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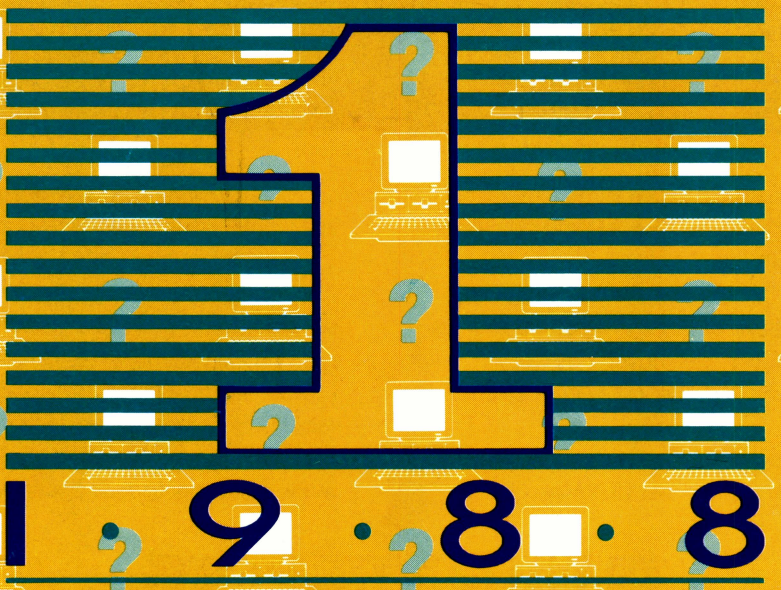

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NEXT MONTH INCLUDES

Finding where to buy a computer is easy ... but what about the bits and pieces, like a diskette filer or a mini patch box? Getting down to business – Steve Keen continues his Business Speciality Software Survey with a closer look at four of the more interesting packages (including a powerful new data base). Then a reader tells of his search for a 'computer-based newsagency' system.

If your business is on the move, what about a hand held computer to take along? From simple diarys and data collectors to spreadsheets in your pocket, we check out the latest offerings. And you'll need a simple invoicing (and customer tracking) system to keep on top of all that business. Just to finish off, Tim Hartnell helps us all towards the end of the world.

Business Speciality Software

The spreadsheet, word processor and database are the 1980s' equivalents of the calculator, pen and filing cabinet. They have become the new office essentials – but it is a very peculiar business which can survive on the essentials alone. For most professions and industries there are particular functions which software's ruling triumvirate simply can't provide.

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Not so friendly!

WHEN NEWS reached us of Apple's law suit against Hewlett-Packard and Microsoft (which attacks both Windows and H-P's new product New Wave as illegal copies of the Macintosh interface) my first reaction was disbelief. Surely Apple didn't believe H-P, Microsoft and IBM (whose OS/2 Presentation Manager is, by implication, also under a cloud) would roll over the way an embattled Digital Research was forced to when Apple sent its lawyers to challenge the GEM environment?

My second reaction was a strong desire to withdraw Apple's Personal Computer of the Year award. Yes, I was serious – I questioned the value in presenting an award for 'advancing the state of the art' to a company which would use such immoral tactics to prevent advancement on an industry-wide scale.

After much deliberation – and a 'calming down' period – I came to recognise a distinction between Apple's engineering and design efforts and commercial considerations like protecting its 'intellectual property'.

And that led to my third reaction, disgust. Hell, it *isn't* Apple's at all! Mac dealers would have you believe Apple invented the mouse, the WIMP (windows, icons, mouse, pull-down menus) interface, desktop publishing, and anything else that's good in the world. Okay, maybe the dealers don't know any better, but Apple certainly does.

The interface popularised by the Mac came from Xerox Parc (Palo Alto Research Centre), as did the mouse. The Xerox Star used the 'Mac interface' well before Apple came up with 'the innovative audiovisual display developed by Apple which makes the Macintosh unique and distinctive'. If Apple knows better, it isn't telling – those words are taken directly from its suit. Developed by Apple, indeed!

At the time of writing, Apple still hasn't answered my questions about who originated the interface. I asked whether Apple perhaps 'bought' ownership by paying Xerox a licencing fee, the only justification I can think of for the 'developed by Apple' claim and for another statement contained in the suit: 'At all times, Apple has been and is the sole owner of all rights, title and interest in the works in suit'.

There's also the claim the Mac interface, and programs built around it, 'substantially consists of material wholly original with Apple'.

Apple says it has 'expended millions of dollars and years of creative effort in the development of artistic, aesthetically pleasing visual displays and graphic images that enhance the value and commercial appeal of Apple's products'.

Maybe so, but that doesn't give it exclusive ownership of WIMP technology. Perhaps H-P's New Wave is a very close copy of the Mac (we don't know, as we haven't seen it yet), but Apple's claim against Microsoft, that Windows 2.03 infringes the Mac copyrights, is ludicrous. Windows 2.03 doesn't use Mac-like icons, and it doesn't use Mac-like menus (actually, we think the new menu operation in Windows is better than the Mac – maybe Apple is jealous?). That leaves the mouse and the windows, and if Apple wants to tell us it owns those I'm keen to hear its story.

Perhaps the problem is Apple sees itself losing its grip on the 'user-friendly' market? After being so far ahead, is it panicking at the sight of the opposition's efforts to catch up? Perhaps Apple is incapable of advancing the state of the art any further, and this is a feeble attempt to keep the others one step behind rather than meeting the challenge the normal way, by staying one step ahead.

Not likely, I imagine, but you could find more elements of truth in there than Apple would like to admit to . . .

My final reaction to the Apple suit is one of qualified delight. Qualified because, if successful, it could stand in the way of much-needed development in user interfaces; delight because Apple has finally taken on someone big enough to fight back, which may help settle the matter conclusively (and hopefully for the good of personal computing).

The whole 'look and feel' copyright issue needs to be kicked to death, or at least given a dose of realism. With any luck Microsoft and H-P will play a part in that – I really do hope they play hard.

MATT WHELAN

American Graffiti

Sure, sure, everyone gets excited about the Computer of the Year. Parties, magazine covers, TV and newspaper stories – all that stuff. But what about the supporting players, those insufficiently sung products crucial to supporting Computers of the Year? I'm talking mundane stuff here, things like printer paper and cable gender adapters, screwdrivers, chip pullers, Kambrooks – and, of course, some of the things that keep us users at peak condition. These things never get the recognition they deserve, but without them, there'd be no Computer of the Year.

An excellent example is that quintessential tool for the adventurous computer user: the chip puller. If you've ever tried to use a substitute – a straightened wire coat hanger, say – you know how difficult it can be. Once, in a hurry to remove a chip, and lacking proper tools, my friend Benny tried to use the only hardware he had available – a funny-looking set of tongs to hold the chip, and a tiny fork to lever it out of the socket.

Both items were normally used for eating escargot. Poor Benny ruined a $162 chip. The whole affair so traumatized him that every time thereafter he tried to look an escargot in the eye, he lost his appetite. (But I digress.) The problem is, without a proper chip puller, you can never get both ends to move up together; once you've pried it out of the socket, it looks more like some kind of ugly square bug with bright, tangled legs. Bugs belong in software, I say, and not on desks.

And while we're at it, let's not forget the screwdriver. The ubiquity of PCs in modern life has meant that lots of businessfolk who once dressed impeccably (and who may have mocked engineers for their plastic pocket protectors), now walk around with screwdrivers in their pockets, ready for any conceivable PC situation. (Note, too, what those clever folks at IBM – normally, paragons of sartorial correctness – have done in the PS/2 to correct this situation: a screwdriver is needed only to remove the cover from the PS/2s. Here's something I wonder about: say you're a rising young IBMer, and you're seen walking around with a screwdriver in your pocket – or purse. Would that be held against you at salary review time?)

Long ago, the concept 'Software sells hardware' became a visceral part of every IBMer's life.

Seemingly ordinary expendables are important, too. Like write protect tabs: here's a totally dull product, given away free with floppy disks, whose functions can be easily duplicated by a piece of sticky tape – and yet, they protect data that can be priceless. And think about this: hard disks, despite all their speed and sophistication, still have no comparable protection mechanism!

(Digression: I once helped my friend Marsha select and install a hard disk. She's good at what she does, but a technophobe and a dummy about anything that requires electricity. Shortly after she began using the disk, she called me, sounding perplexed: 'I looked all through the packaging, but there weren't any write-protect tabs anywhere. Can I buy them separately at my neighbourhood computer store? Are there special tabs for a hard disk? And do I have to remove the cover of my machine every time I want to write-protect the disk?'

Ever since then, whenever I send out a floppy disk to anyone, I always try to make it especially difficult for someone to remove the tab and erase the disk. Maybe I know some really dumb people, because one or two have managed to inadvertently destroy data nevertheless!)

Shareware, too, is an extremely important supporter of the Computer of the Year. Long ago, the concept 'Software sells hardware' became a visceral part of every IBMer's life. If anyone out there doesn't believe that, let me tell you, folks, it's true. Boy, is it true.

Here's a first-hand example: To create a database I needed, I decided to use the widely-known shareware product called PC-File, from Buttonware. Buttonware told me that its older version (which I had on hand, and had played with) would not do what I wanted, but that the latest version, PC-File Plus, would, so I ordered it. When it arrived, I found that it needed 384K, when all I had was 320K.

An additional memory board on my system would eat up another slot, which I was saving for a special use, so I decided to replace my current memory board – fully populated with 256K – with a multifunction board that could carry up to 578K. That would also free up an additional slot.

The bottom line to this story is that I saved probably around $150 by using shareware for my database – and spent $230 for the multifunction board! You bet your XXXXX that software sells hardware!

One of the most important products supporting all Computer Products of the Year is that well-known, widely-abused legal drug that fuels so many of us, caffein. Probably no commercial hardware or software would ever reach the market without caffein to sustain occasional all-nighters by engineers, designers, and programmers. Not to mention the way the rest of us abuse caffein when we're working processing words or crunching numbers or working the bulletin boards!

(And while I'm on this subject, what about the items like a Mini-Vac and blotting paper and the bent paper clips I use to keep my keyboard in working order? Without them, my 'computer of the year' would merely be the paperweight of the year.)

All of this leads me to one inescapable conclusion: a lot of businesses that we don't ordinarily associate with computers are clearly missing some good opportunities. If they were as smart as they like to think, it's these businesses that would work their heads off to promote the Computer of the Year. Paper manufacturers, for instance. Remember that stuff, so long ago, about the paperless office? If you've looked at shares prices and annual reports of paper manufacturers lately, you know they must be doubled over in laughter at some of the silly stuff the computer folk are saying. With all their products – envelopes for floppies, paper to print manuals, labels for diskettes, mailers for floppies – it's obvious that for them, the computer's been the best invention since the flush toilet. □

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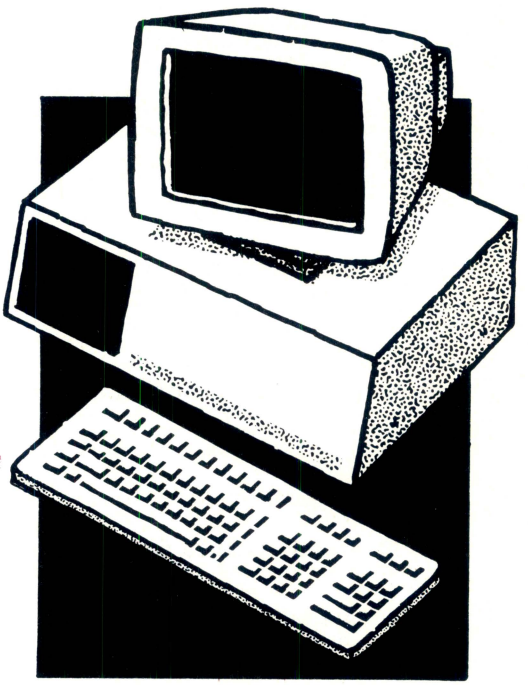

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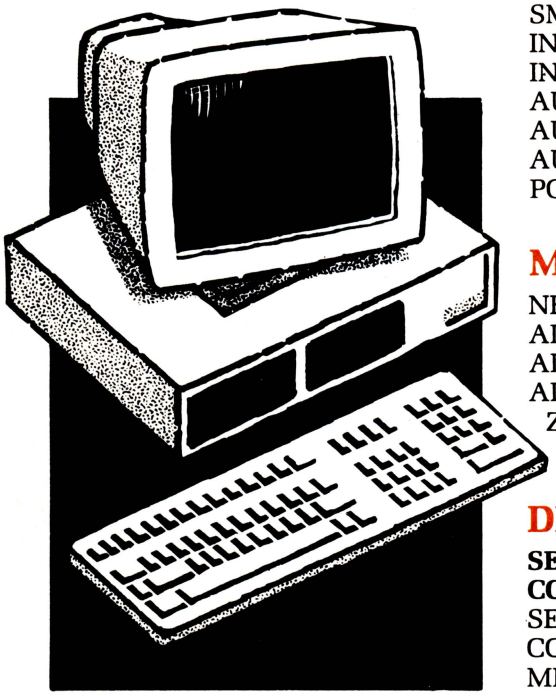

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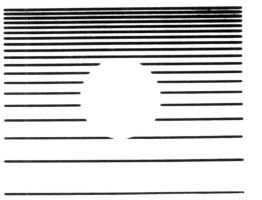

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CANBERRA COMMENT

Apples for the mind

PC Tech at the Australian National University (ANU) forms part of the Apple University Consortium in Australia. The managing director of PC Tech is John Morphett. The Australian Apple Consortium grew out of a similar arrangement in the US where Apple persuaded a number of Ivy League universities to make special arrangements for selling Apples on campus. The US consortium was successful in getting academics and students on to Macintoshes.

PC Tech is a registered company set up within the university. It distributes hardware, software and computer books to ACT tertiary institutions including the Defence Force Academy, the ANU, The Canberra College of Advanced Education and the ACT TAFE Institute. Apple Macintoshes were the initial choice with other computers now available. PC Tech also joined Education Marketing Affiliates (EMA), the education division of IBM. As well, they market the Ultra PC from Imagineering and PCS computers. Any student or lecturer from the universities or colleges can buy a computer from PC Tech at less than retail price. They simply need a letter of authority saying they belong to one of the tertiary institutions.

According to Jennifer Barreda, the manager of PC Tech, the Apple Macintosh is popular with staff and students at the ANU. Barreda and Morphett both believe this is because the Mac is so user friendly for first time computer owners. In teaching and desktop publishing (DTP) the ANU staff have taken enthusiastically to the Mac.

Morphett says that when combined with a laser printer, the Mac gives academics direct control over their publishing. They see how the pages will finally appear and to them this is a great advantage. Jennifer Barreda believes DTP is far easier to learn on a Mac than with DOS systems. The other appealing feature is the Mac's portability. It is easy to lug around, take home or carry on field trips. When asked whether the small size of the Mac screen was a disadvantage Barreda thought it made little difference because the resolution was so good.

The Macintosh also shines with scientific notation. According to Morphett the ANU science and maths people have chosen to use the Mac because mathematical typing is virtually impossible on MS-DOS machines.

In discussing the Mac II with its larger screen and higher power, Barreda thought its big strength would be as a graphics work station. Turning to IBM and its OS/2 release this year, Morphett said education institutions with IBM will take a long time to switch over to OS/2. He believes they have too much invested in their present IBM systems and the advantages of switching just aren't that great.

Any student or lecturer from the universities or colleges can buy a computer from PC Tech at less than retail price.

First academic computer buyers often opt for Apple because of the confusing array of MS-DOS machines Morphett says. Barreda added that there are too many MS-DOS computers on the market and too many horror stories about bad clones. Also she said DOS systems take too long to learn and there are too many versions.

PC Tech also sells Apple printers for its Macintosh range, although Brother printers will now run from a Mac as well. Because DOS computers are number based while Macs are graphics based, some printers need an interface to run off Apples. The big news from Apple is its new Personal Laser Writer printer which Barreda thought PC Tech might sell for around $3,500. Naturally the retail price would be more. One disadvantage with the new Personal Laser printers is the economy model only runs from a Macintosh. More expensive versions can run off other computers.

Both Morphett and Barreda stressed that PC Tech was not just a university marketing company selling affordable computers. It also encouraged software development. Details about software development were published regularly in 'Wings For The Mind', an Apple Consortium magazine which is distributed in the major Australian universities and some of the technology institutes.

Macforth is an example of software developed through the consortium. It is a software program written by Neville Smythe from the mathematics department at the ANU. Generally, academic software is slower getting off the ground because software companies do not realise the extent of the market. There are, for instance, over 250 tertiary institutions in Australia.

Computers at Office Expo

Some new ideas in computer technology were unveiled recently at Canberra's annual Office Expo. Intermec had on show its computer linked file tracking system. This system, already purchased by the Commonwealth Bank, uses bar codes to keep track of files. The bank has some 100,000 files of which 20,000 have so far been coded into Intermec's system.

The Commodore Amiga people had on display the Neriki Image master Pro-Genlock which is a powerful video graphics tool. When attached to the Amiga 500, 1000 or 2000 it can produce professional standard video images. Other new Amiga items on show were business software packages. These included Word Perfect and the Australian designed accounting package, Best. According to sources at the Expo, the Amiga 500 is now popular with schools in South Australia, Victoria and Queensland. Teachers are now being given special offers on the Amiga 500 – something Apple pioneered years ago.

The Kurzweil voice controlled word processing system drew many Expo spectators. Speaking directly to the computer, the user can create memos, letters, reports and quotations. The system incorporates a 20,000 word vocabulary. This is linked to an IBM compatible PC with extra attachments including a 1,000 word command vocabulary.

Also on display was a handy computer phone system. Called Auto Dial it can hold between 400 and 4,000 names and phone numbers. It is useful for replacing card file indexes because all the details for the person being called pop up on the

IBM and Apple Mac owners

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screen when the computer dials the number. The system is accessible in the middle of other screen work.

Megavision showed a new graphics adaptor for IBM PS/2 models 50, 60 and 80. The adaptor gives a high-resolution 1280 *x* 960 pixel resolution on a 19 inch paper white monitor. The screen has an optical filter reducing reflection while improving contrast. These jumbo size monitors are now available for all IBM, plus the Apple Macintosh SE and II series. StarCard Australia showed a neat package which changes an IBM PC into a super fax machine. Called the StarCard Non-Stop Fax, it will not stop regular use of the computer when faxes are sent or received. The Department of Administrative Services in Canberra has bought the StarCard Fax system which allows faxes from departmental contractors to be checked on screen, then stored on hard disc. Replies can also go out immediately.

IBM showed its entire range of locally made PS/2 models. Also on display was a convertible model with a rechargeable battery pack and 90 mm disk drive.

The only Australian laser printer maker, Impact Systems, showed just what its new printers could do. The L2000, a high speed model turns out 20 pages a minute. Smaller Impact models print 15 or 8 pages a minute. Canberra computer dealer CES Computers, was given the Hewlett-Packard ACT Dealer of the Year Award. The Award was for outstanding achievement in computer sales and customer relations. CES has over 600 systems installed in the ACT – its users include John Hindmarsh Constructions, the New Parliament House contractors, The National Parks and Wildlife Service and stockbrokers Bain and Co.

Virus alive and well

The dreaded virus code is in Canberra. Members at a recent Amiga Users Group meeting were told how the virus strikes, randomly ruining programs. The virus copies itself from disk to disk so when users swap disks the virus goes too.

Buying commercial programs is not the answer, as one Amiga owner found when he had his Marauder II disk updated at a local computer store. It caught the virus from the store.

The virus may not appear with its cheery message until you use a program for the fortieth or fiftieth time, according to users struck down already. Other owners have found viruses on disks after they bought used equipment.

Fortunately, there are now one or two disks which will test any program, tell you if it has the virus, then kill it off. The only way a virus can continue to spread is when users do not check disks before passing them on to friends.

What do users think?

A recent survey of federal, state and local government departments at all levels asked how computers had changed their organisations. Some of the answers were surprising.

Organisational problems mentioned included computer systems which had far more capability than was being used. Also, bureaucratic directives on staff ceilings meant expensive computer systems were being stifled through insufficient people to run them properly.

The annual government budgeting problem where money is earmarked for one area only and must be spent within a financial year causes odd decisions. For instance, an education institution was given nearly half a million dollars to computerise its library. There was then no money for a line to link the library with computers in other education libraries. The valuable link was simply overlooked in the budget.

Within service organisations there was conflict over tasks for the computers. Some people wanted the computers for day to day running of an organisation while others demanded it for office administration. These different priorities also caused fights over the size and type of systems installed.

Sometimes a change of government resulted in short term political decisions. This led, occasionally, to complete systems being dismantled.

Many managers learnt a new computer does not necessarily affect only one work area. The effects were much wider. Word processing was one example where productivity increases varied widely, even within the same department. This was often because of the manual mentality of users who applied old techniques to new computers.

The survey mentioned other problems including rapid obsolescence of equipment, a lack of flexibility with software and a reluctance to change to office automation because computer salespersons' claims were not believed.

Some users thought only the executives in their organisation needed computer. Others thought computers should be used like the telephone with everyone having access.

Many organisations saw a 'them' and 'us' attitude between technical staff with as programmers, analysts, DP managers on one side and the users on the other. □

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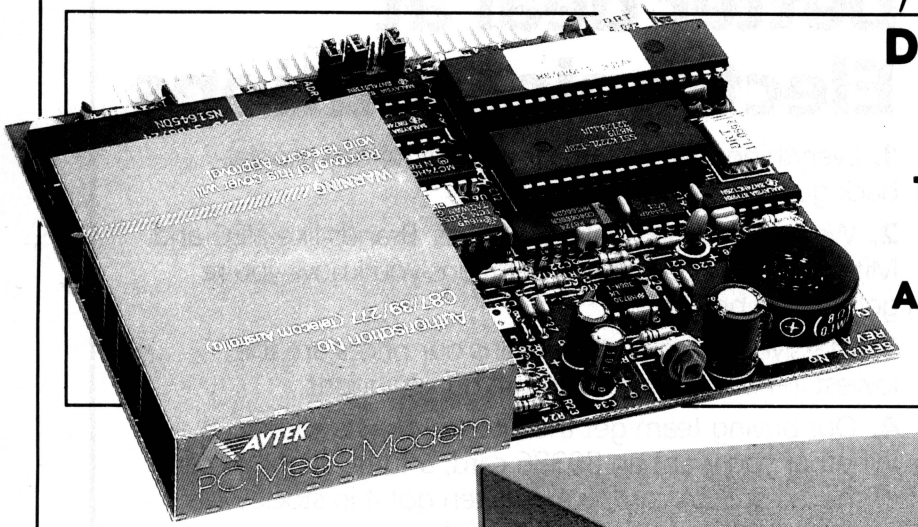

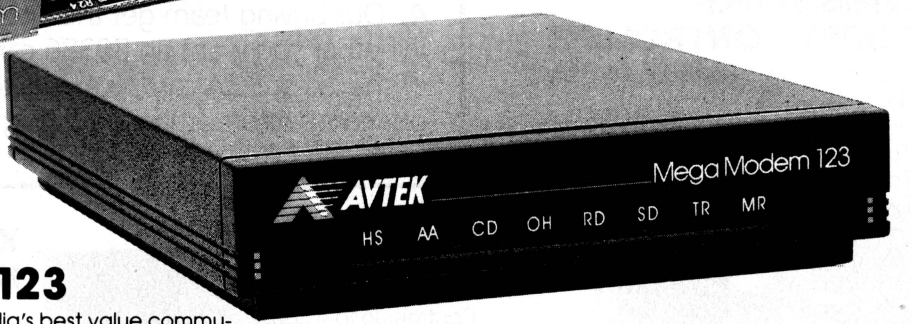

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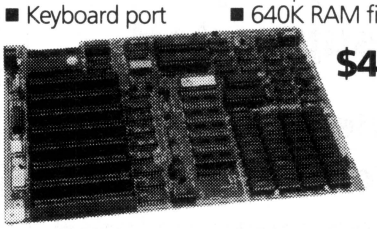

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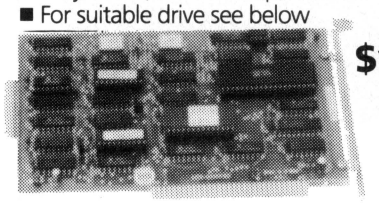

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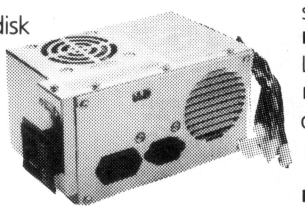

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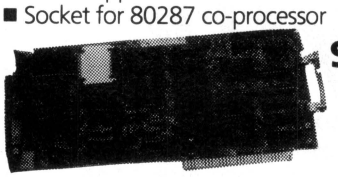

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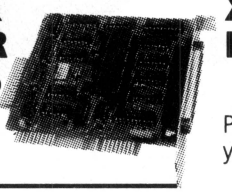

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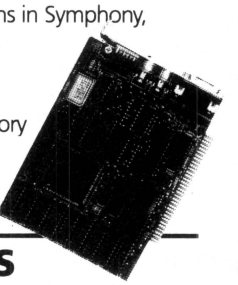

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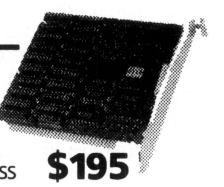

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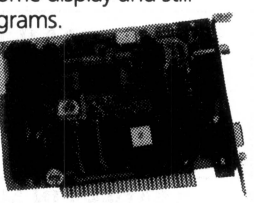

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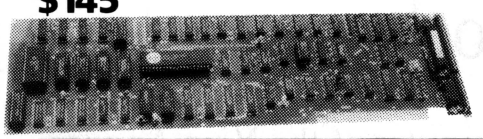

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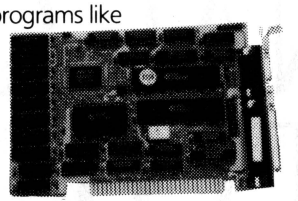

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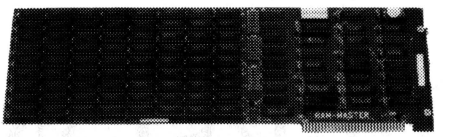

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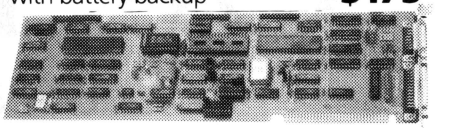
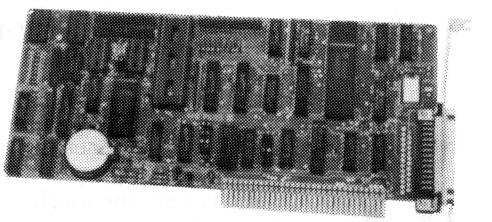


I/O Plus Card

- Clock calendar with battery backup
- 1 serial port, 1 parallel port, 1 joystick port

$136



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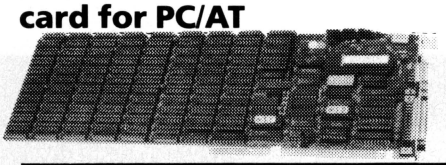

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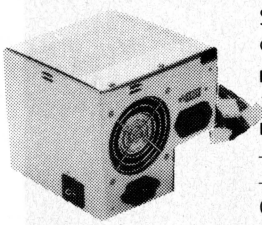

Suits all IBM PC/AT compatibles.

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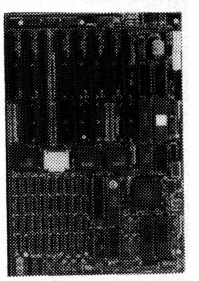
- Cooling fan stops when voltage output falls to zero
- Top quality components used throughout

10MHz Baby AT Motherboard



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Baby AT Case

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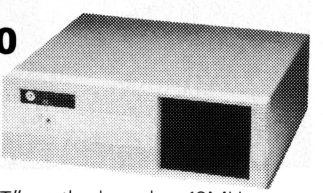

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PERSONAL COMPUTER OF THE YEAR

Breaking the deadlocks

The smallest shortlist in the history of the Personal Computer of the Year Awards may also have been the best: three of the five contenders were deadlocked in a battle for victory right up until the last minute of judging.

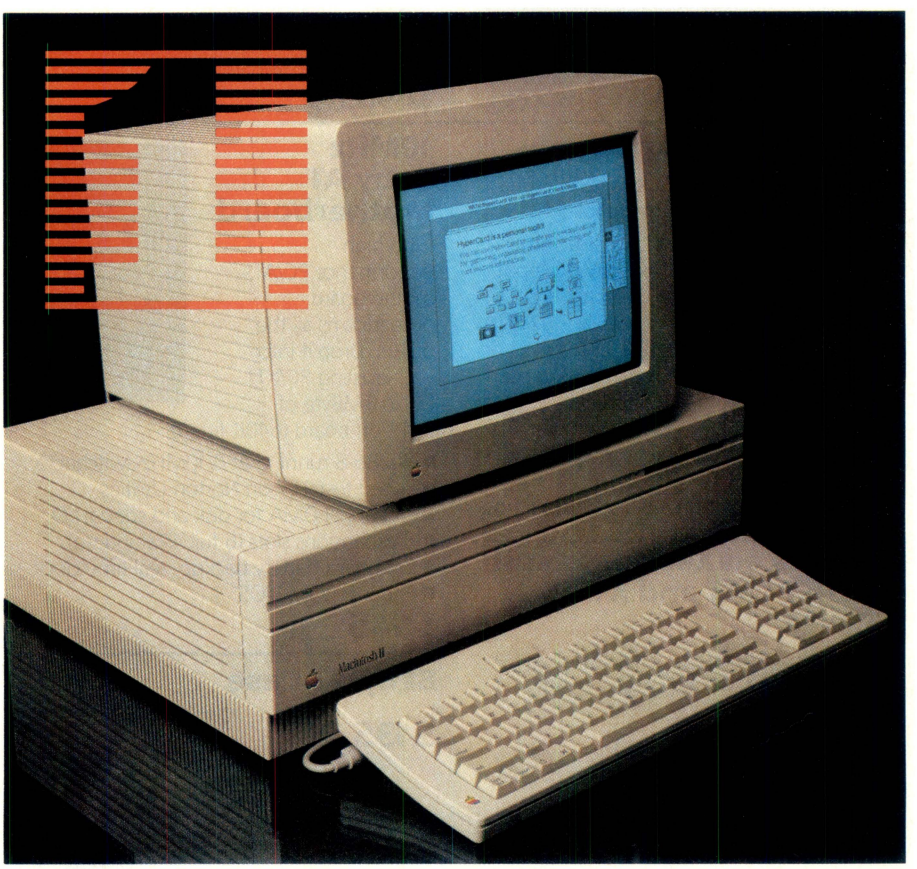
WHILE CHOOSING a winner has never been easy, this year's deliberations were the toughest on record, both in hardware and software. And the crowns – Personal Computer of the Year, claimed by Apple for the Macintosh II, and Software Product of the Year, won by Xerox for Ventura Publisher – can only be considered all the more impressive for the intensity of the competition.

Remember us mentioning the near-panic around the office when we first sat down to analyse the contenders for PC of the Year this time around? While the quality of the potential finalists wasn't in question, the quantity was well down on previous years.

We asked ourselves whether there really were that few top-notch machines launched in the past calendar year, or whether there was 'just one more brilliant design' that might have slipped our minds – as if we didn't have enough problems already in choosing among the machines on our short list!

The answer was simple: yes, there *was* only a handful of notable releases. But the time spent thinking about other potential challengers would have been better devoted to the judging of what we had, because that turned out to be tougher than a 10-way contest.

Our five finalists were: Acorn's Archimedes, Apple's Macintosh II, Compaq's Portable 386, IBM's PS/2 series, and



Personal Computer of the Year: The Macintosh II from Apple. The Mac II revives the power and promise of the Lisa, combines it with the advances in Macintosh software, and extends it with an open architecture that opens a whole new horizon.

Toshiba's T5100. As usual, we attempted a process of elimination. It didn't get us very far this time.

We were able to eliminate the portables because they were great implementations of the 1987 and 1985 award-winning concepts, but as such weren't breaking any new ground – yet even that decision was difficult.

The Compaq and the Toshiba are, after all, brilliant machines, more likely purchase choices for 'travelling judges' like Matt Whelan than any of the other finalists. But in the final analysis they weren't 'new and better', just better.

Surprisingly (to us anyway) we liked the Toshiba more than the Compaq. Even though both need mains power, the laptop design feels better - more portable – than Compaq's 'lunchbox'. The Compaq was slightly faster (though it was closer than expected) and had a better keyboard arrangement, but for 'real' mobile use we'd take the Toshiba every time.

State of the art

Eliminating the portables left us with three contenders, each of which fitted perfectly our award criteria – and each of which did it differently. All three clearly met our major concern, 'advancing the state of the art', but each presented a quite different view of the future of computing.

IBM's PS/2 series appeared to have the weight of the future behind it (if you'll forgive the expression) – new graphics standards and an advanced new bus from the company that by default sets personal computing standards must, for the time being at least, define the future of PCs.

But is IBM's Micro Channel such an advance? It isn't really used yet, and won't be for some time. Is it a promise of a wondrous future, or just a fix for the pains of the past? While its superiority over the existing AT bus is unquestioned, some of the major features touted as great leaps forward exist already in the humble old S100 bus we've been using for years, not to mention more advanced recent designs.

Supporting the features that tend to be over-rated by non-technical journalists are the 'hidden' ones IBM hasn't made much noise about. These 'sleepers' include the sound capabilities (which are clearly more likely to be employed for network voice traffic than to give you music while you work).

Clearly, Micro Channel wasn't to be discounted in our process of elimination. Either it was a winner, or the judges' problems were increasing . . .

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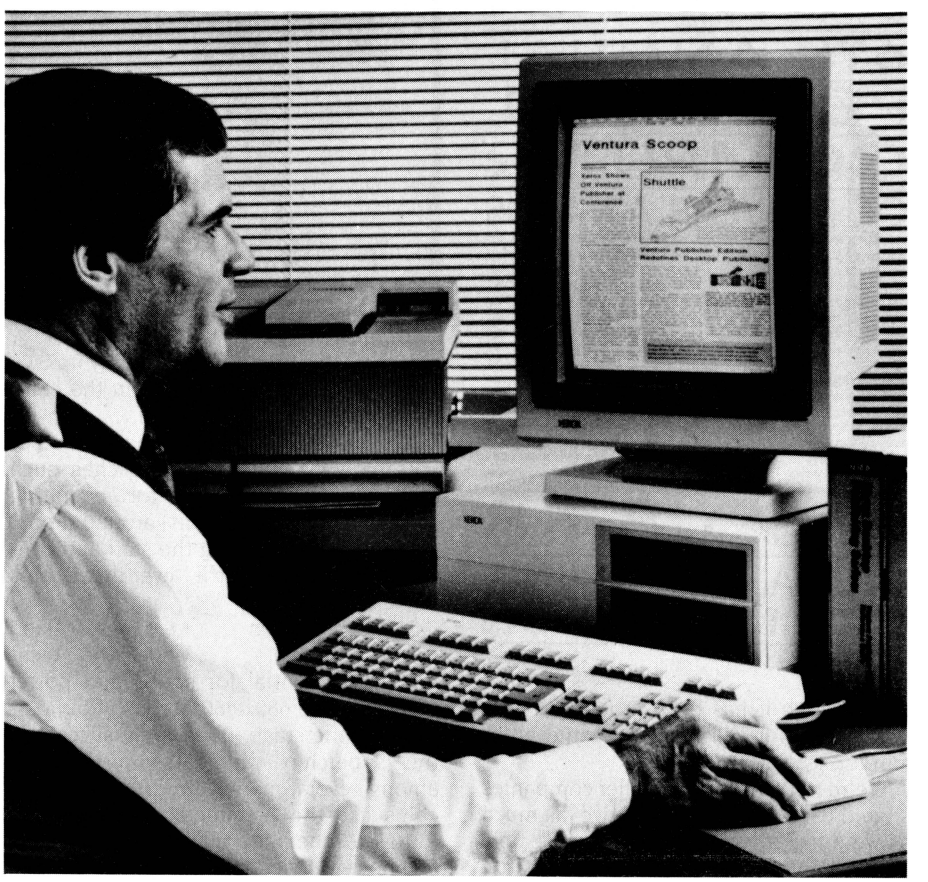
SOFTWARE PRODUCT
OF THE YEAR

We decided it was time to leave the IBM on the finalists' table for a minute and turn attention to the Acorn Archimedes: a quite different machine that experiments with one of the potential alternate paths for future computing – RISC technology.

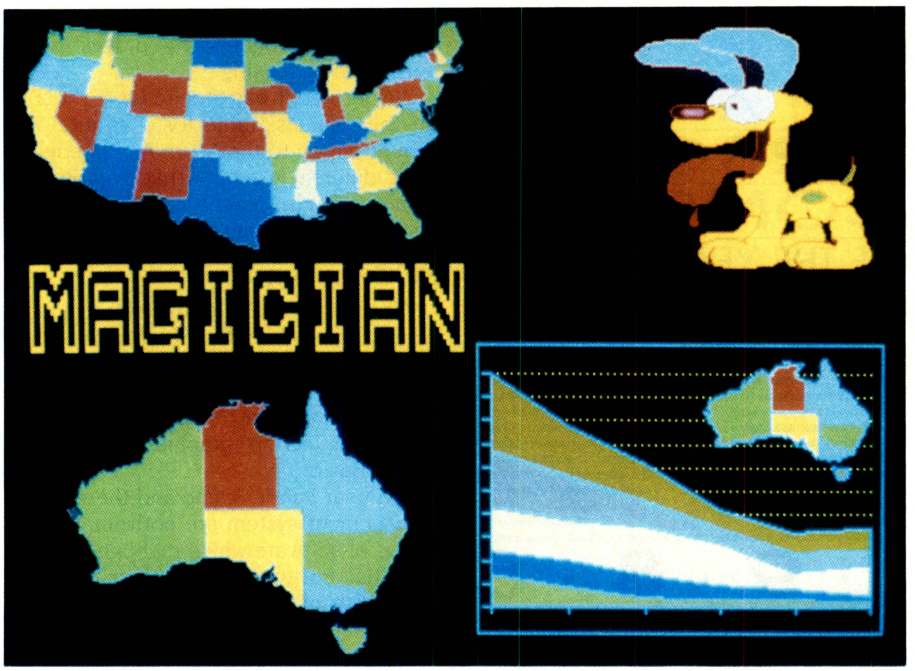
RISCy business

The use of a RISC (Reduced Instruction Set) chip (which the benchmarks claim gives it superior performance to the Compaq 386) has clear benefits, and obvious ones when you watch its handling of advanced 3D 'action' graphics under interpreted Basic.

Its Lunar Lander game and the window management system are both impressive pieces of software which highlight a great potential. But they also highlight a failing, one which plagues any attempt to innovate in hardware design: software support. The Archimedes still falls into the 'nice, but what can you do with it' category,



Software Product of the Year: Ventura Publisher from Xerox. Ventura's powerful features have changed the face of desktop publishing, itself a market that has changed the face of personal computing.



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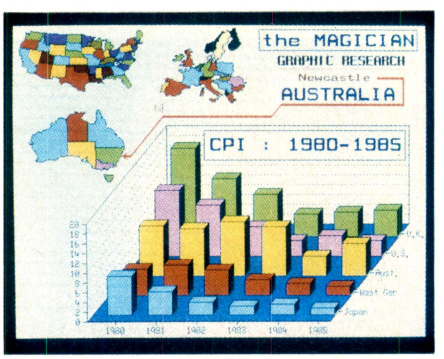
AUSTRALIAN SOFTWARE
COMMENDATION

even though it has been around for several months. It will have the same problem for several more.

We're not convinced smaller companies should even try to be innovative, as much as we'd like to encourage it – even Apple has had a tough enough time of its battle to stay in an IBM-dominated world.

Yes, we realise Acorn is no longer just a small company, but even as part of multi-



national Olivetti it will have to pay its own way. Within Olivetti, and within the computer industry, it's still small.

The future of RISC technology and other 'alternative processor' approaches such as the Transputer is great for generating arguments (er, discussions) around the YC office. Attitudes among the staff and contributors vary from 'it'll never fly' to 'this *is* the future'.

However, we tend to agree (sort of, kind of, sometimes) that while the technology's potential for speed and power may leave the 680x0/80x86 push floundering at some stage, it can only succeed if the superchip candidates are shared among several manufacturers. Proprietary chips like the Archimedes' ARM (Acorn RISC Machine) may only serve to delay the technology's victory.

If only we could have convinced each other of that we could have eliminated the Acorn at that point, but alas . . .

Dennis Redman earned the Australian Software Commendation for his Magician, a powerful integrated graphics package – in two years it's doubled in capability and halved in price (and now it's racking up successes both at home and overseas).

An Apple, too

Rounding out the three-way battle was yet another view of the future, Apple's Macintosh II. Apple was extremely annoyed with us at the 1985 awards when we called the Mac 'great fun, but nowhere near as advanced as the Lisa' before relegating it to the runner-up position. The company had hoped for a 'grand slam' after taking out the 1984 award with the Lisa.

We viewed the old Mac as something of a backward step, even if it did bring the Lisa's 'revolutionary' WIMP interface to the people. Built on a similar hardware platform, it lacked the Lisa's multi-tasking which so befitted the window-based interface. The Mac II revives the power and promise of the Lisa, combines it with the advances in Macintosh software, and extends it with an open architecture that opens a whole new horizon for Apple buyers.

It adds real power and usability to the Macintosh interface, which has finally been accepted by most as the 'way of the future' – even IBM will be 'cloning' it, to a degree, with Presentation Manager for OS/2.

There is no doubting that the Mac-style user-friendly operating system is the key to a computing future for everyone, rather than just the 'power user' or the 'pained stumbler'. Where the Mac was labelled by Apple 'the computer for the rest of us', the Mac II can be a computer for all of us.

The first 'open' Macintosh has an interesting mix of similarities and contrasts with the IBM PS/2 development. The most curious is that while Apple has opened up, IBM has, to a degree, done the reverse. Micro Channel was difficult to clone, and it's still not clear whether other manufacturers will legally be able to use it. Apple, on the other hand, has chosen a standard bus that seems to have all the benefits of Micro Channel.

The NuBus architecture provides similar features to the much-praised Micro Channel advances: it supports 8-, 16- or 32-bit data paths, is independent of the processor, and allows transfer of data between the logic board and add-in cards in large quantities, at high speed.

It uses an arbitration and geographical

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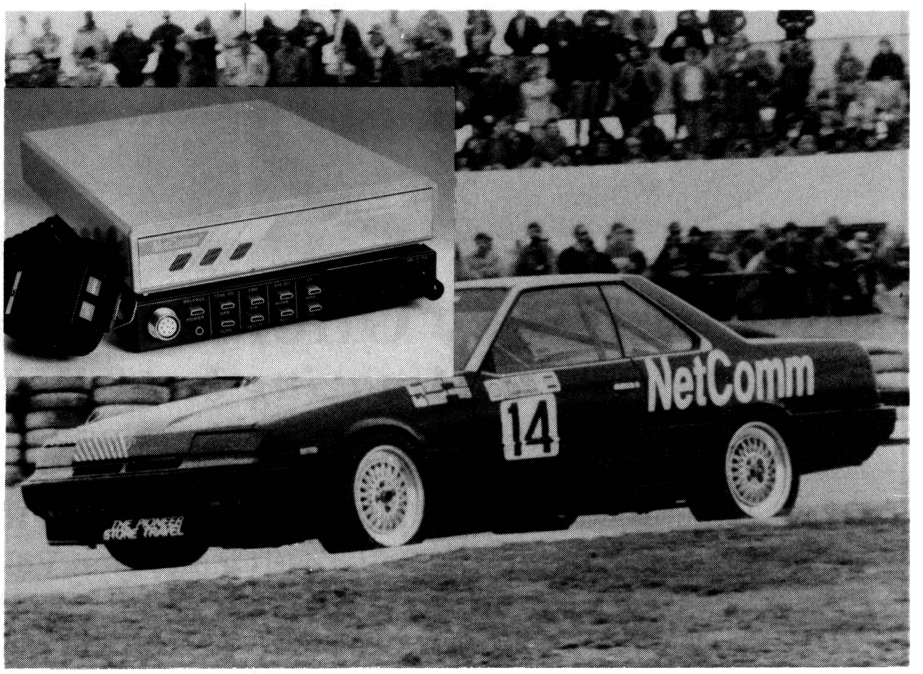
1·9·8·8 AUSTRALIAN HARDWARE COMMENDATION



NetComm's Radio Modem – not just a product, but a concept! NetComm, awarded the Australian Hardware Commendation, used a torture-test approach to its development which stimulated worldwide interest.

addressing system, so add-in cards can 'identify' themselves and provide the system with information about their configuration.

One of the most impressive demonstrations of its capabilities is the fitting of multiple monitors (and attendant video cards). Our friends at PageMaker distributor InfoMagic stunned us with a display of six SuperMac 19-inch colour monitors hooked into the one machine. For anyone who has endured the problems of simply switching to a different video card on current IBM XT/AT-style equipment, the 'plug it in and go' of the Mac II is unbelievable. You should see that 'wall of video' display one day . . .

Drum roll

Time for a decision, we kept telling ourselves. But it wasn't easy. Three views of the future, three trend-setters, three advancers of the state of the art, all different. IBM the forceful (by weight of market support alone), Acorn the fascinating, and Apple the visionary. Which?

We used our favourite salesman-destroying technique to get the answer. It's called *Show Me, Now!* – a phrase you should use extensively when you're out shopping for a computer. 'Show me how your desktop publishing package handles this' you say, presenting your report or newsletter. 'Show me how I can store and retrieve this information' you say, as you listen to glib claims about how simple it is to write your own dBase programs.

We applied the Show Me test to the three contenders left on the finalists' table, and that's where the Apple shone through. It can do it, *now*. Like the others, it offers great potential for the future, but more so it provides benefits and advances now.

Like the Lisa before it, the Macintosh II is showing us the way.

Soft is hard

As we said last month, getting started on the selection process for Software Product of the Year was easy, with several products standing out of the crowd. But picking a winner certainly wasn't.

The contenders divided evenly into IBM and Macintosh camps, itself a first in the history of the Awards and certainly testimony to Apple's rise in 'real-world' relevance.

Two years ago all of the contenders were IBM-based packages. Last year, a solitary Macintosh program, PageMaker, strode through the IBM pack to victory. This year, half the packages by number, and more than half by value, belonged to the world of the WIMP interface.

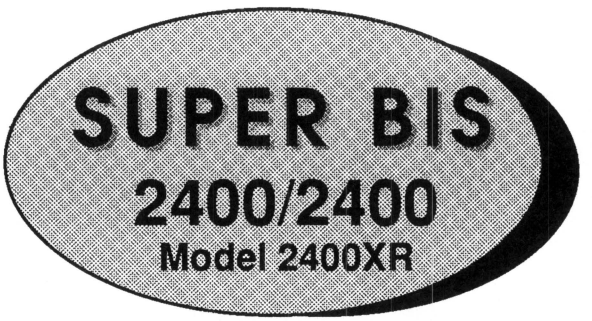
More than half by value? Yes, even though an IBM product took the title, it had three Mac packages hot on its heels. The four-way 'grand final' of short-short-listed packages was weighted three to one in Apple's favour. And the winner itself was one of a small but growing number of Mac-like IBM packages, so the Apple influence was totally dominant this year.

We decided early on in the judging that Ventura Publisher was the only IBM product to have a chance against the Apple lineup.

Knocked out of the running early in the piece were the Norton Guides, Norton's Advanced Utilities, and Borland's Turbo C. These three just didn't have the edge of innovation needed to take the title, even though they are all great packages in their own right. The fact they made it to the finals is confirmation of their excellence, and certainly puts them ahead of the pack.

Utility software like the Norton suite is not what you expect to discover in an award finalists' list, yet we find it one of the most indispensable items in our software collection. However, the updates to the latest version are not enough to make the package more than invaluable.

The Norton Guides fall into the same category: the innovation factor is low, if only because the guides follow in the footsteps of an Australian package, past Commendation winner PC Tutorial. The Guides, however, set a high standard in a mass market and provide facilities that give this class of software enormous ongoing potential.



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Turbo C reached the finals purely because of the 'Borland touch' – bringing the price of a powerful C compiler within reach of all and the usability within reach of the 'like to give C a try' programmers. But it couldn't unseat the real innovators of our finalists group.

On the Mac side, Microsoft Excel was eliminated almost as quickly, but only after a lot of soul-searching. Last issue we admitted our bias ('We journalist types are always at war with bean counters in the publishing industry, so we tend to dislike spreadsheets purely for what they represent'), and this time we had to think long and hard about whether it was that bias or our good judgement speaking out against Excel.

Excel is a powerful and impressive package that has done a lot to help turn the corporate tide in Apple's favour, but it is a development of a theme, with all the benefits (someone else made the running, and the mistakes, for you) that implies.

Advancing the state of art

There's no doubt 1987 was the year of desktop publishing – and all its associated disciplines, like art and design. This is the stand-out development of the cur-

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GRAPE VINE

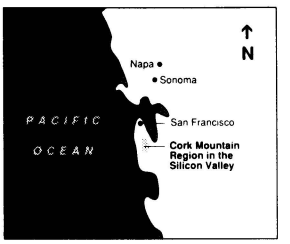
Spring/Summer 1987

Liriel Vineyards' Tenth Anniversary a Very Good Year

Welcome to Liriel Vineyards' 40th edition of *Grapevine*. That means ten years of wine and wine- making has been chronicled in this, the pages of our quarterly newsletter. We at Liriel Vineyards feel this is truly a momentous time for us; having weathered the wine industry of the last few years, we're very glad to be here. Thanks again to those of you who've given us your long-standing support, and to those of you who've just joined us, glad to have you with us.

In either case, your timing is good. As the headline suggests, we believe the '86 Cabernet Sauvignon vintage to be the most promising ever produced by our winery. As usual, quite a few conditions came to together at the right time to allow this to happen.

First and foremost, the 40-year old Caber-



Our Cork Mountain region is among the finest wine-producing areas of California

duced an inferior vintage in a younger vineyard. However, Cork Mountain, established as it is by years of struggle in well-drained soil, had no trouble coming up with the necessary moisture.

Third, late August turned cooler, allowing the berries to build sugar well into harvest time, and

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Adobe Illustrator – one of the founders of a new generation of graphics software.

THE AWARDS

YOUR COMPUTER'S PCOTY was the world's first Personal Computer of the Year Award. In its six year history, it has maintained an enviable reputation for independence and integrity. This year the Awards were judged by the staff of the magazine, with nominations and suggestions taken from over twenty contributors, all of whom are free from the commercial pressures of the industry.

The Awards have two fundamental purposes, in keeping with their two major audiences –

For *Your Computer* readers (the computing public at large), the computer industry is continuously visible through the media and is increasingly integral with everyday life. As this market has grown to fill every niche for home and business use, the marketing activity and the competition has increased out of proportion. This, coupled with the increasing complexity of the machines and software themselves, means that it is becoming even more difficult for the prospective purchaser (and user) to decide what to buy.

Therefore, the primary aim of the Awards is to provide an insight into the most worthwhile product releases during the previous twelve months: which products offer truly new features, an improved 'quality of computing', or other practical enhancements. The depth of knowledge (and experience) of our range of contributors – and staff – assures that even products with a shoestring budget can stand out purely on the merits of their features.

The second audience for the Awards is the computer industry itself – and *Your Computer* is very much a part of that industry. Because computers and their applications are only just entering the logarithmic phase of growth, it is becoming ever more important for all of us to stay informed. And it is just as important that those new products that are showing us the way of the future, receive the recognition they deserve.

This last mentioned point is especially significant in the Australian Commendations for Hardware and Software. The Commendation provides recognition and stimulation to a local industry which is surging ahead in overseas markets. At the same time, it is providing us with an ever-more-inventive pool of skills and talent which we can only applaud.

Judging the Awards offers the perennial problem of trying to compare products at the leading edge of technology (which every technobuff wants, but can't yet find a use for), with rather plain (but mature and sophisticated) offerings which could benefit every office and computer user.

There is also the added complication of judging a product that has been on trial in the market place for twelve months against products exhibiting the latest technology, released just in time to qualify. And, every year, there are those products which we feel should have been included but didn't meet the requirement that at least fifty units must have been shipped in the previous year (1987, in this instance). The criteria we apply when judging the Awards are all of approximately equal importance. They are –

- **Technical excellence** in design and engineering, including quality, reliability, 'feel' and features.
- **Ergonomics** in terms of both software and hardware design.
- **Value**: Are the features and functions worth the price tag?
- **Presentation**: How does the product look? What are the documentation and packaging like?
- **Innovation**: Is the product new and different? Does it truly represent an innovative approach?
- **Acceptance**: What do users think of the product? How well has it been accepted?

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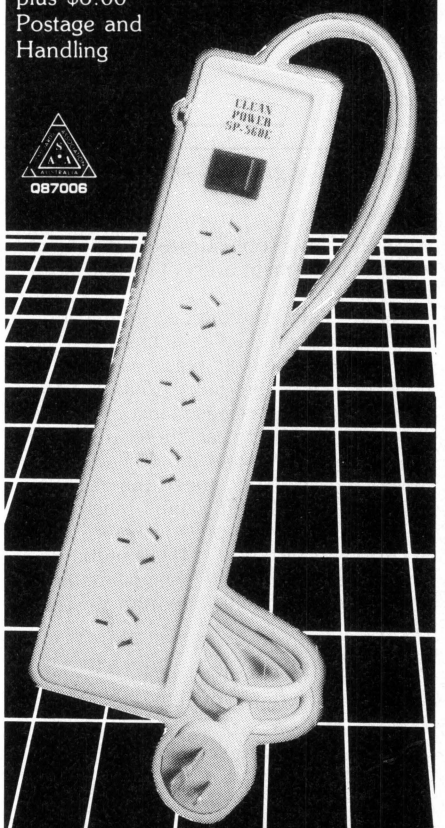

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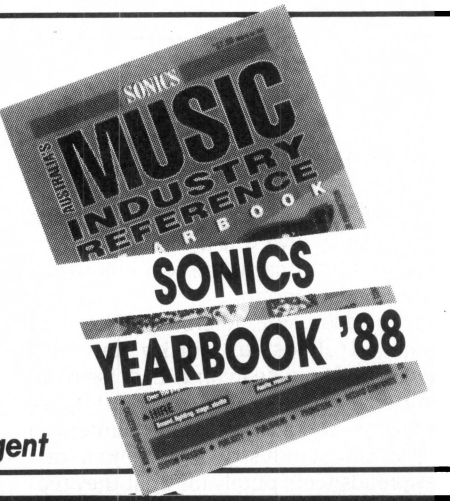

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rent market, the area of innovation and excitement that has breathed new life into the industry.

And it is far from over. Amazing products like Adobe Illustrator and Cricket Draw showed us the possibilities of software designed to take advantage of new printing technologies, and they were only a start: Illustrator 88 and Aldus Freehand are the next steps in an escalation of excellence we'll enjoy for years to come.

We've called these two the founders of another generation of graphics software – not just an ally of desktop publishing, but an extension for it. They're the programs which took the step from straight drawing to real creativity, harnessing – no, exploiting – the power of the PostScript page description language

Cricket Draw was the first of the drawing packages to give people a point-and-click interface to more than the surface of PostScript, which incorporates features and power far beyond traditional typesetting, but was formerly 'reserved' for programmers.

Adobe Illustrator takes the concept a step further with extensions to drawing and type manipulation, plus the ability to load a bit-mapped graphic (such as a scan) as a template and then 'trace' it to generate a pure PostScript drawing.

It's particularly attractive to those of us in publishing, because it does such amazing things with graphics and type – things that were once either not possible, or just too hard to be worth the trouble

Illustrator and Cricket Draw clearly met our criteria. Not only are they great programs, but they are leading the way. They were not to be eliminated easily.

Hyperactive

Nor was Hypercard to be easily eliminated – in fact, nothing was easy about Hypercard. It's labeled by some as a solution looking for a problem, and by others as the next great breakthrough in personal computing. We tend to feel it's somewhere between the two.

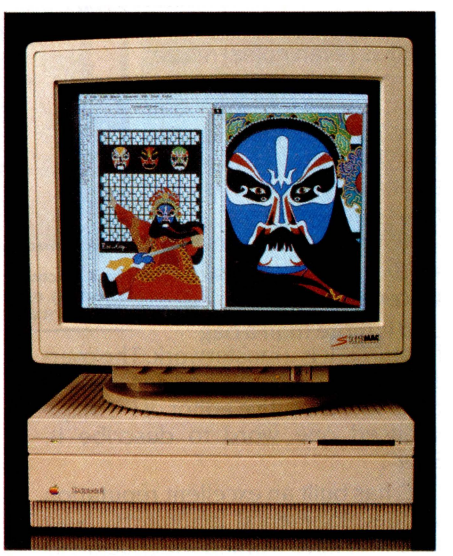
Certainly we're going to see a lot more of this style of program over the coming years, and just as certainly we'll see a lot of great things done with Hypercard.

Its implementation of the concepts of multi-threaded hypertext, integrating with graphics in a 'total environment' is perhaps revolutionary, but in many ways it reminds us of the integrated packages of the IBM world – nice places to visit, but you wouldn't want to live there.

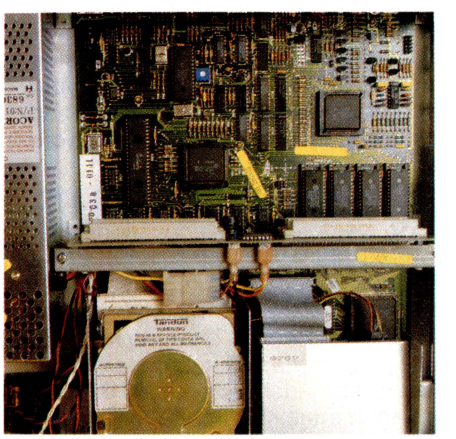
Hypercard is more than that, but we have yet to see an application for it that



The Acorn Archimedes: a quite different machine that experiments with a potential, alternate path for future computing – RISC technology.



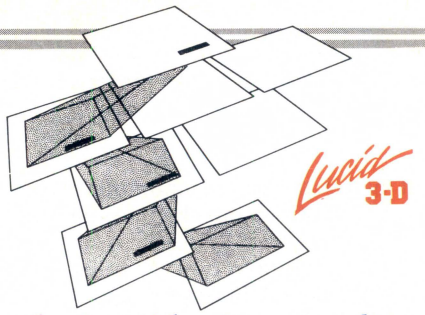
The NuBus architecture of the Macintosh (shown with a 19 inch Super Mac monitor) supports 8-, 16- or 32-bit data paths, is independent of the processor, and allows high speed transfer of data between the logic board and add-in cards in large quantities.



Inside the Archimedes – the ARM (Acorn RISC Machine) chip has clear benefits, but the technology still provides more questions than solutions. (The large ARM chip is in the top left quadrant of the mother board shown above.)

Everyone says "It's the best there is."

Any cell can contain a complete other spreadsheet that you can access with a single key.



"The Best idea I've seen for a spreadsheet in years"
Jim Seymour, Columnist, PC Magazine, PC Week

Don't take our word for it. Use Lucid 3-D for 60 days. Return it for a full refund if not completely satisfied. Plus, instead of the $299 list price, an introductory spread-the-word price of $199

Lucid is as simple as the pictures show. And you don't have to write formulas to do that. All you do is look at the other file, navigating through easy, point and shoot directories. When you come back up (with one key) the link is made automatically for you.

Everything about Lucid works that way. Users say "*It is so intuitive that I really don't need a manual.*" That's because we use something we call a visual command menu. Jim Seymour, the noted PC columnist, talking about Lucid in a recent article said, "*If there ever was an interface idea so good it ought to be stolen and widely used, this is it.*"

Memory Resident

You can pop Lucid up instantly while working in your word processor or any other program. You can cut anything on the screen and paste it right into Lucid, or cut anything from a Lucid worksheet and paste into the application below. You can even run Lucid on top of 1-2-3 if you like, and cut and paste information from one to the other, including formulas.

Notepad Behind Every Cell

Another 3-D feature is that any cell can also contain a multiple page note window that you instantly access with a single keystroke. You can write notes, memos or letters that relate to your work, save them as individual files and even print them separately or with your spreadsheet.

Other Features

Lucid has over 100 innovations that cause users to say it is the best of all the spreadsheet offerings! Things like: **Speed** - background, minimal and visible recalc. **Macros** - learning macros, autoexecute macros, macros work between spreadsheets, user defined macro menus. **Mouseability** - total Mac-like mouse access, but easy keyboard control as well. **Color or Mono** - 17 user controlled color displays. **Audit** - six displays and printouts. **Windows** - multiple sheets on screen at same time. Multiple views of the same sheet. Pop-up windows of function formulas, range names, favorite labels, macro names, filenames, even a calculator. All let you select and insert right into your spreadsheet. All windows (even notes) resize and move where you want them. **Cut and Copy** - between spreadsheets, documents and between sessions. **Help** - press F1 anywhere, you get help specific to what you are doing.

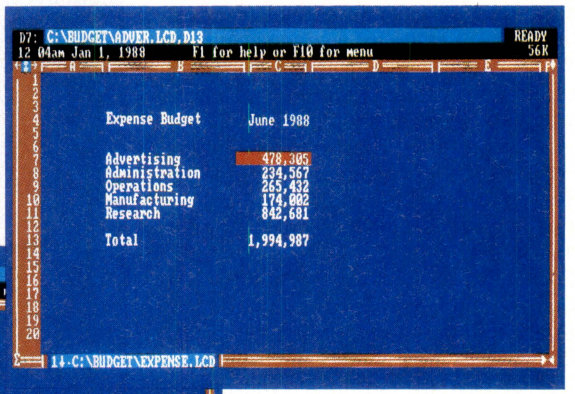


Fig. 1. Let's get the detail on those ad costs, just move the widebar to that cell and press one key (grey +).

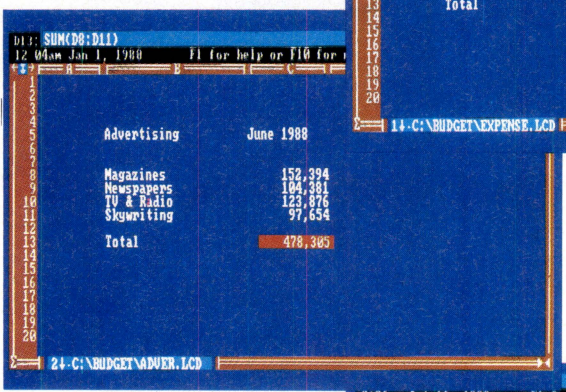


Fig. 2. Here we are instantly. Notice the lower left corner showing we are on level 2. Grey – takes you back. There is no limit to the levels you can go. Move right down to transaction level if you like.

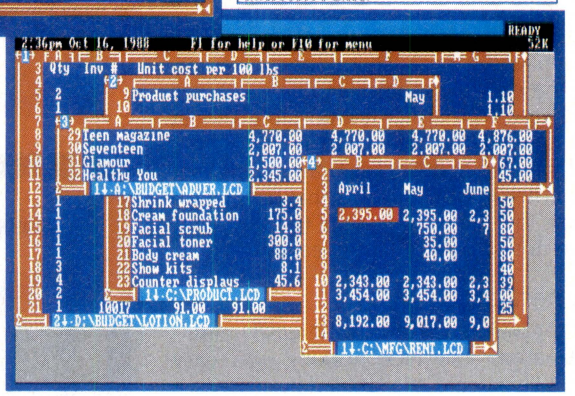


Fig. 3. Of course, Lucid does multiple windows. Notice, you can simultaneously open windows in different directories, different drives, even down as many 3-D levels as you like. No one else can do that.

Co-Winner of the 1987 PC Magazine Award for Technical Excellence
The other winner: Microsoft's Excel

Masterwork

Lucid is more than a bag of features. It is a masterwork. The overall feel is tight and polished. In fact, Paul Somerson, executive editor of PC *Magazine*, used one word to describe it, "*Slick*".

PCSG has built an excellent reputation as a developmental laboratory. Now those who have worked with Lucid 3-D tell us "*you have done it again. This is software everyone should have.*"

Even if you don't plan to abandon 1-2-3, Lucid makes sense. Files are converted between them with ease so there's not an interoffice compatibility problem. This means you can have the power and fun of Lucid 3-D, without having to upset your present systems.

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Makers of LIGHTNING™ disk speed up software, and BREAKthru 286 Accelerator Board.

Lucid 3-D

Exceptional spreadsheet for the IBM PC, PS and Compatibles.

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makes us want to do more than play with (and marvel at) it. If it does one thing particularly well, it's to further the Apple 'computers for the rest of us' theme. Hypercard shows computers can be made to work more like the 'normal' – random access, rather than methodical – human thought patterns.

Ultimately, the judges were thankful for Ventura Publisher's presence – it helped them avoid a tough(er) decision, between the Mac products they liked so much.

However, the Show Me test helped in our Software deliberations as well – and with Ventura, we were able to see desktop publishing redefined to a much broader market, with power and features that were beyond 'mere PCs' in days gone by.

Ventura did for the IBM market what PageMaker did for the Mac, and for desktop publishing, in the first place. But it wasn't just a me-too product, as its new definition of desktop publishing more than doubled the potential market, regardless of hardware considerations.

As we have said before, Ventura's powerful new features for handling of long documents, manuscripts, manuals and so on have changed the face of desktop publishing, itself a market that has changed the face of personal computing. Our lives will, thankfully, never be the same again . . .

Australian Commendations

As far as the judges were concerned, it was no contest in the local section of the awards: one software product and one piece of hardware stood out.

NetComm Australia gets our Australian Hardware Commendation (for the second time, no less) with its Radio Modem effort. It's not just the product, mind you, but the whole effort, even if the modem by itself is a marvel which opens a range of future possibilities.

But NetComm's novel 'torture-test' approach to the radio modem's development, in a racing car, is what caught our eye. The implications of computer monitoring and control of a race car from the pits have stimulated worldwide interest, and NetComm's effort has thrust Australian technology into the spotlight.

NetComm's staff, under the guidance of eminent troublemaker (we only call him that because he asked us to return our review Trailblazer) Wayne 'Smokey' Pickett, has achieved what countless megabudget international race teams would have liked to achieve, but didn't. We salute their efforts.

We offer the same congratulations to Dennis Redman, author of Magician, on earning our Australian Software Commendation. In little more than two years he has taken a limited, NEC-only graphics package and turned it into a powerful all-rounder which is racking up successes both at home and overseas.

YC contributor Ewart Stronach likes to take all the credit for discovering Magician, but it was Matt Whelan who sent him along to look at it the first time – now the package has 'made it', Matt wants some credit too.

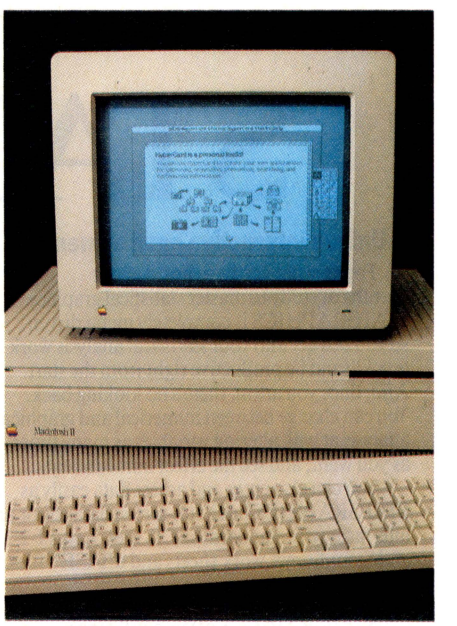
However, he relaxed his claim when we played him a tape recording of the original conversation: 'Ewart, this guy wants to show us a graphics package but I think it's a waste of time. Only go if you have nothing to do that day.' Ewart had nothing to do, and he came back predicting great things for Magician. Matt humoured him. Guess who was right?

Magician is an integrated graphics package, a comprehensive drawing toolkit with a range of inbuilt extras like graph generation, slide-show operation and macro capture and playback. In two years (we're up to Version 3) it has doubled in capability, and halved in price.

It is now ready to mix it with the world's best, and is doing so with considerable success. □



The T5100 is Toshiba's ultimate expression of quality and engineering in a 'compressed' package.



Hypercard shows computers can be made to work more like the 'normal' – random access, rather than methodical - human thought patterns.

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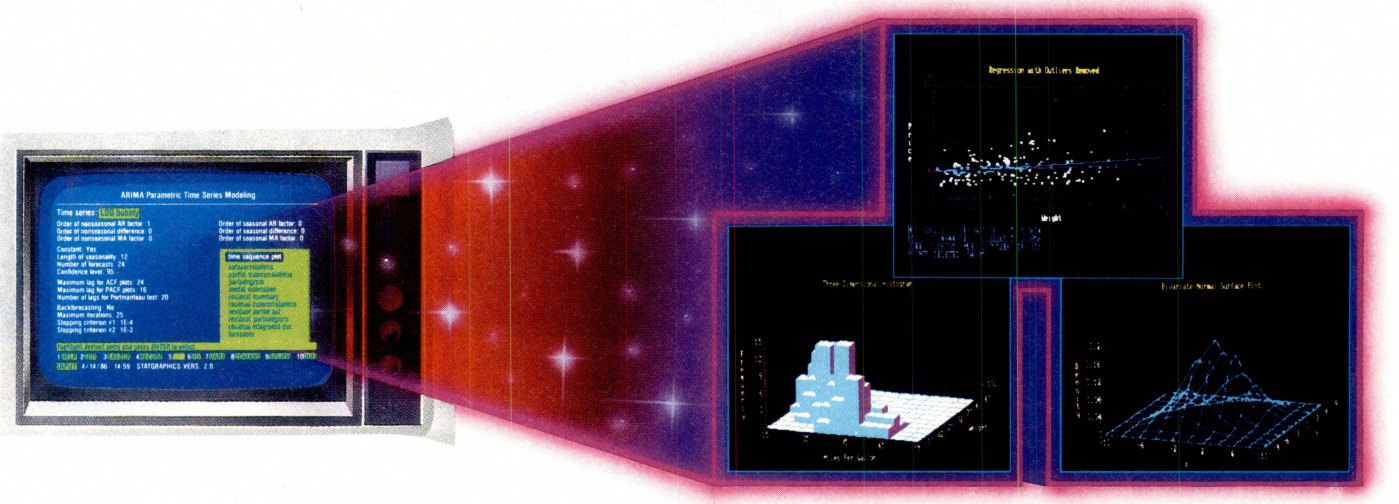

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STATGRAPHICS has a wider graphics capability than any other PC statistical software. It gives you the optimum presentation choice to suit the data, audience and situation from programs, such as:

- Two- and three-dimensional line and surface plots.
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And, you can change colours, labels, scaling and line and point types, or display several plots on the same screen.

STATGRAPHICS is part of the STSC, Inc family of PLUS ★ WARE products and is marketed and supported Australia-wide by McMullan Kilvington Pty. Ltd. Demonstration disks and training are available.



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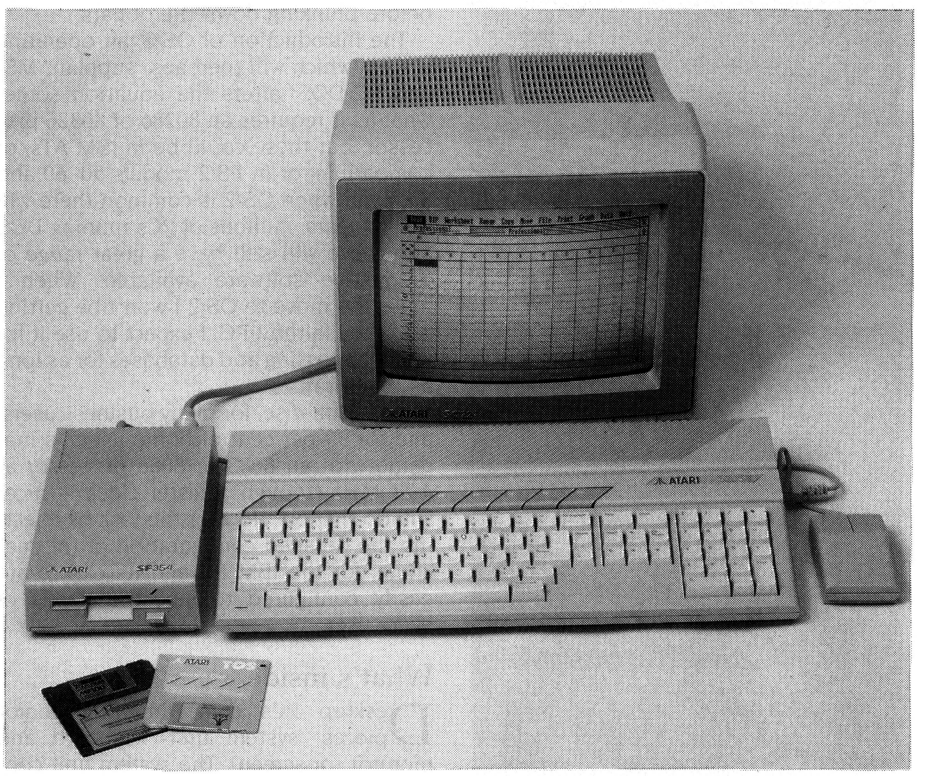
BUYING A COMPUTER



Let John Hepworth give you some good, solid advice so you won't end up having a nervous breakdown before you even get DOS up and running . . .

WE CAN'T all buy the Computer of the Year, and many users won't need the advanced features found on such machines for a few years, anyway. High performance may be necessary for high speed number crunching, and fantastic graphics might be vital for Cad and desktop publishing (DTP), but the majority of applications for those millions of micros out there are word processing, databases, spreadsheets and games. None of these are particularly demanding of disk or processor speeds, and many CP/M machines are still in daily use on similar tasks.

Recently my sister asked me for help in buying a microcomputer for word processing. The budget was a very limiting factor, and I also had the concern that my recommendation should be reliable and that support for the computer and software would be readily available. If you are trying to buy that first computer, or someone has asked you for advice, then some of the ideas I gained in the search should be a help.

What type of machine

There are several stages in the process of selecting a computer. First, determine what tasks the computer is needed to fill. From these determine the software required. Only *then* pick the make or category of machine. Now consider the optional extras. With a specification, and a budget, scour the market place for a machine that is affordable, meets the specification and appears to be reliable.

One has to consider a great range of machines, from IBM and Macintosh, through the various compatibles, Apple II, Amiga, Microbee and Commodore 64. If the machine is intended for use by the kids at home to supplement the ones at school, then a valid choice could be one similar to those at school. If someone in the family uses computers at work, then another valid choice could be a machine which can run the same range of software and reads and writes the same disks. If games and animation are the prime interest, or DTP a major requirement, then different categories will suggest themselves.

For many people the IBM PC, and its various compatibles and variations, form a group which is hard to ignore. There is a wealth of software available for it, both commercially available and in the Public Domain, in almost all categories. Business applications are particularly well represented and education software is less common. While it may not cover any particular area of activity as well as a more specialised machine, the PC and compatibles tend to be the jack-of-all-trades, able to cope competently in any area. They also have the advantage that most machines at work, and a large number of machines at universities and colleges, are either IBM or compatibles, and taking data from one site to another is easy. In addition, now that it is possible to buy a PC clone with two drives, clock/calendar, serial and parallel ports, 640 kilobytes and a mono monitor for less than $1000, the starting point on price for a PC compatible is highly competitive with many other machines.

The biggest choice to be made when buying a PC is the type of monitor to be used . . .

Usually, as a result of this sort of analysis, I end up recommending a computer compatible with the IBM PC, but I have also recommended machines like the Commodore 64, the Apple II series and so on, depending on the needs of the individual user, their aspirations and the other machines with which they come into contact. (*For a look at a range of computers and the features they offer, see 'Hardware for Home Education (. . . or just getting started)' in Dec.'87 and 'Where it's AT' and the 'AT Catalog' in Feb.'88.*)

PCs, ATs and 386s

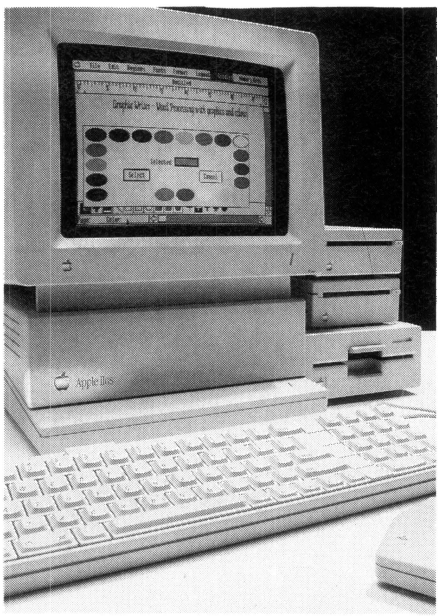
After deciding to buy a machine in the IBM camp, how can you choose one? There are two major divisions in the camp, and variations within both groups.

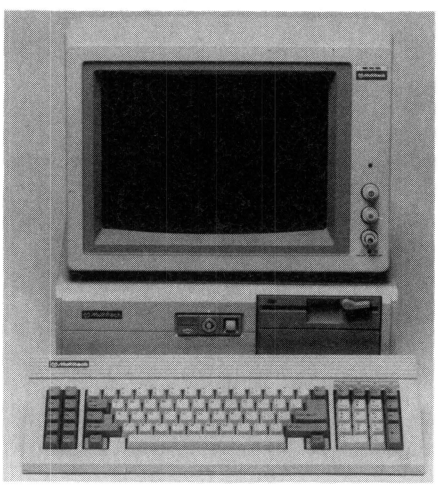
The classic 'personal computer' started with the original IBM PC, running an 8088 processor at 4.77 MHz. The first significant performance improvements came with the introduction of the IBM PC AT, with an 80286 processor at 6 MHz. The performance improvement mainly came from a better processor, but with some help from the slightly higher clock speed. Variations of both abound, with improvements on the PC including ones with the 8086 processor and/or higher clock speeds like 8 MHz and 10 MHz. Similarly there are higher speed ATs available. All of these PC and AT variants follow quite closely along the path blazed by IBM, and software, add-in boards and peripherals work quite predictable with most.

Late starters in the field are machines with the 80386 processor. These are intrinsically faster than the 80286, and are also capable of running at higher clock speeds, but the '386 machines are rather less standardised than the PC and AT and their clones, and somewhat more care is required when choosing one.

PS/2

In 1987, IBM announced the PS/2 line, the second major strand in the group of machines which can run IBM compatible software. While the Model 30 and 25 use the original IBM PC technology, in a new box, with some speed up modifications, the Models 50, 60 and 80 cover quite new





ground with a new bus offering the hope of much higher performance. IBM also announced new video standards, and introduced the general use of the 3½ inch floppy disk drive.

Which computer?

In all of these categories there are machines in the traditional form, a box on the desk surmounted by a monitor, as well as laptop portables with flat liquid crystal or plasma screens. Laptops are more mobile and convenient, but are less adaptable (and usually more expensive), while desktops require half a table top to be dedicated to them. First time users will normally buy on price and thus settle for the desktop.

Choosing between 8088, 80286 and 80386 processors depends on the software to be used, and the need for speed. Its all very well to crave machines on the leading edge, like the '386s, but the 8088 is still the mainstream machine and has not yet fallen to the trailing edge of technology. There are around 10 million classic PCs (and similar clones) around the world, doing sterling service with word processing, databases, accounting, and other tasks. Given the very low price of the basic units compared to many others, one should decide if higher speed is essential before plunking down the dollars.

The introduction of OS/2, an operating system which will (perhaps) supplant MS- and PC-DOS, alters the equation somewhat as it requires an 80286 or 80386 processor, but these could be in IBM ATs, or compatible, or in PS/2 models 50, 60 and 80. Even when OS/2 is common there will be, for years, millions of PCs running DOS and these will still have a great range of productive software available. When I make the move to OS/2 I won't be getting rid of my faithful PC; I expect to use it for word processing and databases for as long as it will run.

To summarise, for many business users, and for 99 per cent of home users, a machine with an 8088 or 8086 processor at 4.77 MHz (though a faster clock is nice) will do the job. Now for the task of selecting the detailed configuration of the machine, for the IBM PC and its clones are easily configured to suit the needs of every user.

What's inside

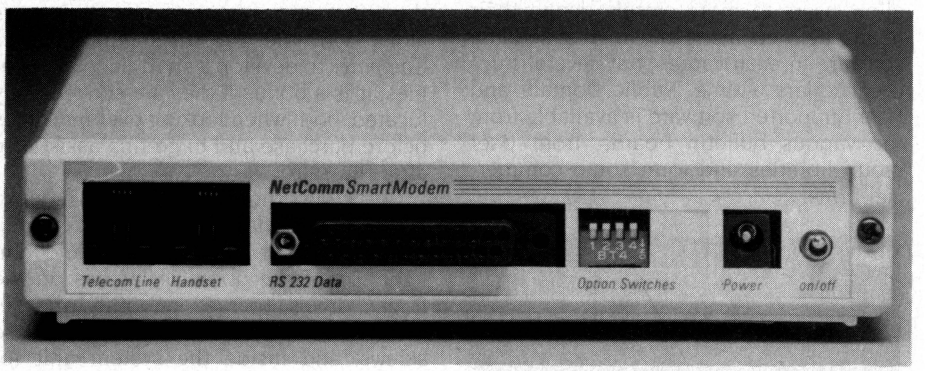
Desktop PCs come in three major pieces: system unit, keyboard and monitor (or screen). The system unit contains the intelligent circuitry. It typically has a sheet steel case, with a cover that either slides off forwards after a few screws are removed, or has a lid which can be tipped up to reveal the innards. Looking around inside, one will find a power supply towards the right rear of the unit, and disk drives (or areas in which they could be mounted) at the right front and centre front.

Flat across the bottom of the unit, from front to back at the left side, will be a printed circuit board full of electronic components. This board is called the mother board, and into it are plugged all sorts of other boards full of electronics. On the mother board is the 8088 (or other) processor, support circuitry, some of the system memory, and some long sockets (normally called expansion board slots) into which expansion boards may be plugged. In the back panel of the case will

be little vertical openings in line with each slot, and a metal strip will cover each.

When an expansion board is installed, the cover is removed, and the board is plugged into the slot with its external connectors poking out through the opening. When someone tells you a PC has eight slots it must have eight connectors on the mother board for expansion cards, and while it may have extra openings on the rear panel these, while convenient, don't count as slots.

Every PC will have several expansion boards, allowing it to be customised as required. Lets look at the possible additions.



Video

The biggest choice to be made when buying a PC is the type of monitor to be used, and from it comes the type of video board used to drive it. In almost all PCs there is no circuitry on the mother board to drive a monitor, and the first, essential, expansion board is the video board. IBM has, over the last few years, defined several video standards. Many other manufacturers make video boards and monitors to the IBM standards, and some have also developed video configurations of their own. One of these is the Hercules video board, and it almost rates as a standard these days.

The most common video standards are IBM's Monochrome Display Adapter (MDA), Color Graphics Adapter (CGA), Enhanced Graphics Adapter (EGA), Multi Color Graphics Array (MCGA) and Video Graphics Array (VGA), together with the Hercules Graphics Card (HGC or MGA) standards. IBM's original boards were the MDA and CGA, with the MDA offering high resolution text (without graphics) on a specialised monochrome screen.

The CGA offered colour, graphics and lower resolution text on a colour screen. The HGC board was announced at the same time, and gave the same text on the same monitor as did the MDA, but with the addition of high resolution graphics. HGC graphics and CGA graphics are not compatible and, while all graphics software can drive the CGA, typically the cheaper graphics software cannot drive Hercules board in graphics mode. Text software runs perfectly on the Hercules, but on CGA is hard to read if one is going to use it hour after hour. The EGA offers high resolution text and graphics in colour.

More recently IBM announced the VGA and MCGA with the PS/2 series, and expansion boards for older PCs are available to give them VGA. MCGA and VGA offer enhanced graphics, and text in colour with resolution to rival that of the MDA and EGA.

At the low end the choice comes down to CGA with a colour monitor or 'composite video' monochrome monitor, or a Hercules compatible board with a TTL monochrome monitor. Other board/monitor combinations are very desirable, but their cost tends to rule them out for entry-level systems: As indicated, all graphics software (including games) will run on CGA with either of these monitors, but with marginal text, while the Hercules gives great text and great graphics with appropriate software, but some graphics and games software cannot be used with it. I chose a Hercules with my PC four years ago and, except for the occasional game which cannot be run, have found little cause for regret.

Memory and ports

An IBM PC can have up to 640 Kbytes of memory, holding just over 640,000 'characters', which can be operating system, programs or data, but can have as little as 64 Kbytes. When the IBM PC was originally released, much software could run in a 64 Kbyte machine, but as more powerful software has become available, the amount of memory required has risen. You may be able to make do with less, but if at all possible get the full 640 Kbyte when buying the machine. You will find problems if you have less than around 256 Kbyte to 384 Kbyte, and with memory being cheap, 640 Kbyte is good value.

All users will need to connect external devices to their computer. These could be a printer, a mouse, a modem or some other device. These are connected to the computer by plugging cables into ports, which are sockets on the rear edge of an expansion card, poking out through the opening in the rear panel. The most necessary are parallel and serial ports. Printers are most commonly attached to the parallel port, though some printers are attached to the serial port. Modems are attached to the serial port, two computers side by side on a table can be attached by their serial ports and a mouse is most commonly attached to a serial port. You will find one parallel port and one serial port is essential immediately, if not sooner. My PC has two serial and two parallel ports and I use them all, regularly.

The clock calendar is another nicety. When a PC is started, an internal clock starts at a fraction of a second after midnight on January 1, 1980. The user can reset this to the correct time and date manually, or a clock/calendar board can do it automatically. Having the right date and time is essential, as the PC dates and times each file when it is saved to disk, and without an accurate date you will get confused one day.

Often the serial and parallel ports will be on the same expansion card along with other functions like memory and the clock/calendar. These combination boards will be called multi-function or multi-I/O boards, but what is on them will vary from one to the next, so check them carefully.

Power supply

Power supply size can be critical. The original PC had a power supply which had an output of only 63 watts, and had difficulty driving a fully configured PC if the hard disk was not a power miser. Later PCs have power supplies which can supply from 150 to 200 watts or more, and this makes it easier to add options without problems.

Drives

The next major choice to be made is in disk drives. The original IBM floppy disk drive had a front panel 150 mm wide, and 90 mm high, and drives with this size front panel are called 'full-height'. Over the years, more compact drives have been developed. Typically these are still 150 mm wide but only 45 mm high, and

are called 'half-height'. It is essential that any PC has space to fit at least two half-height drives, and the ability to fit three or four is strongly recommended.

What drives should you fit? Every PC needs at least one floppy drive, and this could be either a 5¼ inch or a 3½ inch drive. Most machines in use and being sold at the moment have 135 mm drives, but the trend is clearly swinging (and fast) to 90 mm drives. Right now, the first drive probably should be a 135 mm drive, both to make software transfer to other machines easy, and because 5¼ inch drives are half the price of 3½ inch drives. In addition to this first drive, one can add a second floppy of either size, and/or a hard disk drive. The greatest performance improvement one can make is by installing a hard disk drive, and with hard disks and controllers at just over $500 and with a second floppy costing around $200 configuring a system with one floppy and one 20 megabyte hard disk is good value, while two floppies and one hard disk is recommended if possible.

When we talk of drives we must not forget that each of the drives is connected via a flat ribbon cable to a controller card in one of those expansion slots. The controller may only control floppy drives, or only hard disks, or may be able to control both.

The specification

As I indicated earlier, I feel that for most users the 8088 processor is fast enough now, and will remain so for some time. Some users will have immediate needs for faster processors and should start with at least an AT clone, but my usual specification for the first PC for most homes and small businesses is:

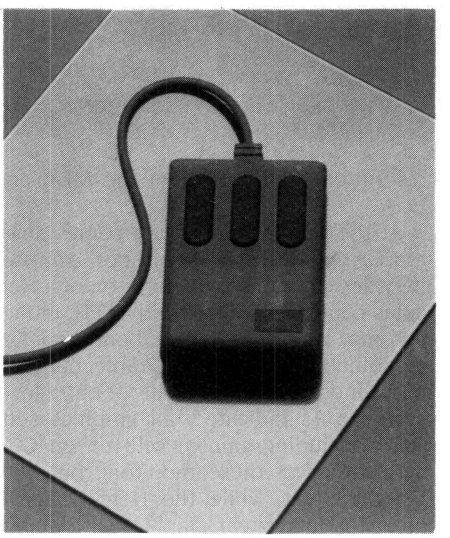
Processor – 8088 or 8086,
Speed – 4.77MHz (8 MHz or 10MHz if available),
Memory size – 640 Kbyte,
Ports – 1 serial, 1 parallel,
Clock/calendar – recommended,
Expansion slots – 5 minimum, 8 recommended,
Power supply – 150 watts (minimum),
Disk drives: *Minimum:* – 1 floppy; *Recommended* – 1 floppy plus 1 hard disk or 2 floppies;
Video: *Text* – Hercules and TTL monitor; *Games and graphics* – CGA board, with colour monitor or composite video monitor.

In addition you will need a *legal* copy of DOS and Basic, with manuals, and manuals for all of the hardware, including the expansion boards. Check them out, and if the manuals are weak or missing you will most certainly regret it later!

Software

A computer without software is useless. The most common software needs are a word processor, database and spreadsheet, plus communications software if required. I have separately reviewed Microsoft Works for the PC and found that it offered these four functions in an excellent value package (under $300 at many stores).

Alternatives from the Public Domain and user supported arena include PC-Write (word processing), PC-File (database), AsEasyAs (spreadsheet) and Telix (communications). All of these (including Works) are excellent starting points, and allow users to more closely define their needs before buying the market leading software in each category at several hundred dollars a time. Public Domain and User Supported software is available from the various bulletin boards, from User group libraries and form some commercial firms.



Hidden extras

When you do look at buying a PC, remember that there will be a few extras that you will have to buy. Initially you may be able to avoid buying a printer, taking disks to a friend with a similar computer and printer and printing them there. Inevitably, within days, weeks or at the most a few months, you will have to buy a printer. Top-of-the-range 24-pin dot matrix printers are now down around $700, and 9-pin printers around $400, so include them in the budget for the first year. When you buy that printer, make sure that you get a cable to suit. (*For a survey of printers see the features in YC, March and April '88.*)

Even without the printer, you will need some disks, and less than around 30 won't be enough. Buying disks a hundred at a time will often get a discount, so consider this when deciding how many to buy. Paper and ribbons for the printer will be needed. A box of paper will cost between $50 and $80, and you should always have one spare box in addition to the one in use. Ribbons always wear out at the wrong time, so always have at least one spare. At around $15 each for most printers the expense is not too great.

Where to buy

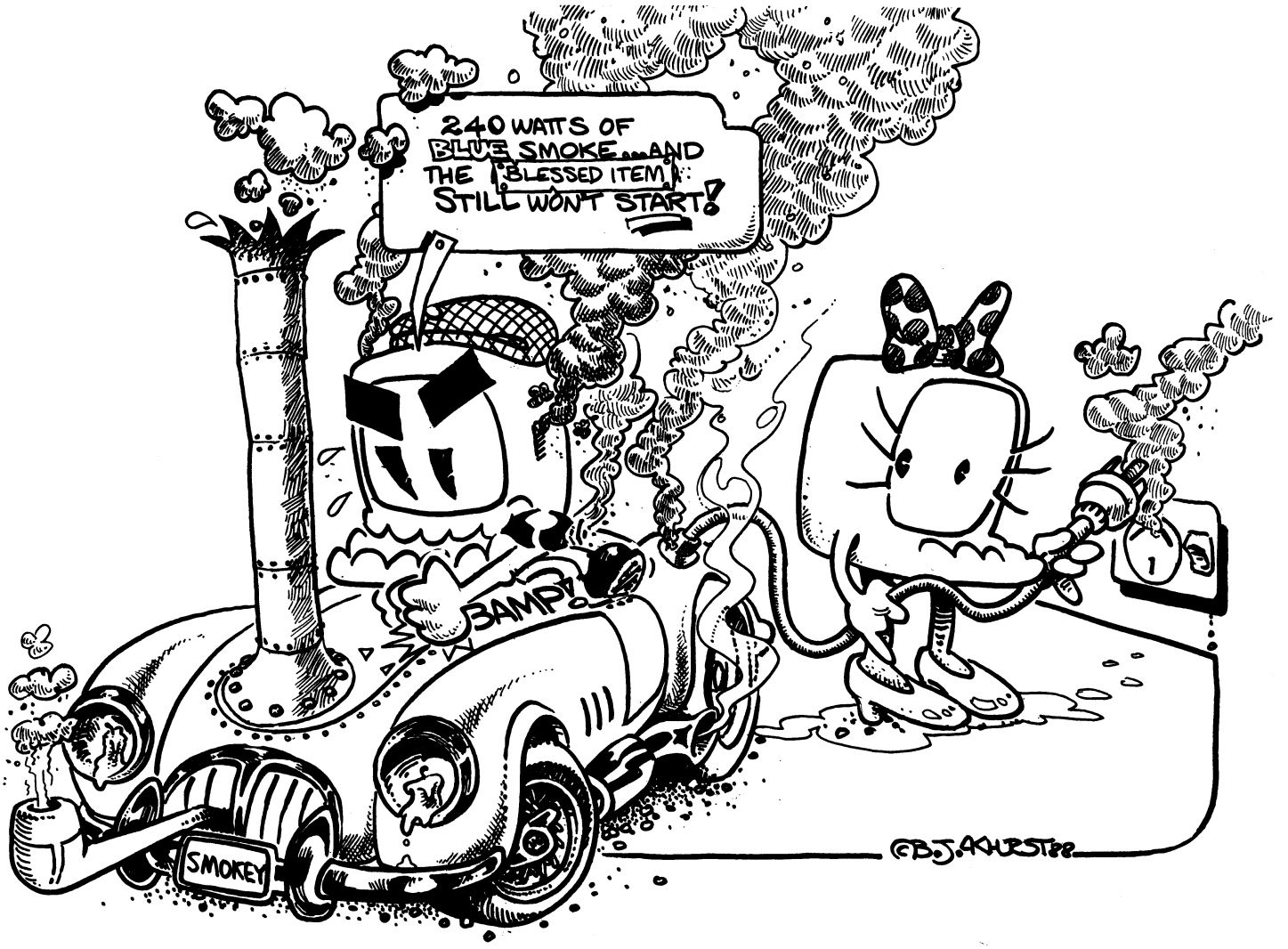
Armed with the specification, look through your local *Yellow Pages*, and the computer sections of newspapers along with the advertisements in *Your Computer* to develop a short list of companies. It is a bonus if they are conveniently located, both when looking over machines before purchase and in getting assistance after the sale.

Check over the machines on your short list. See if the image on the screen is satisfactory for your eyes in bright and dim light. See if the doors or latches on the floppy drives operate smoothly and securely. Look for twisted cases and loose screws, and inside the system unit for badly aligned boards, and for wires loosely draped around the machine.

The ribbon cables from cards to ports or drives probably won't be tied down, but as long as they are moderately neatly arranged this will be OK. Check that drives are securely mounted. Make sure that, if the salesman tells you that there are (say) eight expansion slots, there are eight connectors on the mother board and not just eight openings on the rear panel with six expansion connectors inside. If you think this is a remote possibility, it has actually happened to me, and the salesman appeared to know that the machine really had six genuine slots, and was trying to mislead me.

When selecting a dealer, Jerry Pournelle of *Byte* has advice which may be paraphrased rather loosely as 'if you don't know about computers, deal with someone who does'. Take your time, compare price, quality and advice, and you should be able to sift out the charlatans and come up with a deal and a dealer to suit you.

All in all, remember that twin floppy machines to my specification are under $1000 in many places, and with one floppy and one hard disk, they are well under $2000. Such machines are a very cost effective way to get into productive computing. □



NO SMOKING!

Ewart Stronach reveals the workings of a computer . . .

FINALLY, I have it figured out. All this technical rubbish about bits and bytes, millivolts and megawatts is simply a ploy, devised by the early technical workers to protect their opulent lifestyles. 'Bury the task in intricate terminology,' they said. 'It'll be years before anyone finds out and we'll all be rich.'

Their secret is out – it's *smoke*. Computers run on smoke! All those little wires and tracks simply carry smoke from one component to another. If one of the wires or tracks breaks, the smoke gets out and the computer stops working.

The smoke is made in a device which the technical people call a power supply and stored in devices called capacitors. When it is full up, it starts to leak and you have to go to an expert to get a new one.

The bigger the device, the thicker the wire needed to carry the smoke, or in the case of a complicated device, many thin wires each carrying a small amount of smoke. Devices which open out to the front of the computer are very prone to leaking smoke and any sign of such a leak from your disk door should be viewed with grave suspicion.

The gravity of the breakdown may be judged by the amount and colour of the escaping smoke. Heavy black smoke means heavy repair bills, while light grey smoke is usually the cheapest.

The heaviest black smoke comes from mains powered devices which are connected to the lights in your house. When you turn on a light switch, the smoke flows into the light bulb with such force that it gets excited and glows. This sucks up all the dark in the room and turns the smoke black. This black smoke goes direct to your toaster and either falls on your toast or leaks out the back.

Smoke travels in one direction only and transistors and ICs are simply devices for shunting the smoke about. If they fail and smoke goes along a wire against the normal flow, it almost always bursts out the side of the wire.

Armed with this most basic premise, you may now confidently carry out your own repairs and all you need to know is which direction the smoke should travel.

This has got to be one of the best kept secrets of modern times and passed down from generation to generation between technical workers, and then only after due examination and the exchanging of a secret handshake. It has been known previously only to a select few in each facet of research. The railways department cottoned on to it quicker than most when they noticed that a lot of smoke was escaping from their steam locomotives and they switched to diesel. These also leaked a little, and the trend today is toward almost leakproof electric trains.

I suppose that it is only a quirk of nature that the North American Indians did not invent wire as they obviously had figured out that messages could be displayed by controlled leaking of smoke, but did not take that all important step of enclosing it. Sitting Bull could have been the World's First Programmer! □

From an idea originally read in an MG Car Club magazine; author unknown.

MICRO-EDUCATIONAL PTY LTD

Unit 8, 235 Darby St, Cooks Hill NSW 2300 Phone (049) 264122

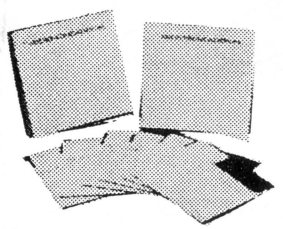
Australia's largest computer mail-order company with 38,000 customers, selling 2.4 million disks a year to customers such as

DISKS

DISKS	10+	100+	200+	500+	1000
1 5.25" SSDD	1.00	1.00	0.95	0.90	0.85
2 5.25" DSDD	1.20	1.20	1.10	1.00	0.90
3 5.25" DSHD	3.50	3.30	3.10	3.00	2.90
4 5.25" Wabash	1.90	1.70	1.50	1.40	1.30
5 3.5" DSDD	2.99	2.99	2.99	2.90	2.75
6 3.5" DSHD	4.75	4.50	4.20	4.00	3.50

READER INFO No. 70

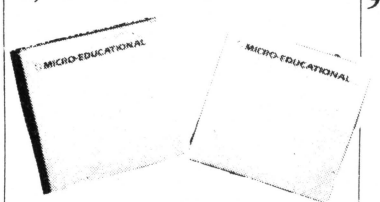
1) 5.25" SSDD



Lifetime warranty, top-quality disks from Wabash USA. Single sided (Can be used double-sided) for use with Apple, Commodore, Bee, etc. Normally $1.40.

Buy NOW at $1

2) 5.25" DSDD



Lifetime warranty, US made by Wabash. 75% clipping level, almost double ANSI standard for DSDD disks. Suit IBM etc. Compare elsewhere at $3 to $8ea. We buy a truckload at a time to bring them to you for:

READER INFO No. 71 **$1.20**

5) 3.5" DSDD



Wabash label, lifetime warranty. Suit ALL 3.5" drives up to 1.6 Mb! Compare elsewhere at up to $12 ea. Normally over $5ea. Our price:

$2.99

Yes, prices include Sales Tax. Ring or refer catalog for tax exempt prices.

STORAGE BOXES

7) HS100

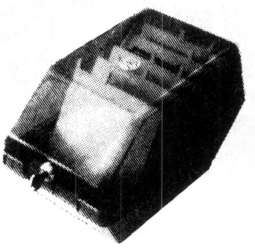
READER INFO No. 73



HS100 disk storage box for 5.25" disks. 100 capacity, dividers, clear perspex removable lid. Lockable.

$50 at Tandy **$25**

8) SWS60

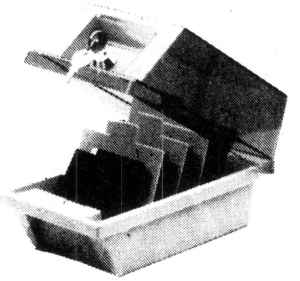


60 capacity 5.25" disk storage box. Lockable, dividers, clear perspex hinged lid, rubber feet, carry handle.

Australian made. **$20**

Normally $25

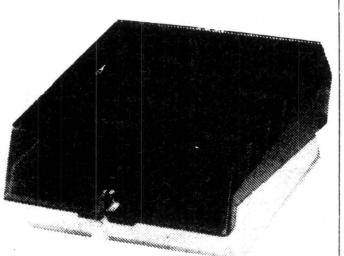
9) YA40



40 capacity 3.5" disk storage box. Lockable, hinged, dividers.

Normally $25 **$20**

10) DD80L

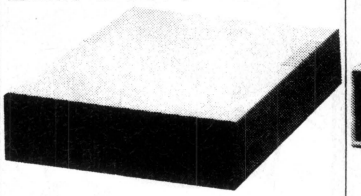


3.5" disk storage box. 80-90 capacity. Clear perspex hinged lid, dividers, lockable etc.

Elsewhere $49 **$30**

DISK DRIVES

11) Apple Slim-Line Drive



Our top-selling Taiwanese slimline drive for the Apple II, IIe, IIGS and IIc. Now in stock. 12 mths wty!

IIc Version $299

Expensive but top quality. **$279**

12) Tandon 20M Hard disk

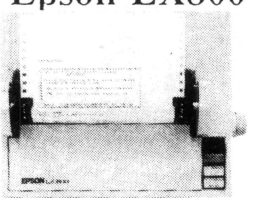


20 Megabyte hard disk drive for IBM and compatibles. Comes complete with OMTI controller and already software configured for your computer. Super quiet, shock-rated to 40G. The best hard drive available. Elsewhere $999. Our price:

READER INFO No. 74 **$699**

PRINTERS

13) Epson LX800

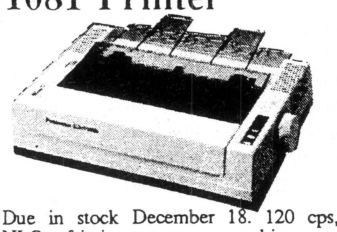


Our top-selling parallel dot matrix printer. 180 cps, two NLQ fonts, graphics, friction & tractor, single sheet feeder, 12 mths wty. Normally $675. Hurry. Limited stock Our price:

Hurry! Not many left!

READER INFO No. 75 **$497**

14) Panasonic 1081 Printer



Due in stock December 18. 120 cps, NLQ, friction, tractor, graphics etc, etc. Sale price:

$595 at Ritronics **$399**

READER INFO No. 76

MODEMS

15) GPA Super-Modem



READER INFO No. 77

The leading Australian external modem. V21, V23 auto-dial, auto-answer, auto-disconnect, Hayes compatible. 12 mths wty. Optional V22 and V22 BIS boards available.

Reduced from $395!

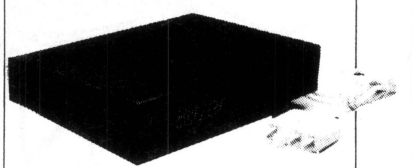
Standard version: **$349**

V22 version: **$449**

V.22 BIS version: **$559**

(Due Feb. Also FORTH SuperComputer. See Dec Y.C)

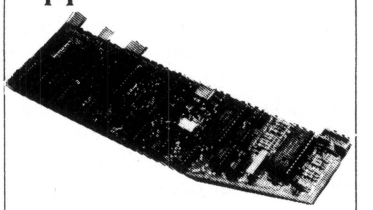
16) Bit Blitzer 123E



From David Hartley's Banksia group, a Telecom approved, compact , well documented and presented external modem featuring V21, V22 and V23 with auto everything, Hayes compatability, pulse and tone dial etc Sells everywhere else at $499. We can sell it to you for:

READER INFO No. 78 **$449**

17) SuperCard for Apple



V21, 22 & 23 Card modem from Maestro for the open architecture Apples (II, IIe, IIGS). Features auto everything & Hayes m/m compat-ability. Works with Ascii Express etc.

READER INFO No. 79 **$349**

18) Auto-Ice Apple Modem

V21 and 23 card modem for Apple II, IIe and IIGS. Features Comms and Viatel software on Eprom. **$279**

READER INFO No. 80

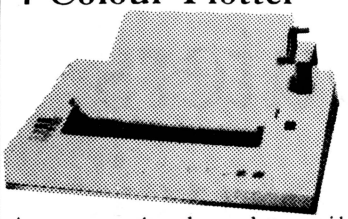
MICRO-EDUCATIONAL PTY LTD

Unit 8, 235 Darby St, Cooks Hill NSW 2300 Phone (049) 264122

Telecom, Dept Navy, Dept Ag, Syd.Uni, UNSW, CSIRO, Monash, HEC, most Aust colleges & high schools, PM's Dept etc, etc.

ACCESSORIES

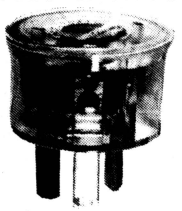
19) COMX PL80 4 Colour Plotter



A compact 4 colour plotter with Centronics parallel port suitable for use with Apple, IBM, etc. Plots at 92 mm/sec in 0.2 mm increments. Emulates Roland DXY800 for AutoCad, Amdek Amplot for Lotus and Symphony. Works with A4 cut sheet or roll paper supplied. The PL-80 is suitable for school, hobbyist and professional use.

READER INFO No. 81 **$499**

20) The Button



Spike filter and lightning arrestor. Low cost protection for your valuable computer equipment. Works in parallel with any equipment on the same circuit. No installation required. The perfect Christmas gift for the computer enthusiast who has everything. You maybe?

READER INFO No. 82 **$35**

21) Logimouse

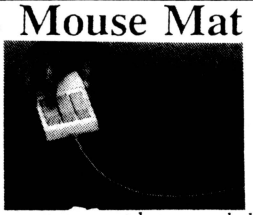


READER INFO No. 83

Microsoft compatible mouse for your IBM or compatible. Comes complete with software. Connects to mouse port. Card version also available for $259 which comes with its own driver card.

$259 elsewhere. Our price: **$199**

22) Mouse Mat

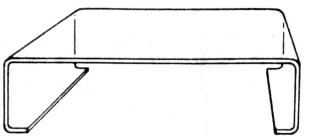


If your mouse scratches your desk you need this neoprene mat. Keeps your mouse clean and working properly. **$19.95**

READER INFO No. 84

ACCESSORIES

23) Printer Stand



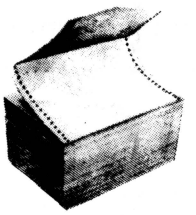
READER INFO No. 85

Clear perspex printer stand. Stylish. Rigid. Holds 1000 shts comfortably. Suits most 10" dot matrix printers.

10" version **$35**

15" version **$45**

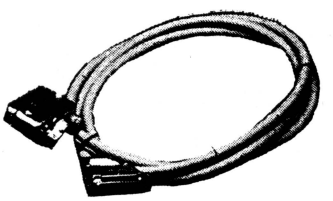
24) Paper



2000 sheet continuous stationery. Laser cut detachable tractor. 70 gsm, 66 line (American standard) printer paper. White bond. Allow $6 to $9 postage as it weighs 10Kg. Compare elsewhere at $52. Our price:

READER INFO No. 86 **$38**

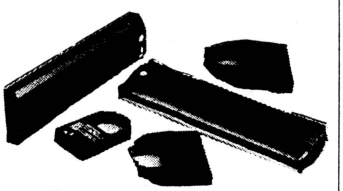
25) Cables



We supply virtually every cable imaginable. Cables to link computers to printers, modems etc. Most cables are available for :

READER INFO No. 87 **$30**

26) Ribbons



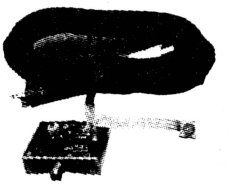
We supply most popular makes of ribbons including DT80, SP80, BX80, all Epson ribbons, Logitec, Super 5, Imagewriter, C.Itoh etc. Most ribbons are:

(Panasonic, EX800, LQ ribbons etc range from $15 to $25. Call$) **$12**

READER INFO No. 88

Apple Bits

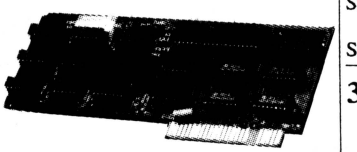
27) RF Mod IIe



If you need (or just want) colour on your Apple IIe but don't want to blow $700 on a colour monitor then invest $40 in a Mclagan Wright RFMod and hook up to VHF channel 11. Just the thing for the kids' games.

READER INFO No. 89 **$40**

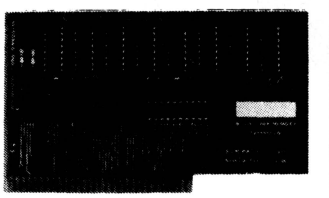
28) Z80 Card



Microsoft compatible Z80 card for IIe or II+. Gives you access to CP/M for such programs as Wordstar or dBase. A bargain at

READER INFO No. 63 **$90**

29) Ext 80 Card



If you still haven't upgraded your IIe to 128K and 80 columns then now is the time to buy the Auto-Ice Extended 80 col card. Allows Apple IIe owners to make full use of their machines.

$90

30) Auto-Ice Printer Card

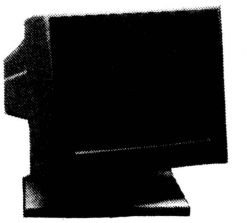


A fully-featured Apple Firmware compatible printer card which includes graphics dumps to most printers. Price includes cable. Works with all the latest software including Printshop. Normally $110. Our price:

$90

ACCESSORIES

31) Samsung Monitor



The best in Korean technology, Samsung is rapidly gaining a reputation for quality, reliability and excellent performance. Available in TTL or composite video, green or amber, and standard or swivel mounted. Prices:

Standard: **$199**

Swivel Mounted: **$220**

32) Viaterm



Viatel software package for Apple users wishing to connect by modem to Viatel. Written by Paul Zabrs who writes most of Telecom's software. Normally $140, our price:

READER INFO No. 59 **$99**

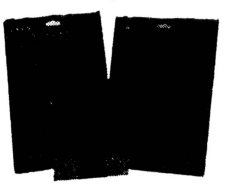
33) Terminapple



Apple communications software from the same author. Everything you would expect in a complete comms package. Elsewhere $145. Half price:

READER INFO No. 58 **$79**

34) Disk Cleaning Kits

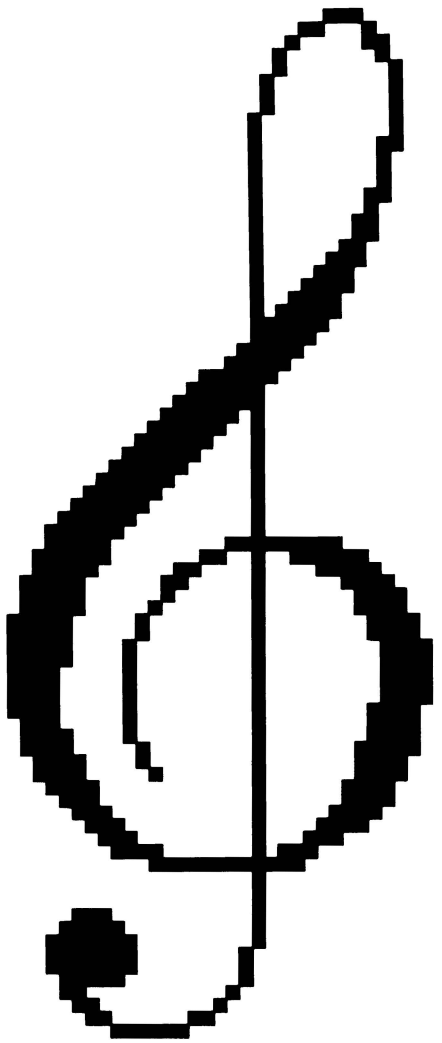


5KIT: 5" cleaning kit with 2 cleaning disks: **$13**

5REF: Ten replacement cleaning disks: **$25**

3KIT: 3.5" cleaning kit with 10 cleaning disks: **$30**

READER INFO No. 57



Microcomputers, MIDI, and music

In February, Andrew Symaniz looked at the theory behind the MIDI and channel voice messages. This month he looks at channel mode messages.

BEFORE we investigate the other important family of MIDI channel commands, channel mode messages, we need to examine more closely the date structure of messages containing the BN Status byte. As their name suggests, BN status 'control change' messages are used primarily for transmitting front panel parameter (or instrument control changes other than key pressures and pitch bender values that were discussed in some detail last time) between MIDI equipment. These messages incorporate a pair of 7-bit data bytes – the first byte defines the logical control number, and the second byte is used for assigning a value to the actual physical control.

In the case of 'program change' messages (CN status), although program selections can easily be dialed up remotely via MIDI, the specific programmed sounds themselves (for example: flute, piano sounds and so on) *cannot* be transferred directly between different makes or models of instrument. And similarly for (BN status) control change messages; these merely provide communication between different machines at their 'least common level'.

Yet another recent enhancement to the original MIDI specification introduces the concept of registered and non-registered parameter numbers.

In the original MIDI 1.0 specification, only two (modulation high bits and low bits) of the possible 122 control commands were explicitly defined. This assignment flexibility has enabled manufacturers of different types of musical equipment to freely investigate their own proposals for parameter control through MIDI. Recently, some interesting new developments have surfaced, particularly in the area of control of non-keyboard MIDI equipment (for example, Yamaha's new OMP7 MIDI-controlled audio mixing console).

Non-specific definitions

But there have been prices to pay for non-specific MIDI controller definitions. One is a certain degree of vagueness regarding the controller compatibility of most 'MIDI-linked' equipment designed by different manufacturers (sound familiar . . . ?). Unfortunately this, amongst other things, has led to some misunderstandings about what can realistically be expected of MIDI in this particular context.

With regard to transmitting sound properties of individual synthesisers (as distinct from simply sending note on/off/velocity information and so on across MIDI), each brand of synthesiser is essentially a unique class of instrument. Each one invariably has its own proprietary synthesis algorithms, programming techniques, features, and therefore its own style and number of front panel controls. It follows then, that only another machine of exactly the same type can be expected to be able to interpret all of the controller information transmitted by the machine of origin.

In some cases, where different machines (or other devices from the same manufacturer) share similar capabilities for sound production, controller communication might be more successful. In

most other situations communication will be strictly limited, since any codes that enable the addressing of a particular parameter (say, cut-off frequency) on one make of synthesiser is unlikely to produce the same kind of effects on another synthesiser – even assuming that it has this facility in the first place. In other words, MIDI never has been and never will be able to turn a low cost synthesiser into a fully specified one.

Recently there has been a trend among some manufacturers to make controller assignment programmable – so that definition of, say, the pitch bend wheel on a remote keyboard unit can be stored as part of a sound patch. In this way the same controller might be used in different ways in several parts of a song to adjust, say, volume level in the verses, or perhaps, pitch bending during 'solo' sections.

Inevitably, the kind of approach that enhances flexibility for controller assignment places considerably more programming demands on the musician. However, since most manufacturers continue to provide comprehensive MIDI implementation charts (usually documented in the back of owners' manuals) the possibility for greater controller communication in the future can only improve.

Recent updates to MIDI 1.0

Some sanity should soon be restored to the less technically minded musician (who usually just wants to 'plug in and play, straight away') since now there are a number of de facto controller standards that have become more accepted as legitimate alternatives to the original MIDI 1.0 specification.

For example, controller numbers 0 to 63 can be assigned to as many as 32 of the more popular continuous controllers such as volume pedals, pan controls and so on (see Table 1). These potentiometer-based controls can have either 14-bit (16384 value) or 7-bit (128 value) resolution, depending on whether the Least Significant Bytes (LSBs: control numbers 32-63) are used in conjunction with the Most Significant Bytes (MSBs: control numbers 0-31).

There is provision of individual manufacturers to decide on the degree of resolution for functions assigned to these controls so that the LSB for a particular controller may, or may not, need to be transmitted or received.

Also, following a recent revision to the original MIDI specification by the MIDI Manufacturers Association (MMA) and Japanese MIDI Standards Committee (JMSC), which are the MIDI standards' watchdogs, the 32 'switch' control numbers 64 to 95 may now be assigned to function independently: either as MIDI switches (values 0-63 = OFF, 64-127 = ON), or as additional continuous controllers with 7-bit resolution (using intermediate values).

Typically this second grouping of control numbers is used for handling such functions as sustain pedal/switches, or for describing the various parameters associated with portamento, tremolo, chorus, phasing effects and such like.

Yet another recent enhancement to the original MIDI specification introduces the concept of registered and non-registered parameter numbers. These can enable all sound parameters on an instrument to be accessible via MIDI sequencing software.

The values of registered/non-registered numbers can be altered using the four data entry 'control change' messages as follows: first the registered or non-registered parameter number corresponding to the parameter to be accessed is transmitted, followed immediately by the desired data entry (MSB/LSB), data increment or data decrement value.

Registered parameter numbers (reception of which should be automatically

Common MIDI Controller Definitions

	Control	Number (decimal)
14- bit Controllers (MSBs)	undefined	0
	Modulation controller	1
	Breath controller	2
	undefined	3
	Foot Controller	4
	Portamento Time	5
	Data Entry MSB	6
	Main Volume	7
	Balance Controller	8
	undefined	9
	Pan Controller	10
	Expression Controller	11
	undefined	12-15
	General Purpose Controllers (1-4)	16-19
	undefined	20-31
14-bit Controllers (LSBs)	LSBs for Cotrollers 0-31 (as above)	32-63
7-bit Controllers (switch data range: 0 - 63 = OFF, 64 - 127 = ON)	Hold, Damper Pedal (sustain)	64
	Portamento	65
	Sostenuto	66
	Soft Pedal	67
	undefined	68
	Hold 2	69
	undefined	70-79
	General Purpse controllers (5-8)	80-83
	undefined	84-91
	Tremolo Depth	92
	Chorus Depth	93
	Detune (Celeste)	94
	Phaser Depth	95
Parameter Value	Data Entry Increment	96
	Data Entry Decrement	97
Parameter Selection	Non-Registered Parameter LSB	98
	Non-Registered Parameter MSB	99
	Registered Parameter Number LSB	100
	Registered Parameter Number MSB	101
Undefined Controllers	undefined	102-121
	Channel MODE messages (see Table 2)	122-127

Table 1. *The common MIDI controller definitions. See Table 2 for the channel mode messages.*

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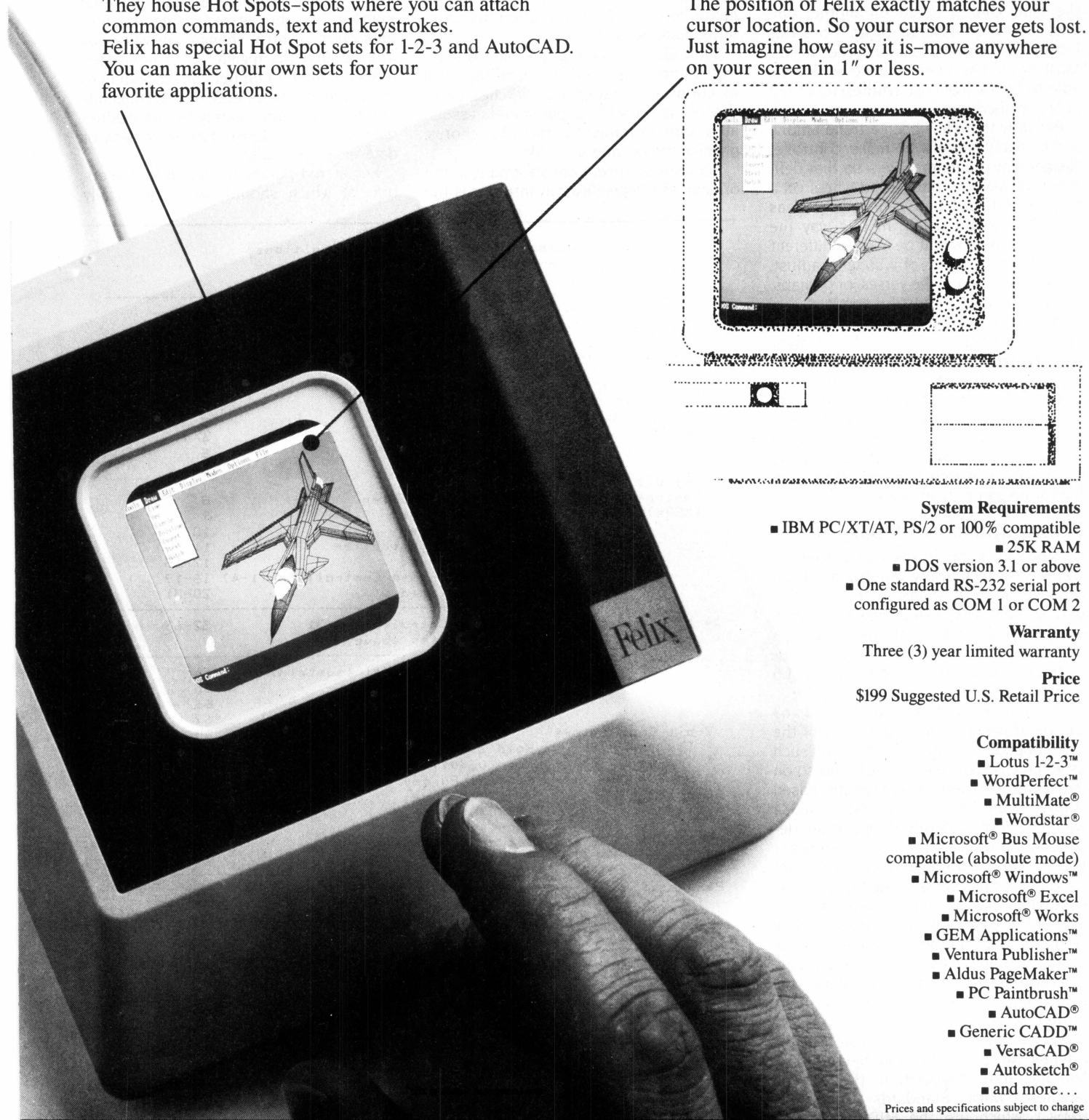

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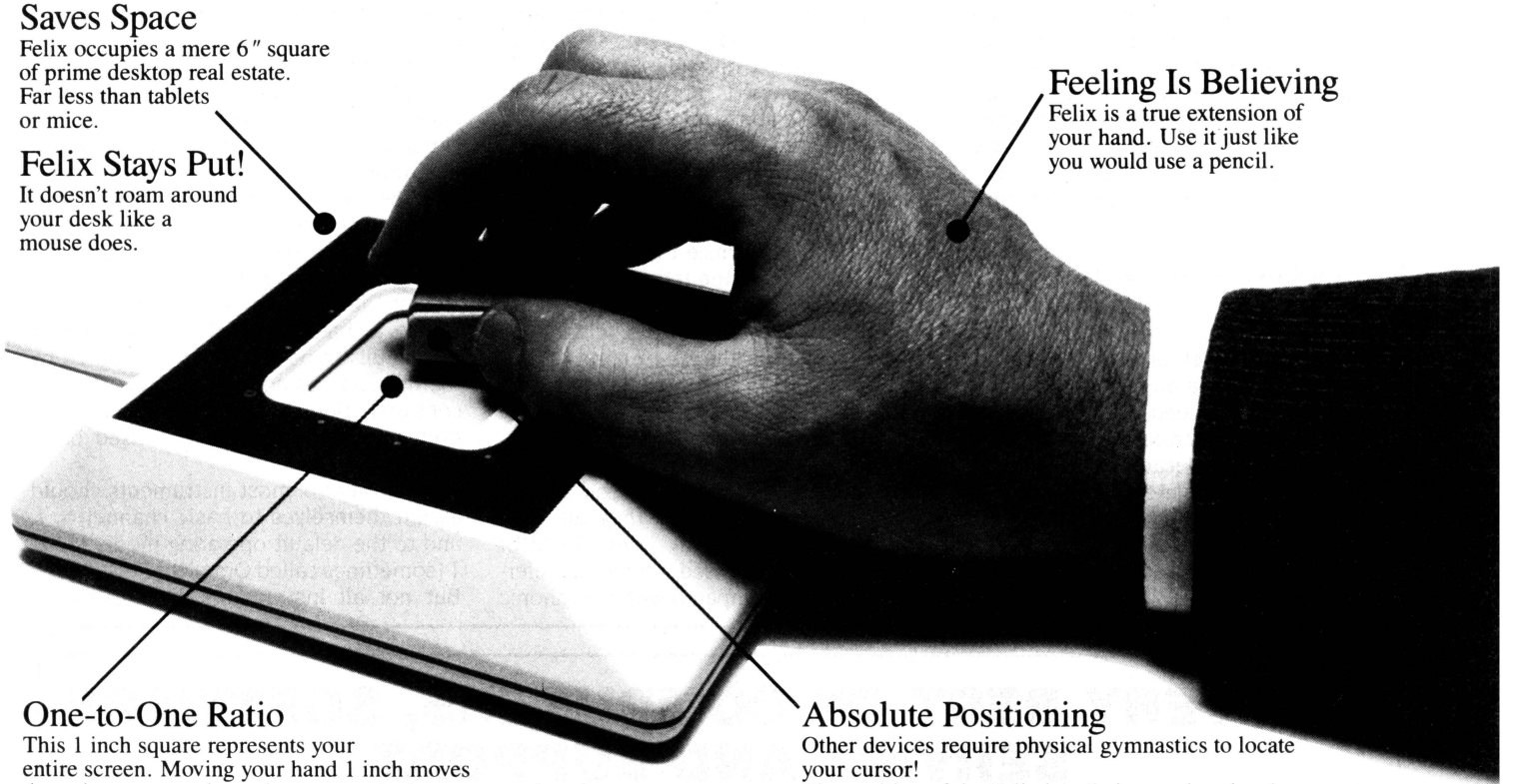

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enabled on instruments at power up) are a standardised list of assignments co-ordinated jointly by the MMA and JMSC.

However, at this relatively early stage of the game, Number 00 (representing pitch bend sensitivity) is the only explicitly defined registered parameter number. The MSB of this data is in semi tone resolution and the LSB data is in units of 1/128 th of a semi tone. Manufacturers can assign as many independent parameters as they need to the non-registered parameter numbers – providing they include all relevant information in their owners' manuals.

Channel mode messages

Control numbers 122-127 are summarised in Table 2 – they belong to an entirely different set of MIDI messages called channel mode messages.

Many musicians need not be too concerned by these discrete modes of MIDI operation. This is because most equipment is designed to automatically configure itself and respond in the most powerful mode possible, the instant it is attached to another MIDI device. This convenience is performed by the various 'mode select' commands, emitted periodically from each MIDI-out port.

However, some appreciation of channel mode operation is necessary, in order to understand how several instruments (or voices, on a multitimbred device) can simultaneously receive exactly the same MIDI data, but respond to this serial data stream in entirely different ways.

Mode selection is imperative in practice, since different equipment can have a variety of minimum MIDI requirements. For example, drum machines need not have to rely at all on specific keyboard note information, though they might be required to synchronize to the timings of played notes, or to the tempo of a master sequencer, or, perhaps, to provide other time dependent events that 'clock' the MIDI network. On the other hand, useful features of MIDI for most synthesisers would include, at least, remote keyboard control and program switching.

Similarly, while the majority of monophonic sequencers can both send and receive most keyboard data, they can deal only with single melody lines. So MIDI data must be organised somehow differently for them, compared with polyphonic sequencers. Also, sequencing devices may, or may not, be interested in capturing sound program, control or other changes. Moreover, it has never really been possible to foresee the number and diversity of instrument configurations that creative musicians in the future might eventually require.

The current MIDI specification provides 16 software designated communication channels – to which instruments are individually assigned according to 4 modes of operation. It is via these discrete modes that the various instruments (and sometimes individual voices) can be addressed individually – regardless of the physical interconnection scheme.

Each device in a MIDI system is assigned a 'basic channel' number (either by default on power up, or reassigned by the musician using the instrument's own controls). Some MIDI equipment, however, may be limited to one fixed basic channel.

On power up, most instruments should assign themselves to basic channel = 1, and to the default operating mode, Mode 1 (sometimes called Omni On/Poly Mode). But not all instruments are capable of

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Control number 122 is used as an optional feature on some keyboard synthesisers for disconnecting or restoring (value 0 or 127, respectively) the internal control path between the musical keyboard and its sound generating circuitry. This capability is particularly useful for MIDI multitracking using a single master keyboard. When 'local control' is set to off, keyboard data is redirected to the MIDI-out socket while the sound generators can only be controlled by incoming MIDI data. Control message 123 is used for temporarily terminating all voices on an instrument (that is to say, 'all notes off').

Control messages 124 to 127 are used for selecting the operating modes of an instrument's voices, via two conceptua' switches – the Omni On/Omni Off switch, and the Poly/Mono select switch.

When a synthesiser is set to Omni Off, the only channel voice messages it can receive are those sent on the single basic channel to which it is assigned. All other channelised messages will be ignored – though, it will continue to receive *system* messages (which we will be considering in more detail in the next article). On the other hand, an instrument switched to Omni on can receive any voice messages sent on any channel.

The mutually exclusive Mono/Poly switching arrangement refers to whether or not the notes received on each MIDI channel will be responded to monophonically, or polyphonically by the instrument's own voices. (Note that Mono/Poly MIDI action is quite independent of whether or not the synthesiser itself is monophonic or polyphonic).

Mono selection can provide for the addressing of just one synthesiser voice (that is to say, sound oscillator) per channel – a special case for instruments capable of multitimbral function.

In all other cases, Poly selection is used for assigning the incoming voice messages to the receiving instrument's sound generating electronics, according to the instrument's own internal polyphonic voices assignment algorithm.

Referring to Table 3, it can be seen that combinations of these settings (Omni On/Off, Mono/Poly) yield four increasingly powerful operating modes for both MIDI reception and transmission.

The ability of MIDI to support any of these operating modes means that, by and large, each piece of equipment in a MIDI system can automatically interpret incoming voice messages (or organise outgoing voice information) in the appropriate fashion – depending on the musical application desired.

In addition to the channel messages we have investigated so far, MIDI supports another group of important commands called system messages. These are distinguished by their own special group of Status bytes and come in 3 different forms – exclusive, common and real time. We'll be tackling these next time. □

Standards organisations

SEVERAL organisations have emerged in recent years, whose main purpose is to encourage communication among manufacturers, developers and musicians with an interest in MIDI.

The International MIDI Association (IMA) caters to individual users, and handles the distribution of the 'MIDI bible' – in other words, MIDI 1.0 Detailed Specification.

This document contains all the specifics of implementation to which all manufacturers have thus far conformed. It includes various schematics and communications protocols for MIDI, drawn up by the MIDI Manufacturers Association (MMA) and the Japanese MIDI standards Committee (JMSC).

The IMA also publishes the monthly IMA Bulletin, where members can exchange technical information, ideas and keep up to date on seminars, new software and products.

IMA has several levels of membership; ranging from $US300 for manufacturers and designers to $US50 for musicians and other users.

The MMA and JMSC function mainly as industry groups that deal more with immediate technical issues. They also serve as a forum for any proposals regarding the extension of the current MIDI specification.

Contact addresses for these groups –

The International MIDI Association,
11857 Hartsook Street,
Nth Hollywood CA 91607 USA

The MIDI Manufacturers Association,
2265 Westwood Blvd,
Box 2223, Los Angeles CA 90064 USA

The Japanese MIDI Standards Committee,
Gakki Kaikan, 2-8-21 Sotokan,
Chiyoda-Ku, Tokyo, 101 Japan

CHANNEL MODE MESSAGES

Message	Status Byte			Data Bytes	
	decimal	binary	hex	Number,	Value
Local control off	176-191	1011nnnn	BN	122,	0
Local control on	"	"	"	122,	127
All notes off	"	"	"	123,	0
Omni Mode off	"	"	"	124,	0
Omni Mode on	"	"	"	125,	0
Mono Mode on	"	"	"	126,	No. channels
Poly Mode on	"	"	"	127,	0

Table 2. *The MIDI channel mode messages.*

MIDI OPERATING MODES

MODE	OMNI		MIDI RECEPTION: (for basic channel = B)
1	On	Poly	All Voice messages are transmitted in Channel B.
2	On	Mono	Voice messages for one voice are sent in Channel B.
3	Off	Poly	Voice messages for all voices are sent in channel B.
4	Off	Mono	Voice messages for voices 1 through C are transmitted in voice channels B through B+C-1, respectively. (Single voice per channel.)

Table 3. *Combinations of Omni On/Off and Mono/Poly yield four increasingly powerful operating modes for both MIDI reception and transmission.*

Megadisc . . . the magazine on a floppy



Not all magazines come hot off the press. Robert Thirlwell browses through a wimp-y one . . .

NORMALLY when you order a magazine it appears in your mailbox either rolled up in plastic, or inside a large brown envelope. In my case, the postie scrunches it up to force feed it through the slot. This can make reading the magazine difficult, with creases and tears featured on every page.

But there's one magazine I subscribe to that's never scrunched up – Megadisc. It's delivered in a letter-sized envelope within a cardboard sleeve, and is strong enough to resist being folded in half. The contents of the magazine are electronically stored on a 3½ inch floppy disk. These are encased in plastic, and are less prone to abuse than 5¼ inch floppies.

Produced for the Commodore Amiga, Megadisc runs off the Workbench. It makes the most of this icon-based environment, so that all of the magazine's articles can be accessed through point-and-click mouse movements. To some of the computer cognizanti, using the mouse/menu/icon environment in preference to typing commands at the keyboard is considered a bit wimpy (pardon the pun). But remember –we're reading a magazine here, and not developing software for the next space station launch. Of course, if you are really desperate and hate icons, you can read the files from the CLI keyboard interface, but you miss out on a lot of fun that way.

Figure 1. *The contents page from Megadisc 5 (above). To open a drawer, select it with the mouse and press the button.*

The icons in Megadisc are not the small, flat and often ambiguous kind that are on the original Workbench disks provided with the Amiga. Megadisc icons cannot be misinterpreted: a drawer is a drawer, and when you click it on, it opens like any real drawer should in three dimensionally rendered space.

The drawers have names such as Articles, Public Domain, Reviews, Feedback, Communications and Art Gallery. This makes sense, and when the drawer is opened a subdirectory is displayed with more colourful icons to click on. In this way, you proceed through the various sections of the magazine, reading the articles, running programs or displaying hi-res and lo-res pictures from the Art Gallery.

These icons have been matched with an excellent utility called Xicon, which executes CLI commands as if you had typed them in, simply by clicking on the icon. All of the routines and utilities are user-accessible and can be used for customising one's own Workbench. With the Amiga's multi-tasking capabilities, it is possible to have several different windows open displaying their contents simultaneously.

Contributions

Like all computer magazines, artists and readers. So far the editorial content has been of a reasonable standard, and the editor Tim Strachan assures me that he has plenty of material and that the magazine is healthy. For new Amiga users, information on how to get the most out of their machine is provided. Readers interested in adding hardware such as extra memory or a hard disk drive can read reviews of Australian products they may not have heard of.

Much of the material has been taken from the Public Domain. This is useful for those who are without modems, or who don't have time to spend searching bulletin boards for small gems that occasionally appear in the gravel.

All of these feature articles have been put together by Strachan, with the help of

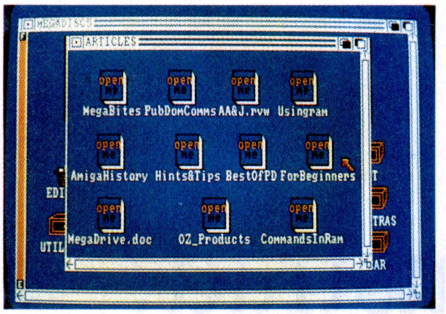

Figure 2. *The contents from the Articles drawer. To read an article, select it with the mouse, and it comes up on the screen automatically.*



Figure 3. *The contents page of Megadisc 4.*

Ian Vanderfield (in the first editions). Megadisc 1 was produced in March '87. Megadisc 5, for example, had articles on the history of the Amiga, handling RAM, and how to set up hard disks. There were also reviews on the Sidecar, Digi Paint, the FACC II disk accelerator and the games Garrison and Goldrunner.

One big advantage of disk magazines is that programs and utilities can be transferred straight to your own operating set-up, without the tedious entering of program listings. Utilities in Megadisc 5 included a Public Domain disk examination program, with hints on how to handle the dreaded virus.

I have been an avid subscriber to Megadisc and have found useful hints, programs and information in each issue. It redefines the meaning of 'magazine' – it's an indication of the way things will look in the world of digital publishing. □

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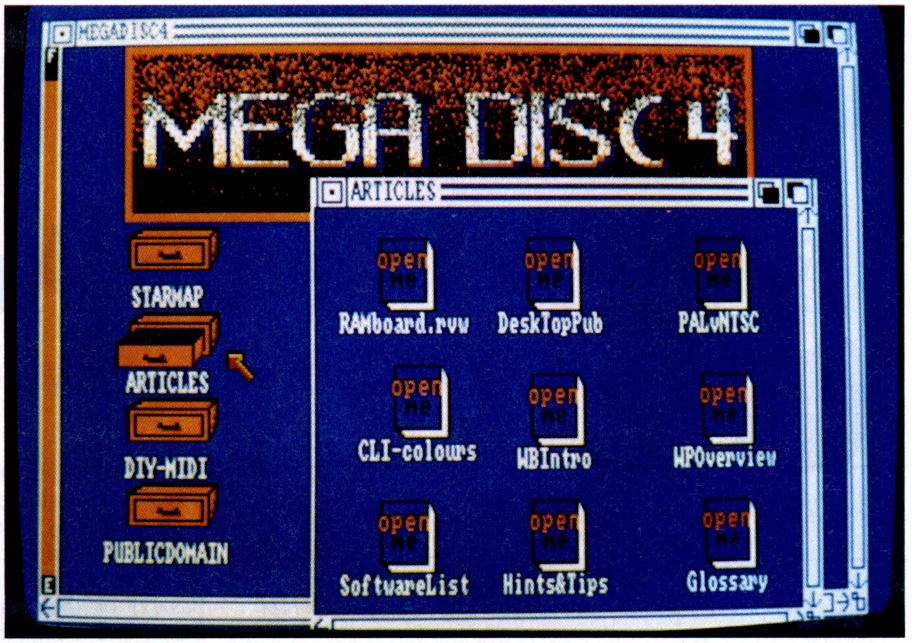


Figure 4. *The Articles drawer from Megadisc 4. Each issue contains informative news and reviews for the Amiga computer user.*



Figure 5. *Tiger, from the Art gallery drawer in Megadisc 5 – Henk van der Graaf produced this excellent high resolution picture with Deluxe Paint.*

Is there Life on Amstrad?

A lesson in the Basic Rules of Life, by Tim Hartnell.

The listings will let you look at Life in action on your Amstrad . . . and most other Basic-running computers.

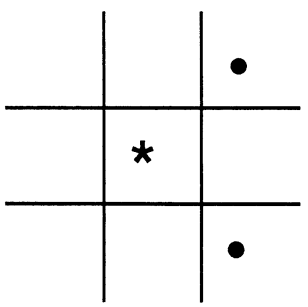
YOU'VE PROBABLY heard of one of the original computer simulation programs, the now-classic Life created by John Conway. Life is concerned with the growth and development of a colony of cells living on a grid. The listings will let you look at Life in action on your Amstrad PC (running under Basic2) or the Amstrad 464/6128 (running under Locomotive Basic) and most other Basic-running computers.

Life was developed by Conway when he was going to university in Cambridge, England. The program produces some amazing effects; its richness is not even hinted at by the rules under which the cells live, reproduce and die.

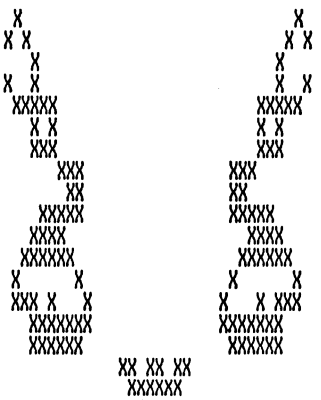
The Rules

Conway's rules are not very complicated, but give rise to the marvellous effects possible from the program. The rules are shown diagrammatically at left. They assume that each cell on the grid has eight possible neighbours (and we keep the outermost ring of cells empty; these are checked after each generation, but not printed out). If a cell has two or three neighbours, it survives to the next generation. If a cell has four neighbours, it dies out in the next generation, due to overcrowding. Finally, if there are exactly three cells neighbouring an empty cell, a cell is born in that location in the next generation.

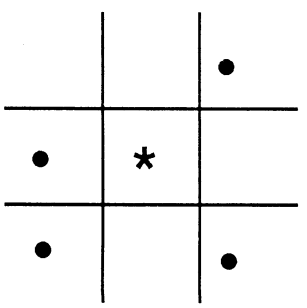
The rules are applied simultaneously across the whole grid. We do this by having a second grid, which records the changes as the first grid is scanned. The second grid is then copied into the first, before it is printed. (The grids are, of course, held in two-dimensional arrays, as you can see from the program listings.)



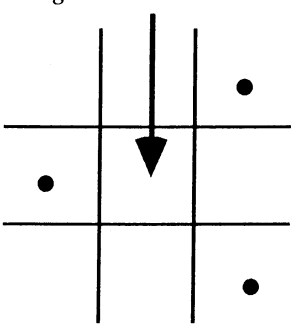
Rule 1. *If a cell has two or three neighbours, it survives to the next generation.*



New cell born here in the next generation.



Rule 2. *If a cell has four neighbours, it dies from overcrowding.*



Rule 3. *If there are exactly three neighbouring cells, a new cell will be born in the next generation.*

The Listings

Listing 1 is for the Amstrad PC, under Basic2. It allows you to decide whether or not you want a randomly generated colony, or one which is held in DATA statements (a sample set of DATA lines for this is given in the program). Listing 2 is for the Amstrad 464/6128, and for most other Basic-using computers if you haven't been wise enough to buy an Amstrad. This produces a randomly generated colony, and gives you the option of printing the colony out directly to your printer. You can easily add such an option to the PC version if you like.

Listing 2 assumes you have a 40-column screen, but prints out an 80-column version on your printer (if you tell the program you want a hard copy). To get an 80-column display on the screen, if your computer permits it, change the 9 in the following lines into a 19: 110, 140, 200, 230, and change line 80 to read TB=22.

Just type in the relevant program for your system and soon you'll be able to tell if there is Life on Amstrad after all. □

```
REM CONWAY'S LIFE SIMULATION
GOSUB initialise
REM *************************
REM MAJOR CYCLE
WHILE NOT finished
 generation=generation+1
 GOSUB printout
 GOSUB evolve
WEND
REM *************************
LABEL evolve
FOR x=2 TO 19
 FOR y=2 TO 19
  c=0
  IF a$(x-1,y-1)="X" THEN c=c+1
  IF a$(x-1,y)="X" THEN c=c+1
  IF a$(x-1,y+1)="X" THEN c=c+1
  IF a$(x,y-1)="X" THEN c=c+1
  IF a$(x,y+1)="X" THEN c=c+1
  IF a$(x+1,y-1)="X" THEN c=c+1
  IF a$(x+1,y)="X" THEN c=c+1
  IF a$(x+1,y+1)="X" THEN c=c+1
  IF a$(x,y)="X" AND c<>2 AND c<>3 THEN b$(x,y)=" "
  IF a$(x,y)=" " AND c=3 THEN b$(x,y)="X"
 NEXT y
NEXT x
RETURN
REM *************************
LABEL printout
PRINT CHR$(7)
PRINT AT(1,1);"
PRINT AT(21,1);"GENERATION"generation
FOR x=2 TO 19:PRINT TAB(15);
 FOR y=2 TO 19
  a$(x,y)=b$(x,y)
  PRINT a$(x,y);
 NEXT y
 FOR y=19 TO 2 STEP-1
  PRINT a$(x,y);
 NEXT y
 PRINT
NEXT x
RETURN
REM *************************
LABEL initialise
CLS
CLOSE #2:CLOSE WINDOW 3:CLOSE WINDOW 4:WINDOW #1 FULL ON
PRINT:PRINT:PRINT
flag=0
WHILE INKEY$<>"":WEND
PRINT TAB(7);"Do you want the colony to be (R) - random,"
PRINT TAB(33);"or (P) - predefined?"
k$="":WHILE k$<>"r" AND k$<>"R" AND k$<>"p" AND k$<>"P"
k$=INKEY$:WEND
IF k$="p" OR k$="P" THEN flag=1
IF flag=1 THEN PRINT TAB(30);"OK, predefined"
     ELSE PRINT TAB(30);"OK, random)
RANDOMIZE VAL(RIGHT$(TIME$,2))
DIM a$(20,20),b$(20,20)
PRINT:PRINT "   PLEASE STAND BY..."
FOR x=1 TO 20
 PRINT 21-x;
 FOR y=1 TO 20
  IF x=1 OR y=1 OR x=20 OR y=20 OR flag=1 THEN GOTO make_blank
   IF RND>.5 THEN a$(x,y)="X":GOTO make_equal
   LABEL make_blank
   a$(x,y)=" "
   LABEL make_equal
   b$(x,y)=a$(x,y)
 NEXT y
NEXT x
generation=0
IF flag=0 THEN CLS:RETURN
REM ***************
LABEL defined_colony
READ d:IF d=99 THEN CLS:RETURN
READ e:a$(d,e)="X":b$(d,e)="X"
GOTO defined_colony
DATA 19,19,19,18,19,17,18,19,18,17,18,16
DATA 3,3,19,18,19,17,3,4,3,5,4,4,4,5,5,3,5,4
DATA 5,5,5,96,6,6,8
DATA 7,7,8,6,8,8,9,5,9,9
DATA 10,10,10,11,10,12
DATA 12,6,12,7,12,8,12,9
DATA 13,5,13,10,14,4,14,11
DATA 15,3,15,8,15,12
DATA 16,5,16,6,16,7,16,8,16,9,16,10,16,11,16,12
DATA 99
```

Listing 1. The Life program for the Amstrad PC running Basic2.

```
10 REM 464 - LIFE
20 CLS
30 GOSUB 470:REM Initialise
40 GOSUB 70:REM Print out
50 GOSUB 290:REM Evolve
60 GOTO 40
70 CLS
80 TB=11
90 PRINT:PRINT:PRINT:PRINT:PRINT TAB(TB);
100 FOR X = 2 TO 9
110 FOR Y = 2 TO 9
120 PRINT CHR$(A(X,Y));
130 NEXT Y
140 FOR Y = 9 TO 2 STEP -1
150 PRINT CHR$(A(X,Y));
160 NEXT Y
170 PRINT:PRINT TAB(TB);
180 NEXT X
190 FOR X = 9 TO 2 STEP - 1
200 FOR Y = 2 TO 9
210 PRINT CHR$(A(X,Y));
220 NEXT Y
230 FOR Y = 9 TO 2 STEP -1
240 PRINT CHR$(A(X,Y));
250 NEXT Y
260 PRINT:PRINT TAB(TB);
270 NEXT X
280 RETURN
290 FOR X = 2 TO 9:FOR Y = 2 TO 19
300 C = 0
310 IF A(X-1,Y-1) = B THEN C = C + 1
320 IF A(X-1,Y) = B THEN C = C + 1
330 IF A(X-1,Y+1) = B THEN C = C + 1
340 IF A(X,Y-1) = B THEN C = C + 1
350 IF A(X,Y+1) = B THEN C = C + 1
360 IF A(X+1,Y-1) = B THEN C = C + 1
370 IF A(X+1,Y) = B THEN C = C + 1
380 IF A(X+1,Y+1) = B THEN C = C + 1
390 IF A(X,Y)=B AND C<>3 AND C<>2 THEN B(X,Y)=E
400 IF A(X,Y)=E AND C=3 THEN B(X,Y)=B
410 NEXT Y:NEXT X
420 FOR X  = 2 TO 9:FOR Y = 2 TO 19
430 A(X,Y) = B(X,Y)
440 NEXT Y:NEXT X
450 RETURN
460 REM ************************************
470 REM Initialise
480 CLS
490 PRINT "Press the space bar":PRINT"when you're
                                        ready to begin"
500 N = 1
510 IF INKEY$ = "" THEN N = N + 1:GOTO 510
520 RANDOMIZE N:PRINT:PRINT:PRINT
530 PRINT "Do you want a copy on"
540 PRINT "your printer (Y or N)"
550 A$ = INKEY$: IF A$ <>"n" AND A$ <> "N" AND
                              A$ <> "y" AND A$ <>"Y" THEN 550
560 IF A$ = "y" OR A$ = "Y" THEN N = 0
570 CLS
580 B = ASC("*"): E = ASC(" ")
590 DIM A(10,20),B(10,20)
600 FOR X = 2 TO 9:FOR Y = 2 TO 19
610 A(X,Y) = E
620 IF RND > .45 THEN A(X,Y) = B
630 B(X,Y) = A(X,Y)
640 NEXT Y:NEXT X
650 RETURN
660 LPRINT "      ----------------------------------";
          REM 6 spaces, 34 -'s
670 LPRINT:LPRINT:LPRINT"     ";
680 FOR X = 2 TO 9
690 FOR Y = 2 TO 19
700 LPRINT CHR$(A(X,Y));
710 NEXT Y
720 FOR Y = 19 TO 2 STEP - 1
730 LPRINT CHR$(A(X,Y));
740 NEXT Y
750 LPRINT:LPRINT "     ";
760 NEXT X
770 FOR X = 9 TO 2 STEP -1
780 FOR Y = 2 TO 19
790 LPRINT CHR$(A(X,Y));
800 NEXT Y
810 FOR Y = 19 TO 2 STEP - 1
820 LPRINT CHR$(A(X,Y));
830 NEXT Y
840 LPRINT:LPRINT "     ";
850 NEXT X
860 LPRINT
870 RETURN
```

Listing 2. The Life program for the Amstrad 464/1628 and most other Basic computers. □

Business Speciality Software

. . . the vertical market

THE SPREADSHEET, word processor and database are the 1980s' equivalents of the calculator, pen and filing cabinet. They have become the new office essentials, but it is a very peculiar business which can survive on the essentials alone. For most professions and industries there are particular functions which software's ruling triumvirate simply can't provide.

With any luck, the solution to your current business problem lies somewhere in this catalog . . .

In the past, the solution was to have a package 'tailormade' — to hire a programmer and have a specific application written for your business, at considerable expense. Ten years ago it may have stopped there, but the massive penetration of microcomputers into industry has made a third way possible: vertical market software, off the shelf packages which have been written for a single industry.

Frequently, these products have evolved out of an application written for a single client; one person's warehousing needs may differ substantially from another, but an intelligent programmer with a good knowledge of the field can design adaptable software. Frequently also they began as mainframe or minicomputer packages, and have been ported down to micros as they have grown in power.

In the past it was necessary to hire a programmer if a package couldn't be found to suit a particular need in business. But now, as Steve Keen found, there are hundreds of packages available that have been specially written to cater for specific businesses and needs, from accounting to zoology. This month we catalog vertical market software; in June, Steve will follow up with reviews on four of the most interesting of these industry specific solutions.

The disadvantage of vertical market software, when compared to tailormades, is that you may be forced to adapt to the programmer's view of how your firm should function, rather than bending a hired programmer to your will. But the extra labour or new work patterns involved are frequently compensated by the lower price of the vertical package. There is another advantage to vertical software over tailormade – there is no need to find a programmer who knows your industry.

Many companies find that the hardest part about getting software written is communicating what is required to the programmer. A vertical product with a proven track record means that problem has already been overcome by somebody else.

Vertical market software is normally a lot more expensive than application packages, because of the more limited market to which it is sold. Often, too, a 'retail price' doesn't really apply, since the price will depend on how many modules you buy, how many machines you want to run it on, and how many copies you intend purchasing, and whether you want any modifications – issues which aren't as prominent in the more anonymous world of Ashton-Tate, Microsoft and Lotus. Because of this, a price is shown for only a few of the packages listed here, and often it is 'subject to negotiation.'

Though we'd like our catalog of vertical market software available in Australia to be exhaustive, we know what the odds are against that. There are many companies we haven't tracked down, some we didn't get information back from, and so on. If you know that we've left a valuable package out, or think we haven't adequately described one, tell us: we'll keep updating the database, and publish new listings regularly.

With any luck, the solution to your current business problem lies somewhere in this catalog. The first part lists products by industry. If a product looks interesting, look up the company name and contact in the second half of the database, and give them a call – tell them *Your Computer* sent you. □

Products

Accounting

Supplier: Attache
Product: Attache Version 3.10 $788
Modular accounting package (price shown is per module). More features than cheaper Attache4, with multi-user capacity. Six modules – Accounts Receivable, Orders, Inventory, Accounts payable, General Ledger, and Payroll.
Product: Attache4 $999
Full accounting package with Customers, Products, Suppliers and General Ledger. Allows you to design your own invoices. Runs on IBM PC and Apple MacIntosh.

Supplier: Compact Software
Product: Compact $855
PC Accounting system with separate modules for general ledger, accounts receivable/payable etc., plus job costing and Nucleus, a Basic code generator which designs relational database systems. Price shown is average per module price (13 modules in all).

Supplier: MCC Software group
Product: MFASYS
A management, financial and accounting information system with general ledger, accounts, fixed assets, job costing, and reinsurance. Attempts to set itself apart from the mob by speed of response, and internal language for adaptations, and speedy data entry with customisable screen layouts.

Supplier: Murphy Creighton Systems
Product: SuperTax $600
The program's two modules (available separately) do tax calculations on Eligible Termination Payments, produce individual reports on Tax Office stationery, calculate maximum tax deductible contributions and maximum benefits.

Supplier: Paxus Professional Office
Product: IBS
A suite of modules covering general ledger, debtors/creditors, orders processing, inventory, job costing, payroll and integrated document based word processing.

Supplier: PSI Computer Systems
Product: Accounts Payable/Receivable
Online multi-user system.
Product: Fixed Assets
Control of financial and inventory aspects of fixed assets; can integrate with general ledger system.
Product: General Ledger and Finance System allows up to 1,000 departments and 10,000 cost centres.
Product: Payroll
On line multi-user payroll system with full files on all employees – hours worked, attendance, vacations, sick leave, taxation. Up to 9 pay cycles; posts to general ledger.

Supplier: Scientia-Whitehorse
Product: Distribution Systems
Distribution and accounting system: inventory management, customer order processing, purchase orders, accounts payable and other accounting.
Product: Foresight
Financial analysis package using complex economic indices to measure a company's level of financial risk.

Supplier: Shaw Systems
Product: Asset Register

Supplier: Axis Accounting System
Product: Modular accounting system
System based on 'landed cost.'

Supplier: Solution 6
Product: Solution 6
Accounting package.

Air Conditioning

Supplier: Palette Applications
Product: Pal-Duct
Airconditioning design oriented CAD package, covering design, detailing, interactive costing and production using NC equipment.

Architecture

Supplier: ARC Cadcentre
Product: SVS Superview Systems
Colour 3D modelling. Also Solids for solid modelling; SPF Space Planning Systems

Supplier: Ceanet
Product: DataCAD $5300
Architects, engineers and construction. Fully integrated 2D drafting and 3D design database, featuring automatic dimensioning of drawings, insertion of windows and doors, full 3D modelling, colour shading.

Business

Supplier: MCC Software group
Product: MFASYS
A management, financial and accounting information system with general ledger, accounts, fixed assets, job costing, and reinsurance. Attempts to set itself apart from the mob by speed of response, and internal language for adaptations, and speedy data entry with customisable screen layouts.

Supplier: PSI Computer Systems
Product: Fixed Assets
Control of financial and inventory aspects of fixed assets; can integrate



The CASEG medical accounts package is sold as a complete system for either physiotherapists or dentists.

with general ledger system.
Product: Payroll
On line multi-user payroll system with full files on all employees – hours worked, attendance, vacations, sick leave, taxation. Up to 9 pay cycles; posts to general ledger.
Product: PSI Stock System
Stock management system, online, multi-user. Covers Stock Enquiries, supplier transactions, goods inwards, transfers, sales and write-offs.
Supplier: QCOM
Product: The Corporate Retriever
A data retrieval product which indexes every significant word in text files stored on a hard disk. Supports a wide range of word processing packages.
Supplier: Technical Imports Australia
Product: Graphtime II
An excellent Australian authored package out of WA with very strong statistical data plotting capabilities.
Product: Statgraphics
An extremely powerful statistical package with 2 and 3D graph plotting powers.

Chemical

Supplier: Technical Imports Australia
Product: T3
Scientific word processor, with ability to write equations and chemical formulas on screen. Considerable control over final print appearance from within editor, though it's not quite a desktop publisher and not entirely WYSIWYG.

Communications

Supplier: ABC Computers
Product: Turbocomms $385
PC to PC remote operation. Includes protocols which other packages do not. Memory resident, file transfers in background. Can logon to another PC and fix problem as tech support.

Construction

Supplier: ARC Cadcentre
Product: Graphic Design Systems
GDS is a base 2D design and drafting system, suitable for any product design area. Additional modules such as GNC, which is Graphical Numerical control, adds the ability to control CNC machines. The suite is being ported to a Mac as a workstation to a DEC or VAX using locally written Mac-Arc.
Supplier: Ceanet
Product: DataCAD $5300
Architects, engineers and construction. Fully integrated 2D drafting and 3D design database, featuring automatic dimensioning of drawings, insertion of windows and doors, full 3D modelling, colour shading.
Supplier: Office Resource Centre
Product: Soft-Tech Joinery System
CAD package for the production of aluminium frames. Includes on screen design (including bar and glass cutting), customer management with quoting, and factory reports.
Supplier: Palette Applications
Product: Pal-Duct
Air-conditioning design oriented CAD package, covering design, detailing, interactive costing and production using NC equipment.
Supplier: Scientia-Whitehorse
Product: MainMan
Maintenance for factories, buildings and public utilities.

Courier

Supplier: ABC Computers
Product: Courier Transport Systems
Manage courier orders, invoicing, rating of dockets and price computations, handles a range of billing cycles, with payroll suitable for sub-contractors – cleans up paperwork.

Dentistry

Supplier: CASEG
Product: CASEG $15,770
Medical accounts package which handles normal billing, Workers Compensation, Third Party, Bulk Billing and Bankcard; special modules for physiotherapy and dentistry. Research module allows database of 32,000 patients, and searches on up to 41 criteria. Price includes all hardware, training, support.
Supplier: Scientia-Whitehorse
Product: Denpac
Dental practice management: billing, teeth charting, patient records, appointments, cash books etc. Orthodontic version also available.

Design

Supplier: ARC Cadcentre
Product: SVS Superview Systems
Colour 3D modelling. Also Solids for solid modelling; SPF Space Planning Systems
Supplier: CADCentre Australia
Product: DIAD
Two CAD modules, a drafting package and a 3D solids modeller
Supplier: CADCentre Australia
Product: DOMA
Drawing Office Management System takes information from CAD centre drafting products, combines them with related information on parts and suppliers to produce orders, parts catalogues, 'where used' lists, stock control, etc.
Product: GNC
Graphical Numerical Control produces programs for numerically controlled machine tools graphically, rather than requiring programming.
Supplier: Centreline Software
Product: Structural Detailing System
Based on the MLD2 computer aided design package, this package is tailored to the design of steel products. Package is now being used by TAFE NSW for CAD training.
Supplier: Cimtec
Product: Autocam $6100
Designed for the production of numerically controlled programs for a wide range of computer numerically controlled turret presses. It is a standalone package but is enhanced when interfaced with Autocad.

Distribution

Supplier: CMS Solutions
Product: Solutions
A management package for importers, wholesalers and distributors, Solutions consists of 17 modules covering customers, accounting, inventory, special pricing, product movement history and sales analysis, budgeting, forecasting, etc. The program manuals are online, to aid operators.
Supplier: Scientia-Whitehorse
Product: Distribution Systems
Distribution and accounting system: inventory management, customer order processing, purchase orders, accounts payable and other accounting.

Engineering

Supplier: ARC Cadcentre
Product: SVS Superview Systems
Colour 3D modelling. Also Solids for solid modelling; SPF Space Planning Systems
Supplier: CADCentre Australia
Product: DIAD
Two CAD modules, a drafting package and a 3D solids modeller
Product: DOMA
Drawing Office Management System takes information from CAD centre

drafting products, combines them with related information on parts and suppliers to produce orders, parts catalogues, 'where used' lists, stock control, etc.

Product: PEGS
The Project Engineering and Graphics System is an intelligent database with integral graphics which both produces schematic drawings and manages engineering information, bridging the gap between process design and detailed engineering.

Supplier: Ceanet
Product: Austrand $1200
Uses graphics to assist engineers to solve problems on IBM PCs. A mouse is used to input data to enable structural analysis and design to be carried out on screen. Statically loaded 2D structural systems, beam and truss elements, constructed of any material.

Product: Ceasat
Structural analysis with skyline equation solving, solution is based on the average bandwidth, thereby increasing efficiency of solution. Performs linear and logic analysis of 3D structural systems.

Engineering

Supplier: Ceanet
Product: DataCAD $5300
Architects, engineers and construction. Fully integrated 2D drafting and 3D design database, featuring automatic dimensioning of drawings, insertion of windows and doors, full 3D modelling, colour shading.

Supplier: Shaw Systems
Product: Engineering Quoting
Contains information from standard engineering mass book, which is used to estimate costs of materials required.

Supplier: Technical Imports Australia
Product: Graphtime II
An excellent Australian authored package out of WA with very strong statistical data plotting capabilities.

Product: Statgraphics
An extremely powerful statistical package with 2- and 3D graph plotting powers.

Product: T3
Scientific word processor, with ability to write equations, chemical formulas on screen. Considerable control over final print appearance from within editor, though it's not quite a desktop publisher and not entirely WYSIWYG.

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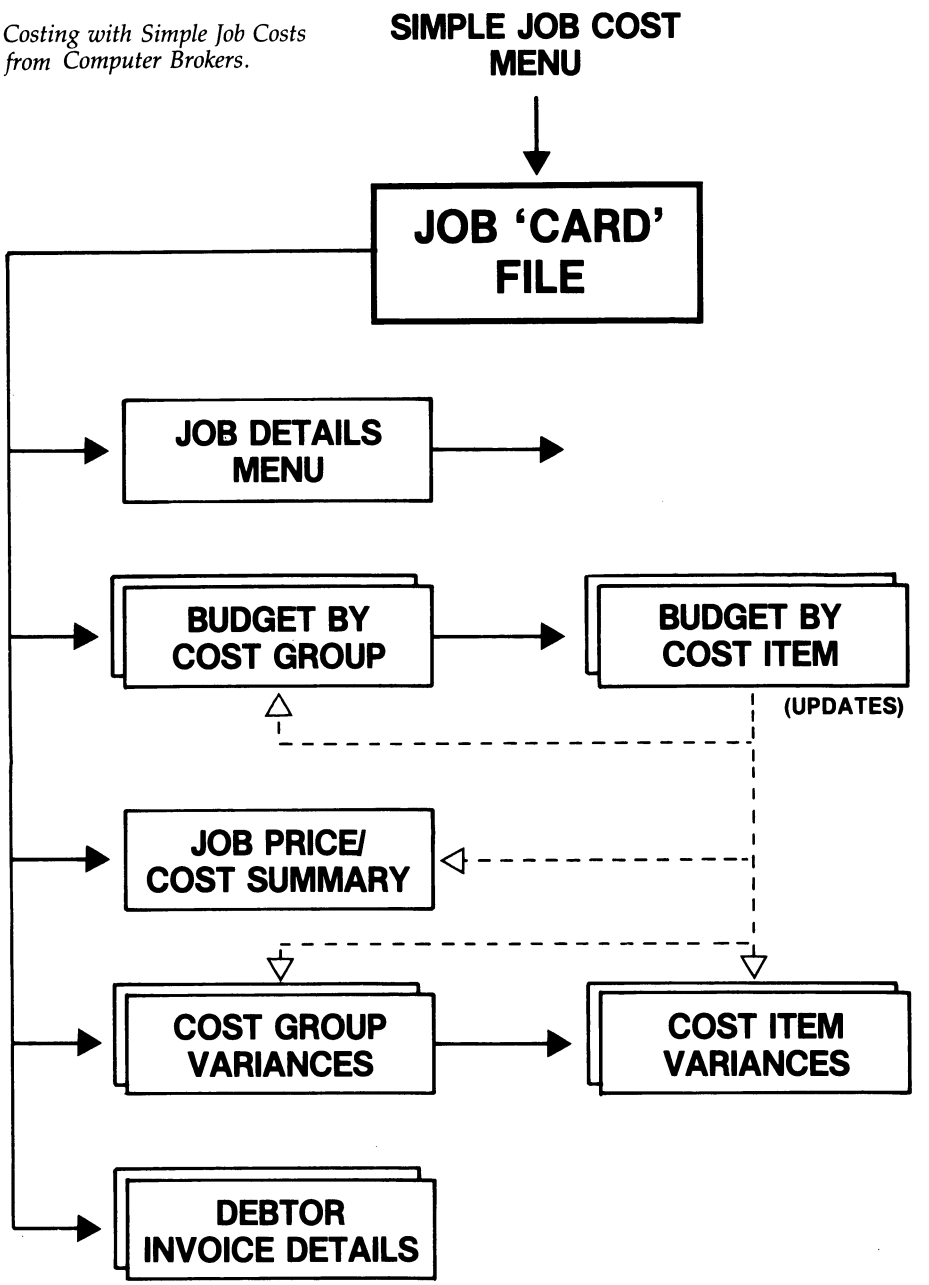

Entertainment/Clubs

Supplier: MDS Qantel (Aust)
Product: Club Management System
Provides membership management, poker machine analysis complete with preparation of statutory reports, payroll, debtors creditors and general ledger, plus a golf club handicapping system, asset register and stock control for food and beverages.

Finance

Supplier: Murphy Creighton Systems
Product: BAS $18,000
Bond Administration System is a multi-user PICK system, providing policy administration for life insurance bonds, including superannuation and rollover bonds. It supports ten terminals on an IBM AT, allowing online updating and enquiry, policy issue, and statutory management. Customisable.

Product: Superannuation Valuation SVS allows clerical staff to calculate the actuarial liabilities of a benefit

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 # 1004 PC-FILE + — Part 2 as above.

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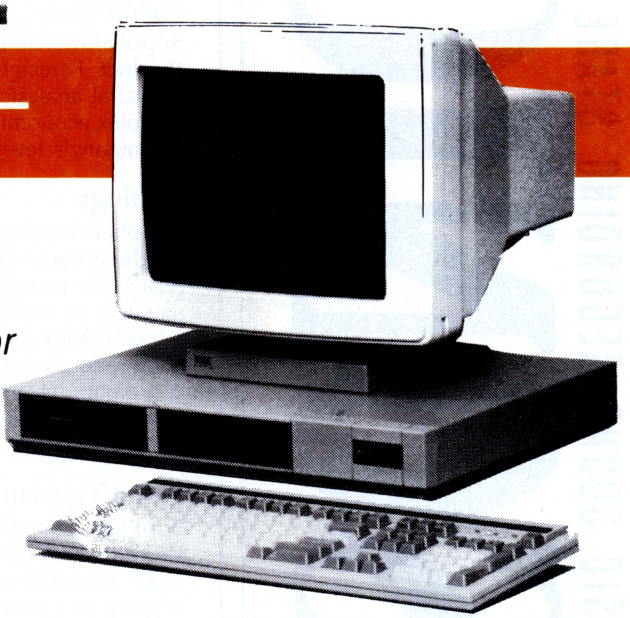

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promise superannuation plan, with checking done subsequently by an actuary.
Product: SuperTax $600
The program's two modules (available separately) do tax calculations on Eligible Termination Payments, produce individual reports on Tax Office stationery, calculate maximum tax deductible contributions and maximum benefits.
Supplier: PSI Computer Systems
Product: Share Register
Maintains corporate share register – shares held, transactions, dates of issue, certificates, cheque register, and mailing labels.
Supplier: Scientia-Whitehorse
Product: Foresight
Financial analysis package using complex economic indices to measure a company's level of financial risk.

Geology

Supplier: Kingdom Computer
Product: MasterMiner
Assists the geologist, surveyor, or mine manager to locate, prove and review mineral deposits. Stores borehole data, reduces raw data into X,Y coordinate information for planning, long and cross section analysis. Mineral assaying, lithology.

Hotel/Tourism

Supplier: CMS Solutions
Product: Hotel 20
Hotel 20 provides a graphical overview of room allocations, classified by name and date, pre-printed registration cards, computer recording of serviced rooms and telephone management, as well as the standard cashier, night audit, etc. Runs on PCs, a Unix box and IBM System 36.
Supplier: Hotel Systems
Product: EECO and Hotelier
Specialised property management software designed to support hotels with between 50 and 3000 rooms. Range of programs from accounting with manual reservations to complete automated system. Front of desk, back office, plus stores control
Supplier: MDS Qantel (Aust)
Product: HAL
Hospitality and Leisure System for hotels and hotel chains, providing reservations, convention planning, guest accounting, guest history, travel agency services, shop rental and specialised accounting including payroll. Modules are available individually.

Importing

Supplier: CMS Solutions
Product: Solutions
A management package for importers, wholesalers and distributors, Solutions consists of 17 modules covering customers, accounting, inventory, special pricing, product movement history and sales analysis, budgeting, forecasting, etc. The program manuals are online, to aid operators.

Library

Supplier: QCOM
Product: The Corporate Retriever
A data retrieval product which indexes every significant word in text files stored on a hard disk. Supports a wide range of word processing packages.
Supplier: Trimagic
Product: Biblio $250
Library management program.

Local Government

Supplier: Kingdom Computer
Product: Landlord
Land Management system providing graphical display of features (including roads, bridges, sewerage etc.) and relational database containing information on land zoning, planning etc.
Product: Masteroad 1 – 4
Terrain modelling for the design of roads, transmission lines, pipelines. Includes project management powers.
Product: Masterpipe
Computation of hydrology and hydraulics of urban drainage pipe systems.

Manufacturing

Supplier: Apollo Information Resources
Product: Apollo $36,000
Shelf management software for supermarkets; designs layout graphically using actual images of products, visually lays out store plan, predicts probable returns from different arrangements of merchandise. Includes digitised database of huge number of products. The Zeus of retailing.
Supplier: CADCentre Australia
Product: C-Plan
C-Plan assists Process Planning, the point where a design is turned into a production plan, taking over the repetitive tasks of this area and allowing the production engineer to

concentrate on efficient resource usage.

Product: GNC
Graphical Numerical Control produces programs for numerically controlled machine tools graphically, rather than requiring programming.

Supplier: CADCentre Australia
Product: PDMS
Plant Design Management System enables plant design staff to solve the problems associated with plant layout, pipe routing and pipework design. Produces 3D model of the plant.

Product: PEGS
The Project Engineering and Graphics System is an intelligent database with integral graphics which both produces schematic drawings and manages engineering information, bridging the gap between process design and detailed engineering.

Supplier: Cimtec
Product: Autocam $6100
Designed for the production of numerically controlled programs for a wide range of computer numerically controlled turret presses. It is a standalone package but is enhanced when interfaced with Autocad.

Supplier: Computer Brokers
Product: Simple Job Cost $2490
Estimates Product/Service cost, sale price, profit margin, analyses cost variance, business profit and loss accounting, plus customer follow up control.

Supplier: Kingdom Computer
Product: Project Master 2
Three modules covering project management (with critical path methods), job costing including alternate methods costing, production management including S curves.

Supplier: Manufacturing Software
Product: MAC $2000
Manufacturing Accounts Control. Debtor and creditor accounting, invoicing and purchasing.
Product: MCS $8500
Manufacturing Control System with QES plus PSC, labour variance and sales analysis reporting.
Product: MIC $4500
Manufacturing Inventory Control – for stock control.
Product: PSC $6000
Production Scheduling and Control system which provides QES plus Machine Loading analysis, Materials required reporting, Orders on Hand, Work in Progress and Work throughput reporting.
Product: QES $2500
Quoting and Estimating System with labour and materials costing, and a complete parts list.

Supplier: MCC Software group
Product: MFASYS
A management, financial and accounting information system with general ledger, accounts, fixed assets, job costing, and reinsurance. Attempts to set itself apart from the mob by speed of response, and internal language for adaptations, and speedy data entry with customisable screen layouts.

Supplier: MDS Qantel (Aust)
Product: MRPS
Manufacturing Resource Planning System integrates the planning, manufacturing, order management, purchasing and financial accounting systems for a factory. Package can be purchased by module, with over a dozen modules in the suite.

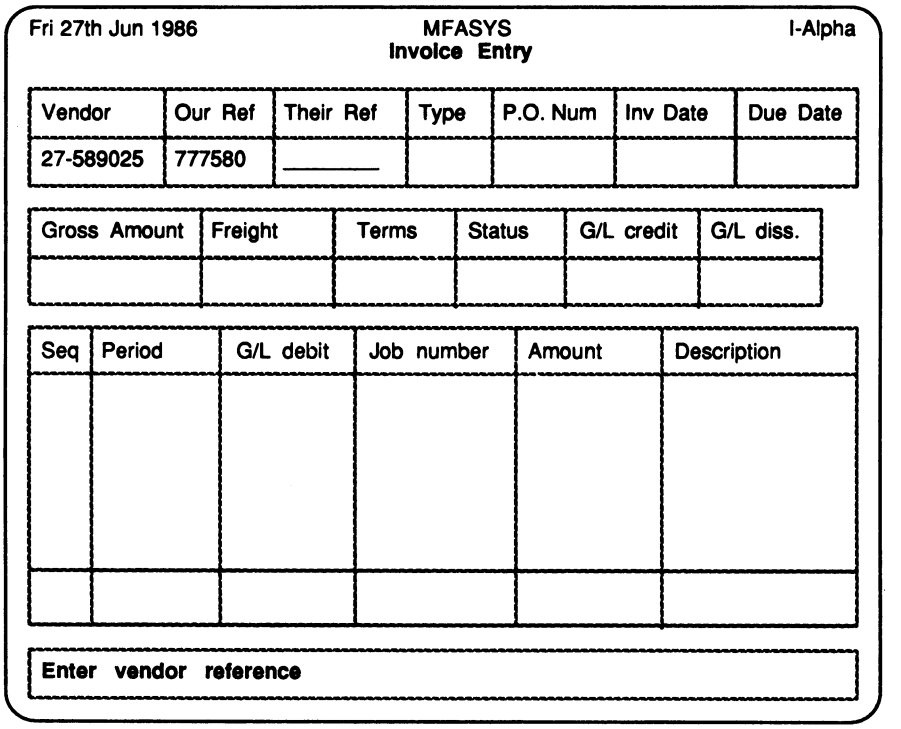
Supplier: PSI Computer Systems
Product: PSI Stock System
Stock management system, online, multi-user. Covers Stock Enquiries, supplier transactions, goods inwards, transfers, sales and write-offs.

Supplier: Scientia-Whitehorse

Product: MainMan
Maintenance for factories, buildings and public utilities.
Product: Production Scheduling Systems
Work schedules are designed taking into account the finite capacities of work stations; can be oriented towards ASAP or JIT usage of machinery if user desires.
Product: Scientia-MCBA Manufacturing
Fully integrated manufacturing and distribution system. Modules include Management, Materials required, Shop floor control, Job costing.

Mapping

Supplier: Kingdom Computer
Product: Map Magic
Map making software which can input data from other computers or by digitiser, enables numeric computation of coordinates with application in surveying, etc, generates polygons for thematic mapping, can link via relational database with census and other data for geographical analysis of data.



The MFASYS (pronounced 'emphasis') management and financial accounting system offers customisable screens.

Marketing

Supplier: Computer Brokers
Product: SAMM
Sales and marketing aide which maintains a client/prospect database, offers intelligent personalised mailing, quoting, sales follow up and post promotional analysis. Modular program, with tailored modifications for particular industries.

Supplier: PSI Computer Systems
Product: AUDAC
Audience research program. User specifies the questions and valid answers for a survey. Program produces survey, whether on paper or computerised over phone. Tabular report allows analysis of raw scores; ranking report; historical report; includes data skewing to compensate for sample variance.

Medical

Supplier: Scientia-Whitehorse
Product: Cardiological Record System
Clinically oriented program for the storage and analysis of cardiological records; screens cater for major cardiovascular symptoms, major clinical findings.
Product: Fatstat
Calculation and analysis of results of obesity surgery.
Product: Medipac
Management system for general practitioners or specialists: billing, patient records, appointments, cash books, reporting and word processing.
Product: Palas
Pathology practice management.

Mining

Supplier: Kingdom Computer
Product: MasterMiner
Assists the geologist, surveyor, mine manager to locate, prove and review mineral deposits. Stores borehole data, reduces raw data into X,Y coordinate information for planning, long and cross section analysis. Mineral assaying, lithology.

Patent

Supplier: Technical Imports Australia
Product: T3
Scientific word processor, with ability to write equations, chemical formulas on screen. Considerable control over final print appearance from within editor, though it's not quite a desktop publisher and not entirely WYSIWYG.

Property

Supplier: CMS Solutions
Product: Property
Six specific modules which can be purchased separately cover tenants, building creditors, commercial, residential, sales, budgets and forecasts. They sit atop a core database and security system whose files can be transferred across a wide range of computers.

Public Service

Supplier: Kingdom Computer
Product: Landlord
Land Management system providing graphical display of features (including roads, bridges, sewerage etc) and relational database containing information on land zoning, planning etc.

Supplier: PSI Computer Systems
Product: BAT
Traffic scheduling, accounting, management information and music systems management for television and radio broadcasting. Broadcast logs, order entry, future revenue analysis, music library management.
Product: Music Programmer
Radio broadcast controller aimed primarily at music broadcast stations. Helps select mix of up to 350 tracks per day, rotates current and gold tracks, produces APRA and Broadcasting Tribunal reports.
Product: Newscom
Aide to scheduling, archiving and retrieving broadcast news pieces, as well as preparation and editing of stories. Includes archiving, wire service storage/retrieval, video prompting (in additional modules to base product).
Product: Television Subscriber System
A subscriber management system for cable television operators. Covers installation, service, billing and disconnection of subscriber equipment.

Retail

Supplier: Apollo Information Resources
Product: Apollo $36,000
Shelf management software for supermarkets; designs layout graphically using actual images of products, visually lays out store plan, predicts probable returns from different arrangements of merchandise. Includes digitised database of huge number of products. The Zeus of retailing.

Supplier: Computer Brokers
Product: SAMM
Sales and marketing aide which maintains a client/prospect database, offers intelligent personalised mailing, quoting, sales follow up and post promotional analysis. Modular program, with tailored modifications for particular industries.

Supplier: MDS Qantel (Aust)
Product: Advanced Retail System
Integrated system which enables retailers to identify hot, cold and best sellers, manage purchasing, receiving and sales, maintain inventory, change prices. Individual modules available.

Shipping

Supplier: Kingdom Computer Cons
Product: Proteus
Three levels: complete system Proteus 0 includes previous two. Offshore navigation, hydrographic survey, the production of plans, contour mapping, chart production. Can integrate with other Mapping products from Kingdom.

Software/Programming

Supplier: Scientia-Whitehorse
Product: SAGA
Software development 4GL, which generates C code and compiles into finished products. Available on UNIX, MS-DOS and VMS.

Steel

Supplier: Centreline Software
Product: Structural Detailing System
Based on the MLD2 computer aided design package, this package is tailored to the design of steel products. Package is now being used by TAFE NSW for CAD training.

Surveying

Supplier: Kingdom Computer Cons
Product: Map Magic
Map making software which can input data from other computers or by digitiser, enables numeric computation of coordinates with application in surveying, etc, generates polygons for thematic mapping, can link via relational database with census and other data for geographical analysis of data.
Product: Masteroad 1 – 4
Terrain modelling for the design of roads, transmission lines, pipelines. Includes project management powers.
Product: Proteus

Three levels: complete system Proteus 0 includes previous two. Offshore navigation, hydrographic survey, the production of plans, contour mapping, chart production. Can integrate with other Mapping products from Kingdom.

Distributors and Contacts

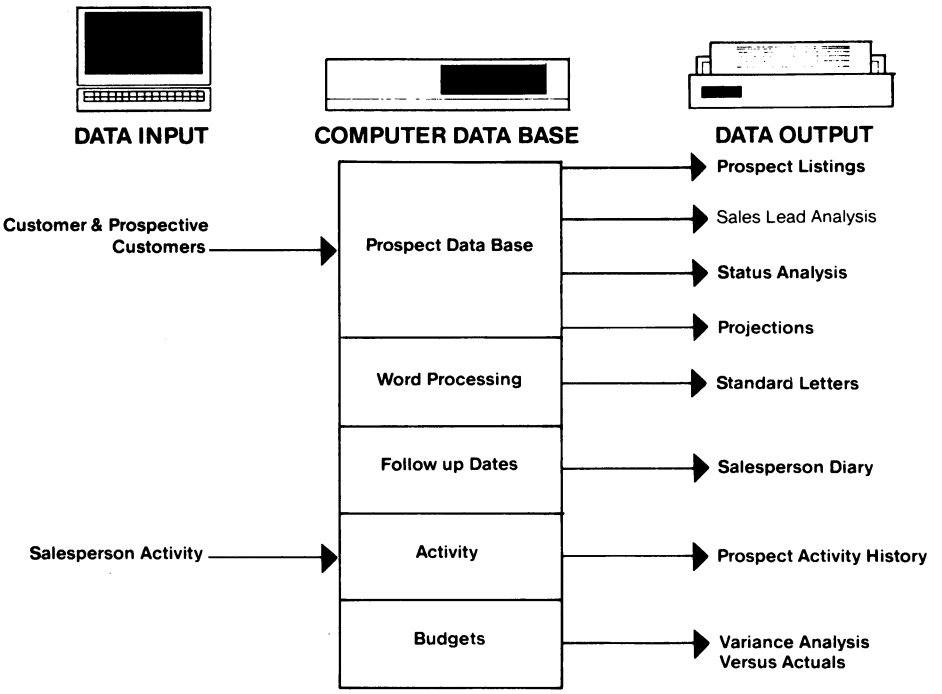
ABC Computers
Contact: Ken Hogg
113-117 Parramatta Road,
Camperdown 2050 NSW
(02) 519-9922
In addition to their courier industry software, ABC have developed a number of general market packages, including a Viatel package with EGA support and a communication program which lets the user control a PC from a remote site.

Accountcom Computer Services
Contact: Leonie Carroll
PO Box 384, Gymea 2227 NSW
(02) 525-0188
Distributor of Sagesoft and Pademede. Former product integrates with a range of products including a database and a Lotus 1-2-3 clone.

Advanced Software Corp
Contact: Graham Osborn
Southside Data Group, 7 Franklin St,
Glebe 2037 NSW
(02) 552-1555

Aguila Holdings
Contact: Jack Middlehurst
103 Brown's Road, Wahroonga 2076 NSW
(02) 489-0104
Predominantly an author of scientific, tailor-made programs, though some packages are available on the public domain.

Apollo Information Resources
Contact: Gary Haberecht
1st Floor, 633 Pittwater Rd, Dee Why 2099 NSW
(02) 982-4388
Associate company of IRAUS, distributors of PC Express, a multi-dimensional database written by Information Resources, the authors of Apollo.



SAMM (Sales and Marketing Management) from Computer Brokers maintains a client/prospect database.

ARC Cadcentre
Contact: Mario Mazzitelli
40 King St, Sydney 2000 NSW
(02) 290-2400
Specialises in CAD applications based upon McDonnell Douglas' Graphic Design System (GDS). Products include terminal emulators to allow MacIntosh and IBM PC users to access GDS on mini and mainframe computers.

ASAP Services
Contact: Liz Mitchell
Suite 8F, 38 Rowe St, Eastwood 2122 NSW
(02) 858-3399

Attache
Contact: Michael Rich
10th Floor, 8 West St, North Sydney 2060 NSW
(02) 929-8700
Leading producer of accounting software on the Australian market, with a 23 per cent market share.

Autoquote
Contact: Carol Flanagan
496 Forest Rd, Penshurst 2222 NSW
(02) 570-1355
Specialist in the automotive trade.

BCS Accounting
Contact: Vic Beecham
2/91 The Crescent, Fairfield 2165 NSW
(02) 72-0245
Primarily a writer of specific programs, but some vertical market products, including health foods, graphic arts, import tracking.

CADCentre Australia
Contact: John Turnbull
153 Darling St, Balmain 2041 NSW
(02) 818-5422

CAISE Library Management
Contact: John O'Farrell
(03) 596-4886
Library management software.

CASEG
Contact: Mrs Segelov
16 Tivoli Ave, Rose Bay 2029 NSW
(02) 371-7954
Software designed by two orthopaedic surgeons, after dissatisfaction with other packages.

CATsoft
Contact: Marie Morris
7-9 Merriwa Rd, Gordon 2072 NSW
(02) 498-6611
Specialised accounting.

Ceanet
Contact: Cathy McPherson
4th Flr, 56 Berry St, North Sydney 2060 NSW
(02) 922-6311
Engineering Applications – structural, engineering, mechanical, mining, and computer aided design. Established in 1969 by a group of consulting engineering firms, to direct engineering expertise into computer applications.

Centreline Software
Contact: Dave Duncan
75 Old Pittwater Rd, Brookvale 2100 NSW
(02) 938-5649

Cimtec
Contact: John Knot
37 Chard Rd, Brookvale 2100 NSW
(02) 938-5433
Local manufacturer of gas heating appliances ('Mod-N-Aire') which moved into Just In Time manufacturing, Autocad and CNC machinery, and have written graphically based CNC software to complement Autocad design.

CMS Solutions
Contact: Michael Dawes
11th Flr, 80 Alfred St, Milsons Point 2061 NSW
(02) 929-6562

Compact Software
Contact: Peter Landis
PO Box 138, Rose Bay 2029 NSW
(02) 371-9333
Producers of Business Accounting Software.

Comprador Business Systems
Contact: Neil Harvey
90-94 Warren Rd, Smithville 2164 NSW
(02) 681-4000

Compumod
Contact: Andy Herbert
20 Martin Pl, Sydney 2000 NSW
(02) 27-7405
Engineering modelling software.

Computer Brokers of Australia
Contact: Clive Rainbow
Suite 4, 14 Sydney Rd, Manly 2095 NSW
(02) 977-8600
Sales and Marketing software.

Computer Drafting Services
Contact: Greg Boyd
PO Box 905, Blacktown 2148 NSW
(02) 622-5422
AutoCAD distributor.

Computer Management Services
Contact: Kay Moyes
80 Alfred St, Milsons Point 2061 NSW
(02) 929-8688

ComputerVision
Contact: Michael Samootin
55 Falcon St, Crows Nest 2065 NSW
(02) 922-2644
CAD/CAM dealers

Consolidated Software Development
Contact: Gerry Clark
2nd Flr, 110 Pacific Highway, North Sydney 2060 NSW
(02) 922-2744

Cordell Computer Systems
Contact: Lionel Sonntate
38 Oxley St, Crows Nest 2065 NSW
(02) 438-2922
Building Industry Software

CP Powerlink
Contact: Rick Einstein
7th Flr, 77 Pacific Highway, North Sydney 2060 NSW
(02) 959-4944
Education Packages marketed under the Prologic name, mainly in Victoria and South Australia.

Creative Computing
Contact: Bernie Hogan
705 Military Rd, Mosman 2088 NSW
(02) 960-3400
Point of Sale software.

Cullinet
Contact: Stephan Andreas
54 Alexander St, Crows Nest 2065 NSW
(02) 439-7166

Custom-Made Software
Contact: Geoff Lewis
91 Avoca St, Randwick 2031 NSW
(02) 399-8520

Daisy Systems
Contact: Robert Best
119 Willoughby Rd, Crows Nest 2069 NSW
(02) 436-0422
Electronic Design

Delta Link Aust
Contact: Tony McArthur
54 Mortlake St, Mortlake 2137 NSW
(02) 736-3622
Private School administration software

Foundation Medical Systems
Contact: John Johnston
22 Elizabeth St, Artarmon 2011 NSW
(02) 419-5755
The company's software has won an Australian Design Award.

Gravolin
Contact: Mark Gravolin
28 Chandos St, St Leonards 2065 NSW
(02) 438-3977
Programs written by local construction and manufacturing engineer. Package still being developed; commercial release still some time away.

Hotel Systems
Contact: Sue Clapham
Suite 603, 781 Pacific Highway, Chatswood 2067 NSW
(02) 419-8188

Kingdom Computer
Contact: Michael Preedy
5 Devlin St, Ryde 2112 NSW
(02) 807-4822
Local software developers specialising in products for land use control, with graphical entry and display of data. Wide range of products available on mainly on mini-computers, but some becoming available on high end PCs.

Lothlorien Software
Contact: Tillie Eakin
34 Cook St, Randwick 2031 NSW
(02) 398-4122

Manufacturing Software
Contact: Jim Roche
57 Oak Road, Kirrawee 2232 NSW
(02) 542-3066
All systems include sub-assembly parts listing and cater for multi-product manufacturing. The NSW Department of Industrial development supports up to 50 per cent of the cost of installing this company's software (up to $7500).

MCC Software Group
Contact: Phillip Miller
Level 35 Northpoint, 100 Miller St, North Sydney 2010 NSW
(02) 959-4977
Began as financial software consultants to commercial computer users in corporate finance, merchant banking and mining control. Designed

MFASYS to provide a integrated management information system which would interface with currently used software.

MDS Qantel (Aust)
Contact: Norma Flint
Unit 1, 39 Herbert St, St Leonards 2065 NSW
(02) 438-1588
Wholly owned subsidiary of Qantel Business Systems, USA, its Club software was locally written as was its hospitality and leisure industry software, which is being successfully sold in the States.

Murphy Creighton Systems
Contact: Paul Murphy
GPO Box 4729, Sydney 2001 NSW
(02) 29-5188
Specialises in software design for superannuation, life insurance and actuaries, using IBM PC compatibles.

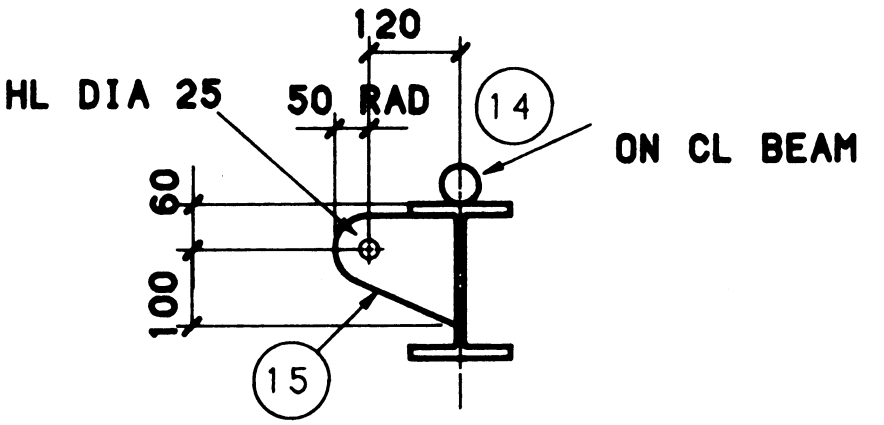
Nalco Industries
Contact: Kerry McNally
Suite 2, 9-11 Bells Rd, Dundas 2117 NSW
(02) 638-2980
Scientific and Video software.

Office Resource Centre
Contact: Peter Hanson
21st Flr, 44 Market St, Sydney 2000 NSW
(02) 29-7704
Software runs on Wang PC, but not under MS-DOS as yet.

Pace Computer Services
Contact: Joe Lockington
35-37 Moore St, Leichardt 2120 NSW
(02) 692-7900
Medical software.

Palette Applications
Contact: John Turnbull
153 Darling St, Balmain East 2041 NSW
(02) 818-5422
Company develops specific industry modules using Palette, an Australian CAD system with over 700 installations. Currently runs only on VAX machines.

Paxus Professional Office
Contact: Syd Ottaway
NZI Insurance, 33 Alexandra St, Hunters Hill 2110 NSW
(02) 816-1155
Specialists in accounting software.



The Structural Detailing System from Centreline Industries is tailored to the design of steel products.

Precise Business Systems
Contact: Debbie Thorpe
Unit 2, 53-55 Gladesville Rd, Hunters Hill 2110 NSW
(02) 816-3233
Wide range of vertical market software.

Prest Computers
Contact: Gerry Plsek
5 Empire Court, Carlingford 2118 NSW
(02) 683-1557
Medical and other vertical markets.

PSI Computer Systems
Contact: Peter Stanford
1st Flr, 11-17 Khartoum Rd, North Ryde 2113 NSW
(02) 887-4144
Produces a wide range of vertical market software, plus provides hardware and installation for Datapoint, Digital, IBM PC computers. Vertical markets covered include radio and TV, video and film production, advertising, magazines, opinion polls.

Rural Data Solutions
Contact: Jim Bougher
Level 2, 161 Clarence St, Sydney 2000 NSW (02) 29-6511
As the name implies.

Scientia-Whitehorse
Contact: Ria Follett
270 Pacific Highway, Crows Nest 2065 NSW (02) 436-0644

Shaw Systems
Contact: Greg Shaw
2 Glades Ave, Gladesville 2111 NSW
(02) 816-4677
Share market register, accounting and import costing, machine sale history tracker, engineering costing and several other applications. Most originated on mainframes/minis and have been ported to micros.

Software Suppliers
Contact: Glen O'Driscoll
7 Avon Rd, North Ryde 2113 NSW
(02) 888-1955

Solution 6
Contact: Derek Johanson
12th Floor, 31 Market St, Sydney 2000 NSW (02) 261-5333

Technical Imports Australia
Contact: Peter Greenhalgh
Suite 602, 220 Pacific Highway, Crows Nest 2065 NSW
(02) 922-6833
Imports a wide range of technical software, including scientific word processors, specialised CAD packages, electronic, mathematical tools and advanced graphics.

Transoft Corporation
Contact: Alan Manly
PO Box 66, Flemington Markets 2129 NSW
(02) 764-4366
Transport industry software.

Travel Software
Contact: John Lynch
Suite 6, 201 New South Head Rd, Edgecliff 2027 NSW
(02) 327-3799
Software for the travel industry.

Trinamac
Contact: John Nielson
Suite 2, 1st Flr, 165 Walker St, North Sydney 2060 NSW
(02) 922-2436

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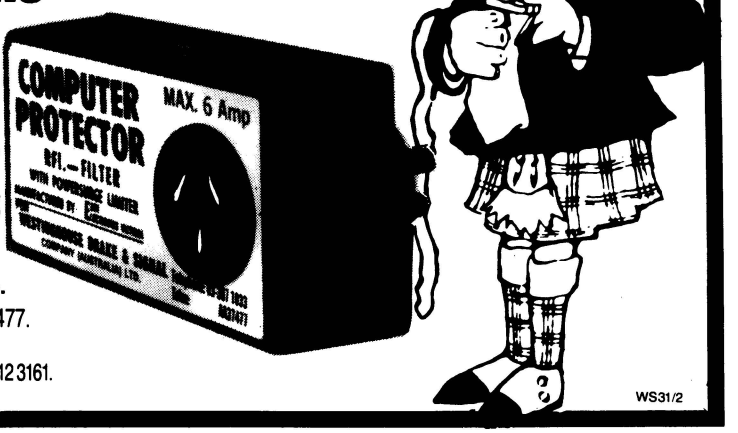

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PIF3-3A	3AMPS	2 STAGE	+E.L.C.
PIF3-6A	6AMPS	2 STAGE	+E.L.C.
PIF3-10A	10AMPS	2 STAGE	+E.L.C.

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80-86 Douglas Pde., Williamstown, Vic. 3016. Tel: (03) 397 1033. Tlx: 37477.

N.S.W.: Autocatt Industries P/L. Tel: (02) 526 2222.
QLD: Colourview Wholesale, Tel: (07) 275 3188. **S.A.:** F.R. Mayfield P/L. Tel: (08) 212 3161.
W.A.: Geo. Moss P/L. Tel: (09) 446 8844.

WS31/2

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Custom Menu Version II makes PC's even easier to use and update and provides a common interface for all your data. This all Australian rapid access menu system will change your views on Menus –

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NB. The $10 for the demo is refundable against purchase.

*Custom Menu is a registered trademark.

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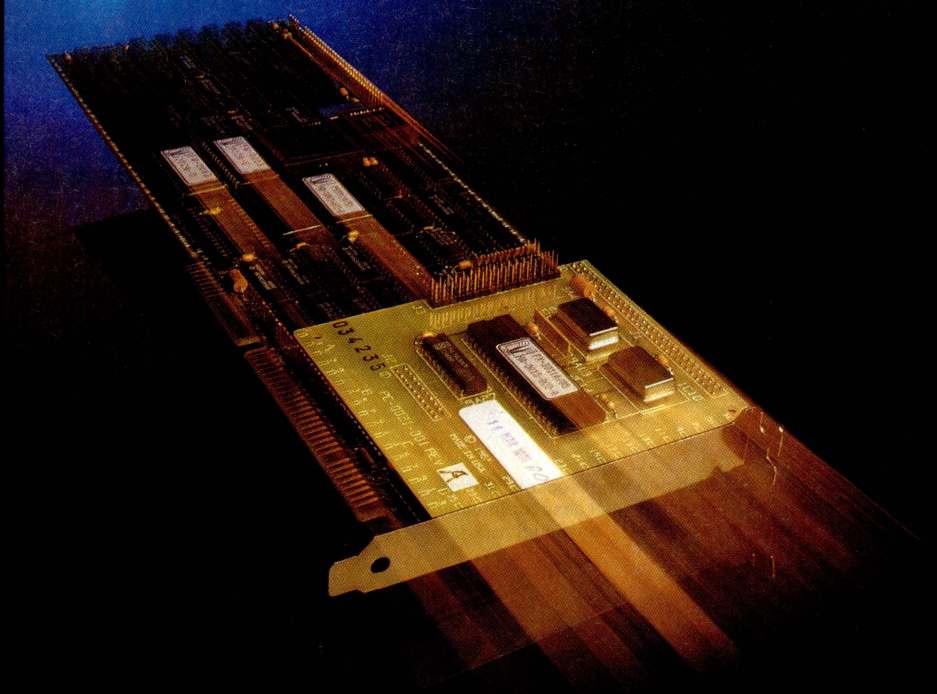
681 Burke Road, Camberwell, Victoria 3124.
Postal Address: P.O. Box 247, Camberwell, Victoria 3124
Telephone: (03) 882 3246

BREAK THE SPEED BARRIER



0.5 mS AVERAGE DISK ACCESS

ACCELERATE YOUR DISK BY 10 TO 20 TIMES ITS CURRENT SPEED

If you need rapid hard disk access you should be using the new PM3011A Caching Disk Controller. The PM3011A represents a giant step in speeding-up CAD/CAM operations and clears the disk bottle-neck in Network/Multi-user systems.

PM3011A features:

- Plug in replacement for standard AT Controller.
- Completely compatible with **all PC** operating systems and hardware, including Novell, Xenix, Pick, BOS, Theos etc.
- Rated by Coretest* 106 times faster than the original PC Hard Drive, when tested in a 12MHz Ø wait state 80286 machine with a 72MB 25mS drive.

* Coretest is a trade mark of Core International.

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Telephone: (02) 439 8400
Fax: (02) 439 8157

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BUILD-IT-YOURSELF 'AT' COMPUTER!



At last! The perfect opportunity for the hobbyist to build the perfect computer. . . Perfect because it has in it what YOU want! All the features of the "AT" - blinding speed, high expandability, and so on - but you put it together yourself - and $ave!

There's more: each board or module comes with a full 12 month warranty PLUS individual, professionally prepared manuals - no Jinglish to decipher!

And best of all, you don't have to buy it in one hit: add what you want, when you want it (and when the pocket allows it!)

Look at the features:

SUPERB QUALITY HINGED CASE

"Baby AT" case in heavy gauge steel, heavily covered in damage-resistant bone crinkle finish. The lid is hinged and locks up for instant internal access - no more undoing screws! Large enough for expansion - but features a footprint of just 430mm square! Cat X-1005

ONLY $175

200W POWER SUPPLY

Completely pre-assembled - even to the on/off switch and input sockets! Simply slots into place in cutouts provided in case. Heavily plated steel case for minimum RFI with integral whisper-quiet fan. 200W capacity is ready for . . . anything! Cat X-1010

ONLY $275

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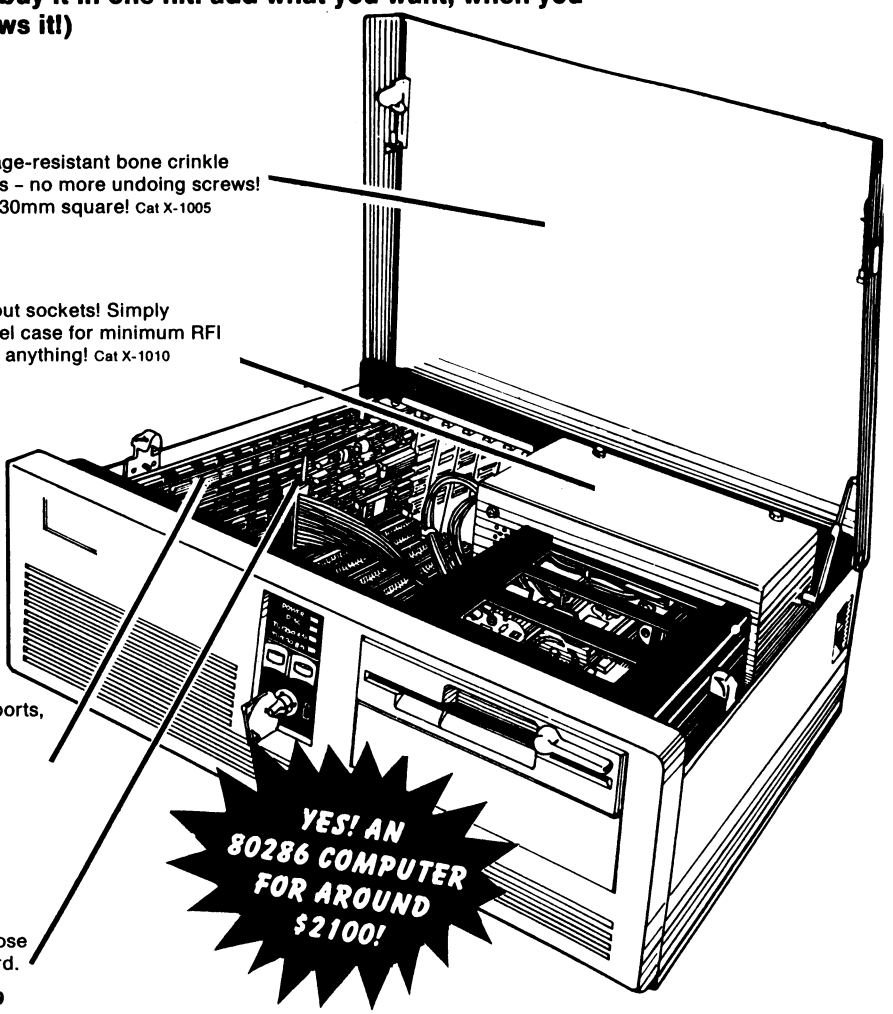

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THE NEOSTAR 386

Now that almost every machine is 'compatible,' service is increasingly the name-of-the-game. Ewart Stronach reports an a fast offering with fast service . . .

THERE IS NO doubt that 80386-based machines are here to stay. With promises of compatibility with IBM's OS/2 and falling prices, the latest bunch of very fast clones are finding rapid acceptance in a crowded market.

This new offering, the Neostar 386, is made by the ALPS Electronic Company of Japan for Mitsui Computers and is distributed by KCM Computers of Melbourne. The test model came with 2 megabytes of 80 ns RAM, an 80386 running at 16 MHz and zero wait states. The system comprised one 1.2 Mbyte floppy and one 30 Mbyte, 28 ms voice coil hard disk. A mono card, serial and parallel ports, real time clock and DOS 3.30 completed the layout.

The specs say 16 MHz, but the Landmark CPU Test reports the clock speed flicking between 17.5 and 17.8 MHz.

It is sold in this configuration but with a 45 Mbyte hard disk and a mono screen, and the price includes tax and a two year Australia wide warranty.

The Neostar 386 looks like most AT-style units with a full size footprint. The front panel has a keylock, a power-on indicator and a disk active light. There is a single 1.2 Mbyte floppy disk, half-height, and a blank panel covering the hard disk. There is room for two more half-height disks. The front panel is plastic and the cover is fairly light pressed metal. The power supply is huge and located behind the disk drives. It is rated at 192 watts and has a moderately noisy fan. The rest of the chassis is pressed metal, well made and very sturdy.

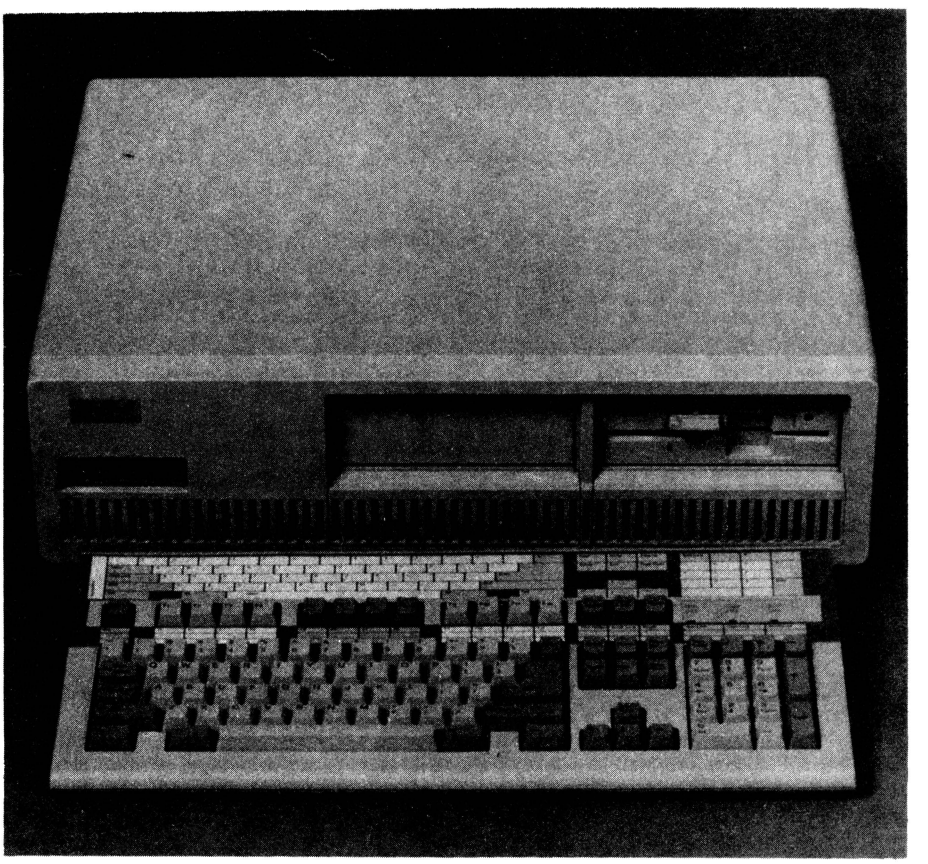

***Figure 1.** The Neostar 386 – made by ALPS for Mitsui, sold by KCM.*

The manual supplied for the hardware is a 68 page, soft cover, note book style booklet with no maker's name displayed anywhere. It is a well written document with a minimum of garbled English and spelling mistakes (a welcome change).

The mother board is large and runs beneath both the disks and the power supply. The 80387 co-processor socket is tucked hard up against the power supply, but it would be possible to insert the chip without stripping down the mother board.

There are only three user-alterable components on the mother board and these are quite accessible. The jumper for video select between mono and colour, the RAM



Figure 2. The AT-style ALPS keyboard is known as one of the most 'compatible'.

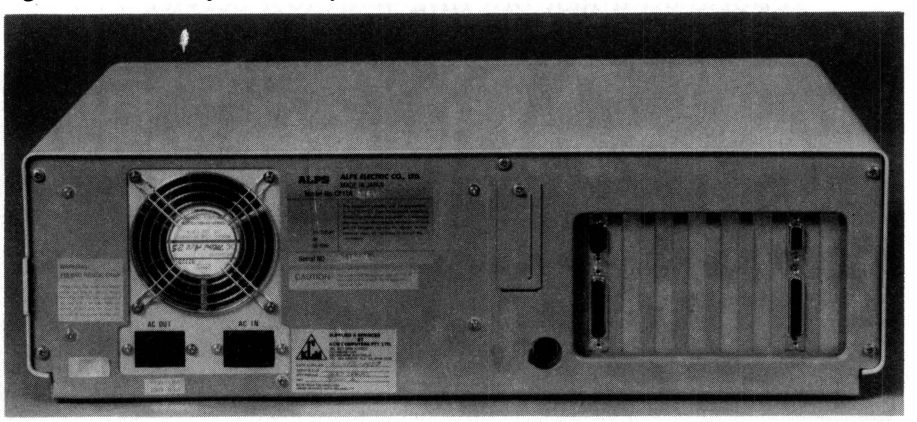

Figure 3. In standard configuration, the unit comes with one serial and one parallel port.

size selector and the 80387 jumper are all on the front edge of the mother board and quite clearly marked. The extended RAM lives on its own board which must be located in the left most slot, reserved for 32-bit memory only.

The mono graphics card supplied with the Neostar was a half length card carrying only a video connector and parallel printer port. The whole thing looked a bit empty when I got it, so I slapped in a VGA card, a mouse card and a scanner card. On power up, the machines beeped in horror, offered me a series of diagnostic messages and pleaded with me to run set-up by using the Alt-Cntrl and SysReq keys. A full ROM resident version of set-up appeared that was menu driven with highlighted commands, and two minutes later all was well.

The keyboard

The keyboard is a standard 101 key AT style layout with 12 function keys along the top row and a separate cursor pad. Unlike my ANITECH ALR AT keyboard, the back edge of this one protrudes about four centimeters beyond the function keys and carries a well-designed template as a keyboard guide. It would be wrong to state that the keyboard is the best in the world but it certainly is the best suited to my needs that I have ever used. As a bonus, the ALPS keyboards are used with a number of other machines are are reputed to be 100 per cent compatible with the 'standard'.

It has an excellent tactile feedback (that's click action to you), and has, to me anyway, that 'just right' feeling. The keyboard connecting cord comes out at the centre of the back of the case but has provision for re-locating the cord for a right or left hand exit point – very handy for those who set the computer up under a desk, leaving only the keyboard visible. As with most keyboards the cord is not long enough for too much flexibility in this type of set-up.

So much for the beauty contest, how does it work? *Fast . . . !* The specs say 16 MHz but the Landmark CPU Test reports the clock speed flicking between 17.5 and 17.8 MHz. There are faster machines available (not from KCM, though) – currently up to 21 MHz and a rumoured 34 MHz(!) 386 which should be available by the time you read – but as this one is reported by the same test to be running at 11 times the speed of a standard 4.77 MHz XT, I for one would not be spending a lot more money chasing that extra 5 MHz.

The speed of the Neostar is switchable from the keyboard and use of the Cntrl-Alt-Minus key pulls the operating speed down to just under 8 MHz - the old 'standard' AT speed. This is an important function as some software will simply not operate at the higher speeds. The speed may be further controlled down to 6 MHz by similar keystrokes or may be left in an Auto mode for automatic speed changes required by certain software.

Warranty

Perhaps the most important difference with the Neostar is the warranty. KCM offer it with a full *two year* warranty, Australia wide. Service contracts after that period may be arranged and it is interesting to note that a company as familiar with hardware as KCM elect to source their machines in Japan and second to charge 20 per cent higher rates for service contracts on machines built in Hong Kong or Taiwan.

KCM offer a series of 'modular' service contracts for full parts and labour, on site service, starting with the basic module consisting of cover on drives, interface cards, motherboards, power supplies, keyboards and hard disks for $190 per annum for a single machine or down to $145 per annum for 11 or more machines at a single site. With technicians charging at about $50 an hour at the moment, this seems like good value to me. For sites outside Victoria, 3M Australia are handling the service for them. □

Product Details

Product: Neostar 386
From: ALPS Electronic Company, Japan
Distributor: KCM Computers
380 Victoria St, Richmond Vic.
(03) 429 2733
Price: $7690 includes 30 Mbyte hard disk, 1.2 Mbyte floppy drive, monochrome monitor.
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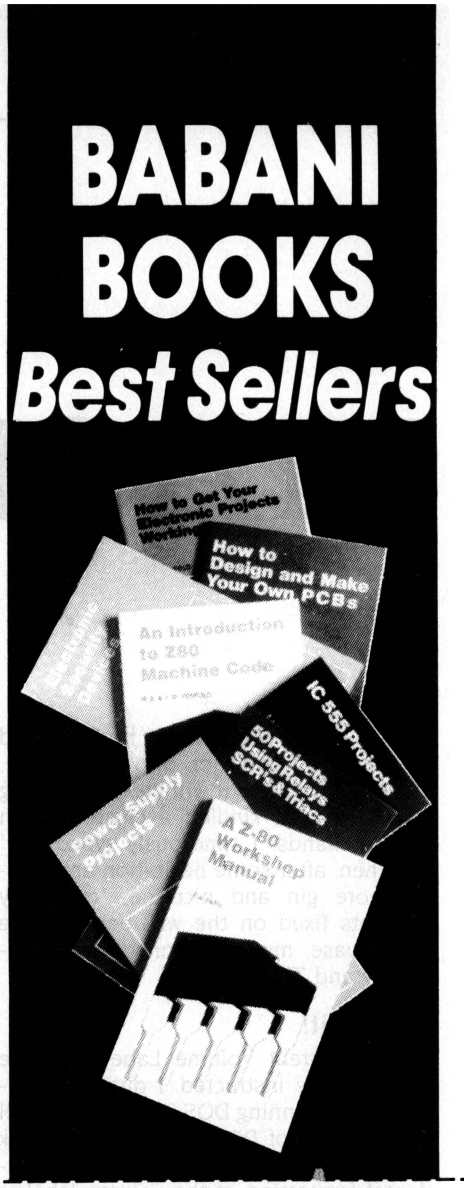

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MACE UTILITIES

. . . for liver and lungs

IF A HARD DISK has to be formatted for the benefit of our reader-base, then formatted it will be. I took a slug of gin and kindled a cigarette with shaking hands. I timorously typed 'for' and then, after some hesitation and a little more gin and nicotine, 'mat', my thoughts fixed on the well-being of the reader-base, my faith pinned on the Almighty and *The Program*.

Format it!

Enter current Volume Label for drive C:', I was instructed. I dutifully complied; I am running DOS 3.3, which, like all 3.xx releases of DOS, uses the hard disk volume label as a safeguard against accidental formatting: if the volume label is not entered correctly, Format aborts.

The hard disk began to chirp and whirr in a distressing fashion and the tide rapidly went out in my beaker. Five word processors, a very large Metro telephone directory, a number of macro files, appointments and to-do lists for the next three months, two C compilers and several megabytes of assorted work of one variety of another – all of them were zapped.

Mend it!

I poured another measure of mother's ruin, reached for a floppy, loaded it into drive A and called up The Program. 'Mend it,' I said. Or more accurately, 'Unformat'. The hard disk chirped and whirred again, and a little over a minute later the five word processors, the very large Metro telephone directory . . . several megabytes of assorted work of one variety of another were back in their appointed places and as good as new. I reset The Engine and it booted from the hard disk just as it ought to. Everything was hunky-dory.

Keith MacKay will stop at nothing to keep our readers informed. Nothing is too much trouble, no personal inconvenience too great, no risk too high . . .

As you may have gathered from the 42-point type at the top of the page, The Program in question is Mace, now in release 4.1, and it works its magic by keeping a duplicate of the hard disk's File Allocation Table (FAT), whose purpose is to record on which area of the disk each file is to be found. When a disk is formatted (other than with the DOS Debug and Fdisk routine for initial installation of a hard disk), the data on the disk remain untouched.

All that happens is that bad sectors are locked out and the root directory is cleared – nothing is physically erased. Reconstituting the data, therefore, is a matter of recovering the FAT. Once Mace has been installed on the hard disk, recovery from an accidental format is a simple matter if a working copy of the program is maintained on a floppy disk. And – even if Mace has not been installed, there is still a very good chance of restoring any data lost since the last reboot.

However, few of us are so hamfisted that we format the hard disk with any great regularity, and the DOS 3.xx Label checking constitutes an added safeguard. Accidental erasure is probably a far more common problem, and one which Mace can also cope with. Just as a format does not physically wipe anything from the disk, so an erasure leaves data intact: when a file is erased, the reference to that file is deleted from the FAT and the space it occupied is marked as free. As long as the space has not been overwritten, it is possible to recover the data by restoring the entry in the FAT, which is exactly how utilities such as Norton and PC Tools work.

However, most unerase programs have one serious shortcoming: they restore data on the problem disk itself, which means that that the recovered files may become cross-linked – parts of one file may be found in another and considerable time will be necessary to allocate the material as appropriate. There is also the possibility that an error will be made in reading the FAT. For both these reasons, it makes better sense to carry out file recovery on a different disk, as Mace does: Mace's Undelete utility saves restored data to a separate disk, leaving the original material untouched on the source, which means that there is less likelihood of cross-linking and allows reconstitution to be carried out with far greater precision.

Non-contiguous files can become a problem also. As files are edited and deleted, the space they used to occupy is marked as free and new material is allocated this free space, which can lead to sections of files being placed on widely separated areas of the disk. With sections of program or data scattered around the disk in this way, there can be an appreciable delay as the read heads move around searching. Mace addresses this problem

with its 'Unfragment' utility, which physically regroups all the files on the disk and brings fragmented files together, closing up any unused space. This results in a considerable enhancement in access speed, as well as increased likelihood of complete recovery from accidental erasure or format since files are physically contiguous and therefore unlikely to become cross-linked when resurrected.

I took a slug of gin and kindled a cigarette with shaking hands.

Further increase in speed is achieved by means of the Squeeze and Sort utility. This does three things: it rearranges the hard disk with all directory entries placed at the beginning; it deletes references to erased files from the FAT, which means that no time is wasted in looking at deleted material – although it also means, of course, that such material cannot be unerased – and it optionally sets the read-only attribute on SYS, COM and EXE files, which allows them to be grouped together at the beginning of the disk. Such files are seldom if ever altered, therefore it makes sense to leave later sections of the disk free for material which is subject to modification.

Diagnose and Remedy

Two of Mace's other disk management utilities are Diagnose and Remedy, which respectively read through the hard disk in search of bad sectors; and move data from bad sectors to good ones, marking the bad so that they will not be used again.Yet further enhancement in data access speed can be achieved by using Vcache, Mace's cache utility, which writes frequently used data to an area of RAM and updates it to disk when changes are made – since most disk activity involves reading program instructions or previously referenced data, there is little point in reading the same material over and over again when it is more efficient to hold it in RAM.

Another Mace utility, Vkette, speeds up floppy disk transfer, and is recommended during Backup, Restore and Diskcopy; and Vscreen intercepts BIOS video routines and increases display speed.

Mace is supplied on one floppy disk and is accompanied by a very informative manual. It is not copy protected. According to the manual, it will run on any PC/MS-DOS computer with a few exceptions such as the Tandy 2000, the TI Pro, the HP 150 and the Wang PC. The only glitch I ran into was trying to run the program with Lightning loaded, a problem which is mentioned in the documentation. Blank.com, Safety-Net, recent copy-protected programs from Soft-Logic and Broderbund, and Priam software drivers prior to revision 3.13 are also incompatible with Mace, as are non-booting Tallgrass, Corvus and Sunol hard disks.

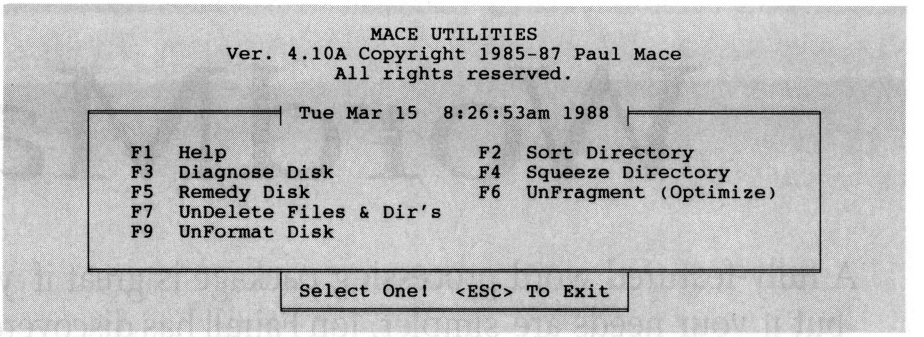
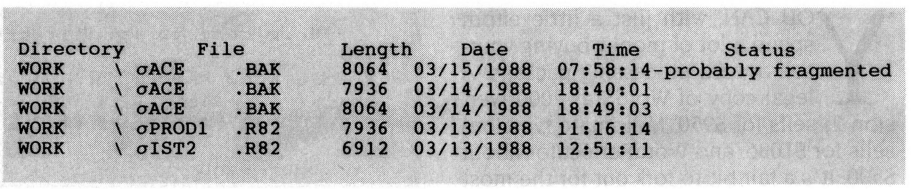
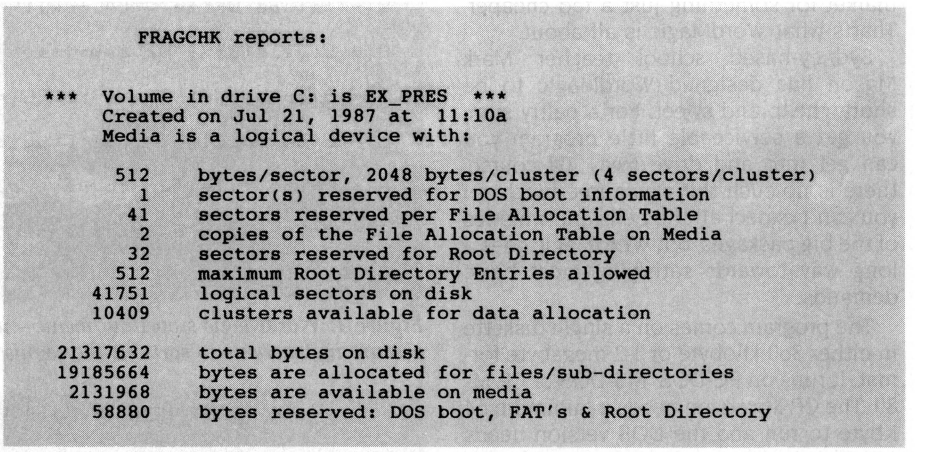


Figure 1. *Mace Utilities' opening menu. If F7 or F9 don't work, the manual advises 'Rue the day you ever bought a computer and take to drink, to sin, or to the woods for consolation.'*



Directory	File	Length	Date	Time	Status
WORK \	σACE .BAK	8064	03/15/1988	07:58:14	-probably fragmented
WORK \	σACE .BAK	7936	03/14/1988	18:40:01	
WORK \	σACE .BAK	8064	03/14/1988	18:49:03	
WORK \	σPROD1 .R82	7936	03/13/1988	11:16:14	
WORK \	σIST2 .R82	6912	03/13/1988	12:51:11	

Figure 2. *All that's needed to recover the deleted files, is to supply a first letter to the file name when prompted.*



```
        FRAGCHK reports:

***  Volume in drive C: is EX_PRES  ***
     Created on Jul 21, 1987 at  11:10a
     Media is a logical device with:

       512    bytes/sector, 2048 bytes/cluster (4 sectors/cluster)
         1    sector(s) reserved for DOS boot information
        41    sectors reserved per File Allocation Table
         2    copies of the File Allocation Table on Media
        32    sectors reserved for Root Directory
       512    maximum Root Directory Entries allowed
     41751    logical sectors on disk
     10409    clusters available for data allocation

  21317632    total bytes on disk
  19185664    bytes are allocated for files/sub-directories
   2131968    bytes are available on media
     58880    bytes reserved: DOS boot, FAT's & Root Directory
```

Figure 3. *As files become fragmented, there can be an appreciable delay as the read heads move around searching for the bits. The Unfragment utility fragmented files together, closing up any unused space. Unfragmenting also increases the likelihood of complete recovery from accidental erasure or format.*

In sum, Mace is a utility which no computer user should be without, if only to cut down anxiety-derived gin and nicotine consumption. □

Product Details

Product: Mace Utilities V4.1
From: Paul Mace Software, Ashland, Oregon, USA
Distributor: Software Wholesalers, PO Box 946, Crows Nest 2065 NSW (02) 957 6686
Price: $210 taxed

WordMagic

A fully-featured word processing package is great if you need all those features – but if your needs are simpler, Jon Fairall has discovered a package that might suit (and there's a CP/M version, too!).

YOU CAN, with just a little effort, spend a lot of money buying yourself a word processing package. A legal copy of WordStar 2000 (version 2) sells for $950, Multimate (version) sells for $1086, and WordPerfect for about $500. It's a fair bit to fork out for the most basic of computer programs. In fact, it's so much, one would think there might be a market for something just a tad cheaper. That's what WordMagic is all about.

Sydney-based school teacher Mark Mason has designed WordMagic to be short, cheap and sweet. For a paltry sum, you get a serviceable little program you can get into and drive away. Of course, there is no such thing as a free lunch, so you can't expect all the bells and whistles of the big packages, but WordMagic goes a long way towards satisfying most basic demands.

The program comes on a single diskette in either 360 kilobyte or 1.2 megabyte format. It runs on PC-DOS, MS-DOS or CP/M-80. The CP/M version needs a minimum 64 Kbyte to run and the DOS version needs 128 Kbyte, although its happier with 256. To get it to run on the small systems, a few of the file names have to be modified.

Once installed, WordMagic really lives up to its promise. It is dead simple to use. The first step on the way in is the opening menu, which is extremely straightforward. Unlike more ambitious programs, WordMagic has no obscure instructions to sort out the cogniscenti from the neophytes. To 'load a file from disc, or start a new file', you press F. To 'save what I have written', press S, and so on. You can do most of the main control functions from this stage, including, interestingly, setting the line spacing.

Once into the editing mode, WordMagic operates on a fairly intuitive level. Complete computer beginners will no doubt have to work with the command list at their elbow, but for anyone who has used

```
    *** Welcome to WordMagic ***
PERSONAL WORD PROCESSOR - Please select from the menu:
          ** MAIN MENU **
 I - Inner menu
 F - load a File from disk, or start a new file
 W - let me Write   [A - with AutoSave] [^W - at typewriter]
 S - Save what I have written   [^S - non-document save]
 D - Display spacing - now Single. Press to change
 L - Line spacing - now Double Spaced. Press to change
 P - Print file (up to page cursor is on)   [^P for 2nd printer]
 Q - Quit the program please
WHICH?
```

Figure 1. *WordMagic's opening menu – unlike more ambitious programs, it has no obscure instructions to sort out the cogniscenti from the neophytes.*

```
        ** PRINT MENU - Main Printer **
  W - print Whole file (up to page cursor is on)
  F - print First page then pause
  A - Abort printing
  M - print Mode - now 10 pt. Std. Spacing. Press to change
  J - right Justification now OFF. Press to change
  Q - dot-matrix print - now Draft Quality. Press to change
  O - page Offset - now 7 (Default  7)   [C - Copies - now 1]
  B - page to Begin printing at - currently p1
  P - Page numbering at bottom centre - now ON. Press to change
  H - new Header (now: )
 WHICH?
```

Figure 2. *The straightforward print menu. There is also a typewriter mode which prints characters as they are typed – great for filling out forms!*

```
          ** INNER MENU **
   L - set Left margin - now 0 (Default  0)
   R - set Right margin - now 70 (Default 70)
   G - Global reformat within new margins
   N - Number on first page. Currently '1'
   T - set Tab spacing - currently 5 spaces
   P - set Page length - now 70
   U - set Upper margin - now 4 (Default  4)
   B - set Bottom margin - now 7 (Default  7)
   S - set Space and a half (/48") - now 12 (Default 12)
   <ESC> - back to Main Menu
  WHICH?
```

Figure 3. The page formatting menu.

a computer before, the system is almost instinctive after just a few minutes.

Cursor control is achieved with the Ctrl-S, -D, -E, -X diamond, a la WordStar, although the arrow keys will also work if required. An extended diamond (Ctrl-A, -F, -W, -Z), moves the cursor an entire word left or right, and scrolls the screen up and down. Other single letter commands include Ctrl-G for delete under cursor, Ctrl-T for delete word under cursor, and Ctrl-Y for delete line under cursor.

It's also possible to imbed commands in the text to control the printer. For instance: Ctrl-U begins underlining, Ctrl-O turns on italics, Ctrl-K gives superscript, Ctrl-V, emphasised and so on. The actual printing of a document is controlled by going to the print menu from the main menu. The print menu presents a list of options that can be changed. From this point its possible to control things like the number of copies, the pages printed, the justification, page numbering, line spacing, letter size and so on.

WordMagic has the minimum of functions in the print mode, but there is one refinement I was rather surprised to see: a typewriter mode. This allows you to use the printer in much the same way as a manual typist would use a typewriter. The printer will actually print as you type, so you can see how things are formatted immediately – it's invaluable for filling in forms.

Also familiar from WordStar are the block commands. These are two letter commands beginning with B – Ctrl-BB marks the beginning of a block, and Ctrl-BE marks the end. Having marked the block, one can use Ctrl-BM to move it, or Ctrl-BC to copy it. Ctrl-BI moves a block in from disk storage and Ctrl-BO moves it out.

There is a Q menu as well. Ctrl-QR resets the cursor to the beginning of the file, Ctrl-QC to its end. Ctrl-QF will find a defined string, Ctrl-QM moves to the middle of a line, and Ctrl-QW generates a word count. And so on and so forth. With this simple sort of notation, most of the functions one would expect to find in a word processor are provided.

There are a number of limitations with WordMagic. For instance, files must have less than 300 (CP/M) or 800 (MS-DOS) lines, and saving files of any length is hellishly slow. To get around this problem, designer Mason has built in a facility that allows only changes to be recovered, thus minimising re-recording. In principle this is fine, but it's a very clumsy answer. Another problem: according to the manual a global reformat of an 800 line file takes about 45 seconds.

In fact, it seems that WordMagic has some sort of problem in its relationship with disks. Whenever they are involved the program starts to look a little ropey. Another example: the manual cautions that, under certain circumstances, you must save before printing, otherwise the system will crash and you will loose the file.

Its not my aim to be too negative about WordMagic – you get pretty much what you pay for; indeed, if you treasure simplicity in word processing then this effort has many positive virtues. □

Product Details

Product: WordMagic
Distributor: Electronic Solutions, 23 Burns Bay Rd, Lane Cove 2066 NSW (02) 427 4422
Price: $139

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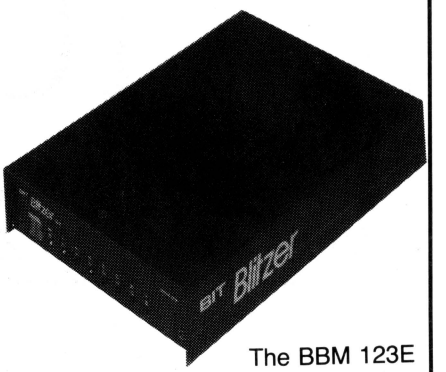

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LAPTOP LOWDOWN

HP'S PORTABLE PLUS AND PORTABLE VECTRA, AND ZENITH'S LAPTOPS

Jan Roberts has found a Litter of Laptops aimed at the corporate or well-heeled client – or for those who want a very sturdy, well-made machine and are prepared to pay.

THE LAPTOP BATTLE is now really hotting up! I have around me another litter of laptops all begging to be adopted. There's a couple of sturdy machines from Hewlett-Packard, including the first Portable Vectra to arrive in Australia, as well as another bright newcomer from Zenith.

This litter is aimed at the corporate or well-heeled client — or for those who want a very sturdy, well-made machine and are prepared to pay. HP has introduced a Portable Vectra (I can boast that I tried out the first to arrive in this country); Zenith's new laptop has very similar facilities and may be its main rival.

But before I move on to deal with these two machines, I should first look at HP's other current laptop, the very original and robust Portable Plus.

LAPTOP LOWDOWN

Toshiba's new range of portables was reviewed by John Hepworth in our February issue. In January, Jan Roberts reviewed the PC-7000 series from Sharp and the T1000 from Toshiba. In August 1987, she compared the Bondwell 8 distributed by Pulsar Electronics and the PHC-16 from Kohjinsha-Sotec. And in September, the Gridlite from Vicom, NEC's Multispeed, and the (superceded) Toshiba T1100+. If you're in the laptop market, see the Services page for back issues; please check with the distributors for currently available configurations and present prices.

Portable Plus

The HP Portable Plus totally bewildered me at first sight. Something was missing — the sides of the machine were too smooth, too blank.

It seemed like any other neat little laptop with its screen folding down snugly over its keyboard. But where on earth was its on and off power switch? I opened it, turned it, twisted it. The switch was nowhere to be found.

Then I realized it also had no disk drive! I turned it upside down and I found in the base two panels marked as software 'drawers'. I guessed these were for ROM stored programs — half the mystery was solved.

I tapped experimentally on the keyboard, not knowing what else to do. Much to my amazement, it came alive: words appeared on the screen announcing the PAM Personal Application Manager and listing its resident programs and documents.

So, this is clearly a laptop with a difference! Like the NEC Multispeed or the Gridlite, it can use a host of ROM based programs. But, unlike them, it cannot also use disk based programs. My initial reaction was that this would be a crippling disadvantage.

A long-lived toughy!

Then I started to read its manual. I was surprised to learn that its batteries lasted 20 hours on one charge — *five* times longer than the batteries on the Multispeed.

Clearly, a machine that does not need recharging for 20 hours could have great advantages in the field. The reason for its low power consumption? Principally, the lack of disk drives which gobble up power.

Disk drives also make a machine more fragile. HP boasts of the toughness of this machine. The specifications say it can take a shock of 100 Gs on any of its sides.

It can also be operated at temperatures ranging form 0 to 50 degrees and take condensing humidity from 5 to 95 per cent — this is a much broader range than that suggested for any other portable! Condensing humidity is deadly to most machines, but, apparently, you could take the Portable Plus with you into your sauna! (I was too much a coward to test it out).

The lack of disk drives also frees up its batteries to support its RAM memory, all of which is battery backed! The Multispeed and the Expanded Toshiba T1000 only back up their storage RAM disks.

In exploring the manual, I found that the Portable Plus, when set up in Power Save mode, actually halts the CPU while there is no keyboard input. After I learnt this, I started to realize just why the HP machine has no on/off switch — you just never need to switch it off! All you need to do is to blank its screen which happens automatically if you leave its keyboard untouched for a defined period of time (30 seconds to 30 minutes). Then, when you return to the machine and tap a key, the CPU operates, the screen comes back on, and you are immediately back at the same place in the same program and file that you were using when you stopped. There is no need to reload programs and scarcely any need to save files with this machine.

Of course, the permanent storage of data in RAM does slowly drain the batteries. The manual told me that a full charge will support data for six months.

There are some safety features. When you have only a 20 per cent charge left in the batteries, the machine reports this on its screen (but only if you are looking at its initial shell-like PAM program). You then have a month's charge left if you do not use the computer or plug it in. If you do use the machine, you have four hours operating time left.

When you have only a 5 per cent charge left in the battery, the machine goes into a coma to protect your data. You can only revive it by plugging it in and recharging. (Unfortunately you cannot change batteries.)

I found after 30 hours of non-use that the battery level dropped by 5 per cent. This seemed rather too fast for data to last the full six months that the manual boasted. Of course the thing to do normally is to leave to plugged in, keeping the batteries fully charged.

Memory options

The machine comes with 512 kilobytes of RAM and 192 Kbyte of system ROM. The supplied ROM programs include the Shell-like PAM program that allows you to reconfigure the machine, a simple terminal program, a LINK program to enable the machine to share data with a desktop machine (and bypass the lack of a disk drive) and some utilities.

My review machine also had Lotus 1-2-3, Microsoft Word and several other useful programs loaded in ROM.

The two drawers under the machine are for the installation of user chosen RAM and ROM chips. Each drawer has twelve sockets. If you don't add any ROMs, then you can expand the RAM memory with 128 Kbyte RAM chips up to a maximum of 1280 Kbyte. Alternatively, you could install up to 24 ROM chips of either 32 Kbyte or 128 Kbyte in size. If you install 24 ROM chips, then there would be no room to expand the 512 Kbyte RAM memory but you would have 3 megabytes of ROM based programs.

Internal drives

It divides up its memory space into three drives. All its memory, whether ROM or RAM, is treated as if it is in a drive. The ROM based programs are supposedly in B:drive. The RAM user memory is called A:drive. If one separate disk drive is added, it is called C:drive. Up to 8 external disk drives can be linked at any one time.

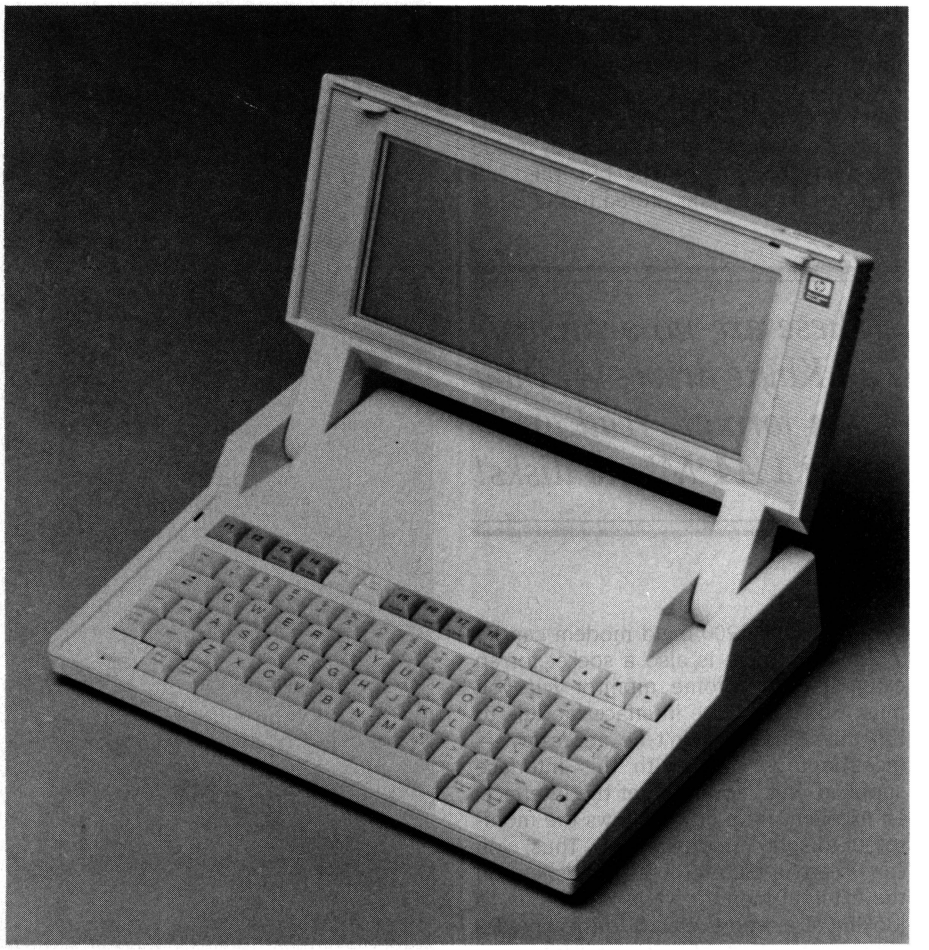


Figure 1. *The Hewlett-Packard Portable Plus — its lack of disk drives lets the batteries support its RAM, all of which is battery backed!*

When you start off this machine, the PAM shell lists the programs present in the B:drive (in other words, in ROM) and you can select them by moving the cursor and hitting F1.

But, any file you write with your ROM based program is automatically stored on A:drive — in other words, in RAM — and thus is not listed on the initial PAM screen. (Although the PAM screen does indicate how much A:drive memory is available.)

You can go on the initial PAM screen to 'System Config' and assign part of your RAM memory to a RAMDISK called E:drive or 'Edisc'. The 512 Kbyte RAM is alloted in 4 Kbyte blocks to either main memory or edisc. The default value is 80 Kbyte for main memory and 432 Kbyte for Edisc or E:drive.

A supplied utility called 'HP LINK' renames the A: and B: drives on the machine running this utility to C: and D:, thus allowing the easy movement of information from the laptop to another computer.

However, you can adapt the PAM initial screen to your needs by means of a supplied utility. You can thus add to the initial menu of ROM programs the names of programs stored in 'Edisc'.

The machine has an 80C86 CMOS chip running at a fair 5.33 MHz. As the software is ROM based, it loads at a very fast speed. It loaded 1-2-3 like a flash of lightning, faster than any hard disk. However, I found the optional external disk drive quite slow.

A resetting snag

I frequently found the documentation inadequate, but it became especially irksome when I had to try to work out how to reset the machine.

The manual told me that the ultimate easy way to reset the machine was by pressing a moon-marked key for a few seconds then releasing it. But I found I had to hold this key down for a full 15 seconds.

The screen went black then light again — but the machine did not reset. I had to lift my finger and tap the same key again to restart the machine. This was *not* in the manual. It tells you that if all else fails there is a reset button hidden away inside the battery compartment but this will wipe out all programs stored in the Edisc or ramdisk.

These are no ordinary 720 Kbyte drives — they can format, read and write 1.44 Mbyte disks!

Expansion

An internal 1200 baud modem can be added. There is also a socket for an external monochrome monitor *but* you must buy a separate interface module to run this. This shouldn't be necessary — most laptops come with this interface supplied. But, if you do get the interface, an excellent little utility allows the monitor to display 'freeze-frames.' Thus, you can 'freeze' a picture of a spreadsheet on the external monitor while moving on to looking at a report related to this spreadsheet on the Portable's own screen.

But otherwise there's a sad lack of ports. There is no parallel Centronics port. At first sight there doesn't seem to be a serial port either but it's there as RS-232, in a non-standard 9-pin form.

I presumed that this was where I attached the ThinkJet Printer I had been lent. But where, then, could I put the overlarge slow external single disk drive I had been lent? (The same size as the printer!) The only connection cables I had were two flimsy thin black cables. Surely disk drives required something thicker? I phoned up to ask just how I attached the disk drive. (HP could definitely improve its documentation.)

I then found out to my amazement that both the disk drive and printer attached to the same drive. They were daisy-chained — you can actually have up to 31 peripherals all working at the same time!

An illustration in the documentation showed that you could plug into the same port at the same time, say, an IBM computer, a portable disk drive, a plotter and a printer. This is a wonderfully flexible system with delightfully unobtrusive cabling,

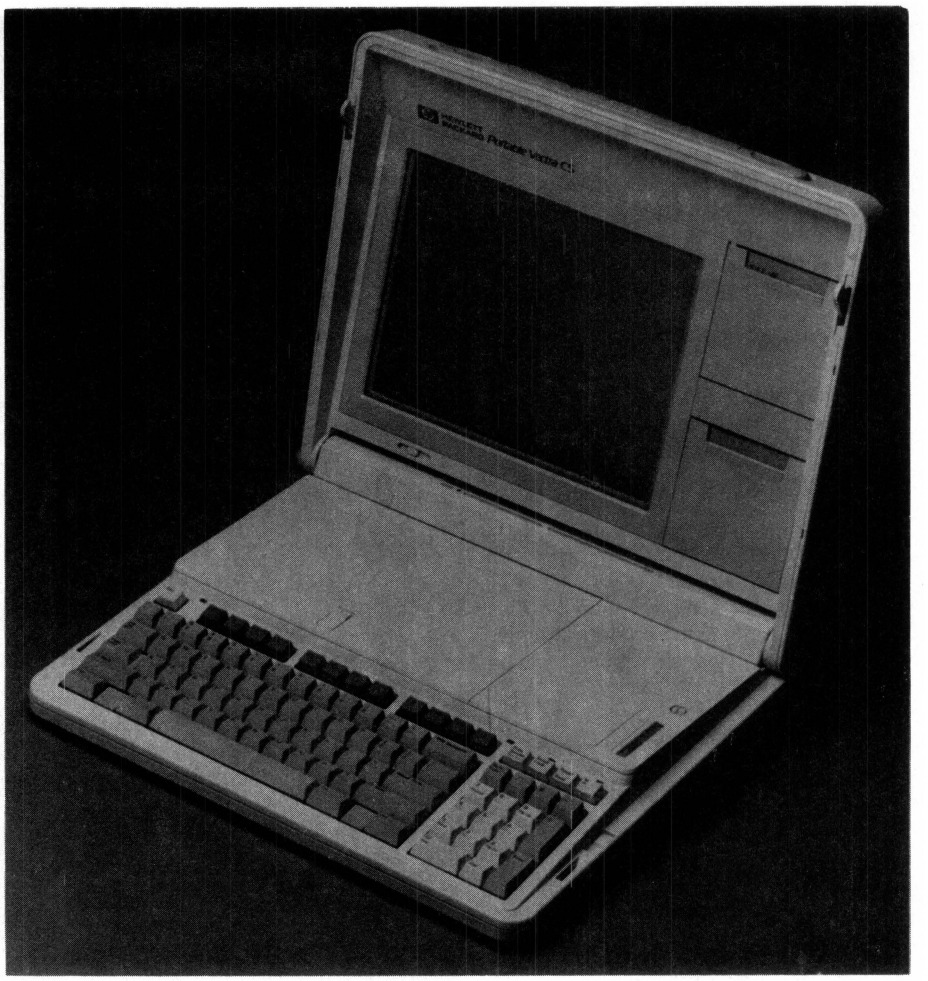


***Figure 2.** The IBM XT compatible Portable Vectra — note the disk drive (folded flat) below the screen and the disk storage next to it.*

although I didn't test it to see if the attachment of a number of peripherals would slow the system down.

You can buy an interface to allow you to set HP peripherals with standard IBM-type computers.

The Portable Plus is around 4.5 kg (a little under 10 lb) and has an adequate liquid crystal screen that needs good external lighting. The keyboard has an excellent touch. The machine measures 33 *x* 25 *x* x-8 *x* cm (13 *x* 10 *x* 3 inches). The screen has 25 lines by 80 characters or 480 by 200 pixels.

A big snag

Any sharp witted computer buff has probably just spotted the machine's great snag in the last words of the paragraph above. However it took me quite a bit longer.

I used HP's optional external disk drive to try to load my own software. I threw at it standard IBM versions of Multiplan, Vfiler and Word — and they froze the machine.

It doesn't have a standard screen so standard programs cannot properly talk it — standard IBM screens are not 480 by 200 pixels but 640 by 200. Thus, you have to go to HP to purchase special versions of IBM programs on ROM.

If you already have your software, this can be an enormous disincentive. I would personally be highly tempted by the machine otherwise. But if you simply wanted a very tough machine with preinstalled software — then this could very well be your machine.

Product Details

Product: Portable Plus
From: Hewlett-Packard,
23 Talavera Rd, North Ryde 2113 NSW
(02) 888 4444
Price: $4965 taxed

Portable Vectra

The Portable Vectra is twice the size and weight of most laptops. It looked like a laptop but only a briefcase built for an elephant could ever hope to contain it. It weighs 8 kg (almost 18 lb), but it does have an excellent handle! This machine is fully IBM XT compatible.

The screen

Its screen folded down to cover the entire top. I was delighted to see how large it was — a full 12 inches. The screen can be tilted to any angle and can even be removed, as on the NEC Multispeed, to allow the easy use of an CGA external monitor. (You could add an EGA card if needed.)

The definition is good — 640 by 400 pixels — but it needs good external lighting as it has no backlight. (There is a rumour that HP will be upgrading this screen by the time you read this).

It has a speed of 7.16 MHz with 0 wait states. It comes with 640 Kbyte RAM as standard but it can be expanded onboard to 6.64 Mbytes on the non-hard disk model and to 4 megabytes on the 20 Mbyte hard disk model. This is an excellent feature, but its expensive at $3089 for 2 Mbyte plus $498 for the expansion card.

This vast amount of RAM can be configured as EMS extended memory. The machine has three expansion slots inside (two on the hard disk model).

I think the excellence of the Zenith screen gives it a clear lead.

Disk drives

These are no ordinary 720 Kbyte drives — they can format, read and write 1.44 Mbyte 3½ inch disks!

Even with the disk drives, a fully charged battery will last a surprising 10 hours on the non-hard disk model and for up to 4 hours on the hard disk model. Another excellent feature is a battery-level meter to the right side of the keyboard — all portables should have one.

The keyboard is a full-sized IBM type, featuring 92 keys with full travel — the touch is excellent. There are 12 function keys and a numerical keypad.

There is also a standard range of ports on the back, a standard serial, a mouse port and a Centronics port.

I ran Multiplan, SuperKey, WordStar and Microsoft Word with no major difficulties. I did find SuperKey a bit difficult as it is in colour and the letters on the monochrome screen came up looking like a poor dot matrix. I found the help screens in Lotus were similarly 'dotty' and hard to read.

PAM IS supplied with this machine (with MS-DOS 3.2 as well) but PAM seems to still think that there are only 8 function keys. I tried to doctor PAM to add items to it (it does not automatically list all files available). There is a utility for the expansion of the PAM screen, but I couldn't get the programs I added to execute unless I used the DOS line. PAM does not allow for 'tagging' files for multiple selection. There are easier Shell systems than this.

So it isn't yet the Rolls Royce it could be. The screen, weight, speed and lack of ROMs all let it down.

I had the very first machine in Australia to try out. It came without any manuals. This was something of a disadvantage but, as it isn't such a rarified beast as the Portable Plus, it was easier to master. It is a 'somewhat' portable (too heavy for laps or briefcases) and a somewhat slow IBM-XT compatible.

Its finer points are the capacity of its disk drives, its EMS memory capacity and its low power-consumption.

Product Details

Product: Portable Vectra
From: Hewlett-Packard,
23 Talavera Rd, North Ryde 2113 NSW
(02) 888 4444
Price: $4986 taxed Portable Vectra

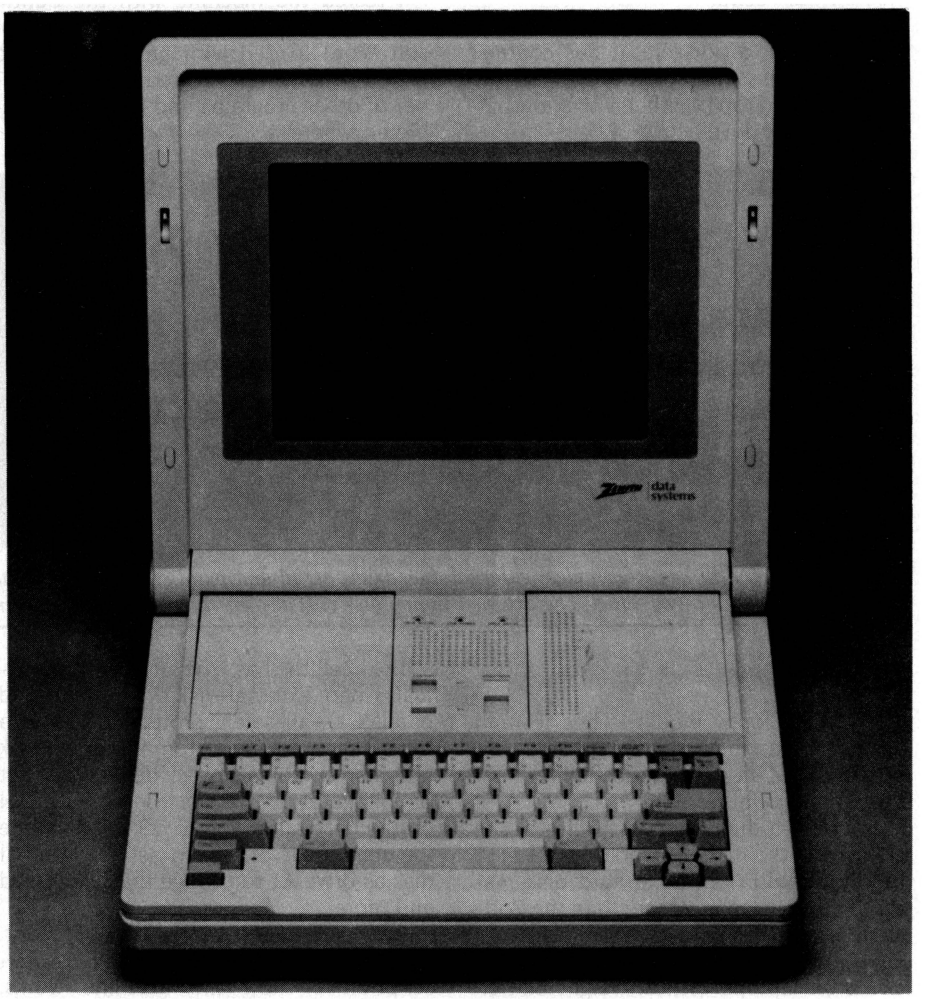


Figure 3. *The Zenith Laptop has a bright, clear, screen that's easy to read in the dark or in daylight.*

Zenith

The new Zenith Laptops look very similar to the Portable Vectra at first sight — before they are turned on. Like the Vectra, they have large screens on a lid that covers the entire machine and two very convenient 3½ inch disk drives that pop up to face you between the keyboard and the screen. And, just as on the Vectra, one 3½ inch drive can be replaced by a 20 Mbyte hard disk. It is a clear challenger to the Portable Vectra.

I turned on the machine — and lo and behold, the screen lit up magnificently! This is the monitor that should be on the Vectra! It is a little smaller than the Vectra's 12 inches, but it is wonderfully bright, clear and easy to read in the dark or in full daylight. This is despite having a resolution of 640 by 200 pixels unlike the 640 by 400 on the Vectra.

It is one of the finest monitors I have ever seen on a portable. It has contrast and brightness slide controls between the disk drives on top together with a low battery and disk drive active LEDs.

The hard disk Zenith is as deep and high as the Vectra but no wider than its 3½ inch Zenith cousin. Neither the Zenith hard disk model nor the Portable Vectra want to be hidden in an average briefcase.

Speedy, too

The Zenith is a turbo running either at 4.77 or 8 MHz - so it is faster and more versatile than the Portable Vectra. Both machines can take a 8087 numeric coprocessor.

It comes with 640 Kbyte of memory. The specifications say that the hard drive machines can be expanded to 1.64 Mbyte EMS memory. (It puzzles me why both Zenith machines cannot be similarly expanded.) The Portable Vectra is clearly superior here.

Storage on the floppy model is either two 720 Kbyte 3½ inch disk drives, with an optional external 5¼ inch drive or an optional external 20 Mbyte hard drive.

I tested the machine with the builtin hard disk, running it on batteries. Microsoft Word loaded with great speed and with no difficulties. I tested it with a number of other programs and found no trouble anywhere.

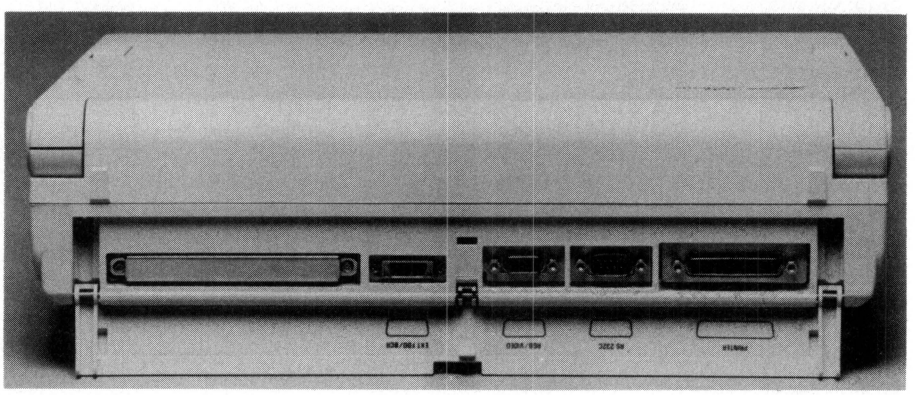


***Figure 4.** The Zenith has RGB/video, external disk drive, serial and parallel ports, all safely protected behind a hinged panel. The external floppy disk port also operates a bar-code reader.*

Specifications

The dual floppy model is heavier and bigger than many portables — but not by much. It is, however, much lighter than the Vectra Portable.

The Zenith dual floppy model is 5.5 kg (12 lb) and the hard disk model is 7 kg (15 lb). You couldn't use the hard disk machine on your lap any more than the Portable Vectra.

I reckon that the Zenith Z-191 is just about on laptops' critical weight barrier. Any heavier machines are transportables rather than laptops.

The Zenith has the usual ports — RGB/video, external disk drive, serial and parallel — all safely protected behind a hinged panel. The external floppy disk port also operates a bar-code reader. A set of configuration switches behind a panel on the base allow you to set the machine for up to four drives, to set an external disk as drive A:, to change the CPU speed and more.

The Zenith manual is the best of the lot. It goes from basics to a very detailed description of how the machine works. Among other things, I learnt that Nicad batteries can be severely damaged if you *continually* charge them. You can cut their life down to 10 minutes! Thus, you should not, repeat *not*, operate your machine on your desk with it constantly plugged in. You should use it as long as possible on batteries before you recharge it.

This means waiting until the low battery light comes on. The manual recommends you continue operating the computer (with frequent saves to disk) 'until the backlight on the screen ceases to function and the screen becomes garbled.' Then plug it in, or put in a replacement set of charged batteries, and carry on. Do not recharge batteries for more than 12 hours, preferably just for 8. The Zenith does have some automatic overcharge protection builtin, according to the specifications. The batteries should last at least 4 hours between charges on the hard disk model — and up to 10 hours on the non hard disk.

Product Details

Product: Zenith Laptops
From: Zenith Electronics
4/74 Gibbes St, Chatswood 2067 NSW
(02) 417 7999
Price: $6205 20 Mbyte hard disk, single 3½ inch floppy drive (Model 183-93)
$5579 dual 3½ inch floppy drives (Model 183-92)
$4224 single 3½ inch 0floppy drive (Model 181-93).
All prices taxed.

The finishing line

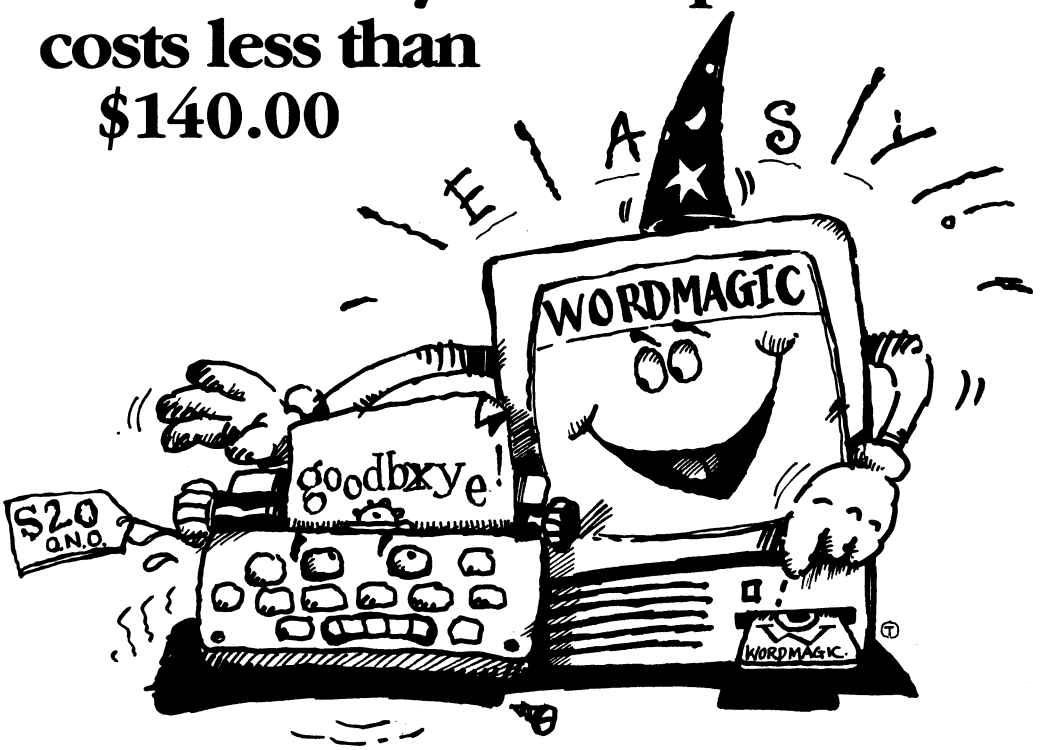
All these machines are expensive: clearly they are aimed at the corporate or affluent market. I think the excellence of the Zenith screen gives it a clear lead. It is all important that the operator can clearly read the monitor under all lighting conditions. Any other standard would be a constant source of frustration.

If it were not for the screen, and if weight were no issue, the Portable Vectra would lead over the Zenith because of its large RAM and the large disk drive capacities.

If you wanted a highly portable machine — well, then the only contender in this month's sweepstakes would be the Portable Plus. This is more expensive than other very portable machines such as the Toshiba T1000 and the NEC Multispeed and not as flexible — but it has a fantastic battery life and is very tough. If toughness is your main criteria — then the Portable Plus may well be your machine. □

WordMagic

The only full featured wordprocessor that is easier to use than a typewriter, runs on nearly all computers and costs less than $140.00



Wordprocessing too difficult? Or too expensive? WordMagic outperforms all those expensive "high performance" word-processors, yet it's the only one that's easier to learn than your old typewriter.

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Typewriter mode	N	Y	Y
Select draft/letter quality	N	Y	Y
Support DOS directories	N	Y	Y
Construct directories	N	N	Y
Instant word count	N	N	Y
True microjustification	N	Y	Y
Graphics	N	Y	Y
Upper/lower case conversion	N	Y	Y
Print multiple columns	N	Y	Y
Whole program in memory for fast response	N	N	Y
Available for CP/M	Y	N	Y
Price	$599	$980	$139

WordMagic doesn't ask you to spend hours training. We've made the commands so simple and logical that you can start writing straight away.

And the manual assumes you are a beginner, not a computer whiz.

We've built-in things you really need. Like true "What you see is what you get". And a typewriter mode for all those little jobs, like typing forms and envelopes, that are nearly impossible on other wordprocessors.

WordMagic thinks ahead for you too. With an automatic save facility, that saves as you type, rather than letting you lose all your work if the plug falls out!

And we appreciate that the most important thing to you is the look of the final product, the printed output. So WordMagic has true microjustification and proportional spacing, even on dot matrix printers. It's the best you can get!

WordMagic is available for nearly all computers, including IBM PC and compatibles, MS-DOS computers (including the NEC APC III) and most CP/M computers, including MicroBee, Osborne and Apple CP/M.

Yes! Send me WordMagic! I enclose money order/cheque/credit card details for $139 plus $5.50 P&P

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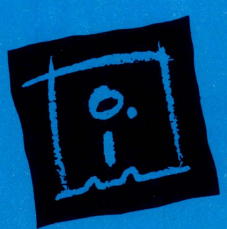

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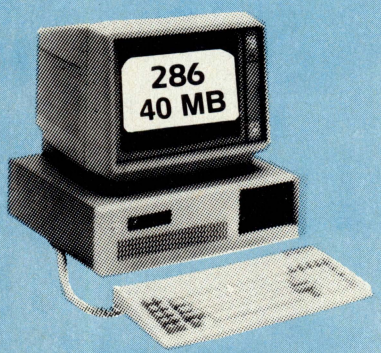

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@Liberty . . . to compile spreadsheets

Want to distribute spreadsheets, but protect them from modification? John Hepworth has the answer . . .

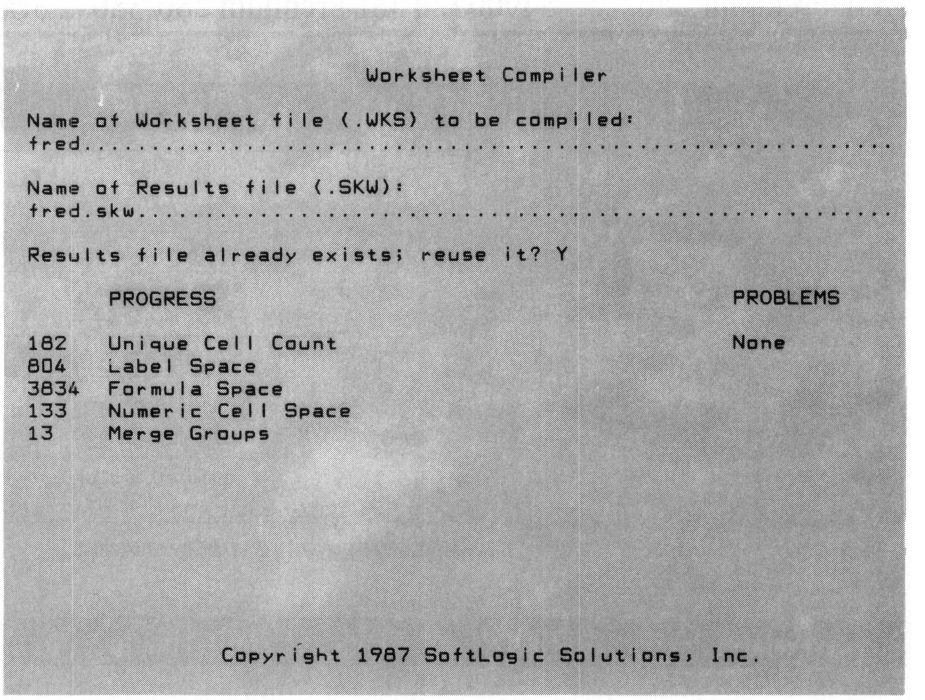

Figure 1. *After entering the output and source files, PREPARE 'compiles' the spreadsheet showing a status display at the bottom of the screen. The once only compile time is the only penalty for ensuring the confidentiality and reliability of properly debugged worksheets, but they load, recalc and save faster.*

THERE ARE LOTS of @ functions in current spreadsheets. @Today gives today's date, @Sin gives the sine of an angle, and @Liberty liberates end users from the spreadsheet program itself.

@Liberty is a spreadsheet compiler. In the past if you created a spreadsheet for use by several end users you, and each of the end users, would have to have an individual copy of a spreadsheet program like 1-2-3. Now, only the author of the spreadsheet needs Lotus. After preparing a spreadsheet with a program like Lotus 1-2-3, Symphony, SuperCalc4, Multiplan, Enable, Twin, VP Planner or AsEasyAs, it is saved in Lotus 1-2-3 1A file format. One of the programs on the @Liberty distribution disk is used to 'compile' it, and each user then uses a run-time program (also on the @Liberty disk) to use it. The whole process liberates users from the tyranny of having to have a copy of the master spreadsheet program for each end user, and frees them from the risk of end users modifying spreadsheets and invalidating their logic.

The Package

Eleven manuals and one disk comprise the package, but don't let this make you think it's complex, as 10 of the manuals are for distribution with the run time packages to end users.

On the disk are two programs, PREPARE.EXE and RUN.EXE, along with some sample files. A user creates a spreadsheet with Lotus 1-2-3, or similar. PREPARE.EXE takes one of these spreadsheet files, and 'compiles' it, creating a file with a .SKW extension. The 'compiled' file defaults to the same filename as the original .WKS file (apart from the extension). The 'compiled' spreadsheet cannot be executed directly from the DOS command line, and RUN.EXE is used to operate it.

The distribution disk is not copy protected, and while users are not permitted to distribute copies of the PREPARE program, the package comes with a license allowing distribution of up to 10 copies of the RUN program. Naturally, unlimited copies of spreadsheet files compiled by PREPARE can be distributed. The licencing of the multiple copies of the RUN program is controlled by rather novel means. The package contains those 11 manuals mentioned earlier. One is a complete manual, for both the PREPARE and RUN programs, and is used by the person writing and 'compiling' spreadsheets.

The other 10 manuals are all for the RUN program, and along with them come 10 sticky labels, one of which must be attached to every floppy disk on which a copy of RUN reside, or to the PC case if RUN is on the hard disk. Most users will find that 10 run time licences for each copy of PREPARE are more than enough, but for those who distribute their spreadsheets more widely, additional packages with 15 run time licences and no PREPARE.EXE are available. It is not hard to be meticulously honest with such a scheme, as the cost per RUN licence is effectively less than $15.

Cell contents

In Lotus 1-2-3, cells in the spreadsheet may contain values (that is to say, numbers), labels (text of some form or another) or formulae. In addition, they may be protected or unprotected, where the user cannot change the contents of a protected cell accidentally. When scanning around the spreadsheet the formulae in individual cells are shown at the top of the screen, and it is possible to print out all the formulae in a spreadsheet. Quite easy for a negligent or malicious user to alter formulae or standard values and totally invalidate the spreadsheet. Quite easy for confidential information, like profit margins, to be snooped.

@Liberty gives the spreadsheet author confidence in two ways. First is that only unprotected cells with values or labels may be changed. Protected cells containing values or labels cannot be altered, and no cell containing a formula can be changed. Protection cannot be activated or deactivated within @Liberty, but only in the original spreadsheet program. Macros are supported, as they are in the original spreadsheet in the form of a column of labels, with the first cell being a range named in a particular fashion.

@Liberty does not have an identical range of commands to Lotus 1-2-3, nor does it have an identical range of macros. In each @Liberty overlaps most of the Lotus commands and macros, with some commands not supported and some added. As an example, the /c command to copy a range cannot be used as this would change cells which contains values, labels and/or formulae — something that no compiler could accept. It will be necessary for most users to fine tune their spreadsheets for @Liberty, as many did when first taking a program in Interpreter Basic and compiling it with a Basic compiler.

After loading a .SKW file into RUN, values and labels may be modified, and it can be saved again as a .SKW file. it is also possible to save as a .WKS (Lotus format) file from RUN, but naturally no formulae are shown, just the entered numbers, labels and the calculated values. If a range was named in the original spreadsheet, it can be printed out from within RUN, and it is possible to specify printer setup strings from within RUN.

. . . @Liberty liberates end users from the spreadsheet program itself.

Compiling

At the DOS command line, the user types PREPARE to run PREPARE.EXE. After an initial decorative screen appears a screen into which the name of the .WKS source spreadsheet is entered. It is possible to specify a source file on a different drive and directory to the current default. PREPARE then asks for the name of the output file to be entered, and suggests the same filename as the source file, but with an .SKW extension. PREPARE now goes about its business of 'compiling' the spreadsheet. Incidentally, the original .WKS spreadsheet file is referred to by @Liberty as a Worksheet file, and the 'compiled' .SKW file as a Results file.

At the bottom of the screen appears a status display which keeps the user informed of the progress of the 'compile'. Information given includes the Unique Cell Count, Label Space, Formula Space, Numeric Cell Space and Merge Groups. During the compile these numbers first increase rapidly as the Worksheet is analysed, and then decrease to zero as the 'compile' is completed. The 'compile' is not fast, and is several times as long as a load or recalc in a normal spreadsheet program of the same worksheet.

Now we have some to the crunch. Not only does the 'compile' ensure the confidentiality and reliability of properly debugged worksheets, but they load, recalc and save faster as well. The only penalty is the once-only compile time. In my figures (Table 1) I used a large, but simple, Lotus .WKS worksheet of 350,848 bytes which, after 'compiling', became a 329,923 bytes .SKW results file. This slight reduction in file size is typical of the 'compile' results files relative to their original worksheets. In addition, I got the Compile, Load, Recalculate and Save figures for @Liberty and Lotus 1-2-3 version 1A* on a 4.77 MHz IBM PC with 36 millisecond hard disk.

@Liberty is nearly twice as fast as Lotus 1-2-3 on load and recalculate, and 50 per cent faster than Lotus for saving to disk.

As mentioned, @Liberty comes with 11 manuals — a full manual for the PREPARE and RUN programs, and 10 manuals for distribution with the run time module, which only cover RUN.EXE. The manuals are well written and complete, and clearly show the features which are common to Lotus and @Liberty, as well as detailing the features which are in one and not the other.

Conclusion

@Liberty is of great value in the corporate environment, where confidentiality is vital, as is elimination of the risk of end users changing models and invalidating their assumptions. It costs around $15 for the run time license for each end user, instead of the several hundred dollars that a copy of Lotus for each would cost. Compiling the spreadsheets with @Liberty brings valuable time savings in loading, recalculating and saving worksheets. On the down side, @Liberty does not have an identical set of commands to Lotus and some modification of existing worksheets will possibly be required before compilation. □

	LOTUS 1A*	@LIBERTY
Compile	NA	446 sec
Load	68 sec	36 sec
Recalculate	22 sec	11 sec
Save	61 sec	47 sec

Listing 1. *A Lotus .WKS worksheet of 350,848 bytes was reduced to a 329,923 byte .SKW results file after 'compiling'. Note the reduced Load, Recalculate and Save times.*

Product Details

Product: @Liberty
From: SoftLogic Solutions, New Hampshire USA
Distributor: Vaporware, PO Box 286, Guilford 2161 NSW
(02) 632 8841
Price: $230 taxed

Eureka . . . I've solved it!

Mathematicians, scientists and engineers may now be able to cry 'Eureka!' more often with this offering from Borland. Nevertheless some care is needed, as AMSEC consultant Glenn Fulford reports.

ACCORDING TO legend, eureka, which means 'I've solved it', was what the famous Greek mathematician and engineer Archimedes exclaimed as he ran naked through the streets of ancient Athens after a major discovery. Borland, the company which wrote Turbo Pascal, has come up with a new program called Eureka, the Solver which it hopes will help mathematicians, scientists and engineers be able to also say 'I've solved it' when working on their own problems.

Eureka is a wonderfully simple piece of software which is used for performing scientific calculations. It aims to replace a scientific calculator as the basic tool of a practicing scientist, engineer or teacher but it does much more than most calculators and is more convenient to use. One of the most attractive features of this piece of software is that equations are simply entered into an edit window in much the same form as one writes them down on a piece of paper.

This program finds solutions of nonlinear equations as well as linear and nonlinear systems of (simultaneous) equations. You can also add constraints to the equations and thus solve simple optimisation problems. Eureka calculates definite integrals numerically (using Simpson's rule) and also can carry out some limited form of symbolic differentiation.

However the symbolic differentiation is carried out internally so the only output is numeric (unlike computer algebra programs such as MuMath, reviewed in *Your Computer*, Aug '87). Eureka also does maximisations and minimisations of functions of one and more variables. Plotting graphs of functions is very simple using Eureka (although it only graphs functions of one variable). Another feature of Eureka is that it allows you to specify units for variables (for example, kilograms and metres/second) and then, by giving conversion factors (for example, cm to inches), to express results of calculations in either set of units.

Eureka runs on IBM PCs and compatibles under PC-DOS (MS-DOS) 2.0 and later. It requires at least 348 kilobytes of memory. Although not essential, you will get better value out of this program if you have a graphics card (CGA, EGA or Hercules Mono Graphics) and an 8087 mathematics co-processor chip.

The best way to appreciate what Eureka does is to look at an example. Suppose that we wish to solve the equation –

```
cos(x) - x = 0
```

Our standard trigonometric identities are no help here and we have to resort to finding an approximate or numerical solution. There are a number of numerical techniques available.

The simplest is the interval halving technique where one chooses an interval, checks that the function changes sign (from positive to negative or vice versa) on the interval and then divides the interval into two halves and checks to see which interval contains the solution. This process is repeated until an approximation to the solution of sufficient accuracy is obtained. Another popular algorithm for finding approximate solutions is Newton's method which starts with some initial guess then by calculating the intersection point of the tangent of the function with the x-axis a more accurate approximation to the solution is obtained (provided the method converges).

One can use a simple calculator to implement either of these algorithms although it is less tedious if the calculator is programmable. Some sophisticated types of scientific calculators also have a solve button which will perform the calculation automatically. These simple numerical algorithms are also reasonably easy to program in any algorithmically oriented programming language such as Basic, Fortran and Pascal.

Borland's Eureka provides a very user friendly environment for doing this type of calculation (and other similar types). Upon activating the program four windows appear on the screen: Edit, Solve, Verify and Report. The problem that is to be solved is specified in the Edit window and a summary of the solution appears in the Solve window. Eureka allows several problems to be solved at once and the use of the Edit window means that you can change the problem around slightly without having to completely rekey in the definition of the function. This is a big advantage over using a calculator, especially if the formulae involved are long and complicated, as is often the case with practical engineering and scientific formulae. Eureka also produces a graph of the function. This is essential for any work involving numerical solution of equations.

The procedure for finding an approximate solution for example using Eureka is very simple. Using the menu at the top of the opening screen, one selects the Edit window. Inside the edit window you define a function $f(x)$ by typing –

```
f(x) := cos(x) - x.
```

You then introduce an unknown variable a by typing –

```
f(a) = 0
```

– which tells Eureka to find the first, approximate, positive value of the solution of the equation. Having defined the problem, pressing the escape key returns you to the main menu. Selecting the solve command finds an approximate value which is presented in the solve window. The value calculated by Eureka was 0.73908513. Eureka also quoted an 'error' of -7.7937656e-14 which is the difference between the left hand side and the right hand side of the the equation that was solved – note that this is not the same thing as the error in the solution itself. The measure of the error used by Eureka is generally a reasonable guide to the acceptability of the solution, provided the graph of the function is not too flat near the solution. Unfortunately, Borland does not explain how its approximation was arrived at.

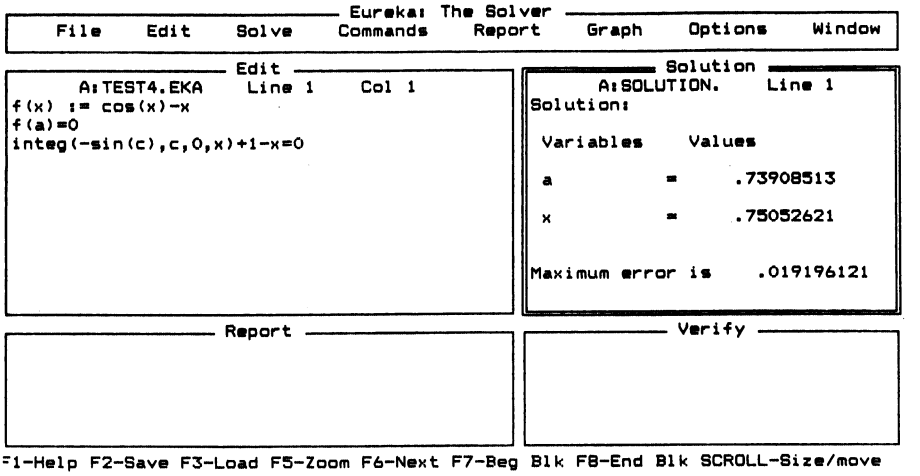

Figure 1. *Eureka's opening screen – the problem to be solved is entered in the Edit window and a summary of the solution appears in the Solve window.*

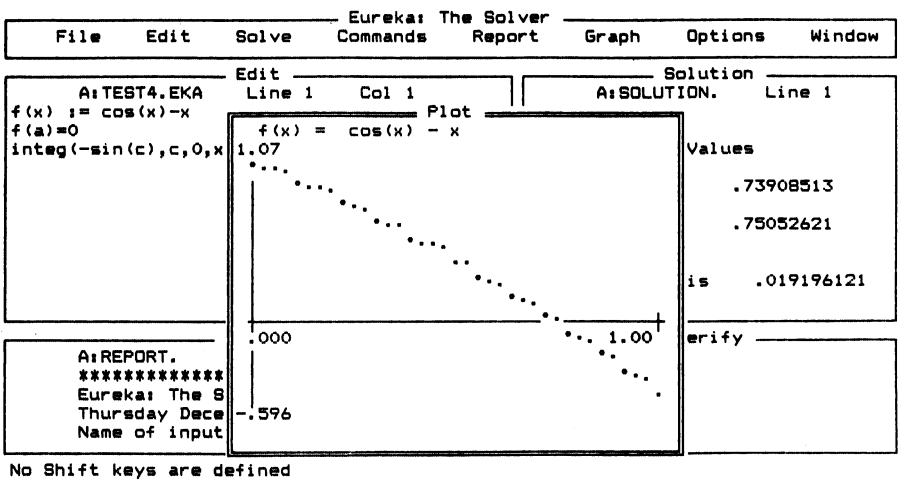

Figure 2. *Having solved the equation, it can be plotted roughly with the Graph function. The vertical axis is scaled automatically.*

Graphing

Having solved the equation, Eureka then allows you to plot the function by selecting the Graph option from the main menu and then answering some simple questions about the range of values for the plot. Automatic scaling is carried out in the vertical direction. The graph, which appears in the middle of the screen on top of the other windows, is fairly rough but usually good enough to see what is going on with the function. A high resolution plot can be obtained, if you have some type of graphics card installed, by pressing the F5 key. Also, a hard copy graph can be obtained on a variety of common dot matrix printers. I was not very impressed with the layout of the graph on a dot matrix printer; it was nowhere near the quality produced by most common spreadsheet packages. I really missed decent labelling of the axes.

It is my own personal view that Borland has chosen to do things the wrong way around by obtaining the graph *after* solving the equation. It would be much better to see the graph first in order to get an idea of whether a solution exists in the first place and how many there are to search for. One can easily fool Eureka by solving a dummy equation first (for example, $a=0$), but this should not be necessary in a polished piece of software.

Documentation

As is usual with Borland products, the documentation is excellent both in terms of readability and ease of use. This is facilitated by the generous use throughout the manual of examples illustrating the use of Eureka in a diverse range of applications. The examples (from calculating bank mortgage repayments to determining the motion of a projectile with air resistance) will enable workers in many different fields to find something they are familiar with in order to get a good feel for what the program does.

The manual also includes three comprehensive tutorials. There is one major criticism I have with the manual however – there is no mention of the algorithms used for any of the calculations that Eureka performs. I personally would never encourage my own students to use software if they did not at least have a rough idea of the algorithm which is being used to generate the results. It really is crucial that one understands how a computation is carried out so that one can appreciate the limitations of the method being used.

I was interested to see how Eureka would handle an equation which has no solution. Firstly I tried to see what would happen if I tried to solve the equation –

```
x^2 + 1 = 0.
```

Eureka immediately detected that this equation has no real solution giving an error message. Next I tried a similar equation which also has no real solution –

```
x^2 + 1 + 0.5*sin(x) = 0.
```

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This time Eureka attempted to find a solution and came up with a value of -0.24267432. An error of 0.9387 was reported which indicated that the result is unreliable. Together with the graph of the function *f* this indicated that Eureka's solution was meaningless. Although no real solution exists to this equation, complex ones do. Eureka can find approximations to these. Changing the settings to complex, I obtained the real part of one solution as -0.27712235 and the imaginary part as 0.93574208 with an 'error' of 8.3266727e-17. One should use this program with a great deal of care and discretion as I found by attempting to solve the equation –

```
sin(x) - x = 0   with x > 0
```

– which also has no real solution. Eureka reported at one stage a solution of 0.16658716 with an 'error' of 0.00076. As mentioned before this is *not* the error in the solution and this value does *not* mean that you can accept the first two digits of the supposed answer. Again the facility to plot the function gives some indication that a solution does not exist.

I tried putting Eureka's equation solving abilities through their paces by using Eureka to solve some problems which arose in the teaching of Applied Mathematics students at La Trobe University this year. One, from my first year class, was to set up a mathematical model which describes the amount of radioactive iodine which collected in the thyroid of deer after nuclear testing. I wanted to use Eureka to find when this amount reached a maximum and what this maximum was. I was able to do this very quickly and I also found the graph produced to be very useful. The second problem, from second year numerical analysis, was to find the solution to the equation –

```
tan(x) - x = 0 3
```

– which is closest to 100. This problem is difficult to handle using the standard Newton's method since the numerical procedure keeps jumping out of the required interval and usually converges to the wrong solution. The best way to handle this problem is to rewrite the equation in a different form; for example –

```
sin(x) - x*cos(x) = 0
```

I was pleasantly surprised to discover that Eureka was able to obtain this solution directly from the original equation. I was not very successful with a third year problem, however. This problem involved finding the unique solution of the transcendental equation –

```
x*exp(x^2)*
    integ(exp(-u^2),u,0,x) = 0
```

– where *exp* is the exponential function and *integ* is a definite integral. This equation arises in calculating the solidification front in a molten ingot. Although Eureka was able to graph the function defined by the left hand side of this equation, it was not able to locate the solution correctly. After some experimentation with a simpler example, I concluded that while Eureka can solve equations and calculate definite integrals, it does not appear to be able to combine the operations.

Borland claims, in its introduction, that you can solve your real world problems without having to learn numerical approximation techniques. I disagree with its philosophy, since I believe it is imperative to have some idea of how the numerical methods work so that you can understand their limitations; most numerical methods have limitations in certain circumstances, so they should be used with extreme caution by a novice.

Overall I was impressed by Eureka as a tool for the practicing engineer or scientist, but I would like to see some description of the algorithms used, perhaps in an appendix and improved output graphics. Another interesting thought would be to include some genuine symbolic computational features as are just now becoming available on some of the more sophisticated calculators (see *The HP-28C Calculator*, YC, Aug. '87).

One final question: Will Eureka run on an Archimedes? □

Product Details

Product: Eureka, the Solver
From: Borland
Distributor: Tech Pacific, 119 Farrars Pl, Sth Melbourne 3205 Vic. (03) 690 9055
Price: $233 untaxed; upgrades are available for a nominal sum.

AMSEC

THIS REVIEW was written for AMSEC by Dr Glenn Fulford, lecturer in mathematics at La Trobe University. AMSEC is a Melbourne-based software evaluation group with consultants in the workplace, in primary and secondary schools and in various tertiary institutions around Australia. AMSEC may be contacted at PO Box 140, Hurtsbridge 3099 Victoria.

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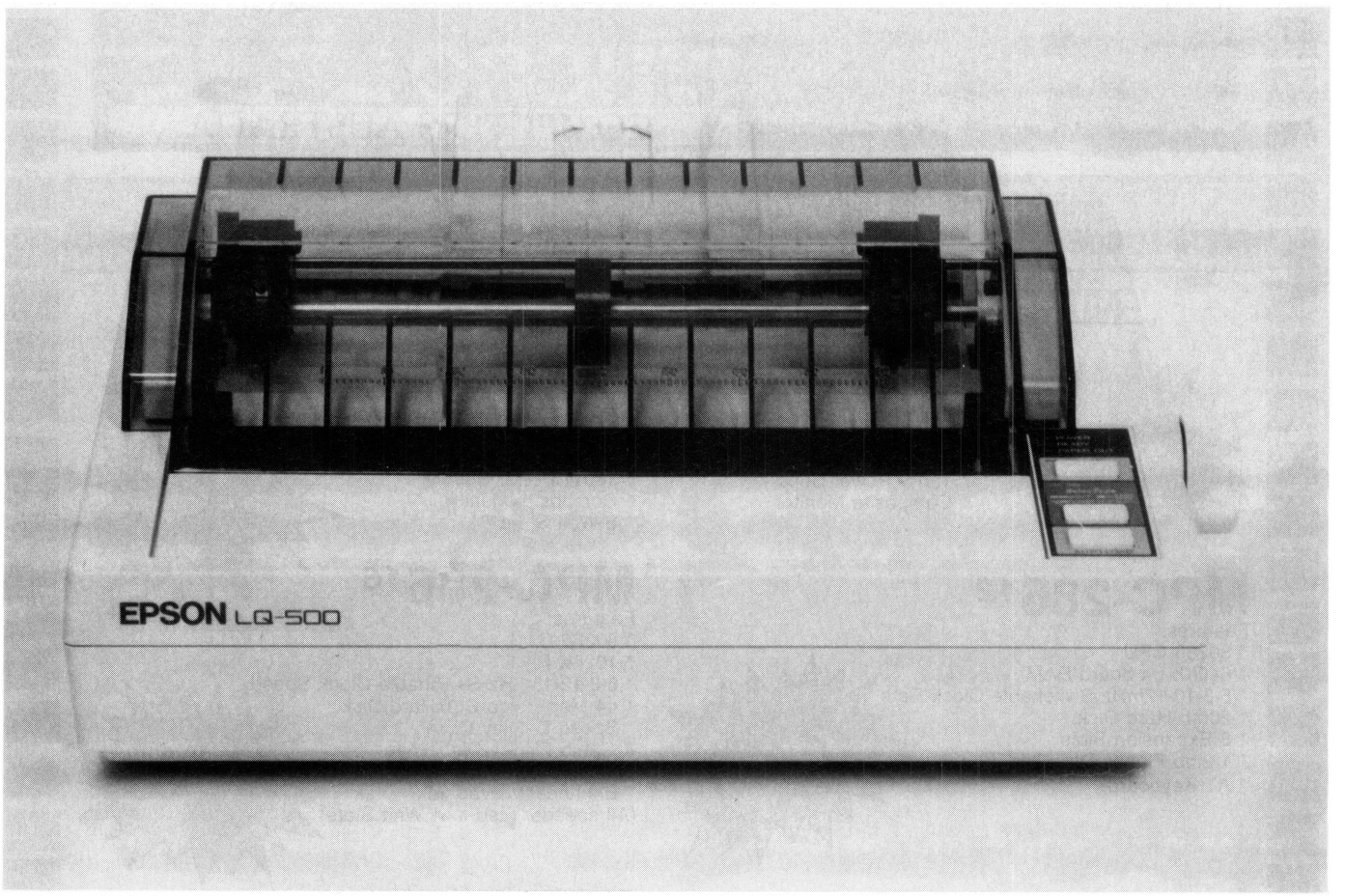
THE EPSON LQ 500



Robert Thirlwell found this new 9-pin offering from Epson gives 24-pin quality at a bargain price!

LETTER QUALITY has reached the lower end of the dot matrix price range with the LQ 500 from Epson. You can now have a printer with 24-pin quality at a 9-pin price. And it is true 24-pin quality since the fonts used by the LQ 500 are from the Epson LQ range, which includes the LQ 850, LQ 1050 and the top of the line LQ 2500+. For the price, this is real value.

Standard fonts supplied with the machine are draft, LQ Roman, and LQ Sans Serif. Tests in draft and LQ modes printed out clear and well-formed type with the default and DIP switch settings printed in a table at the top of the page. The front panel has a simple set of buttons to control paper feed and selection of fonts. The line feed button acts as the auto feed button when the printer is on line. The selection of font pitch is from two DIP switches.

Optional font modules can be purchased separately and plugged into a slot. These modules are the same as those available for the rest of Epson's LQ range, and include Courier, Prestige, Script and OCR-B. When I compared the printouts from the LQ 500 and the LQ 2500+, the three LQ 500 standard fonts proved to be identical in form, and they actually printed better than the LQ 2500+. The print from the LQ 2500+ appears lighter and less

consistent. This could be due to differences in ribbon design, since the LQ 500 uses a long ribbon cartridge that keeps the ribbon close and parallel to the platten.

The printer is small and light – only 140 mm high and weighing 7 kg. It has been cleverly put together with close attention to details such as soundproofing in the covers and components that fit together snugly. The effectiveness of soundproofing is easily tested by lifting off the front cover while the printer is in action: you get quite a blast of printer noise. However, there is no need to have the lid open while printing, and the sound level is bearable (it actually sounds quieter than the rated 62 dBA).

Paper handling is effective and attention to design details makes it easy to load single sheets with the standard cut sheet guide. It is a simple matter of placing the sheet in the guide and pressing the line feed/auto load button. The paper is fed automatically to the top of the page correctly aligned and ready to go. The auto load works so smoothly it could almost be described with the term 'user friendly': it's transparent. You hardly notice that you are feeding paper to a printer.

The pull tractor unit that comes with the printer as standard is not built in. It is quickly installed by turning off the printer, removing the paper guide and front cover, inserting the unit into slots above the platten, then threading the paper. Unfortunately, this process has to be repeated each time you swap between single sheets and continuous paper, and although it is fairly easily accomplished, it could become annoying if you have to swap frequently between draft continuous feed and single-sheets for letter quality. This is where the paper park feature found on other newly released printers would come in very handy.

The printer comes with a parallel port, and there are a number of optional interfaces that can be installed. DIP switches can be set for selection of default LQ font, graphics or italics, print direction for graphics, character pitch and international character sets. There is an additional software command to the normal ESC/P commands which allows the user to print in outline and shadows. The extended graphics character set is supported.

Print speed is a rated 180 cps in draft mode and 60 cps in Letter Quality, which is reasonable for the price. Not as fast as the LQ 2500+ of course, but in terms of print quality it certainly shines. I would recommend this printer for small businesses and for home use where a letter quality printout is required. It is at its best set up for low to medium volume letter writing with a word processor using either the auto load or the optional cut-sheet feeder.

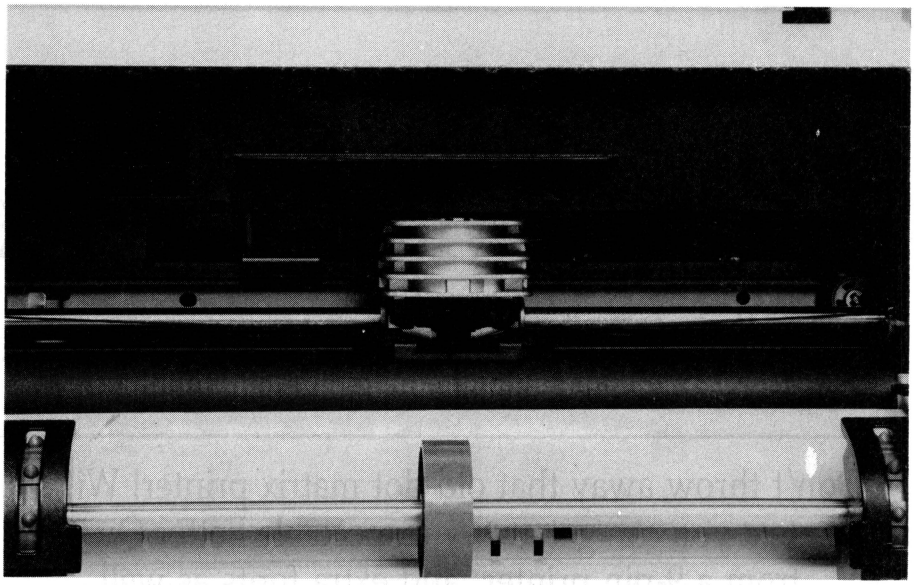


Figure 1. *The LQ 500 uses a long ribbon cartridge which keeps the ribbon parallel to the platten – this setup appeared to give better results than the 24-pin LQ 2500+ which uses the more conventional ribbon setup.*

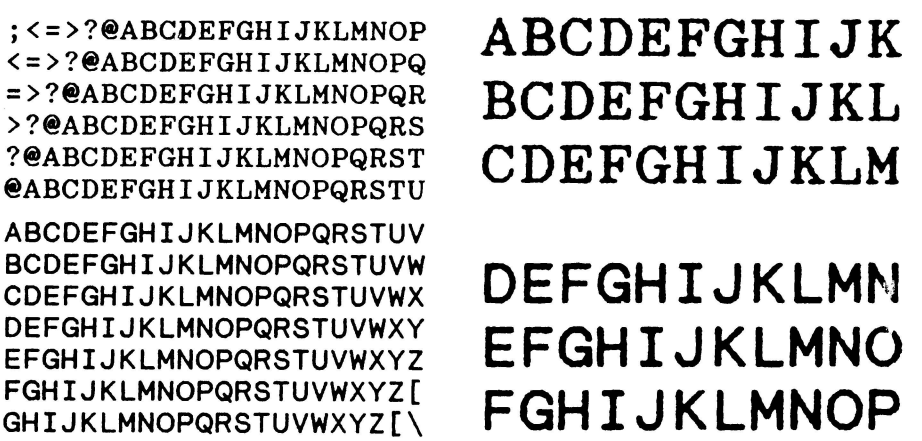


Figure 2. *Roman and Sans Serif fonts, shown as printed and at 200 per cent.*

For the occasional fast printout in draft mode, the pull tractor should certainly be adequate. At first, it appears to be a bit on the lightweight side, but once installed it fits firmly into place on the printer behind the platten and works perfectly. I would not recommend using it as a heavy duty high volume printer, but it should be suitable for average home use. However, if you need to swap frequently between continuous sheets and cut sheets, the procedure of re-installing the tractor feed could become tedious.

At its price, this printer cannot be beaten for its 24-pin quality output. □

Product Details

Product: Epson LQ 500 dot matrix printer
From: Epson,
3/17 Rodborough Rd, Frenchs Forest 2086 NSW
(02) 452 5222
Price: $900 taxed

Metatext Matrix Printer Enhancer

Quality printing from that old 9-pin!

Don't throw away that old dot matrix printer! With Metatext you can get a very respectable Letter Quality from a 9-pin printer, and extra fonts as well.

MANY PC users have been using a dot matrix printer for years to faithfully print out draft and near letter quality (NLQ) documents. But there is sometimes a need for better quality output. What are the options? To begin with, you could go overboard and rush out to buy a laser printer which would definitely increase your print quality (and decrease your bank balance).

Another option is to invest in a daisy wheel printer or an ink jet printer. But if you are used to fast draft outputs and need to print letter quality as well, you would probably opt for one of the new 24-pin dot matrix printers. But all of this costs money: Why not try a matrix print enhancer such as Metatext? It's certainly cheaper than the above alternatives, and the quality is certainly as good as 24-pins, but there is a price to pay . . . it's slower (and makes your printer work harder for the same output, too).

Metatext 2 came in a small box containing a manual, software on a disk, and a piece of hardware called a 'puck' – a flat rectangular piece of hardware that sits on your desk and is flipped over to select between Draft and Quality modes of printing. A cord connects the puck to the parallel port, where it is inserted between the printer cable and the computer. Metatext works by intercepting everything that is sent out of the parallel port to the printer.

With the puck Draft side up, the printer works as it normally would in draft mode (so you get 9-pin draft, not 24-pin on a 9-pin machine). In Quality mode, with the puck flipped over, the Metatext software converts all character codes coming from the computer into graphic representations and overrides the printer's normal NLQ setting to print in the selected Metatext font.

You have to look pretty hard and close to tell the difference in quality . . .

The installation procedure is quite straightforward, and the manual gives adequate instructions. I tried it out using the new Star NX-1000 9-pin dot matrix printer, which has both the Epson LX-800 and IBM Proprinter II emulations. Installing Metatext on a President AT only resulted in the computer locking-up on trying to print. I rang Mitsui, who sent another package, and it didn't work either. So I installed it on an NEC Powermate II 386 and it worked fine.

This brings us to the ubiquitous problem of compatibility: Some things work together, other things just do not. The reason the President didn't like Metatext is probably something to do with the installed parallel card. I have tested quite a few printers with the President with no problems, but Metatext just did not want to work on it. According to the manual, Metatext will work with IBM PC, XT, AT computers, and with Compaq, Olivetti and Zenith compatibles. It also requires that the printer has Epson or IBM graphic codes.

While writing this review, version 3 of Metatext arrived from Image Computer Systems in the UK. Craig Buller from Mitsui gave me a disk to look at which demonstrates the extra fonts and graphic capabilities of the new version. I have not yet seen the final version, but I believe it has an easier installation procedure and (wouldn't you know it!) uses a hot-key combination instead of the hardware puck.

The output from the Star NX-1000 in NLQ mode without Metatext is pretty good. The print head takes two passes and uses bi-directional logic (in other words it prints in both directions to save time). With Metatext installed, the print head takes three passes per line, and prints in one direction only. A comparison of printouts using the Star's resident NLQ Courier font, and the Courier font from Metatext shows a definite improvement.

Now for the real test: Is it as good as LQ printing from a 24-pin printer? Well you have to look pretty hard and close-up to tell the difference in quality between output from an Epson LQ 2500+ and the Metatext-enhanced 9-pin Star. The 24-pin is able to print a thinner diagonal, which shows up in some fonts more than others. But apart from this, I could pick only very minor differences. But remember, the Epson 24-pin is a lot faster (and it's not working so hard).

In Default Quality mode, Metatext prints in three passes, and in one direction only. There are two other qualities selectable from the initial installation or from escape codes. These are *-f* for faster, lower quality (less passes of the print head), and *-l* for letter quality. The *-l* set-

The 24-pin Epson LQ-2500+'s NLQ mode

```
Dear Orion:

At 12:20 this a
and justified b
of the world!
automatically -
first line of m
and perfectly j

This was the la
so by long odds
ever born of th
Livy is downsta

All the witness
historical birt
movable type by
```

Metatext in Draft mode using a 9-pin Star NX-1000 (3 passes of the print head)

```
Dear Orion:

At 12:20 this a
and justified b
of the world!
automatically -
first line of m
and perfectly j

This was the la
so by long odds
ever born of th
Livy is downsta

All the witness
historical birt
movable type by
```

Metatext in Quality mode, again using the NX-1000 (6 passes of the print head)

```
Dear Orion:

At 12:20 this a
and justified b
of the world!
automatically -
first line of m
and perfectly j

this was the la
so by long odds
ever born of th
Livy is downsta

All the witness
historical birt
movable type by
```

Figure 1. *While the NLQ output from the 24-pin Epson LQ-2500+ is certainly respectable, it is not quite as good as that from the 9-pin Star NX-1000 using Metatext in Draft mode; the Quality mode, while slow, produces characters that could have come from a typewriter.*

ting causes the print head to make six passes on each line, again in unidirectional mode. This produces a slightly blacker, thicker printout and is the highest quality available using Metatext. This setting slows the printing rate so that it takes three to six times longer to print a page than if using the printer's default NLQ mode, depending on the printer. Most users would be happy with the Default mode, however, which takes roughly twice the time to print as the printer's normal NLQ setting.

One advantage with print enhancers is that you are no longer limited to the fonts resident in your printer. The extra fonts can make your printouts more attractive, and Metatext gives you the option to load three fonts at a time. With embedded slash commands in your word processor text, it is possible to switch between the three loaded fonts within a single document. Fonts can also be selected with an extension of the Epson escape codes.

The Metatext 3 has a total of 16 fonts, including Roman, Typewriter, Outline and two optical character recognition fonts, OCRA and OCRB. Enhancement features including subscript, superscript, underlining, compressed and bold printing are supported with each font. There is a spreadsheet font, which allows more to fit on the page, and a couple of fonts which make excellent choices for headings.

Graphics are supported with each of the standard fonts including the extended ASCII characters 128 to 254. If that's not enough, a new graphics set, called the Image font, has been inserted using the same ASCII character numbers, but it has the ability to type a more esoteric selection, such as rounded corners and arrows.

If speed is a concern, and you wish to update your old printer (or even a new one) by adding a wider selection of fonts, and improving the output to 24-pin Letter Quality, I would recommend Metatext – but try it first with *your* computer and *your* printer before buying. □

Product Details
Product: Metatext 3
Matrix Print Enhancer
From: Image Computer Systems
Distributor: Mitsui Computers, 1 Rodborough Road, Frenchs Forest 2086 NSW
(02) 451 7711
Price: $295 taxed

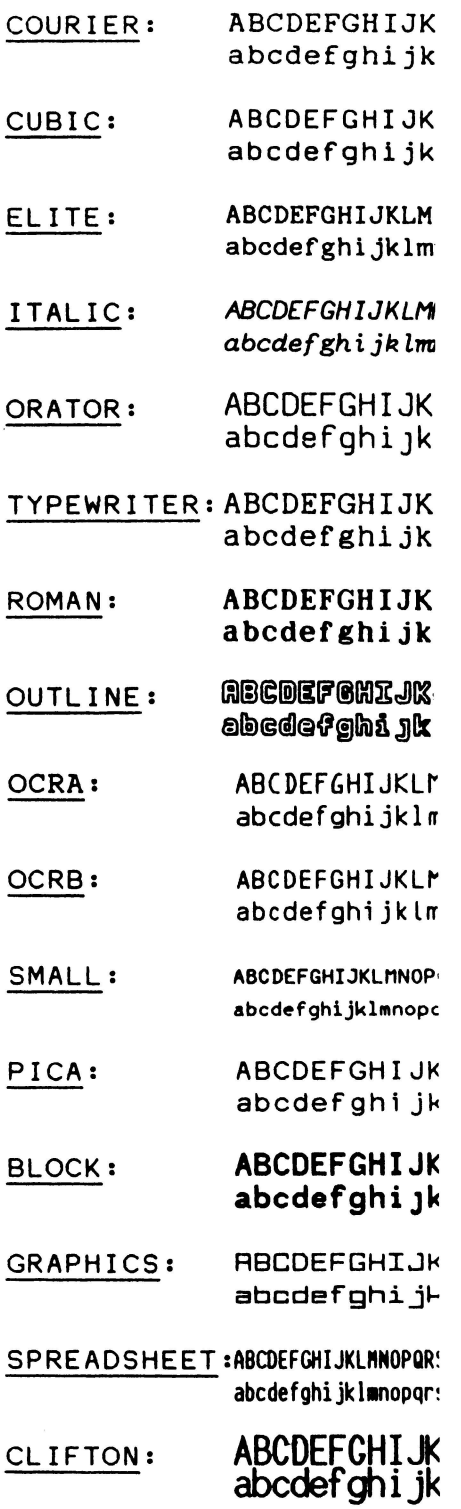


Figure 2. *The fonts available with Metatext 3 – any three can be printed on a single page.*

Project Manager Workbench *vs.* SuperProject Plus

. . . or Commodore *vs.* Rolls-Royce

SuperProject+

SUPERPROJECT+ comes in a (conventional) shrink-wrapped box, which contains a manual which looks like just about every other software manual you have ever seen. To add insult to injury, the first thing you have to do is remove the pages for the manual from (more) shrink wrapping, and insert them into the binder, along with the dividers which come separately.

The shrink wrapped pages come complete with two pages of legal warnings about licenses and warranties and such like, which I never bother to read, and I doubt that most other users read them – so why do the software companies persist in putting them in?

One thing in SuperProject+'s favour is that IT comes with both 5¼ and 3½ inch diskettes, and a sticker that proudly proclaims that it is PS/2 compatible.

Another plus for SuperProject+ (pun intended) is that, unlike Project Manager Workbench, it is not copy protected. I really feel that copy protection these days is both futile and too restrictive on legitimate, licensed owners of software to be justifiable.

SuperProject+ (familiarly, SPJ) seems aimed towards enforcing a rigid style of scheduling on the user, who is given very little latitude in the way that a project is entered, displayed, updated and printed. The user is expected to have all the information about a project at his (or hers) fingertips, and the program is very intolerant of users with minimal information.

Now that you all think this is a computer magazine, David Chatwin tells of a Commodore and a Rolls-Royce . . .

The manual starts off with an explanation of what project management and scheduling is all about. SPJ presumes that the user knows very little about project management, and pitches its spiel accordingly. From this point the manual goes on to the installation process for the package. It is again assumed that the user knows virtually nothing about DOS or how to use their computer, and so very detailed step-by-step instructions are given.

The manual now leads on to the tutorial section. SPJ offers a tutorial which uses the supplied sample files to lead the user through the planning process. A possibly useful feature for first time users is the 'Ten Minute Guide to SuperProject+' supplied with this package. This booklet demonstrates to the first time user most of the main features of SPJ, and as the name suggests, takes about ten minutes to read.

In common with Project Manager Workbench, SPJ is menu driven, with the menu appearing across the top of the screen. The menu for SPJ I found somewhat cumbersome to use, as you must use the space bar (or backspace key) to move along the horizontal bar to highlight the option you want. You then have to press the F9 key to bring up the vertical submenu, and again use the space bar (or arrow keys) to highlight your choice before pressing return to select it.

If you have an extra good memory, there are various function keys you can use to shortcut the menu system. The menus are so cumbersome to use that the function key system is a very attractive alternative.

The range of options that can be varied to suit the individual in SuperProject+ is somewhat overwhelming, especially for the novice user – you can define 34 separate preferences on how to enter, store and display the project. In reality, this is a bit of an overkill, and I have never heard of any user changing more than about 4 or 5 of these preferences. The rest just seem to confuse people and I think that they do more harm than good.

SPJ is centered around the Pert chart (or network diagram), and consists of a series of boxes (each representing an activity) which are linked by lines which show the connection (or link) between activities. This type of representation I personally do not use very often, and I think it is certainly one of the most difficult ways known to plan a project. You can switch to the Gantt chart fairly easily, but the fact remains that the program and the manual do not seem to cope well with the thought of moving away from the Pert chart.

In use, each new activity box is added on top of the previous one, and to see previous activities you need to go through a fairly laborious approach of picking up the top box, moving it out of the way, getting the next box and moving it, and so on until all the activities are spread out. By this stage, the boxes have spread so far out that you can't really get a true appreciation of their inter-relationships. Using the zoom feature of SuperProject+ doesn't help much, as when you zoom out, all you can see of each activity is just its identity number, which, unless you have a photographic memory, is absolutely no help at all.

SPJ forces you into a very rigid (and disciplined) approach to scheduling, by virtually forcing you into supplying all the information for an activity right at the start. This might be okay if you have all the information at your fingertips, but in real life this is very seldom the case.

SPJ also has a coronary at the thought of changing an activity's duration or location in time, and the process of changing even this simple sort of information usually led me to say 'Oh, what the heck? I may as well leave it the way it was', or words to that effect.

Activity numbers

Another annoying aspect of SPJ concerns the allocation of activity numbers. SPJ allocates each number for you as each activity is created, starting at 001. This is great until you want to insert an activity between two others, as the numbering system does not allow this, so you wind up with the new activity at the bottom of the project, until you sort the project (say, by time) to get it in the right place. Even then, the inserted activity retains its original number so it is not unusual to get consecutive activities numbered 005, 128, 006.

In all the time I used SuperProject+ I never got used to this, and invariably got confused by it somewhere along the line. Sometimes it is impossible to get your activity where you want it, so the activity sits somewhere right out of place, just because you forgot to enter it in the right order. Another bugbear is that the activity number cannot be allocated or changed by the user, so you are stuck with whatever number the program wants to give you. This makes it near impossible to number activities to match (say) budget items.

Of course, one of the main reasons you will want to use a project manager is to do the (black) magic trick of automatically calculating the critical path and project

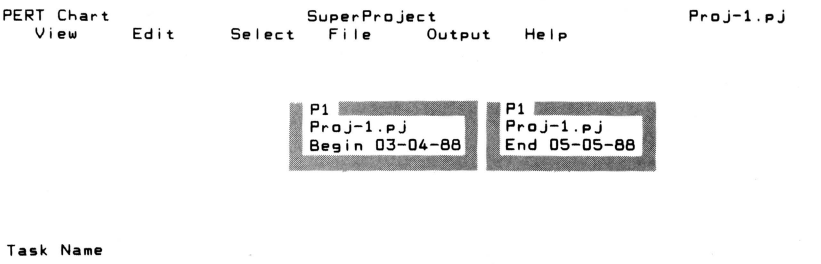


Figure 1. *The initial working screen with Pert-based SuperProject+.*

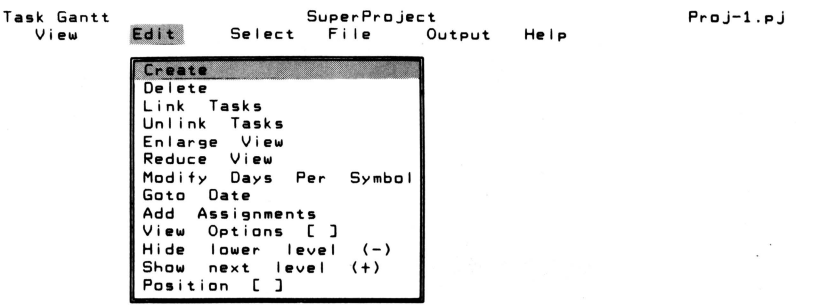


Figure 2. *SuperProject+'s View menu. The program supports slash commands to move through the menus.*

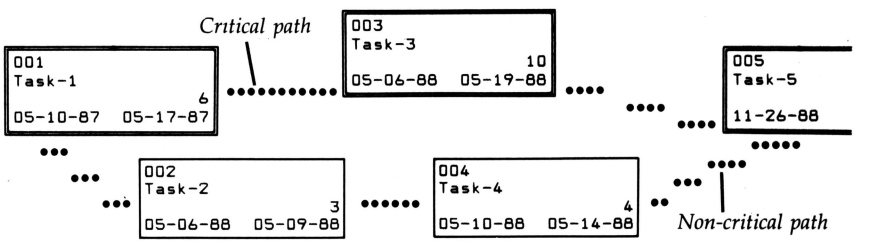


Figure 3. *A Pert chart created with SuperProject+ showing the critical path and tasks.*

duration and (of course) resource levelling. SPJ offers you the choice of doing a recalculation automatically whenever you change something, or of waiting for you to tell it to do a recalculation.

Now, for the novice, automatic recalculation might hold some appeal at first, but the thrill of waiting 30 or 40 seconds (sometimes more) while the program recalculates the entire project just because you have changed some minor detail soon wears off and you realise the benefits of a having a well-behaved package that waits until asked before it starts madly data crunching.

When you have done a recalculation, SPJ will highlight any activities that are overscheduled (that is, you are shown as needing to work 30 hours per day, when you know that the boss will only let you work 26 hours per day) by blinking the names of those activities. Of course you can let SPJ do all the walking by allowing it to automatically re-schedule those activities to a time slot where they can peacefully co-exist, based on priorities and resource availability.

Priorities

Speaking of priorities, SuperProject+ will allow you to set a priority ranging from 1 to 99. Not bad, eh? Well, the truth of the matter is that this is total overkill, and in reality trying to set any more than 10 different priorities is totally meaningless, but some people might like the security of knowing that they can set 99 priorities if they want to.



In terms of resources allowed per task, SPJ is very generous, allowing you virtually as many as you want. I certainly never found myself wanting for more capability in this respect.

SPJ does offer very good (maybe even excellent) costing and facilities. The functions provided could even be used for a quite good estimating and cost reporting system for such people as builders.

SPJ runs entirely in RAM, and as such the size of your project has a finite limit, although on a 640K machine you would be able to create about 750 tasks (based on the average memory usage cited in the manual). On a 320K machine you would be lucky to get away with 90 tasks, and if you have any memory resident programs you might just find yourself out of luck. SPJ will run quite happily on a 320K machine, but as they say in the classics, the more (RAM), the merrier!

The printing options available are good, although you must have the particular chart or screen on display that you want to print. SPJ allows you to generate various summary reports, as well as files that can be read by most spreadsheets. The facilities for setting up and customising the printer driver for your printer or plotter are good (certainly not the best or worse I have seen), and SPJ will even support colour printers, a feature we definitely do not see enough of. SPJ also supports plotters, conventional printers and laser printers. In fact the choice of available printers is amongst the best I have seen. My only complaint about the printing facilities for this package is that they are rather poorly documented, and do not offer any sort of editing facilities.

Another bonus with SuperProject+ is that it come complete with Sideways, which enables you to print those long schedules down the page instead of across. This can save you a lot of cutting and pasting, and will quite happily produce a chart that wraps itself three times around your office before you know it.

For ease of use and learning SuperProject+ would have to rate as poor to acceptable (getting more acceptable as time goes on). In terms of features offered, I would say good to very good.

Product Details

Product: SuperProject+
From Computer Associates
Distributor: MicroAustralia Pty Ltd, 15 McDonald St, Mortlake 2137 NSW (02) 736 3299
Price: $1343 taxed



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Project Manager Workbench

PROJECT MANAGER Workbench comes in a box which looks like it would withstand an atomic bomb blast, or even the ravages of Australia Post. This box contains a leather-look binder with polished brass fittings which not only looks good, but also seems more robust than the normal sort of binder. This manual comes complete, with the dividers already in place, and wrapped in a normal plastic bag which is sticky taped shut. All this when I thought that plastic bags, sticky tape and classy presentation had gone the way of last year's cicadas and milkshakes in metal cups.

Another noticeable feature is the lack of the usual dire warnings about license agreements and so on. I liked this, and I think other software houses might do well to follow Hoskyns lead. Hoskyns assure me that Project Manager Workbench is available in restricted numbers on 3½ disks, hopefully the situation will improve with the new version due out soon (more on this later).

Project Manager Workbench (PMW, to save a lot of typing), is a lot more flexible, than SPJ, and as the name suggests would provide an extremely useful tool for use by project managers. It allows the user (the project manager) to work in an intuitive manner, starting with a minimum of information, and building up details as they become available. Like SPJ, the PMW manual starts by explaining project management and scheduling is all about.

Where the two manuals differ is that PMW works on the assumption that the user knows at least the basics of project management, and tends to concentrate on how PMW will help a manager achieve better control. As is shown through most of the manual, the program thinks that its users know a fair bit about what they are doing, and so the installation instructions are concise to say the least. This is alright if you are an experienced or knowledgeable user, but could leave novices wallowing a bit.

The tutorial for PMW is similar in concept to that offered by SPJ in that sample files are provided to lead the user through the planning process. PMW does not have a Ten Minute Guide, but it does offer a demonstration program which quickly guides the user through the features of the package. In the long run, however, the

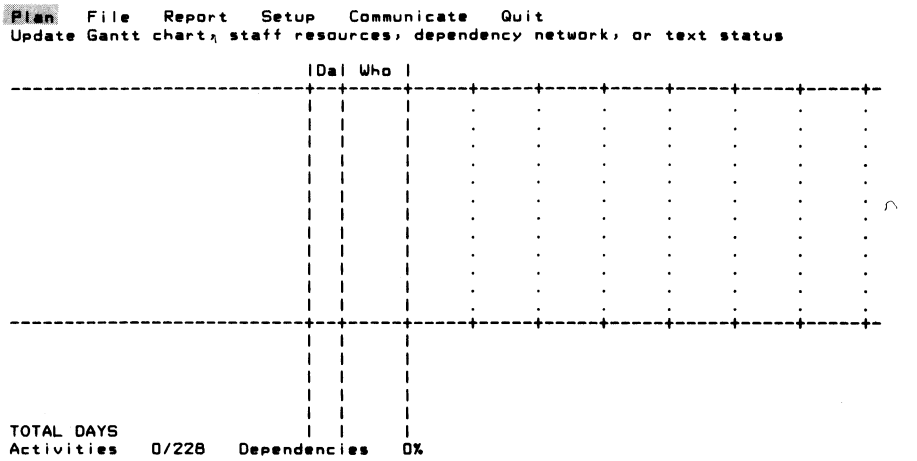

Figure 4. The initial working screen with Gantt-based Project Manager Workbench.

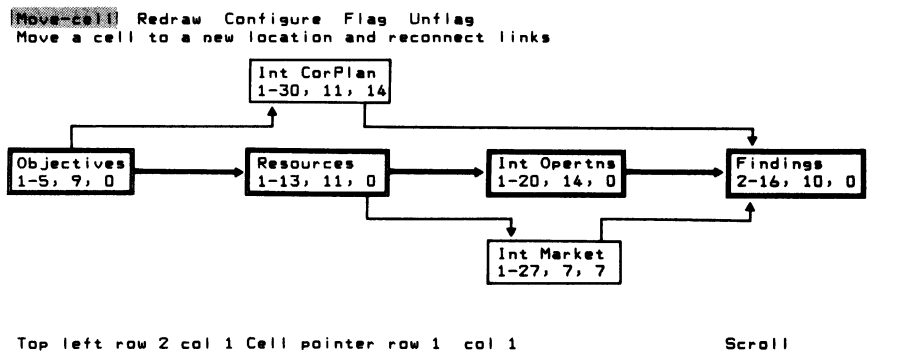

Figure 5. A Pert chart created with PMW showing the critical path and tasks.

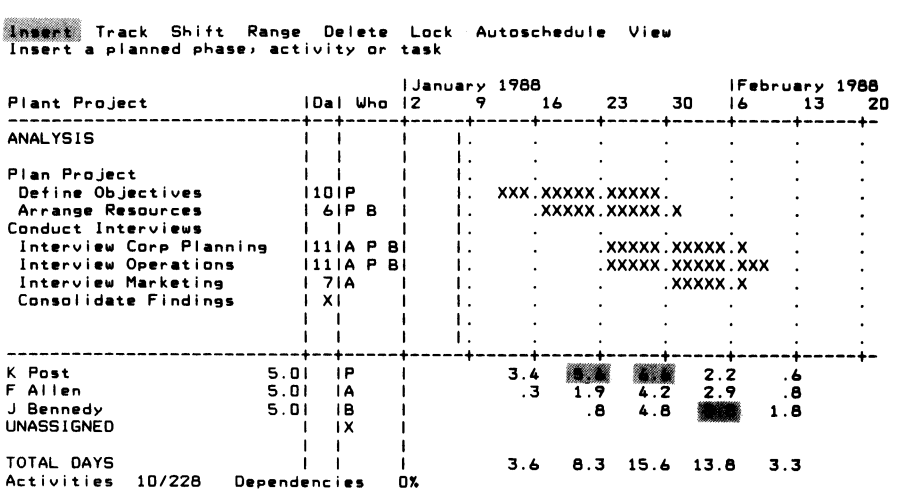

Figure 6. PMW's Resource Spreadsheet (in the bottom third of the screen) dynamically updates to show the commitment of each resource, and how the total commitment for all resources is affected by a change in the Activity.

only way to learn a package like this is to sit down and try to set up your own project on it. This comment holds true for both PMW and SPJ.

PMW is also menu driven, but I found the its menu structure a whole lot easier to use as you have the option of highlighting your choice with the arrow keys and pressing return to select it, or pressing the first letter of the heading to select it with just one keystroke. This action will bring up the next sub-menu (again horizontal), where you repeat the process until you finally get where you want to go.

Users of Lotus 1-2-3 will have absolutely no trouble in using the PMW menu structure, but I defy anyone to get used to the SuperProject+ system in under a month. As in SPJ, those users with good memories can use various function keys to shortcut the menu structure. Another nice touch is that the menu can be turned off to free up extra screen space to display your activity schedule on. The facilities for customising PMW are more restricted than in SPJ, being limited to about ten or so of the most useful preferences. But – during extensive use of this package I never felt that I was denied any option that I wanted to set.

Unlike the opposition, PMW is centered around the Gantt chart, which is simply a bar diagram, where each bar shows an activity, how long it is, and where it sits in the timescale of the project. In my experience most managers prefer to use a Gantt chart for their planning because it clearly shows the important details (duration and position in time) of any given activity. There are some managers who will disagree with this – but I tend to think that they are locked into thinking in terms of Pert charts because it is all they have ever used.

Once you have played around with the Gantt chart format of PMW I think most people would be very quickly converted. Another benefit of the approach taken by PMW very quickly becomes evident – When each activity is added to the screen (or chart) in PMW, it appears on a separate line on the chart. By simply pressing the Scroll Lock key, and using the arrows the user can very quickly see all the activities that they have entered so far. I found PMW the much easier of the two to use. This came about largely because of the approach taken by it to programming and scheduling.

PMW works largely in an manner similar to that used by most managers, of drawing a bar chart (Gantt chart) for all the activities of a given project. You then sit down and start to play around with this chart to get the desired effect, be it best resource utilisation, or meeting a certain finish date, or whatever. In the old fashioned way, using pencil and paper, you do your playing around by rubbing out a line and moving it, or by extending or shortening the line. You then see what effect this has on your resources and other activities, and move them around accordingly. You also normally start out with minimal information at first, and slowly build up your information base as time goes on, and you do a few 'what ifs' with the plan.

As you move your activity around, the spreadsheet dynamically updates to show you how the commitment of each resource . . .

This is exactly the way you work with PMW. You can start out with absolutely minimal information about an activity, and commence by simply placing its bar on the screen. You can then build up the information about that activity as it becomes available, all you really need to start with is the activity's name.

Obviously, the more information you can supply, the better, but PMW is quite happy working with whatever you can supply at the time. Changing the location (in time) of an activity, or changing its duration is simplicity itself, as all you need to do is move the cursor to the activity, start the shift function, and move the beginning, end or whole activity across the screen. As you do this, one of PMW's strongest features quickly becomes evident. This feature is called the Resource Spreadsheet, a spreadsheet (obviously) that appears in the bottom third of the screen.

Resource Spreadsheet

As you move your activity around, the spreadsheet dynamically updates to show you how the commitment of each resource, and the total commitment for all resources is affected by the change in the activity. PMW also appears to run faster than SPJ, especially when the Gantt chart is on display. The screen updating for SPJ is painfully slow, especially on a standard PC, and scrolling through the project is so slow you sometimes feel like going out to make a cup of coffee while the screen catches up with where you want to be. Recalculation times are a bit difficult to compare, but my gut feeling is that PMW runs about two or three time quicker than SPJ.

PMW allows you to use almost whatever numbering system you want to. The only restriction is that each number must start with one of three letters, depending on what level in the heirarchy the activity is. For those of you who are not familiar with activity heirarchies, PMW allows you to use four levels of planning within each project. As the package is supplied, these four levels are called: Project (the overall plan), Phase (each Project can be broken up into several Phases), Activity (each Phase can be further broken up into several Activities), and Task (each Activity can be then broken up into several Tasks).

The names for each of these levels can be changed by the user as they require (as long as the first letter of each of the lowest three levels is different), and the user need only use as many levels as they want to, although you must use at least the Project and Phase levels. The activity number must start with either P, A or T (for Phase, Activity or Task), and three digits are allowed after the letter.

Another area where PMW demonstrates its flexibility is with Activity names. In PMW you can quite happily call two Activities by the same name, whereas SPJ forces you to come up with a unique name for every activity. You don't realise how useful this is until you want to have an Activity which is repeated several times throughout the project.

In real terms, the flexible numbering/-naming system outlined above gives PMW the ability to conform to almost any conceivable inhouse system which you may currently be using.

As I said before, one of PMW's greatest assets is the Resource Spreadsheet. I found it invaluable for dynamically keeping track of just how much of each resource has been allocated at any point in time. If you do not nominate a resource for a particular activity, PMW will automatically allocate it to the Unassigned resource, just so you know how much work effort you have not allocated to resources.

The Resource Spreadsheet makes 'what if?' analyses so simple that even a managing director could do them. In fact, they

are somewhat easier to do than on a normal spreadsheet, as you don't have to do a recalculation – the resource spreadsheet updates dynamically as you make the changes to the program.

Recalculation

PMW only offers recalculation on request. As I said above, this is by far the best approach, as automatic recalculation can be a pain in the keyboard. PMW also offers two types of recalculation. There is the full blown Autoschedule which will do all your resource levelling for you and, acting on priorities, will schedule the project for completion ASAP. The other choice you have is the Recalc option, which will recalculate a range of activities to the shortest possible duration commensurate with resource availability. PMW, by the way, only allows 10 levels of priority, which I feel is more than ample to meet most situations.

A nice touch with both the calculation options is that PMW will highlight any tasks which cannot possibly be completed within the constraints you have specified. As far as PMW is concerned, there are two types of overscheduling. The first, which is the most common, is where all the tasks for a particular activity overschedule the availability of that resource. An example of this is where you would require someone to work 9 days a week to do all their scheduled jobs.

The other type of overscheduling is what PMW refers to as Inherently Overscheduled, where a task cannot possibly be completed in the time allowed. This occurs where the duration for a task does not allow enough time for the resources to complete the task. An example is where you might say that a task has a duration of only 2 days, but a particular resource has to do 4 days work to complete the task. The two different types of overscheduling are highlighted in different ways, just so you can tell which is which.

As with SPJ, PMW will allow you to define a task as being a subproject. Unlike SPJ, you have a bit more control over what information from the subproject you want included in the main (or super) project. You can specify which phase, activity and task you want included, as well as having the choice of summarizing activity detail and including or excluding the subproject resources. You can also elect to not include resource work effort and cost on the main project's reports.

One particular problem I found with PMW is that you are restricted to only using six resources for each task. This can prove to be a bit restrictive at times, but the distributors have promised that the new version (due soon) will allow virtually unlimited resource allocation per task.

The more practical side of this is that enables those users with minimal memory to still create projects of worthwhile size. Of course, once you start spilling to the disk, the whole thing slows down quite considerably, so those extra 4164/41256 chips may still be a desirable investment. The memory guages at the bottom of the screen do give you a pretty accurate idea of just how far you have to go before you start using the disk. PMW does insist on having 512K of RAM to play around with, but let's be honest, what doesn't need 512K these days?

Printing

At first glance the printing facilities seem quite rudimentary, but then as you use them they suddenly start to appear a whole lot better. From the print screen you can pick any of the reports available (regardless of what was on the screen), and send it to your printer or to a file. You also have the choice of printing the project currently in use, or picking one from the disk, which saves the hassle of loading it to quickly run off one report.

Where PMW really shines in the printing department is in its ability to send a report to the screen text editor, instead of to the printer or a file. This enables you to very easily customize the report by adding notes or comments, and so on, before you print it. The text editor will quite happily edit the charts as well as the standard text reports. Unfortunately, when you use the text editor, you can only print out in 80 column width instead of 132, but again Hoskyns promise me that this will be attended to in the new version. PMW does not support colour printers, but it does support HP (or compatible) plotters for those of you lucky enough to own one. Dot matrix and laser printers are also supported, although there are just six different types to choose from.

PMW will print the Gantt and Pert charts sideways down the page, but only if you select quality print, instead of draft mode.

In terms of overall ease of use I would rate PMW as excellent, with the features offered as being very good.

The bottom line

These two packages might seem to address the same market at first glance, but that is really doing them both an injustice – SuperProject+ is certainly a very powerful package, perhaps just a bit too powerful, which tends to make it a bit unwieldy and difficult to use. It has heaps of bells and whistles, and would certainly appear attractive to those of us who worship such things. It is priced right for someone who is just getting into computerised project management, and is not too sure if it is for them or not. It provides a more than worthy competitor for the likes of Microsoft's Project, but I feel that the difficulties to be faced in learning and using it need to be considered before you commit yourself.

PMW on the other hand, has more of the appearance of a Rolls-Royce. At first glance it seems well presented, but has very few apparent bells and whistles. Only after some time does the power and ease of use of PMW become obvious, and then you realise what you have paid for. Just like a Rolls-Royce, at the asking price you would want to be sure that you have good reasons for buying it, but then having spent your money you could relax knowing that you have the best.

Which to buy? It all depends . . .

If you want the Commodore with the twin overhead cam foxtails and the dog with the waggy head in the back window, go for SPJ. It will get you where you want to go, but might cause you some heartache along the way. But then, you haven't paid top dollar.

However, if your tastes run to a Rolls-Royce, then PMW is for you. It runs well, doesn't appear too gaudy or flashy, gives you the opportunity to sit back and enjoy the ride, and gets to where you want to go easily and without any fuss. Added to this is the upgrade about to be released for PMW which will make it, to my way of thinking at least, arguably the best project management package on the market.

I suppose the final bottom line is that, given the money, I would buy PMW, simply because I think the extra cost is more than compensated for by the ease of use and the sheer overall elegance of the package. It, to me, seems well suited to someone who knows want they want, and are prepared to pay for it. But, just like real life, I have to put up with a Commodore because it is all I can afford. □

Product Details

Product: Project Manager Workbench
Distributor: Hoskyns Group,
19 Camberwell Rd, Hawthorn East
3123 Vic.
(03) 813 3944
Price: $3150 taxed

GRAPHICS TECHNIQUES

Now that Miroslav Kostecki has covered the basic techniques, animation, memory and interrupts, we're ready for some simple Cad procedures.

WHEN CONSIDERING graphics on a computer, we tend to think of stick figures, line diagrams and shapes. Although much more realistic techniques exist today, two dimensional line drawings are still the most common form of graphics used in business and industry. It's no wonder then that thin line grids and wire mesh designs have been the hi-tech look for many years. There is one type of program, in particular, which promotes this look.

Have you ever wanted to use the computer to design furniture or electronic circuitry and automatically receive the plans from it? Computer programs created to perform functions such as this do exist, ready to use, but at a price!

They are called Computer aided design or Cad programs. Today, many manufacturers simply would not be in business if left suddenly without their use. Units such as buildings, machines, maps and even computers are all designed with Cad.

The point is, all Cad programs rely on interconnecting line techniques a great deal. In fact, it's these techniques and procedures which perform all the calculating work of zooming into maps, rotating machine cogs or moving components around a circuit board.

Flexibility is the key to this type of work, so most graphic design programs are extremely versatile. By concealing complicated logic behind simple hand movements, you can create almost anything, nearly without thinking. This makes testing new ideas almost fun (a dirty word at respectable businesses)!

For more information on Cad and similar graphics programs, see the feature articles in the November 1987 issue of *Your Computer*.

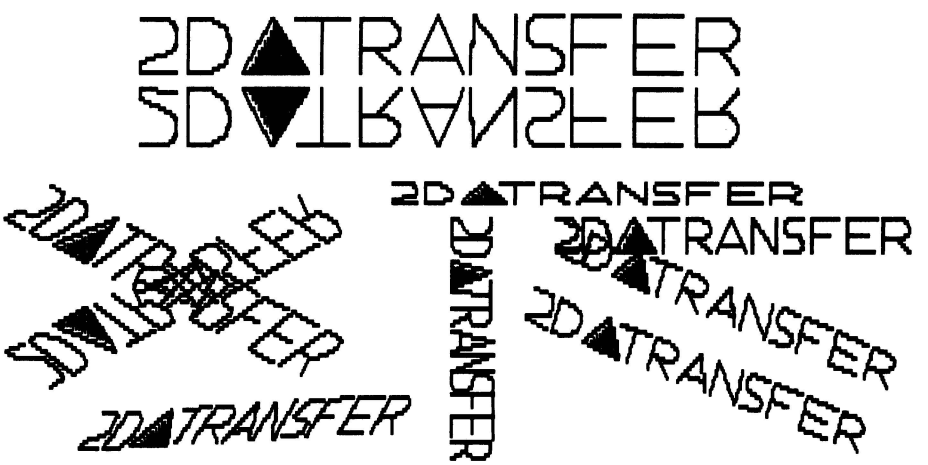

Figure 1. *A printout of '2D Transfer' in various reflections, rotations, enlargements and stretchings.*

GAPS IN PARTS

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How it's done

Of course, there is not enough space here to discuss all the details of Cad. Many large books have been published on the subject and these are by no means exhaustive. However, by examining the way in which some simple transfers are executed, we can obtain a good overall idea of how these work.

The sample printout of 2D Transfer (see Figure 1) in various reflections, rotations, enlargements and stretchings, will give you some idea of what can be done even with a simple program. Try the program on your computer first, then carefully follow Listing 1 as we explain the various parts.

First you must understand how the shapes and figures are stored within the computer. This is essential if you want to understand the changes and movements because this stored information is what really changes. The display program simply exhibits what is in storage.

Think of the way you draw up a shape in line graphics using the Draw command in Basic. A starting point is selected. Then a line is drawn to the first point. From here, a second line continues to a second point,

a third point and so on until the shape is drawn. The only information needed to draw the shape are the points at all the corners. The lines between the points are drawn automatically. It is these points that we need to store to draw the shape again.

Our program stacks the points by first storing the number of points in the shape. Then the starting point is given, followed by the other points. Of course, they are all pairs of x,y co-ordinates. The succeeding shapes are similarly stored.

The program uses separate Data statements for these shapes. Notice that an end is reached when zero is found for the number of co-ordinates in a set.

Where do we encrypt all this data? The Read Data section will store all the x co-ordinates in the a() array, the y co-ordinates in the b() array and the number of points in each shape are amassed in the s() array.

To draw our shapes, the subroutine at line 780 is used. This works as follows: the number of points in the first shape is taken from the first number in the s() array. Starting at the first point stored, we draw this number of lines using the points.

The next number is taken out of the s() array and the next shape is drawn until the number in the s() array is zero. Of course, we keep track of where we are in the s() array (the i variable) and the a(),b() arrays (using the j variable).

Notice that when the shape is drawn, a constant value of x and y is added to them. This is the starting point or 'offset' amount and is added to shift the actual position where the shape is drawn. By changing x and y we can make the shape appear anywhere we desire.

The position is modified in the subroutine at line 900. To enter this section, press the shift key and move the shape using the cursor keys. Figure 2 shows how this offset point shifts the shapes position.

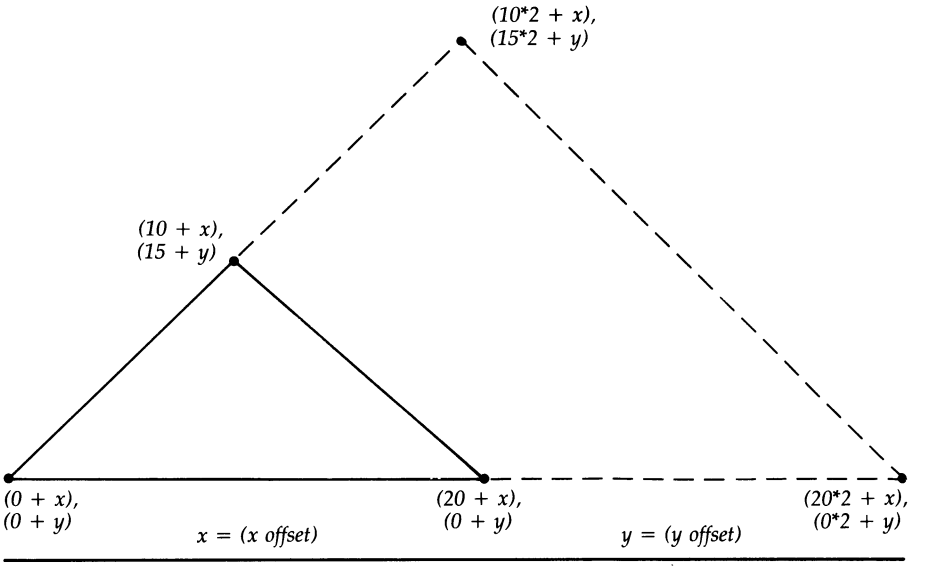

Figure 2. *How an offset point shifts the shape's position (see line 900 in Listing 1).*

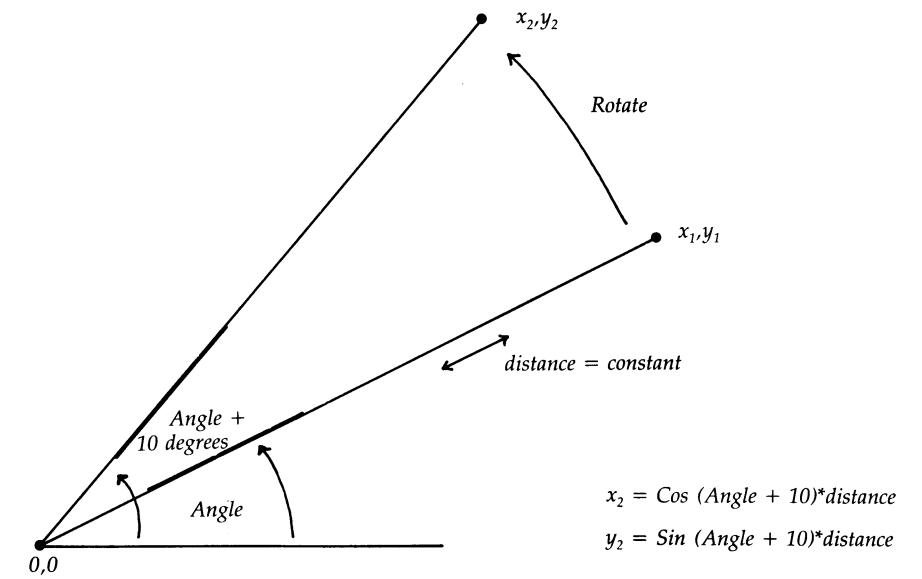

Figure 3. *This shows what the equations in line 740 of Listing 1 achieve.*

Manipulating the point

Now, because the stored points start at or near 0,0 the manipulations are really very simple. For example, to enlarge or shrink the shape we multiply every point in the arrays a() and b() by a certain factor. To double the size, simply multiply them by 2. This shrinking and enlarging is done with the short subroutine starting at line 620.

Compresses and stretches are even easier: just scale the variable you want in the direction you need. For example, to compress the word to half its length, just multiply all the a() arrays by half. The tiny subroutine designed to do this is found at line 580. Again take a look at Figure 2 to see a visual representation of how this is accomplished.

Another manipulation is the reflecting of shapes up, down, left and right. At first you might think that a manipulation such as this would be very complicated. Actually, it is the easiest manipulation. To reflect in the x axis we make the whole a() array negative and similarly for the y axis. These two subroutines are located at lines 500 and 540.

Now for the difficult part: rotations. The 'rotate by an angle' subroutine starts at line 680 and takes some basic mathematics to understand it. The variable 'l' is the distance from position 0,0 to the point; the equations at lines 720 and 730 work out this distance. It distance must stay the same if we rotate around the point 0,0. Only the angle, as represented by the variable 'ag' changes; -10 or +10 degrees in this program.

Now the new point can be worked out by using the fact that for a line from 0,0; x is the cosine of the angle multiplied by the distance and y is the sine of the angle

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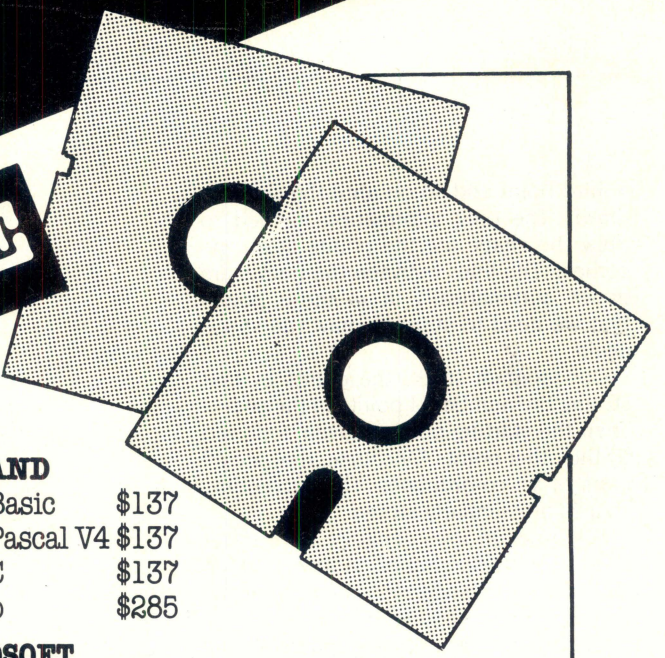
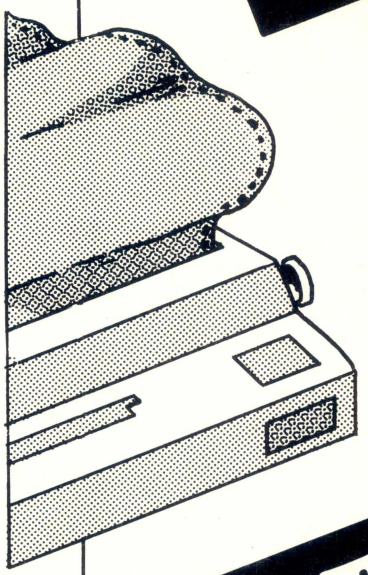
SOFTWARE





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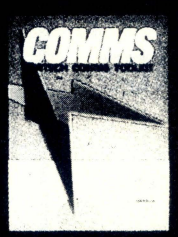

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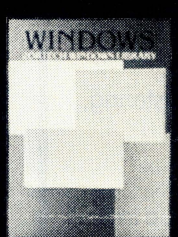



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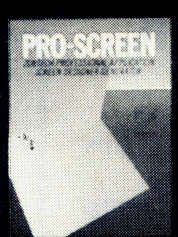

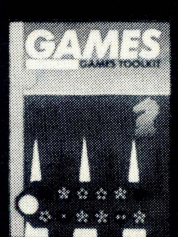

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multiplied by the distance. These equations are used in line 740. The variable 'q' is the old angle and 'ag' is the amount we want to change it by. So we end up landing our new point at a new angle, but the same distance around 0,0. To rotate the whole series of characters, every point must undergo this process.

If that was over your head, try looking at Figure 3 as you read the explanation again.

To speed things up

Now that you've tried the program, you will have noticed that the rotation takes a good deal more time than the other transfers. This is due to the more complicated number crunching that is involved. To speed up the process, you may like to try storing all the sines, cosines and tangents in arrays and then use these arrays instead of calculating the functions every time.

Another way of speeding the process is to store the lengths to each point from 0,0 and also the angles at which the points are positioned.

This eliminates the need to work these out at all. By storing points like this, rotations and enlargements will be calculated much faster. However, the subroutine which draws the shapes will need to be more complicated and so much slower.

Of course, the faster the computer the faster the manipulations. The resolution too has the usual effect?8a higher resolution is much clearer and more accurate, but it is quite a bit slower because of the greater amounts of data that must be manipulated.

If you work withthis faster breed of computer, maybe you are already familiar with these techniques. The latest computers are using these new graphics concepts to add great flexibility to character presentations and the way in which they can be manipulated. Recent computers such as the Archimedes by Acorn even let you redefine the standard text characters in this way. I think we will see more of this type of flexibility the future. □

```
10 '  £££ 2D LINE TRANSFERS £££
20 ' Miroslav Kostecki. Nov, 1987.
30 '
40 MODE 1: INK 1,0: INK 2,13
50 DIM a(100), b(100), s(20)
60 '
70 ' 2D/\TRANSFER
80 DATA 7 ,0,48,29,48,36,38,36,22,31,19,0,9,0,0
,36,1
90 DATA 7 ,46,1,46,48,69,48,84,39,87,23,84,10,71
,0,47,0
100 DATA 3 ,98,0,129,48,161,0,98,0
110 DATA 3 ,176,0,177,48,152,48,202,48
120 DATA 8 ,214,0,215,48,243,48,253,39,253,27,241
,21,215,21,230,21,253,0
130 DATA 4 ,265,0,289,49,313,1,306,13,270,13
140 DATA 3 ,322,1,323,49,363,0,363,49
150 DATA 9 ,375,0,402,0,409,6,409,18,400,24,382,24
,375,30,375,43,381,49,409,49
160 DATA 2 ,420,0,420,49,465,49
170 DATA 1 ,420,25,451,25
180 DATA 3 ,527,49,479,49,479,1,526,0
190 DATA 1 ,479,24,516,24
200 DATA 8 ,541,1,541,48,572,48,582,39,582,29,572
,20,541,20,562,20,582,1
210 DATA 0 ,129,13
220 '
230 ' Read DATA
240 CLS: x=100: y=100: t=0: ee=0
250 '
260  READ n: s(t)=n: t=t+1
270  IF n=0 THEN 350' last data line
280  READ a,b: MOVE a+x,b+y
290  a(ee)=a: b(ee)=b: ee=ee+1
300  FOR i=1 TO n
310   READ a,b: DRAW a+x,b+y
320   a(ee)=a: b(ee)=b: ee=ee+1
330  NEXT: GOTO 260
340 '
350 READ a,b: MOVE a+x,b+y: FILL 2
360 a(ee)=a: b(ee)=b
370 '
380 ' press keys to manipulate
390 IF INKEY(2)=0 THEN r=0.9: GOSUB 620' shrink
400 IF INKEY(0)=0 THEN r=1.1: GOSUB 620' enlarge
410 IF INKEY(8)=0 THEN ag=10: GOSUB 680' rotate lt
420 IF INKEY(1)=0 THEN ag=-10:GOSUB 680' rotate rt
430 IF INKEY(39)=0 THEN r=0.9:GOSUB 580' compress
440 IF INKEY(31)=0 THEN r=1.1:GOSUB 580' stretch
450 IF INKEY(30)=0 THEN GOSUB 540' reflect in x
460 IF INKEY(22)=0 THEN GOSUB 500' reflect in y
470 IF INKEY(21)=32 THEN GOSUB 900' move
480 GOTO 390
490 '
500 ' reflect in y
510 FOR i=0 TO ee: b(i)=-b(i): NEXT
520 GOSUB 780: RETURN
530 '
540 ' reflect in x
550 FOR i=0 TO ee: a(i)=-a(i): NEXT
560 GOSUB 780: RETURN
570 '
580 ' compress/stretch
590 FOR i=0 TO ee: a(i)=a(i)*r: NEXT
600 GOSUB 780: RETURN
610 '
620 ' scale to shrink/enlarge
630 FOR i=0 TO ee
640  a(i)=a(i)*r: b(i)=b(i)*r
650 NEXT
660 GOSUB 780: RETURN
670 '
680 ' rotate by angle 'ag'
690 DEG
700 FOR i=0 TO ee
710  a=a(i): b=b(i)
720  q=ATN(b/(a+0.000001))
730  l=SQR(a*a+b*b): IF a<0 THEN l=-l
740  a(i)=COS(q+ag)*l: b(i)=SIN(q+ag)*l
750 NEXT
760 GOSUB 780: RETURN
770 '
780 ' redraw graphic
790 CLS: j=0
800 FOR i=0 TO t-1
810  n=s(i)
820  MOVE a(j)+x,b(j)+y: j=j+1
830  FOR k=1 TO n
840   DRAW a(j)+x,b(j)+y: j=j+1
850  NEXT
860 NEXT
870 MOVE a(j-1)+x,b(j-1)+y: FILL 2
880 RETURN
890 '
900 ' move around screen
910 IF INKEY(21)<>32 THEN RETURN ' no shift
920 IF INKEY(0)=32 THEN y=y+10: GOSUB 780' up
930 IF INKEY(2)=32 THEN y=y-10: GOSUB 780' dn
940 IF INKEY(8)=32 THEN x=x-10: GOSUB 780' lt
950 IF INKEY(1)=32 THEN x=x+10: GOSUB 780' rt
960 GOTO 910
```

Listing 1. The 2D Transfer program.

TURBO TIPS

Turbo Power Utilities

Since discovering these new productivity tools, it takes Peter Hill two hours longer to finish a program – and now he won't do without them!

MY COMPLETE routine for preparing a finished product written in Turbo Pascal has recently changed. Since I have started using Turbo Power's productivity tools, it takes me one to two hours longer to finish a program which I considered 99.9 per cent complete than it did previously. Who is going to use productivity tools which take this much extra time; I will for one, and after reading this so will you if you are producing commercial quality programs!

Who is going to use productivity tools which take this much extra time; I will for one, and after reading this so will you if you are producing commercial quality programs!

Let's step through a sample session using a small utility program as a working example. The program is called GREP; its purpose is to find strings of text in an ASCII file and report their presence. The source for GREP is included as Listing 1, and it is invoked as –

```
GREP FileSpec S1 S2 S3 ......
```

– an example being –

```
GREP *.PAS once upon a time
```

The example will search all Pascal files in the current directory for the string 'once upon a time'. This is useful for finding all occurrences of a particular string in your source code and is, in fact, the root portion of a MAKE utility – if you include a particular module in your code and subsequently change it, GREP is the start of a procedure to re-compile the code.

I haven't included the source of my original version of GREP because I would be too embarrassed to have it published; after the use of the analytic tools discussed below it showed its true nature as a Frankensteinian monster cobbled together from spare body parts lying around on my hard disk.

TDebug

If GREP is not yet running perfectly, the first task is to debug it; for this I will use TDEBUG Plus. This utility is a memory resident system which allows tracing of the execution of a program as it runs. In many ways it is similar to the DOS Debug utility, but the differences are also significant; TDebug debugs your source code, not object code. If we fire up TDebug, it first calls Turbo Pascal. We then load the file to be debugged and run it. As the program starts running, TDebug takes over and displays its control menu on the lower half of the screen and the code being executed on the upper half. The user can switch between the debugging screen and the program output screen with a single press of the F10 function key, but essentially TDebug (and the user) are in control of the operation.

The basic options available are:

- ?: on-line help,
- G: execute until a breakpoint is reached,
- T nn: trace nn statements,
- N: execute the next procedure or function completely,
- P param: set/delete a permanent breakpoint,
- V param: view text specified,
- E param: examine or change a variable, and
- D param: display an area, for example,an array.

These commands all relate to the source code, so the debugging session requires little technical knowledge.

Using TDebug achieves three things simultaneously. First, it is the fastest and most reliable way to debug Pascal code at the source level which I have ever seen; the ability to reset the value of a variable on the fly allows testing of various hypotheses immediately without the need to recompile.

Second, as you trace your way through the code you see graphically the way in which Turbo Pascal actually executes its code; this leads to a better understanding of the effect your coding will have on the machine. And, third, it is a sensible introduction to debug-

gers in general. After a few hours with TDebug, even a novice would feel much more comfortable approaching something more ferocious like Debug which operates at the object code level.

TDebug works on programs compiled to memory, and hence it is subject to the same limitations that apply to any Turbo Pascal program compiled to memory. Specifically, it cannot handle Chain and Execute, nor can it debug overlays. However, if these parts of your source are developed in a modular fashion (and don't we all do that?) it can be used during the development of the modules. After a little while using TDebug, we will probably have an operating version of GREP. My next step is to run the code through PSA, the Pascal Structure Analyser. PSA concentrates on identifying misuse of variables and constants. The Turbo Pascal compiler checks on the use of variables compiles your code, but basically checks to determine whether what you have done is legal rather than whether it is intelligent. PSA takes the next step and generates a report on whether you have used some constructs which are dodgy. The output of a PSA session can be a structure report (this shows the hierarchical structure of your code), a variable cross reference list or a warning variable cross reference list.

I have found the latter output to be the most useful result of using PSA. In fact, it is useful to the extent that I am not going to publish the results of my use of PSA on the sample program except in a statistical sense. As you will see in the table, by eliminating unused variables and even unused functions, the size of my source code reduced from 8987 bytes to 7122 bytes! Now part of this is sloppy coding , but it is also true that I had been happily using GREP for some months without noticing its shortcomings. At the same time I was warned about a number of variables which were used before they were initialised. Much as I hate to admit it, I have not yet discovered a program I have written which has not benefited from PSA.

Pascal Execution Profiler and Execution Timer

Next come PEP and PET – Pascal Execution Profiler and Pascal Execution Timer respectively. For each of these, a memory resident utility is loaded and some modification of the source is performed. The results are similar; each generates a summary (graphic or numeric) of the execution time of the program. PEP is oriented to the individual instruction, whilst PET is oriented to the Function/Procedure. Using both of these it was possible to determine that the Function UC was absorbing 33 per cent of the time with some 660 calls.

It then became obvious that this procedure could be called only once for the input parameters; that is, instead of continually comparing UC(Input parameters) with UC(Input Line) it was possible to first convert the Input parameters to UPPER CASE and then compare Input parameters with UC(Input Line). This not only halved the frequency of calling UC, but also reduced its share of time consumed to 13 per cent. By the end of this exercise, the file size had decreased to 6469 bytes.

The next step, since we are getting close to a production system, is to reformat the code. This can be done manually, but it is hard to achieve a high degree of consistency in this task. Better than this is to use PF; this Pascal Source Code Formatter has more options than Disneyland. In short, however, it is possible to format your source code in precisely the manner which suits you. In doing so, a standard house format is achieved which allows you a review of the code before committing it to an executable file.

Turbo Object Optimizer and Turbo Library Compactor

Next (ahhhhh, at last) I can compile to a .COM file; now we have an executable version of the program. If you think I'm finished, the best is yet to come. Using TOPT (Turbo Object Optimizer) and TLC (Turbo Library Compactor) we can now optimise and shrink the size of the .COM file by removing some of the null statements and removing redundant code.

TOPT examines the code to determine whether Turbo Pascal has generated any peculiar instructions during compiling. For example, occasionally Turbo Pascal will create an instruction which causes a jump to another location, followed by a further jump; one of these may be unnecessary. Essentially TOPT acts as a second pass to the Turbo Pascal compiler. The usual result (with the settings which I have settled on as a compromise between safe and severe optimisation) is a decrease in the size of the .COM file by 200 to 300 bytes and a modest speed improvement. TLC then goes to work to reduce the size of the .COM file by eliminating code which is surplus to the task requirements. TLC can often reduce a small file from Turbo Pascal's default size of 1100 bytes plus operational code to 1000 bytes.

The Bonus Giveaway

For many Turbo Pascal users, a peripheral aspect of these utilities is going to be the main attraction; complete documented source for all the utilities mentioned here (and other bonus programs) is included on disk! A disk document supplements the excellent user's documentation to provide a detailed description of the coding strategy, and the source code itself is clear and well commented. Please don't confuse this source code with the sometimes appalling source bonuses provided by Borland (I'm still trying to come to grips with its Turbo Editor Toolbox); this is clear, concise and obvious structuring which only resorts to fancy techniques where it is essential to complete the complex tasks. All the utilities are worth purchasing for this factor alone.

The results for our sample program are shown in Table 1.

As a final exercise, I went back to the original source code, compiled it and optimised it using TOPT and TLC. The result was a .COM file size of 6278 bytes and a runtime of 28 seconds; the conclusion is that neither of these products are a panacea for sloppy coding, and will generate the best results where the code is already tight to start with.

All the following utilities are available in the suite from Turbo Power in California –

T-Debug Plus includes TDebug (as described above), TMap (for use with object code debuggers) and TMerge (for users of the Turbo Power utility Turbo Extender).

Turbo Optimizer, as well as TOPT and TLC described above, this includes TOL (Turbo Object Librarian) which can extract standalone object modules from existing programs for later incorporation with other code without recompilation.

Turbo Power Utilities is a veritable treasure chest of routines. In addition to PEP, PET, PSA and PF (which are specific to Turbo Pascal), it also includes: **REP**, a command repeater, **RPL**,a pattern replacing utility, **DIFF**, a file comparator utility, **SDIR**, an extended sorted directory, and **ROOT**, a file finder.

Table 1. *The results with the sample program GREP.PAS (Listing 1) using the Turbo Power Utilities show a 10 per cent improvement in source code performance without resort to any 'trick' coding. In achieving this improvement, all of the utilities mentioned played a part, but the combined output of PEP and PET were the most significant; these are also the utilities which perform the tasks which cannot be substituted by careful review of the source code. TOPT and TLC work synergistically; the minor improvement by using TOPT is built on by TLC. The reduction in runtime file size achieved by TOPT and TLC is something which I cannot achieve in any other manner. The further 8 per cent improvement made by TOPT and TLC was not due to the decreased loading time of the program; about 7 of the 8 percentage points are actual runtime speed improvement.*

	.PAS file size (Bytes)	COM files size (Bytes)	Run time (Secs)
Original	8787	14525	29
After			
-TDebug			
-PSA			
-Pep			
-Pet	6497	14187	26
Source % improvement	17	2	10
After			
-TOPT	6497	14010	26
After			
-TLC	6497	6170	24
Object % improvement	0	57	8
Overall % Improvement	17	58	18

Listing 1. *The program GREP is used to find strings of text in an ASCII file and report their presence – it was used as a sample to test the utilities described in the text. Results of the 'test' are given in Table 1.*

```
Listing 1: GREP.PAS

{-------------------------------------------------------------}
{
GREP        : Search for specified text in multiple files
USEAGE      : Grep Filespec text text text ......
E.G.        : Grep *.pas while not quit do
              will search all Pascal files in the current
              directory for the phrase "while not quit do"

LIMITATIONS : 1. IBM PC or near offer required,
              2. Words must be separated by single space,
              3. Not case sensitive.

REVISED     : 2/8/1987
REVISION    : Extensive. See text of article.
REVISED     : 3/8/1987
REVISION    : Tidy up for publication.
}
{-------------------------------------------------------------}

PROGRAM GREP;

CONST
   Inverse = 113;                                  {Inverse video}
   Normal = 14;                                    {Normal video}
   Carry = 1;
   Directory = $10;

TYPE
   RegSet = RECORD
               ax, bx, cx, dx, bp, si, di, ds, es, flags :
                  INTEGER;
            END;
   FName = ARRAY[1..80] of CHAR;                   {a file name}
   Str80 = STRING[80];                             {a longish string}
   LineStr = STRING[50];                           {various string lengths}
   DateStr = STRING[10];                           {various string lengths}
   TimeStr = STRING[10];                           {various string lengths}
   EntAry = ARRAY[1..112] OF LineStr;              {the entries in
                                                    directory}
   Dta_Def = RECORD                                {the DTA definition}
               Filler : ARRAY[1..21] of BYTE;
               Attribute : BYTE;
               File_Time : INTEGER;
               File_date : INTEGER;
               File_size : ARRAY[1..2] of INTEGER;
               File_name : FName;
             END;

VAR
   Pattern : STRING[40];                           {the file pattern}
   n : INTEGER;
   EntryCount : INTEGER;                           {how many entries?}
   Entry : EntAry;                                 {here they are}
   SearchPattern : STRING[255];                    {the text pattern we specify}
   H_ScrnAddr : INTEGER;                           {start of screen memory}

   FUNCTION Date : DateStr;                        {get the system date - cosmetic
                                                    only}
   VAR
      RecPack : RegSet;
      month, day : String[2];
      year : String[4];
      dx, cx : Integer;

   BEGIN
      WITH RecPack DO
         BEGIN
            ax := $2a shl 8;
         END;
      MsDos(RecPack);
      WITH RecPack DO
         BEGIN
            Str(cx, year);
            Str(dx mod 256, day);
            Str(dx shr 8, month);
         END;
      date := day+'/'+month+'/'+year;
   END;

   FUNCTION Time : TimeStr;                        {get the system time - cosmetic
                                                    only}
   VAR
      RecPack : RegSet;
      ah, al : byte;
      hour, min, sec : String[2];
   BEGIN
      ah := $2c;
      WITH RecPack DO
         BEGIN
            ax := ah shl 8+al;
         END;
      Intr($21, RecPack);
      WITH RecPack DO
         BEGIN
            Str(cx shr 8, hour);
            Str(cx mod 256, min);
            Str(dx shr 8, sec);
         END;
      IF Ord(min[0]) = 1 THEN min := '0'+min;
      IF Ord(sec[0]) = 1 THEN sec := '0'+sec;
      Time := hour+':'+min+':'+sec;
   END;

   FUNCTION UC(DummyStr : LineStr) : LineStr;      {convert a
                                                    string to UPPER CASE}
   VAR
      Count : INTEGER;
   BEGIN
      FOR Count := 1 TO Ord(DummyStr[0]) DO
         DummyStr[Count] := UpCase(DummyStr[Count]);
      UC := DummyStr;
   END;

   PROCEDURE H_WAL(Attr, c, r : INTEGER; CurrentStr : Str80);
                                                    {fast screen writes}
   VAR
      Count, LenCurrentStr : INTEGER;
   BEGIN
      LenCurrentStr := Ord(CurrentStr[0]);
      C := ((R-1)*160)+((C-1)*2);
      FOR Count := 1 TO LenCurrentStr DO
         BEGIN
            Mem[H_ScrnAddr:C] := Ord(CurentStr[Count]);
            Mem[H_ScrnAddr:C+1] := Attr;
            C := C+2;
         END;
   END;

   PROCEDURE recurse;                              {search the directory}
   VAR
      Dta : Dta_Def;
      Param : RegSet;
      SString : STRING[70];
      Dta_Save : ARRAY[1..2] of INTEGER;
```

```
   FUNCTION Pack_Name(VAR a1; size : INTEGER) : Str80;
   VAR
      i : INTEGER;
      b : Str80;
      a : ARRAY[1..1000] of CHAR absolute a1;
   BEGIN
      i := 1;
      b := '';
      WHILE (a[i] <> chr(0)) AND (i <= size) DO
         BEGIN
            b := b+a[i];
            i := i+1;
         END;
      Pack_Name := b;
   END;

BEGIN
   WITH param, dta DO
      BEGIN
         ax := $2F00;
         MsDos(param);
         dta_save[1] := es;
         dta_save[2] := bx;
         ax := $1A00;
         ds := seg(dta);
         dx := ofs(dta);
         MsDos(param);
         ds := seg(Pattern[1]);
         dx := ofs(Pattern[1]);
         ax := $4E00;
         cx := $FF;
         MsDos(param);
         WHILE (flags AND Carry) = 0 DO
            BEGIN
               SString := pack_name(File_name, sizeof(
                  File_name));
               IF ((attribute <> 16)
               AND ((attribute AND Directory) <> 0)
               AND (SString <> '.') AND (SString <> '..'))
                  THEN
                  BEGIN
                     SString := SString+chr(0);
                     ax := $3B00;
                     ds := seg(SString[1]);
                     dx := ofs(SString[1]);
                     MsDos(param);
                     recurse;
                     ax := $3B00;
                     SString := '..'#0;
                     ds := seg(SString[1]);
                     dx := ofs(SString[1]);
                     MsDos(param);
                  END
               ELSE
                 BEGIN
                     CASE attribute OF
                        8, 40, 16, 2, 3, 6, 7, 34, 35, 38,
                           39 :
                           BEGIN  {hidden files; do nothing}
                           END;

                        BEGIN     {normal files; enter them}
                           EntryCount := EntryCount+1;
                           Entry[EntryCount] := SString;
                           n := n+1;
                        END
                     END;
                  END;
               ax := $4F00;
               MsDos(param);
            END;
         ax := $1A00;
         ds := dta_save[1];
         dx := dta_save[2];
         MsDos(param);
      END;
END;

PROCEDURE Handle_Parameters;
VAR
   i : INTEGER;
   PROCEDURE Useage;
   BEGIN
      ClrScr;
      H_Wal(Normal, 1, 1, 'Useage : GREP Filename Pattern');
      H_Wal(Normal, 1, 2, 'e.g.   : GREP *.ftl  once upon a'
         );
      Halt;
   END;

BEGIN
   Pattern := ''; SearchPattern := '';
   IF ParamCount < 2 THEN Useage;
   Pattern := ParamStr(1);              {this is the filespec}
   SearchPattern := ParamStr(2);              {get first word}
   FOR i := 3 TO ParamCount DO SearchPattern :=
      SearchPattern+' '+ParamStr(i);
   SearchPattern := UC(SearchPattern);      {get other words}
END;

PROCEDURE SoundOff;
BEGIN
   Sound(440);
   Delay(50);
   NoSound;
END;

PROCEDURE Search;
VAR
   i, LineCount : INTEGER;
   FndStr, LC : String[5];
   inf : TEXT[$2400];
   ALine : STRING[255];
   IK : CHAR;
   Found : INTEGER;

BEGIN
   ClrScr;                                      {show a header}
   H_Wal(Inverse, 1, 1, ' GREP (c) HillSoft 1987 ');
   H_WAL(Inverse, 70, 1, Date);
   H_Wal(Inverse, 1, 2, 'Search Pattern: '+SearchPattern);
   FOR i := 1 TO 0 DO H_Wal(Normal, i, 4, Chr(205));
   FOR i := 1 TO EntryCount DO             {for each entry do}
      BEGIN
         Found := 0;
         H_Wal(Inverse, 1, 3, 'File: '+Entry[i]);      {show
                                                    file name}
         H_Wal(Inverse, 70, 3, Time);      {re-show the time}
         Assign(inf, Entry[i]);
         Reset(inf);                              {open this file}
         LineCount := 0;
         Window(1, 5, 80, 24);
         ClrScr;
         WHILE NOT Eof(Inf) DO
            BEGIN
               LineCount := LineCount+1;
               ReadLn(Inf, ALine);                    {get a line}
               IF Pos(SearchPattern, UC(ALine)) <> 0 THEN
                  BEGIN                          {a pattern match}
                     Str(LineCount, LC);
                     WriteLn(LC+': '+ALine);    {so show the
                                                         line}
                     Found := Found+1;
                  END;
            END;
         Close(inf);
         IF Found <> 0 THEN                  {if we found some}
            BEGIN
               Str(Found, FndStr);              {show how many}
               H_Wal(Inverse, 1, 25, FndStr+
                  ' found...press a key for next File... ');
               SoundOff;                        {make some noise}
               Read(Kbd, IK);                   {get a keypress }
            END;
      END;
END;

BEGIN
   EntryCount := 0;                                {no entries yet}
   IF ((Mem[0:$410] AND $30) = $30) THEN H_ScrnAddr := $B000
      ELSE
      H_ScrnAddr := $B800;          {where does video RAM start?}
   FOR n := 1 TO 112 DO Entry[n] := '';          {initialise 112
                                                         entries}
   n := 0;
   Handle_Parameters;                    {get command line params}
   IF ((Pattern[Ord(Pattern[0])] = ':')          {generalise open
                                                   ended patterns}
   OR (Pattern[Ord(Pattern[0])] = '\')
   OR (Pattern = '')) THEN Pattern := Pattern+'*.*';
   Pattern := Pattern+chr(0);
   Recurse;                               {search for matching files}
   Search;                          {and search for pattern matches}
END.                                              {that's all folks}
```

Product Details

Product: Turbo Pascal Utilities
Distributor: Microway, 292 Chesterville Rd, Moorabbin 3189 Vic. (03) 555 4544
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Part 5

COMING TO GRIPS WITH NETWORKING

In the last of the series, Stewart Fist tells how it won't be long before mainframes and PCs will be peripherals to the main computing device – the network.

IN TRYING TO EXTRACT any sense of direction from the booming local area network (LANs) market at present, you would have to say, sphinx-like, that LANs are both moving towards wider connectivity and towards workgroup solutions. (There's nothing like having it both ways to increase the accuracy of your prediction!)

Apple originally promoted the workgroup concept many years ago with the idea of Macs linked by AppleTalk to other Macs in the immediate computing neighborhood. In almost all offices the bulk of data exchange is logically and geographically confined to a small group, so AppleTalk's 32-node limit was not a problem.

The problem with AppleTalk was that it was released too early – it was on the market far ahead of good multiuser applications software. Generally, there was also thought to be a conceptual conflict with AppleTalk, in that the 'workgroup solution' didn't fit the prevailing 'bigger is better' philosophies of LANs design. In time, both ideas have proved to be compatible.

Now with its AppleShare server and connectivity to DEC minis and other larger and faster LANs systems (both Ethernet and IBM's Token Ring), AppleTalk is beginning to show its extension capabilities (and they are quite impressive) while maintaining its workgroup basics.

AppleTalk is not alone in making these changes. Ethernet now runs on optical fibre and broadband systems and IBM's Token Ring has come out in bus and star topology versions and now has the ability to run on fibre optics, piggybacked onto broadband analog frequencies.

In fact, network designs and the networks themselves have proved to be dynamic, not static. Once installed, there are always new connections to be made, new facilities to bring online, equipment upgrades, mainframes to be connected, and changing relationships within groups in an organisation that require the interlinking of nets, often of different LAN types.

Most office networks start out with six or seven PCs sharing a printer; later they add both shared files (through a file-server) and additional peripherals. Before long, the group is experimenting with Ethernet backbones to link other independently evolved networks, and they want gateways to the company mainframes and communications links to the outside world. What was a simple peripheral-sharing LAN has become part of a mega-LAN or internet.

This is what happened to Digital Equipment Corporation, the main promoter of Ethernet. It now has 15,000 nodes on its own internal network and they get requests for over a thousand new connection each month. The French Post Office has the same problem – it is now finalising a 30,000 node LAN based on Fox's 10-Net. It is hard to apply the local area concepts to networks of these sizes – but they grew from basically workgroup nets.

Networking, for many larger organisations, is no longer an option but part and parcel of its data processing system. PCs are information processing machines, but they only realise their potential when they have large stores of information available (from hard disks, online databases, and now DC-ROM) and can exchange and cooperatively update this information (through PABXs and/or LANS).

Changing concepts

Before very long we are going to see the geography of the larger of these networks covering whole countries or even continents, with most being permanently linked to packet-switching services which exchange data across the oceans. Both the data and the computing power will be distributed and belong to the network as a whole; the mainframes and PCs will be peripherals to the real computing device – the network.

These changing concepts are having a profound effect on the way LANs technology is evolving. A few 'standard' network types have been accepted, but constant developments wreak havoc on the standards. Different vendor implementations of essentially the same technology may be quite different; not all 'like' LANs are alike. However the LAN market is rapidly becoming the inter-LAN market, which is forcing the vendors back in line.

In time, the present limitations of distance, topology and data throughput will eventually be overcome – although new problems of security and reliability arise. The original Ethernet specification called for a coaxial cable backbone which was divided into three cable segments of 500

Interested in networking?

IN THE FIRST of Stewart Fist's five-part series on networking, he covered the basic network configurations, and the hardware and software requirements (Oct '87); in Part 2, he covered Ethernet and CSMA/CD (Nov '87); in Part 3, Token Ring networks (Feb '88); and in Part 4, he discussed broadband and baseband networking and a variety of other choices. If you missed any of these issues refer to the Services page on how to obtain back issues.



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meters each. There are two cable types – 'thick' for long runs (backbones) and 'thin' for shorter distances (office connections).

The cable segments are joined by active repeaters, so the maximum length of an Ethernet Version 1 network is 1.5 kilometers (now 2.8 kms). This includes the backbone length and the length of the cables that join the stations to the backbone, calculated on a formula that takes into account the thickness of the wire used.

These distance limitations are due to a propagation delay of 9.6 microseconds, with data moving from one end of the cable to the other. Even at the speed of light it takes time for data to move along a length of cable, and collisions can only be detected when the signals collide, rebound, and the jumble is again read at the remote nodes. Remember that the system is operating at 10 million bits per second, so roughly 200 bits can be travelling on the longest Ethernet before evidence of a collision is returned to a node.

Repeaters can double the propagation delay, so the 'collision window' is defined as being twice the maximum network 'lag', and this effectively establishes the theoretical maximum carrying capacity of a system.

As networks grow in size the problems are compounded. The Ethernet (802.3) spec restricts the number of stations on a network to 1024, but some network designs circumvent this by employing buffered repeaters to regenerate the transmitted signals.

We need to clarify the LANs terminology here. There are four different network components with roughly similar (and sometimes overlapping) functions: repeaters, bridges, routers and gateways.

Repeaters

LAN repeaters are very similar to those use by OTC to regenerate voice and data signals on submarine cables under the oceans – and they are generally cheap and reliable.

Repeaters deal only with the physical layer (Layer 1) of the OSI model, and they simply 'repeat' every packet on a LAN. They read all packets on one network segment, amplify them, and transmit them on another. They don't discriminate in any way because they are dealing with the data in a purely 'bit' form without any attempt at network management.

However, buffered repeaters are able to overcome the propagation delay problem because they hold the incoming packets in a buffer and only retransmit them into the other segment when an opportunity presents itself.

On either side of a repeater the segments constitute one single LAN – both physically and logically. All traffic is present on each segment – with one exception – some repeaters now contain logic to prevent problems in one segment form effecting the others. These repeaters won't retransmit erroneous signals.

Repeaters are not only used to link segments in a straight line, they can also be used to create internet topologies with a tree-branching structure (but without loops). Digital make an Ethernet Thinwire (backbone) system with a nine-port repeater which allows you network to connect to either other Thinwire cable segments of up to 185 meters. You can add 29 devices to each segment for a maximum of 232 stations per multiport repeater.

You can also get optical cable repeaters that allow the maximum distances between Ethernet segments to be extended to over a kilometer – but that's only part of the story since you can then begin to link different networks – and here, the sky's the limit.

Bridges

Bridges allow us to link two LANS of the same type so that they are physically separate, but logically the same. One device on the resulting internet can address another as if it were on the same LAN.

The distinction between repeaters and bridges lies in the fact that bridges filter and discard all packets that are destined for the local side and regenerate only those packets addressed to the remote side.

All network packets contain both a source and a destination address. The MAC (Media Access Control) rules define the way these packets can access the physical media: this is part of OSI Layer 2 – the Data Link layer and it is at this level that internet bridges operate.

Devices on each side of the bridge simply address packets to each other as if they were on the same LAN – never knowing that they are dealing with a bridge since the system is 'protocol independent'. Bridges function without the need to use protocols beyond the standard Data-Link layer addressing; they route packets strictly on the basis of their destination address without using any routing protocol.

However, a smart bridge 'learns' which device is on which side, by monitoring the source addresses. It uses this information to build and update its 'routing table' and checks this to decide what packets to filter

FILE SERVERS

NETWORKS NEED to have access control on any database (or other files) used by more than one person. The file-server must differentiate between private and public 'volumes' (virtual spaces).

Public volumes might also need to be made 'read only' to most users, but someone will need to update them, so you must have a system of access rights. Usually these rights are assigned to passwords (attached to the user), but different PCs can also have unique reference numbers held in ROM onboard the net-card (attached to the device).

System software must also have a way of preventing others from accessing a file that is already in use. There are no problems with a standalone PC because you make changes to a file by transferring it (from disk) to your own machine memory, updating it, then copying it back. Sometimes the file can be away from the disk for a long period of time – but this doesn't matter to a lone user. However, in a network environment anything could happen to the disk-based version in that time if the file isn't locked.

The file-server's job is to keep track of where files are in the system, and differentiate between those users who have access on a read only basis and those who can make changes. It must also distinguish between 'acquire' and 'access' requests.

When LANs are used to link a number of terminals to one large database so that a master file can constantly be updated by all operators, it makes little sense to lock the whole file while each record is being updated. Everyone else on the system will be forced to just sit around and wait until the file become available again.

The solution is to only lock the individual records, but this is more risky than file-locking. The type of processing involved in record-locking is largely dependent upon the operating system of the peripheral PCs, and it is for this reason that the changes made recently to DOS are as important.

and which to forward.

Bridges deal with data at the packet – rather than at the bit-level, and they also apply a network management role.

Two separate LANs linked by a bridge will take care of overload conditions much better than two segments joined by a repeater. Most traffic will remain within a local area, so the smaller the LANs unit, the less effect a flood of transmission from one node will have on the availability of the internet to others. Breaking a big LAN into two smaller ones with a bridge between improves reliability and security.

Router

OSI Layer 3 defines the network as a whole – and so it is at this level that the rules used to interconnect complex networks are spelled out – in particular items such as the internet addressing systems, like the widely used US Department of Defence Internet Protocol (IP).

Any device wanting to distribute internet packets through a router must use the same internet protocol and explicitly tell the router to forward the packets by addressing it as a device. Data is transferred 'intelligently' on a message basis. A router simply passes on any incoming packets but it does not filter or monitor the general LANs traffic since it receives internet traffic only.

Routers are much more intelligent than either bridges or repeaters, and LANs which are joined together through a router are physically and logically separate. Routers become important when the network consists of complex LANs with multiple communications paths, perhaps with loops and substantial geographical distance.

Gateways

LANS gateways have taken off this year because of an almost religious 'conversion' to networks by mainframe DP personnel. Gateways exist to allow communications with facilities outside the network or the internet.

The most common gateway is one used to provide X.25 communications over public packet-switched networks like Austpac and Data Access.

Gateways operate at even a higher level than routers. They generally provide not only the physical link but also some kind of applications connection. Some require the use of a dedicated machine (which avoids potential bottleneck problems) while others use a garden-variety PC with special software.

Gateways also provide protocol-conversion between the LAN and a network of a different type, or links with long-haul architectures such as SNA or X.25. Designers are now focusing on the connection of different micro-based LANs and on the provision of gateways to the larger computers through 'virtual' networking. With this approach, a PC-user can access resources on both local and remote servers as if they were within his or her workgroup.

Although virtual networking is maturing, it has its problems. At present, workstations on a virtual network tend to access minis and mainframes as terminals. What we have today is essentially only a distributed filing system using database managers rather than true distributed processing with a wide range of applications.

There is still an enormous amount of work to be done on LANs software – especially where gateways are involved. IBM's newly announced LU6.2 peer-to-peer protocol may be one solution, but it is not

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Q&A Version 3 supports the Appleshare network including record locking of databases. Apple are delighted – *"It is very exciting to see PC users sharing a Q&A database from a Macintosh II file server using the AppleTalk network with our AppleShare PC software"* says Peter Friedman, Manager of Business Systems Marketing at Apple Computer. *"Q&A Version 3 is the first MS-DOS file manager to offer such impressive record-locking support on an AppleShare network."*

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yet available. Apparently it can be implemented on a server with a micro-interface on one side and mainframe-support applications on the other.

LU6.2 was designed for long-haul leased-line connections rather than for LANs and it is intended primarily as a link between user-nodes on a SA network, (which is mainly used in America).

The aim of the International Standards Organisation's OSI layered architecture is to make these systems protocol-independent. LANs are hampered by the incompatible protocols used by the different vendors, but the ISO is still working on its layered model and only a few of the lower layers are fully defined.

The components necessary to make distributed processing work on large internets – such as distributed file systems and network 'operating systems' or network services – are just beginning to emerge. Sun Microsystems' Network File System (NFS) and AT&T's Remote File Sharing (RFS for Unix System 5) system work in the upper levels of the OSI model – and these are still in confusion.

The network operating system's primary tasks are to know where everything is on the system, and to control the resources. These new large network tools will need to be complex and layered because each computer on the network will have its own operating system which will need to slot in to the network O/S at different levels.

NFS is both machine- and operating system-independent, and it allows transparent access to files on other LAN systems. If, for instance, you are using PC-NFS with an IBM or compatible and Ethernet, you can enter DOS commands and transparently access files on any other linked computer running NFS.

Internets

The move towards internets requires much more complex networks operating systems than we have at present. Many are in the pipeline. In the meantime the mega-LAN vacuum is filled by a number of high-level protocol suites including Xerox's XNS, the US Department of Defence's TCP/IP, and Decnet from Digital.

The two most commonly used mega-LAN protocols are the TCP/IP and the Xerox Network System (XNS). These both establish ground rules that allow different vendor products to communicate with each other. Also important are IBM's Network Basic I/O System (Netbios) and Advanced Program-to-Program Communication (APPC) which present a common set of communications standards for multi-vendor products on the Token-Ring LAN. There are only a few LANs which support Netbios fully.

Netbios is said to be easily incorporated into third-party token ring devices, where it ensures they can operate together. The IBM Token Ring has a Netbios interface (which was first introduced for its PC Network), plus a SNA version of APPC.

In the OSI model, APPC extends to Layer 7 while Netbios sits conceptually between Layers 5 and 6 – defining the interface to LAN communications subsystems and detailing call sequences and control tables.

TCP/IP (Transmission Control Protocol/ Internet Protocol) is a much older dinosaur that is still gaining new advocates. Novell and Micom-Interlan have both recently announced new gateways and software products using TCP/IP; at least partly because the protocol is essential for sales to US government and engineering marketplaces. It is byte-oriented and is slowed by the need for mandatory checksums – but it has a virtual-terminal protocol.

Some universities in the US are using TCP/IP to link hardware ranging from Cray supercomputers down to desktop micros. Ethernets also tend to use TCP/IP to communicate across a range of computer systems on a network.

TCP/IP allows diverse hardware and software products to communicate with each other. It had been in the Public Domain for nearly a decade when it entered the commercial area on the back of the Unix 4.2 operating system. The University of California at Berkeley incorporated TCP/IP into its Unix kernel along with an address resolution protocol (that map TCP/IP addresses to Ethernet IEEE 802.3 addresses and thereby makes a convenient interface).

XNS is more efficient that TCP/IP due to its packet-orientation. Xerox designed XNS for Ethernet LANs about seven years ago and it is now the defacto standard for interLANs in office automation although it is still not fully standardised. Novell has a Netware version called IPX for 'Internet Packet exchange.

Both TCP/IP and XNS are layered protocols which can be related to the OSI model. Both correspond to Layer 1 and IEEE 802.3, 802.4 and 802.5 standards. Both offer compatible services at OSI layers 2, 3 and 4 while TCP/IP goes on to layers 6 (and 7) with the Telenet File Transfer protocol that allows data transfer between dissimilar products or operating systems.

So the software components we need for efficient distributed processing and data exchange are gradually falling into place, and national and international mega-LANs are becoming a reality. But a critical question arises: We can build it, but can we manage it?

Large distributed networks have different management problems to small workgroup LANs – not the least of which is finding the device you wish to contact. Artificial intelligence and knowledge bases will probably have to come into the picture simply to handle the complexity of information needed for addressing and using remote host devices.

Addressing

If every device on a mega-LAN is to nave a unique address, then the number of bits allocated for addressing determines the logical maximum number of devices possible. In early CSMA/CD and token systems the standard was set at 16-bits which allowed theoretical possibilities of up to 65,000 devices. But now the address size has been extended on most systems to 48-bits which provides 281 trillion unique addresses – enough for everyone, everywhere in the world to have a unique number... and then some.

Addressing becomes vitally important as networks grow – not only in the number of devices that can be contacted, but also in the range of addressing options. And since it is in an evolutionary stage, Ethernet supports three station addressing schemes: network specific, unique and multicast.

Network-specific addresses are unique to stations on their own network only, but the same address may be used on another network. To address these devices from outside, you must specify both the network and the address.

Unique addresses have no twin on another network. This is important in mega-LANs communications because it is not necessary to specify both a station and its network to produce an unambiguous address at the next protocol level.

Multicast addressing is a facility where packets may be targeted at more than one destination – in other words, for distributed applications. Broadcasting is the extreme case of multicasting where packets are sent to all stations. On Ethernet the broadcast address is simply a series of 48 ones.

Another valuable addressing facility supported by some LAN vendors is resource naming. Users assign specific names to resources and call them by invoking the name rather than the network address. When we start getting 218 trillion unique addresses, some such simple translation system becomes essential.□

NEW PRODUCTS

Software

Algebra Graf(X)
Active Learning Systems
Phone: (07) 350 1477
Price: $118 untaxed

An educational software package that aims to simplify the teaching of mathematics has been released by Active Learning Systems. The company believes the package will be popular with teachers because it doesn't contain information which it is presuming to teach, therefore it isn't directed at any particular level of age, skill or experience.

It may be used wherever graphs, equations, functions, algebra and trigonometry are required. Any functions written in the form $y=f(x)$ or $x=f(y)$ may be plotted.

AppleCD SC
Apple Computer
Phone: (02) 452 8000
Price: To be determined

Apple has announced that it will start shipping AppleCD SC, a compact disk, read-only-memory (CD-ROM) for its Macintosh and Apple II computers, mid-year.

CD-ROMs can store text, digitized images and sounds. A single 12 cm disk holds up to 800 kilobytes of data. The AppleCD SC features a 64 Kbyte memory buffer and Small Computer Systems Interface (SCSI) that enable it to transfer data more quickly. It also features an audio chip set and desk accessory software that let it play CD tracks on CD-ROM and commercial audio CDs.

AST MS OS/2
AST Research
Phone: (02) 264 5505
Price: Not supplied

AST Research has announced that AST MS OS/2 will be available on all AST computer products including the Premium 286, Premium 386, Premium workstation and Xformer 286 mother board. The company will also make AST MS OS/2 available for sale to its installed base of AST Premium computer users.

Capgraph
Capricornia Institute of Advanced Education
Phone: (079) 36 0512
Price: See below

The mathematics and computing staff of the Capricornia Institute of Advanced Education have developed Capgraph, a software package designed to make learning mathematics easier.

Capgraph allows users of quantitative data to plot results more easily. According to maths lecturer and Capgraph designer Debbie Clayton, users of the program can quickly learn how to visually interpret maths equations and functions by plotting in graph form on a computer screen. Capgraph features pull down menus, popup windows and user friendly commands. It costs $85 for a single user; site licences cost $200 for a secondary school and $400 for a tertiary institute.

BALTEC SYSTEMS

CSE 6809 Cross Compiler
Baltec Systems
Phone: (07) 369 5900
Price: $700 untaxed

Written entirely in Australia, the CSE 6809 Cross Compiler for the C language runs on any IBM PC, XT, AT or compatible with at least 256 kilobytes of memory. It generates both relocatable object code and Intel HEX formats for downloading to the target system.

The compiler performs peephole optimization on the object code and produces tight, fast output code of similar size to 8086 compilers. The package includes a cross assembler, linker, loader and librarian; other development tools are supplied free.

DesignCAD 3.0
Technical Imports Australia
Phone: (02) 922 6833
Price: See below

The latest version of Prodesign II has been released and has had its name changed to DesignCAD.

New features include two additional status lines displaying feet and inches instead of decimals, Setup being done from a menu and the support of RS232 communications speeds of 19.2 kilobytes.

The Plotsort feature is now included as standard, EMS is now supported for larger drawings as well as all utilities. An upgrade is available to users of Prodesign II Version 2.5 of $140, plus $28 sales tax and an $8 delivery charge.



SOURCEWARE

Desqview 2.0
Sourceware
Phone: (02) 411 5711
Price: $269 taxed

Sourceware has released the latest version of Desqview, the resource management package for the IBM PC family. It provides multitasking and windowing for up to 250 business programs simultaneously.

Desqview 2.0 manages all the resources of an IBM PC or compatible, such as the screen, so that concurrently running software programs do not conflict. It does this by partitioning each software program into its own area of memory from which it cannot break out. An IBM PS/2 version is available.

Easy Power △
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Easy power looks after debtors, stock, creditors and general ledger accounting needs and runs on most IBM or compatible PC, XT, AT or PS/2 computers with a hard disk.

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ASHTON·TATE

dBase IV for MS-DOS and OS/2

Imagineering
Phone: (02) 697 8666
Price: See below

Ashton-Tate has announced that dBase IV for both MS-DOS and OS/2 based PCs will be available through distributor Imagineering by July 31 this year.

It features major enhancements to the dBase programming language, seamless integration of IBM SAA compatible Structured Query Language and a completely redesigned user interface that features a new applications generator. dBase IV includes a builtin automatic program that Ashton-Tate claims is 10 times faster than dBase III Plus. The company has also announced the dBase IV Developer's Edition for use by applications developers and consultants which will be available at the same time.

dBase IV is priced at $1395, while the Developer's Edition is priced at $2265. The regular upgrade price for users of dBase II, III or III Plus is $299. Those users who purchased dBase III Plus between February 18 and July 31 can upgrade to dBase IV for $99. All prices taxed.

McQuarrie Management Services Pty Ltd

Floppy Disk Subsystem

McQuarrie Management Services
Phone: (02) 958 2945
Price: See below

Verbatim has released a 12 megabyte Floppy Disk Subsystem for the IBM PC, XT, AT and 100 per cent compatibles. The drives are for internal or external use and are designed for the backup and storage of large files and for running applications.

Formatted disk storage is 10 Mbyte and the disks have two separate write protected zones of 2 and 8 Mbyte. Backup speeds on the drives are up to 2 Mbyte using Backit software distributed through MMS. The price of drives fitted is: 12 Mbyte $1920, 6.6 Mbyte $1190 and 3.3 Mbyte $853; Backit costs $229. All prices taxed.

Microsoft Write

Microsoft
Phone: (02) 452 0288
Price: See below

Microsoft Write is an entry level product for the Macintosh environment. It is a direct subset of Microsoft Word. The package includes an 80,000 word spelling corrector and a Page Preview that shows exactly what the printed result will be like.

Write also has optional column footing for newsletter production as well as headers, footers and automatic footnotes. An integrated context sensitive Help program is featured. Write also offers the familiar Macintosh interface, including pull down menus.

ADE with 3.3

ADE Computers
Phone: (03) 543 2677
Price: Not supplied

ADE Computers has signed an OEM agreement with Microsoft to deliver MS-DOS 3.3 with every Opal Turbo PC. The company has also commenced delivery of MS-DOS 3.3/GW Basic 3.22.

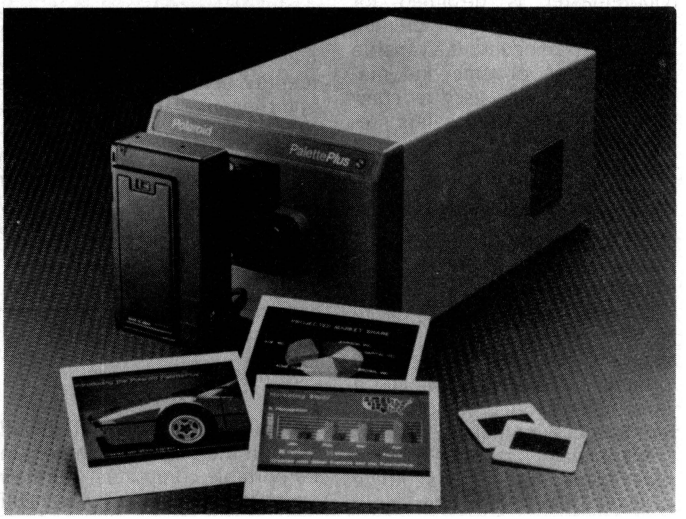
In addition, ADE is delivering MS-DOS Manager with every copy of MS-DOS 3.3. Some MS-DOS 3.3 improvements include I/O performance improvements, extended national language support and the ability to use 32 megabyte partitions on a single hard disk. Existing commands have also been enhanced.

Qikdraw ▷

RCS Design
Phone: (03) 49 6404
Price: See below

Qikdraw is a Cadd package designed for professional use to give fast, consistent results and improved quality control.

Available in two dimensional or three dimensional modules it runs on an ever increasing range of graphics workstations and microcomputers. It is suited to a variety of tasks in engineering, architecture, graphic design, production and manufacturing. Qikdraw also reduces design and drawing time and frees the drawing office from labour intensive tasks such as hatching and grids. Non-English language versions of Qikdraw can be generated with relative ease. The 2D version is priced at $5400 while the 3D version costs $3000.

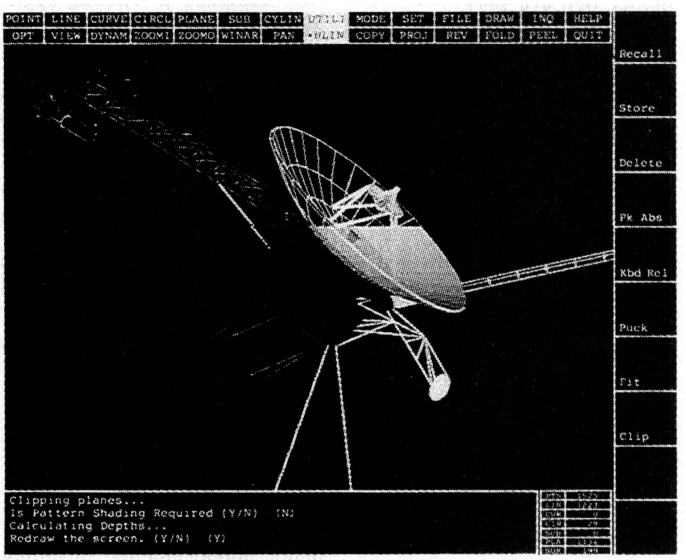


OneStep Graphics Software Version 1.0 △

Polaroid
Phone: (02) 887 2333
Price: $58.80 taxed

The new OneStep Graphics Software Version 1.0 allows users to produce business or graphics presentations without lengthy training. It comes packaged with each Palette and PalettePlus model image recorder sold and is available as an upgrade for existing Palette users.

Using OneStep the operator can produce slides, charts or colour transparencies in just a few steps. It will run on a host computer which is an IBM PC, XT, AT or compatible, uses DOS 2.0 or later and has an EGA or CGA adaptor or compatible, a serial port, low density 5¼ inch floppy disk drive (360 kilobytes) and 512 Kbyte of available RAM.



Quotemaster

Milestone Technologies
Phone: (08) 278 6475

Quotemaster is designed for businesses which must prepare quotes based on either a variable configuration or time and materials. It is being used by computer industry wholesalers, retailers, general business and tradespeople.

The newly released second version of Quotemaster supports fifteen character part numbers, as opposed to the previous five characters. With a few keystrokes Quotemaster can turn a quote into an invoice, and all output can be previewed on the screen, printed out or sent to an ASCII file on disk for incorporation into word processing documents.

Quotemaster requires a PC or close compatible with 512 Kbyte of RAM, DOS 2.10 or later and a hard disk or large capacity floppy. It is supplied with a demonstration disk.

IMPRINT COMPUTER PUBLISHING SYSTEMS

Reflection

Imprint Computer Publishing Systems
Phone: (02) 818 3577
Price: $178

Reflection is a versatile graphics utility, that Imprint claims will alleviate PC graphics compatibility problems.

The package converts any graphics format to another and captures any text or graphics. Reflection is able to share graphics between Amiga, Macintosh and IBM based libraries or bring graphics from any library into popular desktop publishers like Ventura and Pagemaker. It converts file formats for the Amiga, Compuserve, Dr Halo and others as well as being able to capture CGA, EGA and Hercules and AT&T DEB graphics adapters or any test screen.

StyleWriter

Editor Software
Phone: (062) 515 261
Price: See below

StyleWriter is an Australian software program designed to bring the skills of a professional editor to PC users.

It works by analysing text for the major causes of poor writing such as long sentences and overuse of passive verbs. The product uses its 10,000 coded patterns to identify style and usage faults and then gives advice from its library of 5000 messages to improve the user's writing skills. An IBM PC or compatible computer with 512 kilobytes of memory running MS-DOS 2.2 or higher is required.

Toshiba OS/2

Toshiba
Phone: (02) 887 3322

Toshiba has announced it will support the OS/2 environment in its portable computers. The new operating system provides full support for Toshiba's range of Intel 80286 and 80386 based portables.

Turbo Pascal 4.0

Tech Pacific
Phone: (03) 690 9055
Price: See below

Upgrades for the latest release of Turbo Pascal, version 4.0, are now available from Tech Pacific. The company is offering registered Turbo Pascal 3.0 users an upgrade to the 4.0 version for $98.

Turbo Pascal 4.0 includes a faster compiler, the ability to build larger programs, better code generation, a device independent graphics system and an integrated development system with pull down menus and built-in editor. Turbo Pascal 4.0 is available from Tech Pacific and its dealers for $188 taxed.

WordPerfect 5.0

WordPerfect
Phone: (02) 498 7155
Price: $897 taxed

The latest release of WordPerfect, Version 5.0 offers many major enhancements, including the most commonly used desktop publishing (DTP) features. It includes integrated text and graphics to simplify design, improved parallel columns and intelligent printing fonts that can be mixed and changed without affecting page layout as well as other features.

Anyone who bought V4.2 between February 1 and April 30 is eligible for a free upgrade to 5.0.

WordPerfect

WordPerfect for the Mac

WordPerfect Pacific
Phone: (02) 498 7155
Price: $579 taxed

A version of the WordPerfect package has now been released for the Apple Macintosh.

WordPerfect takes advantage of the Mac's ability to show on-screen proportional spacing and font changes, use of pull down menus, and full support for the Apple LaserWriter. An integrated speller, thesaurus, indexing, on-screen columns and merge and macro capabilities are included. The graphics interface promotes an easy, intuitive learning process for new users. The mouse or keyboard can be used.

New Machines



MBC17 Plus △

Sanyo
Phone: (02) 929 4644
Price: $2495 taxed

The MBC17 Plus is an AT compatible that features split system architecture. Sanyo claims it does not have a motherboard in the conventional sense as it has an 80286 processor located on an expansion board which enables it to be upgraded to an 80386 based system. The design also enables it to accept further upgrades such as the 80486 processor.

Standard RAM is 512 kilobytes, expandable to 1 megabyte on the main board the basic model has a standard 1.2 Mbyte floppy drive. Video and five expansion slots are provided.

Megalogic PD 2000 pocket computer

Studio Gifts
Phone: See below
Price: See below

Studio Gifts has released a computer the size of a credit card. The Megalogic PD 2000 can store 2040 characters, such as phone numbers, addresses or personal notes. It files entries in alphabetical order; you can scroll through them or go straight to the file you want. There is no limit to the number of characters per entry, but the total capacity is 2040. It also has security code protection, a builtin calculator and seven preprogrammed metric conversion memories.

The Megalogic PD 2000 costs $59.95 plus $2.50 postage and handling. To order the Megalogic by credit card 24 hours a day, 7 days a week, phone (008) 033 533, or 836 8211 if calling from Melbourne.

PC Portable ▷

Epson
Phone: (02) 436 0333
Price: Not supplied

The PC Portable is a PC compatible portable computer designed for executives as well as scientific and industrial applications.

Smaller than a briefcase, the PC Portable comes with an 80 character *x* 25 line backlit, supertwisted, nematic, LCD screen (640 *x* 200 pixels) with a full-sized AT-style keyboard. Reverse video and colour contrast capabilities provide CGA compatibility. The PC Portable uses the V30 CPU, has 640 kilobytes of main memory and has dual clock speeds of 4.7 MHz and 10 MHz.

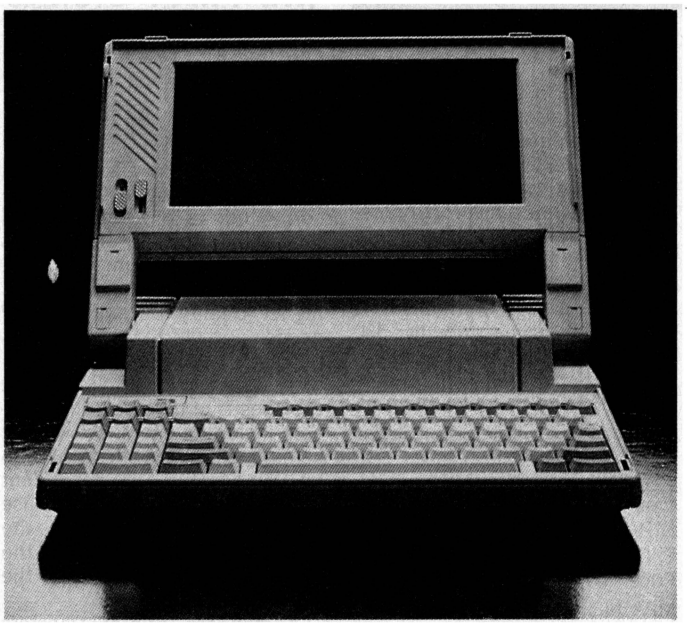
TERRAN COMPUTERS

Terran T-20

Terran Computers
Phone: (03) 439 4100
Price: $7500

Melbourne-based Terran Computers has released the T-20 PC, which combines the latest 16 MHz 80286 and the CS8221 NEAT chipset.

Terran claims that by combining near-zero wait state memory with the 80286-16 processor, speeds equivalent to 80386 based PCs have been achieved. It combines all facilities in the IBM PS/2 products while maintaining 100 per cent backward compatibility with all PC hardware. The T-20 includes 2 megabytes of memory, 40 Mbyte hard disk, MS-DOS 3.3, a Logitech mouse and VGA monitor.



Peripherals

AppleTalk Network System for education

Apple
Phone: (02) 452 8000
Price: Not supplied

Apple has announced six products that extend the reach and power of the AppleTalk Network System with new capabilities designed for the education market; they include AppleTalk network support for users of enhanced Apple IIe and IIGS computers.

New products intended for the kindergarten to Year 12 market include Aristotle application selector software, the Apple II Workstation Card and the AppleShare IIGS WorkStation for networking Apple IIe and IIGS computers.

Also, new and enhanced products for all AppleTalk users have been released: Inter • Poll Network Administrator's Utility, AppleShare File Server Version 2.0 and the AppleShare Print Server (formerly the LaserShare Print Spooler).

dICE In-Circuit Element

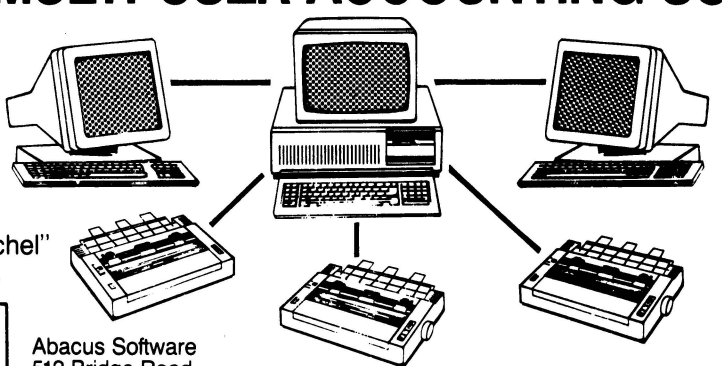
Baltec Systems
Phone. (07) 369 5900
Price: $1771 taxed

Cybernetic Micro Systems, through distributor Baltec Systems, has announced the avail-

THE "SATCHEL" MULTI-USER ACCOUNTING SOFTWARE

You get all 6 Modules...
- Invoicing/Credit Notes
- Accounts Receivable
- Stock Control
- Sales Reporting
- Accounts Payable
- General Ledger

Multi-user DOS is built-in with "Satchel" and runs under MS-DOS/PC-DOS.



$1195 (Incl. S/Tax) 3 users 3 printers

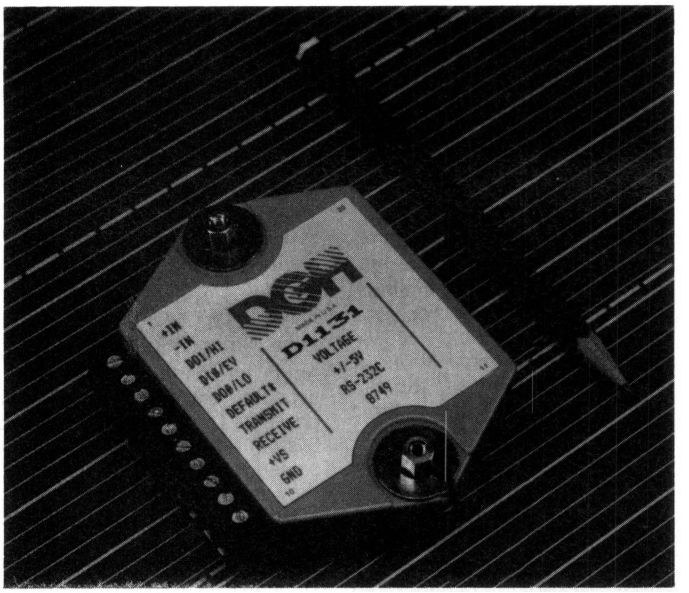
$995 (Incl. S/Tax) 2 users 2 printers

$795 (Incl. S/Tax) Single user

abacus

Abacus Software
512 Bridge Road,
Richmond, Vic. 3121 (Dealer enquiries invited) (03) 429 5844

AB 1279



ability of the dICE-51 In-Circuit Element for 8051 hardware and software development.

The dICE-51 consists of an 8051 compatible chip which plugs directly into the target hardware and communicates with an IBM PC, XT, AT or compatible over the COM channel. The dICE-51 can be used to exercise system RAM, ROM and I/O ports, including memory-mapped I/O and hardware interrupts.

DGH D1000 and D2000 SCIMs △

Data Electronics
Phone: (03) 221 1277
Price: Not supplied

Data Electronics has released the DGH D1000 and D2000 series of Sensor to Computer Interface Modules. The series will allow analog and digital sensors to be interfaced to PCs and microprocessor based control equipment.

The modules allow for distributed remote data acquisition and configuration of data loggers. Each D1000 and D2000 series module has a single analog input channel backed by an auto zeroing, auto calibrating 15-bit analog to digital convertor. Communications is via an RS232C or RS485 serial interface.

Ethernet Network Transceivers

Communication Technology
Phone: (03) 578 0822
Price: $495 untaxed

The Ethernet Network Transceiver provides the functional interface between network terminal equipment and the Ethernet coaxial cable.

Available in two versions, the Network Transceiver is fully compatible with the Ethernet version 2.0 and IEEE 802.3 baseband local area network (LAN) standards. The transceiver supports message traffic at a data rate of 10 megabits per second and system configuration using CSMA/CD access mechanism. It can drive signals up to 500 meters of coaxial cables and support stations up to 50 metres away from the coaxial cable run.

Stallion and Brumby I/O Controller cards

MPA
Phone: (03) 894 1494
Price: Not supplied

MPA has been appointed a distributor for the locally developed and manufactured Anvil Designs range of multiuser I/O controller cards.

The Stallion and Brumby controllers enable desktop PC users to achieve minicomputer performance in a multiuser environment of 8 to 16 users. Large terminal buffers and statistical software incorporated in the Anvil Designs products reduces interrupt overhead by up to 95 per cent. The controller cards compliment the Wyse PC range and SCO Xenix operating system.

Inboard 386/PC

Tech Pacific
Phone: (03) 690 9055
Price: $1735 taxed

Tech Pacific has released an 80386 based Intel add-in board, the Inboard 386/PC. The product increases the performance of IBM PCs, XTs and compatibles by up to 10 times, the company claims.

Inboard 386/PC comes standard with 1 megabyte of memory. It is compatible with the IBM PC, XT, Compaq Portable, Compaq Portable Plus and Tandy 1200HD computers. No additional equipment is required, although some early IBM PCs may require an upgrade of their original power supplies.

IMPRINT COMPUTER PUBLISHING SYSTEMS

Optifonts

Imprint
Phone: (02) 818 3577
Price: See below

Optifonts is a new font control system operating in the Microsoft Windows environment and outputting to the Tall Trees JLaser. The system was developed to provide a faster, higher quality output for DTP needs.

When used in conjunction with a windows application it provides true typographic standards including use of set widths, kerning, character offsets and so on. Some features are dependent on the software's ability to use them. The JLaser card allows the computer to talk directly to the printer at the speed of the computer's bus.

A standard printer transfers the data from the disk to the printer and then the printer has to carry out page formatting, font selection and then print the page. The Optifonts retails for $114 per typeface, while the JLaser sells for $899.

Printstation 222

Genicom
Phone: (02) 417 7321
Price: Not supplied

A new serial impact dot matrix printer, the Printstation 222 (PS222) has been released by Genicom; it has been designed specifically for the PC market.

The PS222 is capable of a wide variety of print modes including expanded, condensed, emphasised, bold, double strike and italics. It offers friction and tractor feed paper handling as standard, and a low cost sheet feeder as an option. It comes with both Centronics parallel and RS232C interfaces and prints 240 character per second (cps) in draft, 50 cps in near letter quality and 30 cps in letter quality modes.

Seikosha SBP-10A1 printer

AWA (Technology Group)
Phone: (02) 888 9000
Price: $7248 taxed

The Seikosha SBP-10A1 is an 18-pin dot matrix printer. It produces 800 characters per second (cps) in draft mode, 400 cps in correspondence and 200 cps near letter quality throughput.

The printer features rear, bottom and front paper paths and bi-directional push pull tractor. The paper parking facility ensures no time is lost between fan fold and cut sheet page due to built in cut sheet feeders. There is a full function front control panel with 32 character LCD readout and three plugin font cartridges. It also has a resident enlarged printing capability, Epson ESC/P and IBM ProPrinter emulation as well as a 64 kilobytes buffer, Centronics parallel and RS232 dual interfaces.

SMT Interchange

Bryte Software Services
Phone: (02) 290 2844
Price: Not supplied

The SMT Interchange is a bi-directional means of transferring data from one format to another between IBM and compatible computers. It you the ability to go from 5¼ inch to 3½ inch floppies, and vice versa. The Interchange comes with a 5¼ inch and a 3½ inch program disks, 10 feet of shielded cable and a manual.

Stepper Motor Control Card

Electro Optics
Phone: (02) 654 1873
Price: $831 taxed

The PC-LabCard Model PCL-738 Stepper Motor Control Card is now available from Electro Optics. Part of the PC-LabCard Series, this card fits into a single slot of any IBM PC, XT, AT or compatible.

It can independently control

up to three stepper motors, allowing it to be used in applications such as precise X-Y-Z position control and robotic or assembly equipment. Each independent stepper channel has its own microprocessor, allowing the PC to be freed for other tasks once a command is sent to a motor.

Teletext adaptors

Microtext, UK
Phone: (0) 705 59 5694
Price: See below

The British company Microtext has produced the Teletext adaptors for use in Australia and New Zealand for the C64, Amstrad CPC464/6128 and Spectrum computers.

The system enables teletext pages to be selected from the keyboard and viewed on the monitor. Other features include the saving to disk/cassette of pages, printing pages out and Teletext information-like sports results may be accessed by the user's own program. The adaptor plugs into the rear of the computer and uses an ordinary domestic video recorder as the tuner for the system. It is supplied with a lead which connects to the video out or AV socket on the back of the video. Channel selection is done via the controls on the video.

The price is St69.95 including surface postage and packing. Airmail to Australia or New Zealand is an additional St7.50.

Services

Macintosh Training Room

Bird Cameron ▷
Phone: (03) 67 9212
Price: Not supplied

An Apple Macintosh training centre has been opened by Bird Cameron, the Melbourne based training organisation. The new centre has nine Macintosh SEs and a LaserWriter Plus Printer all connected through an AppleShare network.

Bird Cameron has Macintosh courses scheduled for first time Macintosh users in various business applications and desktop publishing. The company is also an authorised Aldus Pagemaker Training Centre for both the Mac and PC Pagemaker. The courses are run over 1/2 day, one day or two days and cost $95, $215 and $425, respectively.

Ready Set Go! Workshop

Imagineering
Phone: (02) 697 8666
Price: To be determined

Imagineering has announced a design workshop for the Ready Set Go! page layout software program from Letraset. The workshop will be using Apple Macintosh computers. Instructors will lead students through an eight hour modular course that emphasises effective design techniques while highlighting the features of Ready Set Go!



LAN Administration kit

Micro Management Services
Phone: (02) 452 5966
Price: $797 taxed

Micro Management Services has released a disk based tutorial on the installation of a local area network (LAN). The LAN Administration kit is aimed at first-time LAN managers, or those installing or considering installing a LAN.

The self-study course includes a disk based tutorial, providing a novice level exploration of some LAN applications and functions, a 20 page *LAN Primer* workbook on LAN concepts, an 111 page *Implementation and Management Guide* and a 44 page *Network Administrator's Handbook*.

WordPerfect 4.2 video learning system

Micro Management Services
Phone: (02) 452 966
Price: $797 taxed

A multi-media training program for WordPerfect 4.2 has been released by Micro Management Services.

The video tutorial is comprised of two volumes – Mastering WordPerfect and Advanced Features. The trainee will be able to master the skills needed to utilise WordPerfect by watching the videotape and using the practice disk for hands-on exercises. The video system encourages a hands on approach to make users literate and skilled in WordPerfect.

IF YOU HAVE A COMPUTER, THIS IS FOR YOU

SPECIAL!! Computer Maintenance Membership offers from PCS COMPUTER ENGINEERING

BENEFITS for member: • An absolute saving on Labour for Servicing. • No limit to the number of servicings during currency of membership. • Fast turnaround. • Expert advice to the latest computer technology. • If your computer has not been in for any service, your membership would be valid for another year.

This membership will cover 12 months labour maintenance on your standard personal computer (excluding spare-parts).

Membership fee for each computer type is as follows:

☐ **IBM PC/AT (80286) and compatible ..$170** ☐ **Apple II Series and compatible .. $80**
☐ **IBM PC/XT and compatible .....$120** **(IIGS, IIC, IIE, II+ and Apple II.**

I would like to apply for the membership offer.

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..... **Postcode:** .....

Phone: .....

My computer is .....

Model ..... **Serial No.** ..... **Made** .....

Purchased from ..... **year purchased 19**.....

Please note:
• One membership covers only one computer.
Any enquiry, please do not hesitate to ring us.

(please tick box to indicate method of payment)
I enclose ☐ cheque/money order $.....
or debit my ☐ Bankcard ☐ Visa

Card Holder's name: .....

Address: .....

..... **Postcode:** .....

Card No: **Expiry date:** ...../...../.....

Signature: .....

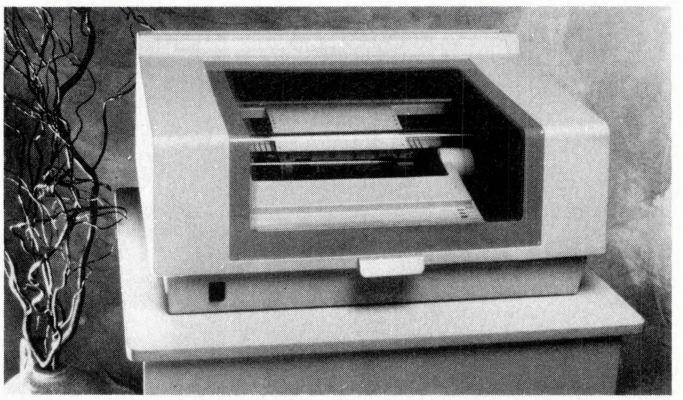
CONDITIONS: ★ Your membership will be valid one week after the correct amount of money is paid.
★ Application is based on yearly rate. If member cancels during the year, money is not refundable.
★ Any cartage involved in delivery or pick-up member's computers, are member's own expenses.
★ If your membership application(s) was not accepted, we will notify you.

Please send to:

PCS COMPUTER ENGINEERING
The Professional Computer Services

38 Graham St., Auburn NSW 2144
Phone 646-5091

Miscellaneous



Acoustic Hood △

Data Decor
Phone: (03) 429 9488
Price: $550 taxed

Data Decor has released the Acoustic Hood, which it claims has achieved unprecedented results in tests carried out by acoustic engineers using an ImageWriter II printer. At 500 Hz, the level where noise is a major distraction; the Acoustic Hood reduced the noise level from 56.5 decibels to 41.

Internal features of the Hood include specially designed sculptured foam. Sound baffles have been strategically placed to prevent noise seepage. The base is perforated, vinyl covered foam which traps sounds and absorbs printer vibrations.

Athana diskettes

Computer Network Services
Phone: (02) 419 7177
Price: Not supplied

Computer Network Services has been made the sole Australian of Athana disks. The disks are available in 3½ inch, 5¼ inch and 8 inch sizes with a number of colour options. They are supplied in either paper box, plastic box or bulk packaging. Disk packs, disk cartridges and storage modules are also available. Computer Network Systems will also be offering copy protection, serialisation and host verification for the Athana range.

Computer software for the handicapped

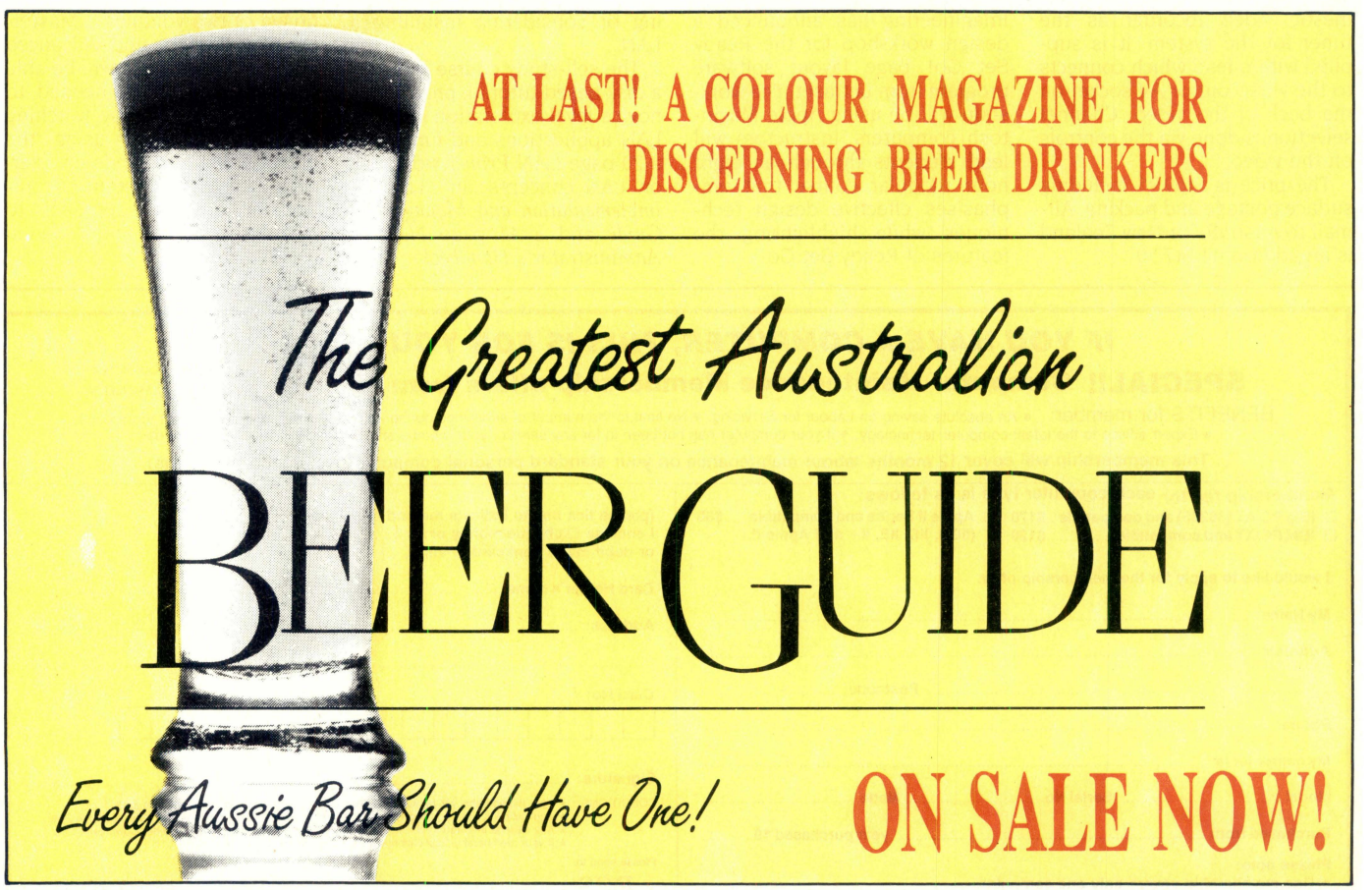
Special Needs Software UK
Phone: (44 41) 357 1659
Telex: 265452

Special Needs Software of Scotland is seeking an Australian agent for its range of easy-to-use software for the handicapped and disabled. SNS has developed the programs in association with the Scottish Council for Spastics to cater for people who are physically handicapped, accident or stroke victims and those with learning difficulties. There are three packages in the range: Electra Pen, a graphics package, Cad Master, a Cad package and Storybook Generator, a learning tool. Contact Mr Q. McClymont of SNS.

Databar Model 440 Bar Code Reader

Nortonic Instruments
Phone: (02) 938 4994
Price: $895 taxed

A bar code reader, Databar Model 440 is now available for use on the Apple Macintosh SE and Macintosh II. Areas of application include libraries, point of sale, factory work and records/file management. The benefits of the bar code reader are: data speed entry is higher, accuracy is greater and operators do not need keyboard skills. Connection to the Mac is by plugging the reader into the free bus socket on the systems unit, keyboard or other input device.





Mouse cover △

Paragon Computers
Phone: (09) 221 3216
Price: $7.00 RRP

What else but a mouse cover to keep your mouse warm when not in use! The furry 'rodent' is available in assorted colours from retailers or Paragon computers. Trust the Sandgropers to think up such an item!



IBM PC AT power supply △

Electronics Solutions
Phone: (02) 427 4422
Price: $180

Electronic Solutions has released a high power IBM PC AT supply. The supply is a high efficiency switching type and is a direct physical replacement for the IBM PC AT supply.

It has hard disk and floppy disk power connectors as well as connectors to the motherboard. Its input voltage is 85 – 140 volts or 180 – 265 volts AC, 47 – 63 Hz.

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THE ALL AUSTRALIAN MUSIC MAKERS' MAGAZINE
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BACK 4 UP
ESSENTIAL DATA DUPLICATOR

Back up your copy-protected disks with **ESSENTIAL Data Duplicator 4 PLUS** ■ **EDD 4 PLUS** is new technology, not just 'another' copy program. The **EDD 4 PLUS** program uses a specially designed hardware card which works with your disk drives to back up disks by accurately copying the bits of data from each track. Don't be fooled . . . no other copy-program/system for Apples can do this! ■ In addition to backing up disks, **EDD 4 PLUS includes several useful** utilities such as examining disk drives, certifying disks, displaying drive speed rpm's, plus more! ■ **EDD 4 PLUS** runs on Apple II, II Plus (including most compatibles), and IIe, and is priced at $190.00 (duodiskl/unidisk 5.25 owners must add $32.00 for a special cable adapter). ■ A standard **EDD 4** version which doesn't include any hardware is available, and can be used on Apple IIc and III (using emulations mode) and is priced at $125.00.

■ Bankcard and Master card accepted by phone. Add $3.00 to all orders for postage and handling.

All orders must be prepaid.

WARNING: EDD is sold for making archival copies only

UTILICO SOFTWARE
83 HALL ST., BONDI BEACH,
NSW 2026 PHONE (02) 30 2105

Features include a builtin EMI filter, an over voltage protection, a short circuit protection and 100 per cent thermal cycle and burn in. There is a 14 day money back guarantee.

Moebius

Questor
Phone: (02) 662 7944
Price: $59

Moebius is now available on the PC. This game sets the player the task of retrieving the Celestial Orb of Harmony which has been stolen from Moebius. Assassins and tigers are just some of the adversaries you have to overcome to retrieve the Orb.

Questor
THE CHALLENGE CONTINUES

Ultima IV

Questor
Phone: (02) 662 7439
Price: $59

The Ultima IV is now available for the Atari ST. The plot for this game sees Mondain, Minax and the Exodus finally vanquished from Britannia. The perfect mortal Avatar is sought to lead the nation into a golden age of prosperity. The strategic use of terrain and weapons is essential to overcome evil so as to survive and reach the final frontier where the ultimate challenge awaits!

The Cruiser

Questor
Phone: (02) 662 7944
Price: $39.95

Questor has released The Cruiser, a joystick imported from the UK.

Daihatsu Rocky Winner

Federal Publishing, home of YC, has announced the winner of the Daihatsu Rocky subscription competition open to new subscribers. The competition ran in all of the company's titles last year and the prize was a Daihatsu Rocky four-wheel drive, valued at over $27,000. The winner was Mr Ken Brown of Stuart Park, Darwin, NT; his subscription was to Modern Fishing.

Events

Computer '88 will be held at the Perth Entertainment Centre from May 5 to 7. Contact Shaun Smith on (09) 443 3400.

The Financing Realities for Entrepreneurs: Tapping the Australian Financial System seminar will be held at the University of New England, Armidale on May 6. Contact Terry Perrens on (067) 73 2541.

The Centenary Congress of the Australian and New Zealand Association for the Advancement of Science will be held at the University of Sydney from 16 to 20 May. Contact the Congress Liaison Officer on (02) 692 4356.

Microelectronics '88, organised by IREE Australia, will be held at the University of Sydney from 16 to 18 May. Contact the Conference Secretary on (02) 327 4822.

The Australian Status User's Group will be holding its conference and annual general meeting on May 25 and 26 at the South Park Motor Inn, Adelaide. Contact Lorraine Gerdes on (08) 274 7531.

Fourth Australian Conference on Applications of Engineering. Papers are being called for this conference by the Sydney Expert Systems Group. The conference will be held in Sydney from 11 to 13 May. Contact Marie Thill on (02) 218 9427.

The Australian Software Engineering Conference is to be held at the Australian Defence Force academy in Canberra from May 11 to 13. It is organised by the ACS. Contact Frank Poole on (062) 88 2884.

Forth Symposium. A two day seminar on the Forth language will be held on May 19 and 20 at the NSW Institute of Technology. Keynote speaker will by Charles Moore who invented the language. Contact Jose Alfonso or Paul Walker on (02) 20 930 or Roy Hill on (02) 217 3828.

Ausgraph '88 organisers are calling for unpublished papers on Cadcam, animation, image processing and scene simulation. The exhibition and conference will be held in Melbourne from July 4 to 8 at the Hyatt on Collins. Enquiries (03) 387 9955.

The Fourth National Space Engineering Symposium will be held in Adelaide July 12 to 14. Papers dealing with any space engineering are invited. Contact (062) 73 3633.

The 5th International Federation of Purchasing and Materials Management (IFPMM) Asia Pacific Regional Conference will be held from 13 to 15 July at the Sheraton Hotel, Brisbane. Contact the Conference Secretariat on (07) 371 7900.

Papers are being called for Forum '88, organized by the Honeywell Bull Users' Association. It will be held at the Sydney Hilton Hotel from July 21 to 23. Contact (02) 218 9578.

Comdex Australia '88 will be held at the Darling Harbour Conference and Exhibition Centre in Sydney from July 26 to 28. Contact (02) 959 5555.

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.

ACE, the Australian Computer Exhibition, is to be held at Darling Harbour in September. Contact (02) 264 5337.

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.

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.

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.

A President Users Group has been formed in Sydney. It 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.

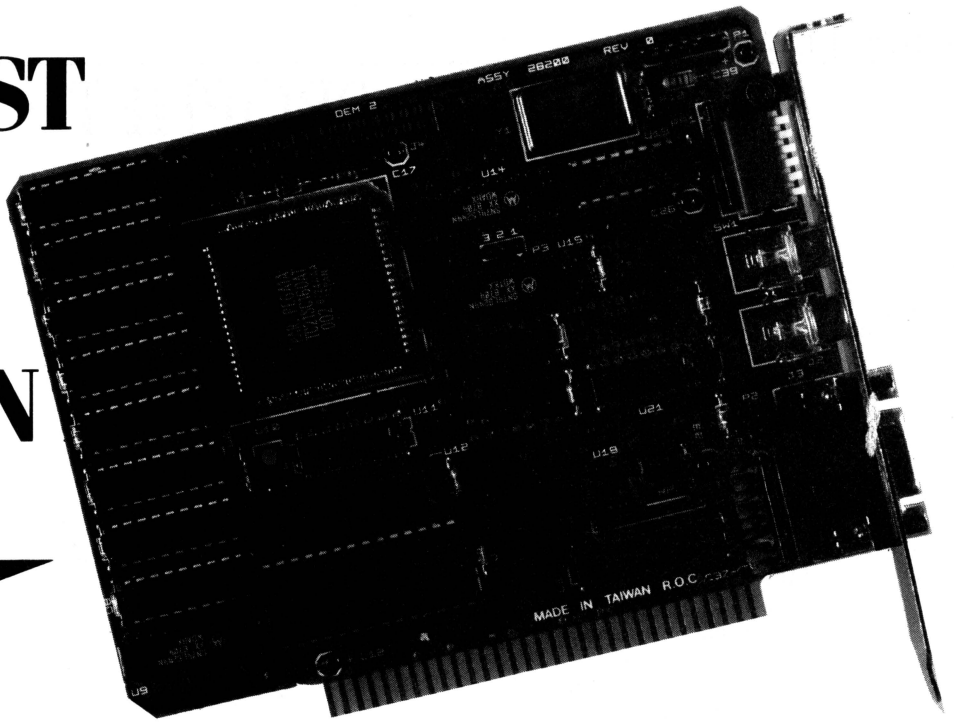
Overseas Exhibitions

Comtec '88 will be held at the World Trade Centre in Singapore from 25 to 28 August. Contact Paul White on (03) 663 3911.

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.

The Enterprising Network Event '88 International conference is to be conducted from June 5 to 9, with the exposition running from June 6 to 8. Both events will be held at the Baltimore Maryland Convention Centre USA. The conference with be focusing on an OSI communications solution for anything from automation protocol through to banking, education and federal and state government sectors.□

THE BEST EGA DEALS IN TOWN



ESM-5400 Ultra high resolution EGA monitor – only $845



This monitor must be the best value EGA in town, with a moderate price and resolution to burn!
For this month only, it is available for only $845, yet thrashes the pants off monitors costing over $1,000.

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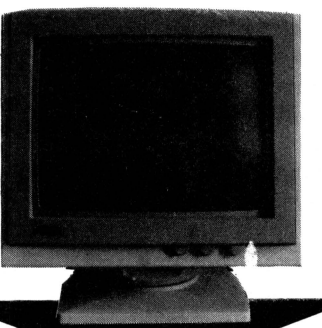
The amazing PEGA EGA card offers total software and monitor compatibilty at around half the price of other EGA cards.



NEW

NEC Multisync II – IBM PS/2 compatible and only $1249

If you want the finest monitor on the market, to go with your PEGA card, it will be the new NEC Multisync II. Totally compatible with all the video standards, including the IBM PS/2 VGA standard, the Multisync is a truly obsolesence proof monitor. The Multisync II now has automatic switching between TTL and analog. It is supplied complete with a comprehensive manual and data cable to allow connection to the IBM PS/2 or graphics adaptor with analog connector.

READER INFO No. 92

PEGA CARD – SPECIFICATIONS

The PEGA EGA card is a half size, high performance EGA card, compatible with the IBM PC/XT/AT and compatibles. It works with Monochrome, RGB colour and enhanced RGB colour monitors and supports all the current video standards, including monochrome, Hercules graphics, Colour Graphics and Enhanced Colour Graphics standards, as well as Plantronics mode.

Facilities include:

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- External switches mean that the PEGA card can be configured from outside the system.
- An easy to use software utility supplied with the card allows users to switch between modes
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- The PEGA card is fully compatible with monochrome, RGB and Enhanced RGB monitors.
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THE PROPHET

We had a visit from Murphy at Prophet, hard disks failing, controller cards blowing chips, all sorts of ugly goings on. Due to not having backups of everything (naughty person), we lost almost everything but the Registry – it was safe, but most everything else went to the big bit bucket in the sky (/dev/nul for Unix types).

Registration

The PAMS Registry was formed to resolve the age old problem of obsolete Bulletin Board Lists. Of course we would rather have electronic registrations, but since this is not possible sometimes, we have included the registration form with this list of updates (although, there is nothing stopping you typing the form in and then forwarding it – this eliminates most of the errors which are mainly caused by bad hand writing).

Send the form to Prophet BBS electronically, (02) 628 5222, or PO Box E41, Emerton 2770 NSW. □

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.

ACT – PC Exchange RIBM
(062) 58 1406
NSW – Prophet TBBS
(02) 628 5222
Vic. – The National
(03) 25-6904
Qld. – AMPAK RCP/M
(07) 263-7070
SA – The Electronic Oracle
(08) 260-6222
WA – Nemo Multiple BBS RAPL
(09) 370-1855

PAMS News 8803

NEW SOUTH WALES

***** Amended *****
2000 and Beyond TBBS
Sysop: Greg Kuhnert
Phone: (02) 522-6514
Baud: V21 V22 V23 B103 B212
Access: Mem VA
Computer: System One
DOS: CP/M
BBSoftware: TBBS

***** NEW System *****
Amiga Zone BBS
Sysop: Richard Duffy
Phone: (02) 771-6351
Baud: V21 V22 V23 B103 B212
Access: Mem LVA
Hours: 2100- 0700 Daily
Computer: Amiga 1000
DOS: Amiga
BBSoftware: BBS-PC!

***** Amended *****
Aquarius
Sysop: Glen Harvy
Phone: (02) 686-2798
FIDOnet: 713/608
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem LVA
Computer: Commodore PC10
DOS: MS-DOS
BBSoftware: Opus

***** Amended *****
AUGUR TBBS
Sysop: Mark James
Phone: (02) 311-3052
FIDOnet: 712/302
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: PC Clone
DOS: PC
BBSoftware: TBBS 2.0m

***** Offline *****
Bert BBS (Videotext)

***** NEW System *****
Brambleбush
Sysop: Ken Allan
Phone: (02) 829-1809
Baud: V21 V22
Access: Mem Reg LVA
Hours: Mon – Sat: 24 Hours
Computer: Clone88 turbo
BBSoftware: Opus

***** Offline *****
Computer Connection

***** Offline *****
Idiom

***** Amended *****
Landover BBS
Sysop: Lance Lyon
Phone: (02) 319-1793
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem LVA
Computer: Amiga 1000
DOS: Amiga DOS
BBSoftware: Custom BBS

***** Amended *****
Manly BBS
Sysop: Chris Patten
Phone: (02) 977-6820
Baud: V21 V22 V23
Access: Reg VA
Info: C-64 Needs Rterm or Ultraterm

***** NEW System *****
Midnight Quest
Sysop: Peter Pride
Phone: (02) 519-3579
Baud: V21 V22 V23
Access: Public
Hours: Weekdays: 1700 – 0900
Weekends: 24 Hours
Computer: XT Clone
DOS: MS DOS
BBSoftware: Opus
Info: Astronomy support

***** Amended *****
Milliway's
Sysop: David Coucke
Phone: (02) 357-7027
Baud: V21 V22
Access: Reg VA
Hours: 2130 – 0730 Daily
Computer: Amiga 1000
BBSoftware: BBS-PC!

***** Amended *****
Mirage Arcane
Sysop: Jeremy Nysen
Phone: (02) 665-5970
FIDOnet: 712/621
Baud: V22 V22bis B103
Access: Reg VA
Hours: Daily: 2200 – 0700
Computer: IBM XT
DOS: PC-DOS
BBSoftware: Opus

***** Amended *****
Nebula RAPL
Sysop: Sean Craig
Phone: (02) 407-2729
Baud: V21 V22 V22bis V23
Access: Mem VA

***** Amended *****
Nightmare BBS
Sysop: Todd Wright
Phone: (02) 545-1132
FIDOnet: 712/503
Baud: V21 V22 V22bis
Computer: FTC 1600FT
BBSoftware: Opus

***** Amended *****
Palantir C-64 BBS
Sysop: Steve Sharp
Phone: (060) 40-1284
Baud: V21 V22 V22bis V23 B103 B212
Access: Reg VA
BBSoftware: Punter

***** Amended *****
Playground BeeBS
Sysop: Brett Selwood
Phone: (02) 53-9688
FIDOnet: 712/504
Baud: V21 V22 V22bis V23
Access: Mem Reg LVA
Computer: AT Compatible
DOS: MSDOS
BBSoftware: Opus

***** NEW System *****
Raucous BBS
Sysop: Mark Weegen
Phone: (02) 261-5329
Baud: V21 V22 V23
Access: Public
Hours: Daily: 0900 – 1800
Computer: AT Clone
DOS: MS DOS
BBSoftware: Opus

***** Amended *****
SBA BBS
Sysop: Bob Wilson
Phone: (02) 411-1850
FIDOnet: 711/406
Baud: V22 V22bis
Access: Reg LVA
Computer: IBM AT
DOS: PC DOS
BBSoftware: Opus

***** Online *****
Sorcerer Users Group
Sysop: John Cepak
Phone: (02) 626-8020
FIDOnet: 713/607
Baud: V22 V22bis B103
Access: Mem VA
BBSoftware: Opus

***** Offline *****
Tesseract RCPM+

***** NEW System *****
The Black Hole
Sysop: Ken Thompson
Phone: (02) 81-4253
Baud: V21 V22 V23 B103 B212
Access: Reg VA
Computer: XT Clone
DOS: MS DOS
BBSoftware: GTPower

***** NEW System *****
The Kiwi Konektion
Sysop: Robert Earle
Phone: (02) 439-6178
FIDOnet: 711/410
Baud: V21 V22 V22bis V23
Access: Reg VA
Hours: Mon – Thur 1800 – 0800
Fri – 1700 – Mon 0800
Computer: IBM XT
DOS: PC DOS
BBSoftware: Opus

***** NEW System *****
Trantor
Sysop: Matthew Geier
Phone: (02) 543-6899
Baud: V21 V22 V22bis B103 B212
Computer: MicroBee
DOS: CP/M
BBSoftware: ROS
Info: * RINGBACK *

***** NEW System *****
Yet Another Bulletin Board
Sysop: Jonathan Chin
Phone: (02) 804-6837
Baud: V21 V22 V22bis V23 B103 B212
Access: Reg VA

Computer: XT Clone
DOS: MS DOS
BBS*oftware*: TBBS

VICTORIA

*** Amended ***
Alpha Centauri BBS
Sysop: David & Kim Nugent
Phone: (03) 874-3559
FIDO*net*: 632/348
Baud: V21 V22 V22bis V23
Access: Reg
Computer: Micro-10
BBS*oftware*: Opus

*** Amended ***
Anzugs OPUS
Sysop: Miklos Bolvary
Phone: (03) 887-0678
FIDO*net*: 631/326
Baud: V22 V22bis B103 B212
Access: Reg VA
Computer: ELT 286 AT
DOS: PC DOS
BBS*oftware*: Opus

*** NEW System ***
Cave 76
Sysop: Avatar
Phone: (03) 882-9197
Baud: V21
Hours: Daily: 2200 – 0800
Computer: XT Clone

*** Amended ***
Compusoft BBS
Sysop: George Tsoukas
Phone: (03) 386-6019
Baud: V22
Access: Public
Computer: Arrow AT+
BBS*oftware*: Opus

*** Amended ***
Crystal Symphony Opus
Sysop: Greg Jones
Phone: (03) 874-4176
FIDO*net*: 632/346
Access: Mem VA
Hours: Daily: 2200 – 0700
Computer: XT Clone
BBS*oftware*: Opus

*** Amended ***
East Suburb Eighty User Group
Sysop: Martin Axford
Phone: (03) 819-3115
Baud: V21 V22 V23 V23ORG

*** Amended ***
Eastcomm Opus BBS
Sysop: Keith Haslam
Phone: (03) 288-0775
FIDO*net*: 630/312
Baud: V21 V22 V23 V23ORG
Access: Public
Computer: Eastcomm PC/AT
DOS: PC DOS
BBS*oftware*: Opus

*** NEW System ***
MACE-ATARI BBS
Sysop: Stuart Szabo & John Burgess
Phone: (03) 899-6203
Baud: V21 V22 V23
Access: Mem VA

*** Amended ***
Maxitel BBS
Sysop: Jos Van Der Sman
Phone: (03) 882-6188
Baud: V21
Access: Public
Computer: C-64

*** Amended ***
MESA RBBS
Sysop: David Woodberry
Phone: (03) 754-5081
FIDO*net*: 632/349
Baud: V21 V22 V23
Access: Mem Reg VA
Computer: XT Clone
DOS: MS DOS
BBS*oftware*: Opus

*** NEW System ***
Museum BBS
Sysop: Rupert Russell
Phone: (03) 662-3336
Baud: V21 V22 V23 B103 B212
Access: Public
Computer: IBM XT Clone
DOS: MS DOS
BBS*oftware*: Opus
Info: Information on the Museum of Victoria

*** Name Changed ***
Sorcerer & CPM Users RBBS
Info: Now Called MESA RBBS

*** NEW System ***
Southern Mail
Sysop: Maurie Halkier
Phone: (03) 725-1621
FIDO*net*: 631/320
Baud: V22 V22bis
Access: Public
Computer: Eastcomm PC/XT
DOS: PC DOS
BBS*oftware*: Opus

*** Amended ***
Yarra Valley BBS
Sysop: Grahame Mitchell
Phone: (03) 736-1814
FIDO*net*: 632/350
Baud: V21 V22 V23
Access: Mem VA
Hours: Daily: 1000 – 0800
Computer: Amstrad 1512
BBS*oftware*: Opus

QUEENSLAND

*** Amended ***
Comtel BBS
Sysop: Warren Mason
Phone: (077) 75-3636
Baud: V21 V22
Access: Mem VA
Computer: Commodore 64
DOS: Basic IEEE
BBS*oftware*: Comtel

*** Offline ***
Concomp

*** Online ***
Hi-Tech CBBS
Sysop: Clyde Smith-Stubbs
Phone: (07) 300-5235

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Mr/Mrs/Ms/Miss *Initial* *Surname*

Address:.....

.....*Post Code*.....

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Baud: V21 V22 V23
***** NEW System *****
Sunshine Coast Connection
Sysop: Brian
Phone: (071) 44-2889
Baud: V21 V22
Access: Public
Hours: Daily: 2000 – 0800
Computer: IBM XT
DOS: MS DOS
BBSoftware: Opus
***** Amended *****
TommorrowLand BBS
Sysop: David Drummond
Phone: (07) 371-0944
FIDOnet: 640/305

Baud: V21 V22 V23
Access: Reg LVA
Computer: Cleveland PCII
DOS: MS DOS
BBSoftware: Opus
***** NEW System *****
TurboLink Australia
Phone: (07) 262-1414

SOUTH AUSTRALIA

***** NEW System *****
Burning Bush
Sysop: Douglas Carthew
Phone: (08) 272-8405
Computer: XT Clone
DOS: MS DOS
BBSoftware: Opus
***** Amended *****
Club Opus CBCS
Sysop: John Pride
Phone: (08) 263-5181
FIDOnet: 680/802
Baud: V22 V22bis V23
Access: Public
Computer: IBM XT
DOS: PC DOS
BBSoftware: Opus
***** Amended *****
The IDN Board
Sysop: Dave Winfield
Phone: (08) 352-2252
FIDOnet: 680/806

Baud: V21 V22 V22bis
Access: Reg LVA
***** Amended *****
The Olympic Board
Sysop: Greg Sanderson
Phone: (08) 265-4232
FIDOnet: 680/801
Access: Public
Computer: AT Clone
DOS: PCDOS 3.1
BBSoftware: Opus

WESTERN AUSTRALIA

***** Amended *****
Amiga Mouse BBS
Sysop: Martyn Bate
Phone: (09) 310-3998
Baud: V21 V22 V22bis V23
Access: Reg VA
Hours: Daily: 2030 – 0800
Computer: Amiga 1000
BBSoftware: BBS-PC!
***** NEW System *****
Lightning BBS Line 1
Sysop: Simon Blears
Phone: (09) 275-8225
FIDOnet: 690/903
Baud: V22 V22bis B212 PEP
Access: Reg LVA
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Opus
***** Amended *****
Lightning BBS Line 2
Sysop: Simon Blears
Phone: (09) 275-7900
FIDOnet: 690/903
Baud: V21 V22 V22bis V23 B103 B212
Access: Reg LVA
Computer: IBM XT Clone
DOS: MS DOS
BBSoftware: Opus
***** Name Changed *****
Meeting Place BBS
Info: Now Called Amiga Mouse BBS
***** Offline *****
Mouse Exchange BBS
***** Amended *****
Omen III RTRS
Sysop: Greg Watkins & Mark Dignam
Phone: (09) 276-2777
Baud: V21 V22 V23
Access: Reg LVA
BBSoftware: Omen
***** Amended *****
Omen Mini BBS
Sysop: Greg Watkins
Phone: (09) 279-8555
Baud: V21 V22 V23
Computer: TRS-80
DOS: NewDos
BBSoftware: Omen
***** NEW System *****
Treasure Island
Sysop: Gloria Platt
Phone: (09) 271-0471
Baud: V21 V22 V23
Access: Reg VA
BBSoftware: GBBS PRO

```
                    Bulletin Board Information

Type: New System / Change

System Name:
-------------------------------------------------------------

Board Telephone number: (____)  ____-_________

Online Sysop Name:
-----------------------------------------------------

Machine: ___________________________

Operating System: _________________

BBS Software: _______________________

Hours of operation: 24hours / ______________________________

Modem Type: _______________________ [V21/23 etc]

User Access: Member/Registered User/Public/Visitor/Limited Visitor
             [Delete as required]
Other
-------------------------------------------------------------------

Online Info ________________________________________________

Fido Address: [_____/_____]

                    Confidential Information

Sysop Name:
-------------------------------------------------------------

Telephone BH: (____)  ____-_________  AH: (____) ____-_________

Address: ___________________________________________________

_____________________________________________________________

_________________________________________Postcode: _________________

Your Computer Subscription Required: YES / NO [Delete as applicable]

Please report changes or new listings to:

Australian PAMS Co-ordinator PO Box E41, Emerton NSW 2770

Electronic: Prophet TBBS (02) 628-5222 V21.V22.V22bis.V23
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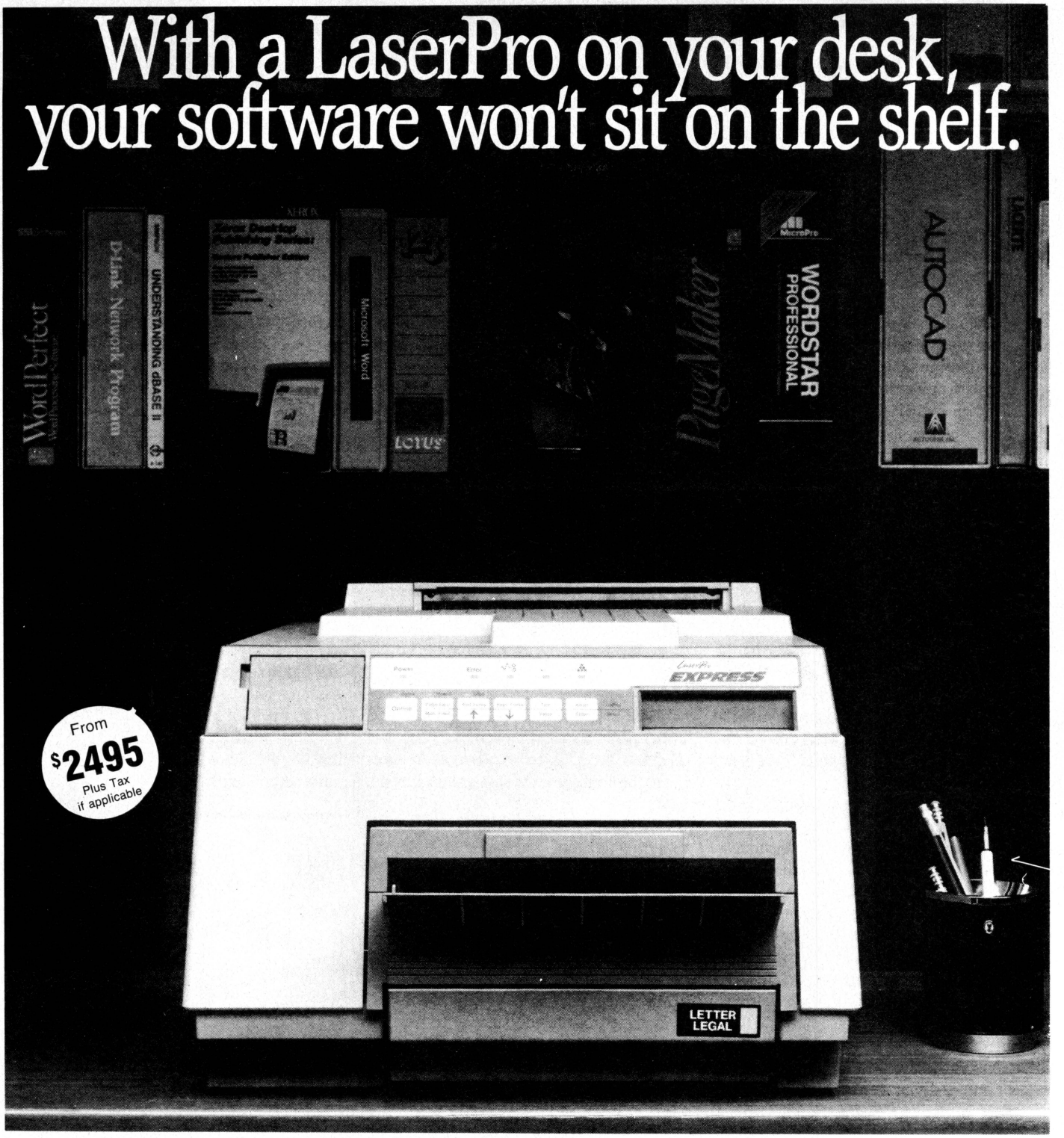

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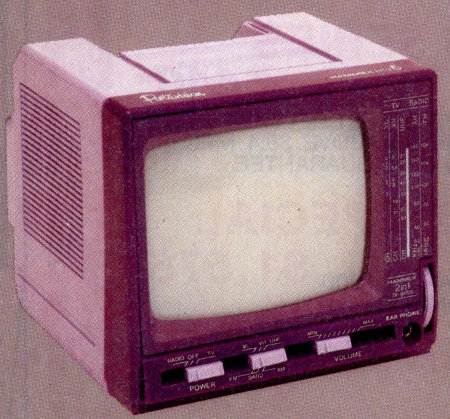

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HURRY! Offer closes July 1988, for Your Computer.

CONDITIONS OF ENTRY

1. The competition is open only to Australian Residents authorising a new/renewal subscription before last mail July 31, 1988. Entries received after closing date will not be included. Employees of the Federal Publishing Company, Sony Australia and their families are not eligible to enter. To be valid for drawing, subscription must be signed against a nominated valid credit card, or, if paid by cheque, cleared for payment.
2. South Australian residents need not complete the coupon but may enter only once by submitting their name, address, and a hand-drawn facsimile of the coupon.
3. Prizes are not transferable or exchangeable and may not be converted to cash.
4. The judges decision is final and no correspondence will be entered in to.
5. Description of the competition and instructions on how to enter form a part of the competition conditions.
6. The competition commences on April 1, 1988 and closes with last mail on July 31, 1988. The draw will take place in Sydney on October 12, 1988 and the winner will be notified by telephone and letter. The winner will also be announced in the Australian on October 17, 1988 and a later issue of the magazine.
7. The first prize is: a Sony Trinitron Remote Control colour TV ($1,200). 2nd prize: 5 inch portable Black & White TV set ($159 each), plus 10 consolation prizes of AM/FM all weather radios (approx $10 each).
8. The promoter is The Federal Publishing Company, 180 Bourke Road, Alexandria NSW 2015. Permit No. TC88/675 issued under the Lotteries and Art Unions Act, 1901; Raffles and Bingo Permits Board Permit No. 88/357 issue on 8/3/88; ACT Permit No. TP88/202 issue under the Lotteries Ordinance, 1964.

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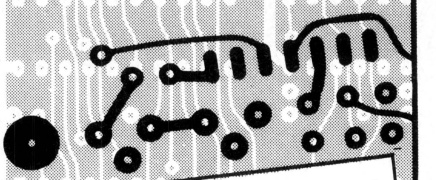

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JOHN HEPWORTH

IBM UNDERGROUND

The clear market leader in spreadsheets for the IBM PC and compatibles has been Lotus 1-2-3, almost from the day the PC was released. There have been a number of other commercial and Public Domain spreadsheets. Some of these attempt to emulate Lotus, or use similar command and macro syntax, while others use their own command syntax. Some also use the Lotus file structure.

A powerful entry from the area of User Supported software is AsEasyAs. Forget the terrible puns in the names of both the program and the company (AsEasyAs 1-2-3 . . . and the company name Trius), for this is a truly powerful and high performing package, quite compatible with Lotus, at a bargain price.

Users are allowed to give copies to friends and acquaintances for trial, and, as is common to User Supported software, a registration fee is requested if the program is used after a reasonable trial period. The fee requested is $US30, and for this tiny amount (plus a few dollars postage) the user gets a disk with the latest version plus a printed 150 page manual. But a bargain price is no good unless the product performs, and AsEasyAs has performance right up there with Lotus.

Performance

Having talked about raw performance, a few figures to compare the speed of AsEasyAs, Lotus 1A, Lotus 2 and Microsoft Works are in order. You will see that AsEasyAs is highly competitive on these common tasks with the industry leader, and with the spreadsheet module of an entry level integrated package. The example used is the standard Lotus spreadsheet used for other *Your Computer* benchmarks, and the machine used was a 4.77 MHz PC with a 36 millisecond average access hard disk. All times are rounded to the nearest second.

Spreadsheet	Load	Recalc	Save
AsEasyAs	117	32	61
Lotus 1A	70	30	61
Lotus 2	198	31	64
Microsoft Works	158	29	80

Table 1. *AsEasyAs times for standard operations on a standard spreadsheet compared with top-selling Lotus 1-2-3 and the spreadsheet module of Works, an entry level integrated package.*

```
F1:Help - F2:Edit - F5:Goto --< Print  >-- F6:Window - F9:Calc - F10:Graph

Define Margins: Top, Bottom ,Left, Right
                ..A/...............B/.................C/................D/........
PRINTTO          1    0.84147098481       0.54030230587      1.5574077247
PRINTER          2    0.90929742682      -0.41614683655     -2.1850398633
OPTIONS          3    0.14112000806       -0.9899924966    -0.14254654307
                 4   -0.75680249531      -0.65364362086      1.1578212824
Margins          5   -0.95892427466       0.28366218547     -3.3805150062
Setup            6   -0.27941549819       0.96017028665    -0.29100619138
P-Length         7    0.65698659871       0.75390225434     0.87144798272
Header           8    0.98935824662       -0.1455000338     -6.7997114558
Footer           9    0.41211848524      -0.91113026188    -0.45231565944
Type            10   -0.54402111089      -0.83907152908     0.64836082746
Quit            11   -0.99999020655       0.00442569799     -225.95084647
                12   -0.53572918          0.84385395873    -0.63585992867
  13            13    0.42016703681       0.90744678145     0.46302113292
  14            14    0.99060735569       0.13673721821      7.2446066158
  15            15    0.65028784016      -0.75968791285    -0.85599340093
  16            16   -0.28790331666      -0.95765948033     0.30063224202
  17            17   -0.96139749188      -0.27516333806      3.4939156454
  18            18   -0.75098724677       0.66031670824     -1.1373137123
  19            19    0.14987720966       0.98870461819     0.15158947061
  20            20    0.91294525073       0.40808206182     2.2371609442
      Free:9.6% [376k]--Auto------------------------------------7:29:43 pm
```

Figure 1. *AsEasyAs uses slash commands, with default menu in the form of a pop-down window. The location of the menu can be toggled from one side of the screen to the other and menu widths can be adjusted with the < and > keys. At the bottom of the window are details of the free memory and the time.*

Using AsEasyAs

Start the program by typing ASEASY at the DOS prompt, or in a batch file. Options may be set by 'switches' when AsEasyAs is started, and these options can include the default drive and directory for data files, and the colours used on various parts of the screen.

While AsEasyAs can normally sense which video board is installed, another command line switch can override it. Boards supported include CGA, EGA, Hercules and AT&T. AsEasyAs has a program file and an overlay file; normally both are loaded when the program is first started, but if your system has limited memory, another switch leaves the overlay file on disk and essential parts of it are loaded and discarded as required, with the effect that 70 kilobytes less memory is used.

Now an initial opening message is seen, and after pressing any key, the spreadsheet appears. The screen is clearly a Lotus compatible spreadsheet, with the familiar columns and rows labelled by letters and numbers. A nice touch is that the number of the current row is shown in reverse video, making the job of finding the active cell easy.

As with Lotus, pressing the / key while in the spreadsheet transfers the user to the menu system. The default menu is in the form of pop-down windows, though a menu bar like Lotus can be specified by a command line switch, and a toggle is available from within the spreadsheet. Location of the pull down menu is toggled from one side of the screen to the other with the Full Stop, and menu widths can be adjusted with the < and > keys. Visible at the bottom of the window are details of the free memory (in percentage and bytes) and the time.

As with Lotus, an option in a menu can be selected by pressing the key carrying the leading letter of the option, or by using the cursor keys to highlight it and pressing Enter. When in a pull-down window style menu, each level selected is shown, and /PPO (for PrintTo-Printer-Options) would all be shown.

Moving around the spreadsheet is just as in Lotus. Home moves the cursor to cell A1, EndHome to the bottom right corner of the spreadsheet, up, down, left and right arrows move the cursor by one row or column, PgUp and PgDn and Tab move by one screen. F5 goes to a nominated cell, and F6 toggles between windows. F2 allows the cell under the cursor to be edited. Two other function keys are F9 and F10, which recalculate the spreadsheet and display graphs respectively. As with Lotus, pressing F1 while in the spreadsheet brings up a help screen. It is not context sensitive, and cannot be called

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when in a menu, just while in a spreadsheet, but it is very helpful.

Values and labels are entered into the cell under the cursor as with Lotus, by typing the label, formula or value and pressing Enter, or by moving the cursor off the cell. Most other actions are very similar to those in Lotus. Absolute, relative and mixed addressing is supported. Circular references are shown by displaying CIRC in the status bar at the bottom of the screen, along with the address of the cell that caused the circular reference.

Files can be loaded with either WKS or WK1 extensions from Lotus 1A or Lotus 2, and are saved with a default WKS extension. Rather nice is the way AsEasyAs can display a list of all files in the directory when a /FR command is executed to retrieve a file from disk.

Commands and menus

The options in the menus are very similar to those in Lotus 1A, with a few additions, deletions and variations. The names in the menus are often different, but with the same leading letters so that fingers instinctively trained for Lotus won't miss too many beats. Some options are different. Just one example is the ability to print a graph while still in the spreadsheet, without needing an exit from the spreadsheet to a separate graphics printing program.

Functions

An inspection of the @ functions in Aseasyas reveals that they are very much the same as those in Lotus 1-2-3 version 1A, with some minor additions, variations and deletions.

Amongst the additions are some elementary matrix operations, allowing addition, subtraction, multiplication, inversion, transposition and equation of matrices. Some of the missing commands include ones to set the default configuration for things like the data directory, though this is set from the command line instead, and variations include the use of Worksheet Headings to lock the horizontal and vertical titles, instead of the Worksheet Titles used by Lotus. There are other additions and deletions, but in most case there is an equivalent in AsEasyAs to those in Lotus.

Macros

As with Lotus, AsEasyAs supports macros, which can recorded as a series of keystrokes within a spreadsheet. There are significant differences in the actual commands, though nearly all of the capabilities of the Lotus macros are available. Typical of the variations are that AsEasyAs does not use the various /X macro functions, and instead uses its own functions with similar effects. As just one example, Lotus 1A uses /XClocation to call a subroutine and /XR to return from a subroutine, while AsEasyAs uses 'CALL location and RETurn, and AsEasyAs includes macro commands for control of sound and colour. Amongst the sample spreadsheets on disk is one which even plays a tune.

Documentation

There is a minimal read-me file on the disk, showing the command line switches to start AsEasyAs. A quite good help screen system is available while evaluating AsEasyAs. As well, a very clear and useful 150 page manual is sent when registering.

Availability

AsEasyAs is to be found on most bulletin boards and in the libraries of many user groups. The version tested was 3.00k, and came from the publisher Trius Incorporated, 15 Atkinson St, Lynn, Mass. USA 01905. They have about the fastest responses to registration of any User Supported software publisher. A friend registered his copy of AsEasyAs, and the manual and new disk were returned only about a couple of weeks after sending off the cheque. Registration is $US30, and while no postage is quoted on the order form on the disk, it would be quite unfair not to add a few dollars for this.

AsEasyAs requires a IBM PC or compatible, using CGA, EGA, Hercules or AT&T video for graphics, while MDA is satisfactory if no graphics are required. Minimum memory is 256K, using 130K for program code and 60K for internal pointers and variables. A sparse matrix is used to minimise the amount of memory used by the spreadsheet.

AsEasyAs is a spreadsheet with performance in the same league as Lotus, and with file and function compatibility. The macro language is based on that of Lotus, with variations and enhancements that may make it impractical to use complex spreadsheets under both Lotus and AsEasyAs, but despite this it can be strongly recommended to anyone seeking a spreadsheet at a realistic price without having to accept reduced functions and performance. □

YOUR APPLE

Hedgehogs, graphics and the GS . . .

Someone once said about hedgehogs making love: It's not how they do it that's amazing, rather the fact that they can do it at all!

I feel the same way about the new graphics packages for the GS. We now have Activision's new Paintworks Plus and Draw Plus, and Accolade's The Graphics Studio for the Apple II series. These are all successful translations of the famous Macintosh programs – MacPaint, MacDraw and MacDraft – but they are only for the Apple IIGS, of course. It's asking a bit much for these to run on the 8-bit IIe. Even translating them to the 16/8 hybrid GS, the publisher's still have to contend with the added complication of colour.

It's only a couple of years ago that we were all agog at the first demonstrations of this style of program on the Macintosh. Nowadays we are highly critical if graphics programs don't measure up to standards that would have been unimaginable back in 1984.

The IBM world has been trying to copy many of the best graphics features of the Macintosh now for many years, and it is only with the introduction of the new PS/2-OS/2 combination later this year that it appears to be getting close. The new OS/2 operating system has a Presentation Manager which they say will make the IBM series as easy to use as the Mac – but on early reports it is also very slow.

So when you think about it, Activision's translation (and to a lesser degree Accolade's) from the Mac architecture with its Motorola 68000 CPU, to the Apple II architecture with its 65C816 chip, is quite an achievement. It must be roughly comparable to translating Mac programs to the IBM's Intel chip architecture.

What has made it slightly easier for the GS programmers is that the 65C816 CPU is a true 16-bit chip which, in native mode, is not bottlenecked by an 8-bit address bus like the IBM PC's Intel 8088. So even at the leisurely clock speed of 2.5 MHz, GS programs should motor along pretty well. And there's no reason with the GS memory available why these can't compete in graphic resolution.

Graphic applications should also be helped along by the Apple GS's ROM resident Tool Box and QuickDraw II which uses a lot of the old Mac black-and-white QuickDraw subroutines and adds the colour. Not all QuickDraw II routines are in ROM in the GS – some less crucial ones are assigned to RAM – as are some of the ten Tool Sets in the Tool Box.

The Video Graphics Controller chip in the GS supplies two functions; the QuickDraw II set of screen graphic tools, and the two 'super-hi-res' modes. There are 4096 colours theoretically available in either mode (but not all at the same time), with the first mode supporting a resolution of 320 *x* 200 pixels. This takes 4 bits of memory per pixel and provides 16 colours.

The Graphics Studio allows you to select which screen resolution you need, and it provides for the transfer of paintings between the two modes.

The second mode doubles that resolution horizontally to 640 *x* 200 pixels by reserving only 2 bits of memory per pixel, but this limits the colours available to only four.

Differences

The use of this ability to change resolution is the most obvious difference between Activision's Paintworks Plus and Accolade's The Graphics Studio. The Graphics Studio allows you to select which screen resolution you need, and it provides for the transfer of paintings between the two modes. Unfortunately in all other aspects it appears to be inferior to Paintworks Plus.

Even allowing for the fact that a Mac user like myself would feel more comfortable with Activision's mimicry of MacPaint, there is still something intensely irritating about The Graphics Studio. The general user interface is badly designed – it looks amateurish and it's not 'intuitive'. To add to the problems there are certain computer-generated features (like co-ordinate bars) which erratically blink on and off as they move, in a most annoying way. I get a headache from this program.

The other essential feature missing from The Graphics Studio is Fat Bits. To a non-artist like myself, the ability to enlarge the drawing and make corrections on a pixel-by-pixel basis, is not just nice – it is essential.

It's certainly not the world's fastest program either. In the high-res mode I accidentally flooded the background of a drawing with a coloured texture. I then made a silly mistake and couldn't use the Undo function.

Fortunately the program allows you to replace the background colour, and when I tried, it took off like a rocket... Stephenson's Rocket on a bad day, that is! It started replacing the colour slowly, then became fatigued and decided not to hurry – it rested often. Just when I thought it had reached its snail-like limit, it coughed a couple of times, rolled over and *died*.

You can, however, kick it back into life; it gave up on me completely a half-a-dozen times and had to be restarted. As a result, a mistake that took half a second to make took a couple of hours in the correction. I've never seen screen pixels change so slowly or so erratically; it was fascinating – almost hypnotic. They ought to design a game around this feature and call it Snail's Pace.

Paintworks Plus and Draw Plus, by contrast, move along nicely – once you've remembered to change the control panel back to the faster clock speed! After my experience with The Graphics Studio I was ready for trouble, and a lot of bitter words were said about Activision before I realised it was my own fault.

My GS gets used a lot for game playing by the ankle-biters, and so it gets switched back to the slower speed occasionally. I know from experience now that at 1 MHz, graphics programs are lethargic and laborious to use. Activision ought to at least warn novice users and stupid reviewers about this potential problem in their manual.

So Paintworks Plus and Draw Plus are fast enough – as is The Graphics Studio in most operations. However, it is one thing to be fast, and another to be useful. Colour is still a 'toy' feature unless you are seriously designing games – and it will remain that way until someone produces a $500 four-colour laser printer. Colour is nice to have but I would swap it for resolution any day.

I haven't got access to a laser printer at the present moment and that might make me like Draw Plus a lot more, but I can't see who is going to use this program. It has most of the features of the original Mac Draw and therefore could be useful as a simple drafting tool – for drawing houseplans, street layouts and so on. But the output resolution would have to be much better than it appears on the screen and the ImageWriter. The manual implies that it is better on a laser printer since the printer 'rounds' and uses its own character generator – but I'd want to see it before I believe.

Nowadays we are highly critical if graphics programs don't measure up to standards that would have been unimaginable in 1984.

Resolution

I think resolution is pretty horrible at the present moment on both these Activision programs – but the promise is there. The screen problem appears to be mainly in the use of an analogue colour monitor which tends to lack 'certainty' in the way it switches screen elements at the boundaries of objects. Have a look at a 1-pixel black dot (use Fat Bits) under a magnifying glass and you'll see what I mean.

Adding to this problem also is the use of a round-dot screen mask, which means that the dots don't ever quite touch, with some areas of non-illumination (grey) always left between the coloured dots, reducing the overall crisp appearance of the screen. Look at the Mac screen under magnification and you can see the square dots touching each other and crating clean areas of black and white.

The real problem, I suspect, stems from Apple's marketing department. It can't make up its mind where the GS fits into the overall home and PC scene. No one knows quite which way to go.

With just a bit more work on the programs and a bit of refinement from Apple, the GS would be a valid business or professional tool – but it isn't at the present. If you are a graphic artist or a designer or architect, you'd be mad to buy a GS when there's the Mac around.

But colour on the Mac costs a fortune, so there's undoubted value for money here in the GS, and with these programs: it's just that value-for money isn't enough – the whole set-up has to be useful.□

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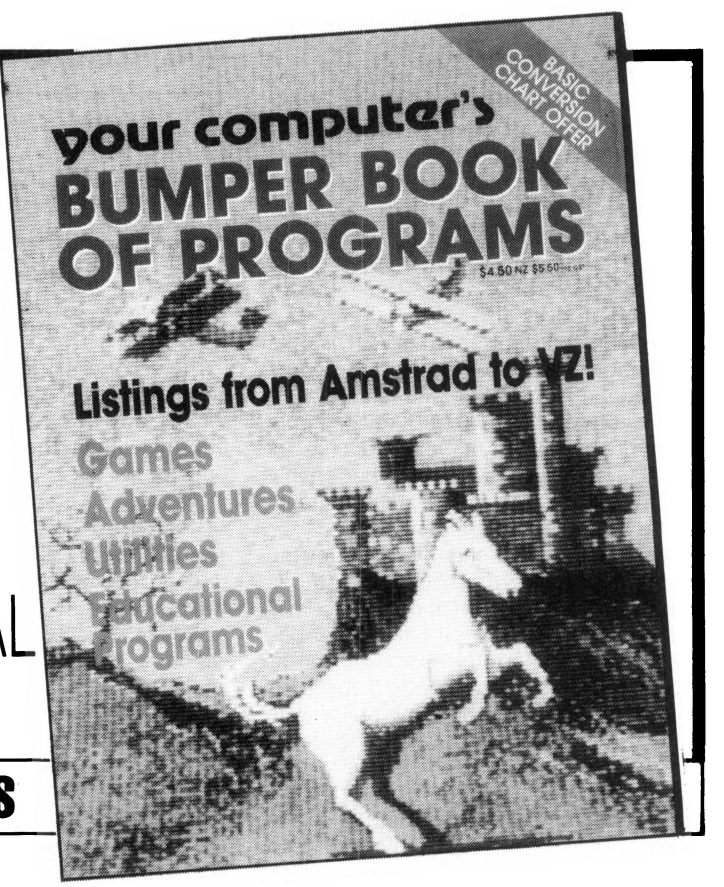

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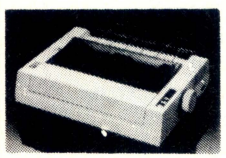

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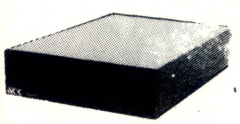

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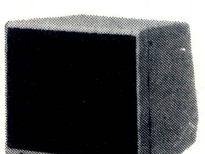

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Front; Power ON/OFF, Contrast.
Rear; V-Hold, V-Size, Brightness
Internal; Vertical Linearity, Horizontal Linearity, Horizontal Width, Focus.
Power supply: 110/120V 60Hz, 220/240V 50 Hz
Dimensions: 308(W) x 297(H) x 307(L)mm
Weight: 7·3Kg
Shipping weight: 8·3Kg

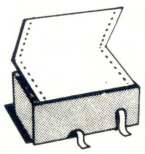
Cat.No.	Description	Price
X14500	(GREEN)	**$189**
X14502	(AMBER)	**$189**



RS232 BREAK OUT BOX

A simple way of monitoring RS232 interface lead activity. Interface powered, pocket size for circuit testing, monitoring and patching. 10 signal powered LED's and 2 spares. 24 switches enables you to break out circuits or reconfigure and patch any or all the 24 active positions.

SPECIFICATIONS:
Connectors: DB25 plug on 80mm ribbon cable and DB25 socket.
Indicators: Tricolour LED's for TD, RD, RTS, CTS, DSR, CD, TC, RC, DTR, (E)TC.
Jumper Wires: 20 tinned end pieces.
Power: Interface power.
Enclosure: Black, high impact plastic.
Dimensions: 85 x 95 x 30mm
X15700 ..... **$94.95**



COMPUTER PAPER

Quality paper at a low price! 2,000 sheets of 70 gsm bond paper.
Cat. C21003 11 x 9½" .. **$39.95**
Cat. C21005 15 x 11" **$67.95**

★★★★★★★★

STOP PRESS!

GOLDSTAR TTL MONITORS ONLY $149
THIS MONTH ONLY!

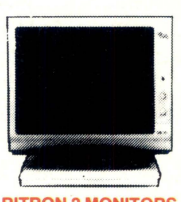
★★★★★★★★



DELUXE PRINTER STAND

- Restores order to your work area without occupying extra space.
- Feeds and refolds paper under the printer automatically.
- Adjustable paper deflectors ensure smooth flow of paper.
- Made of moulded plastic
- Suitable for most printers

C21058 (80 column) **$69.95**

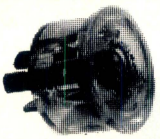


RITRON 2 MONITORS

Stylish monitors available in green or amber displays and featuring swivel base that tilts forward and back 30 degrees and swivels right to left 60 degrees!

SPECIFICATIONS:
CRT DISPLAY SIZE: 12 inches non-glare 90 degree deflection.
INPUT SIGNAL: 1.0 - 2.5V p-p composite video signal.
INPUT INPEDANCE: Normal 75 ohm, high approx. 50K ohm.
INPUT TERMINALS: RCA phone jack.
RISE AND FALL TIME: Less than 25 us
VIDEO BANDWIDTH: 20MHz
Corner; 800 lines
Geometric distortion; 2% or less
Linearity; less than 2%
CONTROLS: Front; Power On/Off, brightness, contrast
Rear; Vertical hold, Horizontal hold, Vertical line, Vertical size.

Green Cat. X14506..**Normally $235**
Amber Cat. X14508..**Normally $239**
NOW ONLY $169



THE BUTTON SPIKE PROTECTOR

Surges and spikes are caused not only by lightning strikes and load switching but also by other equipment being switched on and off, such as fluorescent lights, electric motors, fridge freezers, air conditioners, etc.

For effective protection such spikes must be stopped before they reach your equipment. Simply plug The Button into an outlet and it will protect all equipment plugged into adjacent outlets on the same branch circuit. The Button employs unique metal oxide varister technology and will dissipate 150 joules of electrical energy. (nearly twice that of comparable surge arresters.)

SPECIFICATIONS:
Voltage: 240V Nominal
Total Energy Rating: 150 joules
Response Time: 10ns
Protection Level: 350V peak
..... **$34.95**



COMPUTER CABLE

CIC6 6 conductor computer interface cable. Colour coded with braided shield. (to IE422 specifications). Copper conductor 6 x 7/0.16mm.

1-9 metres	10+ metres
$1.90/m	**$1.70/m**

CIC9.100 9 conductor computer interface cable. Colour coded with mylar shielding. 9 x 7/0.16mm.

1-9 metres	10+ metres
$2.50/m	**$1.95/m**

CIC12 12 conductor computer interface cable. Colour coded with mylar shielding. 12 x 7/0.16mm.

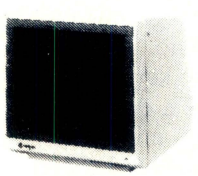
1-9 metres	10+ metres
$2.70/m	**$2.50/m**

CIC16 16 conductor computer interface cable. Colour coded with mylar shielding. 16 x 7/0.16mm.

1-9 metres	10+ metres
$3.90/m	**$3.40/m**

CIC25 25 conductor computer interface cable. Colour coded with mylar shielding. 25 x 7/0.16mm.

1-9 metres	10+ metres
$4.90/m	**$4.40/m**

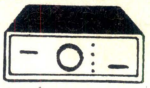


SAMSUNG 12" TTL/COMPOSITE MONITOR ONLY $179

FEATURES....
- At last a monitor with both TTL and Composite modes!
- High contrast, non-glare screen
- High resolution, 80 or 40 character display
- Swivel/Tilt base

SPECIFICATIONS....
Picture tube: 12" diagonal and 90° deflection
Phosphor: Green (P42)
Video input signal: Composite/TTL Switchable
Polarity: Negative/Positive
Level: 0·5 - 2·0Vp-p/4·0+−1·5Vp-p
Impedance: 75ohm, more than 6·8K ohm
Scanning frequency:
Horizontal: 15.75 KHz +−0·1%/18·432KHz+−0·1%
Vertical: 47-63Hz
Video bandwidth: 20MHz
Active display area:
Composite: 206(H) x 160(V)mm.
TTL: 216(H) x 160(V)mm
Display character:
80 characters x 25 rows.
Input terminal: Phono Pin Jack, 9 pin D-Sub Connector.
Controls:
Outside: Power Switch, Contrast, Brightness, Signal Select, V-Hold, V-Size.
Inside: H-Width, H/V linearity, Focus, H/V-Shift.
Power supply: 110/120V 60Hz, 220/240V 50Hz
Dimensions:
308(W) x 297(H) x 307(L)mm
Weight: 7·3 Kg
Shipping weight: 8·3 Kg

Cat.No.	Description	Price
X14509	(GREEN)	**$179**



2 & 4 WAY RS232 DATA TRANSFER SWITCHES

If you have two or four compatible devices that need to share a third or fifth, then these inexpensive data transfer switches will save you the time and hassle of constantly changing cables and leads around.
- No power required
- Speed and code transparent
- Two/Four position rotary switch on front panel
- Three/Five interface connections on rear panel
- Switch comes standard with female connector

2 WAY Cat.X19120 **only $59**
4 WAY Cat.X19125 **only $99**

2 & 4 WAY CENTRONICS DATA TRANSFER SWITCHES

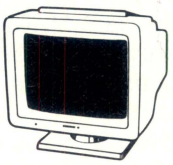
Save time and hassles of constantly changing cables and leads around with these inexpensive data transfer switches. These data switches support the 36 pin centronic interface used by Centronics, Printronics, Data Products, Epson, Micronics, Star, and many other printer manufacturers.
- No power required
- Speed and code transparent
- Two/Four position rotary switch on front panel
- Three/Five interface connections on rear panel
- Switch comes standard with female connector
- Bale locks are standard

2 WAY (X19130) ..... **only $59**
4 WAY (X19135) ..... **only $99**

VERBATIM HARD DISK CARD

Available 20 or 30 M/Byte! IBM* compatible, plugs straight in to your computers bus connectors!

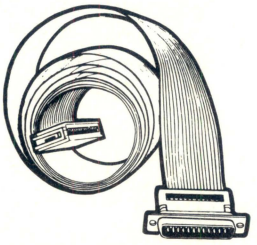
X20020 ..... **$955**
X20030 ..... **$1,095**



THOMSON EGA MONITOR

Top quality high resolution EGA monitors with a space-age design.

SPECIFICATIONS:
CRT: 14 inch (360mm) diagonal, 90 degree deflection.
Display Size: 245(H) x 180(V)mm
Phosphor: P22, non glare, tinted screen.
Dot Pitch: 0.31mm
Video Bandwidth: 18 MHz
Resolution: 15·75KHz - 640 x 200
21·85KHz 640 x 350
Input Signals:
1. RGBI - positive, H(+), V(+)
2. RrGgBbI - positive, H(+), V(−)
Input Impedance: TTL Level (330 ohms)
Dual Scanning Frequency:
Horizontal: 15·75 KHz or 21·85 KHz +−10Hz
Vertical: 50 - 60 Hz
Connector: 9 pin, D-type
Size: 312(H) x 363(L) x 380(W)mm
Weight: 10·8 Kg (Net)
X14525 ..... **$895**



5¼" FLOPPY DISK DRIVE EXTENSION CABLE

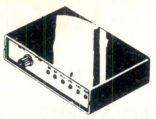
- IBM* compatible
- DB37 Male to 34 way edge connector
- Length 0·5 metres

P19045 ..... **$99.95**

3½" FLOPPY DISK DRIVE EXTENSION CABLE

- IBM* compatible
- DB37 Male to 34 IDC connector
- Length 0·5 metres

P19046 ..... **$99.95**



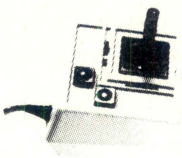
RS232 DATA SWITCH WITH TESTER

- No power required
- Ideal for 1 computer to 2 peripherals or 2 computers to one peripheral.
- 25 pin RS232 "D" connectors.
- Six dual coloured LED indicators showing certain flow status:

T.D. Transmit Data
R.D. Receive Data
R.T.S. Request To Send
C.T.S. Slear To Send
D.S.R. Data Set Ready
D.T.R. Data Terminal Ready

- Size: 200(W) x 68(H) x 150(D)mm

Cat.X19110 ..... **R.R.P. $169**
Our Price $149



JOYSTICK FOR IBM

Features Selectable "Spring centering" or "free floating". Electrical trim adjustments on both axis. 360 degree cursor control

Cat. C14205 ..... **$39.95**

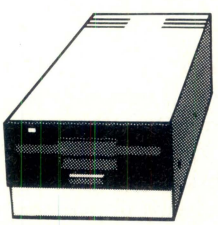
★★★★★★★★

GENUINE CANON LASER CARTRIDGES

EP R340002 Cartridge:
For Canon and HP Laserjet.
EP-S R640002 Cartridge:
For Canon and HP Series 2 Laserjets.
..... **each $210**

★★★★★★★★





3½" EXTERNAL DRIVE

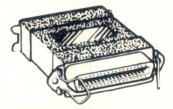
- 720K formatted capacity.
- 37 way D type connector fits directly onto drive controller card.
- Compatible with IBM* PC/XT.
- Requires DOS 3·2 or greater.
- Size: 266(D) x 104(W) x 75(H)mm

..... **only $395**

COPY HOLDER (YU-H33)

- Copy area 9½" x 11"
- Sliding line guide
- Flat metal base

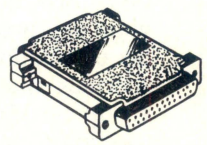
C21060 ..... **$39.95**



CENTRONICS GENDER CHANGERS

- Female to Female.
- Saves modifying or replacing non-mating Centronics cables.
- All 36 pins wired straight through.

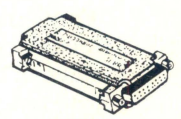
Cat. X15663 **Male to Male**
Cat. X15661 **Male to Female**
Cat. X15664 **Female to Female**
Normally $33.95,
Only $24.95



RS232 GENDER CHANGERS

- Saves modifying or replacing non-mating RS232 cables.
- All 25 pins wired straight through

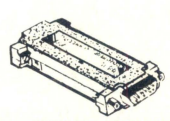
Cat. X15650 **Male to Male**
Cat. X15651 **Male to Female**
Cat. X15652 **Female to Female**
Normally $14.95 each
Only $9.95



DB15 GENDER CHANGERS

- Saves modifying or replacing non mating DB15 connections
- All 15 pins wired straight through

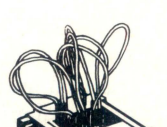
X15645: Male to male
X15646: Male to Female
X15647: Female to Female
..... **only $14.95**



DB9 GENDER CHANGERS

- Saves modifying or replacing non mating DB9 connections
- All 9 pins wired straight through

X15640: Male to male
X15641: Male to Female
X15642: Female to Female
..... **only $14.95**



RS232 WIRING ADAPTOR BOX

- Male to female
- 25 Detachable plug on leads
- 2 mini jumpers
- Ideal for experimenting or temporary connections

Cat. X15665 ..... **Normally $49.95**
Only $44.95



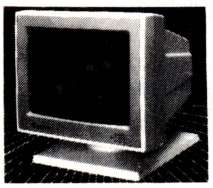
RS232 MINI TESTER

- Male to female connections
- All pin wired straight through
- Dual colour LED indicates activity and direction on 7 lines
- No batteries or power required

T.D. Transmit Data
D.S.R. Data Set Ready
R.D. Receive Data
C.D. Carrier Detect
R.T.S. Request to Send
D.T.R. Data Terminal Ready
C.T.S. Clear to Send

Cat. X15656 ..... **Normally $39.95**
SPECIAL, ONLY $32.95

ROD IRVING ELECTRONICS HAVE A HUGE RANGE OF DISCOUNT PERIPHERALS

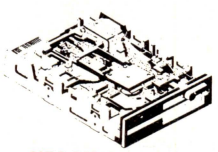


SAMSUNG 12" FLAT SCREEN COMPOSITE MONITOR ONLY $149

FEATURES....
- Flat, high contrast, non-glare screen
- High resolution, 80 or 40 character display
- Tilt/swivel base
- Compatible with Apple* and IBM* colour composite signal

SPECIFICATIONS....
Picture tube: 12" diagonal and 90° deflection
Phosphor: Available in Green or Amber
Video input signal: Composite Signal
Polarity: Negative Sync
Level: 0·5-2·0Vp-p
Impedance: 75ohm
Scanning frequency:
Horizontal: 15.734 KHz + −0·1%
Vertical: 50-60Hz
Video bandwidth: 20MHz
Active display area: 216(H) x 160(V)mm.
Display character: 80 character x 24 rows.
Input terminal: RCA Phono Jack.
Controls:
Outside: Power Switch, Contrast, Brightness, H-Shift, V-Size.
Inside: H-Width, H/V hold, H/V linearity, Focus.
Power supply: 110/120V 60Hz, 220/240V 50Hz
Dimensions: 310(W) x 307(H) x 300(L)mm
Weight: 8·1 Kg
Shipping weight: 9·6 Kg

Cat.No.	Description	Price
X14510	GREEN	only $149
X14512	AMBER	only $149



NEC DISK DRIVES

3½" DISK DRIVE
- 1 M/Byte unformatted, (640K formatted),
- Double sided, double density,
- Access Time 3m/sec

Cat. $255

5¼" SLIMLINE
- Switchable 1.6 M/Byte to 1 M/Byte unformatted
  1.2 M/Byte to 720K formatted
- Double sided, double density,
- AT compatible

Cat. C11906 ..... $269

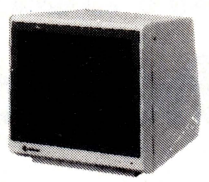
8" SLIMLINE
- Double sided, double density,
- 1.6 M/Byte unformatted.

Cat. C11908 ..... $785



CANON A-50 PRINTER
- Serial Impact Dot Matrix
- 180 C.P.S
- Near Letter Quality Mode
- 1.4K Buffer

Cat. C20045 ..... $595



SAMSUNG 12" 20MHz COMPOSITE MONITOR ONLY $129

FEATURES....
- High contrast, non-glare screen
- High resolution, 80 or 40 character display

SPECIFICATIONS....
Picture tube: 12" diagonal and 90° deflection
Phosphor: Available in Green (P39) or Amber
Video input signal: Composite Signal
Polarity: Negative Sync.
Level: 0·5V-2·0Vp-p
Scanning frequency:
Horizontal: 15.734 KHz + −0·1%
Vertical: 60Hz
Video bandwidth: 20MHz
Active display area: 216(H) x 160(V)mm.
Display character: 80 characters x 25 rows.
Input terminal: RCA Phono Jack
Controls:
Outside: Power Switch, Contrast, Brightness, H-Shift, V-Size.
Inside: H-Width, H/V hold, H/V linearity, Focus.
Power supply: 110/120V 60Hz, 220/240V 50Hz
Dimensions: 308(W) x 307(H) x 297(L)mm
Weight: 7·3 Kg
Shipping weight: 8·3 Kg

Cat.No.	Description	Price
X14514	(GREEN)	$129
X14516	(AMBER)	$129

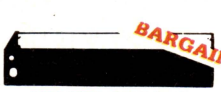
10 OR MORE ONLY $119ea



20 M/BYTE HARD DISK
Tandon drive with controller card. IBM* compatible. Warranty.
Cat.X20010 ..... ONLY $595

40 M/BYTE HARD DISK
Seagate drive, IBM* compatible. 12 month warranty.
Cat. X20020 ..... ONLY $795

80 M/BYTE HARD DISK
Seagate drive, IBM* compatible. 12 month warranty.
Cat. X20030 .... ONLY $2,695



PRINTER RIBBONS TO SUIT:

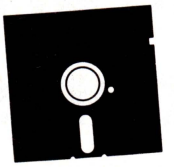
CP80, SX80, DP80, BX100, MB100		
1-9	(C22036)	10+
$8.95		$7.95

MX70 MX80 FX70 FX80 RX70 RX80		
1-9	(C22031)	10+
$8.95		$7.95

MX100, FX100, RX100		
1-9	(C22002)	10+
$19.95		$18.95

LX80		
1-9	(C22003)	10+
$19.95		$18.95

LQ1000		
1-9	(C22012)	10+
$27.60		$25.00



"NO BRAND" DISKS!!

Now you can buy absolute top quality disks that are also the cheapest in Australia! They even come with a 5 year guarantee, which indicates the quality of these disks. So why pay 2-3 times the price for the same quality?

Packs of 10, D/S D/D without boxes, or brand name, just their white paper jacket, and index labels. (5¼" disks includes write protects).

5¼" D/S "NO BRAND" DISKS FROM $0.80 EACH!!

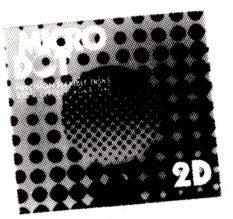
10+DISKS	100+DISKS	1,000+DISKS
$9·00ea	$8·50ea	$8·00ea

(ALL PRICES PER 10 DISKS. TAX EXEMPT PRICES LESS $1)

3½" D/S D/D "NO BRAND" DISKS!

10+DISKS	100+DISKS	1,000+DISKS
$27	$26	$24

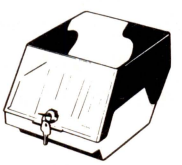
(ALL PRICES PER 10 DISKS. TAX EXEMPT PRICES LESS $2)



MICRODOT DISKS!

DESCRIPTION	1-9 BOXES	10+ BOXES
3½" 2S/2D	$29.95	$28.95
5¼" 1S/2D	$12.95	$11.95
5¼" 2S/2D	$13.95	$12.95

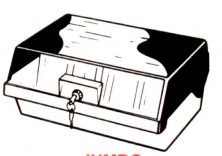
(SEND $2 FOR SAMPLE DISK!)



5¼" DISK STORAGE (DD50-L)

Efficient and practical. Protect your disks from being damaged or lost!
Features...
- 50 x 5¼" disk capacity
- Smoked plastic hinged lid
- Lockable (2 keys supplied)
- Contemporary Design

Cat. C16025 ..... only $14.95



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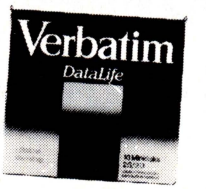

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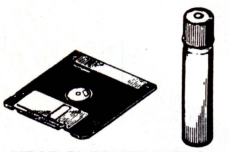

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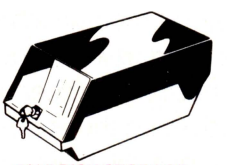

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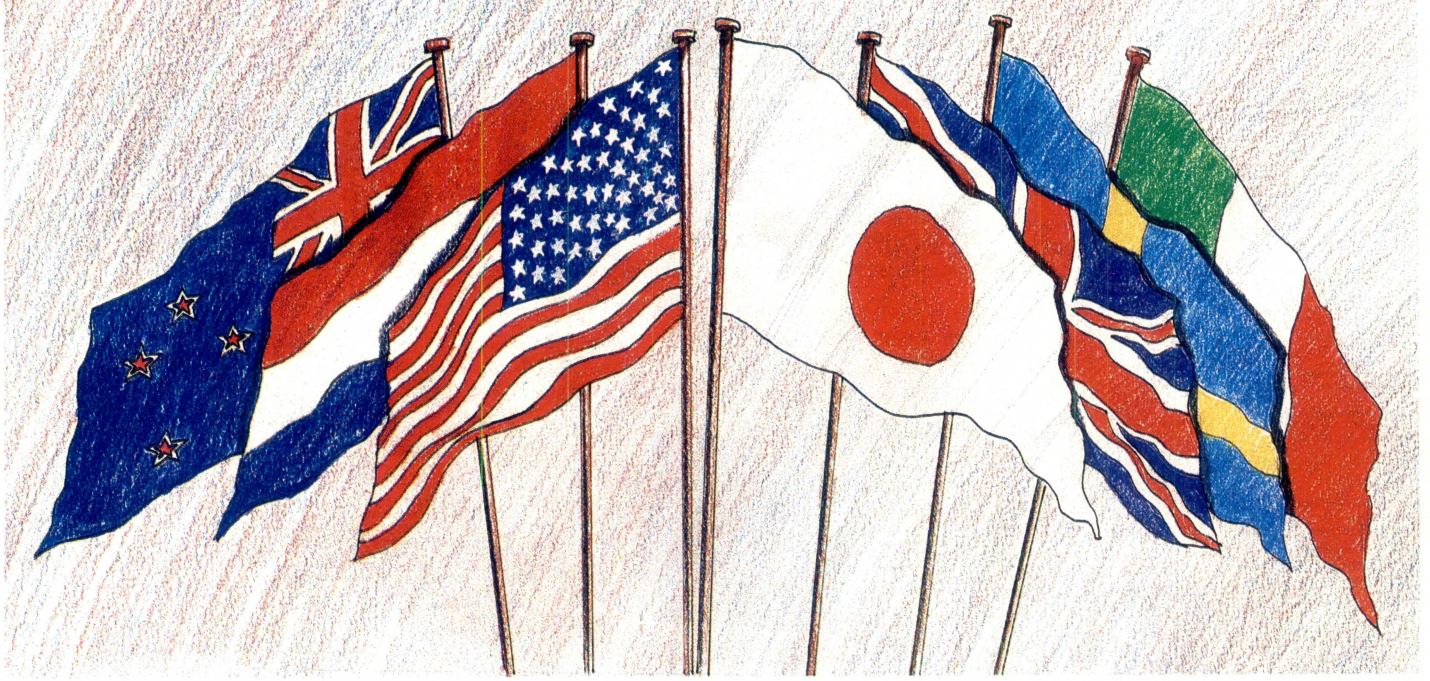

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YOUR AMIGA

The Commodore Amiga range of computers possess sound generation facilities unsurpassed by any other PC. The Amigas are capable of producing sounds over a frequency range from 0 to 30,000 Hz, with output in four voices and stereo. To say that this gives the machine potential for making music is a little like saying that a Ferrari has potential for getting from A to B.

Software developers have paid a great deal of attention to the Amiga's sound capabilities, with the result that there are a large number of music and sound packages available already and more on the way. Some of the more familiar packages like Aegis' Sonix, Deluxe Music Construction Set and The Music Studio have been around for some time. Others, including Instant Music and Music-X, are more recent arrivals. The one thing they all have in common is the ability to turn the Amiga into a very capable music source.

Once upon a time there was a program called Musicraft which many people will tell you started it all for the Amiga. Musicraft appeared in many versions and for those of us who had just purchased the early Amiga 1000s it was too much to believe. There was the capability to play music direct from the keyboard using a variety of different instruments, some of which sounded uncannily like the real thing. We connected the audio outputs of our Amigas to the inputs of our stereo systems and rattled the walls with the unforgettable PowerChord – shades of Deep Purple – playing two-finger versions of *Smoke On The Water* until the neighbours begged for mercy.

Not only that, but Musicraft had a sort of mini synthesizer which made creating new sounds a breeze. Of course it did tend to fall over a lot, and the dreaded Guru reared his ugly head on average once every 13.7 seconds, but it was all good fun. How young and foolish and carefree and unsophisticated we were, back in those glorious days of mid 1986. In retrospect I'm not even sure whether Musicraft was ever released commercially. Every copy I ever saw seemed to have a version number like v0.97 or v0.99 or similar, but everyone had a copy and nobody seemed to worry too much.

If you look closely at a Musicraft screen image and then at a Sonix screen image, a wondrous realisation may strike you. Yes, you guessed it. Musicraft has been reincarnated by those clever people at Aegis Developments under the title of Aegis Sonix. They've made a few minor changes to the original. It no longer falls over all the time, and the Guru has become a positive hermit, but deep down where the soul lives it's still the good old Musicraft we all loved.

The list of instruments available with Sonix seems endless. There are about eight variations on the theme of bells alone. There are cow bells, ice bells, tubular bells, temple bells and just plain bells. And you can use all of them to make music, or noise, depending on your compositional skill. There is, in fact, a separate disk full of instrument files and tunes available to supplement those on the Sonix disk. Some of the instruments included on the Sonix Files disk are high-hats, more bells, echoes, strange sound effects, and myriad variations on normal instruments (Figure 3).

Easy to use

Sonix is a particularly easy package to learn to use. The manual is clear and easy to follow, but it is almost superfluous because the whole package is menu driven. The only difficulty I have heard people mention is in accessing music and instrument files from a separate data disk. This procedure is a little fiddly, and the manual doesn't explain it as well as it might. However, as with most things, a little practice makes it easy. A second disk drive is very helpful, as it is with many of the more powerful Amiga software packages, though it is possible to make full use of Sonix with only the internal drive.

There are some spectacular demonstration tunes available for Sonix. One of these is the John Farnham song *You're the Voice* which uses a very clever mixture of synthetic sounds and digitised vocal segments. Sonix can use instrument files created with the Future Sound digitiser or any of the other packages which produce IFF instrument files. I've even heard a complete tune played with digitised toilet flushes – very arty!

The one thing they all have in common is the ability to turn the Amiga into a very capable music source.

For those people into creating music scores, Sonix is a dream come true; well, for those of us with more enthusiasm than skill or knowledge it sure is. Sonix looks after mundane things like the length of a bar, for example. Rather than letting you place a second minim in a bar of 3/4 time, it will split it into two slurred crotchets straddling the bar division for you. It also takes care of those of us who can't remember whether B can be sharp or flat, by automatically choosing the appropriate semitone.

I guess the thing I most like about Sonix is that it 'feels' right. By that I mean that the controls are intuitive. It does what you expect it to do when you select a command, and to my mind that's the sign of a good program.

The Music Studio

Another of the music packages dating back to the earlier days of the Amiga is The Music Studio from Activision Incorporated. With the appropriate interface hardware, The Music Studio can be used in conjunction with a MIDI instrument. With or without MIDI it is a very flexible and powerful music making tool.

The Music Studio disk is copy protected, which means that (in theory at least) you cannot make a backup copy and must use your original disk each time. In practice, several of the more popular pirating programs will break the protection so, as usual, it is only the honest purchaser who is inconvenienced. It also appears to give the disk drive a very bad time while loading. This is probably connected with the (expletive deleted) copy protection, and is something we can do very well without.

The Music Studio is perhaps not quite so simple to use as Sonix, but it is certainly a more powerful composing tool. Designing instruments can be accomplished by a screen permitting adjustment of the usual attack, decay, sustain and release parameters, as well as amplitude and duration (see Figure 4). As well, there are fifteen pre-programmed sounds which you can use or modify as you desire. Vibrato and tremolo are available, and the stereo channel can be defined for each sound.

It is possible to compose tunes using a MIDI keyboard instrument for input, or you can use the mouse to position note sym-

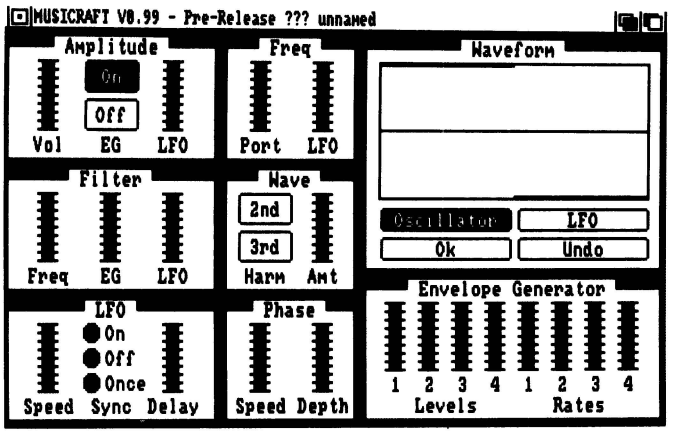

Figure 1. The Musicraft mini synthesizer screen.

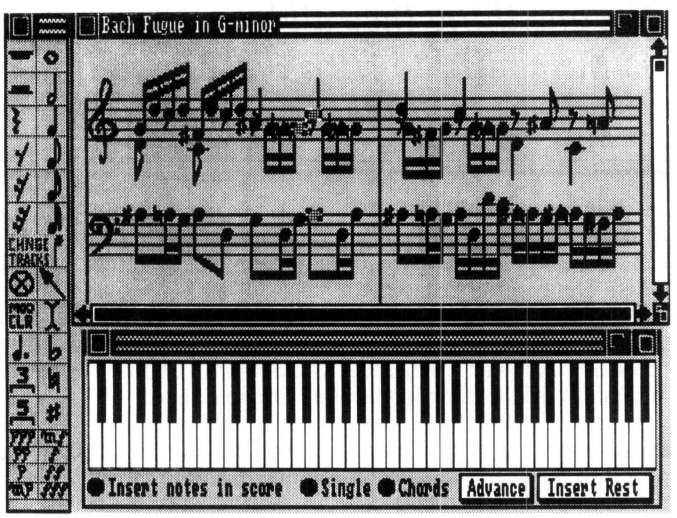

Figure 2. A screen from DMCS.

bols directly onto the staff. A third method is to 'paint music' on the Paint-box screen using the mouse to place coloured rectangles onto a simplified staff (see Figure 5). Whichever method you choose, the package is not difficult to master, and you can soon be turning out some original 'hits'.

The manual supplied with The Music Studio covers both the Amiga and the Atari ST versions of the package, and it's interesting to see how the other half live. You don't even need to know a lot about music as the manual has a number of pages devoted to an explanation of music terms and techniques. The five control screens used by The Music Studio are all comprehensive and well equipped with menu functions. The Music Studio would appeal to people who have some musical knowledge, possibly more than to a beginner, though a beginner could still make good use of the package.

DMCS

Deluxe Music Construction Set is yet another copy protected package, so much so that it defeats most though not all, of the common backup utilities. Again it is only a real nuisance to the honest purchaser who wants a backup of the original disk for insurance against accidental damage.

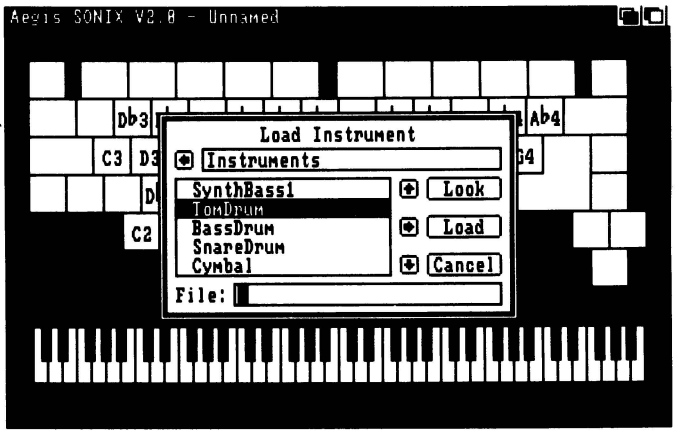

Figure 3. The instruments directory from Sonix.

DMCS (I'll call it that to save my poor typing fingers) is quite similar to the other music packages in using familiar Amiga pull down menus and cursor controls from its colorful windows. DMCS is a big program, over 300 kilobytes in fact, but it still works okay with standard memory. Unlike The Music Studio, DMCS will load and operate with either Kickstart 1.1 or 1.2, and with or without external memory.

In common with the other top range music packages for the Amiga, DMCS is easy to use and, except for learning some of the more obscure facilities, the manual is almost superfluous. The copy of DMCS which I reviewed was accompanied by a disk called DMCS Rock 'n' Roll files.

The R&R files disk contained a large collection of tunes under various directory headings, such as Chicago 1965, Detroit 1962, London 1974 and San Francisco 1968. After loading and playing most of these tunes I was singularly *un*impressed. The tunes were very amateurish, certainly not of the quality one would expect from a commercially released disk. A couple in particular, *Lucy* (in the Sky with Diamonds) and *Orange Sun*, were plain awful.

The R&R files were especially disappointing considering the quality of the program itself, which is brilliant. DMCS covers just about everything a music composer could want, including a full set of rests and loudness marks. Signatures, measures and repeats are all easily set, as are ties, beams and slurs, crescendo and decrescendo, and dozens of other musical parameters.

DMCS uses separate adjoining windows for Score, Piano Keyboard, and Note Palette. The Score Setup window overlays the other three when it is required. About the only shortcoming I noticed with DMCS was the provision of only a Generic printer driver, and no Preferences icon. This means that a user must do some file manipulating through CLI to install a driver to suit their own printer. The reason is obvious – there just ain't enough room on the disk to swing a kitten let alone its parent.

I solved the problem by deleting the La Bomba score file to release about 8 Kbyte, and then copied my printer driver and Devs/System-Configuration file over from another disk. Easy enough when you've had a bit of experience with Amigas, but awful for a beginner.

The DMCS screen layout gave me the impression of being cluttered, although to be fair it worked well enough in use. I guess its a matter of personal taste. The representation of musical notes and symbols is light years ahead of several of the other packages and would, I think, hold much more appeal for a serious musician.

DMCS has the capability to print out hardcopy of the music

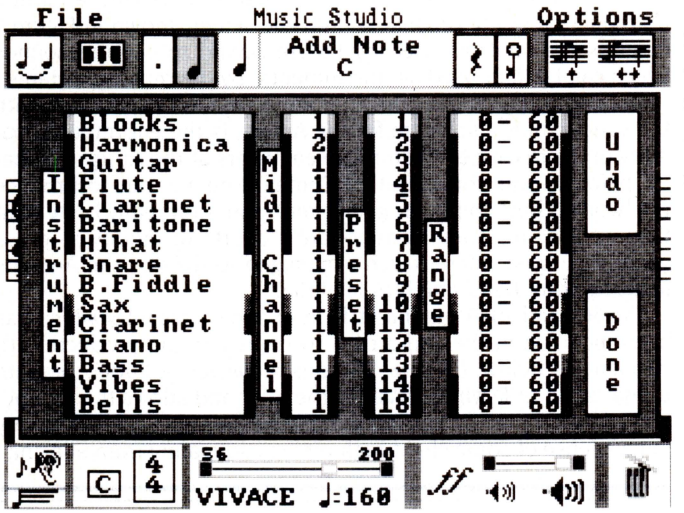

Figure 4. Designing instruments with The Music Studio can be accomplished by adjusting the attack, decay, sustain and release parameters, as well as amplitude and duration.

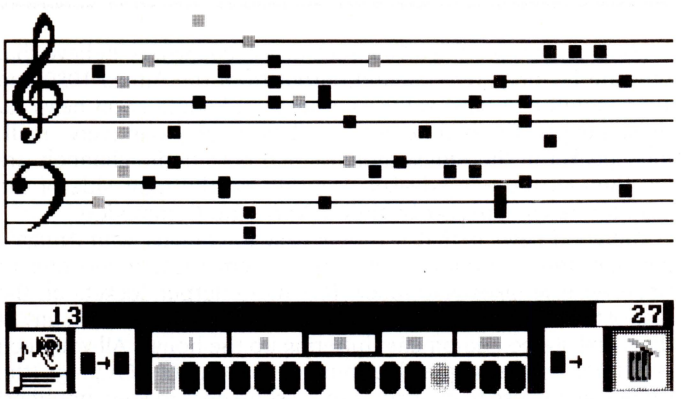

Figure 5. With The Music Studio it is possible to compose tunes by 'painting music' on the Paint-box screen using the mouse.

score and lyrics and this facility worked beautifully as can be seen in Figure 6. I'm dying to get a chance to print a score to the laser printer, should be something to see.

Like Music Studio, DMCS is designed to accept MIDI instrument control. I refer you to Andrew Symaniz' article on Microcomputers MIDI and Music in the February 1988 issue of *Your Computer* for a very comprehensive explanation of the MIDI concept. In all I liked DMCS very much and, despite its few little idiosyncrasies and its lousy files disk, it is probably my favourite serious music package.

Instant Music

Having just given away my 'favourite' award, I guess it's about time to have a look at Instant Music . I still haven't really decided whether I love or hate Instant Music. It's one of those programs which grabs you or revolts you depending on your mood, or the weather, or something.

I think I would classify Instant Music as the music program for non-musicians. If you just want to make some music, or noise or whatever, without having to be bothered about crochets and quavers and such, then Instant Music is for you. At first I was turned off by the simplistic approach presented by Instant Music, but it grows on you. After a while I quite enjoyed playing around with it, but I could never take it seriously as I could DMCS or even Sonix.

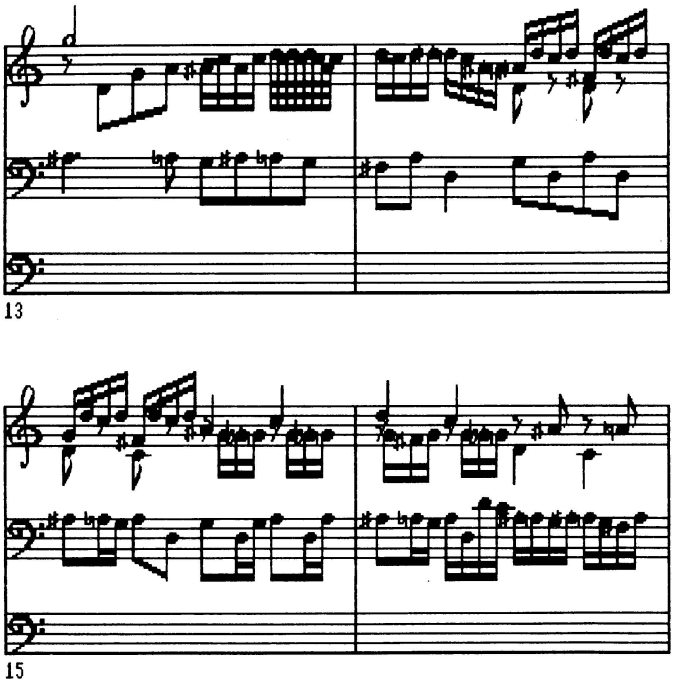

Figure 6. Hardcopy printout of a score using DMCS.

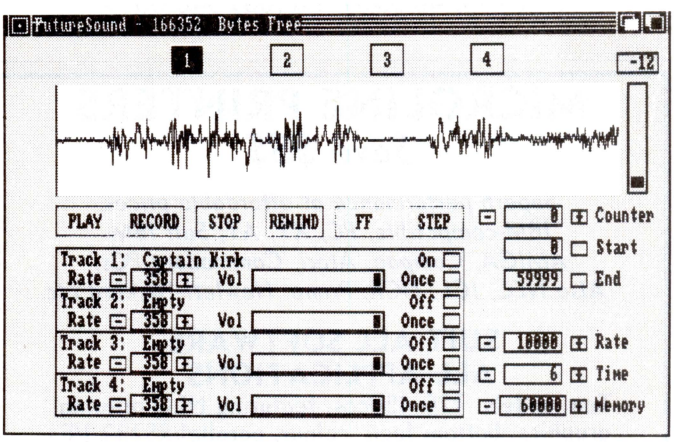

Figure 7. The controls used by Future Sound to capture sounds which can be later used as 'instruments' by the music programs.

On the positive side, Instant Music could be easily operated by the younger members of the family, and given such an opportunity their musical interests may well be encouraged. Don't let me mislead you either, it is quite possible to produce some pretty sophisticated music with Instant Music. This is proved by a number of good quality demos available on the Public Domain circuit.

I mentioned previously the capability of music software packages to use sound files created by digitising software. To explain a little, there are programs on the market, such as Perfect Sound and Future Sound, which take in sound signals and convert the sounds to strings of digital information. The Amiga can be pro-

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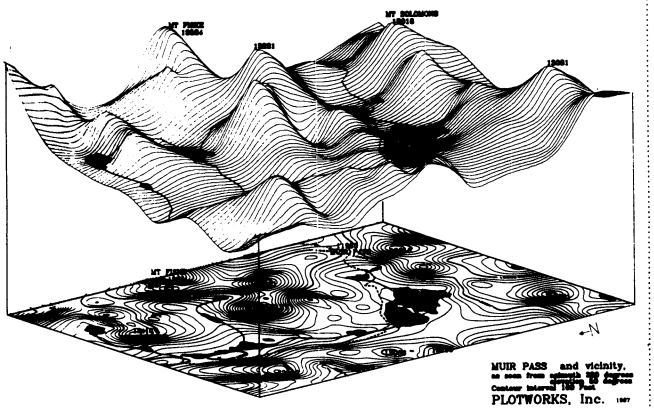

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grammed to convert this digital information back into a faithful reproduction of the original sound. The screen shown in Figure 7 displays the controls used by Future Sound to capture sounds which can be later used as 'instruments' by the music programs.

The one thing which is driven home to me as I experiment with the various music software for the Amiga, is the enormous capability of the machine. When those engineers at the Amiga company, before it was consumed by Commodore, set out to produce the 'world's best computer games machine' they really knew what they were doing. Even Commodore's efforts to modify it into a general purpose micro haven't managed to destroy the Amiga's amazing sound and graphics facilities.

The 500 and 2000 suffer a little from a low pass filter which has been included in the audio path to restrict sound production to frequencies below 7.5 KHz. There is, however, a Public Domain utility called LED which disables the filter and allows the production of sound through the full audible frequency range, at the very rare expense of some slight high pitched squealing from aliasing.

For those people into creating music scores, Sonix is a dream come true.

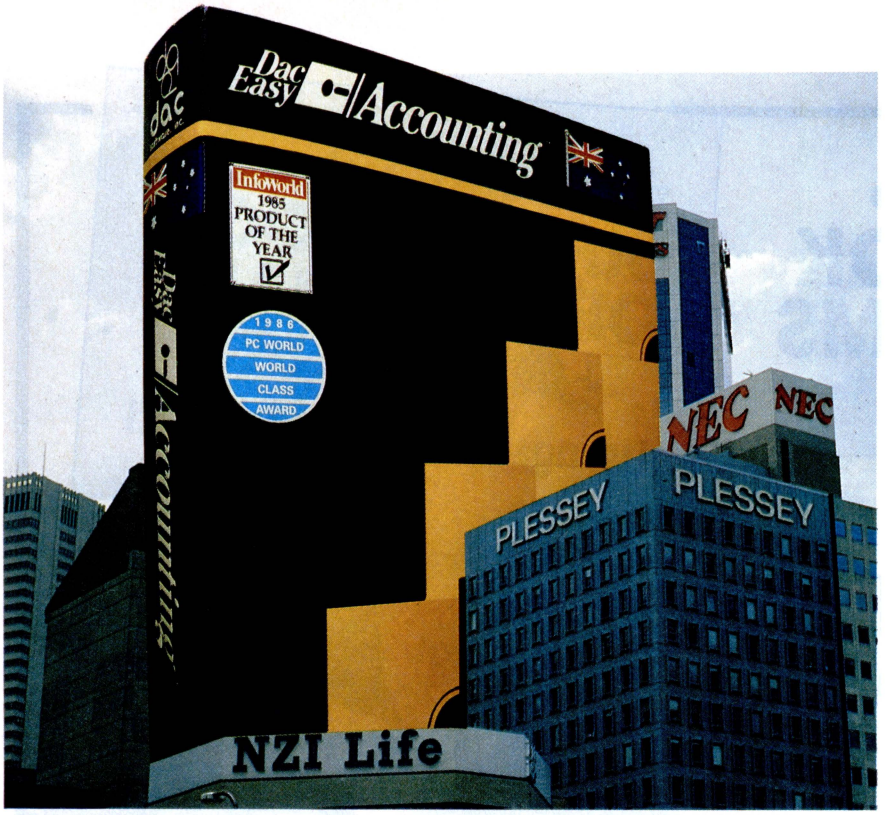
Many owners of Amiga 500, 1000 and 2000 owners, believe that they are hearing stereo sound output from the Amiga 1080 and 1084 monitors. I have some bad news and some good news for those people. The bad news is . . . there is only one (very small) loudspeaker in the Amiga monitor, and both audio channels are fed through the one speaker. The grill on the right side of the monitor has no speaker behind it. Very cute Commodore!

The good news is that it is very easy to connect your Amiga's genuine stereo output to your stereo system, cassette recorder, or whatever else takes your fancy. The audio output sockets on the rear of the Amiga system box are perfectly compatible with any of the usual stereo equipment cluttering up the house. All you need is a stereo connecting lead terminated in a pair of RCA plugs (the same sort you use to connect your cassette deck to your amplifier) and away you go.

Plug the lead from the Amiga into any high level stereo input sockets on your amplifier, 'Auxiliary Input' or 'Line In' are ideal. 'Tape In' or 'CD In' are quite okay, but don't use a small signal input like 'Phono' or you could be in trouble. Until you've heard Amiga music played through a decent stereo system you've never heard computer music – it's really something!

Computer generated music, or sound effects, makes ideal accompaniment for home video recordings, or as an audible intro to your video movies. The audio signal from the Amiga can be safely connected directly to the Audio Input socket of your video recorder to allow easy audio-dubbing and recording. This highlights one area here Commodore have been very clever with their design of the Amiga. The signals output from the Amiga, both audio and video, are compatible with normal domestic equipment, and that makes experimenting very easy – and safe.

In conclusion I must say that having the opportunity to experiment with some of the music software for the Amiga has been a real eye-opener for me. I wasn't previously aware of how easy good software can make the production of computer generated music. Until I started to consciously listen to my various games packages I didn't realise how many have musical introductions and title sequences. I guess it's indicative of the high quality of the sound that it can be so easily overlooked. □



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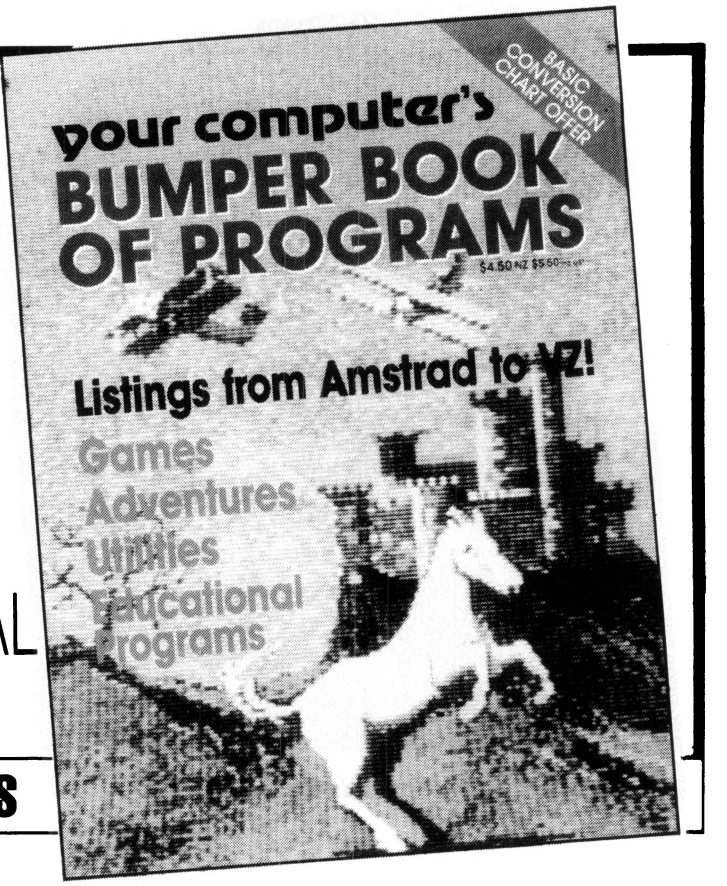

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GENlock

The Japanese did it in the 1960's (at a time when most Japanese products were crude), by calling their companies National, Sharp and Canon, none of which sound remotely Japanese. So I suppose that now the Japanese electronic equipment industry is at the top of the pile it is fair for an Australian company to use the same ploy.

Does Neriki Computer Graphics sound Australian to you? Well, it is. Neriki is based in Sydney and has its manufacturing facility at Orange in country NSW.

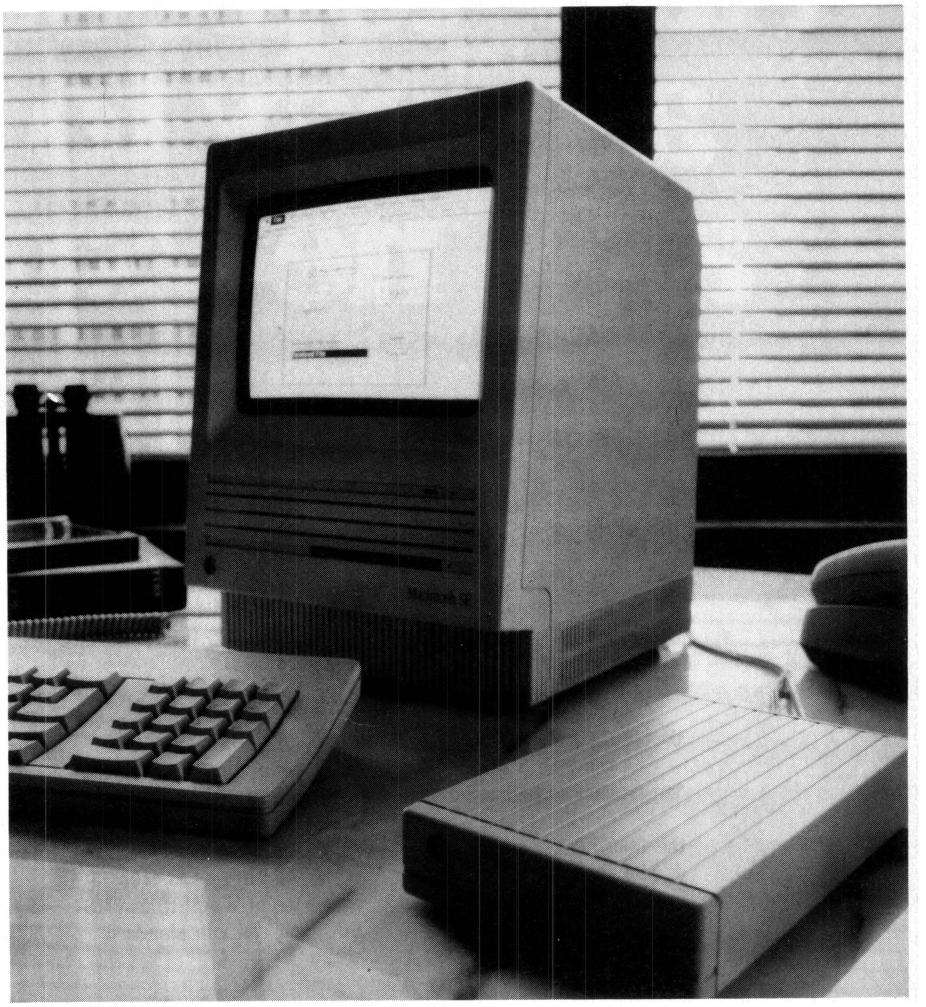
The real significance of genlock in the computer world is with computer graphics.

What's more, all the principles are ex-SBS television executives, technicians or directors, plus a smattering of outside computer whizz-kids.

Neriki has just announced a world first – the Image Master Pro GENlock which, in its various manifestations, will eventually fit the Macintosh II, Mac Plus or SE and Apple GS, as well as (*whisper*) the Commodore Amiga and the Atari ST.

What's a genlock? It's a device widely used in professional television and video studios to let you 'lock' images from two or more sources. Horizontal (line) and vertical (frames) sync pulses are the 'sprocket-holes' of video images, and if you try to insert the image from one video camera (say, with a title graphic) over that from another (say, with a street scene), the result will be chaos unless both tubes in the cameras are sweeping their images simultaneously – and that means in the order of millionths of seconds.

With video cameras, genlocking is reasonably easy. For about $4000 you can buy a broadcast quality genlock unit which takes a split of the composite video from one camera (the master), strips the video image to leave only the sync signals, then amplifies these and distributes them to any other cameras, which then slave to this master sync. You can even do this with some of the top level amateur cameras – as long as they have a sync input connection.



Incidentally, don't imagine that the same technique can be used with video recorders. These have mechanical rotating heads which produce wow and flutter, and if you try to mix these 'unstable' video images with a stable image from an electronic source like a camera, you get other problems. Any source of video signal that involves mechanics needs an extra (very expensive device) called a Time Base Corrector for quality.

In most broadcast studios they use a special Sync Pulse Generator (SPG) rather than a simple genlock. The SPG allows them to have all cameras, video recorders and so on slaving to one source, and since this is a special-built piece of equipment it can be highly stable and produce clean square-edged sync pulses.

Computer graphics

The real significance of genlock in the computer world is with computer graphics. We are now seeing some very sophisticated graphic/colour PCs come on the market for very low cost (although you can hardly include the Mac II under this definition!). But if you've seen high resolution colour on the large SuperMac screen you will appreciate that the Mac II has a colour/pixel potential far superior to the needs of broadcast television.

Then why, with these new paint and draw programs now on the market, isn't the Mac II widely used in creating titles, graphics, artwork and animation for corporate in-house video productions, educational video production and in small professional television studios?

The problem is (or rather was) genlock. For a start the Mac, the GS, and the other

(lesser?) colour computers all run at 60 Hz which is the American mains-power standard. American television is NTSC (often called Never Twice the Same Colour) and it also runs at 60 Hz, whereas Australia and a large part of the the rest of the world use PAL at 50 Hz together with a 50 Hz mains-power frequency.

Fortunately, you can change the clock rate of most computers with a relatively simple software program, and since most PCs don't have a sync input terminal, the obvious approach is to teach the computer to listen to its own power supply, and use this as the basis for the screen frequency.

Neriki has had no trouble with the Amiga and the Atari ST software here, but it hasn't yet debugged the software for the Macs. It also seem to be considerably less confident about the GS. I don't understand what the problems are, but they exist, evidently.

For some other reason that I also can't fathom, the traditional method of taking the video output and stripping the image signal to leave the bare-bones sync pulses, apparently leads to a degradation in video quality. Craig Schuetrumpf at Neriki tells me that if you approach the problem in this traditional way you only get a video output with a resolution of about 250 lines (that is, you can only resolve 250 picture elements along any one line of the scan) which would be enough for hobbyist use, but not for professional.

Most home VHS recorders can resolve about 230 lines, but for professional broadcast use you need at least 450 lines resolution at the studio to allow for some degradation of the signal through transmitter and home TV reception.

Neriki has taken a new approach, and it obviously doesn't want to talk too much about it, but the result (it claims) is a maximum of about 600 lines, which is higher than the best output from the Mac II (about 500 lines).

The Amiga also outputs about 500 lines of horizontal resolution, but this doesn't mean that its picture quality is comparable with the Mac because pixel resolution is also involved. The Amiga puts out a limited number of pixels compared with the Mac, which is the reason for those chunky graphic images.

The major problem Neriki overcame, however, was that of interlace. A normal television image (equal to one frame of a movie picture) consists of two 'fields'. With PAL TV you have a 'frame' range of 25 per second, and a 'field' rate of 50. If the image is derived from a movie film, the scanner begins at the top left of the frame and scans 312.5 times across the image as it descends, to finish in the centre of the last scan line. This is one field.

The electron gun then zips back up to the top again, and this time it begins in the centre of the first scan line of the image, and then it scans another 312.5 times – each scan fitting exactly between the previous tracks. This is 2:1 interlace and it is the standard way of handling NTSC and PAL television signals.

But – high resolution monitors don't work this way. They begin their scan at the top left of the screen and produce a full sequential scan display as they move down.

What's a genlock? I hear you cry. It is a device widely used in professional television and video studios to let you 'lock' images from two or more sources.

You can see why: since each pixel on the screen is represented by a memory address, you need to be able to read them one at a time and feed them sequentially through to the signal output. You don't want to have to worry about only using this group (one scan line), then jumping the next lot, using the third and so on.

However a lot of home computers do play these tricks so as to generate a pseudo-interlace output that can run low-resolution graphics on a home TV set.

Conversion of the hi-res sequential system to interlace was the main problem to be overcome by Neriki, and it took them roughly six months to devise the chips necessary. It is this feature, more than any, that distinguishes its genlocks from the standard broadcast variety.

The implications . . .

So now it's done. What's the implication? Well, for a start, the Mac II with a Neriki genlock provides a lot of the features of the Quantel Paint Box, which at about $150,000 supplies the graphic capabilities that ad agencies need to make their cigarette boxes spin through the infinities of space. Every time you see the logo of a television station, you are looking at the output of a very expensive piece of specialised computer graphics equipment. (And, I must add, some very highly skilled technicians and video artists.)

Nowadays most superimposed titles and crawls (messages across the bottom of the screen) are also computer generated, but by more specialised and less expensive equipment. These are character generators, and they are used in the studio control room for replaying pre-recorded end-credits, superimposing messages on the screen, putting up scores and so on.

The Neriki genlock unit and almost any colour PC should be able to do most of the things that a character generator can do, plus provide a some of the facilities of a Quantel graphic animation system. With the Mac II the system can go very close to the limits of the present laboratory equipment, but the capability of this combination will now depend more on the software that becomes available.

By slipping a low cost, high quality, device into this market, Neriki has opened the way for a rich hobbyist or professional video producer to use an off-the-shelf Macintosh, GS, Amiga or Atari ST to provide his or her own post-production services. About 90 per cent of the work that goes through a Quantel system doesn't push the technology to the limits anyway, so a Neriki/Macintosh unit should be able to steal this work away from the specialised video laboratories and make it available to any serious video enthusiast.

At present, Neriki has only one small rack-mounted model available for all models of the Commodore Amiga (PAL and NTSC) at $2695 untaxed. The Amiga, apparently, was the easiest machine to design for. The Mac models are still in prototype.

There's also an Image Master Polaroid Palette System that lets you connect your Polaroid Palette image recorder to either an Atari ST or an Amiga. With this system you can get high quality 35 mm colour slides and overhead projectors from your computer screen. There's no Mac or GS Polaroid version on sale at at moment, but 'real soon now.'

According to marketing director Kevin Dennes, Neriki's concentration now on the Macintosh aims to provide 'professional competition to existing high-level, dedicated, expensive professional systems'. So if you are heavily involved in computer graphics, this could by your way into a whole new backyard business!□

JOHN HEPWORTH

YOUR IBM

Over the last couple of years, Borland has offered help to programmers working with Turbo Pascal in the form of several Toolboxes, each giving assistance in one particular area of programming. In each case, the Toolbox came as a comprehensive manual plus one or more disks with source code for whole programs, plus source for individual functions and procedures, along with sample executable programs.

Typical were the Editor Toolbox, which contained source, functions and executable files for a word processor, and the Database Toolbox, which contained sorting routines, a B+ tree indexing system, database functions and a sample working database. Three other Toolboxes were available – Graphix, Gameworks and Numerical Methods.

In addition Borland created the Turbo Tutor, a tutorial book with disks of sample programs along with an onscreen tutorial in the finer points of Turbo Pascal. With the advent of Turbo Pascal version 4 there came a need for revision of the existing Toolboxes, and an opportunity in conjunction with that revision to update the Toolboxes to take account of the new features and greater power of Turbo Pascal 4

Just as I sat down to write this month's column, my updates to the Turbo Pascal Toolboxes came in the mail from the United States. While there has not been time to explore them all in minute detail, I have been able to take a look through them so that I can give you my first impressions of the set. Available for Turbo Pascal 4 are Editor, Database, Numerical Methods, Graphix and Gameworks Toolboxes, revised and updated from the version 3 equivalents, and a revised version of the Turbo Tutor. The six packages may be purchased individually, or in various bundles. I ordered the Developers Library, which consists of all five of the Toolboxes plus the Tutor.

Editor Toolbox

The Editor Toolbox comes as a 442 page manual, and three disks. Included on the disks, and clearly explained in the manual, are a plethora of functions required when writing any sort of word processor or editor. If you want to write a powerful and user friendly input routine for that package you are developing, the functions and procedures could be essential.

A stack of functions by themselves might be useful, but would not be very instructive, and so the full source code is included for a powerful word processor called MicroStar, a simpler editor called FirstEd and Binary Editor, which is a program listing detailing the 'hooks' needed to include the editor functions in the Toolbox in a user written program. An executable version of MicroStar comes on the disk, so that trying out the code does not even require compiling it, even though that takes only four minutes on a 4.77 MHz PC. I am writing this column using MicroStar, and it is a fast and full featured word processor, using pull down menus plus WordStar compatible Control key combinations. Microstar creates files in straight ASCII, with a carriage return/-line feed pair at the end of each line, and can reformat files in this format with ease. It also offers optional auto indenting, so useful for programmers in C or Pascal, so that if one line is indented a number of spaces, then starting a new line will automatically give it the same indenting. It does not come with a built in spell checker, but the Turbo Lightning spell checker can be accessed from one of the pull down menus.

Just as I sat down to write this month's column, my updates to the Turbo Pascal Toolboxes came in the mail from the United States.

Database Toolbox

The Database Toolbox has a 170 page manual and two disks. It contains two major subdivisions. Turbo Pascal Sort contains functions to carry out sorting of data using the QuickSort algorithm. Turbo Access contains functions and procedures to create, access, index and manipulate databases using B+ tree indexes. Several sample programs come on disk, and in particular there is a complete and running program for a customer records database. Full source code is provided for this customer database, as are all the functions and procedures needed by it. Extension of the principles, or adaptation of the code to create your own databases would not be difficult.

Numerical Methods Toolbox

The Numerical Methods Toolbox consists of a 278 page manual plus three disks. The disks contain a vast range of functions and procedures to perform various mathematical and numeric tasks, but there are also two graphics demonstration programs on disk, each with separate versions for CGA and Hercules boards. These demonstrate the use of the Fast Fourier Transforms and Least Squares functions in the Toolbox.

The chapter headings in the manual will give a good idea of the types of functions and procedures available on the disk. These are: Introduction, Routine Beginnings, Roots To Equation In One Variable, Interpolation, Numerical Differentiation, Numerical integration, Matrix Routines, Eigenvalues and Eigenvectors, Initial Value and Boundary Value Methods, Least Squares Approximations, Fast Fourier Transform Routines, and Graphics Programs.

Graphix Toolbox

The Graphix Toolbox makes it easy to write graphics programs for CGA, EGA, Hercules and AT&T 6300. The available functions and procedures include the drawing of points, lines, squares and circles, creation of windows, pie charts, bar charts and curves. As the various display cards have different resolutions, using absolute coordinates would draw a point, line or other graphic element at a different places on the screen. The Graphix Toolbox can use absolute coordinates, with the programmer adjusting the coordinates for each possible display card. The Toolbox also includes a system of World Coordinates, where a world is defined for each card. The locations of a graphic element can now be defined relative to the boundaries of the world.

The Graphix Toolbox makes the creation of graphics programs easy. One of the new features of Turbo Pascal 4 was the inclusion of functions which can detect the graphics card in use at run time, and draw lines and so on correctly. Unfortunately the Graphix Toolbox does not use these new functions, and it requires the compi-

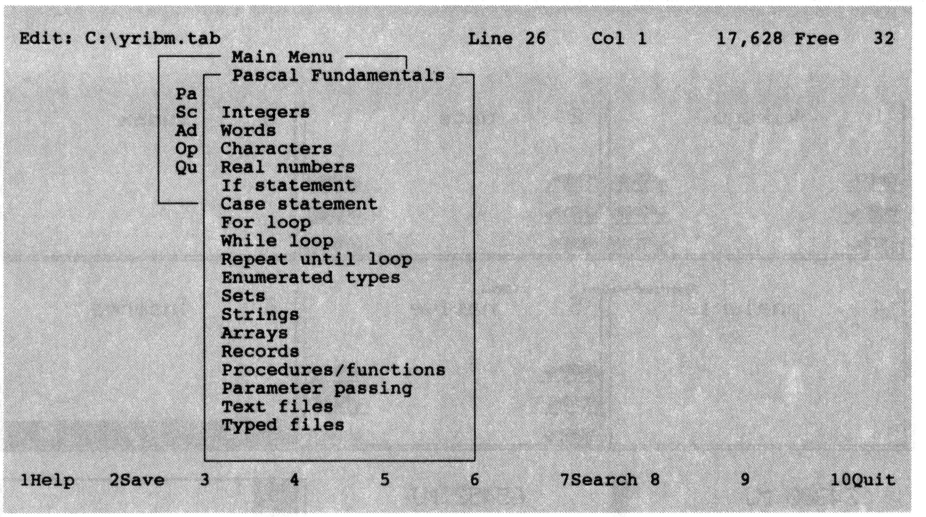


Figure 1. *Choosing Pascal Fundamentals from Turbo Tutor's Main Menu, then Integers lets the user try values for x and y and various mathematical manipulations.*

lation of different versions of the executable program for each display card, though this does not require any change to the source code unless absolute coordinates are used. The Graphix Toolbox has a 240 page manual and comes with 2 disks.

Gameworks

The theory of computer games is an interesting area all by itself. The Gameworks Toolboxes covers the theory of traditional games, when they are adapted to the computer. Space Invaders and similar real-time games are not covered. The Toolbox contains working Chess, Bridge and Go-Moku programs, together with source code and all the functions and procedures needed for them. The manual has 166 pages and comes with two disks.

Turbo Tutor

The Turbo Tutor is essential for all novice Turbo Pascal programmers, and will be of great assistance to intermediate and advanced programmers as well. The 386 page manual is a well structured, clearly written, text book on Pascal. The two disks contain all the sample functions, routines and programs mentioned in the book, and in addition contain a program called TUTOR.XE which demonstrates the matters being discussed. Several sample programs are also included, including a typing game, a guess the animals game, a program to read, make and delete directories and carry out other file functions, and a file listing program.

Starting the main TUTOR.EXE program brings up a first menu, with five choices. These are Pascal Fundamentals, Screen & Sound, Advanced Topics, Options and Quit. Choosing one of these brings up another menu, and in the case of Pascal Fundamentals the next menu offers a choice from Integers, Words, Characters, Real numbers, If statement, Case statement, For loop, While loop, Repeat until loop, Enumerated types, Sets, Strings, Arrays, Records, Procedures/functions, Parameter passing, Text files, Typed files.

Selecting one of these options brings up a screen where various actions can be carried out. As an example, if one wants to investigate 'Integers' then the next screen allows one to enter a value for x and a value for y, and then select addition, subtraction and many other mathematical manipulations. Pressing F1 gives an extensive explanation of the topic and its ramifications; in the case of integers it starts by explaining the example window, followed by a explanation of the way integers are handled in Pascal. Next comes a sample program source using integers, ending with some warnings of the range of data which can be stored and the effects of overflow and underflow. Other topics of necessity are covered in different ways, but the principles are there.

The effect of TUTOR.EXE is to make examples and explanations available on screen in parallel with the text in the manual, and in this it is very successful.

The Turbo Toolboxes and Turbo Tutor are distributed in Australia by Tech Pacific. I obtained mine direct from Borland in the USA as upgrades to the equivalents for Turbo Pascal 3. □

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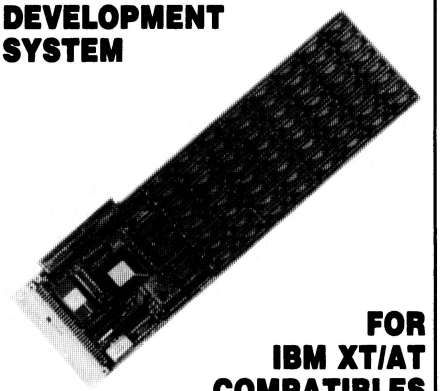

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MICROBEE FILE

A cow of a program . . .

Many nine-to-five city bounded souls may often dream of the rural life. I for one, once dreamed of a life of self sufficiency: running a few cows and goats . . . communing with nature in the vegie patch, selling or bartering my produce for other necessities – The Good Life!

I never stopped to consider what it all entailed, as one is wont to do when dreaming. There is indeed more to the whole rural scene than throwing the cows some hay and pickling the produce. Life on the land is a complex and interdependent existence, which is influenced by many factors, including the weather which cannot be controlled.

A program called Herd by Hawkesbury Software, recently snapped me back to my longings for the rural life, and made me just that much more aware of the intricacies of running a commercial farm. Herd is an interactive simulation of the management of a dairy herd over twelve months or more.

Let me say at the outset that the authors of this software in no way intend Herd to simulate a dairy farm in all its complexity. They state that 'the teaching aims of the program are specific and limited'. However, I believe they have produced a program that serves as a solid model of interdependence; students and teachers alike could go on to apply this model to other situations and construct similar multifaceted simulations.

The program is menu driven which allows one to logically progress through the inbuilt introduction, start a game or resume from a previously saved position.

The introduction sets out the basics behind Herd. To feed your cattle, it is necessary to grow pastures, and like all plants, various grasses have different growth seasons. It is therefore unlikely that a herd of cattle could be sustained by a single pasture crop for a whole year. A mixture of pastures is therefore desirable in order to provide feed in all seasons.

Pastures not only vary in their growth seasons, but also in the amount of energy they provide when consumed. Figures are provided on pasture energy content, which reveal that of the eight varieties included in this program, sudax and native grasses yield the most energy and lucerne the least.

The relationship between the pastures' seasons and energy content are important when planning to feed your herd over a 12 month (or more) period. Your primary consideration is providing your herd with feed to maintain their life and health (maintenance energy). Spurred on by a rising bank balance (and greed) you try to provide your herd with sufficient feed to produce a maximum amount of milk (limited to 600 litres/cow/month).

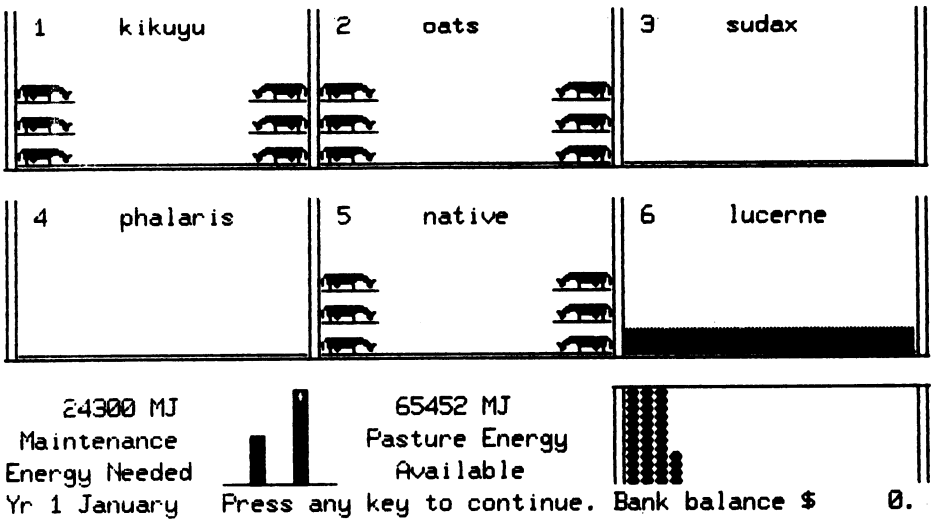

Figure 1. A screen from Herd depicting paddocks and selected pastures, grazing cattle, maintenance and pasture energy levels, hay stock pile and bank balance.

The program has a number of levels of 'difficulty', with each level introducing more factors to be considered in feeding the cattle and making a profit (or just breaking even). For example, in the base model you are provided with 12 cows, you do not cut or store hay and your bank balance is not debitted for overheads.

At level four (the penultimate condition) you are provided with $20,000 capital, your overheads are calculated at $2000 per month, you have 24 cows and a milk quota. You may cut hay from your own paddocks at a rate of $250 per paddock and you may buy and sell hay (the price of which varies seasonally).

The only factor which cannot be calculated or manipulated is the weather, or more specifically, rainfall. The amount of rainfall has a direct bearing on the amount your chosen pastures will grow, and if you are unlucky to be hit with three bad months, you could well be eating into your hay reserves, or accessing your overdraft (the bank charges interest on this, of course!)

Graphics

The program makes good use of graphics, depicting the cows (up to 24 can be displayed on screen) swishing their tails and grazing contentedly. There are six paddocks, three of which can be stocked in any one month. At the beginning of each month, growth is added to the pastures, just as at the end of each month, the paddocks are subject to decay and aging, resulting in a loss of food energy. This is all represented on screen. Other information which is permanently displayed includes the hay shed and its store of bales, and your bank balance – see Figure 1.

Each month has a routine therefore of selecting and stocking the paddocks, awaiting the month's growth, feeding your cattle and then perhaps assessing the need for supplementary feeding with stored or purchased fodder. If you have made your calculations, planned and provided well for your cattle, you will meet your milk quota and grow to be a dairy cattle baron. However, if you miscalculate and do not have reserves, your cattle may die and your bank overdraft may go through the roof.

The documentation provided with the program, although not the glossiest I've ever seen, is comprehensive. It sets out the Teaching Aims of the package, the statistical information and equations needed for all calculations, and notes on running the program.

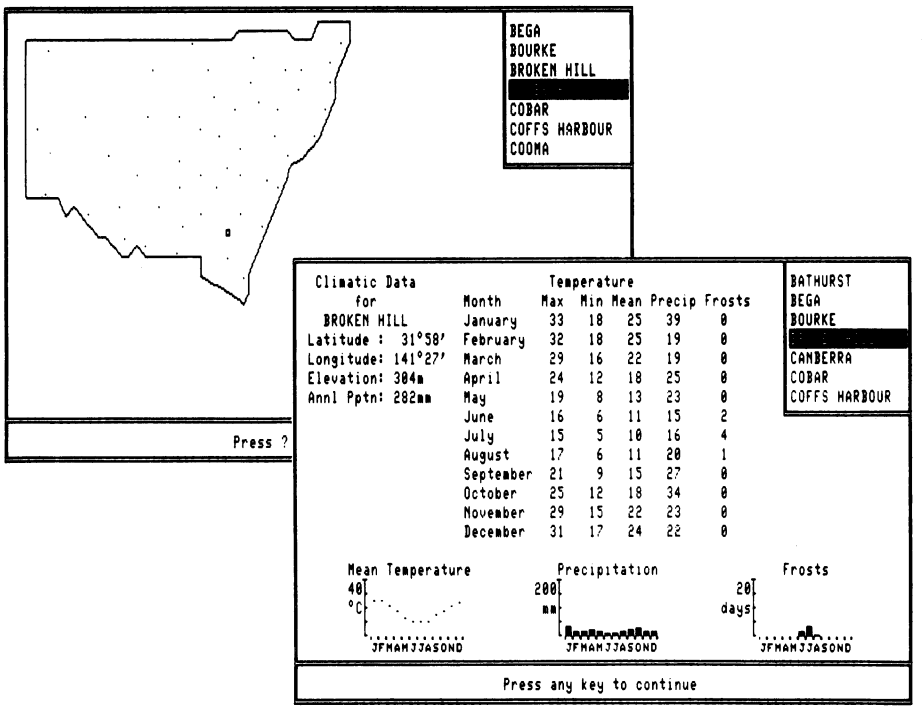

Figure 2. As a town is highlighted in the list, a box-shaped cursor flashes at its location. Pressing Return delivers a comprehensive spread of statistics and graphs for the town.

Customising

A plus with Herd is that it may be tailored by the teacher, allowing new crops with different energy contents and seasons to be established. This would be useful where the crops in the program supplied are foreign to a situation (for example, there may be grasses in WA not listed in the program which may be more suitable). Also, given a whole set of unknown species, one could set an interesting and more complex task, which involved estimating the energy contents and seasonal growth rates of the unknown species.

I found the program to be most interesting, bordering on addictive. The various 'levels of play' allow for many levels of understanding and expertise and as they are structured, lead the player toward an understanding of the compounding intricacies of running a dairy herd.

Herd is available from Hawkesbury Software, Cabbage Tree Road, Grose Vale NSW 2753; (045) 72 1254 (after hours).

A data base for geography and agriculture

Someone once said that 'There is no such thing as bad weather, only different kinds of good weather.' This, like most bald statements, of course can be disregarded in a trice or argued over for days. But, there is no escaping the fact that weather, (or in the collective sense, climate) effects everyone. When one has a working knowledge of weather patterns for a particular region it is possible to plan activities, from farming and the establishment of an industry (like tourism), to going on holidays itself.

The data base program Climate (also from Hawkesbury Software), is their latest opus. A cursory look at the software and the documentation reveals that a great deal of planning has gone into its production. In fact, Climate has been designed for use as a complete self-contained teaching unit, catering in particular for the geography and agriculture classrooms.

Climate, I am pleased to say, is very satisfying and easy to follow. It is menu driven and makes excellent use of graphics to clearly present tables, bar and point graphs and other statistical information. The review copy with which I was supplied,

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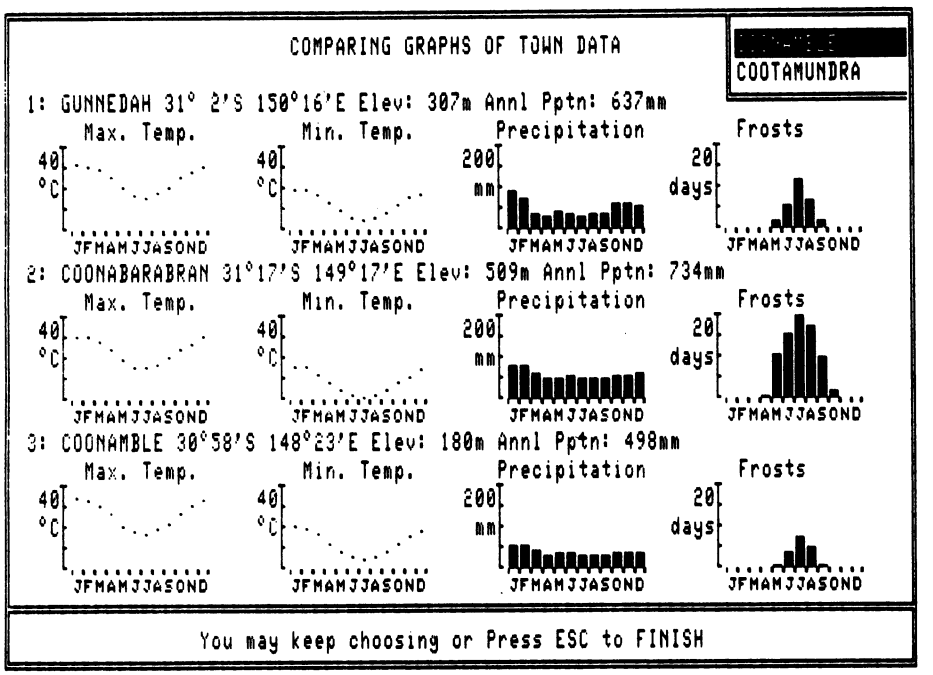

Figure 3. Climate will show graphs of the data for three towns onscreen at the same time allowing comparisons and 'theory testing.'

contained statistical information on 12 out of the total 51 New South Wales towns included on the full blown version.

This was adequate to give me a taste of how the program works. There are two components of the Climate which form a package: the work sheets and the program itself. The work sheets logically guide the teacher and his/her students through the program, and maximise the use of the software in the classroom. The software, however, could 'stand alone' allowing a teacher to devise individual teaching strategies. The attack of this review therefore will be to look at the software in isolation, to see how it stands up as a data base program and then introduce the worksheets as they were meant to be used in conjunction with the program.

Options

When the program is loaded by typing CLIMATE at the A: prompt (the program is a command file), the disk whirrs into action and then presents the title screen. Pressing any key takes you to the main menu. Five options are presented each of which enables the user to access climatic information from different angles. The first option, allows the selection of a town from the list for display of climatic data.

Selecting this option places in front of us, a map of NSW to the left of the screen and a list of towns to the right. By scrolling down or up the list (using the E and X keys), a different town name is highlighted while, simultaneously, a box shaped cursor flicks from one dot to the next on the map, indicating the location of the town (see Figure 2).

When the cursor is over the town on which you want more information, pressing Return delivers a comprehensive spread of statistics and graphs, including location (latitude, longitude, and elevation) and detailed tables and graphs on monthly temperatures, precipitation and frost occurrence.

The second option, 'Select town from map and graph data', brings up a screen containing a map with a diamond shaped cursor. This cursor may be moved around the map using arrow or the E, S, D, X diamond and positioned over any town represented by a dot. When the diamond encounters a dot, the name of the town is printed to the screen. Pressing Return brings up condensed climatic information, in graph form, about the town. It is possible, in this mode, to quickly flit from one location to another, to check on various statistics. It is not necessary to go into and out of the main menu, which is a real time saver.

The third option allows you to compare climatic information of up to three towns, on screen, at any one time. At a glance it is possible to cross check statistics of various towns enabling confirmation or rejection of theories effecting the climate of the towns. At this stage, mention should be made of option 5 (from the main menu) which simply allows you to toggle between graphed temperatures as either 'maximum and minimum' or 'mean'.

Option four presents the statistical information 'from the opposite direction'. Instead of specifying a town and examining its data (as with the first three options), you are asked to specify conditions you are interested in, and then the data base endeavours to match a town to it. The variables which may be defined for specified months are precipitation, temperature and frost.

This is achieved by activating the months (presented on number line arrangement) with the space bar. The amounts of rainfall, temperatures and frosts are selected in the same fashion. The S, D and arrow keys may be used to zero in on the variables you want.

One aspect of the software which particularly appealed was the ability to 'screen dump' to a printer, whatever was up on the screen at any time. There are many uses for this facility, not the least of which would be in the preparation of maps and diagrams for a computerless classroom. This is something to keep in mind, if your school has limited resources or limited access.

Climate is not just another excellent piece of software from Hawkesbury Software. It is a well produced teaching kit. It very much belongs in the secondary geography/agriculture classrooms, and is worthwhile considering if you are preparing a unit involving the climate of NSW.

The fact that it is confined to, or rather based on NSW, may prove to limit the program's circulation which would be a shame. Perhaps the people at Hawkesbury are hard at work 'burning the midnight oil' preparing data base information for other Aussie states. If they take a leaf out of Active Learning Systems' book (the producers of One World, and Hometown, featured in YC, Feb '88) they will investigate the lucrative international market for their high calibre program.

Climate (software plus teacher's manual) costs about $50 (depending on disk format); student booklets are available for $2.90 each. Hawkesbury Software's address is given above. □

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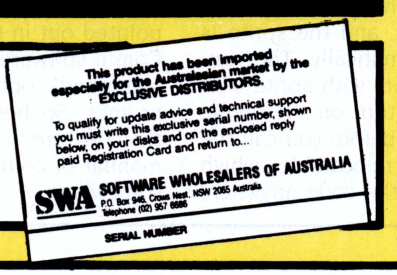

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IAN ALLEN

YOUR C64

One of the handiest features of the 64 is its sprites, or moveable object blocks. What makes them so handy is that they can be moved about on the screen without disturbing any graphics or text that they pass over. They also work with all the 64's graphic modes and can themselves be drawn in either hi-res or multicolour mode. Most of the time they are used in games, but I've often found good reason to incorporate them in more serious applications. If they do have a drawback, it's that moving them about can be a little cumbersome, especially if you are driving their motion from Basic.

But theory and practice are two different things, especially if you are trying to drive the sprites from Basic.

Part of the problem is that in the *x* (or horizontal) direction, there are 512 possible pixel positions. This means that the sprites horizontal location requires a 9-bit address, and as bytes have only 8 bits, the extra ninth bit has to be stored somewhere else. Since there are only 8 sprites, the 64's designers decided to use just one extra byte to store the extra bit for all of them. In theory it seems an elegant solution – bit 0 holds the extra bit for sprite 0, bit 1 for sprite 1, and so on.

But theory and practice are two different things, especially if you are trying to drive the sprites from Basic. The register concerned is location 53264 (or MSIGX in CBM parlance). Because all of its 8 bits are important, you are forced into extra processing every time you read and write it. This is because you don't want to disturb anything except the bit affecting the sprite you are working upon. From Basic you end up with a statement like –

```
-X = PEEK (53248) +
        256* (PEEK(53264) and 1
```

– simply to read the x position of sprite 0. The statement is complex because of the need to filter out the bit you are after, and it's a slow line to execute. And that's just reading! To try to move a sprite across the screen you need even more complexity. Here's a Basic example which moves sprite 1 horizontally –

```
For A=0 to 320:POKE 53248,A
     and 255:POKE 53264, PEEK(53264) and
     254 or INT (A/256): next of course;
```

A real application would be even more complex, because your program would be wanting to do other things at the same time. Reading a joystick or scanning the keyboard are obvious things you might want to do, but imagine the delays if you simultaneously tried moving some of the other sprites!

Fortunately, sprite movement is just the sort of thing that machine language is ideally suited for. And the best news is that you don't have to write your entire program in machine language in order to take advantage of it's power. In fact the best approach is to use Basic for the things that it does well, and only employ machine language when speed is essential. It's surprising how flexible the combination can be.

Sprite cursor positioner

Here's a useful example. In many programs it's necessary to call for input from the keyboard. You've got two ways of doing this, either with a Get or with an Input statement. Personally, I prefer Get to Input because as I have more control over each individual character, but Get doesn't turn on the cursor. There are ways around that, but an elegant approach is to use a sprite as the cursor.

That's what this routine is about. The C64 (and 128) have a kernal routine called plot. This can be used to read or set the cursor position. The current cursor position is automatically updated as a program is run, even if no cursor is displayed.

What this routine does is look up the current cursor position, and then convert the cursor co-ordinates into sprite co-ordinates. The sprite co-ordinates are checked to see whether the ninth bit needs to set, or unset, and the sprite is then positioned automatically. The routine is designed to work with sprite 0 as the cursor. It doesn't turn on the sprite, you'll have to do that before you call the routine. The code is relocatable, which means you can place the code anywhere you like in memory, so long as it's safe from Basic. The $C000 – $CFFF area should be safe. To use it, simply sys to the starting address. Listing 1 is the pal source code while Listing 2 is a Basic loader; Addr is the start address.

Note that the code adjusts both the *x* and *y* co-ordinates with an offset. This is because some of the possible sprite positions are off the visible viewing screen. You can and should fiddle with these offsets to suit the shape of your own sprite design. I won't go into how you design and turn on sprites, except to say that there are plenty of good Public Domain sprite editors about, and that turning on and off sprites, setting colour and so on are reasonably well covered in both the user's manual and the programmer's reference guide.

A new trick everyday

I recently began the major task of rewriting the C64 based Ultraterm Palette so that it would work in 128 native mode. After hours of work, cursing my bad habit of using absolute addresses instead of labelled one, I realised I had a major job on my hands. Yet the only reason I was even bothering was that I wanted to be able to upload both sides of my Superscript 128 word processor disks. Then someone pointed out to me that even in C64 mode, the 1571 can be made to read both sides. This was a major revelation to me and meant that I didn't have to labour away at a 128 version.

Instead I merely added one line of Basic to Palette which took 5 minutes. This is how it's done –

```
10 OPEN 15,8,15:Print#15,"UO>M1":close15
```

To change back to 1541 mode –

```
ENTER10 OPEN 15,8,15:PRINT#15,
                    "UO>MO":CLOSE15
```

I also discovered that this trick works with the Netcomm Modem 64/128 program, so my criticism of it in the January issue was out of line. Still, how to go about it is not pointed out in the manual. With the NetComm software you select the 'issue disk command' option, and enter UO>M1 prompt. So how did my friend discover this feature? It's in the 1571 user's manual of course! There's a moral there somewhere. □

```
; Routine to position sprite at current cursor position

;C-64 references

plot = $FFF0
sp0y = $D000
sp0x = $D001
msigx = $D010

1000 *=$c000
2330 ;top right sprite = top right character
2340 coord      sec
2350 jsr plot    ;read cursor coordinates
2360             ;x has y pos (0-24), y has x pos (0-39)
2365 txa         ;calc sprite y value first
2370 asl a       ;mply by 8 to get pixel equivalent
2380 asl a
2390 asl a
2400 clc:adc #$2e      ;add vertical offset (46)
2410 sta sp0y          ;store in sprite register
2420 tya         ;now do x
2430 cmp #40     ;check logical line
2440 bcc cord1   ;if <40 do nothing
2450 sec         ;else subtract 40
2460 sbc #40
2470 cord1 clc   ;now calc sprite x posn
2480 asl a       ;mply by 8
2490 asl a
2500 asl a
2510 bcs hiset   ;if carry set pos>255 so need to set hi bit
2520 adc #20     ;add in x offset
2530 bcs hiset1  ;greater than 255 - 2nd check
2540 sta sp0x    ;if less we're done but
2550 lda #254    ;turn off msbit in case it was on
2560 and msigx
2570 sta msigx
2580 rts
2585 ;---------- Hi bit needs setting------
2590 hiset     clc
2600 adc #20     ;x offset again
2610 hiset1      sta sp0x
2620 lda #01
2630 ora msigx
2640 sta msigx
2650 spdone      rts
2660 ;---------------------------------
```

Listing 1. The Pal source code for sprite cursor positioning.

```
BASIC LOADER

10 addr=49152
20 read a:if a=256 then end
30 poke addr,a:addr=addr+1:goto 20
49152 data 56,32,240,255,138,10,10,10
49160 data 24,105,46,141,1,208,152,201
49168 data 40,144,3,56,233,40,24,10
49176 data 10,10,176,16,105,20,176,15
49184 data 141,0,208,169,254,45,16,208
49192 data 141,16,208,96,24,105,20,141
49200 data 0,208,169,1,13,16,208,141
49208 data 16,208;96,256
```

Listing 2. The Basic loader for Listing 1.

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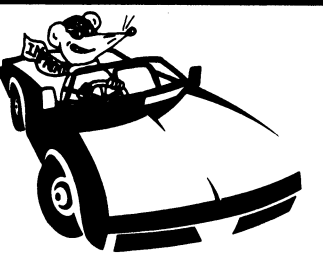

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TIM HARTNELL

YOUR AMSTRAD

This month I'll be looking at the newest word processor from Amstrad, a way of using your PC as an 'instant word processor', as well as providing a short program for both the Amstrad PC, and the 464/6128, which will allow you to calculate pi using your system's random number generator.

In Britain, Amstrad currently has 40 per cent of the PC market. Their penetration in the self-contained word processor market is almost total, as the company virtually invented the category. Reviewers have been very kind to the PCW9512, the follow-up product to Amstrad's original PCW (which stands for Personal Word Processor). The new machine will take the place of the first two models, the 8256 and the 8512, which together have sold over 750,000 units.

The new machine will take the place of the first two models, the 8256 and the 8512, which together have sold over 750,000 units.

The PCW 9512 looks a lot 'hotter' than the old PCW, in stylish off-white, with an 'IBM PC-like' keyboard. As well as this cosmetic change, the new model comes with 512K of RAM, and the computer is fitted with a 720K disk drive. The revamped software now includes a 78,000-word dictionary for the spelling checker, which flags words it does not recognize, and suggests a replacement.

The most important difference between the original PCW and the new one, however, is the printer. Instead of the dot matrix job which was provided with the first model, the PCW 9512 comes with a daisy wheel printer. And all this costs just St499 in Britain, plus their 15 per cent value added tax, or around $1550 Australian.

Meanwhile, it's not just the Brits who are getting an eyeful of Amstrad. Recently Alan Sugar (Mr Amstrad) launched the PCW 9512 at an office equipment show in Atlanta in the US. The launch proceeded despite the fact that the earlier model was a dismal failure. It is thought that Sugar's insistence on continuing to use 3 inch disks – which are more or less unused by any other company in the world – along with the fact that the PCW (old and new) uses the CP/M operating system, which is regarded as more out of date than watching uncolorised episodes of The Honeymooners. The US launch price was $799.00.

Saving Memory Space

My IBM PC takes some 90 seconds to 'warm up' when first turned on, as it checks every memory location. If it finds a fault, it tells me, and refuses to work. The Amstrad PC takes far less time to boot up, but instead of doing a byte by byte memory check, it creates (along with a few other tasks it carries out) a 34K RAM-disk. This is not usually a problem, but some memory-hungry programs need as much space as they can get, and the 34K committed to the RAM-disk is effectively 'wasted'.

To prevent the disk being created, you need to use the NVR program, which actually does the hard work of setting default conditions for a number of start-up situations and set the RAM-disk size to 0K – it's simple since the program is menu-driven.

PCW Software

As PCW owners know, there is not much software available for their computers in Australia. Two public domain groups in Britain supply (for a modest fee) CP/M material, modified to work on PCW machines. If you want details, write to them directly (but please include international reply coupons which come from the post office, so the UK groups can send you details of what is available from them). The addresses are: CP/M User Group, 72 Mill Road, Hawley, Dartford, Kent, DA2 7RZ, UK; and ANWUC, 41 Millwall Close, Gorton, Manchester, UK. Point out that you have a PCW so they send you the right information.

Instant Word Processor

There is a way to use your PC as an 'instant' word processor. Power-up DOS, at the prompt enter COPY CON PRN. This effectively turns your computer into a one-line electronic typewriter. You type away, using the Enter key in the place of a carriage return on an ordinary typewriter. You can correct errors on your current line before continuing to the next line, but you cannot go back to an earlier line.

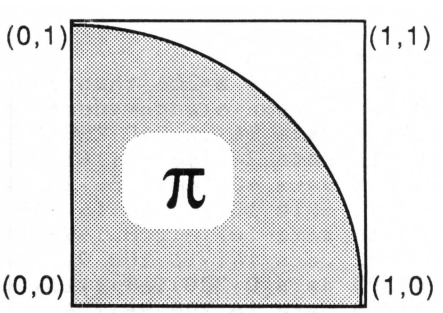
The text is actually printed out, when you've finished entering the document, by typing a Ẑ (that is, holding down the Ctrl key and pressing the Z key), then pressing Enter. The file will then be printed out on the printer just as it appeared on the screen. Note that the file which is printed is, however, not saved on disk in any way, but is just spurted out to the paper. This is handy if you don't want the bother of actually loading up a word processor, having a disk to save files on, and the like.

A slice of pie

Finally in this month's column, we'll have a look at a program which allows you to work out pi, using your computer's random number generator. The program in Listing 1 is for the PC, running under BASIC2, and that in Listing 2 is for the 6128/464 (this second listing will work, with little or no modification, on most Basic computers, if you're unfortunate enough not to have an Amstrad).

If you run either of these programs, it will work out a value for pi. The larger the number you enter at the beginning of the run when prompted, the more accurate the value of pi should be. When I tried it on my Amstrad PC, an initial entry of 100 gave a value of 3.2; 500 lead to an improvement to 3.184; while 1000 produced 3.148 (which is getting much closer to the real value of 3.1415926....

How does it work? How can random numbers produce a value for pi? If you look at the figure below, and follow the explanation, it all makes sense.



Imagine the shaded area is one-quarter of

```
CLS
RANDOMIZE VAL(RIGHT$(TIME$,2))
10 INPUT "How many numbers will I try";num
IF num<1 THEN END
am=0:bx=0
FOR loop=1 TO num
r1=RND:r2=RND
IF r1*r1+r2*r2>1 THEN bx=bx+1:GOTO 20
am=am+1
20 NEXT loop
PRINT:PRINT "OK, I scored";am;"within the"
PRINT TAB(7);"quadrant"
pe=4*(am/(am+bx))
PRINT "which gives me a value of"
PRINT TAB(7);"PI of";pe
PRINT:PRINT:GOTO 10
```

Listing 1. A program for the Amstrad PC running Basic2 which works out a value for pi using the random number generator.

```
10 REM A Piece of Pie
20 REM 646/6128
30 CLS
40 INPUT "How many numbers will I try";NUM
50 IF NUM<1 THEN END
60 AM=0:BX=0
70 FOR LOOP=1 TO NUM
80 R1=RND:R2=RND
90 IF R1*R2+R2*R2>1 THEN BX=BX+1:GOTO 110
100 AM=AM+1
110 NEXT LOOP
120 PRINT:PRINT "OK, I scored";AM;"within the"
130 PRINT TAB(7);"quadrant"
140 PE=4*(AM/(AM+BX))
150 PRINT "which gives me a value of"
160 PRINT TAB(7);"PI of";PE
170 PRINT:PRINT:GOTO 40
```

Listing 2. Listing 1 modified for the 6128/464 (and most other Basic running machines).

a circle, within a square. The numbers in brackets outside each corner of the square are the co-ordinates of each corner. Imagine we are throwing darts at random at that square. Some will land within the shaded quadrant, and the rest in the white area within the square.

Now, if we define the area of the square as 1, the area of the quadrant will be equal to 1 minus one quarter the area of the circle. Points chosen at random within the square would be expected to fall either within the quadrant, or within the unshaded portion, in proportion to their relative areas. We can determine a value of pi from the value which our program produces for the area of the circle.

Two points are chosen at random (R1 and R2, in our listing), then they are squared and added. If this total is greater than 1, the points lie outside the quadrant, so BX is incremented by 1. If not, AM is incremented by 1. The ratio of the areas of the two figures should be close to the ratio of the areas of the two parts of the diagram. As we chose a square with a value of 1, the area of the circle is PI, so the ratio is PI/4 to 1. With this knowledge, the program manipulates the result, in the line PE=4*(AM/(AM+BX)), to give a value for PI.

I'm very 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. A free disk of Amstrad PC-specific software will be given to anyone supplying hints which are used in the column. Please write to Your Amstrad, Tim Hartnell, Your Computer, Box 227, Waterloo 2015 NSW. □

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LETTERS TO THE EDITOR

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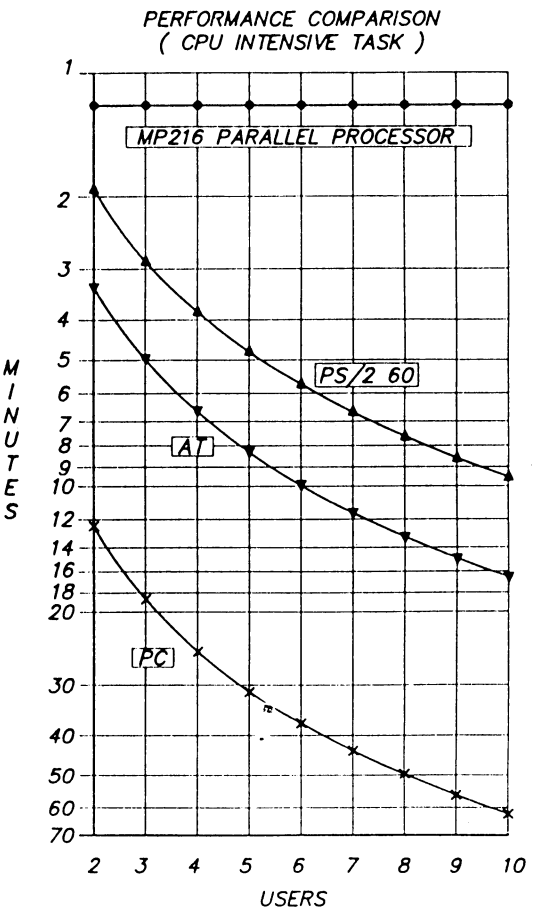

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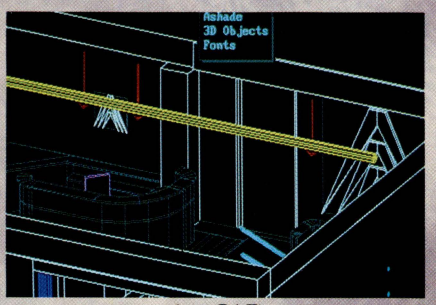

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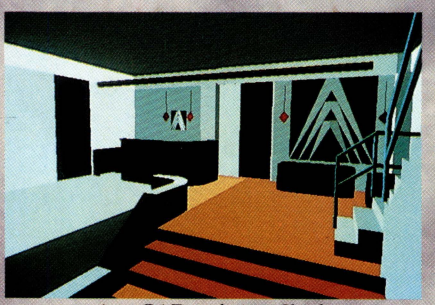
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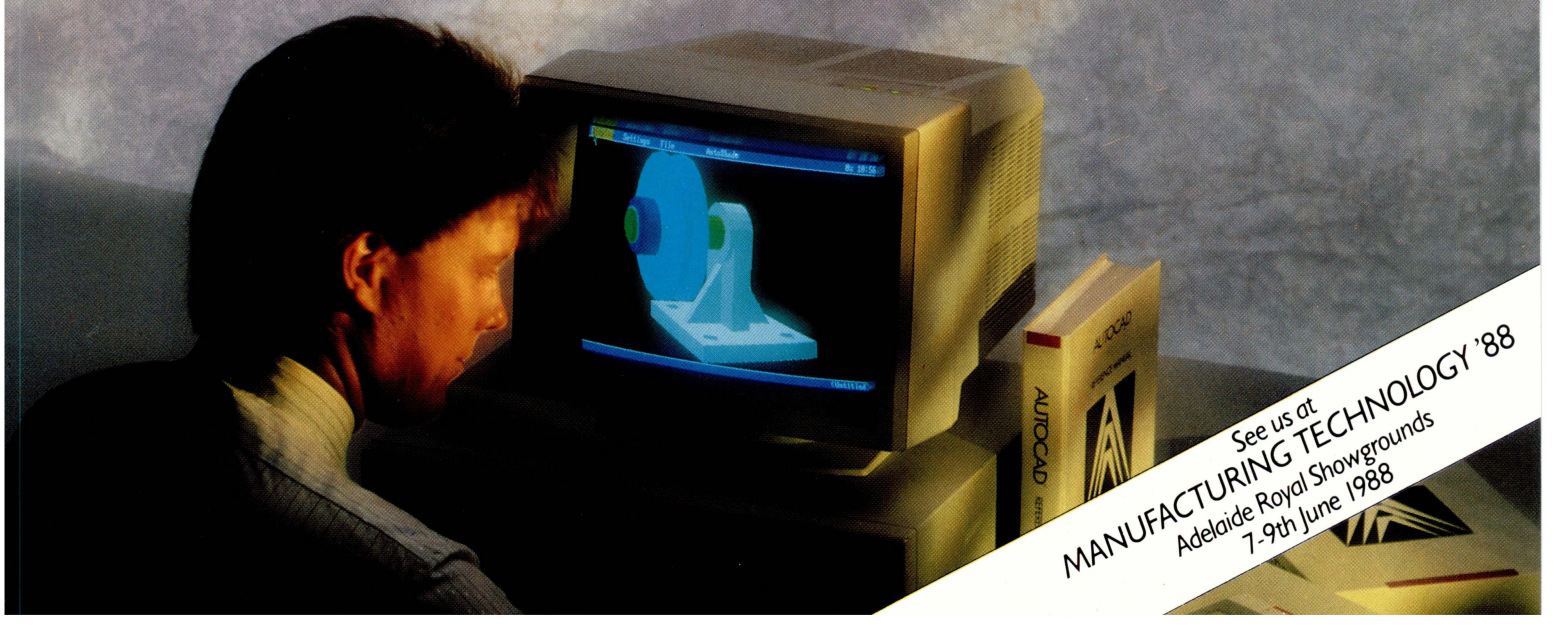

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