic will automatically install the code in a subprogram module, and will include the function declaration in the main module. Save the code in a file called TESTINT – either as ASCII or in Basic format. Then select option Make Library from the Run menu, and supply a library name of MYLIB. When QuickBasic finishes, exit to DOS and look at the files you created.

Firstly, there will be TESTINT.BAS – the Basic source code of your function. Then there will be TESTINT.OBJ, which is the object code file that QuickBasic produced from your source code. There will also be MYLIB.QLB and MYLIB.LIB. These are the library files that contain the TESTINT module – one for the QuickBasic environment and one for use with the separate compilation option. TESTINT.OBJ could

be deleted if you like – it is now a part of the library file and is not required.

Notice that ISEVEN doesn't appear anywhere! ISEVEN is the name of a procedure, and this name is carried in both the .OBJ file with the object code, and in the .QLB and .LIB files in library format. We know that in each case ISEVEN is the only procedure that is in these files, but later on it will be just one of many procedures.

To test the function now that it is in a library, you should write a program that uses it. However, if QuickBasic is going to be able to find the function it must know the name of the library in which you have installed it. Therefore when starting QuickBasic, use the command 'QB /Lmylib'. When QuickBasic starts it will load the library file MYLIB.QLB. Once you have declared your function you can use it just as if it had always been a standard part of QuickBasic syntax.

When it comes to extending your library with additional routines, there are two ways to proceed The first is to reload the original BAS file that contains your existing routines (in this example, TESTINT-BAS which contains ISEVEN) and add the new routine as another subprogram in the file. The second is to create a new BAS file with one or more subprograms in it, and add it to the library file that already contains TESTINT.

If you add a new routine to the existing ones in the .BAS file then the process of rebuilding the library is much easier, but as the number of routines starts to grow the convenience of spreading them amongst several different source files may outweigh the extra work involved in rebuilding libraries.

The QuickBasic environment does not allow direct manipulation of the library files – to do that you use the LIB utility, and are immediately plunged into the arcane world of command line switches, response files and default path names. QuickBasic will only rebuild a library file from scratch, and therefore all the routines in the library must be in memory when the library is built If you are willing to live with this restriction, then it is just as simple to keep all the routines in one BAS file, and avoid having to keep track of which files are required to make a complete library In this case, MYLIB.BAS might be a better name for the source file 'han TESTINT.BAS, which suggests that it contains only one type of routine.

```
DEFINT A-Z
DECLARE FUNCTION ISEVEN% (I%)
CLS
WHILE I <> -9999
  INPUT I
  IF ISEVEN(I) THEN PRINT 'Even' ELSE PRINT 'Odd'
WEND
```

Listing 1. *Demonstrating the library function ISEVEN.*

To recreate a library, simply start QuickBasic without specifying a library file, then load the BAS source file and make it into a library, as described above. QuickBasic will overwrite your old library with the new one, inserting whatever procedures are currently contained in memory. Exit to DOS and restart QuickBasic with the library name specified on the command line.

So now, if ever you find yourself thinking 'wouldn't it be nice if QuickBasic had a single command to ' the solution is at hand. □

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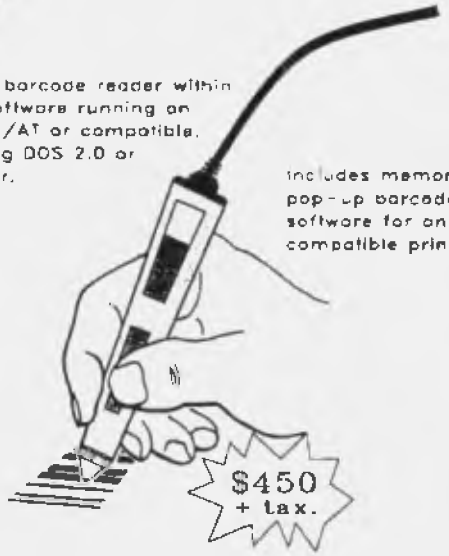

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HARDWARE HACKING

Switching the clock speed of a Turbo PC

TURBO COMPUTERS usually boot up with the higher clock speed active, and most people accept this without question. However there are advantages in using both speeds. For word processing, spreadsheets and the like, the higher clock speed is fine, and the computer really skips along compared to one running at 4.77 MHz. But there are other applications, such as some games, where the lower speed is much better. I have a pinball machine simulation which was obviously written for a single speed, 4.77 MHz computer. When running at 8 MHz, the game is uncontrollable.

Another case is an experimental weather facsimile receiver program which for the moment relies on simple software loops to provide its time delays. It was first written on a 'slow' computer, and since the loops execute faster with an 8 MHz clock, it's pretty useless in the 'fast' mode on a turbo machine.

What, then, is meant by 'clock speed'? The clock is a simple oscillator that generates the 'heartbeat' for the microprocessor. You can visualize it as a little man standing by the microprocessor turning a crank. Simple instructions such as copying information from one register to another might take 4 turns of the crank to complete, while more complicated instructions may take 20 or 30 turns. The faster the man turns the crank, the faster the program instructions are handled by the microprocessor, so the faster the program.

It is very important to note that this 'microprocessor clock' is not the same as the 'timer' chip in the PC. The timer chip has its own clock, independent of the processor clock, and it can be programmed to produce time delays, tones to the speaker, and so on, that are not affected at all by whatever speed the microprocessor clock is running at. The counter/timer chip is a very handy device that will most likely be the subject of an article in this series.

Many IBM compatibles are 'Turbo' versions, which means that they have both the traditional 4.77 MHz and an additional 8 or 10 MHz speed. Tom Moffat tells how to use this feature to advantage . . .

In a 'turbo' PC there is usually only one way to switch back and forth between high and low clock speeds. The keyboard handler routine within the Bios (basic input/-output) software is made sensitive to a particular combination of keys pressed at the same time. This is usually either Ctrl-Alt-Plus or Ctrl-Alt-Minus. Pressing these keys toggles the machine back and forth between high and low speed. The action is verified by changing the shape of the cursor on the screen – a block cursor is supposed to mean the computer is set for high speed, and a line means low speed.

Unfortunately this system is not too reliable, and many people who try it eventually give up in disgust. When no program is running the cursor probably indicates the correct speed selected, but many software packages change the cursor themselves (Basic being one example). So the shape of the cursor soon bears no relation at all to the clock speed.

Another problem arises when you have a program like SideKick installed in the machine. SideKick in its usual form is made active when you hit Ctrl and Alt together, so if you try to switch clock speeds with Ctrl, Alt, and Plus or Minus, you get SideKick instead. And the clock speed may or may not switch at the same time, so you don't have a clue what the speed is.

A software method

It took a fair bit of digging around inside the Bios software to figure out what actually happens when it switches clock speeds. The experiments were done on a Unitron Turbo-XT compatible, but the technique seems to work on lots of other Turbo-XTs as well. It's interesting to note that it won't work on a True-Blue IBM, because they never produced a machine with switchable clock speeds. So this only applies to compatibles or clones with the 'turbo' designation.

The actual switch is part of an 'output port'. A port is simply a connection through which the computer can sense the state of external circuits (an input port) or it can send signals out to other external circuits (an output port). In an 8-bit computer such as a Turbo-XT, a port is considered to be a group of 8 connection lines, each one corresponding to one bit on the 8-bit data bus. Each port in turn has a unique address, just like memory. The port we are interested in has address number 61 in hexadecimal notation, or 97 in decimal.

The particular output line within the port is line number 2, which is physically hooked up to the clock speed switch. In the original IBM design this line was used to select the second part of a configuration switch. But it appears this was never used (the second half of the switch was marked 'spare') so the compatible and clone makers commandeered this line for the clock speed switch. Sneaky!

Port 61 is physically implemented in a

special integrated circuit called a 'programmable peripheral interface'. The port is a 'latch', meaning that each bit is really a one-bit memory cell that remembers the last state it was set to, until the processor comes along and changes it. So if you set Bit 2 of Port 61 'high', a high logic state will exist on its output pin until sometime later when the processor comes along and sets Bit two 'low'. High and Low are actual voltages that are physically wired to the clock speed switch.

Other interesting bits in Port 61 are Bit 0 which lets you start and stop the counter/timer chip (useful for making time delays), and Bit 1 which turns the speaker on and off. You can set both Bits 0 and 1 high and drive yourself stark raving mad as the speaker wails on forever, or at least until you set them low again. Bit 3 is from the good old days; it was meant to control the motor of a cassette recorder! Now it appears to have no use, although it might be possible to do a bit of hacking and pinch it for something else some day. Come to think of it, Bit 3 would make an ideal clock speed switch, since cassettes aren't used in PCs any more. Perhaps some clone makers have used Bit 3. So if our tricks with Bit 2 don't work on your machine, try Bit 3. The remaining four bits are involved with enabling the keyboard and memory.

Now, how to get to Port 61? There are instructions in Basic and Assembler, and probably other languages as well, for that very purpose. To write to an output port, the instruction is, would you believe, 'OUT'. And to read information from an input port, the instruction is (wait for it!), 'IN'.

It is now time for you to sit down at your PC and give this a bash. We will try to switch the clock speed from fast to slow and back again, using Basic instead of the Bios keyboard command. First, get your version of Basic or GWBasic or whatever up and running. Then, type in the little program in Listing 1, and then save it (it will be used several times). Now type 'RUN' but don't hit Enter yet. Look at your watch and hit Enter at some convenient time. If the computer beeps after 7 seconds, your computer is running at 8 MHz. If it takes 12 seconds, the clock speed is 4.77 MHz.

Now, as a direct command (not a program), type the following:

```
OUT 97,76
```

Then run the program in Listing 1 again. It should take 7 seconds to beep, indicating you are in 'fast' clock speed. Next, as a direct command again, type:

```
OUT 97,72
```

Run the program again, and it should now take 12 seconds to beep, indicating you are in the 'slow' clock speed. Note that the numbers being sent OUT to Port 97 (decimal, remember) affect all 8 bits, so they have been calculated to ensure the other 7 are correct (no screaming speakers!). It would have been nice to be able to read the previous state of Port 97, set the Bit 2 high or low, and send the resulting number back out again. But Basic will not allow you to OUT a calculated number, only a constant. (Yet another reason why I never program in Basic unless there is no other choice!)

If you must program in Basic, and want to change the clock speed from within the program (although I couldn't guess why), you can use one of the above commands as a program statement and it should work. But there is a much more elegant way to set the clock speed either when the computer boots up, or as a direct command from DOS. If you have never faced Assembly Language before, grit your teeth and fasten your seat belt, because we are about to write a couple of little machine code programs.

```
10 REM Clock speed check in GWBasic.
20 REM Takes 7 secs for FAST, 12 secs for SLOW.
30 FOR I=1 TO 10000
40 NEXT I
50 PRINT CHR$(7): REM BEEP! when time is up.
60 END
```

Listing 1. *Load Basic, type in this listing, and then save it. Then, type RUN, but don't hit Enter yet. Look at your watch and hit Enter at some convenient time. If the computer beeps after 7 seconds, it's running at 8 MHz; if it takes 12 seconds, the clock speed is 4.77 MHz.*

Oh no! Not Debug!

Yes, it's now time to experience the infinite pleasures of Debug. It's sitting there on your DOS disk, but I'll bet you've never even tried it. Well, the moment of truth has come, but it's not as bad as it seems. You're about to see just how easy it is to use Debug's snazzy little assembler.

Get out your DOS disk, put it in Drive A, and put a working disk with a bit of space in Drive B. Or you can do the whole lot on C if you've got a hard disk. Now, with A or C active, type Debug. You should be rewarded with a dash on the screen; that's Debug's not-very-user-friendly way of telling you it's there and waiting. Now follow these next instructions *to the letter*!

```
        PAGE    55,132
        TITLE   'Slow'
;
CSEG SEGMENT BYTE PUBLIC 'SLOW'
;
    ASSUME CS:CSEG, DS:CSEG, ES:CSEG, SS:CSEG
;
   .RADIX 16
   ORG 0100
;
START:  IN   AL,61   ;PORT 'PB' OF 8255
        AND  AL,0FBH ;11111011, FORCE BIT 2 LOW
        OUT  61,AL   ;MAKE THE SWITCH
        MOV  AH,0    ;LEAVE PROGRAM
        INT  21
;
CSEG    ENDS         ;END OF SEGMENT
;
        END     START
```

Listing 2. *SLOW.COM – An Assembly language program to switch the clock speed of a Turbo PC to 4.77 MHz.*

Observe Listing 2. This is a full blown (although not very big) Assembly language program prepared for the IBM Macro Assembler. If you typed it in with WordStar or something and then turned the assembler loose on it, you would eventually end up with a little utility called SLOW.COM. We will use the mini-assembler within Debug to do the same thing.

First type 'A 100'. This energizes the assembler and tells it to place the resulting machine code in memory starting at address 100 (hexadecimal), where all good '.COM' programs go. Note that since the Debug assembler only understands hexadecimal, Listing 2 and Listing 3 also use hexadecimal numbers. 'RADIX 16' signifies this in the listings.

After you type 'A 100', Debug will present you with a segment and offset address in the form 'XXXX:0100' and then wait for you to type something. Don't worry about the segment part, the computer will take care of that. Just watch the '0100' part. You can now start typing in the assembly language instructions from Listing 2. Don't worry about the stuff at the top of the listing, start with the instructions after 'START' (wasn't that clever?). Don't type in the semicolons or the words after them, those are comments, like REMs in Basic.

Just type 'IN AL,61' and hit Enter. If you did it right, you'll get another address on the next line, this time ending in '0102'. This tells you that the previous instruction generated two bytes of machine code which are now lying in 0100 and 0101 and Debug is waiting for you to continue en-

tering instructions at 0102. Now do it; type 'AND AL,FB' and hit Enter. Sorry but this is slightly different from what you see in the listing, which is 'AND AL,0FBH. This is because the Debug wants hexadecimal digits only, 'FB', whereas the IBM assembler wants a leading 0 to tell it FB is a number, and a trailing H to tell it the number is in hex. Leave this out of the IBM assembler and it goes bonkers.

If all is OK, Debug will have swallowed the last instruction and presented you with a new offset address, 0104. This shows the second instruction also generated two bytes, now stored at 0102 and 0103. You can now continue on with 'OUT 61,AL' (Enter), then 'MOV AH,0' (Enter), and then 'INT 21' (Enter). You are now finished entering the program; you notify Debug of this by hitting Enter without typing anything else. This will return you to the dash-ed prompt.

Now comes a satisfying part. You can actually see your first machine code program, sitting there in memory, if you type 'D 100'. This will provide a display of a large section of memory starting from address 100 (hex). You should see 10 bytes of nice, clean, elegant machine code, most likely followed by a heap of zeros. The 10 bytes are *your* program!

Now we have to get it safely onto disk, and this is a bit fiddly, so again follow the instructions very carefully. First we have to produce a name for the program. If it's to be saved on drive B, type 'N B:SLOW - COM'. (N means 'name'.) If you want to save it to the default drive, just make it 'N SLOW.COM' without the 'B:'. The next step is to tell Debug the length of the program we want to save. We know it is 10 bytes long, but for some reason Debug goes wild if you try to save anything shorter than 16 bytes. So we'll save 16, including the 10 bytes of machine code and 6 of the zero bytes. As usual this must be expressed in hexadecimal, so the number to be entered becomes '10'.

To enter this number, you must manually modify two of the microprocessor's registers, the BX and the CX (That's about as user-unfriendly as you can get!). We use the R (Register) command: Type 'R BX' (Enter). You will see 'BX' and a four digit hex number, probably 0000. Now type '10' (Enter). That fixes BX; now for the CX register. Type 'R CX' (Enter). You will get 'CX' and probably again, '0000' Now type '10' and you will have set the CX register for 16 bytes program length

To finally write the program to disk we use the W (Write) from address '100' command: 'W 100' (Enter). If all is OK the disk should spin and you should see a message saying 'Writing 0010 bytes'. Now you can leave Debug with 'Q' (Quit) and do a DIR of the disk. You should see a new program called SLOW COM, 16 bytes long. If this worked all right you can now repeat the whole Debug procedure for Listing 3, to produce a program called FAST.COM With both SLOW COM and FAST.COM on the disk, it's time to test them out.

```
   PAGE    55,132
   TITLE   'Fast'
;
;
CSEG SEGMENT BYTE PUBLIC 'FAST'
;
   ASSUME CS:CSEG, DS:CSEG, ES:CSEG, SS:CSEG
;
  .RADIX   16
  ORG      0100
;
START:  IN  AL,61   ;PORT 'PB' OF 8255
        OR  AL,4    ;00000100, FORCE BIT 2 HIGH
        OUT 61,AL   ;MAKE THE SWITCH
        MOV AH,0    ;LEAVE PROGRAM
        INT 21
;
CSEG    ENDS              ;END OF SEGMENT
;
        END     START
```

***Listing 3.** FAST.COM – An Assembly language program to switch the clock speed of a Turbo PC to its faster speed.*

Get your disk with Basic ready again, and then, from the DOS prompt, type SLOW. Not much will appear to happen, but if you fire up Basic and then run the speed check program, it should take 12 seconds to beep. Now leave Basic with the SYSTEM command, go back to your work disk, and type FAST. Go back to Basic again, try the speed check program, and it should now take 7 seconds. OK? Whoopee, you've won!

FAST.COM or SLOW.COM can now be placed on your disks. If you include a command in your AUTOEXEC.BAT file, FAST or SLOW, the clock speed will be automatically set to the correct value for the programs on that disk, whenever you boot it up. Or you can have them both on the one disk, so FAST or SLOW become nice, foolproof commands that can be executed from DOS.

The operation of FAST.COM and SLOW.COM are easy to understand. Both programs first read in the current contents of Port 61, all 8 bits, and store them in the AL register within the microprocessor. Next a little logic is applied. In the case of SLOW.COM, the AND instruction is used. This means a particular bit in the AL register and the other operand must both be high for a bit in the result to be high. The hexadecimal number 'FB' becomes '11111011' in Binary. Bit 2 is low (it goes Bit 0-1-2 from the right hand end) and since Bit 2 must be high in *both* numbers for a bit in the result to be high, Bit 2 is always low in the result. The result, in the AL register, is sent back to Port 61 in the third instruction, with Bit 2 forced low. This switches the clock to 'slow'. The fourth and fifth instructions are a good method of terminating a machine code program.

You will notice that SLOW.COM and FAST.COM are identical except for the second instruction, the logic part FAST.COM uses the OR instruction, in which a particular bit becomes high in the result if the corresponding bit is high in *either* the AL register *or* the operand. We use the number 4 which is 00000100 in Binary Bit 2 in the operand is high, so Bit 2 in the result is always high. The AL register is sent back to Port 61 with Bit 2 high, so the clock is switched to 'fast'.

A hardware method

If you want to force your PC into the FAST or SLOW mode regardless of any software, yet still be able to use the software method of switching, this little modification will do the job. It involves the installation of a small switch on the front of the computer.

In July, we showed you how to install a hardware Reset button on your PC; if you intend to install a clock speed switch you should make an effort to read that article first to get a general idea of what's to be done. Perhaps you will want to do the Reset modification and this one at the same time

Your hardware clock speed switch must be a miniature 'single pole, single throw, centre off' toggle switch. In other words the switch must have three possible positions - left, centre, and right. Make sure this is the case before you buy the switch - some don't stop in the centre, and others have springs to prevent them staying in some positions. You'll also need some ribbon cable and some Molex pins, as described last month.

Open up your Turbo-PC and study the main system board. Find the Bios EPROM (it probably has an identifying sticker on it) and a 40-pin integrated circuit labeled as 'U36', to the right of the EPROM. They'll be near the centre of the system board. Right between them, toward the front, you should find a little 3-pin connector which may be labeled 'JP2' There may be a tiny plug bridging two of the pins together. Bad news: if you have a hard

Figure 1. The front of the computer, showing the recessed part of the front panel with both the Reset button and the Turbo switch mounted.

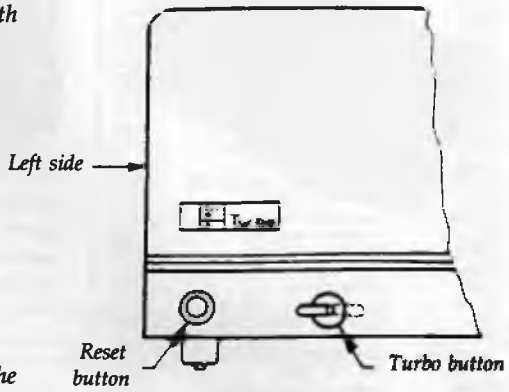
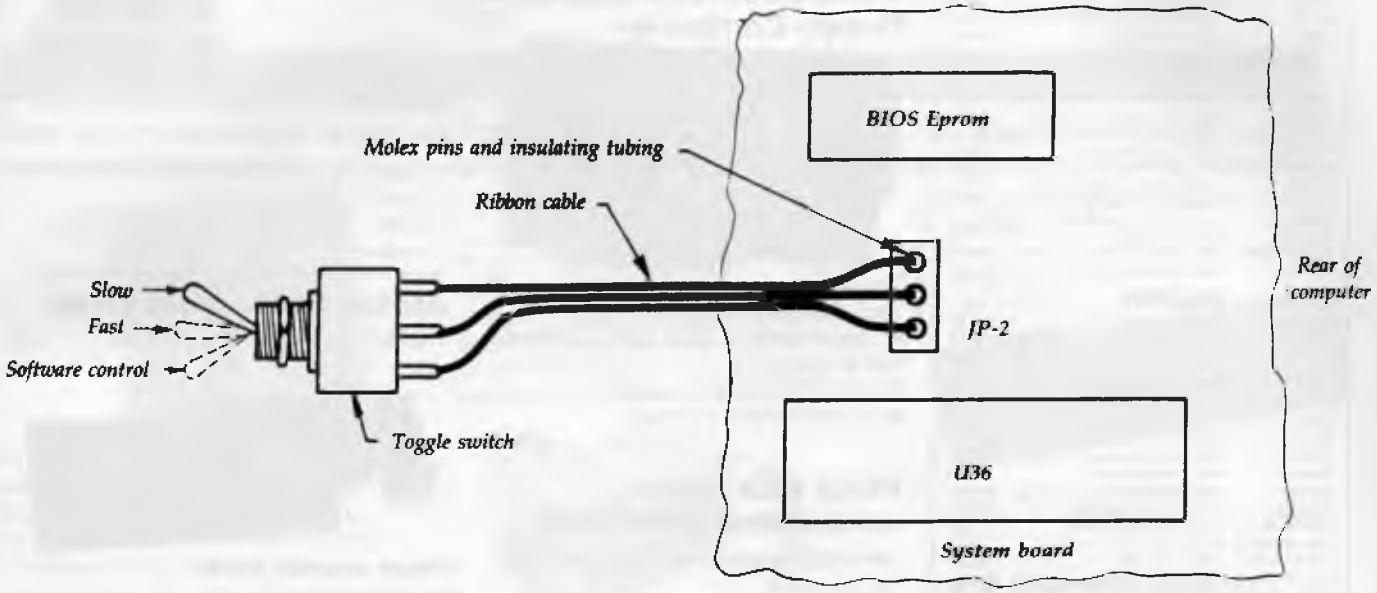


Figure 2. To fit the Turbo switch, first pull off three strands of ribbon cable. Connect the left terminal of the switch to the left terminal of the connector on the system board. Then centre goes to centre, and right goes to right. Use Molex pins and a bit of insulation tubing on the circuit board end, as described in July's article. If you had to remove a jumper plug from the system board connector, tape the plug to the wire or somewhere else convenient so it won't get lost in case you want to un-do the modification for some reason.



disk, you may find this connector buried beneath it, and you may have to temporarily remove the hard disk unit to proceed. This could be messy; perhaps you should seek help from someone experienced in such matters. If there's no hard disk, this job will be dead easy.

Having found the 3-pin connector, you must mount the switch. On my Unitron PC I mounted the switch on a lower section of the front panel which is somewhat recessed behind the main part of the panel, which partially hides the switch and makes it less obvious (Figure 1). This is only a suggestion for mounting; you can put the switch anywhere you want. Just make sure that when you do any drilling in metal, you prevent the filings getting into the computer's works. Just think what interesting devastation they could cause in a disk drive! Also make sure the power is DISCONNECTED!

Now let's get all technological and wire up the switch—the procedure is described in Figure 2.

To test it, drag out Listing 1 and test the speed as described previously, with the new switch first in the SLOW and then the FAST position. Finally, try the software tests again, with the switch in the SOFTWARE position. Some switches are physically different internally from others. If you happen to find the action of the switch reversed, simply un-screw it from it's mounting hole, turn it over, and re-install it upside down.

Fun and games time: for some real cheap thrills, place your new switch in either the FAST or SLOW position, and then fire up the Microsoft Flight Simulator. Establish normal straight and level flight with several thousand feet of clear airspace below you, and then flip the clock switch to the other speed. The plane will go absolutely wild, probably going into a violent spin. It's good fun to see if you can recover from this before you crash—I've done it only once or twice. □

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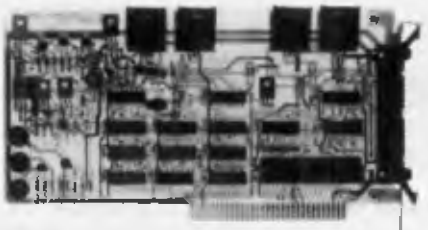

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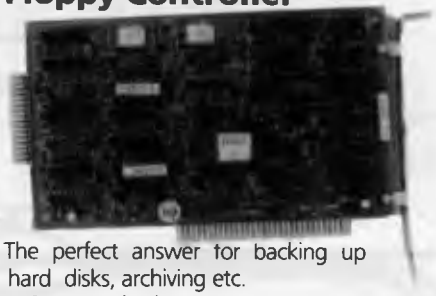

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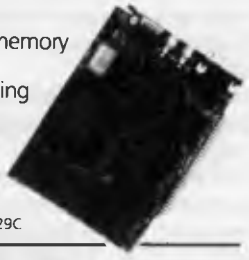

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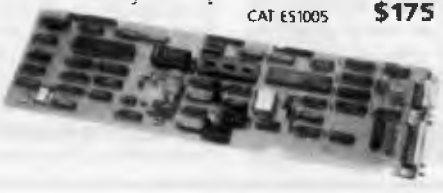

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A reference is any paragraph (including enhancements) of up to 17 lines with the internal order of author(s)-year-title-source.

References may be retrieved by accession numbers, authors, years, title words, sources and keywords. A number of ouput options are available. Autoref runs on an IBM PC or compatible. A hard disk is recommended.

Quarterdeck Expanded Memory Manager-386
Sourceware
Phone: (03) 600 0344
Price: $129 taxed

A new expanded memory manager for 80386 equipped PCs has been released by Sourceware. The Quarterdeck Expanded Memory Manager-386 (QEMM-386) is designed for use with Quarterdeck's Desqview software, a multi-tasking, multi-windowing operating environment for the IBM PC and compatibles.

QEMM is used for converting 386 extended memory to memory that appears to DOS as being EEMS (enhanced expanded memory specification) memory. It manages extended memory in a way that fools DOS into thinking it has programs running simultaneously within the 640 kilobyte limit imposed by DOS. QEMM enables Desqview to act as a control program for a 386 PC, allowing a user to run as many as nine programs simultaneously.

OS/2 Norton Guides
PC Extras
Phone: (02) 319 2155
Price: Not supplied

PC Extras has released the latest Norton Guide for OS/2 API. With the Guide the user gets information about language and syntax, a variety of tables including ASCII characters, line drawing characters, error messages, memory usage maps and important data structures.

The OS/2 and API Guide includes full coverage of all API services, a full discussion of each function with programming tips and detailed notes on all parameters and structure tables. It also includes a tutorial on OS/2 concepts. Each package consists of two parts – a memory resident instant access program and a comprehensive cross reference database.

Mac Accounting
Sybiz
Phone: (08) 232 0600
Price: $1495 taxed

Sybiz has introduced Mac Accounting, an accounting package that runs on the Apple Macintosh. It is aimed at the small business user. Mac Accounting is an entry level program and has an easy to use interface. Using the mouse it is possible to 'flick' through four books – sales, purchases, inventory and ledger. The mouse can be used by the less experienced user and the keyboard by the more proficient.

Mac Accounting enables users to browse through the pages and the entries just as one would in a manual system, except the mouse is 'turning the pages'. In addition, it has the ability to cut and paste from one program to another and also allows insertion of sections of reports and so on into spreadsheets, word processing documents and other Mac programs.

Magic Mirror
The Computer Factory
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Magic Mirror is an information integration facility that allows you to exchange information between different applications programs, or different parts of the same application. This is accomplished by capturing from the screen of one program and providing that screen information as keyboard input to another program

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Problem Tracking
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The system can be used in an on-line mode (at a reception desk where problem calls are received or as a batch 'after the event' reporting tool). PTS also handles telephone messages, indicates where staff are, stores contact numbers and the likely time of return. PTS runs on hardware supported by MS-DOS, PC-DOS, Novelle, 3COM or PC-NET. PTS costs $690 taxed, while a demonstration disk costs $25.

PIC ▽
Parados Software
Phone: (02) 818 3229
Price: $295 taxed per copy

PIC (Payment and Interest rate Calculations) simplifies financial calculations. It has been designed to simplify calculation of payments and rentals, interest rates, balances outstanding, residuals, balloons and so on. 'What if?' calculations have been simplified; the user only has to change the necessary values on the screen and the program alters the other figures automatically. The program is laid out in a flexible spreadsheet-like format.

For compound interest functions PIC automatically adjusts the interest rate when changing the period between payments. PIC can take a complex project and tell you how viable it is by manipulating the rate of return or any of the major cash flows.

PAYMENT AND INTEREST RATE CALCULATOR
Enter Value:

ADVANCE: 0.00
INTEREST RATE: 0.000 %pa(convertible monthly)

PAYMENT GROUP	MTHS TO 1ST PMT	CALC?=0 FIXED=1	PAYMENT AMOUNT	NUMBER OF PAYMENTS	MTHS BETW PAYMENTS
1	0	0	0.00	0	0
2	0	0	0.00	0	0
3	0	0	0.00	0	0
4	0	0	0.00	0	0
5	0	0	0.00	0	0
6	0	0	0.00	0	0
7	0	0	0.00	0	0
8	0	0	0.00	0	0
9	0	0	0.00	0	0
10	0	0	0.00	0	0
11	0	0	0.00	0	0
12	0	0	0.00	0	0

F1-HELP F2-CALC F3-RATE CONVERTER F4-AMORT SCHED F5-END

CASE
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SwitchLAN

Case Communications
Phone: (02) 451 6655
Price: See below

Case Communications has released SwitchLAN, a PC network product designed for small, medium and large PC populations. SwitchLAN is a pop-up PC communications program that networks IBM PCs and compatibles. No network servers or boards in the PCs are required, so installation is simplified and the cost of networking, in comparison to PC LANs, is substantially reduced.

SwitchLAN includes hot-key file transfer, micro-to-mainframe access, E-mail messages, terminal emulation, modem sharing, printer sharing, print spooling and support for dial-in PCs. It also uses pull-down menus and extensive on-line help to present users with a simple, easy to use network interface.

New Machines

Sprint XT

CCA
Phone: (07) 268 7555
Price: See below

CCA has released the first model in its Sprint range of Cleveland PCs. The Sprint XT is based around the CCA designed X2 motherboard, which has a performance index as rated with Norton's SysInfo of 5.00 running at 9.54 MHz and is totally XT compatible. Two 3½ inch floppy drives and up to 44 megabytes of internal hard disk are available. The front panel features include illuminated power switch, 16 character LCD message centre and a twin key reset to guard against accidental resets.

The Sprint XT also has an easy to use security system. At the touch of a panel button, the machine is secured against anyone not able to supply the user selected personal identification number. Other front panel functions are screen blank privacy switch, speed switch and speaker volume control.

A twin floppy drive system costs $2829, a 20 megabyte system costs $3531 and a 40 Mbyte system with voice coil costs $4,700; all prices taxed. Other configurations are available.

12 MHz upgrade

Epson
Phone: (02) 436 0333
Price: See below

Epson has announced the 12 MHz clock speed for its entire 286 range, the Epson PC AX and the Epson PC AX2. As a result, the PC AX offers 6 MHz, 8 MHz and 12 MHz, and the PC AX2 offers 8 MHz and 12 MHz, which are switch selectable from the front panels without rebooting.

Epson will also be supplying MS-DOS Version 3.3 with the PC AX2.

The PC AX with MS-DOS and GW Basic is priced at $4150 untaxed; the PCAX2 with a single floppy drive, MS-DOS, GW Basic and an Hercules compatible video board costs $3865 untaxed.

Z-248/12 AT ▷

Zenith Data Systems
Phone: (02) 417 7999
Price: See below

Zenith Data Systems has released an AT compatible, the Z-248/12, with 12 MHz of zero wait state processing speed and up to 160 megabytes of hard disk storage. The machine is available in three configurations based on mass storage; MS-OS/2 will run on all three. Mass storage comes in 28 millisecond 40 Mbyte, 80 Mbyte unformatted and 18 ms ESDI hard drive configurations. Each also has a 1.44 Mbyte 3½ inch floppy drive as standard, with a 5¼ inch drive optional. The ESDI controller supports a maximum of two floppy and two hard disk drives.

Bundled software includes MS-DOS 3.21, Windows (hard disk versions); MS-OS/2 and MS Xenix 5 are also available The Z-248/12 offers 1 Mbyte of 85 nanosecond memory expandable to 6 Mbyte of zero wait state memory on the system board. Pricing starts at $4999 taxed.

Superstation

Minicomp
Phone: (02) 957 6800
Price: See below

Minicomp has released the Superstation Cadcam workstation. It has a zero wait state 20 MHz 80386/387 processor with 8 megabytes of memory. It also has a proprietary high performance disk controller with up to 6:1 data compression and faster throughput.

The Superstation costs $36,000 untaxed, though when bundled with Cadkey Version 3 it costs $42,000 untaxed. It can operate as a single user or multitasking system

Tandy 5000 MC Desktop

Tandy Electronics
Phone: (02) 675 1222
Price: Not available

Tandy Corporation (US) has announced its latest PC, the Tandy 5000 MC Desktop. It operates at 20 MHz, uses the Intel 80386 processor and utilises a high speed memory cache controller. The 5000 MC includes an onboard VGA, high speed memory caching and IBM Micro Channel type architecture. An IBM Micro Channel compatible video extension slot provides for future extended VGA options.

The 500 will support single user MS-DOS 3.3, multi-user SCO Xenix 386 and multi-tasking Microsoft OS/2 operating systems. It has 2 megabytes of dynamic RAM expandable to 16 Mbyte using 1 Mbyte Single In-line Memory Modules (SIMMS). It also features 32 kilobytes of static RAM and the Intel 82385 memory cache controller. The Tandy 5000 MC Desktop will be available in Australia mid-1989.

Z-286 LP

Zenith Data Systems
Phone: (02) 417 7999
Price: See below

The Z-286 LP is an expandable AT compatible desktop computer in a low profile cabinet. It incorporates an 80286 processor running at 8 MHz with zero wait state. A 40 megabyte (28 millisecond average access time) hard disk drive and 1.4 Mbyte 3½ inch floppy disk drive with

read and write capability for 720 kilobyte format are standard features.

Also standard is 1 Mbyte of RAM – more than enough to run large spreadsheets, or operate windowed applications. Memory may be increased by 2 Mbyte increments for a total of 6 Mbyte on the main system board. Further standard features are two serial ports, one parallel port and Zenith's high resolution video card. Pricing starts at $6499 taxed. ▷

Peripherals

Amtec Ethercard

Computer Networks
Phone: (02) 427 1722
Price: $595 untaxed

The Amtec Ethercard now works under the 3Com and the DecNet-DOS families of local area networking (LAN) products The Ethercard is said to offer up to twice the throughput capacity of other Ethernet adapter boards available for the IBM AT, XT and compatibles. The Amtec board achieves this capacity because its 32 kilobyte memory buffer is dual ported and directly accessed by the CPU. This eliminates the need to set up a hardware implemented DMA channel data transfer.

It supports the Ethernet and IEEE 802.3 networking standards. It also supports data transfer rates up to 10 Mbits/second. The Ethercard has an on board transceiver that allows it to be connected to a Thin Ethernet network.

Buffalo SX

Interface Technology
Phone: (02) 809 6144
Price: Not supplied

The Buffalo SX is an intelligent switcher, buffer and interface conversion system in one box. It is designed with five serial and five parallel connections.

The SX is configurable up to 1 megabyte of buffer memory, al-

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UTILICO SOFTWARE
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lowing users to download their files for printing into the buffer and return to work on their PCs immediately. This means that PC users connected to the SX no longer have to remain tied to a printer nor do companies need to purchase a number of peripherals to cater for the needs of multiple users. The serial and parallel ports machines such as IBM PCs and Macintoshs to share output devices. With communications software, files can be passed back and forth through the PC's serial ports.

Compact Laser Printer

MPA
Phone: (03) 894 1500
Price: $3600 untaxed

MPA has released the new Sharp Compact Laser printer, a six pages per minute entry level model. It produces high resolution text and graphics at 300 dots per inch. A large range of interchangeable fonts are available.

The Compact Laser incorporates Epson, Diablo, IBM and Hewlett-Packard LaserJet Plus printer emulations to meet most application needs. Standard consumable cartridges are used by the Compact. Two resident fonts are included, while additional fonts are available with optional font cards or downloading from a host.

DFX-5000 Printer

Epson
Phone: (02) 436 0333
Price: $3990 untaxed

Epson has released the DFX-5000, a high speed, heavy duty, impact dot matrix printer designed for long print runs. It is ideally suited for printing invoices and continuous report generation where speed and continuous use are of paramount importance.

The DFX-5000 prints at 533 characters per second in high speed draft mode and the long life head is capable of printing up to 200 million characters. The dual tractor Smart Park function allows the user to switch instantly between two types of continuous paper from the front panel. It can be connected to mini and mainframe computers as an ASCII printer.

Epson FX upgrades

Epson
Phone: (02) 436 0333
Price: See below

Epson has upgraded its FX series of impact dot matrix printers with 'smart park' advanced paper handling, increased speed and paper throughput and reduced noise levels The FX 1050 and FX 850 (respectively successors to the FX 1000 and FX 800 models) are 136 column and 80 column 9-pin impact dot matrix printers which are rated at 264 characters per second in draft mode and 54 in near letter quality mode. The rated noise level has been reduced to 65 dBA.

The Smart Park advanced paper handling feature enables fast and easy changeover between cut and continuous paper. A lever parks the continuous paper at the stand-by position while cut sheets are used. By switching the lever again, continuous paper comes back to the printing position. Other paper handling features include easy changeover between cut and continuous paper, paper thickness adjustment for multi-part forms, auto sheet load, builtin intelligent push tractor, short tear off, top of form memory and a new paper tension facility which allows printing on the top inch of the continuous or cut sheet paper.

The FX 1050 costs $1250, while the FX 850 costs $990; all prices untaxed.

Prisma graphics adapters

Keller Automation
Phone: (03) 580 1355
Price: See below

Prisma, through Australian distributor Keller Automation, has released a new line of graphics adapters.

The EGAMAX 480 provides EGA, CGA, MDA, Hercules and 1232 *x* 44/29/25 column text modes on any EGA monitor. It also has 752 *x* 410/640 *x* 480-VGA resolution, 640 *x* 400 CGA double scan and 80 *x* 66 spreadsheet on Multisync monitors. The EGAMAX 860 provides the same features as the EGAMAX 480 plus an 800 *x* 600 resolution.

The VGAMAX 860/1024 offers full compatibility with IBM's PS/2 and PC-type systems with VGA-standard 640 *x* 480 and 720 *x* 400, plus expanded 1024 *x* 768 and 800 *x* 600 advanced resolutions, and downward compatibility.

The EGAMAX 480 costs $510, the EGAMAX 860 costs $630 and the EGAMAX 860/1024 costs $876; all prices taxed.

Saturn 10 modem ▽

Scitec
Phone: (02) 428 9555
Price: $3899 taxed

Scitec has enhanced its Saturn 10 modem to provide greater flexibility for clocking and support of sub-rate operation. The Saturn 10 is frequently purchased by end users and systems houses to provide the necessary G.703 interface and Telecom approved line isolation for foreign equipment only capable of providing RS422 on V35 trunk connections.

VP 1814 and VP 1821

Teco Australia
Phone: (02) 684 4277
Price: Not supplied

Teco has released the 9-pin VP 1914 and the 24-pin VP 1821 dot matrix printers. The VP 1814 has straightforward front panel controls.

Speeds range from 180 characters per second in draft mode to 36 cps for letter quality. Documents are readily enhanced with multiple print modes for letter quality, draft, pica, elite and italic fonts as well as enlarged or bold character. Super and subscript functions are also available. A standard memory capacity of 7 kilobytes is provided, with the option of an upgrade to 15 Kbyte for larger tasks

The VP 1814 user can select IBM and Epson control codes for high speeds of printing. The VP 1821 has a print speed of 180 cps in draft mode and 90 cps in near letter quality mode.

Lancard/A Arcnet Lancard

ADE Computers
Phone: (03) 543 2677
Price: $312 taxed

The Lancard/A network expansion card is the interface between the network and IBM PCs or compatibles. As many as 255 file servers and workstations can be connected in a single local area network stretching 20,000 feet from end to end. As the backbone of the network, the Lancard/A hardware complements the high performance features of Novell's Netware proprietary network operating system. It uses EPROM and is RAMreadable by the IBM PC. The Lancard is based on Arcnet Token passing technology.

WY 500 and WY 650 Monitors

Wyse Technology
Phone: (02) 888 7455
Price: See below

Wyse Technology has announced a line of monitors compatible with IBM's PS/2 Video Graphics Array (VGA) standard. The WY 550 and WY 650 colour monitors are capable of displaying 640 by 480 pixel resolution. The Wyse monitors feature a high speed horizontal scan frequency of 31.5 KHz, a vertical scan frequency of 50/60/70 Hz and non-glare, high contrast screens.

The WY 550 mono monitor is a large 14 inch diagonal display, which provides a 30 per cent larger active display area that the IBM mono monitor. The flicker

free monitor comes in a choice of paper white or amber phosphor. The high resolution WY 650 colour monitor is a fully IBM compatible, 12 inch display with 0.28 mm dot pitch; it displays up to 256 colours simultaneously.

WY-450 VGA display adapter

Wyse Technology
Phone: (02) 888 7455
Price: Not supplied

The WY 450 VGA display adapter is compatible at the hardware register level with IBM's VGA standard and is hardware compatible with analog and multisync monitors. The adapter card offers downward software compatibility with the EGA, CGA and the MDA video standards.

VGA software drivers included with the adapter card are for Ventura Publisher, Lotus 1-2-3, Symphony, AutoCAD Release 9, Microsoft Windows and GEM.

Services

Management of Cad

Programme Learning
Phone: (02) 229 9630
Price: See below

A new educational video and study guide from the Institution of Engineers, Australia and Programme Learning has been released. *The Management of Cad* is for users, managers and potential users. It is designed to show how computers are entering the world of engineering design.

The video was written by David Ireland and hosted by ABC TV's Peter Ross; it is 30 minutes long. It is priced at $240; $190 for Institution members. The study guide costs $35 or $30 for members.

Microsoft Excel Learning System

Micro Management Services
Phone: (02) 452 5966
Price: See below

Micro Management Services has released a cassette based learning system for Microsoft Excel. The course begins with Excel's basic spreadsheet then brings users through more advanced applications of Excel.

The course material includes a 140 minute video, workbook and student exercise disk. It will be available on VHS format for $797 or rental from $28 a day.

PC System Tuning

Fletcher DP Services
Phone: (03) 537 2811
Price: See below

Fletcher DP Services has announced a new service that aims to improve the performance of PCs without the addition of new hardware. According to Fletcher, many PCs are inefficiently organised (internally) to the detriment of user performance and hardware resource use. The company uses a range of diagnostic software to determine the key points of contention. The system is then rebuilt to better suit the type of work being done.

Fletcher offers a written guarantee. Charges for the service are offered on a fixed price or hourly rate. An initial consulation can quickly determine the scope of opportunity for performance improvement.

Fundamentals of the Unix System

Micro Management Services
Phone: (02) 452 5966
Price: See below

Fundamentals of the Unix System is a video self training program from AT&T and distributed by Micro Management Services. Skills acquired through the course include text processing with the VI Editor, communications, file management and common system commands.

The program is divided into three levels – basic, intermediate and advanced. The basic and intermediate levels each have four modules and both cost $1310 taxed. The advanced level has three modules and costs $1191 taxed. The daily rental for each level is $33.

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Miscellaneous

Australia on Disk

Philips
Phone: (02) 925 3333
Price: Not supplied

An enhanced directory containing millions of Australian business and residential names, addresses and phone numbers is now available on a 12 cm CD-ROM. With this directory disk, called Australia on Disk, and a CD-ROM player connected to a PC, the user can call up the information. The disk also includes residential directories for Melbourne, Sydney and the ACT.

The flexible data retrieval software, Textware, that was used on the disk allows it to be searched in a variety of methods to suit business applications. For example, by entering a street name and suburb, it is possible to find the names of businesses and residents. If you enter a particular type of business, say, smash repairs or plumbers, and a locality, a list of those businesses in that area will be displayed. Production of Australia on Disk was a joint project between United Directory Systems, which was responsible for compiling the data, and Philips, which supplied the software and produced the disk.

Computer labels

Esselte Dymo
Phone: (02) 771 6888
Price: Not supplied

Esselte Dymo has released two new pack sizes in its Quik Stik computer label range. The Hacker Pack contains 1000 labels in the two most popular label sizes and is aimed at the home user or small business.

The Pro Pack offers 2500 labels in two sizes with 1, 2 or 3 labels across. Quik Stik Bulk Packs contain 10,000 labels per pack in six sizes, with up to 4 labels across in some sizes.

Computer Usage Timer/Controller

Samways Electronic Engineering
Phone: (048) 85 1541
Price: Not supplied

Samways has released a method of controlling computer usage – the Computer Usage Timer/Controller. The timer connects to the computer keyboard or joy-stick cable and a removable is used to activate them. After 15, 30 or 60 minutes the keyboard or joy-stick is deactivated until the key is used again.

When the key is installed the device may be held on permanently, forced off or operated for a timed period. The timer period is selected by changing a jumper inside the timer. A cover is screwed on to prevent the time period from being altered or the cable removed Versions for IBM, Apple, Commodore and other computers are available.

Keyboard Drawer

Sylex
Phone: (02) 647 2888
Price: Not supplied

No room to move? If you have a problem with too little space on your desk for your CPU, monitor, keyboard *and* your paperwork, then you may need Sylex' Keyboard Drawer.

The Keyboard Drawer is exactly that – a drawer for your keyboard that fits under the CPU. It slides smoothly on heavy duty glides and locks conveniently into the open position to provide a firm keying surface. The builtin rounded wrist support relieves tension. According to Sylex, the steel casing supports even the heaviest CPU and monitor.

Mouse Cleaner 360

PC Accessories
Phone: (02) 449 4721
Price: $40 taxed

Your mouse needs regular cleaning to remove the build up of dirt, lint and other residue on the tracking rollers to keep it operating at peak performance (when was the last time you cleaned yours?). Mouse Cleaner 360 is used by removing the existing tracking ball from the mouse and replacing it with Mouse Cleaner's Scrubber Ball With a few circular motions of your hand, hundreds of tiny scrubbers remove built up dirt, grime and other residue interfering with mouse operation.

The Mouse Cleaner kit comes complete with a Velcro covered scrubber ball, scrubber board, cleaning solution, chamois cloth and velcro strips which for mounting the kit on a computer or in the work area.

OS/2. The Book.

Olivetti
Phone: (008) 022 887
Price: Not applicable

Olivetti has released a non-technical booklet titled *OS/2. The Book* It provides an overview of OS/2 and explains what the new operating system means to the end user. The booklet includes sections on OS/2's compatibility with existing MS-DOS software, licensing of OS/2, the future of MS-DOS and the availability of new applications. For a free copy phone Olivetti.

CADcontroller

TCG
Phone: (02) 698 1339
Price: $1350

TCG has released the latest version of the CADcontroller graphics card which now fully supports AutoCAD release 9.
CADcontroller's new driver supports AutoCAD's advanced user interface, allowing pull down menus and dialog boxes, as well as the fastdraw and packet mode functions. The new card can display flicker free non-interlaced colour graphics at a resolution of 1024 by 768.

It can also be run on NEC Multisync monitors with a resolution of 800 by 600. This versatility saves users from buying a new graphics card if the system is upgraded with a higher resolution monitor. CADcontroller also combines the functions of a graphics and communications card with an on-board RS232C serial port for the connection of peripherals such as printers, scanners or modems.

PC Support Advisor

International Technology Publishing
Phone: (02) 260 0660
Price: See below

A new monthly publication, *PC Support Advisor* , is aimed at PC support professionals in commerce and government. The publication is designed to be a written source of advice in all facets of PC support. Each month will feature new techniques, the latest bugs and how to fix them, new products and in-depth articles on current computer related issues.

PC Support Advisor is a totally independent publication; it carries no advertising and has no affiliation with vendors. The publication PC is available only by subscription costing $495 per year.

PC tool kit

Sylex
Phone: (02) 647 2888
Price: Not supplied

Sylex has released a PC tool kit enabling you to switch peripherals and boards as well as do some simple servicing. Each kit contains a 4-inch nut driver with reversible T-15/T-10 torx driver; a 4-inch nut driver with reversible Phillips-head; two 3½ inch nut drivers; tweezers; a 3-pronged parts extractor; an IC extractor/insertor; a spare parts tube; and a selection of screwdrivers and Philips-heads.

Vertical CPU stand

Sylex
Phone: (02) 647 2888
Price: $49 taxed

If space on your desk is at a premium, then Sylex' latest product may help solve your problem. The new product is a vertical CPU stand, that allows you to put the CPU on the floor next to your desk.

The stand adjusts from 105 to 185 mm to accommodate most popular disk drive systems. The stand is constructed of high impact ABS plastic.

Gothik

Amstrad
Phone: (02) 662 7944
Price: See below

A magical kingdom begins this scrolling maze. The Druid Hasrinaxx lies scattered in six pieces around the catacombs of Kaza. You must use Olga (the lady with magical powers) and Olaf (the man with muscle) to slowly resurrect the Druid.

Olga and Olaf have the choice of arrows, lightening and fireballs to fight 16 death hungry monsters. Their only purpose is to run the maze and stop the reassembling of the Druid. Available for Amstrad (CPC): disk $39.95, cassette; and C64: disk and cassette $29.95

Events

A series of seminars will be conducted by Management Technology Education. Seminars include Successful User Documentation (to be held in Sydney, Melbourne, Adelaide and Perth), OS/2, PC/MS-DOS and Supporting PCs (Sydney and Melbourne). For further information contact: (02) 262 5555, (03) 670 7117 or (008) 22 4514.

Ergonomics is the title of a Worksafe Australia external education program to be held in Sydney on 8 and 9 August. The program is conducted by the National Occupational Health and Safety Committee. For further information phone (02) 265 7555.

Knowledge based systems in civil engineering will be discussed at a symposium to held at Monash University from August 18 to 19. Contact (03) 565 4718 or (03) 565 4949.

AutoCad Expo '88will be held at Centrepoint in Sydney from August 23 to 25. It will incorporate the Third National AutoCad Users' Conference. Papers have also been called for by the organisers, Autodesk Australia. Contact (03) 429 9888.

Geomechanics '88 is the fifth Australian/New Zealand conference and exhibition on Geomechanics. It will be held in Sydney from August 22 to 24 at the Hilton Hotel. Contact the Institution of Engineers, Australia on (062) 73 3633.

ACC '88, the annual conference for the ACS will be held at Darling Harbour, 21 to 23 September. Contact Karen Hucks (02) 211 5855.

Microbits 88 is an introductory course on interfacing principles for IBM and compatible machines. The course is either part time (6 weeks duration, 1 night a week from 14 September) or full time (5 days) from 5 December. For further information contact the Queensland Institute of Technology, Physics department on (07) 223 2196.

The Australian Robot Association will be holding an international symposium and exposition on robots at the Sydney Hilton and Centrepoint from the 6 to 10 September. Contact the association at GPO Box 1527, Sydney NSW 2001

TADSEM '88, the sixth national seminar hosted by Technical Aid to the Disabled, will be held at the Queen Elizabeth II Rehabilitation Centre, Camperdown on the 7 and 8 October. The topic for this year's seminar is Computers Serving People with Disabilities. Contact (02) 808 2022.

Beyond 2000 Science and Technology Spectrum is a multimedia multi dimensional 'experience' held in conjunction with the *Beyond 2000* TV technology show. Five interconnecting pavilions will present working displays of life in the future including lifestyle, medical (featuring a replica of a human heart), industrial, science and electronics. Contact Spectrum Exhibitions on (02) 281 2555.

SUGA '88, the SAS Users' Group of Australia annual conference will be held 12 to 14 October at Darling Harbour. Contact the coordinator on (02) 908 2244.

Infotex '88 is a computer and communications show especially for government. It will be held from November 8 to 10 at the National Exhibition Centre, Canberra. Contact (02) 959 5555.

SST-88, the second Australian International Conference on Speech Science and Technology, will be held at Macquarie University, Sydney, on November 29 and December 1. Contact the Secretariat at Macquarie University on (02) 805 8784.

Microbee Users Group of WA.- New members please note that the group meets at the Leederville Technical College. For further information contact the secretary, Ross Gould on (09) 417 1374 after hours; or write to PO Box N1090, Perth 2000

The Australian Paradox Users Group (APUG) has been formed. Regular monthly meetings will be held on the last Tuesday of each month at Bird Cameron, 316 Queen St, Melbourne 3000 Victoria. For further information contact Gordon Castle on (03) 563 1037. Or write to APUG PO Box 26, Chadstone Centre 3148 Victoria.

CLUES, the C Language Users and Enthusiasts Society, is now holding regular meetings at Microsoft, 1/17 Rodborough Road, Frenchs Forest on the first Tuesday of every month

Special Interest Groups for PC Users: CONSIG meets on the first Wednesday of each month in Sydney; contact (02) 290 2655. The DTP Graphics SIG meets on the first Tuesday of the month in Sydney; contact Mark Richards on (02) 929 5855. PCWEST meets on the first Monday of the month in Sydney; phone Bill McEwen (02) 627 2488.

The President Users Group meets on the last Tuesday of each month at the Hornsby Inn. Contact Raymond Toms on (02) 212 5277.

Watercomp '89, the first Australasian conference on Technical Computing in the Water Industry organisers are asking for papers. The conference will be held from May 30 to June 1, 1989 at the Regent Hotel, Melbourne. Contact the Institute of Engineers, Australia on (062) 70 6549.

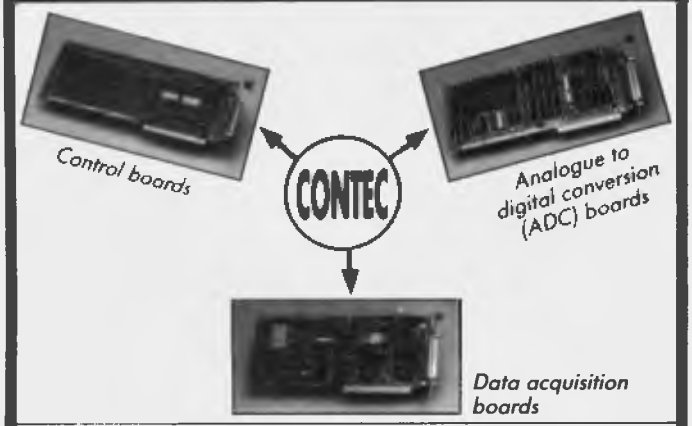
Overseas Exhibitions

Comtec '88 will be held at the World Trade Centre in Singapore from 25 to 28 August. Contact Paul White on (03) 663 3911

A three day conference on Graphic Design Systems will be conducted by McDonnell Douglas Information Systems from August 31 to September 2. Contact Graham Reeve, Sydney (02) 887 9425.

Internepcon/Semiconductor Asia/Pacific, will be held from 14 to 17 September at the World Trade Centre in Singapore. Contact Ann Theseria or Kareen Chang, Cahners, Singapore 271 1013. □

DATA ACQUISITION AND CONTROL



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LARRY LEWIS

THE PROPHET

Registry news and views

The Registry continues to zip along, we seem to be processing changes to between 30 and 50 per cent of listed systems each month. Some System Operators seem to change their system details more often than they change their socks! Not that we are complaining, much better to do changes than have things wrong. If you logon to a system that is not in the list send details to me on my board, (02) 628 5222; or if you have access to a FidoNet system post a message in the National PAMS Conference (or NetMail me on 3:713/606). Better still ask the SysOp to register the board and then he/she will receive a subscription to *Your Computer*.

One of the worrying things that we get faced with at the registry from time to time is messages like 'The SysOp of xyz board is carrying copyright software, why do you list him?' There are others – like the system encourages 'hacking', or, it is run by a deviate. Now I don't like systems that pirate copyright software and I do not agree with the activities of some of these 'questionable' systems but what should the Registry do about them?

The charter of the Registry is to provide a central point for details about bulletin boards (PAMS). Firstly it gathers information on new boards and changes to existing ones, always trying to check the accuracy of information. Next, periodic reviews of existing systems are made to try and avoid the age old problem of systems disappearing and still being listed. Finally (and most importantly) an up to date directory of bulletin boards is produced and distributed nationally each month for users (that's you guys).

You notice that not one mention is made about enforcement, control, or regulations. True, the Registry has some policy guidelines about things, but they do not in any way say that systems need to comply with the Registry to be listed (if you want to read the Policy and Procedures Guide for the Registry it is available from my bulletin board or the other state co-ordinators).

As far as I am concerned if a system operator is doing something illegal, immoral or any other questionable activity it is not the Registry's job to 'take action'. There are things called police, courts and governments to enforce laws (or make them) and, finally, if the board upsets people they have an easy and simple solution – don't call it again!

I hope this clears up any misconceptions as to the role of the Registry and its relationship to bulletin boards.

```
.c.obj:
        qcl -c -Wl -Ze -AM $*.c

pamsed.obj : pamsed.c pamslist.h
pamsed1.obj : pamsed1.c pamslist.h
pamsed2.obj : pamsed2.c pamslist.h
pamsed3.obj : pamsed3.c pamslist.h
pamsed4.obj : pamsed4.c pamslist.h
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Pamsed.exe : pamsed.obj pamsed1.obj
               pamsed2.obj \
             pamsed3.obj pamsed4.obj
               pamsed5.obj \
             pamsed6.obj
        del Pamsed.lnk
        echo pamsed.obj+ >>Pamsed.lnk
        echo pamsed1.obj+ >>Pamsed.lnk
        echo pamsed2.obj+ >>Pamsed.lnk
        echo pamsed3.obj+ >>Pamsed.lnk
        echo pamsed4.obj+ >>Pamsed.lnk
        echo pamsed5.obj+ >>Pamsed.lnk
        echo pamsed6.obj >>Pamsed.lnk
        echo Pamsed.exe >>Pamsed.lnk
        echo Pamsed.map >>Pamsed.lnk
        link @Pamsed.lnk /NOI $(LDFLAGS);
```

***Listing 1.** Make will only compile and link what is necessary to give you the end product. This sample Makefile is one that was generated for one of the PAMS Registry programs. Notice the '.c.obj' that tells Make you are defining how it should (by default) transform a file with an extension of '.c' into '.obj'.*

Make Utility

Make is a utility distributed with Micro-Soft C V5 and is used to automatically compile your programs. When you are developing programs in C (or, at least, developing them properly) you will have a nice modular system that has various source modules. Now, if you change moduleA to add that some feature and want to do a test – let me see, oh yes, now I have to recompile A, B, D and then relink. Rats I missed module F, oh well do it again!

That's one way. Then there's the brute force approach – change one line in moduleA and recompile everything. Neither approach is really much good, one is too wasteful of the computer and the other is gambling with your memory.

Enter, stage left, Make. The idea behind Make is that you describe to it all the bits of your program and how it all hangs together. Once you do this all you need to do to make sure you have the latest version of your masterpiece is to run Make. It will only compile and link what is necessary to give you the end product.

Magic? No just smart programming. To see how it works, look at the sample Makefile – this is one that was generated for one of the PAMS Registry programs. Notice the '.c.obj' that tells Make you are defining how it should (by default) transform a file with an extension of '.c' into '.obj'. This is obviously the first step in the process of building your program.

Further down you see 'pamsed.obj : pamsed.c' that is telling Make that there is an object named pamsed.obj and that it is created by source module pamsed.c; next to it (and all the other source programs) is pamslist.h. This is a common set of definitions for each of the modules that make up pamsed.

Right at the bottom you see 'pamsed.exe : ....', which is the final bit in the saga. It tells Make that to build pamsed.exe, it uses the various .obj files created by the compiler. You might think this is a drag, but you only ever need create this file once (unless you add another module).

Now, if I want a different menu display. With my favourite editor (oops, I mean with QuickC), I change the source, but then what? Well, if the make file is called pamsed.mak I type 'Make pamsed.mak', Make says 'hello' and starts looking at my program.

It sees that pamsed.c has a newer time stamp than pamsed.obj so it goes and recompiles pamsed using the commands stored below the '.c.obj' line. No other code has changes so it does not compile the other modules. It gets to the 'pamsed.exe' line and sees that the pamsed.obj module has a newer time stamp and so executes the link instructions.

Finished! Run it again and Make will do nothing as everything is up-to-date. If there is an error in the compile of the source, Make is smart enough to stop and let you fix it up – great stuff! OK, if now I change pamslist.h for some reason and reinvoke Make, what happens? Make recompiles every module that has pamslist.h as being part of the module (in this case all the source modules use it). Then it relinks the program for me and away I go.

There is a bit of work setting up a make file but once it is done it makes life very simple, now let me see if it will make me some coffee ... □

Primary electronic collection points

The last full listing was given in the April 1988 issue; refer to the Services page on how to obtain Back issues.

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PAMS News 8806

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Airlock Hermitage
Sysop: Greg Glynn
Phone: (02) 600-1822
FIDOnet: 713/609
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: IBM PS/2 60
DOS: PC DOS
BBSoftware: Opus

*** Amended ***
Apolloline BBS
Sysop: Richard Heppell
Phone: (02) 869-8349
Baud: V21 V22 V23
Access: Reg VA
Computer: Macintosh
DOS: HFS
BBSoftware: Red Ryder Host

*** Amended ***
Apple Users Group - Apple // BBS
Sysop: Cameron Brawn
Phone: (02) 449-7798
Baud: V21 V22 V22bis V23
Access: Mem LVA
Computer: Apple //E
DOS: PRODOS
BBSoftware: Proboard //

*** Offline ***
Aquarius

*** Online ***
Blackboard BBS
Sysop: Will Black & Stephen Hudson
Phone: (02) 525-6970
Baud: V21 V22 V22bis V23 B103 B212
Access: Reg VA
Computer: Amiga 500
DOS: AmigaDOS
BBSoftware: BBS-PC!

*** Offline ***
BLAZE-dataLINK

*** Amended ***
Cesspit RAPL
Sysop: Andrew Winter
Phone: (02) 543-7204
Baud: V22 B103 B212
Computer: Apple IIE
DOS: PRO DOS
BBSoftware: GBBS PRO

*** Amended ***
CoCo Arena
Sysop: John Kelly
Phone: (02) 646-5573
Baud: V21 V22 V23 B103 B212
Access: Reg LVA
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: QuickBBS

*** Amended ***
Contact BBS
Sysop: Peter Hall
Phone: (02) 798-6368
Baud: V21 V22 V23 B103 B212
Access: Mem Reg
Computer: IBM XT
DOS: MS DOS
BBSoftware: TBBS

*** NEW System ***
Cranial Cavity
Sysop: Don Cunningham
Phone: (02) 675-1472
Baud: V21 V22 V22bis
Access: Mem Reg VA
Computer: Profound XT Turbo
DOS: MS DOS
BBSoftware: Fido

*** Amended ***
Cursor Contact Amiga BBS
Sysop: Greg Minahan
Phone: (02) 637-8131
Baud: V21
Access: Reg LVA
Computer: Amiga 500
DOS: AmigaDOS
BBSoftware: BBS-PC!

*** Amended ***
Cybersoft Opus
Sysop: Heath Rogers
Phone: (02) 212-2261
FIDOnet: 712/202
Baud: V22 V22bis PEP
Access: Reg LVA
Computer: IBM XT
DOS: PC DOS
BBSoftware: Opus

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Access: Public
BBSoftware: QuickBBS

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Dream Time FRP

*** Amended ***
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Sysop: Ross Wheeler
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Hours: Daily: 1900 - 0700
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Baud: V22 V22bis B103 B212
Access: Public
Hours: Weekdays: 1800 - 2200
Computer: Macintosh
DOS: HFS
BBSoftware: Hypercard

*** Amended ***
Integra TEX
Sysop: Kevin Leong
Phone: (02) 746-1109
FIDOnet: 712/703
Baud: V22
Access: Public
Computer: IBM AT Clone
DOS: PC DOS
BBSoftware: QuickBBS

*** Amended ***
Landover Amiga BBS
Sysop: Lance Lyon
Phone: (02) 319-1793
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem LVA
Computer: Commodore PC5
DOS: PC DOS
BBSoftware: BBS-PC!

*** NEW System ***
Micro
Sysop: Kevin Bessell
Phone: (02) 543-7041
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: QuickBBS

*** Amended ***
Milliway's
Sysop: David Coucke
Phone: (02) 357-7027
Baud: V21 V22 V22bis V23 B103 B212
Access: Reg VA
Computer: Amiga 1000
DOS: AmigaDOS
BBSoftware: QuickBBS

*** Offline ***
Mudgee Connection

*** Amended ***
Nebula RAPL
Sysop: Sean Craig
Phone: (02) 407-2729
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem VA
Computer: Apple IIgs
BBSoftware: Big Bikkies

*** Online ***
New Frontiers CBCS
Sysop: Howard Pew
Phone: (046) 25-6954
Baud: V21 V22 V23 B103 B212
Computer: IBM XT Clone
DOS: PC DOS
BBSoftware: Opus

*** Amended ***
Night Shift BBS
Sysop: Binky
Phone: (02) 635-8175
Baud: V21 V22 V23 B103 B212
Access: Public
Hours: Daily: 2030 - 0500
Computer: TRS-80
DOS: OS-9 Level II
BBSoftware: TABBS

*** Amended ***
Nightmare BBS
Sysop: Todd Wright
Phone: (02) 545-1132
FIDOnet: 712/503
Baud: V21 V22 V22bis V23
Computer: FTC 1600XT
BBSoftware: Opus

*** Amended ***
Pandemonium
Sysop: Mark Farnan
Phone: (02) 411-7642
Baud: V21 V22 V22bis V23 B103 B212
Access: Reg VA
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: QuickBBS

*** Amended ***
PC Users Group - Microcomp Board
Sysop: Bruce Edney
Phone: (02) 540-1842
FIDOnet: 712/505
Baud: V21 V22
Access: Mem Reg VA
Computer: IBM PC
DOS: PC DOS
BBSoftware: Opus

*** Amended ***
Program Paradise
Sysop: Matthew Wood & Andrew Avery
Phone: (02) 969-5861
Baud: V21 V22 V22bis V23
Access: Mem Reg
Hours: Daily: 1900 - 0700
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: QuickBBS

*** Offline ***
Scorpio BBS

*** Amended ***

Silent Running
Sysop: DAZ
Phone: (02) 667-1114
Baud: V21 V22 V22bis V23
Access: Reg
Computer: 8
DOS: PRO DOS
BBS*oftware*: Prime
*** Amended ***
SMUG Bee RCP/M
Sysop: Stephen Thompson
Phone: (02) 476-6396
Baud: V21 V22 V22bis V23
Access: Mem Reg VA
Computer: Microbee
DOS: CP/M80
BBS*oftware*: PBBS
*** Amended ***
Sorcim microS
Sysop: John Caine
Phone: (065) 59-8854
FIDO*net*: 711/405
Baud: V21 V22 V22bis V23 PEP
Access: Reg
Hours: Daily: 2100 - 0800
BBS*oftware*: QuickBBS
*** Amended ***
Steel City
Sysop: Craig Sinclair
Phone: (042) 83-7247
FIDO*net*: 712/420
Baud: V21 V22 V22bis V23
Access: Reg LVA
Hours: Daily: 1500 - 0630
Computer: IBM XT Clone
DOS: MS DOS
BBS*oftware*: Opus
*** NEW System ***
Sydney CAE BBS
Sysop: Geoff Shearsby
Phone: (02) 660-8272
Baud: V21 V22 V22bis
Access: Reg LVA
Computer: IBM XT
DOS: PC DOS
BBS*oftware*: Fido
*** Offline ***
The Guild FRP BBS
*** Amended ***
The Ivory Tower
Sysop: Colin Leslie
Phone: (02) 668-8021
Baud: V21 V22 V22bis V23 B103 B212
Access: Public
Computer: IBM XT Clone
DOS: MS DOS
BBS*oftware*: GTPower
*** Amended ***
The Kiwi Konektion
Sysop: Robert Earle
Phone: (02) 439-6178
FIDO*net*: 711/410
Baud: V21 V22 V22bis V23
Access: Reg VA
Hours: Weekdays: 1800 - 0800
Weekends: 24 Hours
Computer: IBM XT
DOS: PC DOS
BBS*oftware*: Opus
*** Amended ***
The Library
Sysop: Chris Ruwoldt
Phone: (049) 62-2931
FIDO*net*: 711/490
Baud: V21 V22 V22bis V23 PEP
Access: Public
Computer: IBM AT Clone
DOS: MS DOS
BBS*oftware*: Opus
*** Amended ***
YABB
Sysop: Jonathan Chin
Phone: (02) 804-6837
FIDO*net*: 711/803
Baud: V21 V22 V22bis V23 B103 B212
Access: Reg VA
Computer: IBM XT Clone
DOS: MS DOS
BBS*oftware*: TBBS

QUEENSLAND

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CORPLEX
*** Offline ***
Futex C-64
*** NEW System ***
Listline Experimental
Phone: (07) 353-3718
Baud: V21 V23
*** Amended ***
Marlin-Coast BBS
Sysop: Ray Chalmers
Phone: (070) 51-7220
FIDO*net*: 640/501
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Computer: Kaypro XT
DOS: MS DOS
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SOUTH AUSTRALIA

*** Amended ***
Aquarium BBS
Sysop: Bream LeFish / Martin Sandiford
Phone: (08) 270-4341
FIDOnet: 680/807
Baud: V21 V22 V22bis V23
Access: Mem Reg VA
Computer: PC230
DOS: MS DOS
BBSoftware: Custom (Aquarium)

*** NEW System ***
MICRO SHACK
Sysop: Geoff Hurst
Phone: (08) 231-9550
FIDOnet: 680/812
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM AT Clone
BBSoftware: Opus

*** NEW System ***
Nobbiboard
Sysop: Ben Noblet
Phone: (08) 370-2211
Baud: V21 V23
Access: Public
Hours: Weekdays: 2300 - 1500
Weekends: 2300 - 0900
Computer: Amiga 1000
DOS: AmigaDOS
BBSoftware: TAG-BBS

*** NEW System ***
SA Country CBCS
Sysop: Martin Crockett
Phone: (085) 22-4434
FIDOnet: 680/808
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM XT Clone
DOS: PC DOS
BBSoftware: Opus

*** NEW System ***
The Key Board
Sysop: Paul Lawrence
Phone: (08) 344-5354
FIDOnet: 680/814
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM Clone
BBSoftware: Opus

*** Amended ***
Trivia BBS
Sysop: Daron Ryan
Phone: (08) 377-0049
Baud: V21 V23
Hours: Weekdays: 1800 - 0800
Weekends: 24 Hours
DOS: MS DOS
BBSoftware: QBBS

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*** NEW System ***
Alloy Opus BBS
Sysop: Robert Nagy
Phone: (03) 560-3902
Baud: V21 V22 V22bis V23
BBSoftware: Opus

*** NEW System ***
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Sysop: Tal Silberman
Phone: (03) 525-9015
Baud: V21 V22
Access: Public
DOS: PC DOS
BBSoftware: QuickBBS

*** Amended ***
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Sysop: Stephen Paddon
Phone: (03) 367-5816
Baud: V21 V22 V22bis V23
Computer: IBM AT
BBSoftware: QuickBBS

*** Offline ***
Gippsland Mail-Bus

*** Amended ***
L & A Opus BBS
Sysop: Phillip Kelly
Phone: (03) 800-3215
FIDOnet: 631/327
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: IBM AT
DOS: PC DOS
BBSoftware: Opus

*** Amended ***
Labyrinth
Sysop: Stephen Jones
Phone: (03) 318-6562
Baud: V21 V23
Access: Reg VA
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Fido

*** Amended ***
Maxitel BBS
Sysop: Jos Van Der Sman
Phone: (03) 882-6188
Baud: V21
Access: Public
Computer: C-64
BBSoftware: FPR BBS

*** Amended ***
Melbourne Data Exchange
Sysop: Robert Broomhead
Phone: (03) 561-6556
FIDOnet: 633/360
Baud: V22 V22bis V23
Access: Reg VA
BBSoftware: Opus

*** Amended ***
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Phone: (03) 887-1485
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Hours: Weekdays: 1930 - 0600
Weekends: 24 Hours

*** Offline ***
Motel International

*** NEW System ***
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Sysop: Chris Wollin
Phone: (03) 427-0424
FIDOnet: 632/345
Baud: V21 V22 V22bis V23
Access: Reg
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: Opus

*** NEW System ***
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Phone: (03) 568-0794
Baud: V21 V22 V22bis V23

*** NEW System ***
Silicon Valley
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Baud: V22

*** Amended ***
The Magic Pudding
Sysop: Rupert Russell
Phone: (03) 429-9681
FIDOnet: 633/363
Baud: V21 V22 V23
Access: Public
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Opus

*** NEW System ***
The ODBS & Sensible Solution BBS
Sysop: Mark Firus
Phone: (03) 547-5117
Baud: V22 V22bis B103 B212
Access: Reg LVA
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Opus

*** Offline ***
The Ultimate C-64

*** NEW System ***
Valicomm Opus
Sysop: Bill Walker
Phone: (051) 27-2572
FIDOnet: 633/365
Baud: V21 V22 V23 B103 B212
Access: Reg VA
Computer: IBM XT Clone
DOS: PC DOS
BBSoftware: Opus

WESTERN AUSTRALIA

*** Amended ***
AMSNet BBS
Sysop: Ted Marsden
Phone: (09) 453-3590
Baud: V21 V22 V22bis V23
Access: Reg
Computer: AMSTRAD PC1512
DOS: MS DOS
BBSoftware: Opus

*** Amended ***
Bit-Board
Sysop: John Hamill
Phone: (09) 417-3706
FIDOnet: 692/622
Baud: V21 V22 V22bis V23
Access: Public
Computer: Everex AT

*** Amended ***
Lightning BBS Line 1
Sysop: Simon Blears
Phone: (09) 275-8225
FIDOnet: 690/601
Baud: V22 V22bis B212 PEP
Access: Reg LVA
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Opus

*** Amended ***

*** Offline ***
Mouse Exchange BBS

*** Amended ***
Pegasus BBS
Sysop: Michael Russell
Phone: (09) 242-2099
FIDOnet: 692/620
Baud: V21 V22 V22bis V23
Access: Public
Hours: Weekdays: 1700 - 0900
Weekends: 24 Hours
Computer: Epson AX
DOS: MS DOS
BBSoftware: Opus

*** NEW System ***
Terminal BBS
Sysop: Matthew Davis
Phone: (09) 389-8048
Baud: V21 V22 B103 B212
Access: Public

*** NEW System ***
The Codiac Republic BBS
Sysop: Simon Shaw
Phone: (09) 481-4715
FIDOnet: 692/623
Baud: V21 V22 V22bis V23
Hours: Daily: 1700 - 0800
BBSoftware: Opus

*** Amended ***
The Gathering BBS
Sysop: Ken Peters
Phone: (09) 272-4711
Baud: V21 V22 V23

*** Amended ***
The Hotel
Sysop: Rod Evans
Phone: (09) 325-4752
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM AT Clone
DOS: MS DOS
BBSoftware: Opus

*** Amended ***
The Turing Circus
Sysop: Phil Sutherland
Phone: (09) 385-2100
FIDOnet: 690/603
Baud: V21 V22 V23 B103 B212
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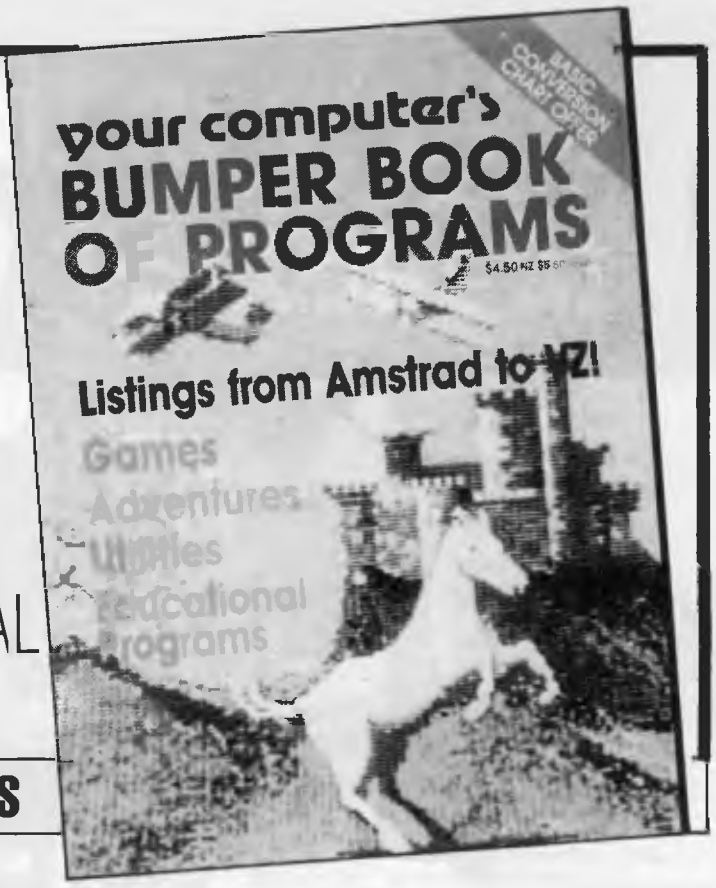

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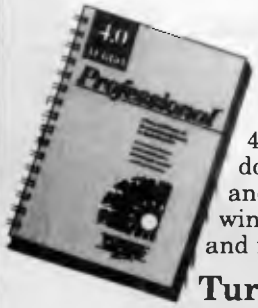

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GREGG FAULKNER

YOUR AMIGA

Gosh! Is it *that* time again, already?? Here I sat, so patiently, waiting for my copy of Photon Paint to arrive. Finally it got here and I've barely had a chance to start scratching the surface and Allecia's on the phone asking for this month's column. Sometimes I think I'm living at 100 km/h and the rest of the world's doing 200.

Perhaps there's a perfectly good astronomical reason for all this. Maybe the Earth is speeding up in its orbit. Relativistic effects are shortening our days and we're all in danger of being strained through a black hole and emerging ... who knows where?

I hope they have Amigas wherever we all end up; and I hope they also have Photon Paint because it really is a knockout. I've said previously in this column that by my reckoning there have been three generations of software for the Amiga – and Photon Paint is most definitely 3rd generation software.

This package really gives the Amiga's graphics capabilities a good workout, and the results can be breathtaking. How about this for starters. Imagine yourself drawing a simple colour-filled rectangle on the screen, let's make it orange. Now use a thickish brush to draw a couple of stripes across the rectangle, red and green would be nice.

For good measure let's put a couple of bright blue blobs on top. By now you should have something that resembles the rectangle in Figure 1. Now grab the whole shebang as a brush and select, for the brush menu, the command WRAP ON/BALL. Set the size of the ball and, hey presto!

In a few seconds (about twenty in fact) Photon Paint presents you with the ball – not bad for starters! But wait. There's more. How about a really nice simple way of producing the same ball with three-dimensional shading? Sound good? In fact, it's so easy with this package that I'm almost embarrassed when people call me an artistic genius.

The LUMinosity control sets the direction and intensity of a light source which, in turn, determines the illumination and shading of your 'wrapped' ball. This is really something!

As if that's not enough, how many colours do you reckon Photon Paint can give you? 16? 32? 64 maybe? Not even close. This package runs in HAM (Hold And Modify) mode giving you all 4096 colours on screen at once. The beauty of HAM mode is the degree of colour shading and blending which is possible with all those colours. Wow!

If I sound a bit like a Photon Paint enthusiast – I am. I've used a lot of paint packages on the Amiga before. Packages like Aegis Images, Deluxe Paint II, Digi Paint, even fairly new packages like Express Paint are good: some of them very, very good, but Photon Paint is a whole new ballgame.

Even the controls are classy. The default tool and control panel at the top of the screen can be moved to wherever you want them. A click on the down arrow produces the lower extension of the control panel from where colours can be selected *a la* Digi Paint. Very quick and easy to use and very powerful.

Some menus drop down from the top of screen as is common with Amiga software. Others slide upward from the bottom of screen and, after selection is made, very slickly slide back into the bottom of screen. All the controls are highly intuitive: they do what you feel they should do. The mouse buttons do all the work for you and most of the commands feel just like those in DPaint and DigiPaint, so I felt at home right away.

Photon Paint arrives as a two-disk set. The first disk contains the program itself (which is a big file at over 200 kilobytes). The second disk contains a selection of demonstration images, some of which are used in the self-contained tutorial.

As if all the above isn't good enough, there's more. Photon Paint is *not* copy protected, so it is easy to back-up or to install on a hard disk, or to load into a RAM:disk. The documentation provided with the package is comprehensive and easy to follow. It is bound with a wire-spiral spine which allows the book to lie flat on your desk for easy reference.

The recommended retail price for Photon Paint is $149, which I think is very fair for such an excellent and useful piece of software. Let's hope the pirates give this one a miss. A good package at a fair price deserves to be bought, not pirated.

If you are offered a 'free' copy, have a good think about who you are hurting in the long run. I've said before, there are times when software producers and distributors bring piracy on themselves, by overpricing. But this package deserves the support of Amiga owners who are interested in improving the quality of software generally.

A couple of months ago I 'had a go' at retailers who sell software which has been removed from its manufacturers plastic sealed pack. Wow, did that ever stir up a hornets' nest. I've been just about put

Figure 1. Starting with a simple colour-filled rectangle, Photon Paint created the ball shape in 20 seconds – the direction and intensity of the light source was then set to give the shaded balls.

Hints, tips and ideas!

Got any hints tips or ideas you'd like to share with other Amiga users? Or maybe you've discovered (or written) a great new program you'd like to tell others about – if so, send them (on disk) to *Your Computer, PO Box 227, Waterloo 2015 NSW*. Please include a printout of the disk and caption any illustrations. Unfortunately, because of space limitations, we cannot publish listings over 200 lines long.

into Coventry by a couple of the local retailers who didn't like me interfering in their business (or funny business) practices.

At the same time I've received many favourable comments from the victims of some pretty shoddy activities. Interestingly, it's not just software which is being sold 'out of the original wrapper'. A fellow I know had a helluva time trying to buy a 1084 monitor 'still in the box'. He was given all the reasons in the world why the box had been opened.

None of those reasons really explained the collection of different dealer's stickers one victim found stuck to his 'brand new' monitor. Very strange! And what does happen to those faulty monitors and other faulty components which are exchanged after purchase? Presumably they go back to Commodore and are repaired, but what then? Are they sent back out ot be sold as 'new' items? If so, what effect has their previous problem had on their future reliability?

Don't interpret this to mean that Amiga components are faulty. In fact the Amiga has a pretty enviable reputation for reliability. If the cook's mother's poor, long-suffering, smoke-saturated and overworked 1000 is any indication, they are remarkably reliable and forgiving machines. But, like any other mass-produced article, there is the odd faulty one which gets through quality control checks.

What I'm carrying on about is the underhand way in which too many retailers pass off used, even repaired, goods as *new*. If I'm paying full price for an item I expect to get a *new* item.

Number two bitch this month is about retailers who are throwing in 'sweeteners' in the form of pirate copies to induce sales of Amigas. I know personally of copies of WordPerfect being offered as inducement by a major retailer. Now I know that WordPerfect is grossly overpriced, even if it is the best But, piracy is theft and if the retailer is going to be seen to encourage it . . .

The biggest laugh of the month is the news that the ATARI 520ST is being reduced to the price of the C64, supposedly just to show what great guys Atari are. I guess if it still won't sell, they'll eventually reduce ti to the price of a four-function calculator. The claim is that Atari sales are booming because they're such great machines. Well, good luck to Atari. I'd hate to be trying to sell those clunkers in competition with the Amiga, it's just no contest.

I do have to admit that the Apple Mac II is a strong competitor for the Amiga, but I'd rather have the four or five Amigas I could buy for the same price. I freely admit to being biased in favour of the Amiga. I guess my loyalty could change, but it's going to take one hell of a machine to do it. See you next month. □

TIM HARTNELL

YOUR AMSTRAD

In the column this month we have a 'reaction tester' to see how quick you are with your trigger fingers on the Amstrad PC, plus a smashing graphics program for the 464/6128. In addition, we have some hints on overcoming incompatible disk formats when using CP/M software on the PCW.

Reaction Tester

We start with a 'trigger-finger tester' this month for owners of Amstrad PCs. Just run it, and follow the instructions on screen

```
REM Amstrad PC Reaction Test
REM Tim Hartnell - Your Computer
hiscore=1000
RANDOMIZE VAL(RIGHT$(TIME$,2))
WHILE hiscore>14
CLS
PRINT:PRINT:PRINT TAB(8);"Stand by!"
LABEL again
FOR a=1 TO 1000+RND*2000
NEXT a
a$=INKEY$:IF a$<>"" THEN GOTO again
PRINT:PRINT
PRINT TAB(4);"OK, press the 'Z' key!",CHR$(7)
count=0
LABEL addit
count=count+1
a$=INKEY$
IF a$<>"Z" AND a$<>"z" THEN GOTO addit
PRINT:PRINT
PRINT TAB(4);"Your score was";count
IF count<hiscore THEN hiscore=count:PRINT CHR$(7);
PRINT:PRINT TAB(4);"The best so far is ;hiscore
FOR a=1 TO 1500:NEXT a
LABEL check_if_clear
a$=INKEY$
IF a$<>"" THEN GOTO check_if_clear
WEND
PRINT:PRINT TAB(4);"You're the champ!"
PRINT CHR$(7)
END
```

Listing 1. *The Reaction Tester – change the 14 at the end of the fifth line into a 10 or a 7, if you find it too easy to beat.*

If you find it is too easy to beat in its current form, change the 14 at the end of the fifth line into a 10 or a 7.

464 Picasso

Save your dollars. You don't need to buy any modern masterpieces to hang on your walls, when your 464 or 6128 can create them for you, with the CPC Picasso program from Jeff Hughes of Watsonia North in Victoria – see Listing 2. When you run the program, you'll be asked to enter a value for 'step size' and for the variable *a*

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```
10 CLS
20 MODE 2
30 INPUT "Step size, a?",s,a
40 CLS
50 DEG
60 ORIGIN 320,200
70 FOR k=-1 TO 1 STEP s
90 PLOT 0,0
100 FOR ang=0 TO 36000 STEP s
110 x=ang*(COS(a*ang))
120 y=ang
130 DRAW x/100,k*y/160
140 NEXT ang
160 NEXT k
170 FOR k=-1 to 1 STEP 2
180 PLOT 0,0
190 FOR ang=0 to 36000 STEP s
200 y=ang*(COS(a*ang))
210 x=ang
220 DRAW k*x/100,y/160
230 NEXT ang
240 NEXT k
```

Listing 2. The 464 Picasso program – create your own modern masterpieces.

When you've got it up and running, try the following values –

STEP	A	Picture produced
91	1	Ripple Mask
91	2	Do Not Adjust Your Set
90	1	Vortext Mk I
75	2	Vortex Mk II
160	1	Vortex Mk III
89.8	2	Fiddlesticks

Software for the PCW

Paul Hunt of Toowong in Queensland says he has, on occasions, imported software for his PCW from the UK, but has found it a fairly expensive exercise.

'However, there is a good range of generic CP/M software in Australia, much of which will run on the PCW. The problem, of course, is getting it onto a 3 inch disk format,' he says.

Paul found two ways to overcome this problem. He imported a disk drive interface from the UK, so he could connect a 5¼ inch disk drive to the PCW. The one he bought (Uni-2) can be connected to either an 8256 or an 8512. In the latter case, drive B: is toggled between either the high density drive B: of the PCW, or the external drive. Using the interface, Paul connected a standard 40-track double-sided TEAC drive to his PCW. Paul was then faced with the problem of incompatible disk formats.

'As you know,' he says, 'disk formats are BIOS dependent, so it is not a simple matter of inserting any disk and hoping for the best. I purchased a program called Chamelion from the UK which patches the PCW parameter blocks with parameters from a library. This is not a very satisfactory program, as I discovered that some of the parameters in the library are inaccurate. However, a modify option is provided, and now IU can easily read disks in Kaypro II format. There is another program in the UK, called MFU v.4, which I believe is much more satisfactory.'

If you don't want to go to all this trouble, Paul says a second approach is to find someone with a computer which can read disks in the format of your 5¼ inch software, link up via the RS232 and use some comms software to download the program.

'Among other programs, I have successfully transferred a copy of Turbo Pascal I bought in Kaypro format to the PCW, and then all that was required was a simple installation procedure. I was quoted a price of $247 for Turbo Pascal from Amsnet International, but I bought the program locally in Kaypro format for about $110,' he says.

This discovery by Paul means that various word processors, statistics packages, accounting software and various utilities are now available to PCW owners. In addition, Paul has found that the UK company NewStar Software has a good range of PCW software, and is very helpful with overseas orders. They will send you a free catalog on request.

Paul has supplied some UK addresses for PCW owners –

Uni-2 disk drive interface and Chamelion software – Silicon Systems, Trafford Technology Centre, 43 Elsinore Road, Old Trafford, Manchester, M16 OWG UK; (061) 848 8959

MFU v.4 software – Moonstone Computing, Strathclyde Business Centre, 31 Clyde Street, Clydebank, Glasgow, G81 1PF UK; (041) 941 3120

NewStar Software – NewStar Software, 200 North Star Road, Brentwood, Essex. CM14 4SG UK; (0277) 22 9509.

I'd be interested in hearing from any companies making hardware or software for any of the Amstrad range for review in this column. As well, I'd be more than happy to share any of your discoveries, hints, tips, comments and programs with other users of the great Amstrad machines, along with details of any Amstrad-specific user groups. A free disk of Amstrad PC-specific software will be given to anyone supplying hints which are used in this column. Please write to Your Amstrad, Tim Hartnell, Your Computer, Box 227, Waterloo, 2015, NSW. □

Bundles of Books

New Release . . .

LOGO For Beginners

This book is an introduction to the programming language LOGO, and also in an introduction to computing, as it assumes no previous knowledge of computers of programming. LOGO is a good language to learn programming, indeed, that was its original purpose. It teaches how to write programs in a structured form which makes them easy to follow and to understand. This book starts with the famous turtle graphics, and then goes on to explore the mathematical and logical aspects of LOGO, and finally to the interesting topic of list processing, on which many aspects of artificial intelligence are based. LOGO is more standardised than most languages, so it is possible to write a book of this sort to cover all the major versions. However, special attention has been given to Digital Research's DR LOGO, as this is perhaps the most widely known in the U.K. being supplied as standard with many Amstrad and Apricot computers, and also some Atari models. It is hoped this book will introduce the reader to the interest and fun that is to be had from writing your own programs — especially in LOGO.

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R.A. & J.W. Penfold **BP0152**

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AEIMS

MARTIN CARR

YOUR ATARI

Figure 1. *The most amazing aspect of Spectrum 512 is that it will display 512 colours all at the same time on a low resolution screen. It also features a magnification window for all functions.*

Figure 2. *The range of colours available with Spectrum 512 are selected from either the system palette at the bottom of the screen or the user defined palette at the sides.*

Graphics

Atari ST owners are well aware that they have in their possession a powerful graphics machine. The potential of the ST is displayed in many of the excellent commercial games now available. Many games use brilliant pictures that enhance the play and add that touch of realism previously missing on the less powerful 8-bit machines. For those with an artistic bent there are also many art packages available which enable the user to create their own visual wonders. Packages such as Neochrome (once free with every ST), Degas and Degas Elite have been firm favourites since the inception of the ST, becoming the recognised standards in picture format for the machine. Many other application packages such as Maps and Legends, Publishing Partner, K Spread, K Graph and so on, make use of either one or both of these formats to add to their own flexibility.

Whilst these art programs are extremely powerful, there are constraints placed on them by the hardware of the ST. In low resolution there is a maximum of 16 colours available and this drops to 4 colours when using medium resolution. Aliasing (the step-like appearance of diagonal and arced lines) also detracts from the finished product, and the placing of composite, multiple pictures on the screen whilst retaining their original palettes is impossible. These problems, although not affecting the casual user to any great degree can cause headaches for the serious computer artist. However, a solution is in sight in the form of a new graphics package for the Atari ST range – Spectrum 512.

Spectrum 512

Spectrum 512 is the latest paint program to be released for the ST and the features are most exciting. Possibly the most amazing aspect of this program is the fact that it will display 512 colours on a low resolution screen, all at the same time. The image is rock-solid, flicker free and extremely impressive. Colours can be selected from a 512 colour system palette, a 1 to 192 colour user-defined palette, or from any colour on the screen. You can create colour ranges between any two or more colours automatically and make use

of a powerful colour edit mode which will enable you to search for and replace one colour with another or several colours with several others.

You can also increase or decrease luminance of one or more colours, add or subtract RGB values of one or a range of colours, or perform any of these functions on a global or local level. The writers of Spectrum 512 (Trio Engineering) have overcome the hardware limitations by giving you 48 colours per scan line on a colour monitor (the program is for colour only). This makes possible shading and highlighting effects which have not been available in other art programs.

This program is compatible with the standard Neochrome and Degas formats and this allows pictures from these and other programs to be loaded and enhanced within Spectrum.

Taking advantage of the shading abilities of the program, Trio Engineering has included anti-aliasing, blur functions, auto pattern alignment and pixel offset (for overlap of up to 38 brush shapes) to name but a few of the many features. Composite, multiple pictures on the screen are no longer a problem and a handy feature called gradient fill has also been included. This function allows the user to slowly move towards the wanted fill colour in order to achieve the desired result.

Spectrum 512 also includes a 12 screen picture buffer (with a 1040ST) and features block cut and paste as well as scaling and flipping. A magnification window is also available for all functions. The program is mouse controlled and selections of brush type, colour edit, fill and so on are made from a menu which resides at the top of the screen. The amazing range of colours are selected from either the system palette at screen bottom or the user defined palette at the sides. A full screen mode is available to allow the user to view the finished masterpiece fully.

There is no doubt in my mind that Spectrum 512 is definitely the most advanced art package available for the Atari ST. (The depth that 512 available colours give to a picture is astounding!) This program is compatible with the standard Neochrome/Degas formats and this allows pictures from these and other programs to be loaded and enhanced within Spectrum. Even the Amiga IFF format is supported.

Hardware limitations

The main problem with a product as advanced as this, appears, once again, to be hardware limitations. There is not currently an affordable colour printer on the market able to give an accurate hard copy of a picture created within Spectrum 512. Spectrum pictures may be saved to Degas format and printed through that program, but of course this will not support the 512 colours of the original. Included with the package are detailed instructions of how to use your 35 mm SLR camera (with appropriate filters) to photograph the screen and so produce a hard copy of your work. This, the program writers explain is the only alternative, until technology produces a reasonably priced colour printer that will handle the complex output of Spectrum 512.

Despite the above problem, Spectrum will certainly be the answer to many people's prayers. Spectrum is extremely powerful and yet given a little practice, extremely easy to use. The instructions that accompany the program are comprehensive and encourage experimentation by the user. Being compatible with other packages is a big plus and will be appreciated by all who decide to purchase this program. If you are serious about your art, or just want a more flexible painting package, Spectrum 512 is for you. (Review machine supplied by Computer Oasis.

Atari ST hints and tips

If you have two drives, or are using a ramdisk, and wish to copy all your files from one disk onto another, but don't want to erase any files from your destination disk as would happen by dragging Icon A over Icon B, try the following: open the window of your destination disk and drag the source disk icon into that window All the files will be copied across. This is very useful when you have more files to transfer than can be displayed in an open window and alleviates the need to move through the directory, lassoing files either one at a time or in groups.

Publishing partner page layout

Starting a new document with Publishing Partner can involve creating a new layout. This can be a difficult task if you are unsure of the column widths, space between columns and so on that are required for your pages.

One easy way of overcoming these difficulties is to purchase a large sheet of graph paper from your local stationary store (the paper with centimetre squares is best) and use this paper to map out your layout before you start. You will find that you will save time, have fewer headaches and end up with a more professional result by taking a few minutes to prepare your work.

Directory update

If you need to check the contents of several disks, you don't need to keep opening and closing windows. Place the first disk to be checked in the drive and double-click on Icon A. To view the contents of a subsequent disk, just place it in the drive (after removing the previous one and having left the window open) and hit the Escape key. The window will refresh and display the new directory.

Cover that computer!

Remember, dust is the enemy of your machine. Always keep your keyboard covered to avoid dust build-up and the resulting key bounce (keys failing to register). Do not use plastic covers as condensation may cause damage and do not use any substance which might drop lint into the keyboard Anti-static nylon covers are the best and these are available from most computer stores.

Don't lose data

Keep your valuable disks well away from sources of magnetic field. Placing them near such things as monitors, fridges, televisions and so on may cause damage to the data they contain. □

Hints, tips and ideas!

Got any hints tips or ideas you'd like to share with other Atari users? Or maybe you've discovered (or written) a great new program you'd like to tell others about – if so, send them (on disk) to *Your Computer, PO Box 227, Waterloo 2015 NSW*. Please include a printout of the disk and caption any illustrations. Unfortunately, because of space limitations, we cannot publish listings over 200 lines long.

SHARON FRANCE

MICROBEE FILE

This month let's take out the biology texts and have a look at the relationship between 'Bees and Apples, or to be more specific, 'Bees and Macs (the variety of computer, not what you put on with your wellies). Also, we'll have a look at a bank of strategy and logic games written for children, which will entertain and challenge kids from 6 to 60. To complete the suite, we go on tour with a Knight.

Microbee meets its Mac

Earlier in the year I reviewed some of the latest developments at Microbee Systems which were dragging the little 8-bit micro closer to the desktop publishing arena. As I commented then, all credit should be given to those responsible for stretching the 'Bee this far, but of course there are limitations.

Well, DTP fans, do not throw away your Microbee in despair, it may well become a Macintosh's best friend. In fact, teaming a Microbee (or three) with a Mac may be a very cost effective solution to publishing for schools and budding DTP bureaus. This is not theoretical, pie-in-the-sky stuff. There are working examples of this symbiotic relationship, including the production of a school magazine by the Bright School in Victoria, and the part production of Microbee's Online.

There are two basic situations which arise when teaming a Microbee with a Mac. The first is when the machines are physically next to each other and the second is when communications are necessary via the phone lines. Both are reasonably involved, but it is worthwhile wading through some of the more technical aspects, in order to achieve the desired results – they being the ability to use cost-effective word processing machines (the 'Bees), thereby allowing expensive resources (the Mac) to be dedicated to specialized functions such as final layout and production.

I would like to thank John Kerr and the State Computer Education Centre, Victoria, for their kind permission to use parts of their case study 'Creating a School Magazine Using Microbees and a Macintosh' for this article.

Let's begin with the basics – the Microbee as a word processing machine. When you have made a decision to transfer files to the Mac for DTP, there are certain things that you should follow to make life easy for yourself. Remembering that the Mac will ultimately turn your words into galleys of visual delight, you should make your Microbee files as vanilla as possible. Avoid fancy formatting – forget about tab stops, underlining, bolding and the like. What you are creating with the 'Bee will not resemble the final output, so save all of your artistic flair for the Mac.

I have personally had experience in transmitting WordStar files to a Mac via the phone lines. Using WordStar, the files should be saved under *non*-document mode – N from the WordStar main menu. It is possible to write and edit under the normal document mode, but when your article is saved for the last time, before transfer, it should be opened and saved as a *non*-document. WordStar is rife with control characters which reek absolute havoc on an attached Mac. To cut out other WordStar control characters, a filter program was written at Microbee to allow files to be converted to plain ASCII. This program may be available from Microbee Systems if you are interested.

An alternative source for such gems is a programmer called Jeff Ponton, who mentioned that he was working on some super fast filters for Microbee word processors like Simply Write, WordBee and WordStar. This may be a little way down the track, but if you are interested, drop a line to me via *Your Computer*

I have been told that WordBee files are reasonably similar to MacWrite (and I would imagine Simply Write would be too), so filters for these seem not to be necessary. If this is all starting to sound too confusing, let me reassure you that I am trying to cover all angles. For things that I have not experienced or used myself, I have consulted others who have experimented. If you do not filter your programs and follow the rest of the steps set out here, the worst you will end up with is some odd characters in your Mac files which are easily deleted.

If you are using the 'Bee as the major word processor, for a magazine, pre-plan how you think the magazine will look. This will help you decide how best to group the files for transfer. If you want all articles on 'Aardvarks' together and 'Trivia About Teachers' scattered throughout the publication, you are best to amalgamate all articles for the former under one heading or file and the latter under several. The time you spend here will be rewarded later in hours saved at transfer. Remember, it is best to minimise the number of files you have to transfer.

Transferring

Now, let's get down to the transferring process. First of all, let's tackle the harder set-up, where the Microbee and the Macintosh are co-habitating. You will need a special cable to connect the two. Soldering boffins, arm yourselves with one of each DB-9P and DB-25P solder cup connectors and matching backshells, some 5-core wire (long enough to reach from the Microbee to the Mac) soldering iron and screwdriver. Connect the two like –

MAC END DB9 (MALE)		BEE END DB25 (MALE)
9	----------	2
5	----------	3
7	----------	5
3	----------	7
6	----------	20

With the advent of the latest Macs (the II, the SE and the Plus), there is a need to fix the Microbee to talk in the same true RS232 format. If you are using an original Mac, forget the rest of this paragraph as these machines are more forgiving of tolerances in the RS232 'standard.' If you have the latest, however, your Microbee needs an operation for a successful courtship. It is pretty technical stuff and all requisite information for 'Microbee True RS232 Installation' can be obtained from Microbee Systems (direct your enquiries to Bee-to-Mac Enquiries, Microbee Systems, PO Box 41, West Gosford, 2250 NSW). If I was faced with performing this surgery, I would opt for an add-on black box available form Jaycar Electronics in Sydney and Rod Irving Electronics, Melbourne.

The software items you will need for transferring the material are Telcom 2.*n* (where $n = 0, 2$ or 3) for the Microbee, and MacTerminal for the Mac.

That's the set-up, now down to the transfer. Connect the Microbee and the Mac (as shown above) with the Bee-to-Mac cable. On the Microbee, go into Telcom and set the following parameters: BAUD 4800, XMODEM ON and CHECKSUM format.

On the Mac, load MacTerminal. Under SETTINGS select: TERMINAL and then TTY, ON LINE, NEW LINE, BLOCK, 80 COLUMNS, OK. Then select COMPATIBILITY and the following options in order: 4800, 8, NONE, XON/OFF ANOTHER COMPUTER, MODEM PORT, OK. When you are ready to perform the deed, on the Mac select FILE and then RECEIVE FILE. At this point type in the file's name and then SAVE.

For the 'Bee type SEND <filename> and press Return; provided you have all of the above right – *hey presto!* – everything has gone from the 'Bee to the Mac.

Strangely enough, when the Microbee and the Macintosh are not able to be physically joined and communications via the phone lines is necessary, the whole transfer process is a lot less complicated. For a start, you do not have to worry about the RS232 compatibility and you don't have to build yourself a cable. You do, however, need a modem for the respective machines at each end.

The files should be prepared on the Microbee as outlined above. For transfer, you should also follow the set-up instructions as already outlined, however, the figure 4800 must be replaced for both machines with the baud rate you will be using. If you have a 1200/75 baud BeeModem, this figure will be 1200. If you have modems capable of faster speeds, then experiment with these, remembering that if you are sending files over a long distance, you can clock up considerable STD charges.

The faster the transfer, the more economical for you. Serious bureaus who transfer lots of material may consider the TrailBlazer by NetComm, which can achieve speeds of up to 19.2Kb/sec.

It will be necessary to talk to the person who will be receiving the files on the Mac. On a BeeModem, your switches should be set to ANSWER, 1200/75 and PHONE. When you are ready to transfer, flip the PHONE switch to MODEM and, having typed in SEND <filename.ext> under Telcom, press Return. The carrier detect light should come on, indicating that the file is on its way. Normal telecommunications procedures should be happening simultaneously with the Mac. If your pessimism gets the better of you, type in VIEW ON at the Microbee Telcom main menu, before you start. During transfer, your file will whiz past your eyes as it funnels its way down the phone line.

In fact, teaming a Microbee (or three) with a Mac may be a very cost effective solution to publishing for schools and budding DTP bureaus.

This telecommunication connecting of 'Bees to Macs has not been officially documented anywhere, so the information here is more of a guide rather than the final word on the topic.

Games of strategy

Games of logic and strategy have never been my passion, but there are times when I quietly want to take myself into a 'computer corner' and do something different from bashing away at the word processor. Strategy Games for Junior Primary, Senior Primary and Rainy Days from Garry Clark of N.E.WARE afforded me that opportunity.

There are some old favourites amongst the total of 18 titles (on three separate disks), including computer versions of Mastermind, Reversi (or Othello) and Insane (or Instant Insanity). These are well implemented and make good use of colour. There are also some refreshing challenges I hadn't seen before, including a game called Mancala, which in fact is an Ancient African strategy game, using beans as the booty.

The games aim to develop strategy and problem solving skills in children and are, even for adults, quite challenging and in

some downright difficult. By their very nature, they encourage you to think about what you are doing. Random moves in most games just waste time and effort. Most of the games are written for two players, but this can be manipulated – played by an individual or extended to incorporate a whole class. All of the programs are written in Basic and the author has thoughtfully utilized a menu system for easy game selection.

There are three main parts to each disk – the main menu, the instruction page for each game and the game itself. Selection of a number from one to six will give you the corresponding game for that disk (Junior Primary – Kono, Pindown, Capture, Squeeze, Lineup, Climb; Senior Primary – Tablut, Kalah, Circles, Factor, Quink, Escape; and Rainy Days – Mastermind, Hex, Reversi, Insane, Mancala, Guard) The instructions are straight forward and may be accessed when the game is in progress, if there are any mid-game queries, crises or disputes. At any stage, the game may be terminated by returning to the main menu (by pressing the @ key).

As the author points out, 'at home and in the classroom, these games stimulate a lot of thinking and there is no mess to be packed away.

The disks are accompanied by activity sheets which help to extend the activities beyond the keyboard and which will help to encourage discussion and co-operation. From the documentation, it is obvious that the author holds these interactive classroom activities very high.

9	34	37	52	19	32	39	22
36	51	8	33	38	21	18	31
7	10	35	20	53	56	23	40
50	47	54	57	2	45	30	17
11	6	49	46	55	62	41	24
48	3	58	63	44	27	16	29
59	12	5	2	61	14	25	42
4	1	60	13	26	43	28	15

Figure 1. *A successful Knight's Tour! Note that there are only 10 unique starting locations, with all others being reflections, rotations, or a combination of both.*

The suite, Strategy Games for the Classroom which has been recommended as an 'excellent package' by the NSW Computer Education Unit, may very well be the thing you are looking for to compliment your existing computer software. As the author points out, 'at home and in the classroom, these games stimulate a lot of thinking and there is no mess to be packed away.'

If you are interested, send your specs (disk size, computer configuration and colour/monochrome monitor type) and $35.00 for each disk, or $95 for the suite of three to N.E.WARE Software, 14 Braebank Avenue, Armidale 2350 NSW.

Knight's Tour

Knight's Tour is a wonderfully entertaining program written in C, by a Goodison Software author, Jeff Ponton. For those of you familiar with Goodison Software, Jeff also had a hand in 'Let's Go Punting' and 'Top Of The Class.'

This latest work started out as an exercise in writing in C and turned into a fascinating piece of software. The program is set on a standard chess board, with the focus of attention being the Knight. The object of the exercise is for the Knight to tour the board, using only the standard Knight's L-shaped move, to fill all of the 64 squares. The program itself examines various strategies which may be employed for a successful tour.

The program allows for two basic modes – firstly, where the computer is in control, and secondly where the user directs each of the Knight's movements around the board.

Primarily, the program is set up for the former A number of pre-set and tested strategies are employed to move the Knight, including the random strategy (where the Knight moves to a previously unoccupied square), the edge strategy (where the Knight's preference is to move to within two squares of the edge of the board, if such a move is possible), a corner strategy (in which the Knight moves at random, but always moves to a previously unoccupied square if possible) and the combined strategy (which is an improved version of edge strategy – if a corner square is legally available, the Knight always occupies it).

All of these options are available from a 'control panel' to the left of the screen. Selection of any one of these strategies is effected by using the up and down arrow keys (or Ctrl-E and -X sequences). The strategies may not only be selected at the start of a 'game', but may be changed at

any stage during the Knight's tour. The speed may also be set from this 'control panel.'

At the bottom of the screen is a display of options including AUTO, MANUAL, TOUR, PRINT and QUIT. To select any one option, you simply move to it using the left and right arrow keys and then press Return.

The default for the program is set to TOUR. By pressing Return, the Knight is set into action. He moves off from the King's Knight position (set by default) and moves around the board according to the strategy and speed indicated in the 'control panel.' As the Knight leaves each square, it is numbered sequentially, until the Knight cannot make another move.

If the AUTO option is evoked, the user is asked to enter the number of continuous tours required. The maximum number allowed is 999,999, which as Jeff points out in his documentation, would take two to three weeks to complete at top speed. The default number is set to 100, which can take between three and four minutes to complete at top speed. In this mode, statistics are collected as the Knight tirelessly starts and finishes tours.

The statistics panel appears, displaying the number of tours entered and the number thus far completed, the highest number of moves in any tour (and in brackets, the number of times this has been achieved), the lowest number of moves (and how many times achieved), the average number of moves and the 'strike rate' (if 5 successful tours were completed out of a set 100, the strike rate would be 20 – that is, 1 in every 20).

The program is compelling, begging you to try out different strategies and different starting points on the board (which may be changed by the user). As the author points out, there may be 64 squares on the board, but there are only 10 unique starting locations; all others are reflections or rotations or a combination of both.

The program may be used for fun and interest in the Maths classroom, or perhaps by those mental giants who need to be stimulated by problem solving situations. Whatever the application, Knight's Tour is sure to provide hours of entertainment, whether you take it seriously or not.

Knight's Tour makes excellent use of both colour and graphics, and therefore runs on Premium machines (or better). It is available from Goodison Software, Monument Road, Kilmore 3764 Vic, for the princely (Knightly?) sum of $45.00. □

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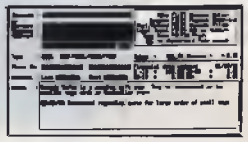

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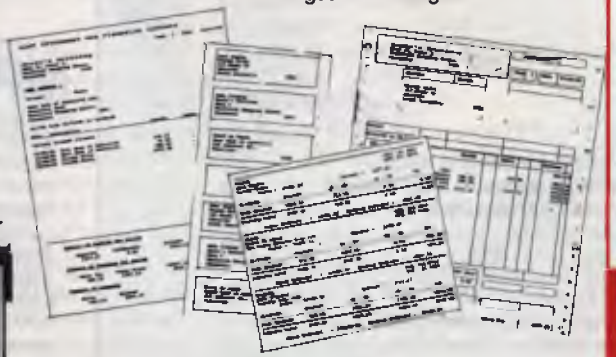

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JOHN HEPWORTH

IBM UNDERGROUND

Four years ago I bought a PC Three years, 11 months and 2 weeks ago I found two programs which became my faithful friends. I found them absolutely essential, and used them regularly, hour by hour and minute by minute. The programs were D.COM and WHEREIS.COM.

I hate the listing that the DOS DIR command gives me, but D.COM gave a multi-column sorted directory listing on screen, and showed file sizes rounded to the nearest 1 kilobyte, plus the total file sizes in the directory, and free space on the disk.

WHEREIS.COM allowed me to specify a file name, with wildcards, looked for it in all directories on the default drive, and listed on screen the file names (including directory) found. Both programs did have some limitations, and as time moved on replacements were necessary. D.COM would not work with many hard disks formatted with DOS 3.x, while WHEREIS can only look for files on the default drive

D.EXE

The replacement for D.COM is D.EXE, distributed within the archive file CFLUTES1-.ARC, along with A.EXE and REPCHAR-.EXE, plus the documentation files for each of them. Not only does it work with drives that choked on D.COM, but it adds a vast range of options. D.EXE normally lists the files in four columns, omitting hidden and system files, but showing in addition the names of any subdirectories one level lower than the directory being searched. The filenames and extensions are in upper case, while subdirectory names are in lower case and precede the file names. D.EXE can also display files one per line, with additional information including date/time and exact file size. For the rest of this description I will call the default display 'column' and the one-entry-per-line display 'wide'.

Entering 'D file_pattern' at the DOS prompt (wildcards are acceptable) gives the basic sorted directory listing in columns of all files in the default directory just as did the old D.COM, and merely entering 'D' is the equivalent of 'D * *'. To list all files with a .DOC extension, enter 'D *.DOC'. Want to list all files with a .DOC extension and all files with a .BAK extension? Easy! Entering 'D *.DOC *.BAK' will do the trick, again with column display.

D can list files in more than one drive and/or more than one directory. Just quote the drive and/or directories one after the other on the command line. 'D file_pattern A: B: C:' will look in the default directories on drives A, B and C and list the files matching the pattern. In this case the wide display format is used. All the files from different directories are listed together, sorted by filename regardless of the drive and directory, and comparison of details of files in several locations is easy.

```
C:\>whereis readme.*
\ATHENA\README
\DESKLINK\README.TXT
\HOT\README.DOC
\LL\README.TXT
\NETCOMM\README.C2L
\NETCOMM\README.TXT
\PAGEVIEW\README.DOC
\QB4\README.DOC
\TURBO-C\README
\TURBO-C\README.COM
\TURBO-P4\README
\TURBO-P4\README.COM
\TURBO-P4\TUTOR\README.COM
\TURBO-P4\TUTOR\README
\UTILITY\README.NRC
\WAMPUM\README.DOC
\WINDOWS\README.DOC
\WORD\README.DOC
\XTPRO\README.DOC

C:\>
```

Figure 1. Running WHEREIS from the DOS prompt would list every occurrence of files matching the specification, along with their subdirectory. Although the program was effective, it could not look across multiple disks nor could it look at any disk other than the default.

A great range of options are available by using 'switches' on the command line. 'D /A' or 'D * DOC /A' shows all files (or all .DOC files) in the target directory, along with their attributes (hidden, read-only, system and hidden), though the normal D listing does not show hidden files like IBMBIO.COM. When the /A switch is used, the display is in the wide format but with the addition of the file attributes.

There are many other switches, which can often be used in combination with each other. /B gives a brief listing, but showing only the summary lines and not the names of the actual files /D Lists files in wide format, sorted by creation date and time. /E sorts files by their extension. /F lists files created after one date/time and before another date/time. /H shows a help screen with the syntax of available options. /N lists files created today. /O omits the names of subdirectories and just lists the file names. /P sends the output to the printer. /R reverses the direction of the sort. /S sorts on file size. /T displays hidden and system files as well as those normally displayed. /U lists the files in unsorted order. /W lists files one-per-line, with size, creation date and time.

Before leaving D.EXE, I should mention the other two programs in CFLUTES1.ARC. Normally, changing drive and directory needs two separate DOS commands. A.EXE allows the user to change to a different drive and directory with just one command. As an example 'A C:?dir1' changes from whatever drive and directory the user was in to the C drive and dir1 subdirectory. REPCHAR allows every occurrence of a character in a file to be replaced by another character. Both are small but useful functions.

Whereis

One of the most difficult tasks for a PC user is to find an individual file from a couple of thousand spread over dozens of subdirectories on a hard disk. Way back in '83 or '84 came WHEREIS, and running 'WHEREIS file_pattern' from the DOS prompt (yes, wildcards were acceptable) would list every occurrence of files matching the specification, along with their subdirectory. It was a simple but effective program with few frills, but could not look across multiple disks nor could it look at any disk other than the default. Almost simultaneously, two replacements have come my way. FF207.ARC takes very much the same form as the old WHEREIS as far as the screen layout is concerned, but with additional features WHIZ208.ARC greatly enhances the screen display and has a different range of performance enhancements and options.

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```
C:\)\word\yc\ff readme.txt /e
FF.COM fast file finder - with options.
Version 2.07 copyright 1987 by Keith P. Graham

C:\DESKLINK\README.TXT
C:\LL\README.TXT
C:\NETCOMM\README.TXT
D:\WINDOWS\README.TXT

Total elapsed time: 0:0:26.58
FF.COM finished. For the latest release of FF
call PC Rockland BBS - (914) 353 2176
```

Figure 2. FF.COM has two functions: it has an enhanced file find function and, if it's invoked without specifying a file pattern, it will send a formfeed to the printer, replacing the program or batch file called FF.COM or FF.BAT often used for that purpose.

FF207

The active program in FF207.ARC is FF.COM. It has two functions. It has the enhanced file find function mentioned above. In addition, if invoked without specifying a file pattern, it will send a formfeed to the printer, replacing the program or batch file called FF.COM or FF.BAT used by many users for that purpose.

Multiple drives can be searched for files. 'FF file_pattern A: B: C:' would search for the desired file(s) on drives A, B and C, though other combinations of drives can be specified. Alternatively, switches can be used to invoke options, and 'FF file_pattern /E' will look for the specified files in all drives starting with the C drive. Setting an environment variable FF to 'FF=A:C:X:' means the default search drives will be A, C and X.

There are several other 'switches' to invoke options. /A looks inside ARC files as well as in ordinary directories. /B writes out the list of files to disk as they are found, in the form %1 file_pattern %2 %3 %4, allowing the user to readily take action on files spread across several directories or disks. /D is an option I wish did not exist, as it deletes the files found. /P does the same, but prompts the user file-by-file before any deletion. /G searches for strings within a file. /H looks for hidden and system files as well as those normally displayed when a DOS DIR command is used. /I looks for files with date higher than a date specified by the user. /J jumps to the drive and directory of the file when found. /K only lists files which have not been backed up. /O stops the search after the first match is found. /S finds only hidden and system files. /T allows the user to trace the progress of the search by listing the drives and directories as they are searched. /U only searches the current drive and directory. /V gives file size, creation date and time and, for members of ARC files, follows with the original file sizes. /W pauses the display every 23 lines and waits for a keystroke. /Z is like /A, but ignores normal files and only looks within ARC files. /? prints out a list of switches and options to the screen.

The FF program mentioned here is a product of Keith P. Graham of the PC-Rockland BBS in the USA. It is true Public Domain, and no contribution is sought from users. While it shares the same filename as a file search program by Peter Norton, the programs from Graham and Norton are quite different.

WHIZ208

WHIZ version 2.08, distributed as WHIZ208.ARC, is another program to search multiple drives and directories and list files which match a pattern specified by the user. It has a considerably enhanced screen display compared to either WHEREIS or FF, and has a different range of options.

The display has one line per file. The first column contains the file name. The second column shows the drive and directory. The third and fourth have file creation date and time, while the last has the file size. Where more files are found than

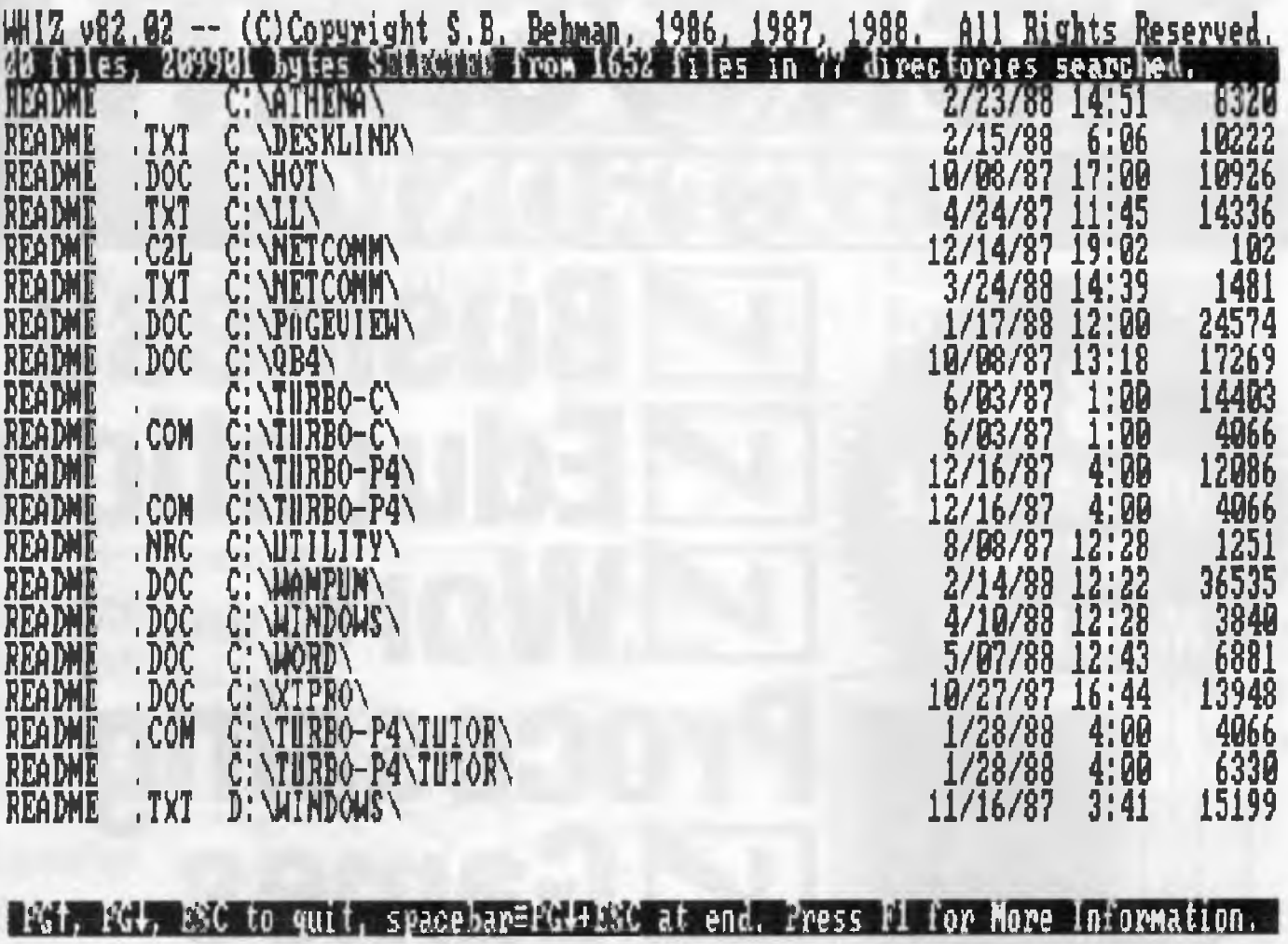

Figure 3. Using WHIZ in default, all available drives are searched, though floppy drives with the door open are ignored. The environment variable $WHIZ$ can be used to set default search paths for searches.

will fit on one screen, the user can jump to the start of the listing by pressing the Home key, to the end with the End key, and can page forward and backward with the PgDn and PgUp keys.

By default, all available drives are searched, though floppy drives with the door open are ignored. The environment variable $WHIZ$ can be used to set default search paths for searches. A search on only a single drive can be requested with 'WHIZ drive:file_pattern'

Again by default, the listing shows the files sorted by drive/directory/filename/extension. Extensive use is made of function keys. F1 brings up a help screen. F2 sorts by filename, F3 sorts by extension, F4 by descending Date/Time, F5 by descending file size, while F9 and F10 write to a disk file the list of selected files in two different formats. DOS uses the archive bit to mark files which have been backed up since their last change. Files not backed up are shown bright on the screen, while those which have been backed up are dim The default is to show all matching files, backed up or not, but the user can decide to see only those files matching the pattern which have been backed up, or only those which have not been backed up.

Enhanced wildcards are a feature. With DOS the wildcards are ? and *, with ? being replaced by any character in the same position and * being replaced by all characters in the same position or further to the right. WHIZ allows *a* to find all files with 'a' anywhere in the filename Other possibilities of course exist, such as *bas* to find all files with 'BAS' in the filename or extension.

WHIZ does not look inside ARC files, but the multiscreen display and the ability to page up and down through it more than compensates WHIZ is a product of S. B. Behman, 20581 Ashley Way, Saratoga, CA 95070, and a donation of $US10 is requested.

My choice

I find that D.EXE is vital to me. I prefer WHIZ to FF or WHEREIS, both on the quality of the display, and also because it is over twice as fast as FF or WHEREIS. FF is of great use when looking within ARC files, as is another package not mentioned here called PKFIND. My only reservation relates to the ability of FF to delete files found when the /D option is invoked, as one could easily strip a hard disk bare with a simple error.

CFLUTES1.ARC, FF207.ARC and WHIZ208.arc are all to be found on the *Your Computer* Bulletin Board. □

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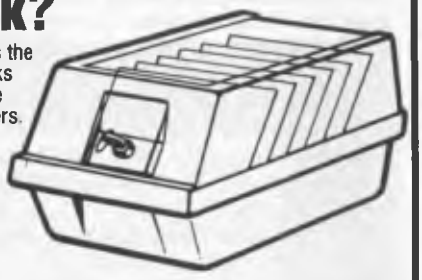

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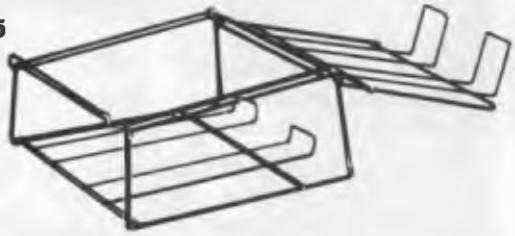

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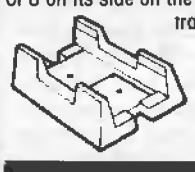

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JOHN HEPWORTH

YOUR IBM

Drives, drives, drives!

Recently I bought a Microbee. Not a classic Microbee, but one of the portable PC clones made by Mitac. It's a great machine, with 640 kilobytes, two serial ports, one parallel port, clock/calendar and so on. It's semi-portable, with the keyboard and system unit all in one case, but needing an external monitor. It does have one problem. Only one 5¼ inch floppy disk drive is installed, and there is no room for an additional internal drive.

Some software is useless with only one drive, and just one of many examples is the communications package Telix. This must have the program disk available at all times so that it can load fragments of code from overlays as required, a technique designed to reduce the memory requirements. Leaving the Telix disk in the drive causes no problems when using the system as a terminal off a remote computer, but downloading and uploading is a problem, as a second disk is required for data. While there is room on the program disk for a small upload or download file, the 300 Kbyte that I often transfer in a session simply won't fit.

I had to come up with a solution. I could fake a drive, by taking part of memory and creating a ramdisk, or I could find a way to connect an external drive. In the end I did both. First I used that 640 Kbyte of memory to create a ramdisk, and copied the Telix program disk into it, allowing me to put a data dusk into the physical disk drive. My second solution was to create a cable which could connect an external floppy disk drive to the 37-pin connector on the rear panel. The things I learned along the way should help anyone who need a small ramdisk to speed up batch files from tediously slow to lightning fast, or who want an external drive (say a 3½ inch unit) added to their PC.

VDISK.SYS and warmboot

A ramdisk is a section of memory set aside and arranged so that DOS sees it as if it were a physical disk drive. It has advantages and disadvantages. The access time is lightning fast, as there is no need for a disk to rotate under a head to read or write data. On the downside, turning off power erases all information in the ramdisk, and if part of the 640 Kbyte of normal memory is used, less is available for DOS and applications software.

Many programs and device drivers are available to make a ramdisk, but I used VDISK.SYS which comes with DOS 3.x. DOS was designed to be adapted to allow for extra physical devices, like disk drives, by invoking device drivers like VDISK.SYS from the CONFIG.SYS file which DOS reads as it boots. My standard CONFIG.SYS file reads –

```
buffers=40
files=40
device=\dos\ansi.sys
country=061,,\dos\country.sys
```

and, with a copy of VDISK.SYS in the root directory of the boot disk, addition of one more line reading –

```
device =drive:\directory\VDISK.SYS 360
```

will create a 360 Kbyte ramdisk. The ramdisk will be allocated a drive letter by DOS which depends on the drives already available. If you only have an A drive and a B drive, the ramdisk will be C, while if you already have drives A to E, the ramdisk will be F.

Number of Drives	DIP Switch 1 Position 1	DIP Switch 1 Position 7	DIP Switch 1 Position 8
0	ON	ON	ON
1	OFF	ON	ON
2	OFF	OFF	ON
3	OFF	ON	OFF
4	OFF	OFF	OFF

Table 1. The DIP switch settings for classic IBM PCs – but it might be different for your machine, so check the manual before starting work.

The drive size does not need to be 360 Kbyte. Not specifying a drive size will create a drive with the default size of 64 Kbyte, but almost any size drive can be created at will. Ramdisks take up memory, and a 360 Kbyte ramdrive would only leave 360 Kbyte for DOS and your applications programs. If you have an AT or clone with 1 megabyte of memory, 360 Kbyte will be extended memory, outside the normal 640 Kbyte, and can be used for the ramdisk by changing the line in the CONFIG.SYS file to –

```
DEVICE=C:\DOS\VDISK.SYS 360 /E
```

Now the ramdisk will be out of the 640 Kbyte that DOS allows for itself and applications, and only the device driver for the ramdisk will be in conventional memory.

There are problems with VDISK.SYS as a ramdisk. As mentioned before, a power failure will erase the ramdisk and all its data. They should only be used for programs, with all data being kept on a physical disk. This is no penalty, as batch files and other programs can see significant performance gains when in a ramdisk. The other problem is that changing the size of a ramdisk requires the user to change the CONFIG.SYS file and reboot.

I wanted control of the ramdisk size, without having multiple boot disks, and sometimes want no ramdisk, sometimes a 180 Kbyte ramdisk and sometimes a 360 Kbyte ramdisk. I solved the problem by having three master CONFIG files on disk, one for no ramdisk, one for 180 Kbyte and one for 360 Kbyte. Then I used three batch files and a Public Domain program WARMBOOT.COM to copy the desired master CONFIG file to CONFIG.SYS and then reboot. The CONFIG.360 file contained the line –

```
DEVICE=VDISK.SYS 360
```

and the file 360.BAT contained –

```
copy CONFIG.360 CONFIG.SYS
WARMBOOT
```

CONFIG.180 contained 'DEVICE=VDISK.SYS 180' and CONFIG.000 had no line which invoked VDISK. 180.BAT copied config.180 to CONFIG.SYS and then rebooted, while 000.BAT did the same with CONFIG.000. I have found that a 360 Kbyte ramdrive is fantastically useful. Much software can be run on what is in effect a two floppy system with 360 Kbyte of memory.

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1	1	1	21
2	2	2	3
3	3	3	22
4	4	4	4
5	5	5	23
6	6	6	5
7	7	7	24
8	8	8	6
9	9	9	25
10	16	10	7
11	15	11	26
12	14	12	8
13	13	13	27
14	12	14	9
15	11	15	28
16	10	16	10
17	17	17	29
18	18	18	11
19	19	19	30
20	20	20	12
21	21	21	31
22	22	22	13
23	23	23	32
24	24	24	14
25	25	25	33
26	26	26	15
27	27	27	34
28	28	28	16
290	290	290	357
31	31	31	16
32	32	32	18
33	33	33	37
34	34	34	19

Table 2. *The pinouts required to connect a couple of drives to the external port. Note that all odd numbers on edge connectors are signal grounds and all pins from 20 to 37 on D connectors are signal grounds. Pins 1, 2 and 20 on the male 37-pin D connector are not used.*

and the two packages I most commonly use this way are Telix and Microsoft Word 4.0, though the latter cannot use the spell checker or thesaurus as you can't change ramdisks in midstream!

External drives

The ramdisk did not solve all problems, as programs like Windows need, as a minimum, two real floppy drives and as much memory as possible. The kids were screaming for Windows Paint and that game that comes with Windows called Reversi. I had no option but to cobble up an external floppy disk drive, using an old full height Tandon 5¼ inch that came out of an old PC.

The floppy controller in an IBM PC can handle four floppy drives, two internal and two external. Changing DIP switch settings on the mother board allows the system to find the extra drives. The IBM guide to operations and technical reference manuals don't mention DIP switch settings for more than two drives, but they are shown in *How to Repair and Maintain Your IBM PC*, by G. B. Williams (Chilton Books), a very useful book with all sorts of data and tips for the semi-practical PC owner. Table 1 shows the DIP switch settings for classic IBM PCs. Look in your manual for the DIP switch settings for your machine.

Alternatively the DIP switches can be left unchanged, and the device driver DRIVER.SYS can be invoked from the CONFIG.SYS file at boot. If the DIP switches are set for four drives (two external) then the floppy drives will be A and B (internal) C and D (external), with hard disks starting at E. If the DIP switch settings indicate one or two drives, and DRIVER.SYS is used to access the external drives, then the internal floppy drive(s) will be A and B, the hard disk drives will come next starting at C, followed by the external drives.

The internal drives share a cable connected to an edge connector on the controller, while the two external drives again share a ribbon cable connected to the 37-pin female D socket on the rear panel of the floppy controller. At this point I should warn you that the IBM technical reference manual has a conflict between the pinouts it shows for the internal edge connector of the floppy disk controller card and the external 37-pin connector. All but two pins agree with each other, and unfortunately the error has been propagated in the pinouts in at least one catalog from an electronics supplier.

The Microbee did have a similar 37-pin port on the rear panel, and the same cable

used to connect external drives to a PC could connect a .drive to the Microbee. From now on I will ignore that Microbee (except to note that it did need a jumper installed on the motherboard to enable the motor on the external drive), and just discuss the connection of external drives to a PC.

To make up a cable to connect a couple of drives to the external port you will need approximately one meter of 34 conductor ribbon cable, two 34-way edge connectors to suit the disk drives and a 37-pin male D connector for the external port. The pinouts are arranged to make use of insulation displacement connectors easy, and compressing these onto a ribbon with a woodworking vise is far easier than soldering a connector and trying to get all connections right. Ribbon cable and three connectors for you to make up your own cable should cost around $30.

Pinouts

There are a couple of tricks in laying out the cable. Ribbon has one core coloured, often red or blue, with the rest of the cable another colour, usually grey. The coloured core is usually numbered as core 1, with the other cores being numbered from 2 to 34 across the cable. On most connectors, the pin numbers are molded into the body of the connector. Make the cable with about 700 mm between the 37-pin connector and the edge connector for the second external drive, and about 250 mm between the connectors.

The connector for the second external drive is fitted with the number of each 'pin' matching the core number – core 1 to pin 1, core 34 to pin 34 and all in between having matching pin and core numbers. The edge connector for the second external drive is a little different. Cores 1 to 9 go to identical pin numbers, as do cores 17 to 34. Cores 10 to 16 have a half twist, with core 10 going to pin 16, 11 to 15, 12 to 14, 13 to 13, 14 to 12, 15 to 11 and 16 to 10. This is achieved by slitting the cable twice, between cores 9 and 10 and again between 16 and 17, and turning over the strip of cores 10 to 16 before inserting them into the connector (see Table 2). Figure 1 will give you the idea, or you could look at the internal floppy cable of an original PC to see a similar twist, where the B drive is straight core-to-core from the controller and the A drive has the twist of cores 10 to 16.

Now for the 37-pin connector – with a 34-core cable to be connected, three pins are not used at all. These are pins 1, 2 and 20 which are all at the same end of the connector. Merely laying the cable into the connector with core 1 on pin 20 and core 34 on pin 19 gets the connection right.

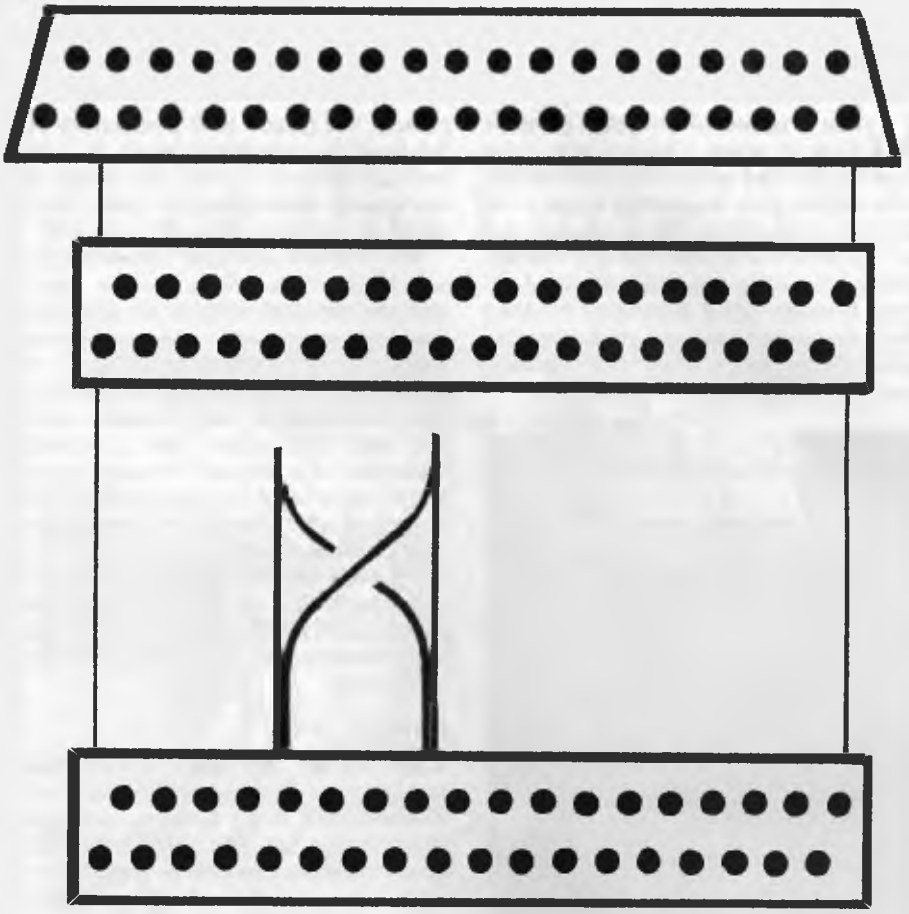


Figure 1. The connections for adding external drives to your PC.

Now squeeze the connector slowly and gently with a vise until the pins on the connector penetrate the cable and make contact with the conductors. When the connector clicks, indicating that it has latched closed, remove it from the vise and trim surplus cable with a very sharp razor blade.

Commercial cables and power supplies

If you don't want to make up a cable, Rod Irving Electronics, (03) 543 7877, advertise one for $99.95. Other suppliers can make up a cable for you, or sell connectors. Geoff Wood Electronics, (02) 427 1676, has an excellent range of connectors and semiconductors, while specialists like Connect Electronics, (02) 437 6224, can make up cables of all types in small or large quantities at very competitive prices.

A case and power supply for the external drive will be required. Rod Irving advertises an extensive range of cases for external drives with or without power supplies, or a general purpose electronics case could be adapted and power obtained from the PCs power supply. If you use a case without a power supply, DC for the drive can be obtained from your PC's power supply. If it does not have enough power outlets, a Y cable (a sort of flexible double adapter) can do the trick.

Economics

Adding a second drive to the Microbee got my two daughters off my back, and they now have a PC almost all their own. I had a spare drive and this made the exercise cheap, but before cobbling up an external drive yourself, remember that some people are selling 3½ inch drives in cases with cable and power supply for very competitive prices, and the economics of the situation can depend on availability of a drive at a bargain price. □

YOUR C64

When it comes to computer games, I have to admit I have a bias away from arcade type games that require joystick dexterity. My experience is that I tire of them fairly quickly. This is possibly due to a number of factors like my reflexes being a bit on the slow side, or back of the mind thoughts about developing RSI, but I think the main problem is that once I've mastered an arcade game there doesn't seem to be much point in playing it.

***Figure 1.** Reach for the Stars Edition 3 has improvements in its graphics and command modes.*

Anyway, that's my bias and I'm sticking to it. Instead I much prefer to play strategy games – ones which play differently each time and where the computer opponent has some degree of intelligence about its actions.

The yardstick that I use when assessing strategy games is an Australian product called Reach for the Stars. It was first released in 1983, with a second updated edition in 1985. The game is basically about interstellar exploration and conquest. You share the universe with three other players, computer or human, and as each explores and expands their empire, there is inevitable conflict. The beauty of the game is that has a number of dimensions of interest.

On one level there is the economic equation. The more you invest in your planets, the greater their productivity but the faster the population grows. To avoid overpopulation you must take people off the planet to colonise new ones. That's where the exploration factor comes in.

Not all worlds are equal, some being far less hostile than others. So you have a powerful incentive to seek out and settle upon the better star systems. Unfortunately the other three players have the same idea, and that's where the need for a star fleet comes in. But to build a strong star fleet you must have productive economies. It's very much a balancing act, and on top of it all is the tactical business of fighting what amounts to a war of survival on three fronts.

It's a very addictive package, and one of enduring interest. In fact it's only now that I've found something that tops it. And that something is a new edition of the same game.

Edition 3

Reach for the Stars Edition 3 is actually two games in one. The standard game has improvements in its graphics and command modes, plus the computer intelligence seems to have been upgraded to make them even meaner opponents. (Beginners fear not – you can still set skill levels for easier play!) But the big news is the all new 'enhanced' game. This still uses the same Star System and planetary economics basis, but a different set of realities confront the player.

For starters, your ships can no longer roam through space to far off stars. Now they have a range of navigation beyond which they cannot go. This means that except for the stars closest to your 'home' planets, most of the universe remains unknown. You can explore more of the universe by colonising the outer star systems, and in doing so it makes for a far more strategic game with real frontiers. You also have more things competing for the available resources. Apart from the familiar concepts of starship technology and industrial investment, you can also spend on navigation technology to increase your range, or spend on productivity technology which can double planetary output.

The game takes longer to play (allow three hours) and requires far more strategy. The navigation limits also affect the computer players, so a key element of your defences is to deny the enemy access to stars that would give them the range to reach your inner planets. Everything costs more (although you can vary costs), so your planetary economic productivity is vital. You can also spend money on raising planetary armies to help ward off attacks. All in all, you have what at first seems like a bewildering range of possible things to spend money on, so the computer offers you an advice option for the first 16 builds. You can override it, but it's a great feature when you are learning.

One nice touch is that at the end of the game you can get to see what your opponents knew and what they didn't know about the universe. This is helpful if you were wondering why you just got thrashed or where that mysterious enemy probe kept coming from. You can also save games to disk (of course), and try different permutations of about a dozen different game options.

For $50 it's great value (I've already told you my bias), but if you already own version 1 or 2 of RFTS, SSG is offering a $20 upgrade. All you have to do is send the money, your original disk plus the front page of the manual to Strategic Studies Group, PO Box 261, Drummoyne NSW 2047. I wish other software companies had similar upgrade policies.

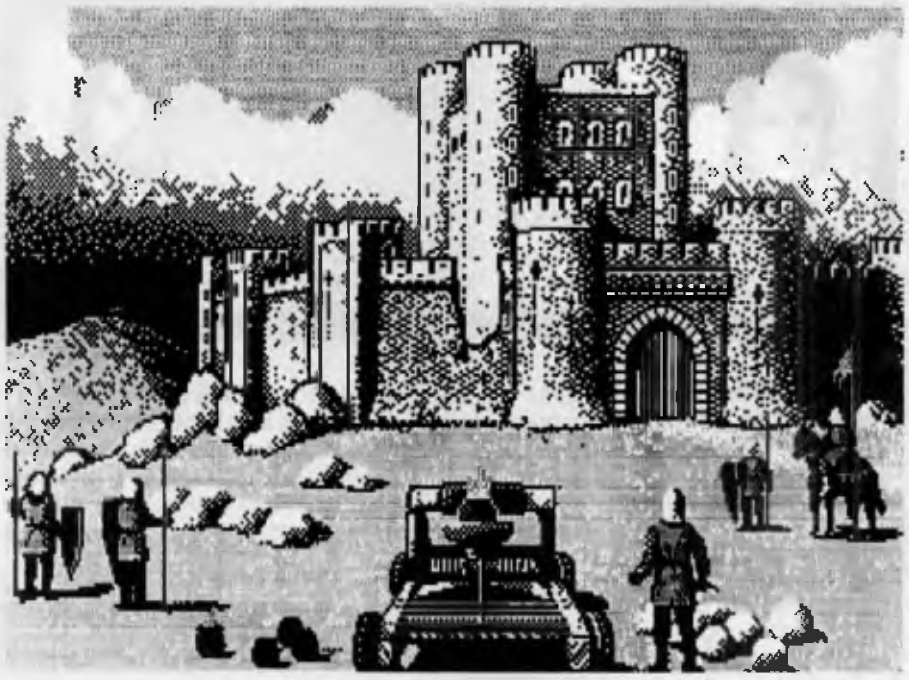
IBM and others

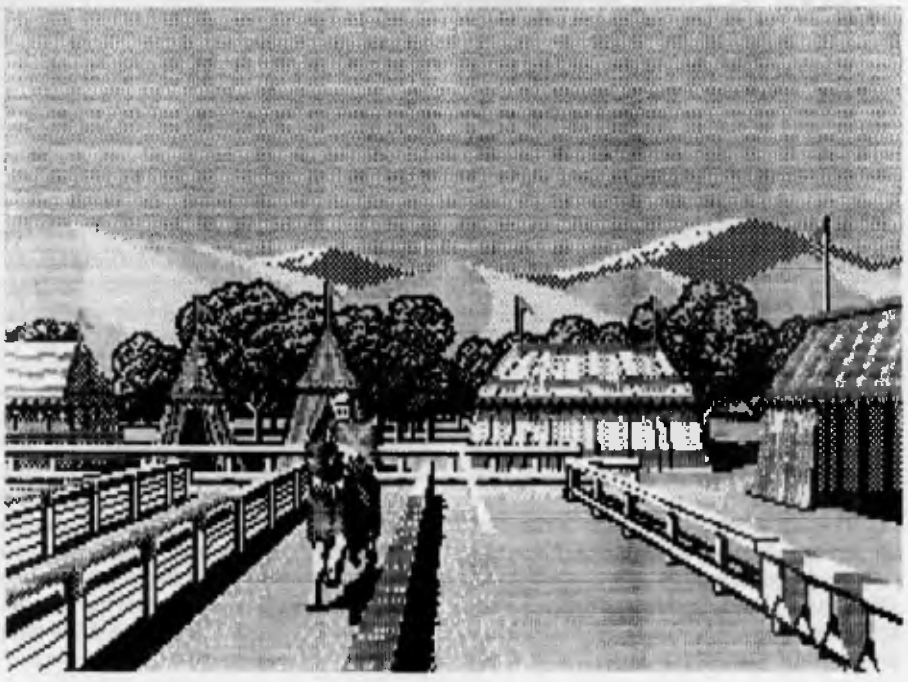
Incidentally, until now SSG products have been exclusively available for the Apple II and C64/128. That was because programmer Roger Keating's forte is 6502 assembly language. But the company has decided to support the Apple Mac, Apple IIGS, IBM (all graphic cards) and the Amiga. Versions of Reach for the Stars Edition 3 for all of these machines are now available. The graphics are slightly different for each machine, but the computer players' intelligence and the general strategies of play remain the same. This means that when humans play, there is no advantage over whose computer they choose to play on.

One important aspect of SSG's decision to support the 16/32-bit machines is that their prices for all computer models are standard. Mac and IBM users have had to put up with overpriced and inferior game software for too long. Hopefully when they get a taste of the sort of price/quality ratios we Commodore owners have long enjoyed, that state of affairs may change. Full marks to SSG. □

Defender of the Crown

With some help from Robin Hood, Gregor Stronach has been rescuing fair maidens, catapulting Greek Fire, and generally raising mayhem amongst the Lords.





DEFENDER OF THE the crown is an interactive game which allows the player to become properly involved as one of the characters, whether it's during the fights with the enemy, or rescuing the fair maiden from the foul dungeons of the Norman Lords.

The game comes packaged in a very colourful and well designed box, with a sticker proclaiming that it has 'Award Winning Graphics', and it's well earned, I feel. The graphics of this game are truly magnificent and make the game a pleasure to play. As I attacked the Norman Castle of Edmund the Grim, I was amazed at the reality of the picture of that giant Norman structure.

As you fire up the game, you are presented with a magnificent title page, written in the Olde English font. Sparkling light effects and good music enhance the titles. After the opening display, you get to choose which of the four Saxon characters you wish to be. You get to choose on the basis of their qualities of leadership, jousting and swordplay. The characters are: Wilfred of Ivanhoe, Cedric of Rotherwood, Geoffrey Longsword and Wolfric the Wild. Colourful characters indeed.

You are then given the background of the story which you are about to take part in. This is displayed on a a piece of old parchment with the story written on it, set on a screen with the backdrop of Robin Hood's campfire blazing merrily away with his men all listening to what he has to say. After this the game begins.

The graphics of this game are truly magnificent and make the game a pleasure to play.

There are many different things to do in this game. One is to hold a tournament, where you can joust for either fame or land. The graphics and reality of the joust are really quite good. If you hit your opponent anywhere other than in the middle of his shield, you stand a good chance of being knocked off your horse instead of you knocking him off.

There is the option to 'seek conquest' over the neighbouring territories. When this option is chosen, another menu comes up. You can choose between sending forth your campaign army, transfer forces from your home army to your campaign army and vice versa. You can read from the map and see which territory would be the most prosperous for you to conquer, or to go and see Robin Hood. Robin has pledged his aid to you three times if you 'seek to re-unite the Dark Kingdom. From there you can return to the main menu if you wish.

Next is the the option to go raiding. This means that you go away and fight your way into an enemy castle and steel his gold, which goes into your treasury. However, if you lose the battle to get into the castle, you will be held ransom, and the ransom money will be taken from your treasury.

After that there is the option to buy your Home Army. Your Home Army is the defence force of your Home Castle. If you loose your Home Castle, the rest of your territories are forfeit and you lose the game. You can buy your Home Army at set prices. The footsoldiers are one gold piece each, catapults are 15 gold pieces and castles are 20 gold pieces each. The castles can be positioned in any of your territories that you wish, and they make it harder for the enemy to conquer that particular territory.

To conquer a territory that has a castle on it, you need a catapult. When using the catapult, the Lords said that anything was fair game. They threw anything from boulders to dead animals over the wall of the castles. The dead animals were a regularly used method in those times to spread disease amongst the enemy. Greek Fire is another available weapon and consists of oil, pitch, resin, sulphur and quicklime, which when catapulted into enemy strongholds, started fires which were unable to be extinguished with water alone.

Unreliable vassals!

Next is the option to read the map. This means that you may look at all the different sp cifications of the territories, seeing who owns the, (if they are owned at all), how many vassals there are on the land and how many gold pieces it produces a month in tax. Vassals will fight for your army, but are very unreliable. They cannot be expected to stay around for extended campaigns. If they revolt, you will probably lose the territory on which they live. This can also occur the other way, and the vassals will give their territory to you by revolting against one of the other Lords.

You are constantly playing against the other Norman and Saxon Lords. The game progresses with each Lord taking turns at applying his strategy against yours. Each Lord has a very predictable strategy and you will soon learn how to attack the other players most effectively. You may also pass a turn, or go to the options list. The options consist of turning either the sound or joystick on or off, ending the current game or starting a new one.

During the game, you may be called upon to rescue a fair maiden from the Norman's dungeon, where she was taken after being kidnapped. This is virtually the same as going raiding except that the guards are better swordsmen than the usual guards when they are only guarding their master's gold.

You win the game by defeating either all the Lords (both Norman and Saxon), or by simply defeating only the Norman Lords, and taking over their territories.

With the package, there is an 18-page booklet, with instructions, sage advice (hints), and a brief history of each of the different aspects of the game, including the tournament and the siege.

There are not many things to complain about in this game at all. The game can take as long as you like to play, and the first time I was able to play and win took me over an hour. It is a single player game but it always seems to attract a large audience which is generally full of helpful advice.

Defender of the Crown is designed for IBMs and true compatibles with 256 Kbyte of RAM, CGA card and DOS 2.0 or higher. The disk is unprotected but when copied onto the hard disk it continues to look for a disk in drive A. This is a shame as the picture files would load a lot quicker from the hard disk. □

Product Details

Product: Defender of the Crown
From: Mindscape
Distributor: Wypa, Unit 5/6 Gladstone Rd, Castle Hill 2154 NSW (02) 899 2277
Price:$54.95, C64; $79.95, all other machines.

TERRY CASS

YOUR APPLE IIGS

The Apple II has been around for some time now and has changed its spots many times during its life span. With the release of the Apple Mac, many users changed to the new Mac environment, but the hard and fast Apple II enthusiast waited, and waited, for the rumored release of the Apple II*x*. The name of the new Apple machine changed as often as a pair of socks, but in late 1986 the Apple IIGS was finally born.

Getting information of the IIGS has been a problem from the word go; even at Apple, no one seemed to know much about it, or, if they did, they weren't saying much. Born of this ignorance was a group of dedicated Apple II developers who started exchanging information that they had discovered about the IIGS. It didn't take long for the word to get around and more and more interested parties joined the band wagon.

A GS Association was formed to distribute the latest information on the machine plus offer hardware and software reviews and technical manuals. From this month on, we will be bringing you the latest hardware updates on the GS and offering reviews of software. Some of the best (and the cheapest) software is Public Domain or Shareware, so we'll be covering that, too. Watch for a review of the new 2 megabyte 3½ inch drive and the next-release GS.

If you'd like to know more about the GS (or have a contribution to knowledge you'd like to offer), contact me by writing to: *Terry Cass, GS Users Association, PO Box 210, Wentworthville 2145 NSW.*

New GS Basic

By now, we should all have seen the new Basic released for the GS. It runs along the same lines as Mac Basic, enabling direct access to the Tool Box manager. In fact, if the program is written according to the Apple Guide rules, anything written in GS Basic can be compiled to run on the Mac. While we're on the subject of Guide rules: anyone who has a copy of Music Studio, Bards Tale GS, or Hacker II, and finds these programs won't run once they've had the upgraded ROMs installed, shouldn't throw away their disks.

The problem lies in the way the rules were broken when the software was written. These disks made direct access to the Tool Box instead of through the Memory Manager. Your local distributor can fix the problem with an updated copy of the software, or contact me at the above address.

There are a number of rumours going around about ProDos 16 Version 2.0 (and they all seem to be false!). The truth is that ProDos for the GS is finished. Apple have now written a new 16-bit system called GSOS (GS Operating System) which will speed up program execution and disk access and generally take about half the time to run GS software. GSOS can replace your old ProDos system files – more information next month!

In fact, if the program is written according to the Apple Guide rules, anything written in GS Basic can be compiled to run on the Mac.

PaintWorks Gold

When the GS was first released, Activision released GS Paint, a similar program to Mac Paint. ECP followed with Deluxe Paint II and offered an upgrade path to any GS user who had purchased Paint. Well, Activision has now gone one step further and released PaintWorks·Gold, and have provided an upgrade path for GS owners who have bought other paint packages. (If you bought your copy of PaintWorks Plus through the User Association, you can upgrade to Gold for $30.)

To bring the GS closer to the Mac environment, over 80 new features are included in the new program; 35 of these aren't yet available on any other GS program. The PaintWorks Gold Sys file takes a massive 286 kilobytes (against 106K for Plus). Put this together with its associated files, and that leaves only 6K unused on an 800K disk – you will need 1.25 megabytes of RAM to use Gold. Because of the extra features in Gold, some speed has been sacrificed, but the release of the 5 MHz accelerator card soon, should solve this.

Apple have now written a new 16-bit system called GSOS (GS Operating System).

Leisure Suit Larry

Sierra's Leisure Suit Larry in the Land of the Lounge Lizards has been around for some time on the Amiga and other computers, but the super hi-res graphics that the GS supports made it worthwhile waiting for.

Larry's the kind of guy you wouldn't want your daughter to date, let alone meet. The game gives you the chance to step into the shoes of a lovable nerd and would-be swinger as you take on the town of Lost Wages for one fabulous night You'll dance; you'll drink; you'll gamble; you might even meet the girl of your dreams – and have fun doing it. This is definitely the best comedy adventure game I have played.

The game includes two excellent, real-to-life casino games that pay at realistic odds. There are full facial views of girls that Larry meets – watch their expressions as Larry tries out his best pick-up lines: if the girl smiles or winks, Larry may be in for the time of his life

As this is undoubtedly a game for the 'mature' user, a system to keep minors away is builtin: before the game will start, you must answer a series of 5 trivia questions that, theoretically, only a mature player can answer. Being an American game, the questions are drawn from American trivia, which can be frustrating as the computer tells you that, if you were really 30, you should know the answer.

Softswitch

The author of Softswitch, Ken Kashmarek, has brought us one step closer to realising the full potential of the GS. But first, I must make a point I've made to users many times before – anyone who only has 512K in his GS only has a glorified IIe; for example the Mac-type Finder for the GS uses the best part of the 512K itself. And, over 20 per cent of GS programs now need more than that amount of memory.

Softswitch is the GS version of the Mac Switcher. Softswitch allows you to have three programs running on the GS at once. Here's how it works: first, boot with the Softswitch disk which will give you a choice of Basic or the Desktop onscreen. Softswitch then allows you three empty boxes to place whatever programs you want into; the Desktop should always be placed in Box 1, so you have a backdoor from which to boot your next program (for programs that cannot be run from the Desktop, you can cold boot the disk without taking Softswitch out of memory)

The second program is started in Box 2 and a third in Box 3. You can delete the Desktop from Box 1 and replace it with another – and switch instantly from one program to another!

This switching can be done with, or without, 'automatic update.' One advantage to turning the update off, is that when playing a game that doesn't allow you to save at a certain point, you can do so with Softswitch.

Softswitch is mainly set up for ProDos 8 since ProDos 16 takes up so much memory. It's not recommended to use the program with less than a megabyte; if you wish to use 16-bit programs with it, you'll need three meg or more. A great add-on to the program is the ability to capture a picture from one program and instantly transfer it to another. Both ProDos and Dos 3.3 programs can be run together, and files from Dos 3.3 can be transferred to ProDos with no trouble at all.

Shadow Copy

Apple II owners have known about Copy II Plus for some time now – it copies protected programs onto another disk, but the software is still protected so it can't be copied to a hard disk or run on RAM cards. Shadow Copy for the GS gets around this by sector-copying the original disk to another, and then writing a patch over the 'protection' on the back up copy, which means it can be used as an unprotected disk. (*Please remember that copies can only be made for archival purposes.*)

One of the biggest problems with programs like Copy II Plus is that all information and upgrades have to come from the States. The upgrades are generally in the $US25 to $US30 range: converting that to $A adds another 25 to 30 percent and import duty adds a further 40 per cent to the price.

Education software

Since the GS has a builtin Ensonic chip, it was only a matter of time before we saw some great education software written for school and handicapped children. The following two programs are from First Byte, but other developers have already released some impressive software using the chip.

MadLib makes could use of the sound chip by giving instruction on how to use the program as soon as it is started up. The program first asks for a series of words giving the type (noun, verb, and so on) it requires. After giving it enough words, Mad Lib writes all the words into a short story and reads it back.

KidsTalk goes one step further. It provides a word processor screen for entering letters, word or sentences. After they are entered, the user is given the choice of having them read back letter by letter, word by word, or in full sentences.

The voice can be changed from female to male, faster to slower, and from high-pitched to low. A Cut and Paste option is also available and KidsTalk comes with its own library of words that can be added to or deleted.

Both programs retail for $75.

First Letter & Words

This four-part educational program is written for 3 to 10 year olds. In the first section, the user compares cards: each card has a letter of the alphabet on it which must be matched with another card (the letters are spoken as they are shown). When the cards have all been correctly matched, the student is rewarded with a visit to the circus.

The second section is the Magic Letter Machine – the student picks a letter, the Machine works out what it looks like, draws it in large print; speaks it, and then gives a word that starts with that letter.

Then, there's Dinosaur Surprises – the program picks a prehistoric animal and the student then colours in the various body parts as they are nominated by the program.

The fourth section is Who Am I? The computer reads out a description and the user must then decide what it is. There is

an easy version that gives a choice of answers and a hard one that gives only a blank.

The retail price for First Letters & Words is $75. Other programs that are available in the same vein are Smooth Talker (a talking word processor), Math Talk (a talking maths test) and Math Talk Fractions (another talking maths test).

PC Transporter

PC Transporter, from Sydney-based Applied Engineering, is a card that turns an Apple GS into an IBM compatible. I've seen the card installed in slot 7 of an enhanced (platinum) IIe and then connected to an IBM-type disk drive – the whole operation only took a matter of minutes!

When the Apple is turned on, it looks just the same except there is now an extra (minimum) 256K of RAM. To switch to the IBM mode is simply a matter of booting from the disk that comes with the card. The disk is ProDos-based; both 3½ and 5¼ inch disks are supplied. The system can be either manually configured, or the software will do it all for you.

Now you're ready to run just about all of the available IBM software – and run it up to three times faster than on an IBM PC/XT. Even Flight Simulator works!

You can choose the amount of memory you want on the card, up to 640K. The memory can be used in either IBM or Apple mode, but 128K is needed in IBM mode as system memory. The card can be installed in any slot, except slot 3 (where it would interfere with the 80-column card). PC Transporter uses its own IBM-type character set that look a bit strange at first; the card also re-maps the keyboard so it looks like an IBM.

The card has a socket for a 8087-2 maths co-processor chip which will increase the speed even more when number crunching. It also has a socket for an IBM style RGB monitor. Using the card, you can transfer files from MS-DOS to ProDos and back. If you have an Apple 3½ inch drive (*not* Unidisk), it can be used as an IBM drive. However, in most cases, you will need to buy an IBM 5¼ inch drive to use the current range of software; this same drive can then be used with ProDos disks as well.

PC Transporter also allows you to use the mouse, printers and modems as IBM devices. The card will work with the standard composite monitor and the Apple RGB monitor. The card, with 256K, costs just over $1000 and the IBM drive (also available from Applied Engineering) is about $350. □

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YOUR MAC

Managing data

Australia isn't the only country to see a high-tech future in the production of good computer software. The Poms, the French and the Germans are all out there, working like hell to grab a piece of the mass micro market.

For instance, have a look at the range of relational database managers now available for the Mac. In addition to the US standard Double Helix and Reflex, there is the obvious Omnis from the UK, fabulous Fourth Dimension from France and Moxie McMax from Germany.

Now that the Mac has breached the 1 megabyte barrier, there has been a rush to get serious relational databases out for the machine. It is now big enough to be treated seriously.

In addition, some of the old DBMS favourites have been dusted off, refurbished and pumped back into the market – bigger, better, and brighter than ever before. In fact, 1987 was the year of Mac databases, almost to the point of overkill.

I've often complained in this column about the trade-off costs involved in making the Mac simple to use. The graphics interface and the standardised set of programmers 'tools' make most Mac programs a joy for the novice – but rarely do we appreciate the cost in terms of memory consumption and speed involved in providing this interface. This new range of database managers makes the trade-off obvious and apparent.

McMax

Fourth Dimension and dBase Mac are the most Mac-like of all the programs on offer – and also the slowest. At the other end of the scale is the McMax which is a straight translation of the old MS-DOS dBase III. McMax doesn't look like a Mac application at all but it fairly screams along – in some tests it is a hundred times faster than some of its rivals.

It hails from Germany where it was written to provide dBase III programmers with a means of transporting customised MS-DOS applications to the Mac. It seems to be about ten to twenty times faster than dBase Mac and Fourth Dimension in most sorting, indexing and record access tasks with large files.

McMax is actually one of the more interesting of the programs – if you are prepared to overlook the sacrilegious heresy of ignoring the Mac interface. What happened to the old German principle of 'You vill follow ze rules!'?

It is a very close to being a dBase III Plus doppelganger, and generally it will run dBase command programs directly ported from the IBM system. I wonder how they got passed Ashton-Tate with the rash of look-and-feel litigation in the States?

Now that we have Appletalk, AppleShare and TOPS (which are increasingly integrating Mac and IBM-PC networks), McMax will become vitally important for some organisations. It allows you to use either standard dBase III or dBase III Plus data although it doesn't have multiuser capability over AppleTalk. Nor does it handle graphics, pictures or icons.

But for what it was designed to do, McMax is an excellent and useful piece of software . . .

But for what it was designed to do, McMax is an excellent and useful piece of software – as long as you understand dBase III programming.

At the other end of the scale is that other supposedly dBase-like program, dBase Mac from Ashton-Tate. I hear that the program was written for them by Hayden and it certainly shows many of the Hayden characteristics . . . which is why we don't see Hayden programs around much anymore!

Quite frankly, I think dBase Mac stinks. It is not a member of the dBase family in any sense of the word – not in look, feel, design, procedural language, capabilities – nothing except the name and the marketing hype. More to the point, the design of the data entry system is disastrous and guaranteed to create problems. It is slow, cumbersome and heavily over-featured.

Foxbase Plus/Mac

Another new player in the dBase field is Foxbase Plus/Mac, which I haven't yet seen. It's been around in Mac beta version since the beginning of the year – and for many years before that it was a popular database management package in the MS-DOS world.

Rumours say that it uses dBase files and command programs without modification, and is as fast (if not faster) than McMax – but – and this is a big 'but' for most Mac users – it allows you to build custom applications with almost-full-Mac-like interfaces. If so, it destroys my argument that both speed and Mac features can't usually co-exist in database management programs. Until I see Foxbase running on my Mac in a release version I'll reserve judgement.

Double Helix II is a new colt from an old stable. It will be especially liked by accounts and small organisations which need to build custom applications without the help of skilled programmers.

Odesta has boosted the speed of Version II and added technique (through an icon command) called Posting which accountants use to automate their record keeping. It has also added a forms capability and the ability to store report setups. Despite its complexity and power, this program is easy to use at a basic command-programming level. It has all the Mac interface features like icons, menus and graphics, and you can build customised applications by manipulating icons in a most fascinating way. It is amazing what can be achieved without writing code – but there is a limit. This is a program for quiche-eaters – the beef-and-burgundy programmers will want something more substantial.

For LANs use, Double Helix II can be supplemented by a special Multiuser kit which allows access to other Mac Helix databases over Appletalk without the need of a file server. Again, this a very valuable feature for small businesses or small work-groups – but if you are dealing with big files you really need the extra speed of an SE to use this program.

Reflex Plus is another database program that I haven't used myself – and don't think I ever will. Borland is noted for writing good programs however, and I am sure that Reflex Plus is good at what it does.

But the point is that it doesn't do much. It is a glorified list-manager with some relational capabilities through special 'linking-fields', but it has no procedural language.

The only pluses I can see in this program are that it is cheap, and it works at a reasonable level for those people who keep small related files, but don't have a

Mac with a hard disk. If you need something more than Microsoft File or Filemaker Plus and you've only got a Mac Plus (or less) with floppies, this may be the program for you. It does handle graphics, if this is what turns you on.

Omnis upgrade

Omnis 3 Plus (the worthy successor to Omnis 2, and Omnis 3) has now been upgraded by the addition of a front-end code generation package called Express. If you are familiar with F&G's Quickcode for the old dBase packages, you'll understand how Express works.

It lets you automate the building of file, data-entry, report and custom-menu formats outside the Omnis program by just specifying the basic information. Files and formats built in this way don't run as fast as those you design and build yourself by writing code, but they are fast enough.

Fourth Dimension

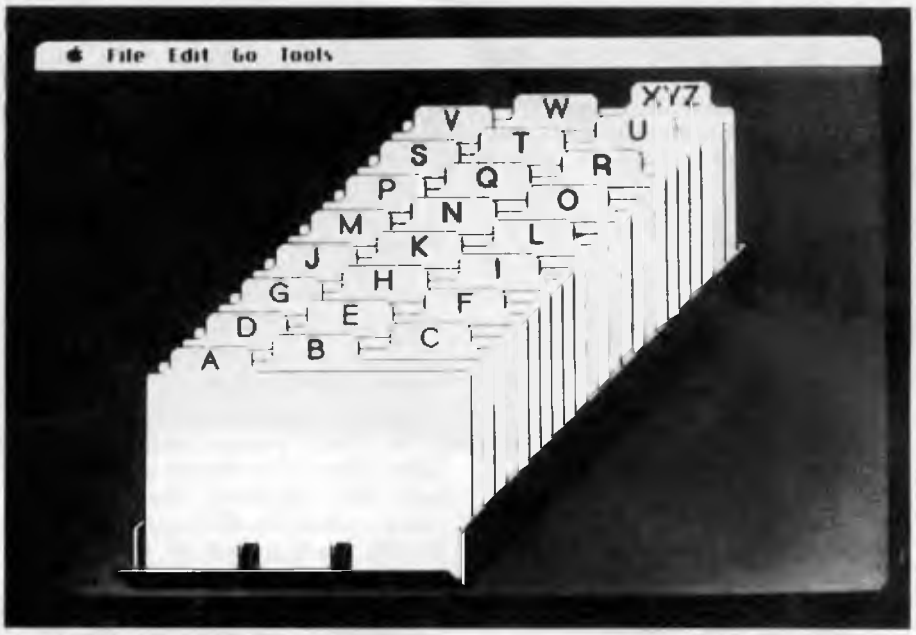
The last database manager on my list is Fourth Dimension, and it is quite possibly the most important, in the long run. This is not necessarily a recommendation to buy it now.

Fourth Dimension is what the Mac version of dBase should have been: the top-of-the-line, full-featured, total Mac interface, database standard for the next decade. *But*, only if you've got an SE or a Mac II with a decent sized hard-disk, and the need for complex automation or large files.

This is the Mac program that will make mainframe DP professionals green with envy – but 90 per cent of average Mac users will be better off keeping their mailing lists on OverVue or Microsoft File. Who needs this power when the cost is in complexity and speed?

I would anticipate that this is the program which will plug us into DEC and IBM mainframe systems, automate the accession of data on-line, and run with CD-ROM systems. But it is only early days, and it is probably fair to say that the 'final' version is still only half-written. See where it gets to in 10 years!

Don't buy now; wait for the next release. Version 1.0 is too slow – a fact admitted by Acius' managing director Guy Kawawaki, who said in a recent interview that the program was written 'on the assumption that there would be faster chips and more memory' than are now available. If you can't wait, you will certainly need a accelerated SE or a Mac II to run large databases and complex command programs – and if you aren't, you probably don't need Fourth Dimension anyway.



HyperCard 1.2 will be on the streets by the time you read this. It has undergone a lot of changes – originally to allow it to access information from CD-ROM disks. But, while he was making changes, Bill Atkinson decided to fix some faults, add some suggestions, amd make a lot of procedural language improvements.

An extra dimension of hype

They held the annual Apple Developers conference in the Blue Mountains at Leura – the only town I've ever found to be incorrectly positioned on a Shell map. Shell claim that Leura is about ten miles on the inland side of Katoomba.

I found the venue eventually, and sat in on a number of discussion varying from the elementary to eclectic exotic esoterica. If you want an overview of where the Australian developer's interest lie, I can sum up by saying that HyperCard is seen as being 'not for developers' even though Apple tried desperately to drum up interest in Stackware publishing. Fourth Dimension is seen as the Mac database of the future without doubt. It had almost universal support from the developers I talked to. The A/UX discussion group was over-subscribed and had to be repeated again at night. So Unix is *in* in the Mac world.

But Unix is *out* for me, so I can't tell you much about what went on at this discussion: life is too short to indulge in such masochistic pleasures! I attended the Fourth Dimension and Hypercard discussions instead

HyperCard seems to have taken over as the programmer's substitute for flowcharting. I commented on its value as a program-outliner a few months ago, so it was interesting to find that most software developers now use HyperCard as their preliminary planning tool.

HyperCard 1.2 will be on the streets by the time you read this. It has undergone a lot of changes – originally, to allow it to access information from CD-ROM disks. But, while he was making changes, Bill Atkinson decided to fix some faults, add some suggestions, and make a lot of procedural language improvements.

HyperCard's links to the outside world are improving steadily all the time. Bulletin boards in the States are apparently full of external routines (for both HyperCard and Fourth Dimension) that allow the systems to be extended beyond our wildest dreams of even a few months ago.

Apple was showing HyperCard driving a

standard Pioneer interactive video disk player at the conference. The disk was an off-the-shelf National Gallery of Art production with tens of thousands of still frames – great works of art, plus text material about art and artists. The HyperCard front-end provides a consistent interface. So a complex retrieval system can be added to existing video disks with a minimal amount of cost and trouble – which is one hell of a step forward for interactive video systems. I think we'll see a lot of this combination.

These HyperCard multi-media capabilities are made possible by a whole range of standardised HyperTalk commands like videoFrame, stepVideo, videoTime and so on. If you want to write your own scripts, you'll only need to add buttons with message lines like 'play video from frame #', or 'stop video'. What could be easier?

You can also get a number of ready-made control button panels for video disk players. To add video disk controls to your Stack, all you do is to cut and paste the buttons and the video externals. Some of the other Version 1.2 changes that will interest HyperCard users are –

1) You can now select whether the left and right arrow keys take you to the next card, or whether they control the cursor in a text field. This is set in the Home Stack.
2) The problem with overflowing a field has been solved by adding AutoTab, which jumps you automatically to the next field when the first is full.3) Command/Tab/Tab is now the equivalent of selecting the Button tool, and Command/Tab/Tab/Tab is the same as selecting the Field tool These were a real curse in the old version.
4) HyperCard can now be used on locked disks, and the home card can be locked against modification. It also works on file servers.
5) Generally, the new version runs faster, and requires less memory space.
6) The find command has been improved even more to take into account the need for index searching with CD-ROM.
7) Hide and Show Picture commands allow you to semi-animate some cards by swapping between card and background images.
8) ClickV and clickH commands are now provided to extend the clickLoc command in the same way as a mouseLoc.
9) Syntax has been improved for the locking commands, and new abbreviations have been added.

Atkinson has also fixed most of the bugs in the original program; the report- and label-printing problems with the original have been solved. The Tab has been fixed. It now works correctly with the LaserWriter II and AppleShare.

Apple has now hired a StackWare librarian to look after the booming catalog of HyperCard stacks. It is holding 200 megabytes of stacks already, and the catalog alone fills 2 Mbyte on a hard disk – but it is revealing that Apple still point to Focal Point and Business Class as the two examples of StackWare that sells.

Where is the new super StackWare that we were promised would flood onto the market? Apple says that there are 400,000 HyperCard users already waiting out there. This could reach a million copies world-wide by the end of the year.

Fourth Dimension

While HyperCard has been making most of the waves, Laurent Ribardiere of ACI hasn't been idle on Fourth Dimension either. He's apparently been sitting in Apple's Cupertino offices for the last six months, hacking away at some of the problems with his database. He is making a great program even better.

If I was a betting man I'd lay odds that a decade from now, Fourth Dimension will be seen as having been more important to Apple than HyperCard – even though it is not so dramatic an innovation.

The new version of Fourth Dimension will be about four times as fast in importing and exporting data, and about ten times as fast in executing code, Apple claims. This should remove the last objection that has been sustained against this program.

It is interesting to note that none of the developers at the conference had serious complaints about Fourth Dimension's widely publicised (present) 'lack of speed', anyway. In general, they said that a speed improvement would be welcome but not essential for the success of the program.

There are rumours of an outside compiler for Fourth Dimension, but ACI has announced that its version won't be along for a couple of years yet. If the speed improvement is as much as it claims, a compiler won't be all that important anyway

Ribardiere has also been working on the multi-windowing capability, and he has provided even more control over the toolbox. The big news is that he has now given us a spreadsheet area within the database. The spreadsheet was described as 'Excel, without the macros'. The new version of Fourth Dimension is due in September, and updates will either be free, or available at 'a low cost' – to quote the company that should know.

Specialist software

Both Fourth Dimension and HyperCard users will be interested to know that Apple's purchase of a number of small specialist software companies has finally begun to pay off in terms of new and improved products.

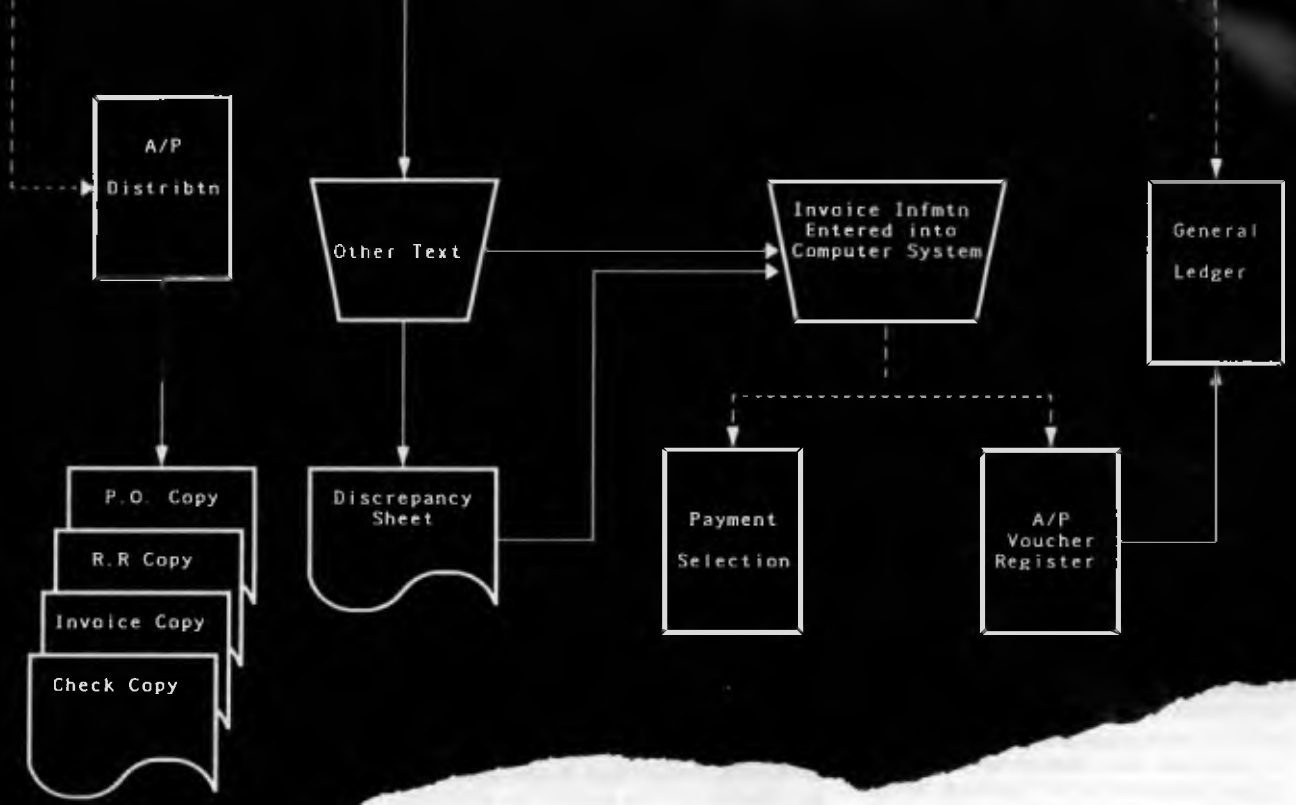
A few months ago Apple bought Network Innovations which owns the CL/1 language now widely used for sending and receiving data between micros and mini/-mainframes. CL/1 is a standardised SQL (Structured Query Language) which can be used between LANs operations and any large processor/database. The aim is to make the data available quite independent of the storage language or structure.

Network Innovations already has a CL/1-server for DEC VAXs, and has an IBM mainframe-server coming next year Add to this Hyper-CL/1 for HyperCard and external links from Fourth Dimension, and you can see emerging the possibilities of very powerful data networks with very simple front-ends using the standard Mac interface. Apple has already demonstrated HyperCard which has SQL code embedded in buttons. It was used to perform SQL queries (through CL/1) of a DEC database at the recent Dexpo East conference.

Apple is also about to release MacAPPC, which is its implementation of IBM's LU 6.2 protocol for program-to-program communications. APPC was developed to allow program-level communications across various operating systems, and it has now been widely accepted by the vendor community. MacAPPC will be a co-processor with a HyperCard front end.

Apple also says that it will release the complete HyperCard source code to developers, so that they can build their own interfaces to other applications and hardware. Other HyperCard tools are also in the pipeline, including a serial communications product.

These front-ends, peripherals and communications products are going to change the way we use our computers – initially in the corporate environment, and later for everyone. We are very quickly moving towards a Macintosh world where a LAN user won't know whether the information requested is coming from a local-hard disk, the LANs file-server, a distant optical disk on an internet, or a remote on-line mainframe. It will all be just 'information' delivered to you via your favourite Mac program, in exactly the same way as it does when you access your phone list The trade-name, size, location and distance of the source hardware, will be of no interest or importance. □



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YOUR APPLE

The GS comes of age

The recent Applefest in the United States had good news for Apple II enthusiasts; at long last Apple Computer seems to have rediscovered a corporate commitment to promoting and developing the Apple II line. Well . . . at least this is the rhetoric . . . and maybe we can detect some signs of substance.

Internationally, the GS now appears to be making substantial inroads on the installed base of Apple IIe and II+ machines around. In the States the GS is outselling the IIe by a substantial margin – although this hasn't happened yet in Australia, probably because of the price difference.

Apple has now opened up its private bulletin board system, Applelink, to the Apple-using public . . . almost!

What they've done is to install a parallel system called Applelink Personal Edition, which sounds like an Apple-only version of *Byte's* BIX bulletin/conferencing system with a lot of CompuServe and The Source added in.

It costs US Apple enthusiasts $30 per year, plus $6 per hour connect time to go on the system – but if you want to use it from Australia you'll have to add to that the cost of OTC's Data Access packet-switching service which will hike the price somewhat.

I haven't had a chance to use the system at the time of writing, but apparently it is based on the 'room' metaphor where you can set up 'conference rooms' or special 'discussion rooms' within the network for closed or open conferences about computer-related topics. It also has a mail service, airline schedules, stock-market reports, on-line shopping, program downloading facilities, and an Apple 'magazine'.

The conference side of the system will be run by Apple, and you will be able to directly connect to Apple's customer relations staff. Apple say that you'll usually get an answer to queries within 24 hours. The general service station section with chat board, mail, information, shopping and so on will be run for Apple by Quantum Computer Services.

You can prepare your messages on-line or off-line, and if you want to create a discussion-group, you can set up a 'room' and invite participants in. Apple is also providing a 'key-speech' service where the text of any important speech (I assume on Apple topics) is added to the system immediately, so if you can't get to hear Woz speaking in Texas on the Friday, you can read what he said by Friday night.

There's a disk of special communications software for the system which lets you select, high-light, or ignore messages from different participants as well as automate most of the log on procedures. The idea of allowing us to be able to make bulletin-board-bores invisible is a stroke of genius.

At present Apple has only released this special communications software for the Apple II series – the Mac version isn't due for about six months! You can read this in two ways: either it is the result of a special effort to provide services for the II series, or the Mac fraternity at Apple think bulletin boards are low priority for their customers.

In the States the GS is outselling the IIe by a substantial margin – although this hasn't happened yet in Australia, probably because of the price difference.

Education sales

In Australia the sales of the GS are about to be boosted by the machine's inclusion in the NSW Department of Education's contract list which makes them eligible for purchase by schools. Education is traditionally a price-sensitive market where the IIe reigns supreme, but schools in the States are now purchasing more GS than IIe machines.

Part of the success of the GS in schools appears to follow the increasing use of LocalTalk (AppleTalk) in classrooms, with greater emphasis on the need to share some of the new expensive peripherals – like laser printers and CD-ROM.

The significance of this expansion in education usage, for private users, lies in the development of new software. Ninety percent of all software sales are made to computer purchasers in their first year of ownership, so GS sales means that there will be a corresponding shift in emphasis to GS programs running under Prodos 16. This is the first year where the GS has dominated the software market; until now software houses have written mainly for the 8-bit market and added a few super-hires flourishes for the GS at best.

Apple GS owners already have a number of goodies in the pipeline. Styleware are about to release GS/Works, which is a poke in the eye with a sharp stick for Apple/Claris who have been decidedly sluggish in developing a 16-bit version of AppleWorks themselves.

The program should be available through Imagineering about the time you read this. It has the standard AppleWorks-like word processor, database and spreadsheet (all with expanded capabilities) plus graphics, communications and built-in macros. Beagle Bros. are never going to forgive them.

All this is in colour, of course, and from the reports, the combination in GS/Works effectively gives you a desktop publishing (DTP) program which will handle Draw and Paint images as well as the standard integrated applications. Supposedly, it can import files from almost anywhere. If you've bought a recent copy of GS/Scribe, you'll be able to upgrade to GS/Works for under $100 (so the rumour says!).

Incidentally, if you are into DTP or graphics manipulation on a GS you should have a look at an Australian program called Graphic Tourer (from Techflow). It has just been sold to the States, and will be released under the name The Graphic Exchange – which is probably a better name since it is designed to allow you to rescale and reposition any Apple graphics. There will be an Apple/Mac version soon.

Apple is also about to release Version 4 0 of the Prodos 16 operating system for the GS (at the time of writing). It was designed originally to handle the introduction of CD-ROM where the present operating system severely limits the use of large files. Since CD-ROM traditionally holds 550 megabytes (and can hold up to 660 Mbytes), the old operating system was a problem.

Version 4.0 is much faster and has no partitioning requirements whatsoever; it can address 550 Mbytes. Apparently someone in a beta test site in the States is running a 90 Mbyte third-party hard disk as a single partition without trouble. □

SERVICES PAGE

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AD INDEX

Advance Peripherals 86,87
Ann Court Com. Serv. 98
Atlantis ..... OBC
Automation Ice Co. 50
Babani Books 113
Blue Chip 20
Choice Marketing 22
Computer Capital 6
Custom Made Software 61
Computer Trader 72,107
Dick Smith Electronics 126,127
Discware 10,11
Electronic Solutions 94,95
Freesoft Int'l 27
Ideal Systems 121
Imprint 76,137
Infomagic ..... IFC
Inform 12
Inspek 102
Interface Publications 112
Mace 27
Maestro 45
Mannacomm 85
Marketworld 18
MicroDOS 122
Microeducational 34,35
Microgram 83
Micromart 18
Microsales 70,71
Microways 108
Multiview 89
NEC 9
PC Extras 3
Peripheral Systems ..... IBC
Perfect Interface 3,38,145
PC Accessories 105
Ribbon Rolls & Printers 76
Ritronics 78,79
Software Express 64,141
Sony 114,115
The Computer Factory 55,124
Utilico 98
Wilbroprint 129
Vapourware 28

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MICHAEL BURLACE

CURSORY GLANCE

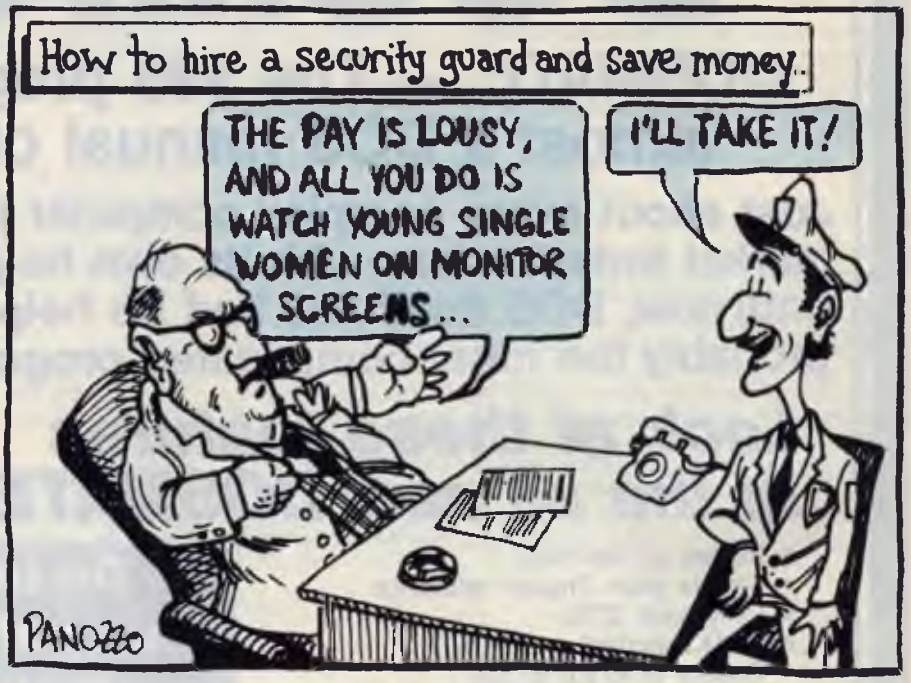
I had a call from Keith, a wheat and sheep farmer, who wanted to buy a computer to give his son a better education. Keith runs 3000 hectares which is quite a big business by anyone's standards. He has no computers. I suggested he might look at one for the farm which his son could also use. Since he was just starting out in the field (so to speak), I warned him he needed to watch out for vapourware. Because that made no sense, I suggested it came out the back of a bull down his way. Point made. So I thought I'd throw my other favourite computer joke his way (no, neither was invented by me, I just like them). I asked if he knew the difference between a used tractor salesperson and a new computer salesperson. The answer of course is that the former *knows* when he or she is lying to you.

- One of my clients with an IBM compatible wants a driving simulator program. Does anyone know of a good one –suitable for improving driving skills rather than just playing games? Presumably it would come with something like a steering wheel and the appropriate pedals.

- Paperless office? That will be the day. I've yet to meet anyone who has reduced their paper consumption significantly since introducing a computer. Not only do we consume more paper in the printer, we buy more books, manuals, magazines and papers. No wonder having a computer takes back half the time it saves – it's all that reading.

- Robots are being sold to gyms to take people for exercise sessions. Some are basically just scales which weigh people and talk to the person about their weight gain or loss and make allowances within certain ranges at certain times of the week. Others are more like your typical instructor, out the front leading the group. Still others work on an individual basis. They structure the regime to suit the person and then lead them in exercises.

Each robot is endowed with a 'personality' ranging from sedate to quite flirtatious. Given the stereotype of the gym instructor as being fit, strong and attractive for many of the participants, where does that leave the robots? Perhaps we are heading for the ultimate extension of technology into computer dating – instead of being lined up for a date by a computer, you will find yourself lined up with a computer.



- The real meaning of screen – a device to keep the bugs in your computer.

- Microcomputers are supposed to be breaking down power structures such as the ones set up by owners of mainframe computers and by the head of the computer department. In this way, the micro is allegedly freeing people. The price of this freedom is that the people must respond in rigid ways laid down by the authors of the operating systems and the software as well as those user-hostile people, the hardware designers.

- In the last few years it has become compulsory for cars to have wipers and washers on the tailgates and on headlights. If only Volvo would go into the desktop computer business, I could skip cleaning my computer screen.

Bootstrap

A Melbourne firm completed excellent new pattern-recognition software recently after four years in the incubator. It is so advanced that it can recognise skin types, facial shapes, body shapes and hairstyles. The program is a world-beater but the company is keeping a low profile in their home town and have sought no publicity. They have sold the USA rights to a Californian company called Dateline. They expect to sell the European and Japanese rights later this year and will then go public about their identity. No doubt they will also launch it in Australia then.

Dateline is using it with its video system to scan residents in a 2000-person singles-only apartment complex near Hollywood. The video system is used for security purposes but some bright spark thought up an extension of its capabilities. Dateline is feeding video images into Meetmatch, the pattern-recognition software and taking the sorted output from that into a database program which has criteria from each of the other residents in the complex. The result is a list of possible partners. The list is then passed to an artificial intelligence program which finds the best possible match of personality types. The final stage is meeting in person.

The system is working so well that prices of the apartments have gone through the roof. Not only that, but many of them come on the market because single people couple with other singles on a more permanent basis and therefore have to move out. □

Michael Burlace is a consultant and trainer with The Clear Group. He may be contacted on (02) 317 5190 or by writing to PO Box 57, Broadway 2007.

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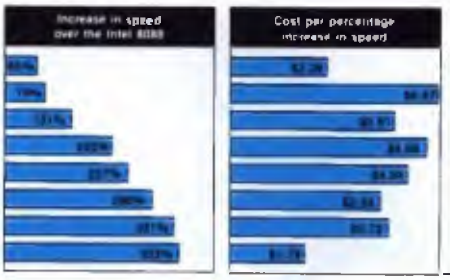
- ☐ **Breakthru 286-12**



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We are excited about our three speedup products. You probably know about our Lightning disk access speedup software that was awarded PC Magazine's Best of 1986 award (see box). After the smashing success of Lightning, in late '86, we guaranteed the Breakthru 286 board to be literally the most advanced, fastest, most feature-rich board available. The runaway success it has enjoyed truly proved that assertion. Now we go ourselves one better with the Breakthru 286-12. This new board has the clock speed cranked up from 8 to 12 MHz for speeds up to 10.2 times faster than an IBM PC. It is 50% faster than an 8MHz IBM AT, and up to a whopping 1,000% faster than a regular PC.

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PC MAGAZINE BEST OF 1986

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