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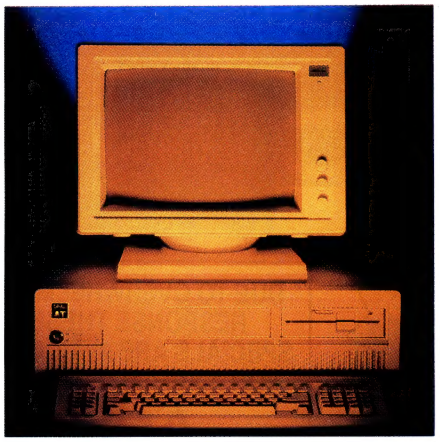

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NEXT MONTH INCLUDES

Part 1 of our annual printer feature covers laser printers (have they become the best value?) and the speciality market — ink jet and thermal printers and plotters as well as printer 'peripherals.' In April we'll cover dot matrix and daisy wheel printers.

We'll also continue our look at ATs and round that out with reviews on two interesting laptops — the Compaq 386 and the Kookaburra. And to help make life easier, we've taken a look at two desktop utilities — SideKick and Pop-Up Deskset. Since everyone's getting serious about education, we've included a general evaluation of educational software and an update on Listen and Learn. Plus a new contender in the Group A computing class (21 times faster than an XT!).

Get AT It!

The new wave of computers has hit the market in full force: the 80286-based AT has emerged as the standard for personal computers and 1988 will see that position strengthen as the price of powerful (and speed and memory hungry) software becomes affordable. And speaking of standards — we've given a feature length review to Toshiba's new range of portables (which includes the T3200 AT shown on the cover with the T5100 and T1200).

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Just because they look the same doesn't mean a thing.

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There really is a difference.

Ruwald & Skinner 466NA

ATTACK!

DOES TELECOM'S plan to time-charge local phone calls mean much to us as computer users? Probably a lot more than we think. At least one group of computer users — the comms 'freaks' who hang out at the local bulletin board — got quite worried when time-charging was proposed for data calls, but few others were perturbed.

Now that a general time-charge proposal is being implemented, many of the comms fanatics are sitting back and relaxing. After all, if it's all-round it must be fair. Rubbish. Time charging could have several dramatic effects on the future of computing.

We are really just clambering into the era of sophisticated communications, where access to information from around the world will be available to all, not just the Fidonuts (we addicted users of the wondrous Fidonet amateur bulletin board network). I can see many dangers for the growth and success of computer communications in time charging.

Although it's not entirely clear which direction our 'information retrieval' is heading (it may be by phone hookup to various databases, or it may be through the provision of 'personal data banks' in the form of CD-ROMS and the like), it is highly likely a large part of it will come over telephone lines.

A combination of powerful, small computers, advanced modem technology, intelligent software and the cellular telephone network looks set to automate information retrieval. It will appear to the user as if the neat little desktop or laptop they use knows everything there is to know in the world. The reality will be that the computer, like all experts, simply knows where to look for the information. When I ask my PC for the population of Vilnis it will tell me, not because it has the info on disk, but because it can dial immediately into the right database and ask the right question.

Time charging really won't interfere with this at all, will it? No, it won't. At least not if viewed at the simple level. What really worries me about time charging is the future potential rather than the current proposal. What if Telecom decides to place a premium on data calls? With the equipment in place (Telecom has already indicated it will be able to tell the difference between voice and data) it will be far easier for Telecom to ramp up its charges for data calls with hardly a whisper.

It has already discussed plans for a premium on data calls, supposedly for commercial services. That is, online databases you might dial into for information will be charged for the time, and guess who they'll pass the charges to? If this is extended to bulletin boards, which are usually funded out of the system operator's pocket, guess what won't be free any more?

If information retrieval does go the comms route, we may all end up paying too much for the pleasure. Time charging of local calls may seem fair. It is used in many parts of the world, and quite a few of those have an inferior service to ours (if you travel the world with a modem and a PC and try to use dial-up lines, you quickly discover good old Telecom Oz ain't so bad). But many other parts of the world have an advanced and efficient telephone service with *free* local calls. Telecom is not losing a bundle of money . . .

No, I think we should all scream about time charging on principle, just in case it is used to screw an extra dollar out of us some time in the future. Let's campaign for free local calls instead. We as a group have one of the most powerful political weapons available — a mail-merging word processor — and if we bombard them (Telecom, politicians, their mothers) with enough paper maybe they'll collapse under the weight. Since the previous data-call charging proposal, several Sydney bulletin boards are carrying lists of the right people to complain to; I assume it's the same in other states. Attack!

MATT WHELAN

American Graffiti

My brother-in-law the professional computer layman (he's fascinated by computers, but determined to avoid learning anything substantial about them) made an offhand, telling observation recently about 'obsolete' micros. He's seen the ads and heard some of the jargon being used to advertise some of the new ATs, PS/2s, and other '386-based machines, so he's an instant expert about hard disks and virtual memory and related things. He was gushing about some of the 'amazing' things those new, hot, fast machines can do.

His advertiser-induced enthusiasm about new hardware is not atypical, but he fails to appreciate that there's still plenty of life left in that 'obsolete, slow' hardware. (It was a surprise to him, for example, to learn that some of the technology still in high demand is nine years old!)

Brother-in-law's thinking is representative of an unfortunate, though nevertheless very human, tendency: to apply some of the criteria of the fashion world to microcomputing. The pressures are the same — vendors want to keep peddling their goods — but the two worlds are very different. Fashion certainly influences the computing world, although computing is really much more focused on function, while the fashion world focuses on more ephemeral concerns — what's 'in' today, what will make us feel good today or tomorrow. It would be unfortunate for both worlds if we began looking down our noses at technology merely because it's 'older.' As with wine or antiques, newer doesn't necessarily mean better. Computing might be better off if it overcame this automatic lust for ever-faster hardware.

There's something about human beings, something builtin, that makes us lust perpetually after 'the ultimate' — the newest, the latest, and, especially, the fastest. The computing world also participates in this quest, seeking faster spreadsheet recalculating, faster word processing, but especially, faster chip speeds.

The results of this speedlust (it's about time for English to start emulating the German language and create more neologisms by just running words together) have some interesting consequences. For example, vendors would have us trade our 'outmoded' hardware up in order to get work done faster, although faster chip speeds won't always translate automatically into 'more work per day.'

For a good deal of the work done on a computer, more speed is unnecessary — a kind of techno-luxury. Take wordprocessing — it has about three or four different elements. First, you stare at the screen, suck your thumb a little, and think about what you want to say. Then, you try to get your fingers to perform unnatural acts as they twist all over each other in odd ways to punch the correct key. (A significant part of this phase of wordprocessing consists of backspacing for various reasons, as you correct fingererrors or thoughterrors.) A third phase consists of reading what you've just written and revising, either on-the-fly or more formally, after a complete draft has been written. The fourth part consists of printing out drafts and/or final versions.

It's hard to figure out exactly which aspect of wordprocessing would be speeded up by a faster microcomputer. Upgrading to faster fingers, or a faster printer, would help considerably. But otherwise, the chief speedbenefit of a more advanced computer (a 286- or 386-based machine) is a little difficult to define: fingers, eyes, and brains are the primary limiting factor.

(In America lately, we've had a minor flap about politicians who 'write' their speeches by 'borrowing' the work of others. Faster machines might help them, but equally, might get them into hot water more often.)

So it is, too, with telecommunications. The limiting factor here is rarely the computer's chip speed. More often, it's related to other hardware, such as modem speed (yours, or the one on the other end) or line speed (a dial-up line can only go so fast, unless you use very high quality, expensive modems). Alternatively, the limiting factor might be found in the wetware — in reading or thinking speed. Reading text at even 1200 baud can be a challenge.

I don't wish to suggest that manufacturers and developers should cease their quest for ever-faster, ever-bigger machines. Some applications, such as really high-quality graphics, heavy-duty number crunching, and so on, really do need that speed. It's also true that almost any advances in hardware speed or performance ultimately translate into benefit for some or all micro users And in any case, when faster micros come onto the market, we all benefit, since newer hardware drives down prices of 'older' micros.

But advances should not obscure the fact that many of us have just about as much speed as we'll ever need — or can cope with. One of the classic jokes of data processing has one bloke explaining proudly to another: 'In an hour, this machine can make as many mistakes as an army of accountants working night and day for 20 years.' You can see this phenomenon at work today, in a curious way, as users rush to grind out spreadsheets, projections, estimates, models, articles, letters, memos and other computergeneratedstuff stopping to think first about whether it's accurate, sensible or needed.

There's no doubt that the new crop of machines are indeed faster than your old 8086-based machine, and will operate several times faster than the current crop. They'll probably do Cad/cam 3-D rotations faster, for example, or complex, lengthy calculations. I bet, though, that most users probably don't spend more than an hour or two on compute-bound tasks, so how much more time will faster machines create for most users? What will most of us do with the extra 7.23 minutes per day these machines create for us?

Hmm . . . Let's see . . . 7.23 minutes per day, times 365 days . . . that would give me . . . just about enough time to play one quick game of Space Wars per week, if my machine had enough power to support hires graphics and really fast computation and . . . . Maybe I was a little hasty. □

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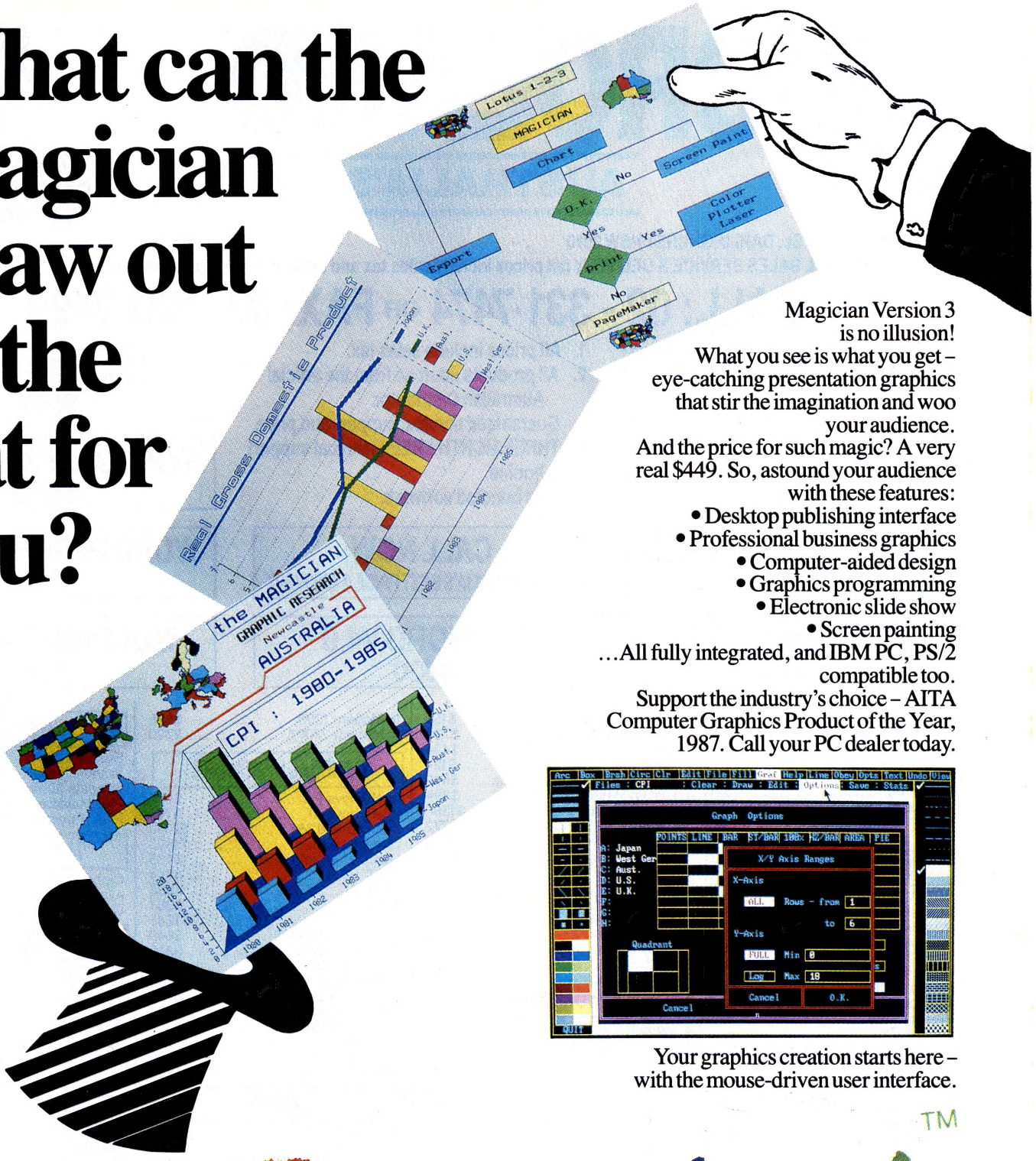

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CANBERRA COMMENT

Computer prints

The Australia Federal Police records in Canberra are now linked to the central fingerprint computer in Sydney. The fingerprint data bank at Parramatta in Sydney has 1.4 million sets of prints on line. All the mainland states are linked into the fingerprint system with Tasmania the only state still to join.

The NEC mainframe at Parramatta was installed at a cost of eight million dollars and is based on similar fingerprint databases in the US and Japan. The Federal Police link to Sydney cost about $800,000.

Checking on criminal fingerprints is now an easier task for Federal Police. A spokesman, Sergeant Gordon Kendall, witnessed the system in action in Melbourne last year: detectives at the scene of an armed hold-up recovered a partial fingerprint which the computer identified in less than three seconds. The old manual fingerprint search system took months, often without success.

Another example of the fingerprint computer's success was in clearing up a 1976 NSW murder. The suspect's fingerprint was found on a bingo card and the computer was able to identify the fingerprint using a new technique.

The computer runs a new analysing program which checks points of similarity on fingerprints. These points are then processed at 39,000 print sets a minute. The computer has three processors working together enabling nearly 120,000 fingerprint checks a minute.

New TAFE Software Register

The TAFE National Centre for Research and Development has released the first *TAFE Software Register*. Alan Wheeley, spokesman for the Centre in Canberra, said that the Register was for TAFE colleges Australia wide. It is published in book form with 172 packages listed.

Listings have information about the producer of the software, the distributor, the general content, the price, hardware needed, disk size, network potential and what the software does or claims to do.

An example entry for the Macintosh is shown in Table 1.

TAFE teachers who are using the software have written some of the evaluations. These are checked in conjunction with TAFE computer departments although not all entries have evaluations.

Peter Davis, head of computing at Canberra TAFE college, commented that money is available for a second edition later this year and thought putting the Register on a disk with a search program was preferable to a book. It's already on a microfiche in most TAFE college libraries.

Davis believes the Register was only a guide to prices — anyone intending buying software listed in the Register should be able to get it for less.

One of Davis' pet hates is software with key discs because it is so impractical in the TAFE set up. Some of the software programs are for computer-aided machine tools and key discs have a short life in a workshop where they are often loaded by apprentices.

Also, when corrupted key discs are returned to the distributors for replacement, the software is idle. This is a particular problem with some software from England which Davis said is good, except for key discs.

OS/2 is incompatible with the TAFE's present IBM system and would be resisted for as long as possible.

When asked about Public Domain software, Davis said much of it was useful and getting better all the time. Canberra TAFE has a large collection of Public Domain software.

Canberra TAFE is running IBM, a deci-

Title:	The Professional Bibliographic System
Description:	Bibliography; database; library
Producer:	Professional Bibliographic Software Inc.
Distributor:	Apple Dealers
Price:	$580,
Medium:	3.5" disc
Hardware:	Macintosh: 128K RAM: printer
Abstract:	This program links with communications, database and W/P packages. It maintains databases of references, produces bibliographies and reference listings using pre-set or user defined formats.
User Contact:	Chris Harrison, Learning Resource Branch, Dept. T.A.F.E, South Australia
Other Information:	Review published; Johnson, Rubard 'Mac the Bibliographer'. Small Computers in Libraries, Feb. 1986, pp 24-29.

Table 1. *An example entry for the Macintosh from the TAFE Software Register.*

sion taken to overcome compatibility problems which other TAFE colleges have experienced. The system is networked so IBM software can be used at any workstation throughout the college.

Unfortunately, some of the states have not been so far sighted. According to Davis, NSW TAFE is running Apricots while Victoria and South Australian TAFEs use a mixture of Apple, BBC, Microbee and IBM.

Davis said IBM OS/2 would not be going into Canberra TAFE in 1988. OS/2 is incompatible with the TAFE's present IBM system and would be resisted for as long as possible.

Davis also made some other interesting points, not directly about software. He criticised Telecom transmission links as hopelessly slow. The TAFE has give up trying to use them, finding it quicker to fax programs or post disks.

One computer problem Davis has solved is access to terminals — many TAFE computer classes are restricted because there are too few terminals available. Using a video card, Davis and his staff have transferred screens onto VHS videotape. The tapes are available to beginner computer classes as a television tutorial. Students can take copies home then run through the program, stopping or repeating sections they are not sure about. The video tapes save time in familiarising beginners with screens and how they work. This also frees terminals for other groups.

Canberra TAFE is also developing self-paced learning programs. Their aim is to produce as many self-paced packages as possible in each TAFE subject.

Computers bank on jobs

In September 1987, *Your Computer* reported on a move by the banks to close branches and reduce staff. Marie Keir, research officer with the Australian Science and Technology Council, predicted banks in future would force customers to use ATMs or home terminals.

In a front page report since then, the *Sydney Morning Herald* suggests the move is now on. The Herald report said that the Commonwealth Bank planned to reduce staff by 5000 over the next four years. Jobs in bank branches would be slashed by 4000, while 1000 positions would go from head office.

The chief general manager of the Commonwealth Bank, Len Spencer, said staff salaries made up 70 per cent of the bank's costs. The 5000 positions represented 14 per cent of Commonwealth Bank jobs.

Westpac has already cut its staff by 1200 in the last 12 months and more reductions are on the way. Westpac's general manager Bill McInnis pinpointed changes in technology as the main reason for the cuts. McInnis predicted that Westpac would continue to thin down staff.

Other banks, while having no plans to reduce staff, were certainly not taking on extra people.

The Commonwealth Bank Officers' Association condemned the staff cuts saying that many bank workers in their 40s and 50s were not in a position to retrain or seek new jobs.

Closing suburban and country bank branches would release millions of dollars in prime real estate giving the banks windfall profits for their shareholders. An ATM does not need its own block of ground — anywhere in a shopping centre will do. □

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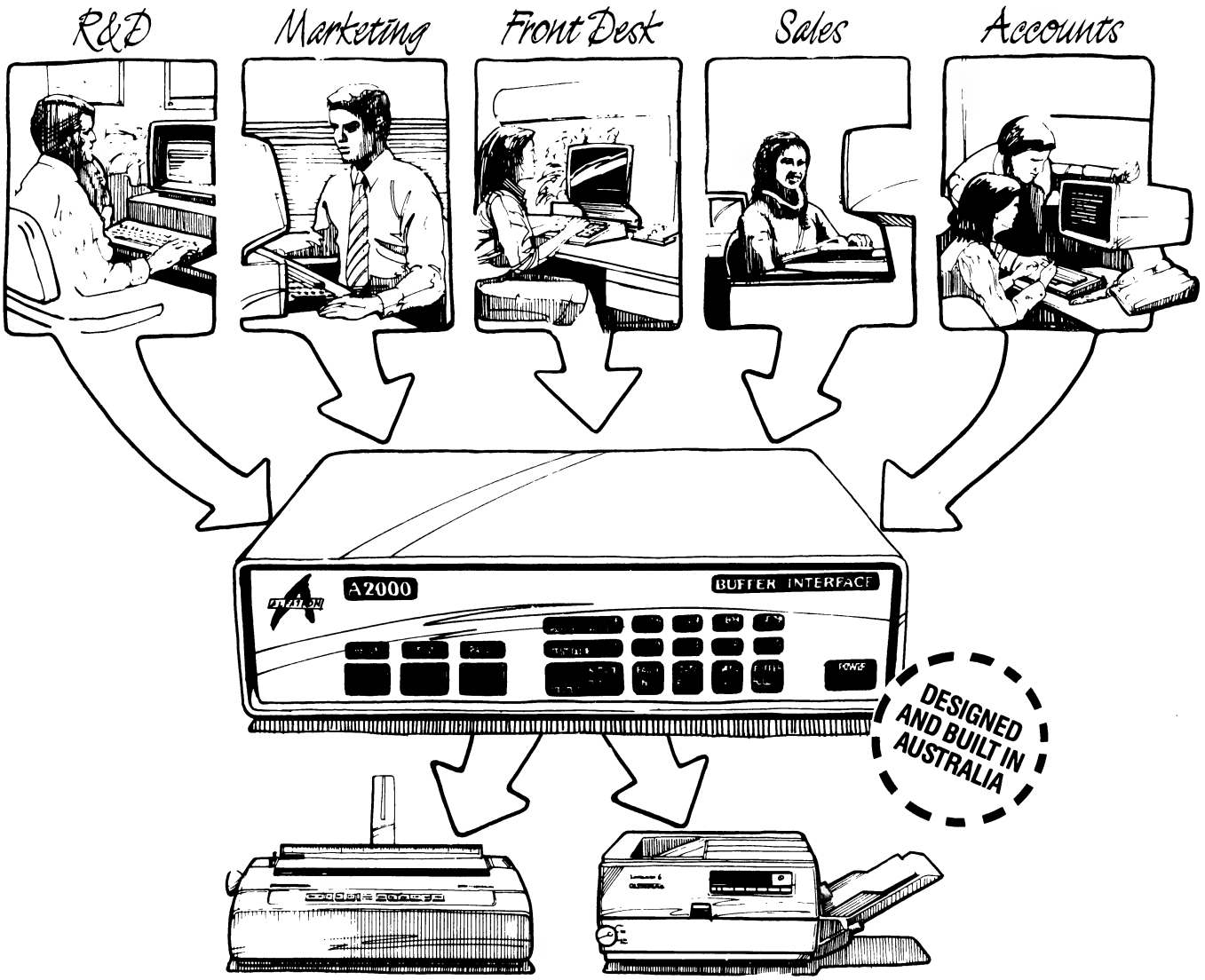

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THE TOSHIBA WAY

The T1000, T1200, T3200 and T5100

With the release of the new additions to its range, John Hepworth thinks Toshiba has made an art of the laptop — and the portable.

TOSHIBA HAS MADE an art of the laptop, and continues to release new variants on a theme, set to suit the special needs of almost any user. It started with the T1100, moved onto the plasma screened T2100 and T3100, and then added the twin floppy, LCD screened T1100+. Two of the latest releases are the T1000 and the T1200 laptops. Both are battery powered with blue LCD screens, but they are equipped and aimed for quite different markets. They may be thought of as a very welcome update to the T1100, and as a T1100+ with a hard disk, respectively.

Another variant on the same theme is that of the portable computer (as opposed to the laptop). Toshiba has come up with the T5100 and T3200 portables. The dilemma of getting what you want in a computer — such as size, more speed, a big, fast hard disk, autoswitch EGA card, flat-screen, built-in multisync monitor and reasonable price — has been solved with the release of these two machines. They are stylish, compact and high performing, making them desirable additions to any desk.

Figure 1.The T1000 (pictured) has 512K RAM as standard while the T1200 has 1 megabyte — all memory in the T1200 is battery backed. Both machines have one 90 mm, 720 Kbyte floppy disk drive; the T1200 also includes a 20 Mbyte hard disk.

The Toshiba T1000 and T1200

The T1000 comes with 512 kilobytes of RAM as standard; a memory expansion board can be fitted which adds a further 768 Kbyte. When fitted, memory above 512 Kbyte in the T1000 can be used to extend memory used by DOS to 640 Kbyte. It can also be used as Expanded Memory and/or a RAM disk. The 768 Kbyte in the optional memory board has battery backup.

The T1200 has 1 megabyte of RAM as standard. Memory above 640 Kbyte in the T1200 can be used as RAM disk and/or Expanded Memory. All memory in the T1200 is battery backup — power can be turned off half way through a Lotus recalc or a Flight Simulator excursion and turned back on up to two weeks later, and the T1200 will continue with the calculation or flight at the point it was interrupted.

Laptop Lowdown

IN OUR August '86 issue, Jan Roberts reviewed the Bondwell 8 distributed by Pulsar Electronics, (03) 330 2555, and the PHC-16 from Kohjinsha-Sotec, (03) 534 0286. In September, she compared the Gridlite from Vicom, (03) 699 3239, NEC's Multispeed, (02) 438 3544, and the (superceded) Toshiba T1100+. And, in January 1988 we had the lowdown on the Sharp PC-7000 series and Jan's view of Toshiba's T1000. 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.

Drives

Both machines have one 90 mm, 720 Kbyte floppy disk drive. The T1200 also includes a 20 Mbyte hard disk. Speed of the hard disk is good for a laptop, average when considered against desktop machines. The T1000 has a ROM which appears to the machine as a C drive carrying DOS and all the external DOS utilities including Debug and Edlin. In addition, there are 128 bytes of battery backed RAM included in the C drive for CONFIG.SYS. When a chkdsk is run on the C drive, it shows a 720 Kbyte drive with around 250 Kbyte of files. Who knows what could be added to this ROM in the future? As mentioned above, both the T1000 and T1200 can configure memory above 640 Kbyte as RAM disk.

External Ports

Both the T1000 and T1200 are generously equipped with external ports. Each has a 9-pin serial port, 25-pin parallel port, 25-pin port external disk drive port, RGB and composite video connectors for external color monitors and a connector for an external numeric keypad. Pressing the Fn key at the same time as the Home or End keys toggles the video output between the LCD screen and the external monitor.

Exterior

Moulded plastic, beige cases are fitted to both machines. The screen is hinged to the main unit about half way back across the top surface of the case and closes over the keyboard; two latches hold the screens closed. Under the keyboards are a carry handle for moves around the office, while a shoulder bag is included for longer trips.

The T1000, at 31 cm wide x 28 deep x 5 thick, will fit into many briefcases and leave room for the power supply and even for a snack and a few documents. The T1200 is a little larger, particularly in depth: 31 cm x 30 x 7. At 3 kg the T1000 is extremely portable, while the T1200 at 5 kg is hardly a monster.

Screens

The screens on the T1000 and the T1200 are relatively wider than the monitors we are all used to, but both are very legible in all lights, including dim home lighting. The T1000 screen is about the same width as the T1200 screen, but not as high, and characters and graphics are stretched a little more sideways on it.

Both have NiCad rechargeable batteries and external power supplies which can charge the batteries and power the machines from a power point. The batteries in the T1000 are internal, and the machine must be opened to change them. Life of a charge in the T1000 is four hours. The batteries in the T1200 are in a moulded carrier which clips into the top deck and allows a user to carry more than one on an extended field trip and change them as required. The hard disk in the T1200 can be switched off if not required and battery life on a charge is around two hours with the hard disk running and six hours with it off.

Keyboard

Both the T1000 and the T1200 are about as small as it is possible to make a machine with a full size alphanumeric keyboard, but as a result there is no room for a separate numeric keypad/cursor pad. Four keys at the bottom right of the keyboard are assigned to cursor, and pressing the Fn and SysReq keys at the same time can toggle a group of keys to exactly emu-

Toshiba Modem

TOSHIBA have just announced the release of a Sendata modem especially designed for their T3100, T2100, T1200 and T1100+ range of laptops. The modem works to the Hayes standard and features autodialling and autoanswer. It operates V21, V22 and V23 protocols. □

late the IBM numeric keypad and grey plus and minus keys. Function keys are in a row across the top of the keyboard.

Keyboard feel is good, and the layout overall is typical Toshiba. I took only moments to adapt to it and had little difficulty jumping bach and forth from either to an IBM PC. At the top right of each keyboard are indicator lights, showing which disk drive is operating, power on and low battery. The T1200 can run at either 4.77 MHz or 8 MHz, selected from the keyboard, and another indicator light shows the speed being used.

Compatibility is excellent. With the exception of Norton Editor, both ran all other programs I normally use. The failure to run Norton Editor should not be considered a major demerit as other fine machines have also choked on it.

Both of the units were very early production samples and came with preliminary photocopied manuals full of Jinglish. Toshiba has always had excellent manuals when the final versions are released and the same is expected here.

Overall

The T1000 and T1200 are excellent machines, and very good performers. Both are excellent choices for users who need portable, battery powered computers. Some users have applications which cannot be run on a machine with only two 720 Kbyte floppies, and for them the T1200 with a hard disk and interchangeable battery packs will be a godsend. Many users need no more than two 720 Kbyte floppies. For them, the T1000 is near ideal. Application software could be carried around on floppies and copied into the RAM disk as required, leaving the floppy drive for the data disk.

While both machines are very portable, the T1000 is half the weight of the T1200 as it has no hard disk and a smaller battery. It is eminently suited for education and field use, while the T1200 is aimed at users with more complex applications who will take a computer with them from one office to another. Speed of the T1000 is very similar to that of any 4.77 MHz PC, while the 8 MHz T1200 is twice as fast as a typical 'old' PC and about the same speed as an IBM Personal System/2 Model 30. It is also similar in price to a Model 30.

My (very personal) choice — the T1000. I would have the 768 Kbyte expansion card, configured as a RAM drive, and leave a wordprocessor permanently loaded into it. Its size and weight advantage over all other portables makes it a winner. The T1200 is no less a winner, but the weight makes it a little less portable and the price will stop many people considering an otherwise very desirable machine. □

	4.77 MHz IBM PC	Toshiba T1200	Toshiba T1000
bbb	26.4	9	25
sieve	14.74	5	15
lotus load	53.8	33	
lotus recalc	22.4	10	
lotus save		33	
Sysinfo	1.0	2.3	1
MyBench1	1.32	.43	1
MyBench2	5	1.76	4
MyBench3	12.20	3.85	10
MyBench4	12.47	3.9	10
MyBench5	13.68	4.23	11
MyBench6	24.38	7.74	22
MyBench7	39.77	12.52	34
MyBench8	37.79	13.23	35

Table 1. Benchmarks for the 8086-based T1000 and T1200 — all figures are in seconds, except for Sysinfo which is a measure of speed relative to a 4.77 MHz PC (= 1).

The Toshiba T5100 and T3200

BOTH THE T5100 and T3200 have an EGA plasma screen and autoswitching video chipset on the mother board. Both have extremely good performance, with the T5100 being fitted with an 80386 and the T3200 having an 80286 processor. Both have an internal 40 Mbyte hard disk, one fast, and the other very fast. Both machines are portable, but not battery powered due mainly to the power requirements of the plasma display. Both have 90 mm floppy drives, internal clock/calendars and all the expected external ports.

Apart from the use of different processors, there are some other significant differences between the two machines. The T5100 is very similar in size to the well known T3100 and T2100 laptops from Toshiba. The T3200 is larger, allowing it to include two card slots for one full length 16-bit expansion card and one short 8-bit expansion card. In addition, the extra size allows the T3200 to have a full size numeric keypad/cursor pad separate from the qwerty keyboard, while the T5100 has a numeric keypad embedded within the qwerty keyboard.

The T5100 has an 80386 operating at 16 MHz, which can be toggled to 8 MHz if required for compatibility with software; I did not find this necessary with any software I tried. Pressing Fn-PgUp selects 16 MHz and Fn-PgDn selects 8 MHz. The T3200 has an 80286 at 12 MHz. Both have sockets for numeric co-processors, an 80387 in the T5100 and an 80287 in the T3200. Neither test machine had a co-processor fitted.

The T5100

When closed, the T5100 is 31 cm wide x 36 deep x 9 thick, so it's still a laptop. At almost 7 kg it's easily carried in one hand, using the builtin carrying handle at the rear of the unit.

Opening up the EGA plasma screen by pressing the single latch at the front of the T5100 reveals an excellent keyboard and a number of indicator lights. Visible on the screen hinge are small knobs for contrast and brightness along with indicator lights for CapsLock, NumLock and Scroll lock; there is another indicator which is illuminated when the external monitor port is in use. To the left of the screen hinge, and visible when the screen is either open or closed, are the power and drive activity lights. Visibility when closed is important, as it is possible to plug in an AT style keyboard and external monitor, and get the best of both worlds with a builtin keyboard and screen for portability and a full size keyboard and monitor when back at

base. The monitor can be either an EGA or a CGA — the port will drive either.

During setup, using a Toshiba utility program, the keyboard can be defined to emulate either the original 84-key AT keyboard or the newer 101 key enhanced keyboard. If the 101-key keyboard is selected, then function keys 11 and 12 are emulated by pressing the Fn key and Fn1 or Fn2 at the same time. The normal qwerty keys are all there, the 10 function keys are across the top and the cursor, insert, delete, home, end and suchlike keys are grouped around the lower right corner of the keyboard. While there is no separate keypad, pressing the Fn-NumLock pair of keys toggles a group of alpha keys into this function; these can be cursor or numeric keys, depending upon the use of the NumLock key. Also included in this embedded keypad are the Grey-Plus and Grey-Minus keys that live at the extreme right of most keyboards and are essential for some software. The keyboard has an excellent feel with good tactile feedback, and the inclusion of little 'bumps' on the home keys makes it easy for a touch typist to adapt to the machine.

Going around the outside of the unit reveals the expected range of ports and facilities. On the right side is a 90 mm floppy disk drive for 720 Kbyte and 1.44 Mbyte disks. The left side has knockouts over the connectors for an external keyboard and numeric keypad, and a switch to set the parallel port as the printer port, or as a connector for an external A or B floppy drive.

On the rear panel there is DIP switch which is used to set memory and parallel port parameters, along with the power inlet socket and power switch, the 9-pin serial and 25-pin parallel ports, the 9-pin monitor port and the voltage selection switch. Also visible is a cover for the area containing a proprietary slot, to which can be fitted modems and so on. Standard memory is 2 Mbyte, and a memory expansion card can be fitted internally to take memory to 4 Mbyte without using this slot. Memory above 640 Kbyte can be defined as extended memory and/or Lotus/Intel Microsoft expanded memory. In addition, some memory can be set aside so that the ROM can be copied into it for increased performance.

The T3200

The T3200 is larger than the T5100 due to the expansion slots suited to one full size 16-bit card and one 8-bit short card which are located across the machine at the rear. Its dimensions are 37 cm wide x 40 deep x 10 thick. At just under 9 kg it is easily carried in one hand.

With the exception of Norton Editor, both ran all other programs I normally use.

Two latches hold the screen of the T3200 closed over the keyboard, and the carrying handle retracts beneath the keyboard. After opening the EGA plasma screen a number of indicator lights are visible on the screen hinge. These are for power, drive activity, external monitor, Capslock, NumLock and Scroll lock. Two knobs set into the edge of the screen surround control the contrast and brightness of the display. The keyboard of the T3200 has a separate numeric keypad/cursor pad, but cannot emulate the 101-key keyboard. As with the T5100, the keyboard has a lovely feel with just the right tactile feedback.

On the right side of the machine is the 90 mm floppy drive, and the connector for an external keyboard. On the left side can be seen the cover for the connectors of cards installed in the two expansion slots. At the rear is the power inlet, the power switch, serial parallel and monitor ports, a switch to select the parallel port for printer, or to connect an external A or B floppy drive, and a cover running the full width of the machine which is removed to install those standard expansion cards.

Standard memory is 1 Mbyte, and a further 3 Mbyte expansion card can be fitted internally without using up either of the expansion slots.

Video

Both the T3200 and the T5100 have orange plasma screens. The T5100 has with an effective area of approximately 19 x 14.5 cm and a resolution of 720 x 400 pixels. The T3200 has a 21.5 x 145 cm screen with the same resolution. Plasma screens can only display one colour, and a limited range of intensities, in this case four. A co-resident utility program called XCHAD is used to set the intensity for any colour, using high, medium, low and off, allowing characters in the odd colours used by some programs to be easily seen on screen. Maximum brightness of the screens is marginal. While easily seen in typical rooms, dimly or brightly lit by artificial or natural light, in very bright areas such as a sunroom they can be hard to read, though any monitor is in trouble in such locations.

The video 'cards' on the mother boards

Figure 4. *The extra size of the T3200 allows it to have a full size numeric keypad/cursor pad.*

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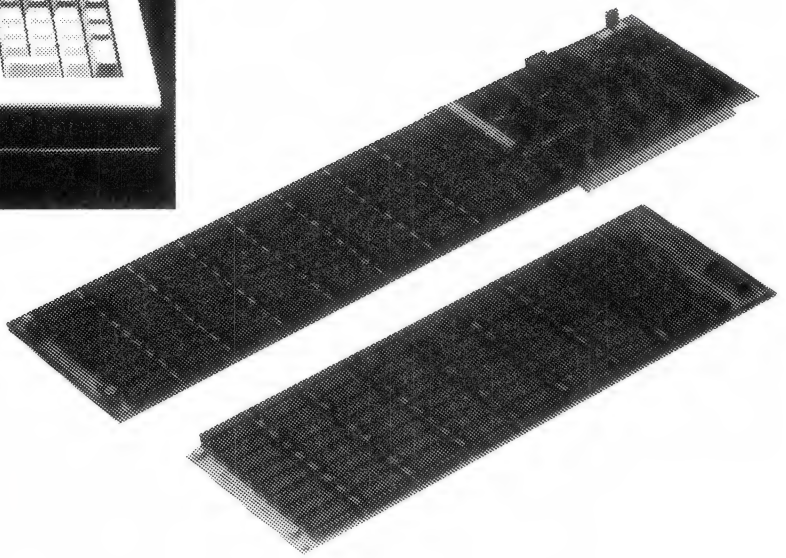

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***ECS 286-20, 25 Mbyte Hard Disc, 10 Mhz 80286, 640 Kbyte RAM, 2 serial, 1 parallel, 1 F.D.D., MSDOS, GW BASIC**

	T5100	RATIO	T3200	RATIO	IBM PC
dBASE					
Stage 1	122.20	7.51	19060	4.81	917.40
Stage 2	79.90	4.66	109.30	3.41	372.40
Stage 3	88.70	4.86	129.90	3.32	431.25
LOTUS					
Load	8.45	6.58	13.02	4.27	55.59
Recalc	2.52	9.00	3.90	5.82	22.69
Save	7.42	4.98	13.29	2.78	36.97
Norton 4					
SI	17.20	17.20	11.70	11.70	1.00
DI	9.00	9.00	2.50	2.50	1.00
PI	14.40	14.40	8.60	8.60	1.00
MyBench1	0.11	12.00	0.22	6.00	1.32
MyBench2	0.50	10.00	0.93	5.38	5.00
MyBench3	1.16	10.47	1.98	6.13	12.14
MyBench4	1.21	10.30	2.02	6.17	12.46
MyBench5	1.32	10.32	2.20	6.19	13.62
MyBench6	2.47	9.81	3.95	6.13	24.22
MyBench7	3.95	10.03	6.42	6.17	39.60
MyBench8	4.34	8.61	6.26	5.97	37.37
CBSIEVE	1.29	11.42	2.42	6.10	15.59
BBBMARK	3.24	8.19	4.66	5.69	26.52

Table 2. *Benchmarks for the 80286 T3200 and the 80386 T5100.*

of the T3200 and T5100 are clearly not the same. Both can drive either the internal plasma screen, or an external monitor. The T5100 internal screen can emulate EGA or CGA, and the monitor port CGA or EGA. The T3200 plasma screen emulates EGA, CGA and MDA, and the monitor port EGA, CGA, MDA and Hercules! The bulk of my testing was carried out in EGA and CGA modes on the plasma screen, in which both the T3200 and T5100 performed impeccably, and even ran both Lotus 1-2-3 and Flight Simulator.

Performance

Both turned in outstanding performances on the standard *Your Computer* benchtests, plus a few extras that I run myself. These include a dBase benchmark which creates, indexes, deletes and packs a database, a Lotus benchmark which loads, recalculates and saves a spreadsheet, a Basic interpreter loop, and a compiled Sieve of Eratosthenes. My extras are the Peter Norton SysInfo and some additional Basic benchmarks.

When looking at the results of the benchtests a couple of things should be kept in mind. The results show a range for the T3200 from 2.78 to 11.70 relative to a standard PC, ignoring DI (disk speed index), and for the T5100 a range from 4.66 to 17.2, again ignoring DI. The average speed gain relative to a standard 4.77 MHz IBM PC is 4.18 for the T3200 and 9.38 for the T5100. When you interpret these results, remember that Sysinfo always gives slightly optimistic results for 80286 and 80386 machines compared to other benchmarks. While the results can be compared with those run at other times on other machines they strictly should only be compared with tests run in the same session, as happened here.

Compatibility

I ran a great range of software, from Lotus to Flight Simulator, through Norton Editor, Norton Utilities, Autocad, Windows, Xtree, LapLink, Turbo Pascal, TELIX, Microsoft Word and others, along with a great range of EGA utility and demonstration software. All ran perfectly, except for the Public Domain program D.COM, which gives multi-column, sorted directory listings. D.COM operated correctly when reading floppies but not when reading the hard disk, apparently due to the parameters with which the hard disk was formatted. I have found that it does not work on around 75 per cent of hard disks formatted under DOS 3.xx and so this was no surprise.

A 3 Mbyte expansion card is available for the T3200, and a 2 Mbyte card for the T5100. These are installed without using a slot and take memory in each machine to 4 Mbyte. Other options include external 90 mm and 135 mm floppy drives, an internal modem for the T5100 proprietary slot and PC Floppy link, a card which plugs into a desktop so that the floppy drive in the desktop can be used as an external drive for any Toshiba laptop. Keytop sets for many European languages are available, as is an external expansion unit for the T5100 which takes standard size expansion cards.

Documentation

Each machine comes with two manuals, a paperback A5 DOS manual of around 450 pages and a spiral bound A5 owner's manual of around 200 pages. The manuals are quite good in quantity of information and quality of presentation, miles ahead of most Taiwanese manuals even if not quite up to IBM 's standard.

Overall

I loved both these machines, and the choice between them would truly be difficult. The additional performance in a smaller package of the T5100 would probably outweigh the slightly lower price and expansion slots of the T3200, particularly since an AT keyboard and external monitor can be fitted to either when not away from home. The slots in the T3200 could be the deciding factor if terminal emulation cards (like IRMA) or LAN cards are required, but users with these needs should probably be thinking of a small footprint desktop anyway.

Value and price are a bit difficult to judge. Desktops with performance similar to the T3200 are not much bigger and can be a fair bit cheaper, yet on dollars per unit of performance it is still very good. The T5100 is excellent value, being about the same price as a clone 386 with a 40 Mbyte hard disk and similar performance, but with the advantage of portability and compactness. Lovely to use, better to keep, the T5100 and T3200 are two more great machines from Toshiba. □

Product Details

Products: Toshiba T1000, T1200, T3200, and T5100
From: Toshiba, Unit 84/92 Talavera Rd, North Ryde 2113 NSW
Price: T1000 $1914, T1200 $6360, T3200 $9495, T5100 $10,590;
2 Mbyte RAM card T5100 $2500 (pre-release price),
3 Mbyte RAM for T3299 $2552.
(*All prices taxed.*)

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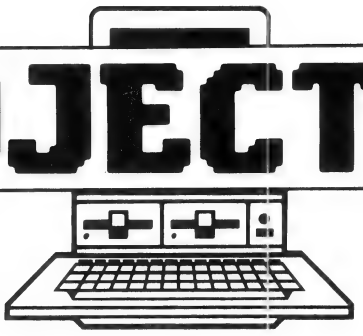

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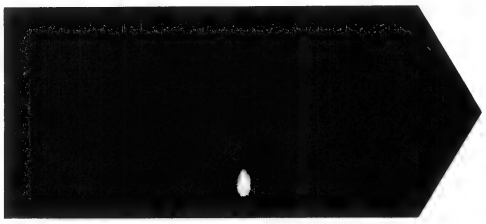

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■ NEC 1.2/360K floppy	**$275.00**
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Normal price	**$5195.00**
OUR PRICE (until 31/1/88)	**$4995.00**

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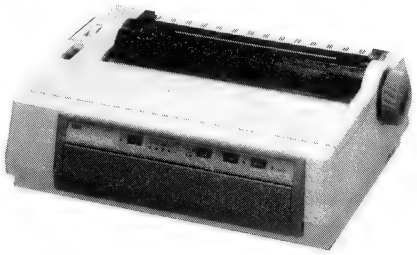
NEC Pinwriter P2200 Printer



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- Built in tractor feed, optional sheet feeder
- 168 CPS (draft mode), 60 CPS letter quality mode

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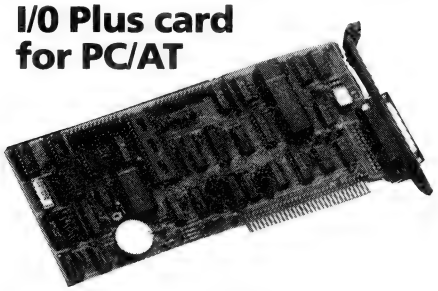

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Interface your PC to measuring instruments.

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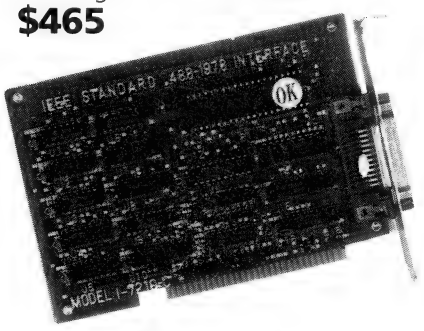
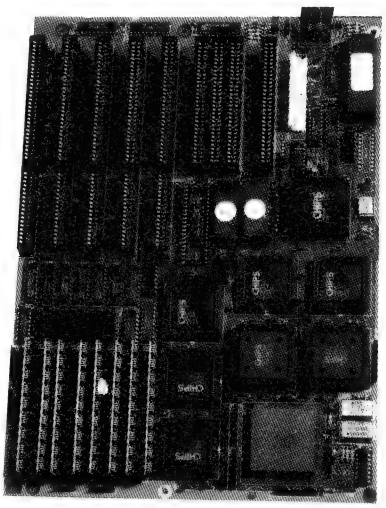


80386 Motherboard



Incredibly compact, fast, powerful – and reliable. This 80386 motherboard is a drop-in replacement for the normal XT sized motherboard, but look at the performance: Drop this board into your PC for a quantum leap in performance!

- 80386 32 bit CPU. Zero wait state. 16MHz operation (20MHz optional).
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- 7 expansion slots, 5 16-bit and 2 8-bit, 1 optional 32 bit slot available
- The latest "CHIPS" VLSI chip set for ultra reliable operation

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$4500 (20MHz)

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- Accepts 2716, 2732, 2732A, 2764, 2764A, 27128
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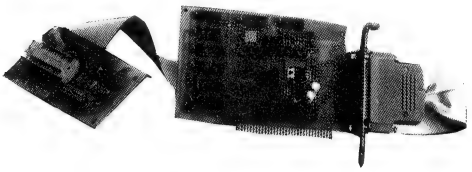
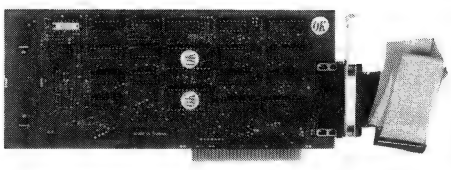


12 bit AD/DA converter



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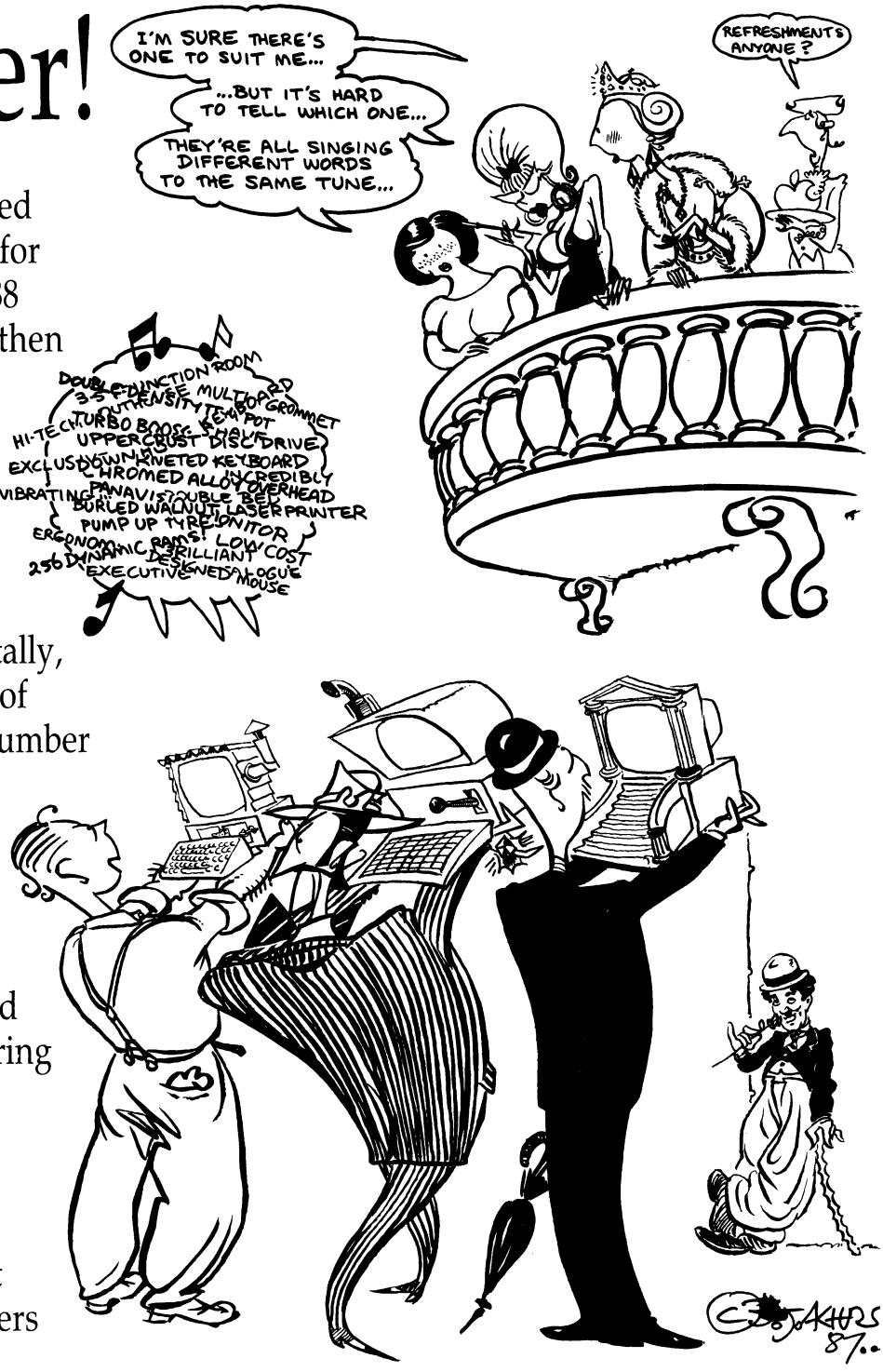

Last year saw the 80286-based AT emerge as the standard for personal computers and 1988 will see that position strengthen as the price of powerful (and speed and memory hungry) software becomes affordable — and us 'average users' find the need for more sophisticated packages. Not so coincidentally, last year also saw the price of ATs drop by half and the number of suppliers double. All of which doesn't make the job of finding a new machine any easier — to help you shop (or plan, or just dream) we've assembled reviews on eight ATs, covering the range from about $2500 to $6000.

If you can't find a suitable machine amongst these, there's a comprehensive list of available ATs and suppliers following the reviews.

President 286

The only fault Adrian Huyskens found with this machine was that it's an AT!

The President 286 computer is similar in size and appearance to the IBM PC AT with the key lock on the front panel, as well as a touch sensitive reset switch, power indicator light, clock speed indicator lights and hard disk indicator light.

The system unit is extremely heavy with separate cages for disk drives and hard disk. It also takes up a lot of desk space.

It *should* be possible to place the system unit vertically on the floor, but the short keyboard cable and the even shorter monitor cable (which forces the monitor to be on the top of the system unit) make it impossible without replacing the cables (an expensive exercise).

The configuration of the computer was: system unit Turbo 6/8/10 MHz; 640 Kbytes of memory on the mother board; two 1.2 Mbyte floppy disk drives; a 40 Mbyte hard disk; magnetic tape drive; 9-pin serial output port; DB25 parallel output port; display, EGA RGB monitor; keyboard, IBM 101 key compatible.

The insides of the system unit are accessible by removing five screws from the back panel and sliding the cover forward. Not a job easily done!

Six AT and two XT compatible expansion slots are available of which one of the XT slots is occupied by the EGA card and the disk controller takes care of an AT slot. It still leaves plenty of opportunity for additional expansion and a 200 Watt power supply takes care of any power requirements.

A socket is available for an optional 80287 mathematics co-processor while there is room for an additional half-height hard disk drive.

The EGA card and monitor worked well and the screen resolution of the colour monitor gave a clear picture.

The President 286, shown here sporting two floppy drives, and a tape backup unit.

Operation

The system unit is a Turbo model running at 6, 8 or 10 MHz with the option of zero or one wait-state at each speed. Speed selection is either under software control using speed.com with which both speed and wait-state can be selected or by Alt, Ctrl/*/-/+ keystroke combinations which will change the speed but not the wait-state.

The clock speed is visible from the front panel by means of LED indicators — none at 6 MHz, green at 8 MHz and red at 10 MHz.

The hardware in use is programmed into the system unit using the standard set-up program for AT computers. No difficulty was encountered doing this.

The hard disk was already formatted and partitioned for MS-DOS operation so that the unit was up and running in a very short time.

Software

The computer was supplied with MS-DOS version 3.2. An additional disk provided setup, head parking, speed and diagnostic utilities.

The absence of Basic in any form was noted and probably indicates that the main users of this machine are in the business area.

Compatibility

The following software programs were run without any problems at any of the speeds of the unit: Framework II, Sympho-

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dBase III plus	$799
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Lotus HAL	$220
Lotus 123	$590
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Magician	$325
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Mirror	$ 89
MultiMate Graphlink	$80
MultiMate 3.3	$615
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Norton Advanced	$199
Norton Guides	$139
Norton Utilities ver. 4	$130
Novell Netware 286	$2990
Paradox 2 Multiuser	$950
PC Alien	$ 94

Clipper	$769
NetComm Pocket Modem	call
Hyperace 286 Plus	$690

IBM SOFTWARE

RapidFile	$485
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Reflex 1.1	$229
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NetComm In/Modem 123	$650
NetComm In/Modem 1234	$830
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NetComm Smart 123	$860
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DISK STORAGE:	2x360 KB	360 KB + 20 MB
INPUT/OUTPUT:	serial/parllel/game port/8 slots	
SCREEN:	mono	colour

AST Premium 286

MODEL:	85	140
CPU:	286 @ 10MHz	286 @ 10 MHz
RAM:	1 MB	1 MB
DISK STORAGE:	1.2 MB	1.2 MB + 40 MB
INPUT/OUTPUT:	serial/parallel/7 slots	

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MODEL	T3100	T3200	T5100
CPU:	286 @ 8MHz	286 @ 12MHz	386 @ 16 MHz
RAM:	640 KB	1 MB	2 MB
DISK STORAGE:	720 KB + 20 MB	720 KB + 40 MB	1.44 MB + 40 MB
INPUT/OUTPUT:	Ser/Par/Exp	Ser/Par/Exp/2 slots	Ser/Par/Exp

WYSE 286

MODEL:	2200	2112
CPU:	286 @ 10MHz	286 @ 12.5 MHz
RAM:	640 KB	1 MB
DISK STORAGE:	1.2 MB	1.2 MBN + 40 MB
INPUT/OUTPUT:	serial/parallel/8 slots	

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ny, Turbo Pascal, Turbo C, Turbo Prolog, SideKick, Superkey, AutoCAD, Inset and WordPerfect. Pop-up utilities such as SideKick, Superkey and Inset are a fairly good indicator of compatibility with the IBM standard. The only program which would not run on this machine was Flight Simulator, though I believe this is a problem even the IBM product has in common with the clones.

No problems were encountered in the transfer of data from XT to AT, except that at times disks formatted on the AT were rejected by the XT. This was probably due to the fact that the President formatted disks using the 1.2 Mbyte drive which cannot be read easily on any 360 Kbyte drive computer. (There is a warning to this effect in the DOS 3.2 manual.)

Documentation

ALL the documentation supplied came in a neat ring binder and consisted of an EGA User's Guide, a MS-DOS 3.2 manual, a Computer User's Guide, an Operating System Manual, and a User's Reference.

The documentation on the whole is good except that the keyboard drawings and keyboard explanations apply to the XT keyboard, which leaves me still in the dark about the use of the 'Sys Req' on the AT keyboard.

Performance

The System Information utility of the Norton Utilities has become a de facto standard of assessing performance between clones and compatibles running at different speeds.

I ran the test and the SI Computing Index reported 9.8 at 10 MHz while the SI Disk Index reported 3.4 at 10 MHz giving a total Performance Index of 7.2.

In my opinion Norton is somewhat optimistic in its performance indices. A field where I appreciate the increased performance of the AT machine is in compilation: A 2500 line program in Turbo Pascal takes 18 seconds on the AT versus 78 seconds on a standard XT. An improvement of somewhat better than 4:1.

A series of bench tests held by the magazine returned the results shown in the table.

Subjective Assessment

The keyboard is similar to the IBM 101 enhanced keyboard with separate numeric keypad and cursor keys, 12 function keys across the top of the keyboard and a panel containing indicators for Num Lock, Caps Lock and Scroll Lock keys.

The key-layout on the AT style keyboard appears to be a retrograde step. I missed the single hand facility of using Ctrl, Alt and Shift keys together with the function keys.

In programs like WordPerfect the new keyboard must be a source of RSI complaints. Also the fact that the '*' key is relegated to the far end of the AT keyboard makes one realise how often this key is used.

The keyboard supplied had an audible click feedback which I found annoying. (A poll of a number of computer users however indicated that some 50 per cent actually liked this kind of feedback.)

Despite the increased resolution of the EGA card with respect to the CGA card, for text only applications such as wordprocessing and programming, I found the Hercules Card with an amber monochrome monitor to cause less strain over extended periods of computer use.

Programs like Autocad however make extended use of the colour capabilities available.

The disk drives and fan were found to be exceptionally quiet. The fast access of both floppy drives and hard disk made the use of this computer a pleasant experience.

Service

The President computer was initially delivered with a faulty keyboard — one of the keys was sticking — a Hercules card and paper white monochrome monitor. The behaviour of this monitor was very poor on graphics displays.

A telephone call to the company had the keyboard replaced, an EGA board installed and a colour monitor fitted within hours of contacting. One would like to think this is the service the regular customer gets from President Computers.

The President AT compatible computer appears to be a solid unit. Any criticism that can be levelled at the AT computer is more towards the AT system than at this particular implementation. □

Product Details

Product: President 286
From: President Computers, 100 George Street, Hornsby 2077 NSW (02) 476 2700
Price: Basic unit (not reviewed) $2600, 40 Mbyte hard disk $1300, EGA RGB monitor $860, magnetic tape drive with 60 Mbyte tape back-up $1200. *All prices untaxed.*

The Skai 286

Looking for a good price to performance ratio? Paul Zucker found a bullish machine . . .

WHAT'S THE ANGLE? You've gotta have an angle to sell anything these days. With the Skai, the selling point could be the price to performance ratio. I say 'could be' because a couple of months is a long time in this industry and what seems a bargain today will probably be bettered tomorrow.

Anyone buying a PC for business or even home use must be able to see the machine paying for itself in two years. Could you say that of the machine you just bought? Could you say it of the Skai if you bought it? Perhaps by the end of this review you'll have enough data to make that sort of decision.

What You Get

The Skai 286 falls into the high end of the low end: it's not a top-line PC or even a second row machine. It comes in the group sourced in Taiwan and partly assembled here. These can range from excellent value to very doubtful. The units can consist of matched modules or thrown together bits.

The Skai we tested could be taken as one of the 'economy' units at first glance — it takes a look at the specs' to show where the value lies. For instance, the machine that we tested really has some top end qualities. How about an Orchid EGA board, a TVM EGA monitor, 8/10 MHz motherboard (although the speed tests say 13 MHz because the machine has no wait states.), two 1.2 MByte disk drives and a 70 MByte hard disk. That has to be something to compare with your average Compaq!

Now don't get me wrong — you can buy the Skai in a more modest form and the speed is still there. The basic unit comes with a mono/graphics board, a monochrome monitor and a mere 20 Mbyte hard disk.

How It Works

There are more speed tests and benchmarks around than we could ever use. The much maligned Norton SI has been re-vamped in the latest version. It now

takes hard disk speed into account and comes up with a compound speed index. Another interesting test is the Chips & Technologies MIPS test. It not only gives a speed relative to well known PCs, it also gives an overall MIPS (Million Instructions Per Second) rating so that you can compare your latest purchase against a Cray or whatever.

Tests aside, the real judge of speed is your own reaction — how does it feel with your favourite application. We invited a few users to try it out and all were amazed at the apparent performance of the Skai. Dennis Redman, author of the best selling The Magician graphics package, said that he had never seen his product go so fast.

We tried a couple of desktop publishing packages out on the Skai and found them a pleasure to use. As a matter of fact, the Skai as we tested it is an excellent DTP machine. It has the high resolution graphics, plenty of hard disk space for scanned images and publication and , of course, speed.

Enough about speed — how was it to set up and use in general? The PC comes with two disks, a Setup/Diagnostics disk and a DOS disk (MS-DOS 3.1). There are three DOS manuals: User's Reference, User's Guide and a larger Programmers Reference.

Now you and I and Microsoft know that these are legitimate manuals for a legitimate copy of DOS but I just can't help getting an uneasy feeling every time I use a Taiwanese manual. The printing quality is OK but it feels just like the 'special' manuals that sell so very cheaply in Hong Kong and Malaysia. We didn't have to set the Skai up but re-did it anyway just to check. The procedure is straight forward and painless.

An interesting inclusion was a manual for the motherboard — the *Digicom Digis 286S AT Turbo Mainboard*. For those of us with inquisitive minds or just plain itchy fingers, it gives a lot of information about the chips, setting jumpers, installing options and so on.

Comments

There were a couple of complaints about the Skai so we'd better mention them here. Firstly, the power socket on the back panel that many of us use to power the monitor is not connected through the PC power switch. This means that you can't just turn off the PC and the monitor does likewise — you have to switch off both. A small point but annoying.

The TVM EGA monitor, labelled Skai, is not up to scratch. The quality was coarse and less than what we would expect from either TVM or Porchester. I hope this was an isolated instance — but check before you buy.

The Skai 286 is available in a number of configurations that suit it for a range of applications from network server to high resolution desktop publishing.

The chassis is too flimsy for a machine of this size. It relies on the cover to stop it from twisting too much. An extra 30 per cent thickness of steel would be appreciated.

The power supply is clearly marked 220V, and, as this is a transformer type power supply, we worried that it might be a bit stressed in Australia where the mains can be 250V. On the plus side, the power supply is a healthy 200 Watts.

Who would buy a machine like this? Well apparently Porchester has already found a ready market. True Blue IBM purchasers would not go for the Skai naturally, but anyone wanting performance and price ahead of brand would certainly do well to consider these Taiwanese animals. Uses that come to mind are — CAD workstations, DTP machines, network servers and good old personal productivity PCs.

Specifications

Porchester will kit the basic box out as you wish with all sorts of combinations of hard disks (average stepper motor or fast voice coil, 20 Mbyte to 160 Mbyte, and more. There is internal space for two half-height or one full-height), different combinations of diskette drives (space for two half-heights), graphics cards and monitors and even the famous Orchid 386 Turbo card if you want the Ferrari version.

There are four 16-bit slots (one already used) and three 8-bit slots (two already used) as well as one fake slot (no connectors but a cutout on the back panel) and two 'D' connector cutouts on the back panel. The front panel has a 'turbo' switch, reset button and a keyswitch which doesn't lock the cover on. In fairness, I understand that there is a new version of the machine that has addressed some of the minor annoyances mentioned here. □

Product Details

Product: Skai 286
From: Porchester Computers, 177 Barkly St, St Kilda 3182 Vic. (03) 537 2722
Price: $3995 with 20 Mbyte hard disk, monochrome monitor; $5495 RRP with 40 Mbyte hard disk, and DEGA board with IDEC multiscan 15 inch flat tube monitor.

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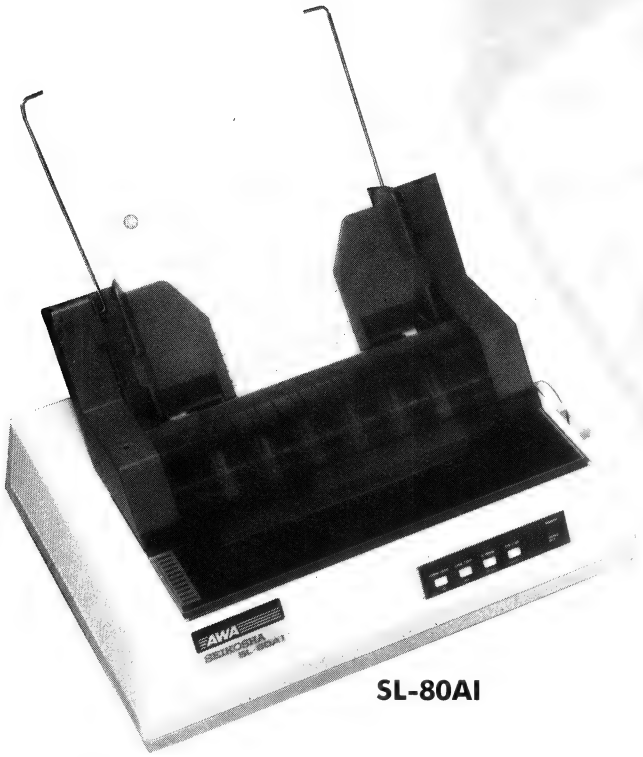

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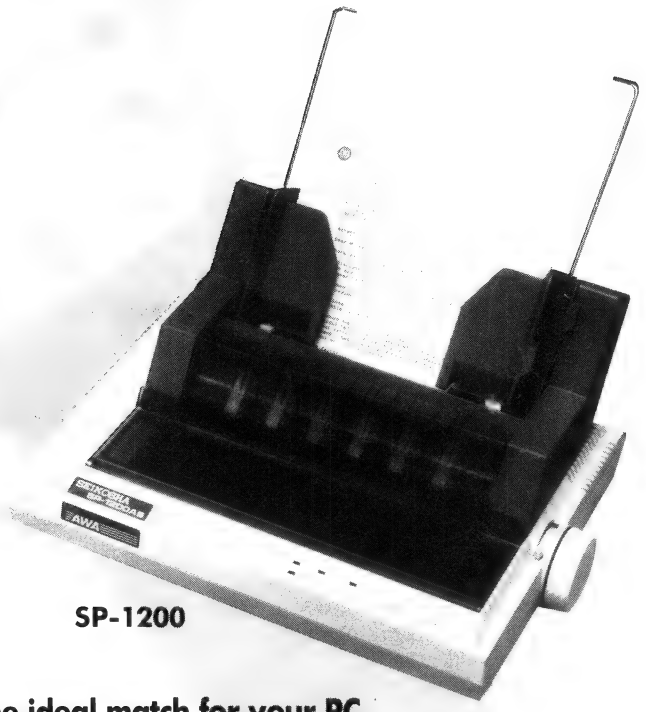

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Hewlett-Packard Vectra ES/12

Even without documentation, Fred Fattal found the Hewlett-Packard Vectra ES/12 to be an excellent piece of engineering.

The Hewlett-Packard (HP) Vectra ES/12 is an 80286 based IBM AT compatible running at 12 MHz only, as it has no facility to switch to another speed. The machine tested had a standard 640 kilobytes of RAM. It is an excellent piece of engineering, well built in the typical HP class of equipment.

Keyboard

The keyboard is ultra thin with 101 keys. It has a standard QWERTY layout with separate numeric keypad and a cursor diamond in the usual inverted-T configuration, as well as 12 programmable function keys across the top of the keyboard. The keyboard has a Power On, NumLock and CapsLock indicator with a comfortable feel and layout. It is plugged in at the back of the computer. An annoying feature is the continuous audible (through the computer speaker) feedback at the press of any key; the keys themselves are somewhat 'spongy'.

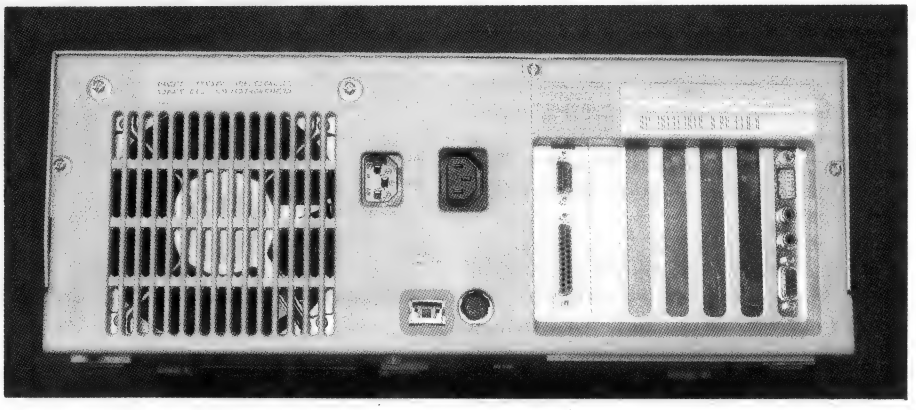
The Computer

The machine tested was a small footprint that had a 1.2 Mbyte floppy drive and a 40 Mbyte voice coil, half-height hard disk which was previously formatted to drive C:, leaving no room for any extra disks.

The Vectra runs at a constant speed of 12 MHz and has 640 Kbyte of RAM, 1 parallel printer port and one RS232 port. The test machine was equipped with an HP Enhanced Graphics Adapter (EGA compatible) which provides a high 640 x 350 pixels resolution. The evaluation model came installed with an 80287 Maths co-processor.

The BIOS is an HP copyrighted one which is a Phoenix version 00.11.16ES 12 that automatically boots up to 12 MHz. It came supplied with MS-DOS Version 3.2 and GWbasic. The 640 Kbyte RAM was on the motherboard along with the I/O ports.

The Hewlett-Packard Vectra ES/12P



The small footprint Vectra has 7 expansion slots, of which one is used for the HP graphics card and a second for the I/O card.

The model evaluated came with no documentation, apart from information on the graphics card and monitor. It had 7 expansion slots, of which one was used for the graphics card and a second for the I/O card. Attempts at opening the case were futile without a handbook, and it is assumed that the disk controller is on the motherboard.

For comparison (with an IBM XT = 1), Norton's SI gave a computing index of 11.5, a disk index of 3.2, and an overall performance index of 8.7.

An annoying missing feature was the absence of a Reset switch. This facility is proving to be essential in cases of software lock-up.

Video System

The HP Enhanced Graphics display is controlled by an Enhanced Graphics Board (EGA compatible) with an En-

hanced HP Video BIOS Ver. B.01.01 (256 Kbyte RAM). The card ran all the common EGA programs faultlessly resulting in crisp, sharp graphics and text, without any strain on the eyes. The display had part of its adjustment on the front, while the sync rotating switches were at the back. One of the scientific packages, Asyst, does not run satisfactorily on the Vectra and a special Vectra version is available.

Manual and Documentation

As mentioned earlier, the system came with no documentation, except for the monitor and graphics card. No comments can be made on the user's manual or MS-DOS manual, which one assumes is supplied with the machine. No technical references were supplied and therefore one assumes that it might contain setup procedure and installation steps. □

Product Details

Product: Hewlett-Packard Vectra ES/12
From: Hewlett-Packard
17 Talavera Rd, North Ryde 2113 NSW
(02) 888 4444
Price: *$5965 with 20 Mbyte hard disk and $7850 with 40 Mbyte; $913 EGA adaptor; $1687 enhanced display monitor.(All prices taxed.)

The Sancom 286

Adrian Armitage went looking for an AT — and found there was no need to pay a for a 'name.'

So you're trying to keep up with technology and your bank manager is finding it easier to say 'no' in the mornings? Now you're resigned to buying an 80286 based microcomputer, your first question might be, is there any difference in the computers for my dollar?

I scowered the Sydney retailers for an affordable clone (the real thing is too much out of my league), and came up with a really affordable Japanese system from Sancom Computers (bear in my mind I was buying this one for myself).

Just to see whether the computer stacked up to the much more expensive competition we put the machine through a battery of tests which looked at the disks, the bios, the extended memory, and the electronics.

The Sancom 286 looks a little on the 'Cut Price Corner' side with the computer housed in an off the shelf (literally, they can be bought separately) case which makes up in design what it lacks in quality.

The case is a thin metal with two buttons either side towards the front of the computer. The lid section is hinged so that it lifts up and is held up by a locking bar. This system is much easier than trying to fiddle around with screws to get to the inside of your machine.

One fault, thought, is that it gives distinct signs of buckling under the weight of the monitor, and I fear what would happen with this weight over a long time.

The Configuration

The Sancom came with 512K onboard memory and expansion memory. This was augmented by an NEC 1.2 Mbyte floppy drive and a Tandon 20 Mbyte hard disk drive. There is still room for another half-height hard disk and second floppy drive.

There are eight slots on the mother board, comprising six full-height and two half-height. There are also two slots for the mouse port (I only got one) which allows for both male and female connectors to be available on the same machine through the same board.

One problem I noticed with the slots on the mother board was that the full length slot toward the centre of the computer looked set on a collision course with the hard drive. When I began to move boards around, I found there was no way a full length would fit there. A re-think of the mother board layout to put a half length in would be sensible, or a re-positioning of the hard drive so that it doesn't get in the way. The hard drive looks pretty set where it is though.

The power supply is takes up almost a quarter of the area inside the machine. Talk about noisy! The power supply, from a Japanese company called Toyo, had the cooling fan built in and it made a (comparative) racket.

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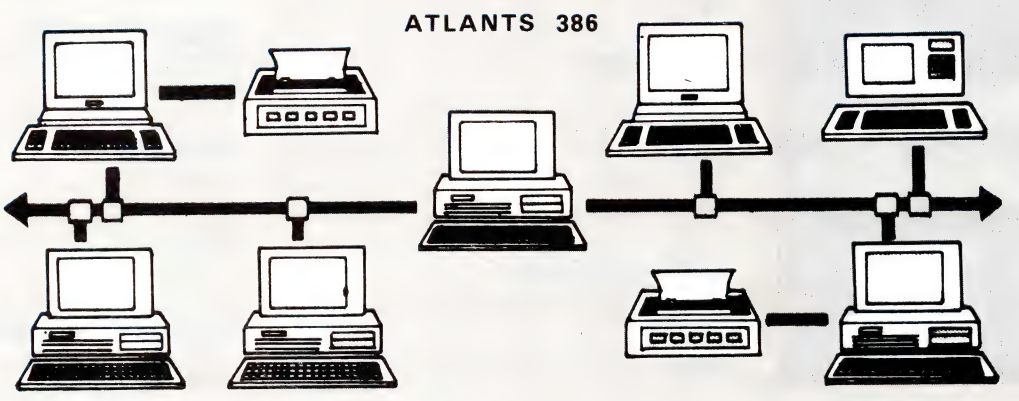

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The Back

The slots have their standard metal sheaths which are unscrewed to make way for the boards. As mentioned, there are two slots for additions such as the mouse connector. Underneath this is the keyboard connector which, like most computers, is stupidly located considering the manufacturer has to provide extra cable to get it from the back to the front, and it's a nuisance to plug in if you're moving your computer around a lot.

The only other interesting parts about the back is the air cooling vent and the power points. There are two power points — one for the machine and the other for those monitors which run from the machine rather than have their own cable.

Speed

Unlike most 80286 computers which are switchable between 8 and 10 MHz, the Sancom was provided with a turbo board which bumped the speed from 8 to 12 MHz. This is a nice boost to the performance of the machine and it's good for those number crunching programs such as Lotus or those power draining CAD programs.

One problem I found with the turbo board was that it hung the system every so often when I switched over, which meant that I had to go for the red button — going for the keyboard boot didn't get the system back. There was also a distinctive change in sound from the computer with a high pitched whine sounding when you went to 12 MHz - I've gotten used to it, however.

One interesting point when running the Norton's Utilities version 3.10 was that it gave differing computing performances when the hard disk was nearly empty and when it was nearly full. At about 10 per cent full, I tried the Norton's System Information came up with a performance index (relative to the IBM PC) of 10.9 in the 8 MHz mode and 13.5 in 12. This lowered to 10.3 and 12.9, respectively.

Other things that Nortons picked was that there were five logical disk drives, A through to E. DOS reported 512K of memory, 157K used by DOS and resident programs and 355K available for applications programs. A search for active memory found 512K main memory and 32K display memory.

The Keyboard

There is nothing flash about the keyboard, a standard IBM layout with the functions keys to the left and the numeric keypad to the right. This meant that the keyboard is full width and took up a lot of room.

The feel of the keys is relatively solid and I felt comfortable using them. Certainly better than some of the keyboards I have used, and none of those irritating clicks each time you hit a key.

The board is raised by sliding down two spring-loaded prongs which are very stable (although I doubted this at first).

The keyboard has three LEDs for the Caps Lock, Num lock, and Scroll Lock. These are located at the top right hand corner of the keyboard, in clear view.

One thing I did appreciate about the Sancom was that the reset and turbo switch buttons, and the keyboard lock, were very clearly located in the middle of the front of the computer.

The keyboard lock is standard — the only problem is that the lock and unlock symbols on the front of the computer are around the wrong way, but apart from initial confusion, this posed no problem.

There are also three LEDs on the front of the computer with the two top ones representing power on and the hard disk operating. The third one is built in for the turbo board.

As far as a monitor for the computer, I didn't received one as I had a Thomson handy, but Sancom can supply an RGBI IBM compatible monitor. You also have the choice of an EGA or CGA card.

The Bottom Line

The bottom line is that the Sancom 286 must be one of the most competitive clones around. On a journalist's wage, my bank manager started saying 'yes' when I mentioned the price of the Sancom, and, these days most of the buying decision comes down to price performance. Although the Sancom 286 looks patched together, and there are certainly many parts sourced from various companies, it seems to have all blended together. □

Product Details

Product: The Sancom 286
From: Sancom Computers,
Distributor: 1 Athol Street Leichhardt 2040 NSW
(02) 568 2660
Price: $2300, monitor supplied is an RGBI colour monitor 14 inch IBM compatible $520, combined package of EGA and monitor is $990. The standard machine comes as an 8/10 MHz switchable. All prices taxed.

Blue Chip 286

If you're looking for a standalone machine, this AT- almost described by Adrian Huyskens might suit . . .

THE BLUE CHIP AT compatible computer is essentially an AT mother board in an XT case. The size of the system unit is identical to the XT, including the quick access lid. The front panel has the standard AT key lock as well as a reset switch, power indicator light, clock speed indicator light and hard disk indicator light. The clock speed of the system can be changed by means of a front panel push button switch.

The keyboard is similar to the IBM 101 enhanced keyboard with separate numeric keypad and cursor keys, 12 function keys across the top of the keyboard and a panel containing indicators for Num Lock, Caps Lock and Scroll Lock keys.

Five full length AT and one short AT compatible expansion slot are available; one full length slot is occupied by the disk controller. The two XT compatible, full length slots are used for the EGA card and a short card containing a parallel and serial interface.

A 200 Watt power supply is provided to take care of the expansion power requirements. A socket is available for an optional 80287 math co-processor — to install it, the hard disk drive must be removed, however.

The EGA card and monitor worked well and the screen resolution of the colour monitor is such that at all times a clear picture was obtained.

The Blue Chip PC-AT

Operation

The system unit is a turbo model, which according to the documentation, runs at either 6 or 10 MHz (an unusual combination for an *AT*). At the higher speed, a selection of 0 or 1 wait state can be made by means of a jumper on the motherboard. The actual operating clock speed in turbo mode was found to be 13 MHz (0 wait states).

Despite the fact that no problems were encountered in running any software at this speed, a question of long term reliability may arise if a 80287 is fitted, since its operating temperature is related to the clock frequency.

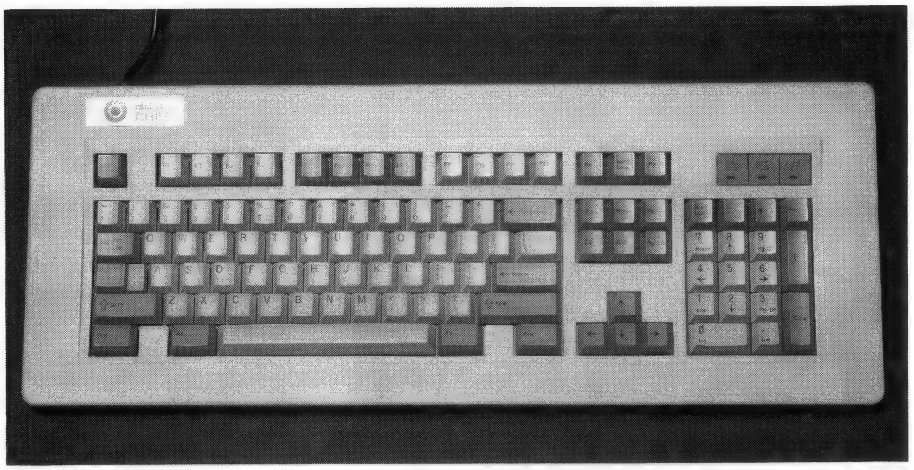
The clock speed is indicated on the front panel by means of an LED indicator.

Framework, Symphony, Turbo Pascal, Turbo C, Turbo Prolog, SideKick, SuperKey, Autocad, Inset and WordPerfect were all run without any difficulties — the pop-ups are a good indicator of compatibility with the IBM standard. The only program that would not run was Flight Simulator.

Documentation

The documentation is supplied as a series of booklets: the Mini '286 Mainboard User's Manual contains information of jumper settings for memory installation, wait states, display adaptor, co-processor installation and some technical specifications on timers, interrupts, DMA and I/O channel slots.

A Printer/RS-232 User's Manual shows the pin-outs for the parallel and serial ports, while a Hard/Floppy Disk Controller User's Guide describes installation and formatting, and includes how to instal Xenix. The EGA Printer Card User's



The Blue Chip's AT style keyboard has an excellent feel (and sound).

Manual describes the card and jumper settings for different modes and gives technical information on setting up various registers of graphics and CRT controller chips. And — the Owner's Manual which is a guide to setting up and using the computer; it includes a 'low-level' description of the keyboard, and installation of expansion boards and hard and floppy disk drives. It includes a description of the diagnostic programs and error messages.

Overall, I found the documentation to be rather poor. The technical information in most of the manuals is of little use to new or even average users, while for the technically competent, the information is insufficient. The lack of an adequate DOS manual is a remarkable omission.

Performance

Norton's System Information utility was used as an easily comparable performance index: the Computing Index reported 5.8 at 6 MHz and 11.2 at 13; the Disk Index was 1.3 (6 Mhz); and the Performance Index was 4.3 (6 MHz) and 7.9 (13).

For my own information, I wanted to compare the machine with an XT using a version of Sieve written in Turbo Pascal — it took these times to generate the prime numbers between 1 and 10,000: the Blue Chip running at 6 MHz, took 0.72 seconds for calculation and 14.77 to print to the screen; at 13 MHz, the times were 0.33 sec and 10.55; a 4.77 MHz XT took 2.25 and 18.18 sec, respectively.

Overall

While the keyboard has the disadvantages of the AT layout, the unit itself is one of the best I've come across. The keys have the right amount of tactile feedback without being noisy. The disk drive supplied was quite noisy — whenever it was being accessed it gave a grinding noise, although that didn't seem to affect performance — the noise appeared to be caused by resonance of some metal shield or other part in the drive (replacing the drive didn't solve the problem).

The Blue Chip AT left me with mixed feelings — the keyboard and monitor were both first class, while the system unit is a compromise between an AT motherboard and XT peripherals. □

Product Details

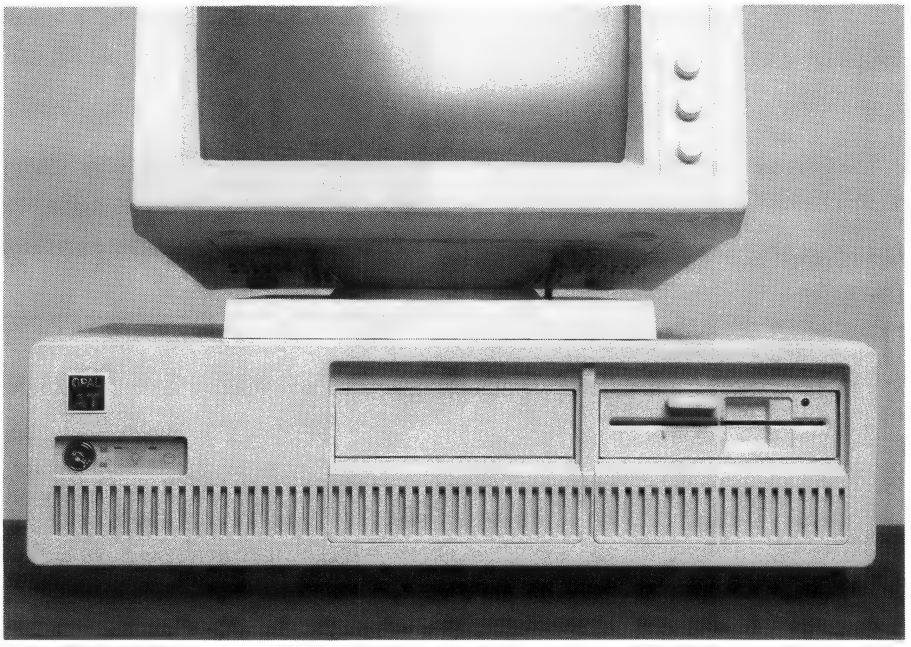
Product: Blue Chip PC-AT
From: Blue Chip, 272 Pacific Hway, Crows Nest
(02) 436 3655
Price: $2995 with 20 Mbyte hard disk, 1 Megabyte RAM, 1.2 Meg floppy drive.

ADE Opal 286

Although this machine was primarily designed as a file server, Brian Webster found it's better than many standalones.

THE OPAL PC AT is an interesting slim line computer which presented some surprises. The first thing that caught my eye was that it didn't have a reset button. As I later found this is not too much of a problem, although unusual.

I spoke with the company and found that its market is local area networks with the machine being specifically designed as an almost dedicated file server. As one of ADE's managers said, 'to have a reset button on a file server was dangerous



The Opal PC AT.

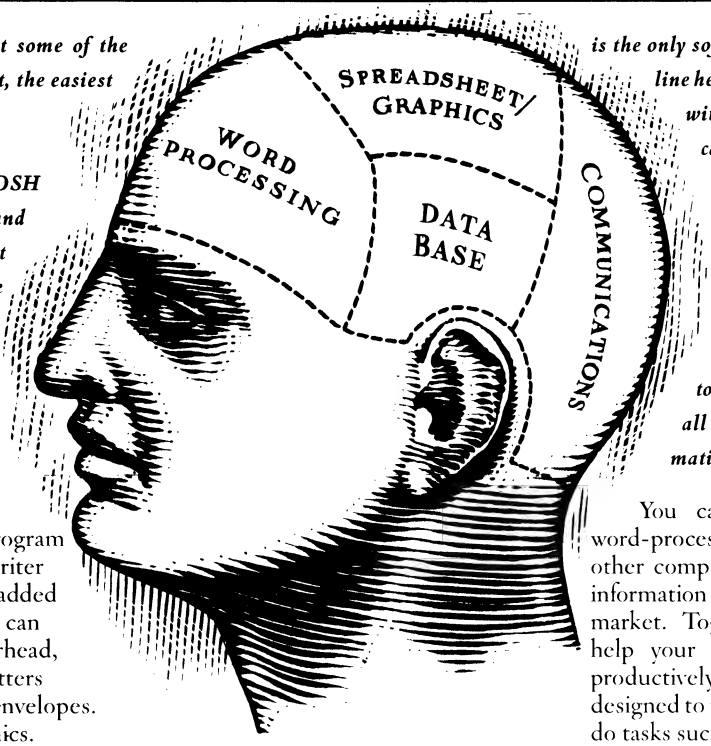
MICROSOFT WORKS. BASED ON AN EARLY DESIGN, AND JUST AS EASY TO USE.

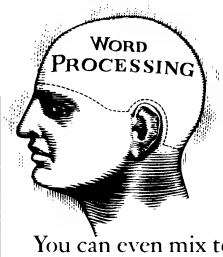
You may find it amazing that some of the most sophisticated tools are, in fact, the easiest tools to use.

Such is the case with Works. Microsoft Works for the MACINTOSH and for IBM personal computers and compatibles combines the four most important business tools in one software program.

Anyone can learn to use Works. Microsoft, the leaders in software technology, have made sure of that. You see, Works is the only software of its kind to give you on-line help when you need it. It also comes with a complete set of lessons, so you can learn at your own pace. So even if you've never used a computer before, you'll become productive immediately. Works actually allows you to do the things you couldn't on individual software.

You don't have to close one file to work with another, which means all your programs can share information quickly and easily.



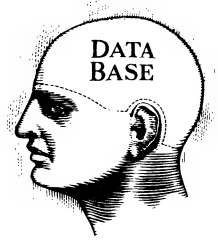


The word-processing program is your typewriter – with many added bonuses. You can create a letterhead, make form letters and address envelopes. You can even mix text and graphics.

Everything is designed to make life easier for you, including the special formats for printing mailing labels. Works handles headers, footers and page numbers automatically.

The word-processing program will give you the highest quality results possible for a printed word processing document.

It's also very fast. Which means you will be very productive.



The Works data base is your filing cabinet – with a difference. It finds what you want, sorts it, even calculates it. Names, addresses, product descriptions, dates, times and prices can all be stored in the data base.

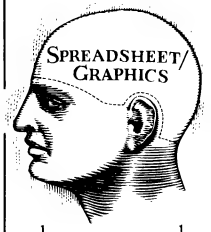
This program has a reporting component, which lets you print out information from your data base according to the characteristics you specify.

You may, for example, want a report on items which sold the best in a particular area. Works will automatically calculate totals and averages.

Pre-defined format fields on the data base program will save you time, by eliminating set-up time.

The program's extensive search criteria lets you quickly find any information you may need.

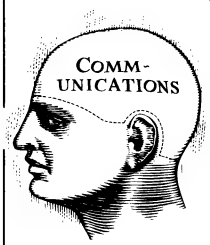
The spreadsheet program is your standard row-and-column accounting pad. With much more.



It allows you to work out budgets, financial forecasts, balance statements and more. It doesn't simply do the necessary calculations – it also recalculates whenever you change a number.

The spreadsheets are easy to work with and there's plenty of room to handle almost any set of numbers. You can split the screen to see different parts of a large spreadsheet at the same time. There's also a full range of pre-defined functions to make your complex financial, mathematical and statistical analyses go quickly.

There's also a charting component, so you can turn the numbers on your spreadsheet into charts. If you change the spreadsheet data, the chart instantly reflects those changes.



The communications program is your telephone and fax machine.

When you use your computer with a modem, Microsoft Works allows you to send and receive important data anywhere there's a phone line.

You can send your spreadsheet, word-processor or data base files to other computers. You can hook up with information services such as the stock market. Together, these programs will help your business run smoothly and productively. Because the tools are designed to work closely together, you can do tasks such as merge addresses from the database into a form letter, and insert spreadsheet numbers and charts into a business report.

Macros are another important time-saving feature. You can automate long chains of commands with a single keystroke taking the place of many.

Microsoft Works can also share information with other Microsoft programs. So you can begin with Works, then move up to any other Microsoft program if your needs become more demanding.

To find out more about how Microsoft Works would help you and your business, call Microsoft now on (02) 452 5088 or toll-free on 008 226 850. They'd be more than happy to help – after all, when you're the leaders in software technology, you've got a lot to say.

For more information please send to Microsoft, Freepost 3, Forestville, New South Wales, 2087.

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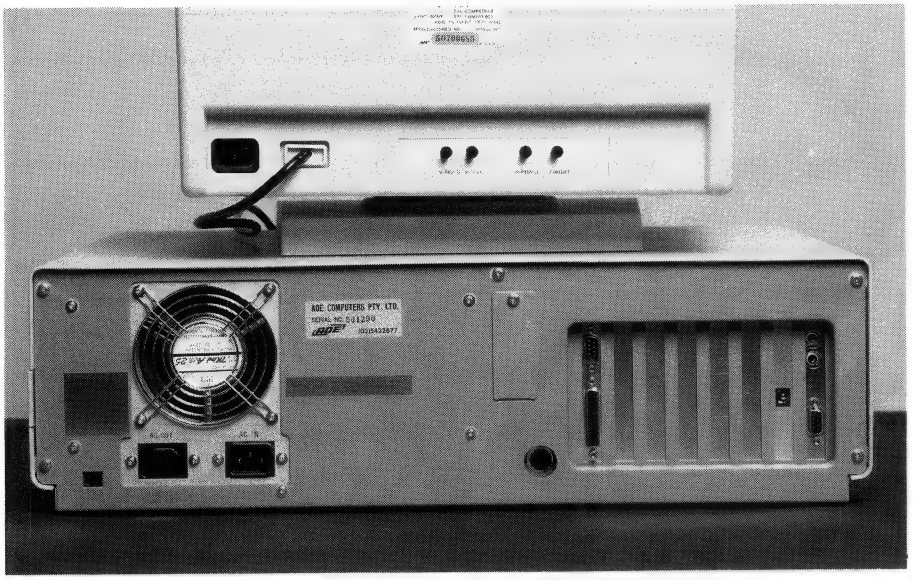
Microsoft® Works

FOR THE MACINTOSH, IBM AND COMPATIBLES

John Bevan M140501



The Opal systems unit is well constructed — there were seven screws holding the lid on. There are four 16-bit and one 8-bit slot available for expansion.

since anyone could bump it and mess up the whole network.'

We looked at the computer as a desktop standalone and found some nice features (despite the lack of the reset button).

The keyboard

The keyboard is a standard IBM AT style layout, and has indicators for Numbers Lock, Capitals Lock, and Scroll Lock. I liked the feel of the keys — very much a solid, business like feel. The keyboard is raised by flicking up two plastic legs, which offers a comfortable angle and view of the keyboard. The keyboard's cable plugs into the back of the computer and the back of the keyboard; this makes the cable bend against the front of the computer and could cause some cable trouble.

The 10 function keys are on the left hand side. This is a good setup as you can be hitting one of the function keys with your left hand and some other key with your right without any problems.

The computer

Many people have been placing their computer on its side on the floor — that's a good idea for getting some room back on the desk, but the installation tips in the Opal manual tell you not to, so be warned.

The computers standard features are: 80286 CPU processor, MS-DOS 3.20, 640 Kbyte of RAM, and 1.2 MByte floppy disk drive. The keyboard is compatible with the IBM keyboard. There's a parallel printer port, RS232 serial port, built in real time clock and eight IBM PC AT compatible 16-bit option slots which are available for additional boards.

The maintenance of the computer should be straight forward as the disk drives are in a welded metal cage with provision for four drives. The front comes off with four screws and the drives can be slid out of the front for easy removal. The hard disk is mounted to the left and the floppy on the right with provision for the other drives underneath these.

The insides

The power and controller connectors are supplied. The socket for the 80287 co-processor is clearly seen on the system board.

The fan is mounted on the back of the machine and goes into the power supply. This power unit is separate at the back of the computer box, and the expansion connectors are easy to plug into, as they are located in the bottom of the left back of the computer along with removable metal panels to add any extra connectors.

The I/O, disk controller boards, video board, and the system board plug into the mother board which only has the bus and some power connections on it. The bus has five spare slots, but only one is an 8-bit slot.

A 3.6 volt battery for the real time clock is mounted on the system board and is easy to get at.

The computer looks very well constructed; I found there were seven screws holding the lid on, which allows it to be slid off without lifting, but I am not sure if that many are really necessary.

The monitor

ADE has supplied its own ADE-60 high resolution colour monitor which was nice on the eyes and handled anything we threw at it. The monitor offers a brightness control, and green colour or orange switch (which looks a bit yellow). Separate controls on the back allow for height size, and hold and horizontal position.

Manual

The only manual supplied was the system manual which explains the PC, installation and operation. The manual supplied is the absolute minimum and would only be suitable for someone who already knows MS-DOS and can set up directories and batch files to get the computer working. This is also necessary as only the Command file was present on the hard disk.

The computer can be locked for security with a key supplied, otherwise a green light displays. A red light on the front tells you when the hard disk is in use.

The Opal's speed is normally 10 MHz but can be switched manually at the back of the computer to 6 MHz, or by using Ctrl-Alt — or + from the keyboard.

Ordering from the menu

To reset the computer by software, takes a Ctrl-Alt-SysReg and a selection from a menu (I prefer the old fashioned reset switch). The menu also allows you to set up the time and date for the real time clock, plus any additional changes to your system. The hard disk can be prepared for moving by using this menu also — I like to do this before switching off my machine.

I used Nortons Utility and an integrated package to test for software compatibility, and they performed exactly as expected. I used the Norton check against an IBM XT and the results were: 88 Kbyte RAM used by DOS, 552 Kbyte for applications, 32 Kbyte memory for display. The Computing Index relative to an IBM XT was 11.2 at a 10 MHz, Disk Index, 2.7, and Performance Index, 8.3. □

Product Details

Product: Opal PC AT
From: ADE Computers, 2 Dublin Street, East Oakleigh 3166 Vic. (03) 543 2677
Price: $5736 taxed

NEC Power Mate II

'The workmanship sets this machine apart from the 'clone' tag given to many ATs,' thought Fred Fattal after putting the Power Mate II through its paces.

It's derogative to refer to the NEC APC-IV Power Mate II personal computer as a 'clone'. This machine is solid and brilliantly engineered with outstanding features, and this workmanship sets this machine apart from the 'clone' tag given to many ATs.

It is basically an IBM-AT compatible with an 80286-10 (10 MHz) microprocessor, which can execute at a selectable speed of 8 or 10 MHz. The machine tested had a standard 640K of RAM that could be extended to 10.5 Mbyte.

The Keyboard

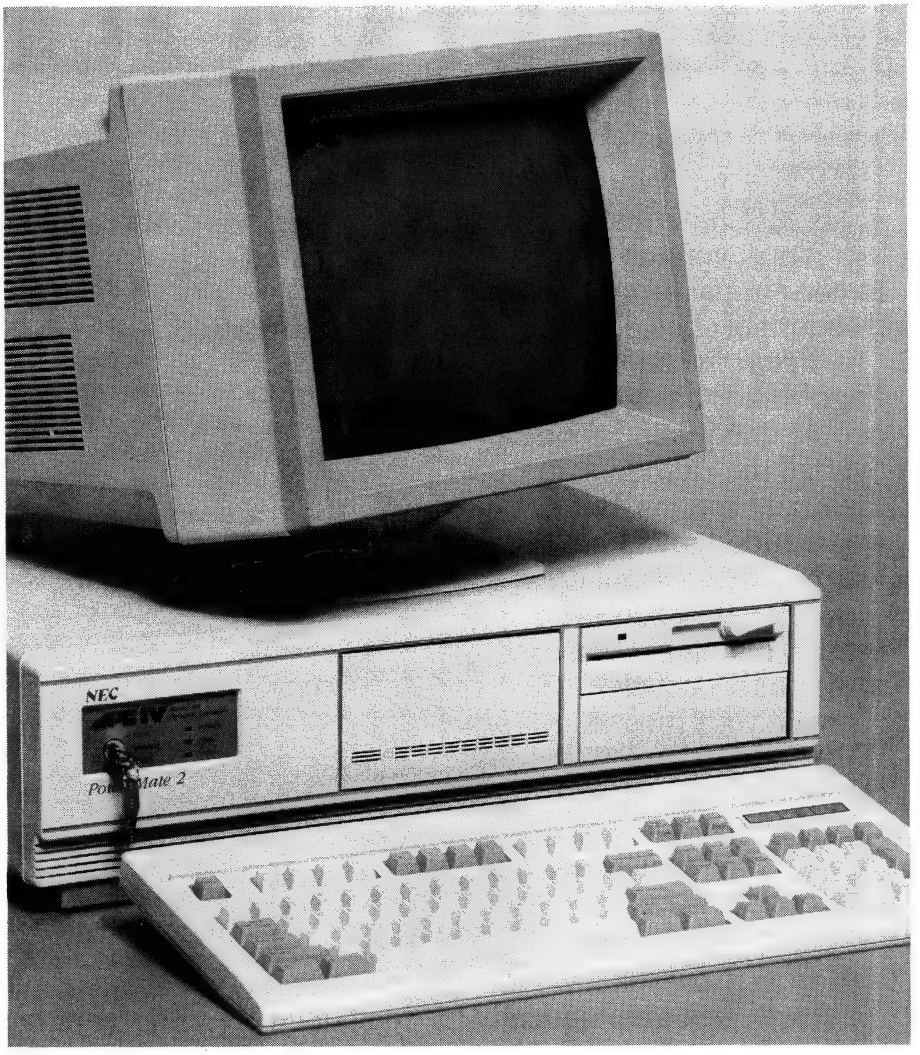
The keyboard is ultra thin with 101 keys offering a standard QWERTY layout with separate numeric keypad and a cursor diamond in the usual inverted-T configuration, as well as 12 programmable function keys across the top of the keyboard.

It has power on, NumLock and CapsLock indicators with a sculptured, comfortable feel and layout (if you are accustomed to the new IBM layout), with a light tactile feedback which is not forceful or loud. It plugs directly into the back of the computer.

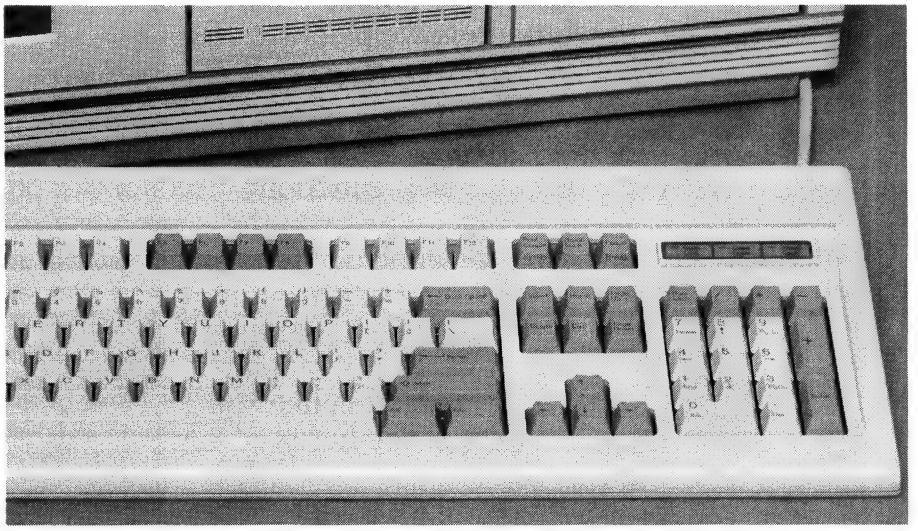
The Computer

The Power Mate II comes with standard 66 Mbyte voice coil hard disk and a 1.2 Mbyte floppy, the keyboard, 1 parallel printer port and two RS232 ports.

The user is then given a choice of selecting a graphics card from a Colour Graphics Card (CGA compatible) providing 640 x 200 pixel resolution with all normal text attributes, or an Advanced Graphics Card (EGA compatible) which provides a higher 640 x 350 pixels resolution capable of displaying 16 out of a possible 64 colours at any one time. The model tested came with the latter. There is a further choice of a non-IBM standard NEC Power



The NEC APC-IV Power Mate II



The Power Mate keyboard is ultra thin with 101 keys and a separate numeric keypad and a cursor diamond, as well as 12 programmable function keys.

Introducing P

Three years after inventing desktop publishing, the people at Aldus have just re-invented it. With a new version of PageMaker® dedicated to one simple proposition: freedom of choice.

From the beginning, PageMaker has given people unequalled control over all the elements of their publications. But now we've added many new features that also give you the ability to assemble even the longest documents with a couple clicks of your mouse. With PageMaker 3.0 the choice is always yours.

Here are a few of the new ways you'll have to exercise it.

TECHNICAL PAPER
#852330

kind of delay potentially unaffordable. A single such delay could not only wipe out the savings of those tires on that unit, it could lose a valued, profitable customer, thereby substantially reducing revenue.

Fleet standardization is another difficulty today with wide-base singles. These tires cannot be used on steer axles due to their lateral wet traction problems and proclivity for irregular wear caused by light loading. Fleets therefore would have to purchase a conventional type of tire for the steering positions. The problem with that is retreads are not generally used on steer axles and the retreaded tires wouldn't fit at any other position.

Equipping today's trucks with wide-base singles is also costly from a purchase tax standpoint. Since the Federal Excise Tax (FET) for a 212-pound 16.5R22.5 is $71.50, the total purchase price of the wide-base single, though only 57% more than a standard radial, is now much closer to the cost of two low profile tires whose total FET is $48.00. The small price advantage, as well as some of the cost savings of the wide-base singles, can be more than offset currently by the added cost of the special axles and wheels they require.

Wide-base singles may be the tire configuration of the future. New materials and constructions could increase their value while new tread designs and compounds may reduce their disadvantages. Should a reliable, self-sealing liner be developed to eliminate equipment downtime and freight delays, the acceptance of this type tire would be appreciably accelerated.

To summarize, the following is what we consider realistic and achievable in five to ten years:

Low Aspect Ratio Tires- These must exhibit reduced rolling resistance, weight and size to increase vehicle payload and decrease fuel consumption. Fleet operators will want to choose between dual low profile tires for other than steering positions or low aspect ratio wide-base singles, which offer further advantages in weight and rolling resistance over dual low profile tires.

Hardware for Low Aspect Ratio Tires- In order to maximize these tires' performance, truck manufacturers must design equipment to fully accommodate the smaller diameter tires. As soon as practical, suspensions must be redesigned to be compatible with the springing characteristics of radial tires. Reduced tire size may also create a need for redesigned transmission and drive axle gearing.

Hardware for Wide-Base Tires- Axles will have to be lengthened to situate these tires correctly under 102" wide trailers. The added room afforded may provide for more design creativity in the brake and sus-

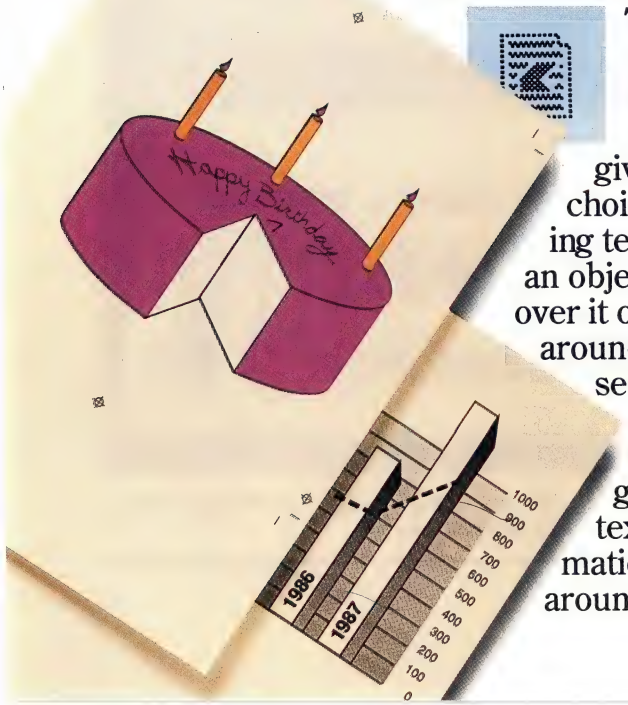
Spot Color

Mix a virtually unlimited palette of colors based on any one of three standard color models: RGB, CMYK or HLS. Then you can tag any element in the publication with a color by just clicking your pointer on it.

And, when you print your document, PageMaker 3.0 gives you the choice of a single, composite image or separate sheets for each color used. You can even place registration marks in the corners of your separated output for accurate assembly by a professional printer.

Autoflow

Now you have the option of flowing text automatically for long documents, or placing it column by column for shorter, more design-intensive pieces.



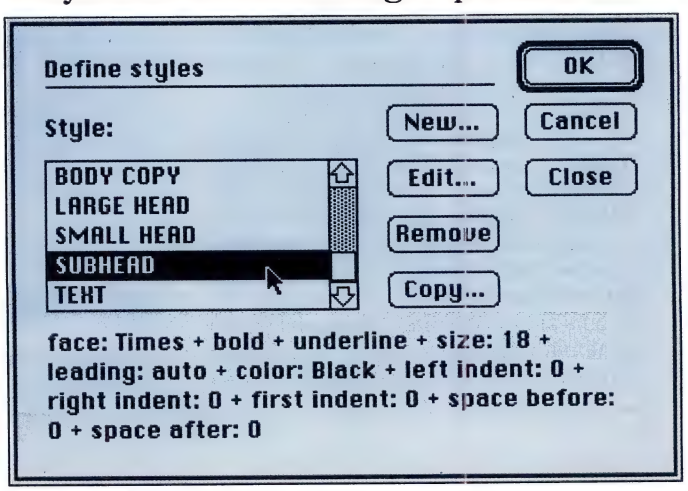
Text Wrap

Our new text wrap function gives you the choice of flowing text through an object, jumping over it or wrapping around it, like you see here.

And when you move a graphic, your text will automatically reflow around it.

Style Sheets

PageMaker's style sheets give you the ability to create and apply style formats, including color, for all your text. And that allows you to reformat an entire story or document in a single operation.



'ageMaker 3.0

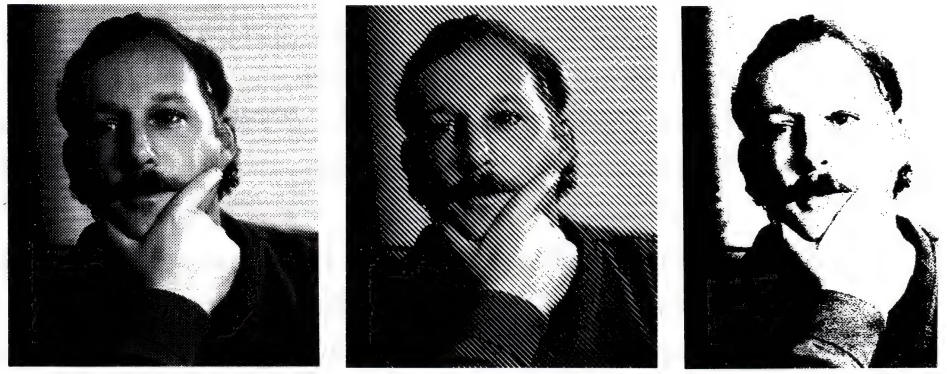
You can also tag text in your word processor, database or spreadsheet for instant formatting in PageMaker. And any style commands from Microsoft® Word files are read directly.

Templates

Since professionally designed templates are now included with PageMaker, it's easy to give every document you create a designer's touch. You use the templates like blueprints, placing your own headlines, text and graphics according to the designated styles and sizes.

Image Control

You can now adjust the lightness or contrast of any scanned image or bit-map graphic you place in PageMaker. And if you want to further customize a graphic, you can use one of our built-in special effects, or even create one of your own.



High Quality Fonts

In addition to supporting a wide range of PostScript® fonts, PageMaker for the PC now expands the capabilities of the HP LaserJet Series II and other PCL output devices.

That's because we're including three Bitstream® fonts and Fontware,™ a special font generator, at no extra cost. So you'll be able to create bit-map and screen fonts from 4 to 128 points in Dutch, Swiss (Bitstream's versions of Times and Helvetica) and Courier typefaces.

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Graphics Card at 1120 x 750 pixels for graphics intensive applications.

The BIOS is a Phoenix 80286 ROM BIOS Ver. 3.05 TB, which automatically boots up to 10 MHz mode which can be switched to 8 MHz with Cntrl-Alt-minus and back to 10 MHz with Cntrl-Alt-plus.

The machine was supplied with MS-DOS ver 3.2 and GWBasic. The 640K RAM was on the motherboard along with the I/O ports. It had 8 expansion slots, two XT (8 bit slots) and six AT (16 bit slots).

The Power Mate's hard disk was previously formatted to drives c:, d: and e: — it gave an average access time of 23 ms. The 5¼ inch full height floppy drive left room there for an optional extra floppy or 20 Mbyte or 40 Mbyte slim type hard disk. The head movement of the hard disk was quite high, but this is typical of the voice coil.

A single 3½ inch floppy can be also installed but no format and size information was available or its compatibility to the IBM floppies.

The power supply is 220W with a noiseless cooling fan. The lock on the machine has three positions: Lock, Unlock and Reset which can be used as a hardware reset position. There is provision for an 80287 maths coprocessor but that was not installed.

Video System

The machine evaluated was supplied with an NEC Advanced Graphics Display (EGA monitor) controlled by an NEC Advanced Graphics Board (EGA compatible) with a Phoenix Enhanced Video BIOS Ver. 1.17 (256K RAM). The card ran all the common EGA programs faultlessly with crisp and sharp graphics and text without any strain on the eyes. The display was 35 cm diagonally with an automatic scanning and adjusting facility to the horizontal frequencies between 15.75 and 35 kHz.

Manual and Documentation

The accompanying user manual was well written with extensive illustrations to enable complete installation with sufficient technical details. It is also supplied with an MS-DOS manual and diskette, as well as, a GWBasic manual.

A separate utilities diskette has the set up program for the AT Power Mate II, which is menu driven, very comprehensive and easy to use to configure the system and its hard disk. □

Product Details

Product: NEC APC-IV Power Mate II
From: NEC Computers
Distributor: NEC, 99 Nicholson Street, St Leonards 2065.
(02) 438 3544
Price: Power Mate II with 66 Mbyte hard disk $6440, colour monitor $1218, CGA $640 and MS-DOS $84 (all untaxed)

Tandy 3000

Here's a compatible that's not a clone — Brian Webster takes a closer look.

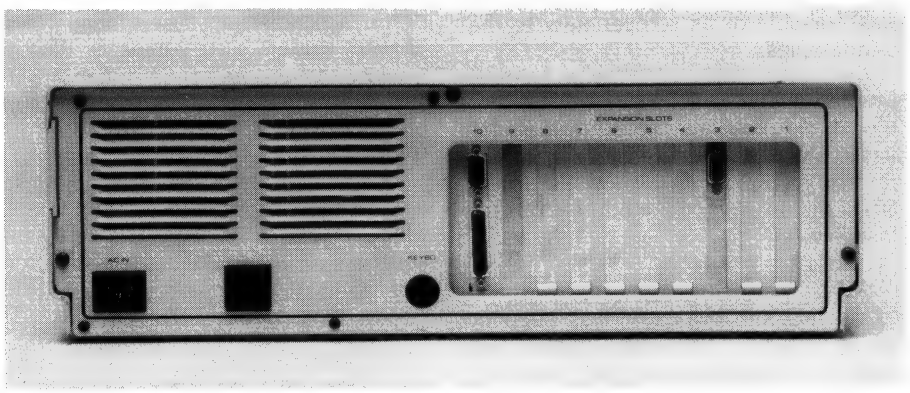
TANDY, THROUGH its Christmas advertising, started marketing its low end PC and XT computers as affordable hard work horses. According to Tandy, the 3000 is aimed at the small business, corporate and government markets.

The first thing I noticed about the Tandy 3000 was that it was outwardly a low priced computer — but the internal workings soon caught my interest.

When I powered up the Tandy, I found a customised menu which provided several options. This isn't provided on Tandy machines as standard, as it only sells either the Xenix or MS-DOS operating systems. The machine is, however, also designed to take the new OS/2 when it becomes available.

The system supplied was a standard 80286-based computer, with a 20 MByte hard disk, and a 1.2 MByte floppy disk drive. The software supplied was Desk, an integrated general business package, with

The Tandy 3000 shows its own style.



The back of the Tandy shows ten slots — even with three used for the I/O, video and disk controller boards, there's still plenty of room for expansion.

The keyboard for the Tandy 3000 is a standard AT style.

a wordprocessor, spreadsheet, database and business planner. This package was easy to use and suitable for a new computer user. A 'shiptrak' program is supplied to park the hard disk for moving the computer.

The Tandy 3000 is just a little larger than the standard AT.

BasicA was also supplied, and MS-DOS 3.2. A menu of other programs had been added for demonstration purposes, the person responsible for the helpful program not asking for payment for his two wives and five children as usual, but wouldn't turn down a case of beer.

Nitty Gritty

The hard disk is mounted in the bottom drive with space for two floppies above, but one of the drive slots was unused. The power and controller connectors are supplied.

Maintenance of the computer should be straight forward as the disk drives are all held on with a couple of screws and a metal guide, and are easily removed. The socket for the 80287 co-processor is clearly seen on the main board, so installation should be easy.

The CMOS RAM battery is also easy to remove from the front panel — it's 6.8 volts (which I trust Tandy stock). The battery has a connector and wire soldered to the it; this would have to be re-soldered or bought as a complete replacement; Tandy quote the battery life to be three years.

The fan is mounted on the front of the machine and makes a lot of noise. The power unit is separate at the back of the computer box, and the expansion connectors are easy to plug into lying in the bottom of the left back of the computer box, along with removable metal panels to add any extra connectors.

The I/O, video, and the disk controller boards are already plugged into this bus. The boards use conventional integrated circuits, rather than integrated specials and as a consequence take up a lot of board space. This can be an advantage for service, but could explain why the extra cooling is necessary.

I used Nortons Utility, and a graphics package to test software compatibility and I used Desk, Open Access and Space Invaders which were supplied. All the software worked as expected, the only problem being my ability on Space Invaders.

I used the Nortons check against an IBM XT and the results were: 88 Kbyte RAM used by DOS and 424 Kbyte for applications; and 64 Kbyte memory for display. The Computing Index relative to an IBM XT was 7.7 at 8 MHz, Disk Index, 1.7, Performance Index, 5.7.

This performance was relatively low for a machine in this price bracket, and did not show good price to performance ratio. At least we would have expected a machine which was switchable to 10 MHz and perform a little better in the Norton's test.

Keyboard

The Tandy 3000 has a standard IBM AT style keyboard layout. It has indicators for Numbers Lock, Capitals Lock, and Scroll Lock on the keys. The keys have a solid business-like feel; two plastic legs allow the keyboard to be raised (one of these was broken on the review machine). The cable plugs into the back of the computer and is very robust. The 10 function keys are on the left hand side.

Monitor

The monitor supplied was a Tandy TRS-80 high resolution color monitor CM-1, which has a 12 inch color CRT. The plug to the monitor video is one I hadn't seen before — it's 8-pin and non-standard; although it's robust, something like this can be a nuisance if it ever has to be replaced.

The manuals supplied are Tandy 3000 Installation and Operation Manual, and MS-DOS, Basic, and DeskMate manuals. All are well written and illustrated. The manuals were all in conventional style, describing each command, instruction, and more, in great detail. □

Product Details

Product: Tandy 3000 PC/AT
From: Tandy Computers, 91 Kurrajong Ave, Mt Druitt 2770 NSW
(02) 675 1222
Price: $7499 basic system; $1099 high resolution monitor; $199 operating system (either Xenix or MS-DOS). All prices taxed.

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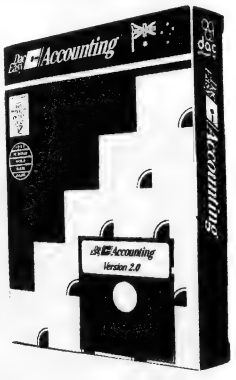

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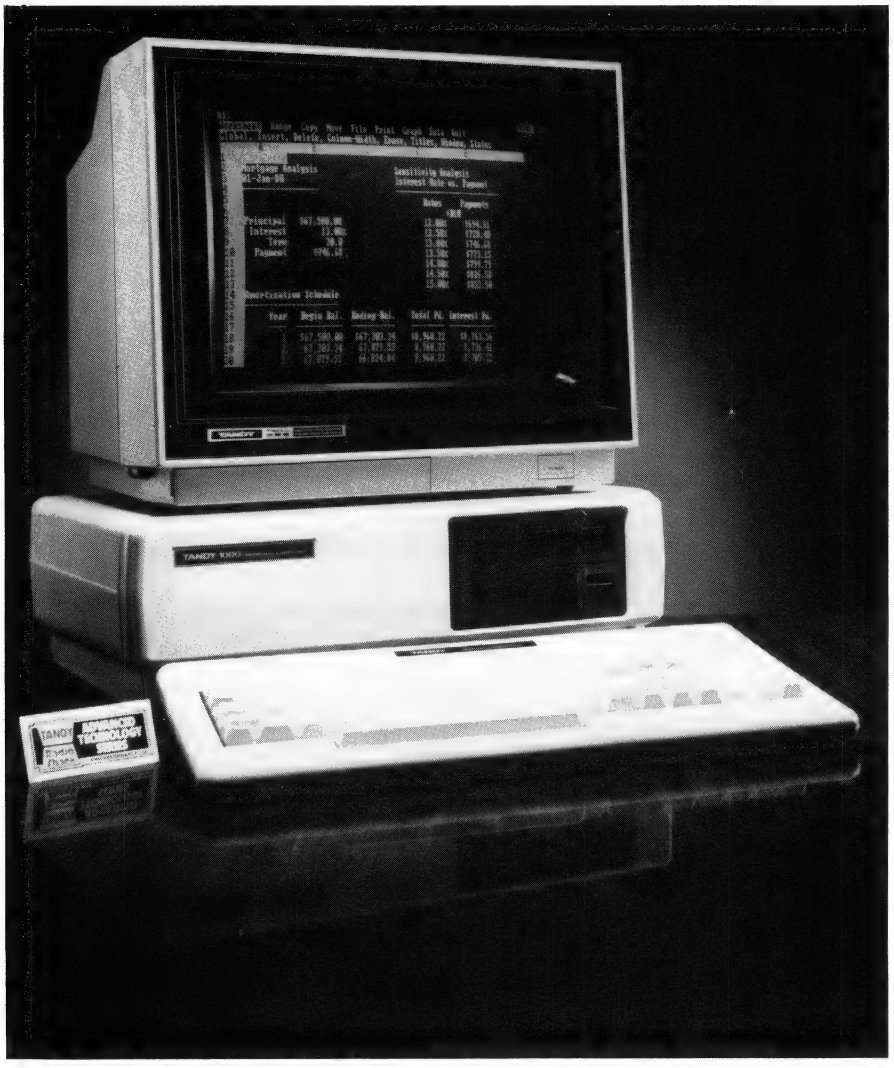
Your Computer's AT Catalog

Now that you've decided 1988 won't be complete without a new AT sitting on your desk, we've assembled a list of suppliers who can help. Because of the almost infinite variety of configurations that can be put together (and the same number of prices), we strongly recommend that you shop around to find the combination that best suits your needs.



Portables

MOST OF THE affordable portables available are still XTs. A number of manufacturers and distributors have released (or are set to release) AT portables, but in many instances the configuration and availability were uncertain when we were compiling this feature. If you are interested in a portable AT, contact American Business Machines, NEC, President Computers and Sharp, all of whom are listed under Desktops. Toshiba's portable AT offering, the T3200, is reviewed in this issue.

Desktops

Acer Multitech 286

Dick Smith Electronics
Corner of Lane Cove and Waterloo Roads,
North Ryde 2113 NSW
(02) 888 3200
Configuration: 20 Mbyte hard disk; 640K RAM; 1.2 Mbyte floppy drive; 6 to 10 MHz switchable; six expansion slots consisting of two 8-bit (one occupied) and four 16-bit slots; a 3-in-1 video board to accommodate most monitors.

ACD Baby AT Computer

ACD Computers
76 St Kilda Road,
St Kilda 3182 Vic.
(03) 537 1722
Configuration: 512K RAM; 1.2 Mbyte floppy disk drive; 180 Watt power supply; 84 key AT style keyboard; 6/10/12 MHz switchable speeds; CGA and Hercules graphics supported.

ASI Baby AT

Telecomputing PCS
2nd Floor, 156 Pacific Highway,
St Leonards 2065 NSW
(02) 439 5966
Configuration: 6 to 8 MHz switchable; 1 Mbyte onboard memory; 20 Mbyte

hard disk; 1.2 Mbyte floppy; 200 Watt power supply; comes with Easy wordprocessing software; the standard machine has mono screen and graphics but colour can be provided through a CGA.

AST 286

Imagineering
77 Dunning Avenue,
Rosebery 2018 NSW
(02) 697 8666
Configuration: 640K RAM expandable to 1 Mbyte; 1.2 Mbyte floppy; parallel and serial ports; enhanced 101 key keyboard; 40 Mbyte hard disk; DOS 3.2; 192 Watt power supply; seven expansion slots, one 8-bit and the rest 16-bit.

Blue Chip PC AT

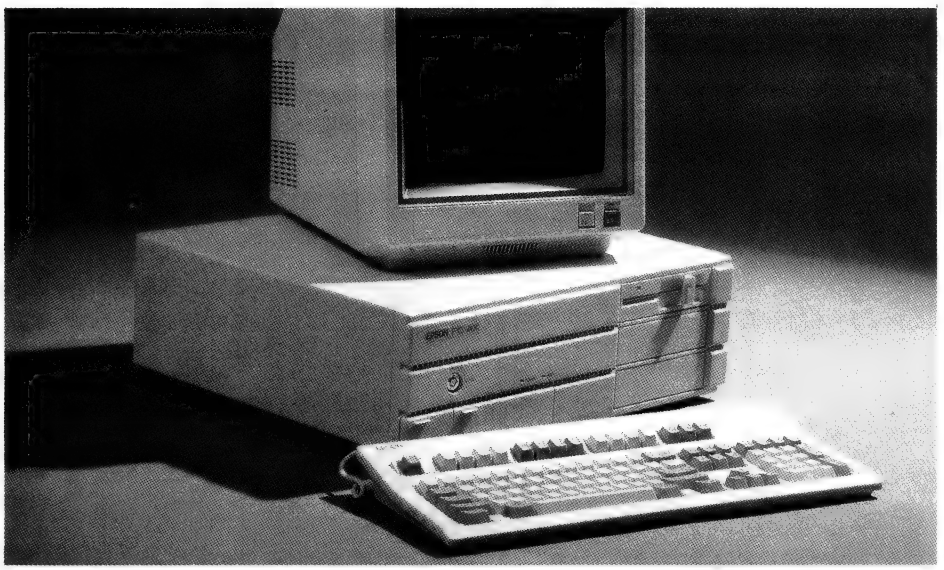
Blue Chip Computers
272 Pacific Highway,
Crows Nest 2065 NSW
(02) 436 3655
Configuration: 1 Mbyte RAM, 20 Mbyte hard disk, 1.2 Mbyte floppy, standard AT keyboard, and a green or amber screen; switchable clock speed of 6 to 10 MHz; comes standard with monochrome monitor but has CGA colour compatibility; eight slots with two 8-bit and six 16-bit. See review this issue.

Canon A200 EX

Canon Australia
1 Waterloo Road,
North Ryde 2113 NSW
(02) 887 0166
Configuration: The standard machine comes with a 40 Mbyte hard disk; 1.2 Mbyte floppy; it has serial and parallel ports; 640K RAM; eight slots, six are 16-bit and two are 8-bit; switchable speeds of 6 and 8 MHz; comes with monochrome monitor; has Hercules Graphics Card installed; reset button on the front.

Cleveland 286

Computer Corp of Australia
Unit 3, Airport Industrial Park,
Hendra 4011 Qld.
(07) 268 7555
Configuration: small footprint; 6 or 8 MHz switchable; 20 Mbyte hard disk with 1.2 Mbyte floppy; 200 Watt power supply; CGA monitor standard, EGA available; bundled with DOS 3.2 and GWBasic. See review in Jan '88 YC.



Commodore PC-40

High Tech Communications Solutions
290 Bay St,
Brighton 3186 Vic.
(03) 596 6211
Configuration: 6 and 10 MHz switchable; 1 megabyte RAM; 8 expansion slots, two 8-bit and six 16-bit; Advanced Graphics Adaptor; HGA and CGA compatible; standard 84-key AT layout; 200 Watt power supply; bundled with DOS 3.2 and GWBasic.

Compact 88

Profound
215-217 Park Street,
South Melbourne 3205 Vic.
(03) 699 3088
Configuration: Standard 640K memory setup; processors incorporate no wait states; 84 key keyboard; 20 Mbyte hard disk; space for one additional half height hard disk, and one floppy; mono or colour optional as monitor not supplied.

Compaq Range

Compaq
100 Harris Street,
Pyrmont 2009 NSW
(02) 660 0077
Configuration: Compaq Deskpro 286 runs at a switchable 8/12 MHz clock speed; 640K memory expandable to 2.1 Mbytes; 20 Mbyte hard disk in standard unit; six expansion slots with one 8-bit and the rest 16-bit; options for two floppy drives and two half height hard disks; an enhanced 101 keyboard; EGA and CGA compatible; can only run Compaq designed monochrome screens; 220 Watts power supply; parallel and serial ports provided. See review April 87 issue of YC of the 16 MHz version of the machine.

Datamini AT 20

Cartel Personal Computers
823 Glenhuntly Road,
Caulfield South 3162 Vic.
(03) 523 0008
Configuration: Comes standard with 640K memory expandable to 1 Mbyte; switchable 8/10 MHz; 1.2 Mbyte floppy and 360K floppy drives; 20 Mbyte hard disk; CGA and RGB connection; 101 key AT style keyboard; mono monitor; MS-DOS version 3.21 and GWBasic.

Datatel DPC-286

Datatel
19 Raglan Street,
South Melbourne 3205 Vic.
(03) 690 4000
Configuration: One Mbyte RAM standard; 1.2 Mbyte floppy; 20 Mbyte hard disk; 200 Watt power supply; AT style keyboard; compatible with CGA, HGC and MGA video cards; switchable 6/8 and 10 MHz; supplied with MS-DOS 3.21 and GWBasic; has Phoenix Bios; 8 card slots; and comes with the MDS Genius monochrome monitor.

Epson PC AX

Epson Australia
17 Rodborough Rd,
Frenchs Forest 2086 NSW
(02) 452 5222

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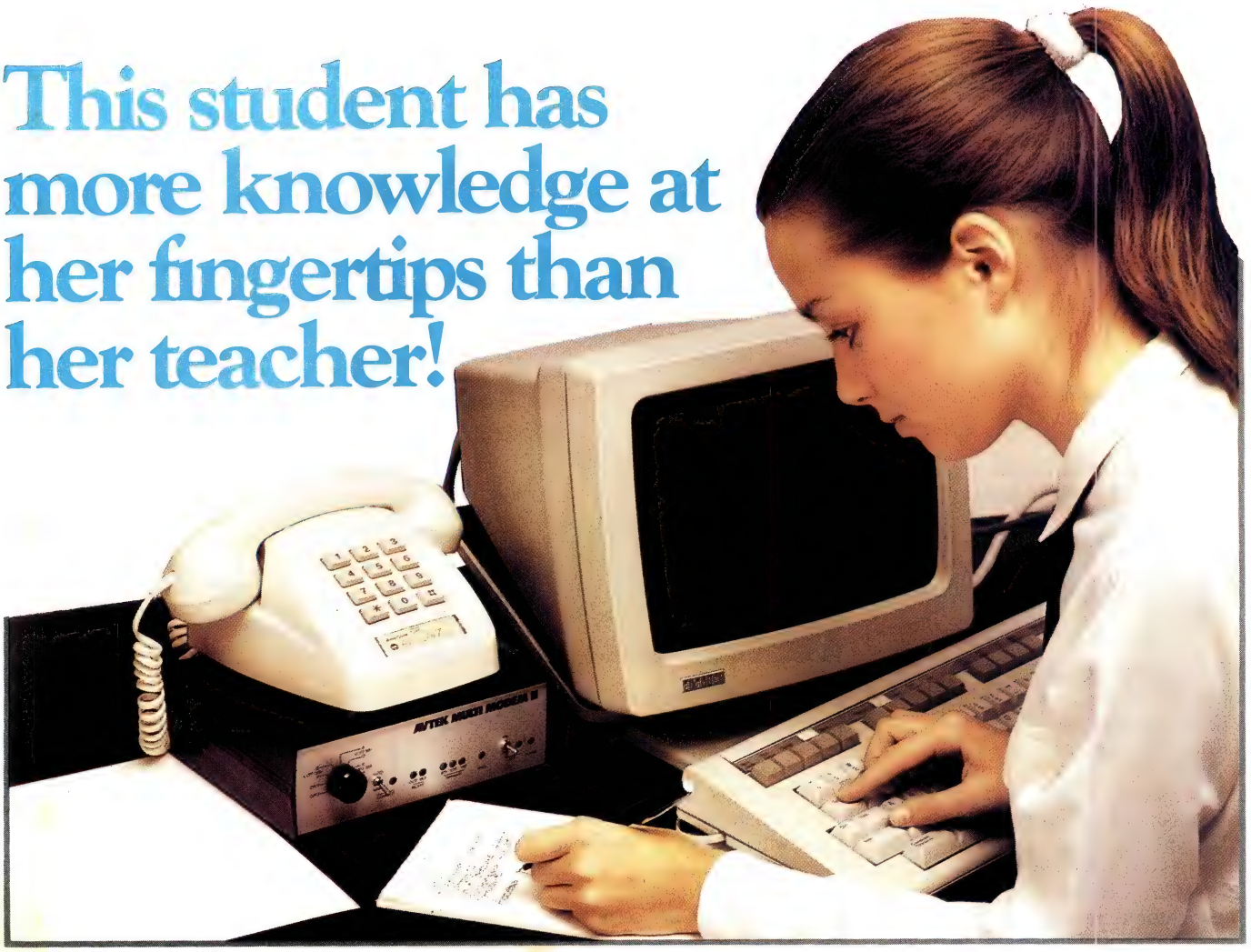

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* Australian Politics
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Schools Across Australia

This School-based Bicentennial Initiative aims to create a National Computer Link between Australian schools so that ideas, resources and experiences can be shared.

This link is hosted by CTC.

***AVAILABLE 1988**

Configuration: Standard 40 Mbyte hard disk and 1.2 Mbyte floppy; 6, 8 and 10 MHz switchable; nine expansion slots, three 8-bit and six 16-bit; enhanced DOS 3.2; color our monochrome monitor; 101 key AT keyboard. Reviewed YC Dec '87.

Hewlett-Packard Vectra ES/12

Hewlett-Packard
17 Talavera Road,
North Ryde 2113 NSW
(02) 888 4444
Configuration: Small footprint computer with 40 Mbyte hard disk; 1.2 Mbyte floppy; 640K RAM; parallel and serial ports; an EGA card; ultra thin 101 key keyboard with 12 function keys. See review this issue.

IBM PS/2 50

IBM Australia
Coonara Avenue,
West Pennant Hills 2120 NSW
(02) 634 9111
Configuration: A 20 Mbyte hard disk; 1.44 Mbyte floppy; parallel and serial ports; 1 Mbyte of RAM; optional co-processor; 10 MHz non-switchable; 101 key standard IBM keyboard; a VGA chip which copes with monochrome or colour monitors.

IPX 286 AT Turbo

IPEX Computers
Suite 60 Chatswood Village,
47 Neridah Street, Chatswood 2067 NSW
(02) 419 8577
Configuration: Six speed selectable, two drives (1.2 Mbyte, and 360K), and optional 3½ inch drive is available; one tape backup unit cartridge, two hard disk drives (140 Mbytes); 640K memory expandable to 12 Mbytes; extended AT keyboard; 200 Watt power supply; colour supported by EGA, CGA, MDA, and Magic Video boards.

Kaypro 286 C Model

Kaypro Computers
Unit 8, 29-33 Waratah Road,
Kirrawee 2232 NSW
(02) 542 3866
Configuration: The model C is fully configured with a 10 MHz clock speed, 0 wait states; serial and parallel ports; 40 Mbyte hard disk; 1.2 Mbyte floppy; 101 numeric keyboard; no video board or monitor is supplied.

NEC Powermate II

NEC Australia
99 Nicholson Street,
St Leonards 2065 NSW
(02) 438 3544
Configuration: Comes with a 66 Mbyte hard disk as standard; ultra thin keyboard with 101 keys and numeric keypad; monitor is optional (NEC supply their own); MS-DOS is also optional. See review this issue.

Neostar 286

KCM Computers
380 Victoria Street,
Richmond 3121 Vic.
(03) 429 2733
Configuration: 1 Mbyte of RAM; 45 Mbyte voice coil hard disk; TTL monitor; supplied with MS-DOS 3.3.

Olivetti M28

Olivetti Australia
140 Williams Street,
Sydney 2000 NSW.
(02) 358 2655
Configuration: Specially designed small footprint case and keyboard; 40 Mbyte hard disk; 1.2 Mbyte floppy.

Opal 286

ADE Computers
2 Dublin Street,
East Oakleigh 3166 Vic.
(03) 543 2677
Configuration: A 20 Mbyte hard disk; 8 to 10 MHz switchable clock speed; CGA board; mono or colour monitor; AT style keyboard. See review this issue.

Osbourne Endeavour 286

Osbourne
93 York Street,
Sydney 2000 NSW
(02) 290 1122
Configuration: 12 MHz; baby AT case; four half height drives, which includes 3½ inch floppy disk drive capability. 101 key enhanced AT style keyboard layout; MS-DOS 3.3; EGA card; and standard 20 Mbyte hard disk.

Premier 286

Total Peripherals
Unit 22, 1-7 Short Street,
Chatswood 2067 NSW
(02) 417 7455
Configuration: Runs at 10 MHz; 512K RAM; Phoenix Bios; 360K; Hercules

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Configuration: Switchable between 6, 8 and 10 MHz; 101 key AT style keyboard with function keys across the top; 200 Watt power supply; six AT and two short 8-bit slots are provided; 640K of RAM; 1.2 Mbyte floppy; a 20 Mbyte hard disk with 40 Mbytes available; EGA supported monitors. See review this issue.

Sancom 286

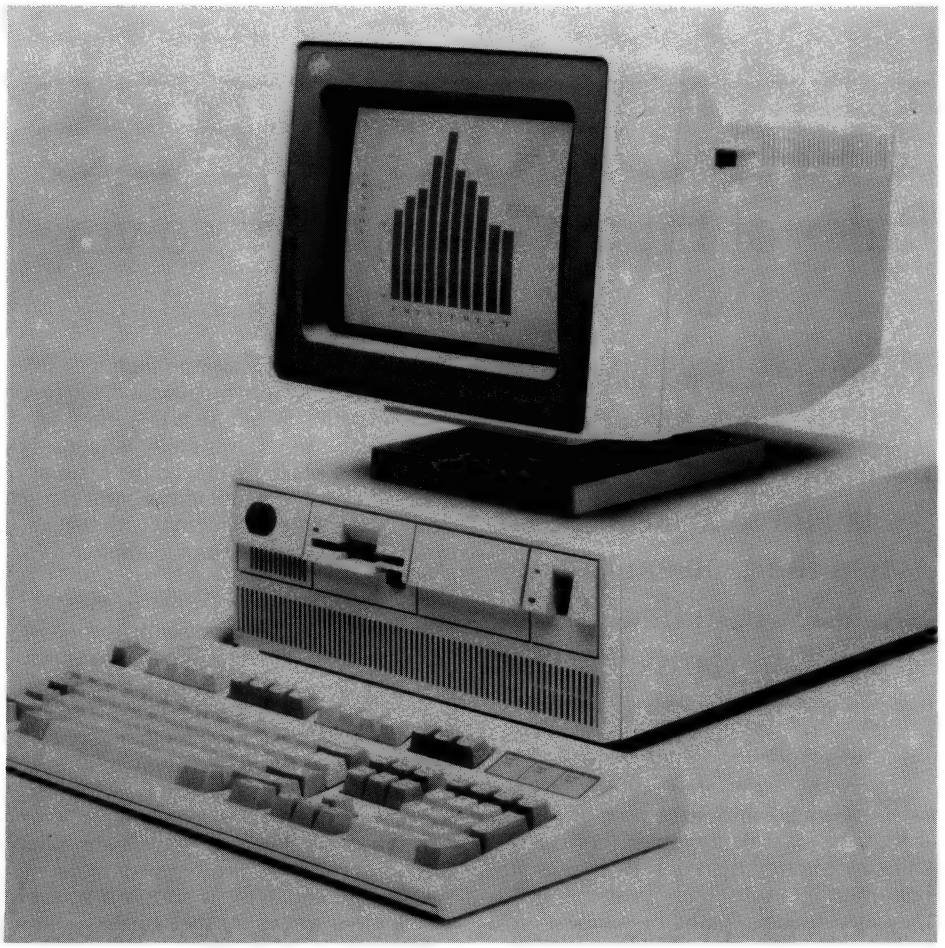
Sancom Computers
1 Athol Street,
Leichhardt 2040 NSW
(02) 568 2660
Configuration: 8 to 10 MHz switchable; 84 key low profile keyboard; option of CGA or EGA colour or monochrome adaptors; 512K RAM; eight slots, two 8-bit and six 16-bit; 20 Mbyte hard disk, with space for additional hard disk, and floppy drive. See review this issue.

Skai 286 AT

Porchester Computers
177 Barkly Street,
St Kilda 3182 Vic.
(03) 537 2722
Configuration: Switchable 8 to 10 MHz clock speed with zero wait states; two 1.2 Mbyte floppies; 20 Mbyte hard disk; EGA board although standard comes with mono board and monochrome monitor; five 16-bit slots and three 8-bit expansion slots; standard 101 key keyboard. See review this issue.

Sotec AT

Kohjinsha-Sotec
17 Brighton Street,
St Kilda 3182 Vic.
(03) 534 0286
Configuration: 10 to 12 MHz switchable; 640K RAM; 1.2 Mbyte floppy and 20 Mbyte hard disk, with room for one floppy and a half height hard disk; parallel and serial ports provided; HGA supplied; eight expansion slots, two 8-bit slots and six 16-bit slots; standard 101 key keyboard; monitor is optional; memory is expandable to 1 Mbyte.



Tandy 3000 PC AT

Tandy
91 Kurrajong Avenue,
Mount Druitt 2770 NSW
(02) 675 1222
Configuration: 20 Mbyte hard disk; 1.2 Mbyte floppy; 8 MHz clock speed; specially designed connectors to the Tandy TRS-80 monitor; standard AT style 101 key keyboard. See review this issue.

Vectra ES/12

Hewlett-Packard
17 Talavera Road,
North Ryde 2113 NSW
(02) 888 4444
Configuration: Runs at a constant 12 MHz; 640K RAM; supplied with MS-DOS 3.2 and GWBasic; seven expansion slots, one of which is used for the graphics card and monitor; thin keyboard with 101 keys; 1.2 Mbyte floppy; 40 Mbyte hard disk; monitor supplied supporting HP EGA.

Walkom and ABM 286 Turbo

American Business Machines
9 Claremace Crescent,
Berkley Vale 2259 NSW
(043) 88 5133
Configuration: The 286 machine runs at 8MHz with 512K RAM. It has eight slots; a 1.2 Mbyte floppy drive plus 20 Mbyte Miniscribe hard disk. Colour is supported through an MGP colour board; running on ABM TTL monitors. The keyboard is standard IBM AT layout.

Wyse AT 286

Imagineering
77 Dunning Avenue,
Rosebery 2018 NSW
(02) 697 8666
Configuration: 640K RAM expandable to 1 Mbyte; 50 Mbyte hard disk; seven expansion slots, two 8-bit and five 16-bit; 190 Watt power supply; enhanced 102 key keyboard; serial and parallel ports; EGA card; DOS 3.2 and GWBasic.

HEURISTICS

Rules of thumb for problem solving

Computers need black and white choices to make a decision — so how can they be taught to make a choice when the problem is more complex than that? Easy, says Tim Hartnell . . .

HEURISTICS ARE 'rules of thumb'. They are often rather inexact rules, which have been proved in practice to produce correct results, more often than not. Heuristics are important in artificial intelligence (AI). As they are, in effect, paths or signposts towards solutions, an AI program can employ them to solve problems. But computers don't like things which are not either black or white, zero or one. Shades of grey, degrees of uncertainty, and possibilities and perhaps sit unhappily within electronic brains.

Nevertheless, the intuitive judgement, the exercise of common sense, is a vital part of human thinking, and it is said that until an AI program can work with incomplete data, and imperfect methods, and still get its results, it has no reason to expect to be considered intelligent.

'Heuristics are criteria, methods, or principles for deciding which among several courses of action promises to be the most effective in order to achieve some goal.' That's the definition given by Judea Pearl in *Heuristics: Intelligent Search Strategies for Computer Problem Solving*, (Addison-Wesley, 1984). These heuristics, says Pearl, 'represent compromises between two requirements: the need to make such criteria simple and, at the same time, the desire to see them discriminate correctly between good and bad choices.'

All problem-solving programs have procedures with which to work. I suggest that only if the procedure is imperfect, unproved or inexact can it really be considered to be a heuristic procedure. In an effort to make that statement a little more clear, I've included a program with this article which shows a heuristic approach in action.

The program, Antimind, is really Mastermind in reverse. Instead of the computer thinking of a four-digit code which you have to solve, the program tries to solve your three-digit code (in which none of the numbers appears more than once). Think about the last time you played Mastermind. How did you narrow in on the correct choice? It is extremely difficult to determine exactly how you made your decisions, apart from the obvious one of rejecting all colours in a choice if you've no blacks or whites for that guess.

Antimind is an attempt to write a program which would work towards the answer to a problem in an apparently intelligent manner, even when no clearly-defined human approach to solving the problem exists. In this, the computer is attempting to solve a Mastermind-like puzzle, in which you think of a three-digit numerical code, and the computer tries to guess it.

You give the computer feedback in the form of responding to its guesses with 'whites' and 'blacks', where a white is given for a digit which is correct, but is in the wrong position within the code, and a black is given whenever there is a correct digit within the code.

The problem, as I suggested earlier, is not totally straightforward, as the computer does not know, for certain, which digit produced which result. It works in a fairly simple manner, in theory, although implementing the relatively simple idea behind the program was not particularly easy. Every time a digit appears in the code which is awarded a black, every digit within that code is weighted so it appears more often in future guesses. The more blacks in that particular code, the higher the weighting each code gets. A much smaller weighting is awarded if the code gets one or more whites. Any code getting neither a black nor a white leads to all the digits within that guess being totally removed from future consideration.

The program works reasonably well, in most cases, although it can sometimes get a fixation for a digit which is not in the answer, and which it will then bring up endlessly, refusing to discard the wrong answer. Once you're tried it a few times, you might want to refine its methods, or try a totally different approach to solving the problem (and I'd like to see any solutions you come up with).

Here is the output for one run of the program, when it managed to solve it within seven guesses —

```
Guess number 1
My guess is 1 2 3
How many blacks? 1
And how many whites? 0

Guess number 2
My guess is 4 5 6
How many blacks? 0
And how many whites? 1

Guess number 3
My guess is 7 8 9
How many blacks? 1
And how many whites? 0

Guess number 4
My guess is 4 2 6
How many blacks?
And how many whites? 1

Guess number 5
My guess is 8 2 1
How many blacks? 0
And how many whites? 1

Guess number 6
My guess is 1 9 4
How many blacks? 1
And how many whites? 2

Guess number 7
My guess is 1 4 9
How many blacks? 3

I guessed your code of 1 4 9
in just 7 guesses
```

If you want to try your hand at other problems of this type, you could write a program to solve the following puzzles:

Puzzle One: There are twelve billiard balls, eleven of which are identical in weight. The remaining ball — the odd one — has a different weight. You are not told if it is heavier or lighter. You have a balance scale for weighing the balls. You

```
10 REM ANTIFOUR - to solve four digit codes
20 REM (c) Tim Hartnell, 1987
30 GOSUB 520:REM INITIALISE
40 REM MAKE A GUESS
50 IF GUESS = 0 THEN FOR Z = 1 TO 4:B(Z) = Z:NEXT Z:GOTO 80
60 IF GUESS = 1 THEN FOR Z = 1 TO 4:B(Z) = Z + 4:NEXT Z:GOTO 80
70 GOSUB 290
80 CLS
90 GUESS = GUESS + 1
100 PRINT:PRINT
110 PRINT "Guess number"GUESS
120 PRINT
130 PRINT "My guess is"B(1);B(2);B(3);B(4)
140 PRINT:PRINT
150 INPUT "How many blacks";B
160 IF B = 4 THEN GOTO 590
170 IF B = 3 THEN 200
180 PRINT:PRINT
190 INPUT "And how many whites";W
200 IF W + B = 4 THEN Q = 4:C(1) = B(1):C(2) = B(2):C(3) =
    B(3):C(4) = B(4)
210 IF B + W = 0 THEN C(B(1)) = 0:C(B(2)) = 0:C(B(3)) = 0:C(B(4))
    = 0:GOTO 40
220 IF B > AID THEN FOR Z = 1 TO 4:E(Z) = B(Z):NEXT Z:AID = B
230 FOR Z = 1 TO 9
240 FOR D = 1 TO 4
250 IF B(D) = C(Z) THEN C(Z) = C(Z) + (B + W)*100 + W*10
260 NEXT D
270 NEXT Z
280 GOTO 40
290 REM Pick four numbers
300 FOR Z = 1 TO 4
310 D1 = C(INT(RND*Q) + 1)
320 IF D1 = 0 THEN 310
330 D2 = C(INT(RND*Q) + 1)
340 IF D2 = 0 THEN 330
350 IF INT(D1/10) > INT(D2/10) THEN B(Z) = D1
360 IF INT(D1/10) < INT(D2/10) THEN B(Z) = D2
370 IF INT(D1/10) = INT(D2/10) THEN B(Z) = D1
380 IF B(Z) > 100 THEN B(Z) = B(Z) - 100*INT(B(Z)/100):GOTO 380
390 IF B(Z) > 10 THEN B(Z) = B(Z) - 10*INT(B(Z)/10):GOTO 390
400 NEXT Z
410 IF B(1) = B(2) OR B(1) = B(3) OR B(1) = B(4) OR B(2) = B(3)
    OR B(2) = B(4) OR B(3) = B(4) THEN 300
420 IF AID > 0 THEN COUNT = 0:FOR Z = 1 TO 4:IF B(Z) = E(Z) THEN
    COUNT = COUNT + 1
430 IF AID > 0 THEN NEXT Z:IF COUNT < AID - 1  THEN 300
440 M = 1000*B(1) + 100*B(2) + 10*B(3) + B(4)
450 K(GUESS) = M
460 IF GUESS < 3 THEN 510
470 COUNT = 1
480 COUNT = COUNT + 1
490 IF K(COUNT) = M THEN  300
500 IF COUNT < GUESS - 1 THEN 480
510 RETURN
520 REM INITIALISE
530 GUESS = 0:Q = 9:AID = 0
540 DIM B(4),C(9),E(4),K(100)
550 FOR Z = 1 TO 9
560 C(Z) = Z
570 NEXT Z
580 RETURN
590 PRINT:PRINT
600 PRINT "I guessed your code of"B(1);B(2);B(3);B(4)
610 PRINT TAB(5);"in just"GUESS"guesses"
620 END
```

Listing 1. *Antimind — an attempt to write a program which would work towards the answer to a problem in an apparently intelligent manner, even when no clearly-defined human approach to solving the problem exists.*

'Heuristics are criteria, methods, or principles for deciding which among several courses of action promises to be the most effective in order to achieve some goal.'

have to find out which ball is the odd one — using only three weighings — and whether it is lighter or heavier than the others.

Puzzle Two: There is a checkerboard which has had it's upper left and lower right squares removed. You have a box of dominoes which are one square by two squares in size. Can you exactly cover the checkerboard with dominoes?

Puzzle Three: There are four people: Roberta, Thelma, Steve and Pete. Among them, they hold eight different jobs (no wonder the dole queues are so long, with these four hogging the jobs). Each holds exactly two jobs. The jobs are chef, guard, nurse, telephone operator, police officer, teacher, actor and boxer. The job of nurse is held by a male, and the husband of the chef is a telephone operator. Roberta is not a boxer, and Pete has no education past the ninth grade. Roberta, the chef and the police officer went golfing.

According to *Automated Reasoning: Introduction and Applications* by Larry Wos, Ross Overbeek, Ewing Lusk and Jim Boyle (Prentice-Hall, 1984), the source of these problems, the final one regarding the jobs has been solved by intelligent sixth-graders, so your computer should be able to handle it.

I'd be interested in seeing programs which solve these, and similar problems. If you don't want to type in the Antimind program, you can download it from our Bulletin Board, along with an extended version of the program, Antifour, which solves four-digit codes. Alternatively, I can supply you with both programs, along with a number of other interesting programs, on a disk for the IBM PC for $5.00. You can send your programs and comments to me at this address: Tim Hartnell, 34 Camp Street, Chelsea, Vic., 3196). □

COMPUTERS
In Music Education

COMPUTERS ARE now being widely used in the making of music. You may be familiar with the highly successful John Farnham album, 'Whispering Jack', but did you know that it extensively uses computers and such computer musical instruments as the Fairlight CMI, computer controlled mixing desks, and digital effects devices.

Another familiar example is the speaking voice of Max Max Maxxx Headroom in the latest commercial for Coca-Cola. Max's voice is a sample of a real voice which is sometimes altered in pitch, and digitally cut and replayed to get the stuttering effect. Most television and radio jingles use digital equipment and often computer based sequencers, but more on that later.

Everyone involved has realised the time, economic and artistic benefits of working with computers in this way — much of the work can be done outside of expensive studios before recording. Of course, being able to edit a jingle to have the right sound, and be exactly 28.5 seconds, speeds up the process.

Music in Schools

With such extensive use within the music industry, it would seem appropriate to address the relevance of computers in music within schools.

Due to the advent of pocket calculators, the teaching of mathematics changed to accommodate the technology — and the subject became more interesting without the drudgery of manual calculations. In the same way, the introduction of computers for specific music use, should see a rethink of what is taught, and the way it is taught.

Such changes, however, are not going to come easily or cheaply. But they will come more easily (and cheaply) if there is an education system support structure to aid the transition from current practices to a cognitive approach to learning music which is relevant and comprehensive.

Computers are used extensively in producing popular (and not so popular) music — why aren't they being used more to teach music? Education specialists Andrew Brown and Kevin Purcell examine some answers . . .

Be assured though: just as calculators have not changed the basis of mathematics, the essence of music is not altered by computers. Rather, they have revealed new facets of music making which will give us a developmental music well into the twenty-first century.

Now this is not to say that there isn't a growing awareness in the need for schools to consider the use of computers in music and in arts education in general. This is evident by articles such as this appearing in the media and by the growing interest the industry itself is showing in promoting products in schools.

However, there is an absence of guidelines, differences in opinion regarding curriculum content and in the changes needed in teaching practices. And there is a need for computer music educationalists to set concise course directions and offer suggestions.

Those who are afraid that computers will take over their job, or that they won't ever understand the technology, should look positively on the introduction of computers to music education — it's an extra string to their bow. Overall, a greater awareness of computers and their uses in music education will require ongoing professional teacher development, and the redirection of funds to aid and establish computer music programs.

There is also a growing need for commercial enterprises to act in a responsible manner when marketing their music and computer instruments — we've found instances (in almost every state) of distributors trying to dictate the purchase of computer based instruments solely to justify adequate monthly sales figures in almost every state.

On the other hand — two firms, who are really trying to assist schools in this field are Audio Logic, (03) 557 5188, headed by Roger Campbell, and John McCubbery's The Electric Factory, (03) 480 5988 .

Audio Logic is the sole importer of music software for the Atari ST range — the 1040 ST is presently the recommended computer system for music in schools, here in Victoria. The Electric Factory imports instruments such as Ensoniq's Mirage digital sampling keyboard, the Emax digital sampler, the (extraordinary) Emulator III, and the Ensoniq ESQ-1 multi-timbral synthesiser, which is the Victorian Ministry of Education's recommended keyboard peripheral for computer music applications.

Willing Partners

The students seem to be the most willing partners to the technological revolution in an area where student motivation has traditionally been limited. We've found that using computers as a learning tool has increased the time students will spend making music — students at our school often spend their free time working on a music project, huddled over a synthesiser, a text book and computer.

Because much of the music students hear outside the classroom is created

using computers, having access to the equipment in the classroom stimulates them to create and recreate similar music. As an example of computer enhancement in music composition — a 1986 HSC music class, all of which had no formal training outside of the school (two students hadn't even studied music before), received the highest marks in the composition option in the music exam. All of their composition was computer assisted.

There are no limitations to what can be learnt about music using computer technology — a common misunderstanding is that if you use computers, then you must only be studying 'the new music', or heaven forbid, that 'terrible disco music.' At present, computers are being used to the record and playback musical performances ('sequencing'), to create new sounds by digital synthesis, to notate music, and to instruct through drill and practice.

The Software that Works . . .

The software that works in education is the same as that written for professionals and enthusiasts. There is little need for special educational software except when trying to teach specific musical skills — drill and practice programs are an example. However, the educators need to guide student to maintain a structured learning progression.

There are a variety of packages of various complexities available, so software that suits most needs is not hard to find. It is equally true that computer applications are much more interesting than computer aided instruction (CAI). What is needed, though, is for software companies to develop ways of using their packages in the classroom.

Sequencers

A sequencer is just an electronic version of the player piano — put in a roll of perforated paper, pump the pedals, and instant music is heard; the 'perforated roll' has been replaced by computer memory.

Most sequencers allow users to *easily* input their own tunes and edit ones that are recorded, so at least it's more flexible than the old player piano. The editing can include a change of tempo or the transposition of pitch, moving the music about in the same way a wordprocessor moves words and can even include functions to alter the volume and length of individual notes. Onscreen representation of the notes, is a great aid to students — they can see the overall musical phrasing or flow.

Sequencing is used in schools to aid in composition, to hear edited versions of study pieces, and for dedicated ensemble performance or vocal backing. For example: what does a four part string quartet sound like without the bass part? Simply put the piece into a sequencer and mute the bass line.

Music theory can also be successfully taught on a need to know basis whilst working with step time sequencers. When students cannot get exactly the notation they want, they will seek out the solution — this way they control and direct their own learning.

Digital Synthesis

Digital synthesis has the computer making musical sounds, not just controlling them. Sounds are stored in a computer simply as table of numbers which represent the waveform of the sound. These tables can be constructed by inputting values one by one, or by drawing a wave on the screen and having the computer work out the wave table, or even by using simple waves tables (like sine waves) and combining them to produce more complex ones. Finally, wave tables can be created by 'sampling' (recording) the sound using a microphone and appropriate hardware.

Once the sound is stored in the computer, you want to be able to hear it. To do this we need a Digital to Analogue Converter (DAC) which changes the numbers into a signal that can be amplified and played through speakers. Some of the newer computers have on board DACs — the Apple IIGS and Commodore Amiga are two examples.

To understand, create and edit sounds on a computer means learning about sound, so the physics of sound becomes an important element in music education — and computers are both an aural and visual aid to teaching it. For example, it is useful for students to see the relationship between the printed score and the music itself, and computer notation packages make this association far easier.

Microcomputers, MIDI and Music

READERS interested in computers and music are referred to Andrew Symaniz' series (of the above name) — in this issue he covers real-time music composition. Previous topics have included programmable sound generators, digital sound sampling, and non-real time composition. □

The advent of MIDI sequencing packages with sister packages for scoring has lessened the arduous task of transcription, although it's still necessary to understand musical notation — the computer's score of a performance may be too exact and print your mistakes, or inaccurate.

Hardware

There are two ways of approaching computer music in terms of hardware. One is to use personal computers (with the appropriate software and hardware interfaces) to perform the tasks that you require. Software is available for computers such as the Apple IIe, IIGS and Macintosh, Atari, IBM, Commodore 64/128 and Amiga, BBC, and most other makes. Software and hardware additions range from the inexpensive to the overpriced, from the simple to the extremely sophisticated.

The use of computers in the music classroom is an exciting venture. It is one that is poised to expand from a few isolated centres into a generally accepted component of music education.

The other approach is to use dedicated music computers (which may not resemble a 'computer'). These devices still include a CPU, RAM, and a disk drive, but they are often smaller and more robust for easier and safer portability — Roland's MC-500 sequencer and their S-50 performance keyboard are examples.

Rather than a qwerty keyboard, these machines have a limited number of dedicated 'soft' keys that are redefined depending on the task. A mouse, continuous controllers, and graphics pads can also be used for input. The S-50 can even be connected to a colour monitor for editing.

Such a diverse array of hardware can work in a computer music system because the music industry has accepted a standard communication protocol (MIDI) which allows musicians to purchase equipment from a variety of manufacturers without fear of incompatibility. MIDI — Musical Instrument Digital Interface — is a 16 channel serial data communications bus

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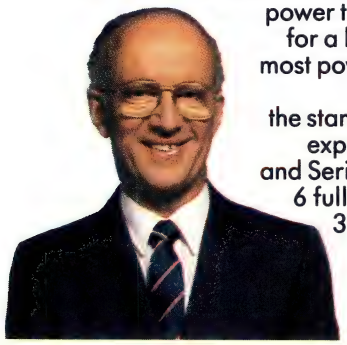

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which allows transmission and reception of information such as note on and off messages, velocity of key strikes which result in variation of note volumes timing information, digitised sound file transfers, MIDI time code, and a whole host of ever expanding performance information.

Catching Up

In real terms, any piece of computer equipment is an expensive item considering the budgetary restraints of a school, although funding for computers is currently available in all states. As reported in the August edition of *Your Computer*, the Western Australian Education Department allocated $3.76 Million for 2600 computers to improve the student/computer ratio. This is a positive step towards a greater overall computer awareness.

Music teachers must become aware of these sources of funding — in most instances computer funding information is sent to computer specialists. It is up to the music specialists to get together with them and prepare submissions for funds.

Computers have been in schools for the past 5 to 10 years, usually in labs using 8-bit systems such as the Apple IIe. These installations have used the rather limited internal sound capabilities of the computers for teaching music (this requires some computer programming skill).

However with the addition of a MIDI interface and software, useful computer systems can be set up for about $250 using these same computers. Most music educators have not taken this step to utilise these existing computer resources, and as a result the music curriculum has a lot of catching up to do.

The use of computers in the music classroom is an exciting venture. It is one that is poised to expand from a few isolated centres into a generally accepted component of music education. Using computers in music education is established and has proven its effectiveness, but it's real potential is about to be realised. So let's see music educationalists grab the computer bull by the horns.

Is Anybody Out There??

So — what's happening outside Victoria? If you are doing anything you believe is worthwhile in the field of using computers in music education, we'd like to hear from you — first to give you a pat on the back, and second — we'd like to tell others about it in a future article. Contact us at Technology In Music Education (TIME), PO Box 364, Rosanna Vic. 3084; (03) 698 7515. □

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GLEE

End-user 4GL Software

FORMER university lecturer Graham Lee, now a full time computer consultant and instructor, has written a versatile database, text processing, number crunching, file management and administrative problem-solving program that can automatically create its own applications by having the user answer a few simple questions.

The program is called Glee (after its author) and is designed to present the user with the opportunity to write or respond in plain English while all the housekeeping is done in the background.

Lee perceived the need for a new approach to application building as users frequently had difficulty in understanding the complex programs that it was necessary to use; and they often required a number of programs to service their application.

Many of these programs had limitations or bugs and users would need to wait for updates or technical support from overseas to solve their problem. Sometimes, programs were specifically written for a company whose needs later changed; this led to long delays in updating the application since the programmers were frequently unacquainted with the original program, and, even if they knew the original inside out, they often found themselves 'bending' it to fit the new requirements.

According to Lee, Glee can be mastered in a few hours of instruction with no previous knowledge of computer programming and without the need for specialist programmers — all that's needed is the ability to read English and an understanding of the computer keyboard.

The first 4OOO-line version of the program had been written by November 1982 and Glee was introduced to some 500 users in early '83 — students at Lee's WA University Extension course, 'Develop Your Own Computer Application.' This has provided about 10,000 hours of user feedback (the course is still being offered), and, of course, a number of refinements.

Glee was installed on the WA College of Technical Advanced and Further Education's VAX mainframe in 1985 as a result of recommendations from students and staff who had undertaken Lee's course. Since then, students aged from 17 to 70 have used it to develop their own application to suit their business interests.

> If you need your own specific application, but lack the time (or knowledge) to build it, this fourth generation program discovered by John McLean may be the answer.

This has been very successful due in part to the easy to follow question and answer dialogue used by Glee and the absence of computer jargon.

Flexibility

The program resists attempts to categorize it, since it can perform most tasks that computers are used for. It is not a spreadsheet, yet it can do everything a spreadsheet can — while the traditional cells are not displayed, the calculating functions are incorporated into the powerful database.

Reports and forms are easily produced in any print format, with the advantage that calculations such as discounts on invoices, are automatically performed.

Text handling includes the ability to integrate a number of standard letters with the mail merge facility, or for simple use as a diary or address book.

However, graphs cannot be generated, but are left to dedicated graphic programs which can access Glee's data files.

Generally, users do not hit the 'wall' found in such powerful programs as dBase

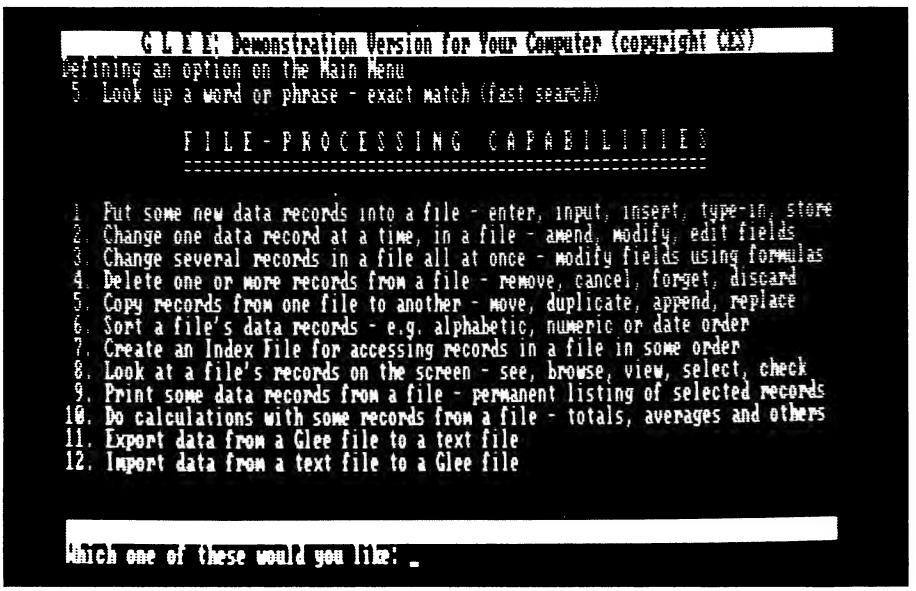


Figure 1. *Glee has a variety of file processing capabilities that are chosen from the above menu — for example, choosing 7, 8, and 9 would select from a file, sort the data into some order, show it on the screen and then print it.*

and Framework, where the builtin language must be mastered before undertaking complex functions — Glee's functions are hidden from the user and programs are created by entering a number from a menu or grid.

Most spreadsheets require a degree of skill, planning and manual interaction to solve a problem, whereas Glee can carry out quite complex reporting functions in just a few steps.

By answering five or six simple questions from Glee's sub menus, it's possible to select various categories of data. The data can then be broken down into groups, and subtotals calculated for each of the potentially thousands of these groups and then printed in any report format required, with page breaks and subtitles, if required. Once the report is set up, it can be re-generated with one or two keystrokes.

Glee can perform all the tasks of a dedicated database program, including sorting, selecting, updating, deleting, copying and joining. Fields with Boolean, numerical, mathematical, string and substring matching operators work effectively. Statistical requirements, such as standard deviation, are catered for.

Commands can also be generated in 3GL style, which permits specific or unusual aspects of some applications to be catered for — these are generally abbreviations of commands using the first one or two letters, such as 'ex' for execute.

Much of Glee is simple to use, but should help be required, the program has builtin screens of explanation which are context sensitive and explain the function fully.

Applications

The applications become limitless. Some of the known uses for Glee include mail merge with a select and send facility, invoicing, customer orders, debtors, creditors and other accounting programs, student and teacher records, bibliographies, registering dangerous chemicals, correspondence (with and without a standard letter), sort routines, administrative problems, personnel information, project management and so on.

The 399 page manual, known as Glad — Graham Lee's Advanced Documentation — is a practical, user-led manual based on creating such applications as a personal accounting system, electronic textbook and project management. The lessons are designed to introduce increasingly complex functions, so that little reference to the manual should be necessary after they've been mastered.

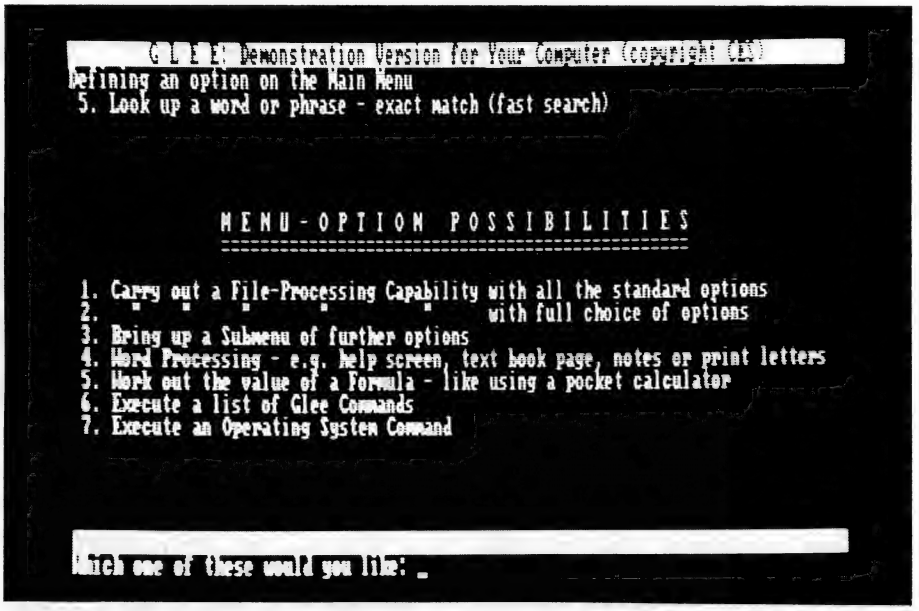


Figure 2. When building a new application for the first time, Glee asks the kind of processing that is required.

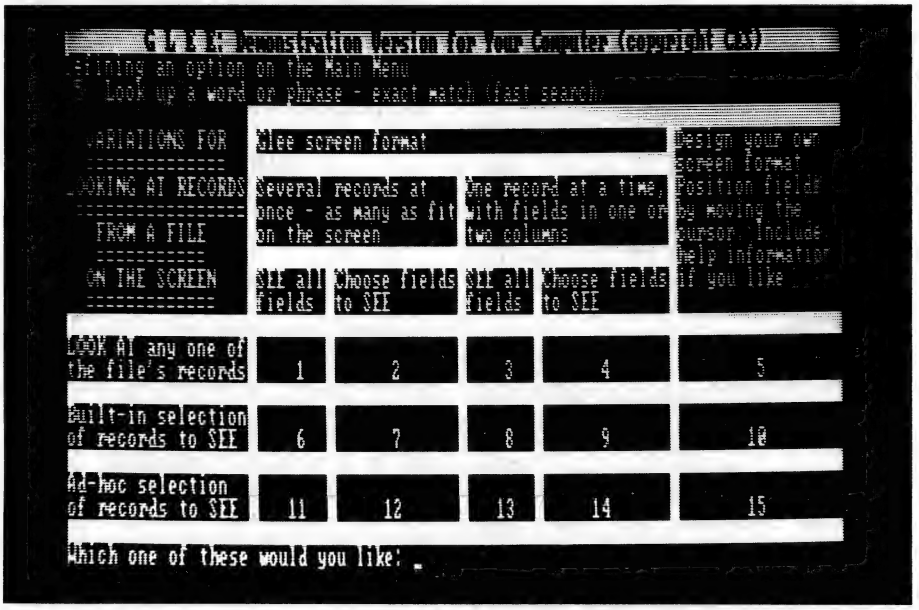


Figure 3. Using Menu option 2 from File Processing Capabilities (Figure 2), allows the user to 'fine tune' how records are to be viewed on the screen.

The first memory hungry version of Glee was written in Pascal for mainframes. But, demand from students and others who wanted to buy it led to the development of a PC version which only needs twin floppies to run (disks only need be swapped for help). It should be available by the time you read this.

Interested parties should either contact the distributor or Graham Lee directly: 3 Crieff St, Floreat 6014 WA □

Product Details

Product: GLEE
From: Glee Software, Perth WA
Distributor: Hi-Com Software, 21 Stirling Hway, Nedlands 6009 WA (09) 389 1500
Price: Under $1000 for PC version (*Marketing arrangements and retail price were still under negotiation at the time of publication.*)

APPLICATIONS FOR A SUPERCOMPUTER

IN THE November issue of YC, I discussed the Novix series of superchips, in particular, the 16-bit NC4016, from Maestro Distributors. Now, let's look at possible applications when combined with the development system also provided by Maestro: it has put an NC4016 on board an IBM-type card and included enough software and hardware bells and whistles to wake anyone up!

The board is designed to plug directly into an IBM PC, XT or AT slot and communicate directly with the IBM — this means that the Novix board can use the IBM host's floppy and hard drives, keyboard, monitor and so on. (The board is full-length, mainly because it accommodates lots of extra goodies.)

Now, before you cry out 'I haven't got an IBM,' let me continue: The board also has an external serial port which enables it to be placed on a bench and connected to *any* computer that recognises the RS232 serial protocol. Maestro has even catered for those people who haven't even got their own computer (and have been waiting for something like this to arrive). All it takes is an $80 black and white monitor, a $70 keyboard (with serial interface) and a 5 volt power supply. For those people with their own computer (non-IBM) and a serial card, the only requirement is the provision of a 5 volt power supply.

The mind-boggling power of this board still amazes me. Imagine having all the power of a DEC VAX 11/780 computer, sitting in your hand and being capable of running from a Nicad battery. The future is here with us today using the power of the NC series of chips. Let us take a trip through the details of the board and describe the features.

Firstly, the Novix chip sits in a big square LIF (Low Insertion Force) socket — the chip is an NC4016P, the 'P' indicates a Prototype version (later versions of the chip have been produced in both plastic and ceramic packages and the P suffix now means Plastic). More on this later. One reason for using a LIF socket is that the NC5016 should be available by mid '88 and it is a direct replacement for the NC4016, with more power, speed and addressing capabilities. When this chip comes out, users will have the option of retaining the 4016, or upgrading to the 5016 and using the 4016 as a graphics co-processor.

In November, Roy Hill told of the Novix NC4016 chip (and the reality of your own 6 mip supercomputer) — but what can it be used for (and how)?

Just to the right of the 4016 is a 15 MHz crystal, which is used to provide the programmable clock used by the NC4016.

Not Sheepish About High Speed RAM!

THE MANNER in which the four 43256 static RAM chips are used on the board is quite an interesting exercise in computer design. Whilst this article is not intended to be a treatise on computer design or advanced electronics, it is helpful to understand how this board has been developed with two main criteria in mind — first, the board had to run at the highest economically feasible speed, in order to make the most use of the high speed processor; and second, it had to use readily available components that were not too costly for the average home enthusiast.

For these reasons, it was decided to provide the kit with 43256-120 RAM which run at 120 ns and are relatively cheap, but unfortunately, only allow the Novix to run at 4 mip (million instructions per second), possibly even 5. For an extra $70, 43256-100 chips (running at 100 ns) will enable the Novix to run at 6 mip. The manner in which the board has been designed, enables users to make their own cost/performance selection without requiring major board modifications. Let me explain how this is going to be done — first, refer to Figure 1 for the design of the 'symmetrical' clock found in most computers.

Now, let's have a look at how the Novix would work under a symmetrical clock with the chip running at 6 mip — the Novix would have a t_1 of about 75 ns. To provide RAM having a similar speed would cost the earth (about $80 *per chip* and you'd need four times as many of them). This would place the cost of the board way beyond the purchasing ability of all but the most dedicated. However, if we provide the board with an asymmetrical clock, we can make use of slower (read less expensive) RAM — see Figure 2.

Note that each of the RAM access cycles in Figure 2 is 10 ns longer than the actual designated speed of the chips. This is to allow the hardware time to decode the actual address of the chip being 'talked to' and also to allow for the fact that none of the verticals on the diagram is truly vertical — see the blown-up section in Figure 2. If we also make the clock totally pro-

grammable, with variable mark/space ratios, we can make provision for almost any speed of RAM and introduce another very interesting aspect of Novix Power. Normally, the Novix runs at the full speed of the clock, but by placing a value on the top of the stack (which is done by just typing in the number and executing the word CLOCK), the clock speed is changed to that value.

In practical terms, this means that the board can be user programmed to run at anywhere from full speed to about 2 seconds per clock cycle. The advantages are that we can perform dynamic de-bugging of source code, simply by slowing down the clock to its slowest speed and examining the source code as it executes. Plus there are numerous other advantages in having the processor operate slowly — educational purposes, demonstrations, data and return stack examination, to mention a few — so that the on-looker can see the instructions being performed in real time. And, of course, the chip only consumes a small amount of power.

An Eprom Programmer

The ability to slow down the clock to virtually any speed also has an application for another outstanding feature of this board. For those with IBMs or other computers with serial interfaces, off-line storage does not pose any problems, as the host computer's discs/tapes are available to the Novix. However, for the user with only a terminal and monitor, off-line storage could be a problem.

This has been solved on the Novix board by the inclusion of an on-board serial Eprom programmer, which is capable of having data either downloaded from the host computer, or having on-line data (source code/screens and so forth) burned into an Eprom, thereby allowing the user to create applications that are semi-permanently stored. In order to program an Eprom, one needs three main things — the data, a source of programming voltage (easily generated on-board) and a 50 ms programming pulse.

The provision of a programmable clock means that no additional hardware or software is required to generate the programming pulse. The scenario is so simple it's elegant — the user creates an application, removes the old Eprom and inserts a new, blank Eprom, enters programming mode (which slows down the clock and switches on the programming voltage) and burns the new Eprom. Programming mode also verifies as it programs (256 bytes at a time), so the risk of having a dud program is eliminated. Unfortunately, the device is not yet clever enough to sense bugs in programming logic and correct them. Maybe the next version! It is also possible to program a single byte, word or block of bytes.

Whilst on the subject of Eproms, mention should be made of the fact that all of the system (the Forth primitives and dictionary plus additional applications) is provided in Eprom. If we were to try to execute from Eprom, however, the Novix would be slowed to a walk — relatively speaking, because of the very long access times for standard Eproms. These normally have access times from 200 ns (fairly fast) up to 450 ns (normal). Even at 200 ns, the Eprom is far too slow to allow rapid (100 ns) access to data, so we overcome that problem by downloading all the software from Eprom (at a slow clock speed) into RAM, switch off the Eprom, switch on RAM and change into top gear, with foot flat to the floor.

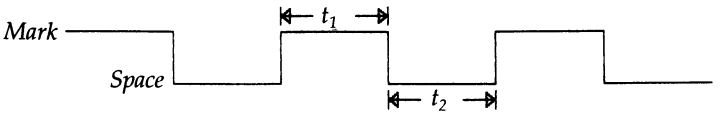
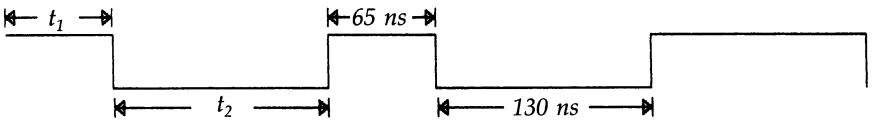
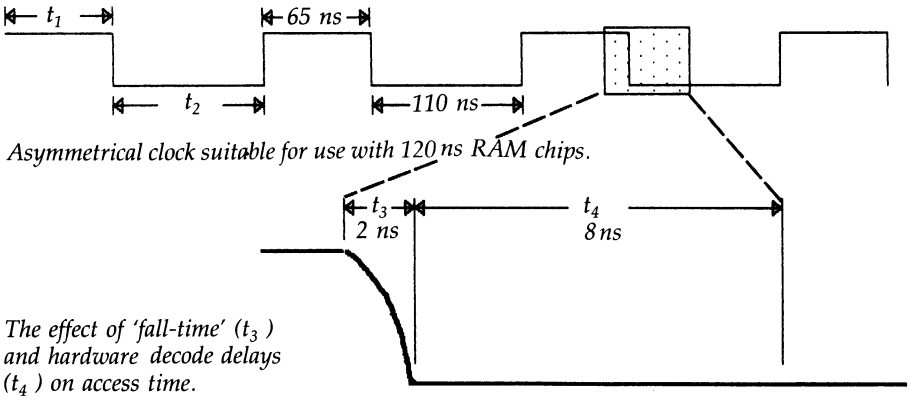


Figure 1. *The design of the 'symmetrical' clock found in most computers — t_2 is usually (but not always) the same time as t_1. If t_2 is longer than t_1, the clock is 'asymmetrical'. This is as far as most computers go, in order to allow for RAM (which uses t_2) that is slower than the processor being used.*



An asymmetrical clock suitable for use with 100 ns RAM chips.



Asymmetrical clock suitable for use with 120 ns RAM chips.

The effect of 'fall-time' (t_3) and hardware decode delays (t_4) on access time.

Figure 2. *Using an asymmetrical system clock (t_1 * ≠ t_2) allows the use of slower and less expensive RAM.*

The top half of the Eprom (and hence the RAM) contains all the source screens for the system, together with a large number of blank screens — see the memory map in Figure 3. The user has the option of either modifying existing screens (which will require a blank Eprom) or adding new ones to blank screens (either use the existing Eprom or a new one). By downloading data from the host computer to the Novix board, the user now has a serial Eprom programmer at his or her disposal, capable of handling 27xx devices of the Intel type. A programmer of this type would normally cost at least $500, without having any computing facilities whatsoever. Also to be included in the top half of the Eprom is the Forth Optimising Compiler and cmForth source screens (cm = Charles Moore).

As has been mentioned, the RAM used is the fairly readily available 43256 type. There is another requirement for RAM on

the board and this is for the Data and Return stack RAM which is handled by two 6264 type (8K x 8) static RAMS (these can be subsequently upgraded to 43256 types).

It Talks!

For many years, I have been interested in speech synthesis and have searched out examples of computer generated speech wherever they can be found. I have looked at SAMs (for the Apple), Votraxes, Speak-and-Spells, Power House museums and so on. I have never yet heard a speech synthesis system yet that didn't sound like Donald Duck with a mouthful of cake crumbs talking underwater. What I have always wanted was a speech synthesiser that talked in a normal English manner, rather than me having to train (or should that be strain?) my ear to the subtleties of computer generated mumbles. And now it's here!

Maestro has built a fast 8-bit A/D-D/A converter onto the board. Each time it fires up it produces a welcoming message (no, I'm not going to give any clues), which, of course, can be modified by the user. Because of the high speed of the Novix, sampling rates for speech patterns that were previously the domain of mainframes are now available on a home computer. Real Time, Real Genuine speech. Another feature of the speed of this board is to have a randomly selected message spoken on fire-up.

Of course, this is not the only use of the A/D-D/A converters. Anyone who has ever wanted to experiment with control and data acquisition now has the ability to do so, and to use a board and computer language that are designed for the task. Incidentally, a more powerful version of the A/D-D/A portion featuring a fast 12-bit converter will be included on export models of the board and will also be available (at extra cost, of course) for domestic consumption.

Let's have a brief look at the underlying concepts of speech synthesis and why the Novix is better than standard processors in accomplishing it. Speech is a fairly complex thing, especially when one realises that we also rely on visual signals to help get messages across. It is difficult to explain some concepts across the telephone in the absence of some visual signals. The two main methods that have been used in speech synthesis to date are, first, the use of phonemes, in which sounds within words are made into a series of standard representations.

These may amount to about 50 different sounds and speech can be synthesised using these phonemes. The Apple SAM card and the Votrax system both use phonemes as the basis of their operation. This method is simple and convenient, but the speech produced leaves a lot to be desired.

The second method is the use of Linear Predictive Coding (LPC), which is used by speech synthesisers with plenty of computing power available. It's based on taking samples of the sounds being spoken and comparing the samples to a fairly extensive look-up table, which shows the word most likely being spoken on the basis of its agreement with the lookup table.

This method of speech synthesis is quite accurate, but requires a fast processor (and A/D converter) to perform the sampling and a fast processor to perform

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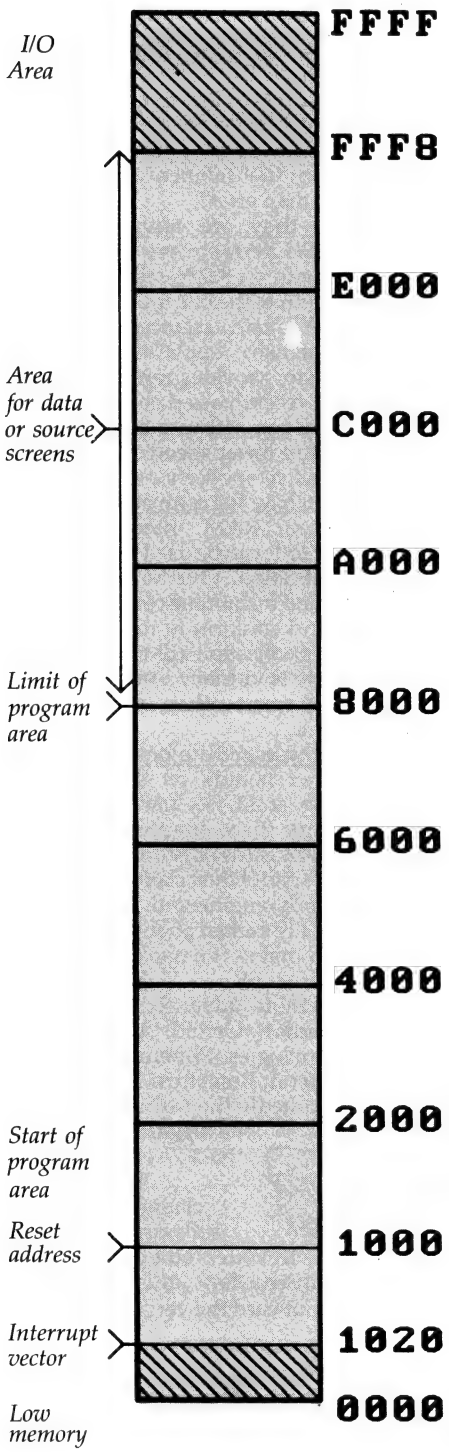

Figure 3. *For the user with only a terminal and monitor, the problem of off-line storage has been solved on the Novix board by the inclusion of an on-board serial Eprom programmer. The top half of the Eprom (and hence the RAM) contains all the source screens for the system, together with a large number of blank screens.*

the lookup of what is a fairly large table. The Novix fills the bill very well on both these counts and this is one of the areas that Maestro are going to tackle as their first priority.

I/O Lines

For those who like to play around with add-on devices, the Novix board fairly bristles with I/O lines. In addition to the 21 lines of the NC4016 itself, there is an I/O window in the top portion of RAM (see the memory map in Figure 3), consisting of 16 *x* 8 byte I/O lines. As well, all of the internal I/O lines created on the board are taken to external pins, so all up, there are literally hundreds of I/O lines available. One of the interesting features of this board is that Maestro has adopted a 'total disclosure' policy. Everything that they do will be provided as either source code or circuit/block diagrams as appropriate. For the stand alone option, two of the Novix's I/O lines have been dedicated to the RS232 interface.

Bugs and the Optimising Compiler

Earlier I mentioned that the NC4016P was a prototype chip and that an Optimising Compiler was available for the Novix board. One of the reasons to have an optimising compiler is to ensure that the code is compiled for maximum throughput. Frequently, what would normally be several Forth words taking several clock cycles, can be compiled into a single cycle Forth word. The other reason for the optimising compiler is the P suffix on the chip. Because this was a prototype version, there were a few design faults in the chip. For most users, these faults are totally transparent and need not be worried about. However, for the sake of completeness and for those who need to know about the quirks of the board, these are the bugs —

1) Interrupt Pin: Use of the interrupt pin for signalling external events is limited because it leaves the wrong return address on the stack.

2) XPORT: 5 lines are currently used for I/O; they were intended to be used as extra address lines but these are disconnected.

3) No TriState: Both I/O ports (XPORT and BPORT) were intended to be tri-state, but aren't.

4) Return Bit: The Return Bit (return from a called word) sometimes doesn't work on two cycle instructions. The Optimising Compiler fixes this.

5) 0<: This instruction must be followed by a No-Op. Once again, the Compiler fixes this.

6) Range Restrictions: Multiplies and divides are restricted to 15-bit values and square roots to 14-bit values. (There are ways around this, too.)

7) Multiply: A multiply with an odd number on the top of the stack could produce an error. This is fixed up in software, not by the Compiler.

8) Carry: The carry is saved in register 15 by a call — it must be masked in order to use R15. Once again, the Compiler comes to the rescue.

Applications

One of the most interesting possibilities is the use of the board as a speech recognition/synthesis unit, which is an application that Maestro is developing for use by hearing impaired persons, to enable them to correctly pronounce words. Another (slightly frivolous) application would be to have a conditioned computer that responds to human commands — the more terse (or rude) the commands given, the politer become the replies, could be one application. Other applications already being investigated are real world control applications, robotics, stepper motors, logic analysers, frame (vision) capture and editing, text (document) capture and editing, and data acquisition and analysis.

One of the other applications that is still only in the 'think about' stage is the use of the Novix as a Super Graphics Tablet, in that it may be possible to mount a miniature ultrasonic transmitter in the tip of a pen-type barrel and have the Novix monitor the movement of the pen tip. Just imagine, a computer that deciphers hand writing and converts it to ASCII text. Keep thinking, Maestro!

Availability

The board kit is available in various configurations: As the basic unit with Novix and 120 ns static RAMS; it runs at 4 mip and includes a fully socketed board with the Novix already mounted, full source code and documentation ($699 plus $8 postage and packaging). The enhanced speed unit (6 mip) is an additional $100. An enhanced A/D-D/A converter (provided as a daughterboard) is also available, but the price depends on the particular converter selected.

Enquiries should be directed to Maestro Pty Ltd, Calool St South Kincumber 2256 NSW, (043) 682277 or 682278). □

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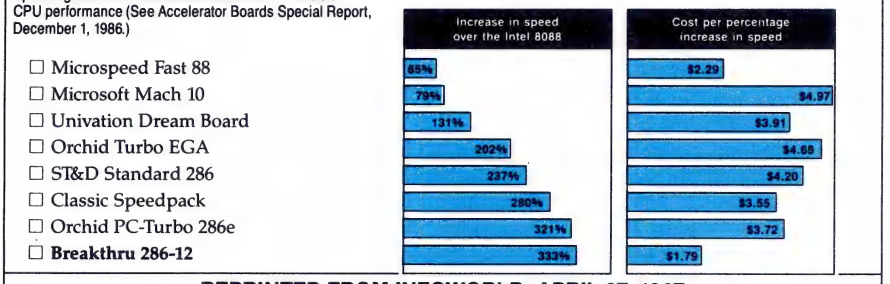

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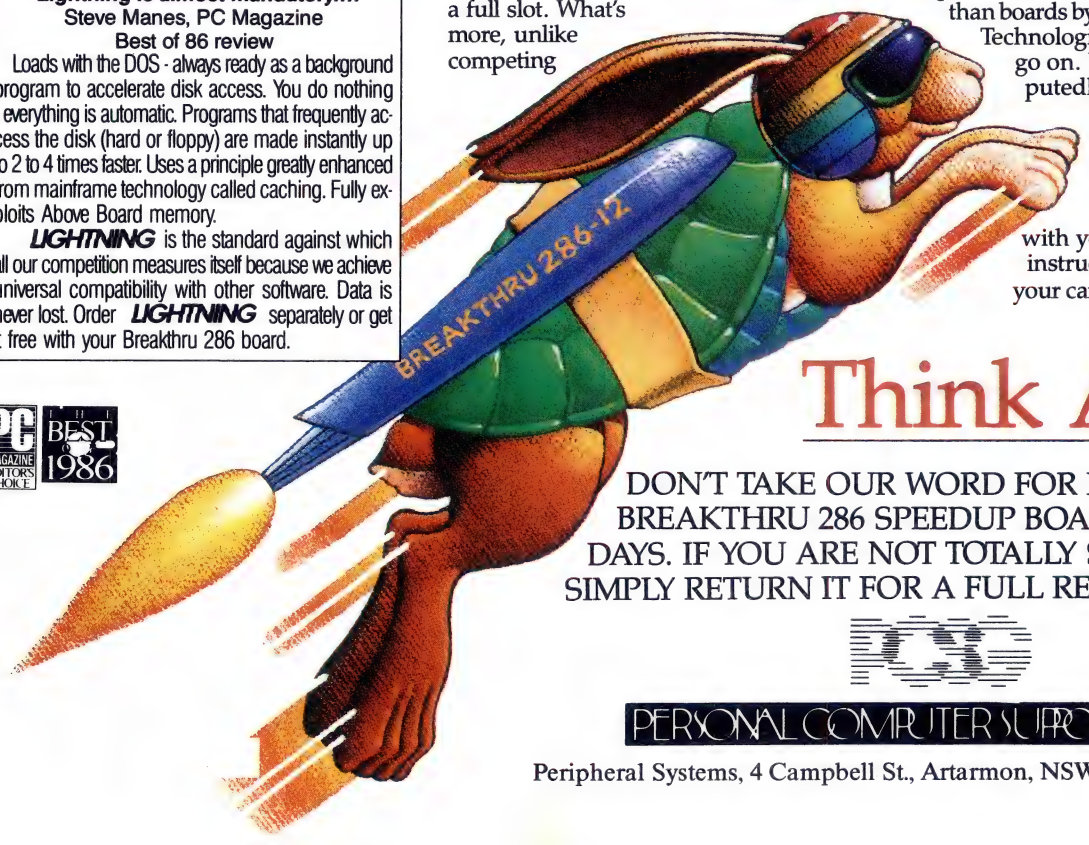

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Looking for an efficient wordprocessor that'll leave you enough cash to buy stationery? Keith Mackay has found two . . .

Dac Easy Word II

DAC EASY WORD II runs under DOS 2.0 or higher and requires 256 kilobytes of RAM and two floppy disk drives or one floppy and one hard disk. The program occupies two floppies and is not copy protected. Having a deep-seated hatred (pathological, it has been suggested) of ring binders, I was pleased to discover that Dac's manual is a paperback. It is, furthermore, well written, well organised and reasonably informative, and in association with the sample text files included on the distribution disk, gives a good coverage of all the program's features. This may seem a curious point to make — after all, that is what a manual is supposed to do — but adequate software documentation, alas, is the exception rather than the rule.

Installing Dac is a painless process, involving simply making working copies of the distribution disks or copying them to a suitable directory if a hard disk is used, and then invoking the Installation procedure. Up to three printers can be selected from the wide selection offered; screen colours can be changed, including different colours for text windows; a default search path can be set for text files and a default file extension established also.

Dac's editing screen is clean and uncluttered, with a ruler and status line occupying the top three lines of the screen, leaving 22 lines free for text with no overlap, which I find a little annoying — an overlap of one or two lines is more helpful. Text may be displayed either justified or ragged right, and is automatically reformatted as deletions and insertions are made. As is often the case when this feature is used, there can be delays while Dac does its sums. If more than one space is entered at the keyboard, Dac displays a grey box, which is not the most attractive thing in the world. However, the command Alt-V will suppress this display, as well as hard carriage returns.

Screen Refresh

Cursor commands are quite conventional — Ctrl-Left Arrow to move one word left, Page Down to scroll to the next screen, and so on; and a neat little command I have not come across before, Alt-A, moves the line where the cursor is to the top of the screen. I found screen refresh rather sluggish with both justified and ragged-right display, but the distributors suggest that the fault is that of my computer, an XT compatible running — or creeping — at the standard 4.77 MHz. On a genuine IBM PC XT, they assure me, and on all the compatibles on which they have used the program, Dac is very fast. It would seem to me, however, that speed is entirely relative — both WordStar and XyWrite, for example, run extremely fast on The Engine, and Dac is undeniably a good deal slower, even if a cache is used. Were I fortunate enough to have a 10 MHz machine I would expect to find the same difference, all other things being equal. But perhaps all other things are not equal under the bonnet, and I am prepared to take the distributors' word for it.

Dac is driven by means of pull-down menus, invoked with the F10 key; and many commands can be issued instead by means of a 'speed key' — an Alt-letter combination, in most cases mnemonic. Thus, instead of invoking the Block menu and selecting 'M' to mark a block, Alt-M will bypass the menu and go straight to block marking. One or two of the Alt-commands have no menu equivalent: Alt-W counts words, for example, and Alt-O ('O' for 'out'?) exits temporarily to DOS to execute another program.

It would be quite possible to learn Dac without referring to the manual at all . . .

It would be quite possible to learn Dac without referring to the manual at all — aside from context-sensitive help, summoned with the near-standard F1 key, and the table of speed-keys, brought to the screen with Alt-H — the commands are, for the most part, obvious.

Options

Eight options are offered in the menu bar: File, Print, Text Format, Search, Block, Dictionary, Window and Macro. I shall consider each of these in turn.

File, as the name would suggest, covers the opening and saving of files, as well as their renaming and their translation to standard ASCII for manipulation by other applications. It also offers Autosave, which saves text at a user-determined interval between 1 and 59 minutes. When

this is active, a window appears on the screen when the given time elapses and the user is asked whether to proceed with the save. Unfortunately, Autosave has to be reactivated each time Dac is loaded — it would have seemed a better idea for such a valuable feature to have been made an optional default in installation, or perhaps to have incorporated it in the Format which is associated with each text file.

Still in the File menu, Directory gives a file list for the active directory and allows searching with wildcards; Link allows files to be read into the current file, and Mail List is a simple mail merge program, including Zip codes. I understand that the Australian distributors are planning to replace these with Australian post codes.

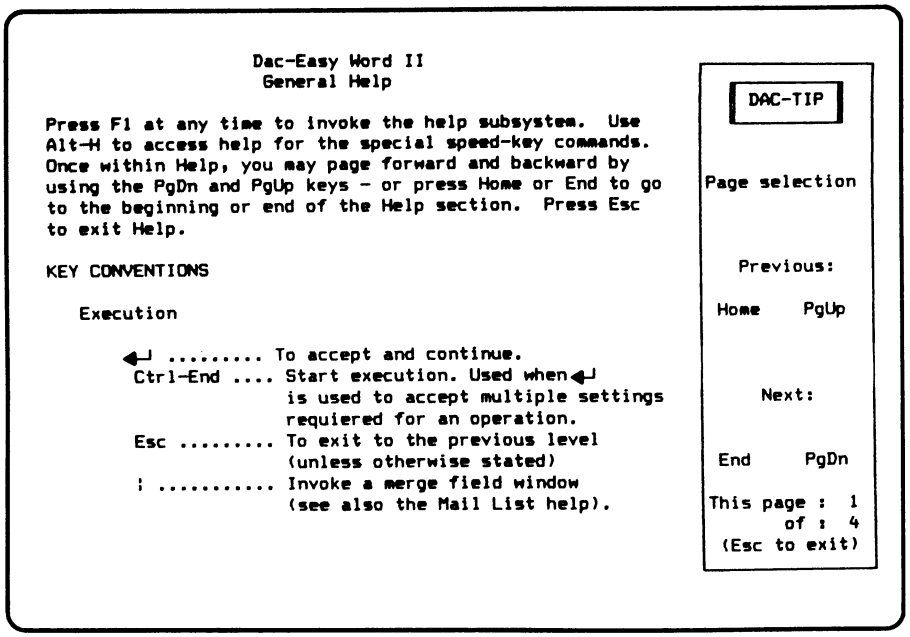


Figure 1. Dac Easy Word II's context-sensitive help, plus the speed keys and the fact that most commands are 'obvious,' makes it very easy to learn.

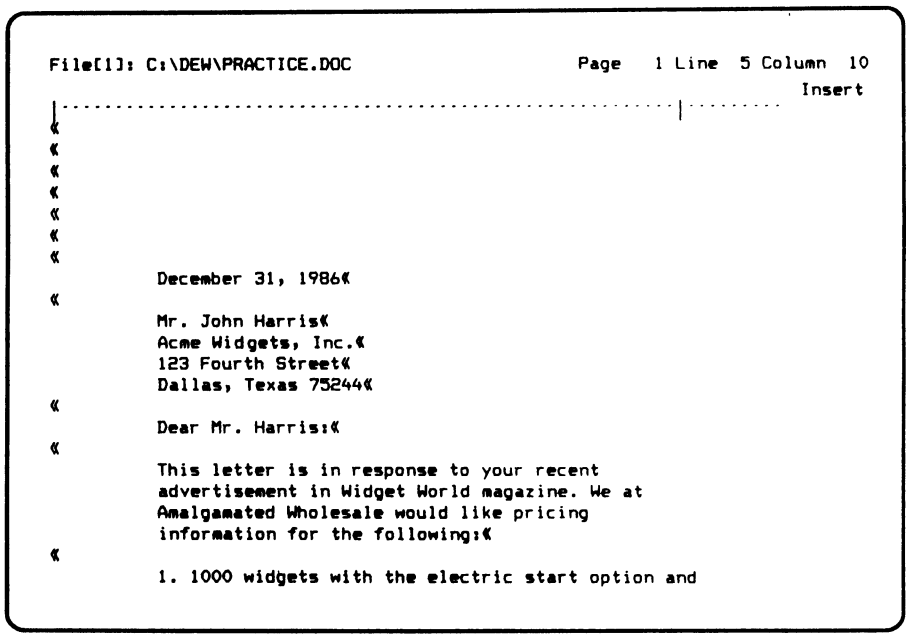


Figure 2. The editing screen is clean and uncluttered, with a ruler and status line occupying the top three lines of the screen, leaving 22 lines free for text with no overlap. Text may be displayed either justified or ragged right, and is automatically reformatted as deletions and insertions are made.

Apart from the obvious options, Print also offers Disk Output, which produces an ASCII file with pagination, footnotes and so on displayed as they would be on a printed page, a welcome feature for those who are concerned to save paper, time or both.

Text Format is concerned with margins, tabs, line spacing and display format. Format files can be saved to disk: a file is associated with the format used when it was saved, but reformatting is also possible. Reformatting a paragraph to a different margin setting, for example, is a matter of invoking Read Format; while reformatting an entire text, perhaps to change from ragged right to justified display, involves marking the entire text as a block before calling Read Format to operate on the block — this is one of Dac's few clumsy commands and is one which could well do with simplifying.

Headers and footers are also controlled from the Text Format menu and are limited to twenty lines.

Dac's Search and Search-and-Replace are very limited in their scope. Both operate forwards only and the sole options available are toggle case matching and replace with verification. F2 repeats the last search.

Block controls all block operations. A block must first be marked, which is accomplished either by invoking the block menu and positioning the cursor at the end of the block or by using the speed key. The Block menu then reappears automatically and the user chooses the required operation from the options Delete, Paste, Copy, Hyphenate, Reformat, Switch Case, Typography and Generate Macro. All of these will be obvious except for Typography, which determines the print style to be used — the options here are Underline, Bold, Compressed, Double Width, Double Strike, Subscript and Superscript. The screen display for these is established in the Installation procedure.

Dac allows up to four texts to be edited simultaneously by use of the Window command, and text may be cut and pasted between windows. Windows are of predetermined size: with two open, the screen is split horizontally, allowing nine lines in each window — the 'lost' lines are accounted for by the frames. A third window splits the bottom window vertically and a fourth splits the top window vertically.

One minor problem is that with the right margin set at 80, the right-hand window frame obscures the last two characters of each line — for this reason, it would have been better to divide windows simply with a horizontal bar. However, this difficulty, as well as the inconvenience of working with such small portions of text, can be overcome with the Zoom command, which allows any window to occupy the full screen with no frames displayed. The counterpart of Zoom, Contract, restores multiple on-screen windows. Function keys F3 to F8 are available as alternative controls for rapid movement between windows.

Spell Checker

Selecting Dictionary from the menu offers two options: adding a word to the supplementary spell checker dictionary or spell checking the active file. The manual does not reveal either the number of words which may be added or the size of the main dictionary, but the main dictionary file is somewhat over 130 Kbyte, which is substantial enough for day-to-day purposes — every word in this section of the article was recognised except 'files' and 'scrolling'. The latter is perhaps forgivable but the former is not, given the way the dictionary is organised, with head words and derivatives listed separately, plurals clearly being derivatives of singulars.

The spell checker is not especially sophisticated. When it encounters an unrecognised word, it gives the options of adding it to the dictionary, ignoring it, browsing through the dictionary for a match, or correcting the word. The latter, however, must be done by hand if nothing useful is found in the dictionary. Typing errors such as 'hte' for 'the' produce no useful suggestions, which reduces the feature's value — I look to a spell checker to tidy up my typing at least as much as to spot orthographical lapses.

A source of irritation for those of us who spell correctly or who aspire so to do is that few American wordprocessors offer dictionaries which recognise the superiority of British standards. Dac's distributors, aware of this problem, are preparing a spell checker based on the Shorter Oxford English Dictionary, a most welcome development, particularly if the package can be tailored for other programs.

Dac supports macros, allowing text and/or commands to be placed under any Control-Alpha-key combination. A number of predefined macros are supplied, invoking various commonly used functions from the menu, and those who work with Dac for any length of time will undoubtedly wish to use command macros to sidestep menus where there is no speed key. Macros can also be generated from the block menu, allowing a section of text already typed to become a macro.

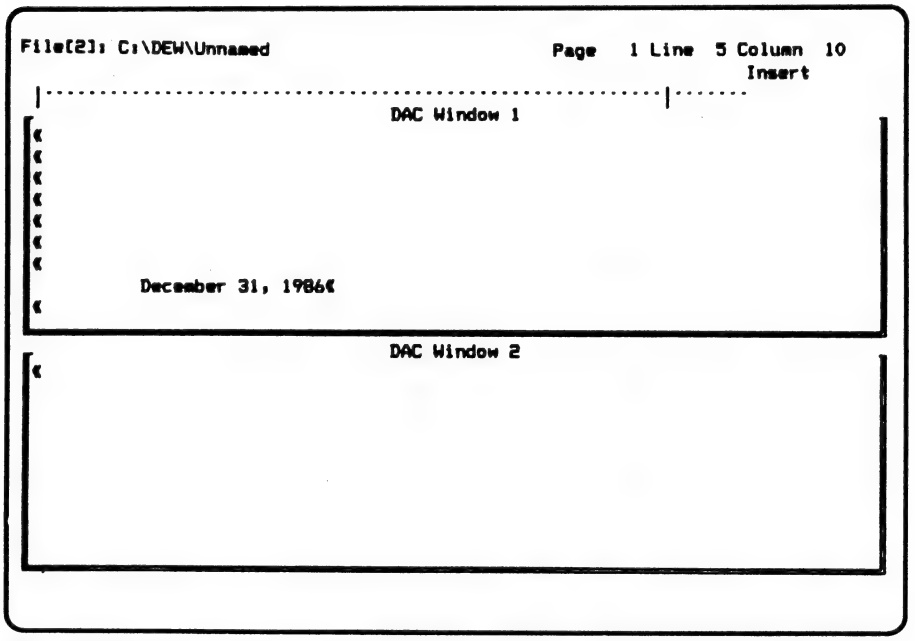


Figure 3. Dac allows up to four texts to be edited simultaneously by use of the Window command, and text may be cut and pasted between windows. A window can be made full screen size at any time with the Zoom.

Summary

Dac is not the package for writing your doctoral thesis or your monograph on 327 types of cigar ash. Work of that sort demands the features of top-end word processors such as XyWrite or Word Perfect — which also command top-end prices. However, for the less power-hungry, Dac represents outstanding value for money, particularly in view of the additional support which the Australian distributors are putting behind the program. It is an excellent middle-range word processor, easy to learn and aside from one or two minor inelegancies, transparent in use. □

Product Details

Product: Dac Easy Word II
Distributor: Mace Software, 23 Sylvan Rd, Toowong 4066 Qld. (07) 870 3600
Price: $110 (taxed)

Webster's New World Writer

WEBSTER'S New World Writer runs under DOS 2.0 or higher and requires a minimum of 256 Kbyte and two floppy drives or one floppy and one hard drive. It is supplied on three floppy disks and is not copy protected. The documentation consists of a small pamphlet covering installation and outlining the most essential word processing commands; and a bulkier reference volume, spiral bound and with hard covers.

A 'Writer's Guide' is included in the manual, offering advice on such matters as file maintenance and tricks of the word processing trade, as well as matters of style and presentation for various types of text. Guidance is offered also on questions of grammar, punctuation and misuse of words. Two of the items listed as misused are 'alternate' and 'alternative' — it is pointed out quite rightly that 'alternate' means 'first one, then the other', while 'alternative' means 'one without the other'. That this is a common error is amply demonstrated on almost every preceding page of the manual.

Installation

There is no installation procedure as such. For floppy-only systems, the manual simply runs through the business of making working copies of the distribu-

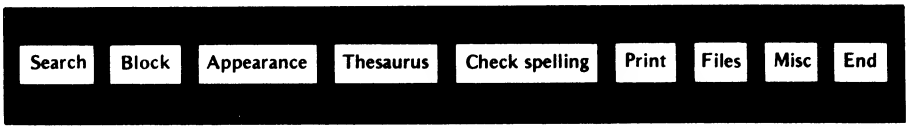


Figure 4. New World Writer's Main Menu.

tion disk, while for hard disk users, the creation of a directory for the program is outlined. The computer must be configured to at least 20 files and 12 buffers — the program will either write the necessary CONFIG.SYS file or modify an existing one. Printer installation and general set-up for program and text files are performed within the program itself. An option 'monitor' offers the useful advice that the monitor's contrast and brightness controls may be deployed if the sample text is not satisfactorily displayed; but it is possible to carry out more far-reaching changes: display colours can be set for both the wordprocessor itself and the dictionary and thesaurus.

In the case of a floppy-only system, this must be done at the DOS level, invoking a program COLOR.COM on the spelling checker disk and specifying which part of the program is to be changed; while on a hard-disk system, colour changing is to be found lurking under spell checking in the main menu. Various other defaults can be established, including the creation of back-ups and the enabling of automatic save, which occurs after every 1000 keystrokes; and which, the first time it occurred, suddenly brought the hard disk to life and scared the daylights out of me, giving me to wonder whether I had discovered an undocumented feature (polite trade term for 'bug'), since I happened to have just pressed the Page Down key.

When Webster's is booted, the sign-on hangs around for a few moments and then gives way to the main screen. A file must be loaded before anything can happen — the command line is set up for the current path or text drive and all that is necessary is to type in the file name. If the file is not a new one, pressing Alt-J takes the cursor to its point at the last save, a very nice little feature.

The top line of the editing screen displays the legend Esc: Main Menu and shows the name of the current file. Two lines are left blank below this for the said menu, and a status line at line 4 shows the current cursor position by page, line and column, as well as indicating whether Insert or Overwrite mode is active. As an extra safeguard, a different cursor shape appears according to the mode in use, which is another nice touch — although it is hard to do any serious damage, it is highly irritating to overtype text. A ruler line at the bottom of the screen shows margins and tabs, as well as a ghost cursor, which echoes the movement of the cursor. There are thus 20 lines free for text display, with no overlap, which is a little annoying — I like to see at least one line repeated from the previous screen. The status line does not show character or word count, but a word count to the document end can be called from the menu.

Text can be displayed ragged-right or justified, and is automatically reformatted if any cursor key is pressed after an insertion or deletion has been made. Extensive editing of a justified text eventually leads to inaccurate justification, however, particularly if the margins are changed, with excess spaces appearing between words — I suspect that this is a genuine example of an undocumented feature. Various glyphs litter the screen to show paragraph breaks and so on, but the majority of these may be hidden.

Cursor movement is controlled either by the arrow keys together with the shift and control keys; or, to my great delight, by means of WordStar commands — ^A to move back one word, for example. As readers of these articles will know, I am unswerving in my devotion to WordStar, particularly since version 4 was released, and any program which uses its commands has already gone half way to the winning of my heart. Both scrolling and cursor movement are acceptably brisk, and movement from top to bottom of a 20 Kbyte file was instantaneous. However, for some reason which I am unable to fathom, the cursor appears to migrate to the top of the screen from time to time when characters are being erased — this is an appearance only, as the cursor is in fact in the position which it ought to occupy.

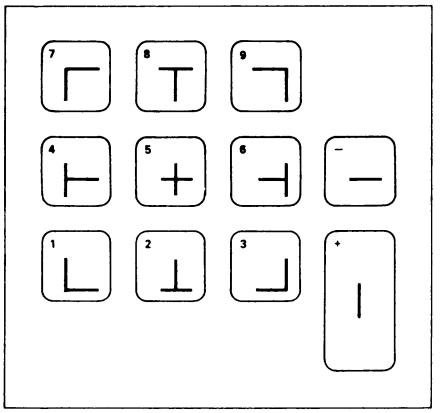


Figure 5. In Box Drawing mode (accessed by Misc from the Main Menu), the Shift key plus a keypad key draws 'box characters' for tables, rules and boxes.

Command Structure

Webster's enjoys a double command-structure: commands can be issued either from a series of menus, which appear at the top of the screen above the status line; or, to my increasing delight, by means of WordStar commands. In many cases an Alt-key combination is possible also; thus Search-and Replace, for example, can be invoked from the menu; with the WordStar command ^QA; or with Alt-S (or Alt-G to make it global). Some of the more recondite WordStar commands are not recognised, but there is enough duplication for a WordStar user to be up and running with Webster's in a matter of minutes. The menu system is invoked with the Esc key, which also cancels any command. The charmingly named Whoops command allows erasures to be unerased.

Text appearance is governed by the Appearance option in the main menu, which allows a number of standard formats to be set up for tabs, margins, justification and so on.

The Thesaurus has a vocabulary of some 20,000 words and is invoked either from the main menu or with Alt-T. If the target word is not found, the Thesaurus displays its Alternate Entries, which the authors of the Guide would no doubt prefer to call the Alternative Entries. The Thesaurus pops up on the right hand side of the screen, but can be made to occupy the full screen. It can also be temporarily cleared from the screen to reveal the text file, a useful feature.

Spelling Checker

The Spelling Checker has a vocabulary of 114,000 words — every entry in Webster's New World Dictionary, Second Concise Edition, according to the manual — and further words may be added to auxiliary dictionaries. In addition to spell checking, it also corrects hyphenation and contractions, splits words that have been run together — an excellent feature — and detects repeated words, although like all such spelling checkers I have seen, it does not recognise 'had had' as a legitimate repetition. It is not particularly fast,

primarily because the text is automatically saved when spell checking is invoked and reloaded when the job is completed. The text appears to be scanned alphabetically, and a tally of questionable words appears as the scan proceeds. Once the scan is over, the results may be previewed, an option which allows legitimate words to be excluded from the final stage in the process, the correction of errors. At this point the text is reloaded to RAM, questioned words are highlighted and corrections are offered; and the usual options of accepting the correction, correcting manually or adding to the dictionary are presented.

Summary

Webster's does not qualify as a power wordprocessor by any means, and has no pretensions to that status. It is, however, extremely easy to learn and use, and offers a reasonable range of features. It is fast enough for any but the most crazed of speed-freaks, and its command structure and menu organisation are clear and logical. Its major blemish is external — it is perhaps a little overpriced.

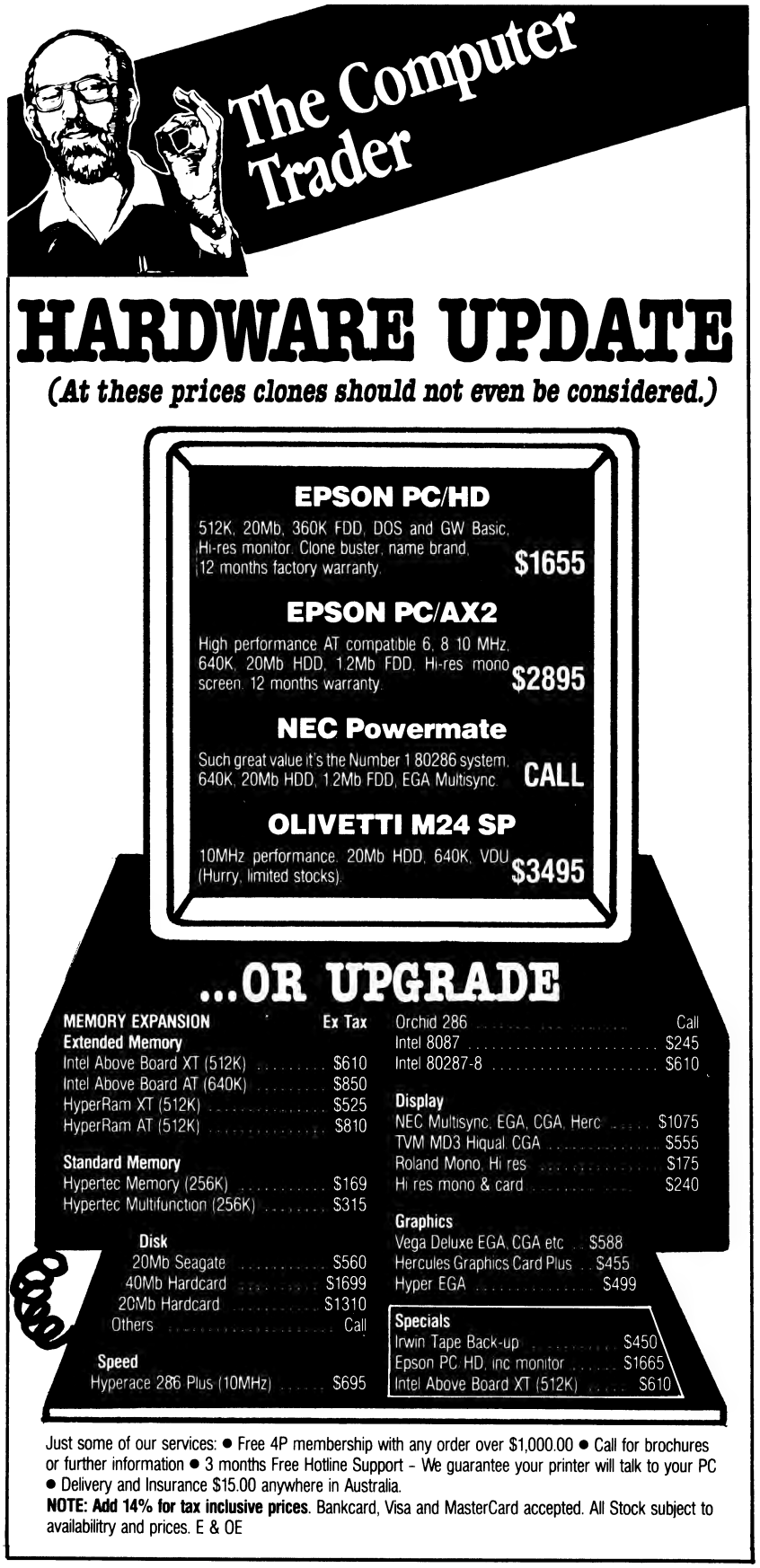
In Conclusion

Either of these programs would be a good selection for anyone looking for a medium-power word processor without the need for embarrassing interviews with bank officials. Dac has the advantages of mail merge, multiple document editing and a macro recorder; while Webster's, on The Engine at any rate, is considerably faster, as well as offering the benefits of a thesaurus. Dac perhaps has a slight edge with its mail merge, macros and windows, but at this level these features are not sufficiently developed to be significant — they are a taste of what is possible. And while one could debate whether what is possible is worth the several hundred extra dollars, such are the dollars the market commands. If you need complex macros, go for something like XyWrite; if you want 64 files in RAM simultaneously, have a look at OK Word Processor, and so on.

If what you want is something that simply processes words efficiently, and leaves you enough cash for stationery, either Dac or Webster's is a good bet, depending on your specific needs. □

Product Details

Product: Webster's New World Writer
From: Simon & Schuster, New Jersey USA
Distributor: Busiware, 24 Kippax St, Surry Hills 2010 NSW (02) 211 1266
Price: $195 (taxed)



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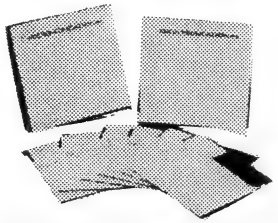

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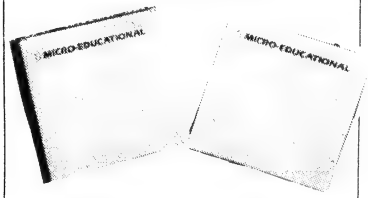

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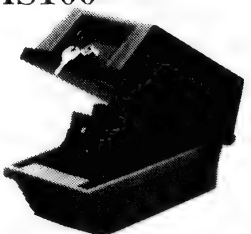

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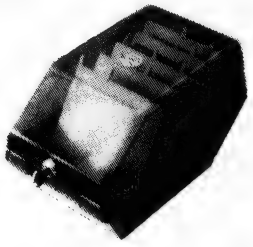

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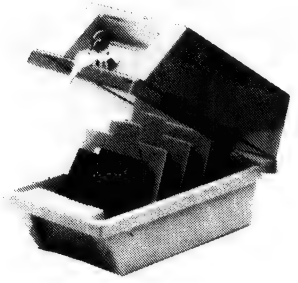

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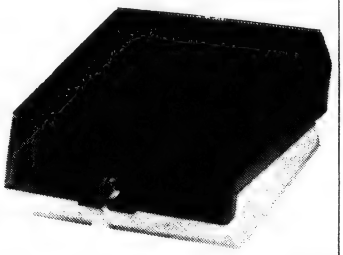

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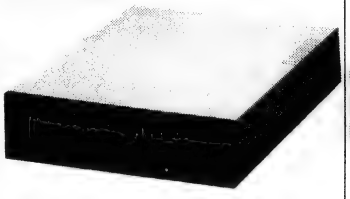

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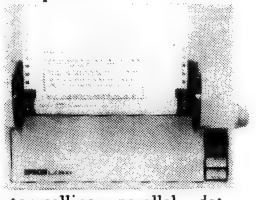

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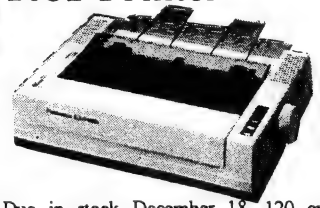

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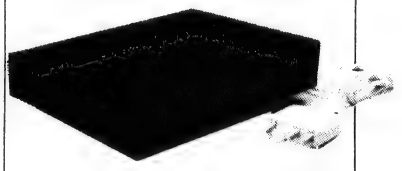

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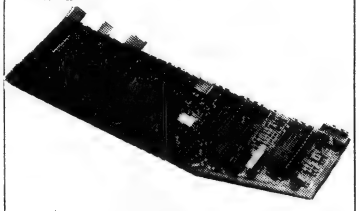

V21, 22 & 23 Card modem from Maestro for the open architecture Apples (II, IIe, IIGS). Features auto everything & Hayes m/m compatability. Works with Ascii Express etc. **$349**

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

MICRO-EDUCATIONAL PTY LTD

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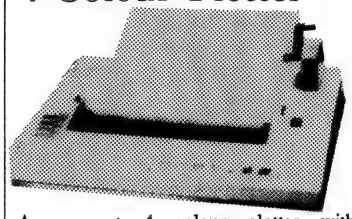
Telecom, Dept Navy, Dept Ag, Syd.Uni, UNSW, CSIRO, Monash, HEC, most Aust colleges & high schools, PM's Dept etc, etc.

ACCESSORIES

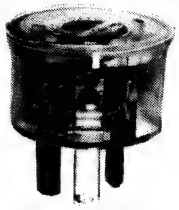
19) COMX PL80 4 Colour Plotter



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.

$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?

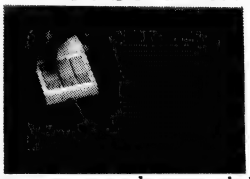
$35

21) Logimouse

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

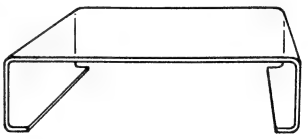


If your mouse scratches your desk you need this neoprene mat. Keeps your mouse clean and working properly.

$19.95

ACCESSORIES

23) Printer Stand

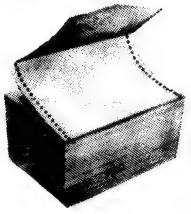


Clear perspex printer stand. Stylish. Rigid. Holds 1000 shts comfortably. Suits most 10" dot matrix printers.

10" version **$35**

15" version **$45**

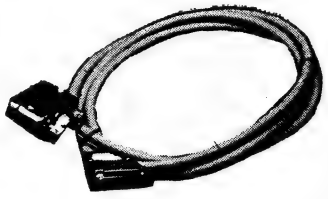
24) Paper



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:

$38

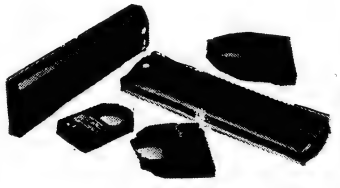
25) Cables



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

$30

26) Ribbons



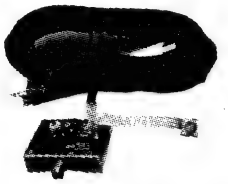
We supply most popular makes of ribbons including DT80, SP80, BX80, all Epson ribbons, Logitec, Super 5, Imagewriter, C.Itoh etc. Most ribbons are:

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

$12

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.

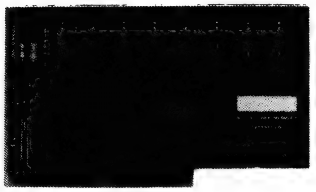
$40

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

$90

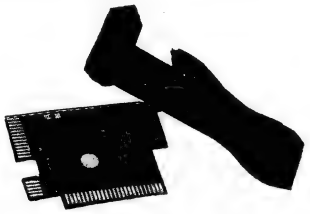
29) Ext 80 Card



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

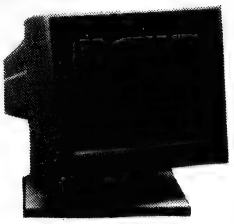


A fully-featured Apple Firmware compatible printer card which includes graphics dumps to most printers. Price includes cable. Works with all the latest software including Printshop. Normally $110. Our price:

$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**

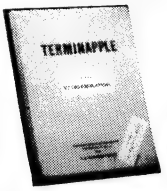
Swivel Mounted: **$220**

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:

$99

33) Terminapple



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

$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**

LOTUS MANUSCRIPT

The Document Presentation System

Into large-scale, highly structured documentation? Rose Vines is — and she's found a Document Processing System that can help.

MANUSCRIPT IS NOT a wordprocessor. Although some of the press releases have promoted it as a 'wordprocessor for technical writers,' it would be unfair to judge it as such, as it would fail miserably.

Manuscript is both more and less than a wordprocessor. Its initial sign-on banner proclaims it to be a Professional Document Preparation System, which is a far better designation. Manuscript is specifically designed for the development of large, structured documents; it's possible to use it for writing things such as memos and letters, but it'll probably drive you nuts, especially if you've used another wordprocessor before.

Manuscript comes from the US company Lotus, renown for its spreadsheet Lotus 1-2-3 and the overwhelming Symphony. Manuscript is a little overwhelming itself at first. It comes on eight disks, with a Getting Started guide and a reference manual. You can only use it on a system with a hard disk with 640 Kbytes of standard RAM, and I'd strongly recommend adding some expanded memory if you don't already have it. The Manuscript program files occupy about 1.6 Mbytes on your disk (that's if you get rid of unnecessary printer control files). It'll also use disk space for temporary work files if you don't have expanded RAM, so make sure you have some elbow room when you put it up.

Introducing Manuscript

Manuscript consists of a series of programs, all tied together under the Document Manager. You start the whole thing by typing MS at the DOS prompt, and you're then placed in the Document Manager Menu. The first time you run Manuscript, you have to run the Setup program, which lets you nominate your display and printer and set up virtual memory for temporary Manuscript files. You can use Manuscript with non-graphics monitors, but you won't be able to use its Preview feature if you do.

If you want to create documents larger than 100 pages, you must allocate memory before you start editing. The basic Manuscript program, MS.EXE remains in standard RAM while you're using the program, while the other Manuscript programs — such as Edit and Spell — are loaded into RAM when required (this means you have to wait around for various parts of Manuscript to be loaded when you change tasks). The program then uses the rest of standard RAM, expanded memory (if you have it) or normal hard disk space as virtual memory to manage various tasks.

A 100 page document requires approximately 1024K of RAM; if you want to make larger documents, you need to pre-allocate 10K per page. So, a 500 page document will require about 5 Mbytes of RAM and virtual memory. If you don't set this up before you start editing, you'll find you have to start wiping various files in the middle of your editing session — most disconcerting. Manuscript will let you allocate up to 16 Mbytes of memory, but things will start moving at a crawl as you approach this limit.

The best way to learn Manuscript is to work your way through the Getting Productive manual. This contains a series of lessons which cover all the main aspects of the program, and take you through producing a fairly complex series of documents. (Manuscript describes this process as 'keystroking' — yet another totally unnecessary buzz word.) After finishing the tutorials, I felt I was starting to know my way round, although I certainly wasn't feeling comfortable.

In addition to descriptions of all Manuscripts functions, the Reference Manual gives an overview of the concepts behind the program. You'll need to understand these to establish a productive working relationship with Manuscript. Various other bits and pieces include a Getting Started guide, a Quick Reference booklet, and keyboard templates.

The Concept

I said before that Manuscript is not a wordprocessor. While you can use it as such, it is both inefficient and aggravating. In operation, it's more of a 'block' processor — it deals in blocks of text, and does so very efficiently.

There are four levels of text in Manuscript: text, blocks, columns and sections. Text can be anything from a single character, to words, sentences and paragraphs. You can use the various editing and formatting commands on text or blocks of text which you define by highlighting with the cursor keys. These blocks of text are not to be confused with Manuscript blocks; they are really the equivalent of blocks in wordprocessors such as Microsoft Word and WordStar.

Blocks are units of related text. Unit is the key word here, as Manuscript deals with a whole block of text with the same speed and efficiency with which most wordprocessors deal with single words. Blocks are identified on screen by a solid horizontal line (you can make this disap-

pear and just have a space, but you can't get rid of the space). You start a new block by typing Ctrl-A. Whenever you work in Manuscript you are dealing with blocks: you may create a file with only one block, but Manuscript will treat it as a block.

The manual suggests you limit each block to less than one page — as soon as you exceed this limit, Manuscript functions slow down.

A column is a vertical portion of a block, indicated on screen by a dotted vertical line. In combination, blocks and columns let you create tables with ease. You can assign formats to specific columns, and move, copy and delete them.

A section is a group of related blocks, generally consisting of a headline block (usually with the title or major idea of the section) and as many related blocks of text as required. Its represented on screen by a double horizontal line. Sections can have sub-sections, and you edit a section individually, so changes made only affect that part of the document.

Two other concepts are important when working with Manuscript: structured and unstructured editing. Sections are only used in structured editing, which is ideal for creating methodical numbered documents. For example, I've recently had to create documentation for a computer course, conforming to a format with successive levels of numbered sections. Thus an outline a chapter in the document looks something like —

```
1. Introduction to DOS
1.1 History
1.2 Other Operating Systems
1.2.1 CP/M
1.2.2 Unix
1.2.3 Pick
1.3 General Overview of DOS
```

Creating this type of document is greatly simplified using Manuscript, which lets you create levels of sections, and specify different formats for each level. I could, for example, define all my level 1 sections (chapter headings and intros) to appear with bold underlined headline blocks and bold text, and cause all level 3 sections to appear in italics. Set these formats once, and they are then applied throughout the whole document. You can also use Structured Edit as an outliner: I could write a complete chapter, and then get Manuscript to display just the headings (as above) or suppress the display of all text below a certain level. Thus, pressing Alt-1 will give me headings only, while Alt-2 will show level 1 text as well as the headings.

Unstructured Edit doesn't use sections, only blocks. You'll use it if you want to create short documents with Manuscript, or less formal or structured documents (you can easily convert an unstructured document into a structured one).

The Tools

The Document Manager menu contains nine options (plus 'Quit'), shown in Figure 1. You select an option by using the cursor keys (or the first letter of the option) to highlight it, and then pressing INS.

Why INS? One of the defacto standards in software these days seems to be 'cursor to highlight and enter to select'. But not Manuscript. This was one of my first gripes. Added to this, the keys used for various functions were not always consistent. For example, on this menu, I could highlight an option and then press Enter instead of INS, but this wouldn't work on other screens.

There is also a system of displaying choices within options by pressing either the space bar or the grey + key. There didn't seem to be too much consistency here either. In fact, there quite often seemed to be a lot of keystrokes needed to accomplish simple tasks.

My next gripe was the cluttered screens. So much information is put on the screen that my mind often went blank. It took me much longer to learn Manuscript just because of information overload on the screens. Have a look at the Preview Formatter screen in Figure 2. All that information is flashed up on the screen when all you want is a quick peek at how a document will look when printed. I kept on having the distinct feeling I'd missed some

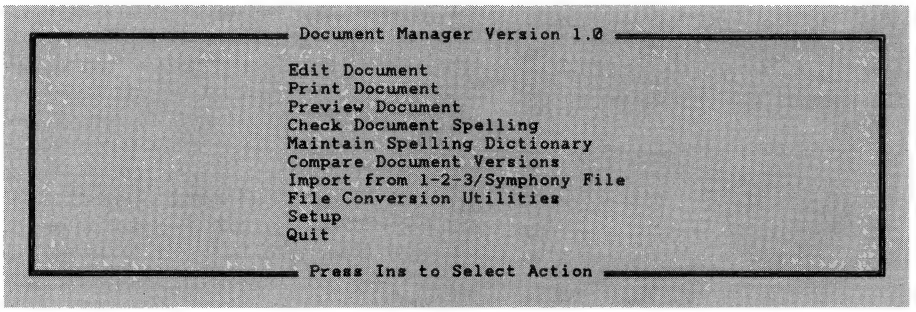


Figure 1. *The Document Manager menu contains nine options (plus Quit). You select an option by using the cursor keys (or the first letter of the option) to highlight it, and then pressing INS.*

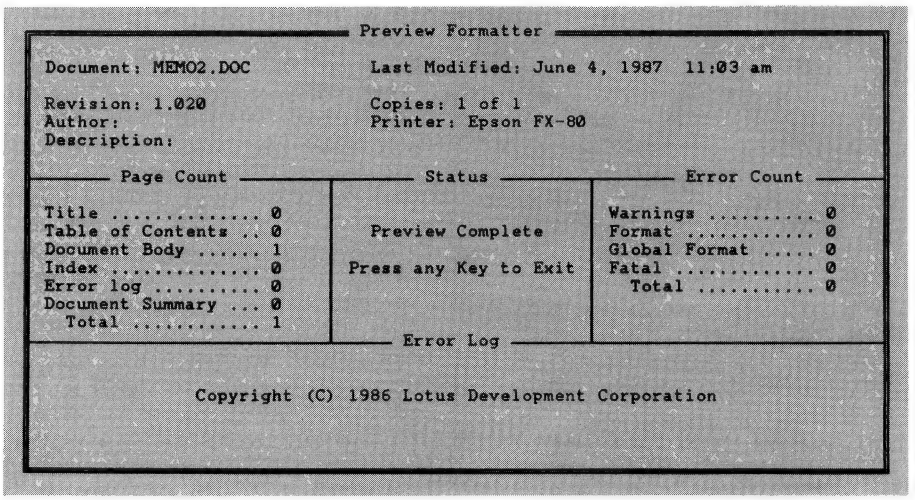


Figure 2. *The Preview Document option lets you see what a document will look like when it is printed — italic text is indicated onscreen by an underline when you're writing, for example. To see what your document will look like before you print, you need to save the document and load the Previewer which shows a full page and lets you zoom in on portions of text. It also shows how graphics will look when incorporated.*

important detail. It also reminded me of the dreadful Multimate — a program surely designed by someone chained to a mainframe, and with no conception of the possibilities of the micro.

Perhaps I'm being a little harsh on Manuscript here and once again expecting it to perform like a wordprocessor; recalling it's a 'Document Preparation System' made me appreciate the whyfors of so much detail at each stage of the program.

Most of the options on the Document Manager menu are self-explanatory. The Preview Document option lets you see what a document will look like when it is printed. Manuscript is not a WYSIWYG - italic text is indicated by an underline when you're writing, for example. To see what your document will look like before you print, you need to save the document and load the Previewer. This shows a full page at a time, with a box which lets you zoom in and magnify selected portions of text. It will also show how graphics will look when incorporated (you can include graphics from other Lotus packages and special digitised images). It doesn't look all that good on a plain old Hercules mono graphics card and screen, but an EGA screen would make a prettier sight. As with spell and print, make sure you save your document before using the function, otherwise you lose all your new work.

The Print option lets you use draft or final print modes, and print the whole or portions of a document. A range of options in either mode gives this function a lot of flexibility. However, there's no background print mode — so you've got to wait round while your printer churns out your document.

The spelling program is so-so; I found it not half as efficient as WordStar 4's, but I did appreciate having the Collin's dictionary available for English/Australian spelling (the US version has Webster's). There's a neat option which lets you convert a document to a dictionary (or vice versa), and you can use two custom dictionaries at a time, in addition to the Collin's.

The file conversion utilities let you transfer files between Manuscript and other Lotus products, or import and export DCA (Document Content Architecture) files. You can also import and export files in ASCII format. I found moving files from WordStar to Manuscript most satisfactory; in the other direction, it didn't work quite as well. When importing ASCII files, you can import 7- or 8-bit data — using 7-bit gets around WordStar's funny highbits.

Editing

When you select the Edit option from the Document Manager, you first have to fill out an edit panel, detailing the name of the document you wish to edit, and other details. A fascinating feature of Manuscript is that it stores the name of the file you were editing at the end of the last session, and displays this file name as the default file. Not only this, it stores the cursor position — so you can return to exactly where you last were, even if you've turned your computer off in the meantime. A nice touch.

A not-so-nice touch is that you have to type the full name of your sub-directory and file in the edit panel. If the currently displayed sub-directory is: C: WP MS and you want to use C: WP MS MSDATA as the default, you can't just edit the first line. You have to type in the complete entry. You also must use the file extension '.DOC'. If you already use a naming convention which utilises the three extension letters, you'll have to dump it. These may seem like small things, but it's the small things that eventually drive you bats.

When editing, most formatting and editing controls are accessed through function (or Alt-ed function) keys. For example, F10 gets you the Main Menu, which lets you use a variety of file editing, formatting and printing commands. Once you've finished with a command, you've got to back out with ESCape. So, to count the words in a document, press F10, G (for Global) and W (for Words). In the top right of the status panel the message — MENU-GLOBAL-WORDS — appears. To get back to editing, you have to press Esc three times.

As a hardened WordStar user, I found it a lot of keystrokes to accomplish a task (admittedly, WordStar doesn't have a feature to let you count the words in the document), and having to use function keys and Esc breaks up the rhythm of typing. It made me realise that I like the much maligned control keys used in WordStar because they let me type smoothly, without any of this function key or mouse nonsense. However, Manuscript also has 'accelerator keys' which let you perform tasks quickly. Instead of having to press F10, F (for File) and S (for Save) to save a document, you can press Ctrl-S. Almost like WordStar!

Commands such as delete, copy, format and paste can work at text, block, column or section level. The formatting controls are extensive, and make it a breeze to create tables, numbered lists, and bulleted lists with hanging indents. You'll

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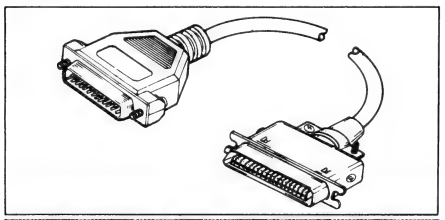

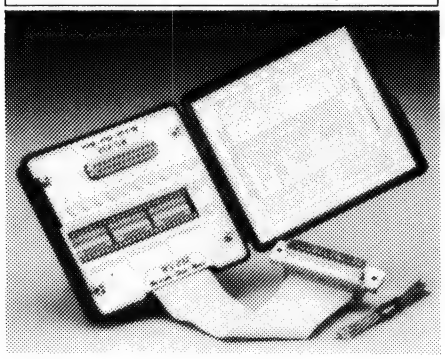

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probably find yourself working at block level most often, and it's fascinating to watch the speed of Manuscript when working with blocks. It takes a while to get used to the fact that each block is operating as a *unit*, but once you do, large scale editing becomes a delight. As long as you stick to the guidelines provided in the manuals, Manuscript performs very efficiently, and its document creation tools prove invaluable.

Likes and Dislikes

Note I said 'as long as you stick to the guidelines'. After a little practice with block editing, I started to like Manuscript. But it did make me feel that I was conforming to the program, rather than the program having the flexibility to meet my needs and style. It felt, well, blockish. I especially didn't like the degradation in performance when you use long blocks. Once again, I felt it was important to get rid of the 'wordprocessor' image when dealing with Manuscript, and to accept it as a new type of tool. When I did this, I relaxed into block editing.

Some other dislikes include the absence of a line, page or file size indicator on the status panel. You never know exactly where you are in a document, all you're given is the current column position of the cursor. I thought the Help function (activated with the F1 key) was weasely. There is a timid attempt at context sensitivity, an inadequate index and cluttered information which quite often leaves out the one detail you want (such as, what key do I use to get a particular function?).

If you use Manuscript without expanded memory in your computer, be prepared for your hard disk to get a real workout. Once you start building large documents, disk access becomes frenetic, so its a good test of how well your hard disk is functioning. I really think it's worth having the expanded memory or, at least, a very fast disk drive. I started worrying mine would keel over and die. I also hated using up so much disk space for one program; I'm down to the last 9 per cent of my 20 Mbyte hard disk, so space is valuable.

Things I liked included the option of using accelerator keys (a blessing for a WordStar user and for anyone who likes continuity when typing), the powerful formatting commands and structuring features, a lot of the block features (for example, you can alphabeticise your blocks — a neat, quick way to create a glossary), and the Windows, for editing two documents at once (although I'd like to be able to edit two parts of the one document at the same time). The backslash commands are also useful — these let you do things like: insert the current time, date, author or revision number into a document; create a document from a list of other documents; and control various font, formatting and print settings.

You can also use a backslash command to create equations. You can preview the output with the Preview function, although it's pretty hard to work it out on my plain mono graphics screen. You also need a printer capable of producing such output, and some patience. Depending on the complexity and number of equations in a document, it can take some time to print it. That's not a complaint — I appreciate the facility being there.

To create some sample equations with Manuscript, I used the backslash command, Equation, and wrote out the equation in words. There are well over 100 symbols recognised by the equation processor.

If I type the 'int super infinity sub A (t) dt' within an equation command, the result will be —

$$\int_{A}^{\infty}(t)\,dt$$

Another example is 'int int sub real nabla #. (V #x n) = int sub real n sub real' which will appear as:

$$\int\int_{\mathbb{R}} \nabla \cdot (V \times n) = \int_{\mathbb{R}} n_{\mathbb{R}}$$

Conclusion

I feel torn about Manuscript. It has some great features and some nasty turnoffs. However, it seems the more I use it, the more I enjoy it.

It's certainly not going to replace WordStar 4 as my everyday wordprocessor, but I'd seriously consider using it to create some large-scale, highly structured documentation — the task its creators intended it for. If that's the sort of work you're into, or if you need features such as the equation processor, I can heartily recommend it. □

Product Details

Product: Lotus Manuscript
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Price: $970 (taxed)

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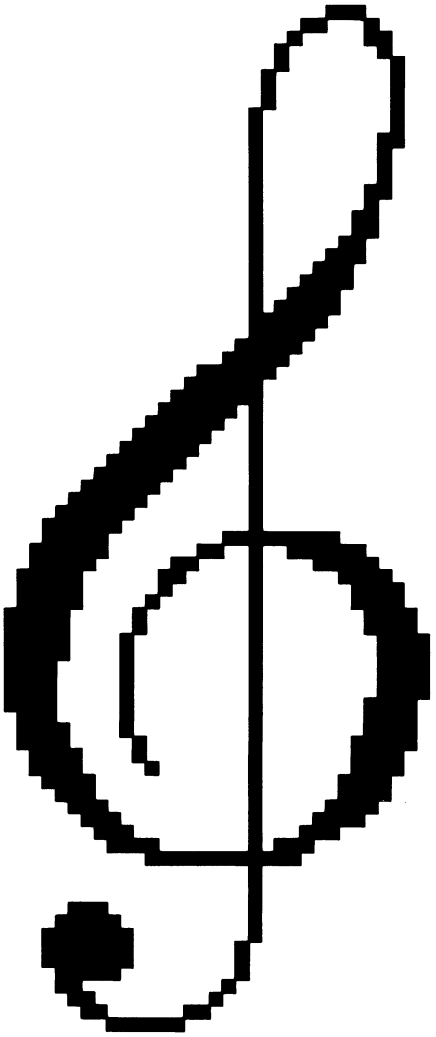

Microcomputers, MIDI, and Music

MIDI has changed the way professional musicians create, perform and produce their music, and, it provides a comprehensive and affordable tool for the musical amateur. Let's look at the theory behind that tool (compliments of Andrew Symaniz) . . .

THE MUSICAL INSTRUMENT Digital Interface (MIDI) is the computer musician's equivalent of the RS232 — the 'electronic glue' that binds together an enormous range of products from both the music and computer industries.

When MIDI was first proposed several years ago, it was initially intended to be strictly a keyboard-oriented interface that provided real-time communication between musical instruments from different manufacturers. Today, MIDI has evolved far beyond this early conception.

Not only has MIDI changed the way professional musicians create, perform and produce their music, it can also provide comprehensive and affordable tools for the musical amateur. Vast collections of 'intelligent' MIDI peripherals (synthesisers, rhythm machines, sequencers, audio mixing and other sound processors — even non-musical equipment such as lighting controllers) can be controlled remotely by computer, and combined into a single integrated system.

Fortunately, MIDI is sufficiently open-ended to allow ample room for expansion into a largely uncharted future. Several new proposals are already in the pipeline. One of these includes an SMPTE-like time-code that enables independent sequencers to be 'locked together' to play from any arbitrary point in time. Another implementation will allow sounds sampled on one machine to be dumped across to other MIDI equipment for more extensive editing/processing.

In future articles we'll be looking more closely at some of these advanced applications. For now though, let's indulge in a little MIDI theory . . .

MIDI Hardware

The MIDI 1.0 specification entails both hardware specs (optically-isolated current loop with separate cables for send and receive) and a software protocol that allows enough flexibility to accommodate most synthesiser architectures. Not only does the MIDI instruction set define detailed methods for transmitting note-control data, it also provides a variety of universal music commands for more general or future use.

MIDI interfaces incorporate the same kind of serial interface hardware (Universal Asynchronous Receiver/Transmitters or UARTs) as used in the RS232 system. MIDI communication, however, uses a higher transmission rate of 31.25 Kbaud (or 1 bit every 32 us), and a fixed data format: 1 start bit, 8 data bits, 1 stop bit, no parity.

MIDI's serial data format allows low-cost cables and standard 5-pin DIN connectors to be used for interconnection, rather than the considerably more expensive multi-way cabling, connectors and interfacing hardware that would be required for faster parallel interconnection.

Although economic considerations such as the above mentioned were instrumental in establishing MIDI's universal acceptance right from the start, the current serial specification is restricted by certain trade-offs in the areas of speed, economy and efficiency. Inevitably, this can lead to compromises in performance.

On the plus side, MIDI's optical isolation and 5 mA current loop enables relatively noise-free communication (as long as the cables don't extend more than 15 metres). However this hardware arrangement precludes star-network configurations using Y-cables, that is, MIDI OUT ports may not be connected to more than one MIDI IN.

Therefore, most synthesisers provide a MIDI THRU port slaved to MIDI IN, which can pass on a copy of data received. This permits individual units to act as passive links between two or more pieces of equipment. Together the three ports enable musicians to assemble a wide range of MIDI-compatible devices into complex networks.

Unfortunately, in more demanding situations data delays can become quite noticeable.

However, several manufacturers now produce a variety of MIDI accessories that help eliminate (or at least filter out) some of the causes of these problems. MIDI data-distribution boxes, for example, can be employed to route MIDI messages from single sources (sequencers) to multiple destinations (sound generators) without having to resort to indiscriminate 'daisy-chaining' via MIDI THRUs.

Other MIDI hardware can help minimise not only opto-isolator induced delays (3 milliseconds via each MIDI THRU connection) but also transmission bottlenecks caused by the inherent speed limitations of MIDI itself.

For example, even in best-case circumstances the starting transients for, say, three 4-note chords might be spread apart by as much as 12 milliseconds — and that's just within range of the threshold of audible delay.

Some manufacturers are now starting to use double frequency rates (62.5 KHz) for various data-intensive applications — such as downloading waveform samples from sound samplers to waveform editing software.

But as far as real-time performance goes, one very simple solution which looks promising involves sequencing software that can support multi-ported MIDI interfacing.

The Fairlight Series III, for example, provides four *independent* 16-channel MIDI transmission systems; this is how the III's sequencing software (CAPS) can provide as many as 64 fully polyphonic MIDI channels for composition or performance — in addition to the CMI's internal 16 voices. And as PCs continue to become increasingly more powerful and affordable, PC-based sequencers featuring multi-port MIDI capabilities should become much more common.

MIDI Data Protocol

Of course, you don't need to know absolutely everything about MIDI's technical specs in order to compose and play music. But some knowledge of the main concepts, and at least an appreciation of what is happening at the data-stream level, can provide useful insights into what you want to achieve musically. A deeper understanding of how MIDI functions can also save you money, and many headaches . . .

Prior to transmission, all MIDI information originates as an ordered series of 8-bit bytes that can easily be represented in digital memory. In MIDI communications, however, serial bytes are actually 10 bits long since they incorporate two extra 'markers' (start and stop bits) that enable receiving units to keep track of where meaningful data begins and ends. (This, so called, 'asynchronous' operation of MIDI eliminates the need for separate 'sync' messages and other timing procedures).

Message	Status Byte			Data Bytes	
	Decimal	Binary	Hex	First Byte	Second Byte
Note off	128-143	1000nnnn	8N	key number	release velocity
Note on	144-159	1001nnnn	9N	key number	attack velocity
Poly key pressure	160-175	1010nnnn	AN	key number	key pressure
Control change	176-191	1011nnnn	BN	control number	value
Program change	192-207	1100nnnn	CN	program number	-
Channel pressure	208-223	1101nnnn	DN	pressure value	-
Pitch bend	224-239	1110nnnn	EN	LSB	MSB

Table 1. *Channel Voice Messages: MIDI is capable of transmitting up to 16 individual channels concurrently — refer to the text for a detailed explanation.*

Control	Status Byte		Data Bytes	
	Decimal	Hex	Number	Value
Continuous Controller 0 (MSB)	176-191	BN	0,	0-127
Continuous Controller 1 (MSB)	"	"	1,	0-127
Continuous Controllers 2-31 (MSB)	"	"	2-3,	0-127
Continuous Controller 0 (LSB)	"	"	32,	0-127
Continuous Controller 1 (LSB)	"	"	33,	0-127
Continuous Controlers 2-31 (LSB)	"	"	34-63,	0-127
On/Off Switches	"	"	64-95,	0=off 127=on
Undefined	"	"	96-121	0-127
Reserved for Channel Mode messages	"	"	122-127	0-127

Table 2. *The assignment of control numbers.*

Once the marker bits have been stripped off, the receiver interprets the remaining 8-bit byte in one of two different ways — either as a status byte or as a data byte.

Most performance information transferred across MIDI consists of batches of bytes called 'messages' — these usually consist of one status byte followed immediately by one or more data bytes. Status bytes indicate the type of data to be transmitted and are recognised as always beginning with a 1 (bit 7 set). On the other hand, data bytes always contain a 0 in this same position (bit 7 reset).

The upshot of all this is that there can be 128 different ways of interpreting 'packages' of data sent across MIDI. In particular, any data contained within a message (ranging from 0 to 127 for 7-bit, or 0 to 16,384 for 14-bit data) can mean entirely different things, depending on the 'message status' of the previous status byte.

All messages carried by MIDI fall into two distinct categories: channel messages which relate to individual voices or instruments assigned to specific MIDI channels; and system messages which provide more general information for all of the connected devices in a MIDI system, regardless of their channel assignment.

Furthermore, channel messages can either be channel voice messages or channel mode messages. Similarly, system messages can be further subdivided into three groups — system exclusive, system common and system real time.

Channel Voice Messages

First, let's consider channel voice messages: MIDI is capable of transmitting up to 16 individual channels concurrently. A MIDI transmitter such as a multi-track sequencer can merge all 16 channels of information into a single data stream that is sent out in serial form to any number of MIDI RECEIVERS (synthesisers, drum machines, effects, whatever) comprising a MIDI system. However, only those devices assigned to specific channel numbers (0 to 15) will respond to messages broadcast on a particular channel.

Channel voice messages (Table 1) are the most common of all MIDI messages. The actual function of the status byte is encoded into the most significant 4 bits, and the sixteen channel numbers (shown as 'nnn' in binary, 'N' in hexadecimal) are indicated by the value of the *least* significant 4 bits in the status byte.

There are seven kinds of channel voice messages — these are indicated by status bytes 8N, 9N, AN, BN, CN, DN, EN, and

hex. Some of these messages include the ability to turn notes on and off, change sound programs, or provide expressive information relating to individual keys or controllers on a musical keyboard.

Now, each of the musical keys on a MIDI keyboard is assigned a unique 7-bit data value: for example, the value of key number 0 is 'the note C five octaves below middle C' and the value of key number 127 is 'the note G five octaves above middle C.' Remember, the most significant bit of all data sent must be 0 to distinguish it from a status byte. Hence the maximum keyboard range permitted is represented by values 0 to 127 (00000000 to 01111111 binary, or 00 to 7F hex).

From Table 1, you can see that three consecutive bytes of the form 90 00 7F hex, (10010000 00000000 01111111) means 'turn on the note C five octaves below middle C on channel 0 with maximum attack-velocity.' Similarly, 83 7F 00 hex (10000011 01111111 00000000) would signify 'turn off the note G five octaves above middle C on channel 3 with minimum release-velocity.'

A third kind of key-related channel voice message includes the AN status byte — 'polyphonic key-pressure', sometimes called 'after touch.' However, this particular message (relating to pressure sensing for individual keys) is usually ignored by virtually all but the most expensive instruments.

A deeper understanding of how MIDI functions can also save you money, and many headaches.

A more common, but closely related status message is ON — for 'channel pressure.' In this situation only one data byte is required to complete the message since the key number is not transmitted. This data represents the force applied to *all* keys on a musical keyboard.

Another channel voice message is the CN 'program change' or 'patch change' message. Here, a single data byte is used to select one of 128 patch programs that define a particular sound or voice on an instrument.

Recently, status message EN was set aside for 'pitch-bending' — it's used to sharpen or flatten a note. In this case, data is transmitted as two consecutive 7-bit data bytes. This enables the transmission of pitch-bend values with 14-bit resolution.

Pressure and pitch-bend messages differ from the note-on and note-off messages in one important respect. They require repeated transmission of *continuously* variable values (a message is sent whenever there is a change in pressure or pitch-bend value).

Continuous data controls, such as pitch-bend and modulation wheels, can generate enormous quantities of inflexion data. Consequently, musicians are often warned to use these controls judiciously — to avoid clogging the MIDI serial channel or using up excessive memory when recording into a sequencer.

Finally, there is another family of more general channel commands (status BN) which are dealt with slightly differently from the other channel voice messages we have looked at so far (see Table 2). □

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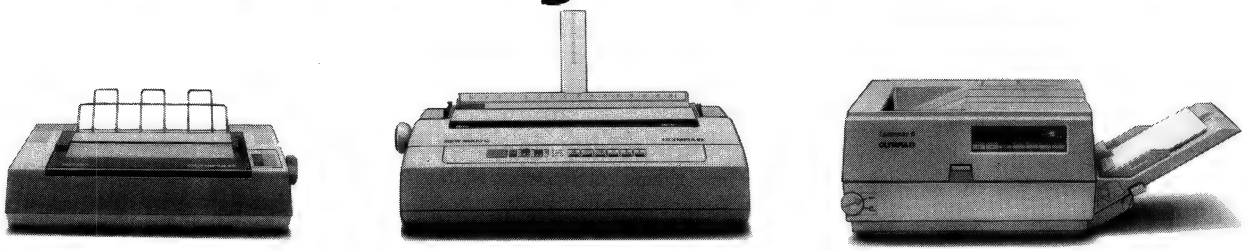

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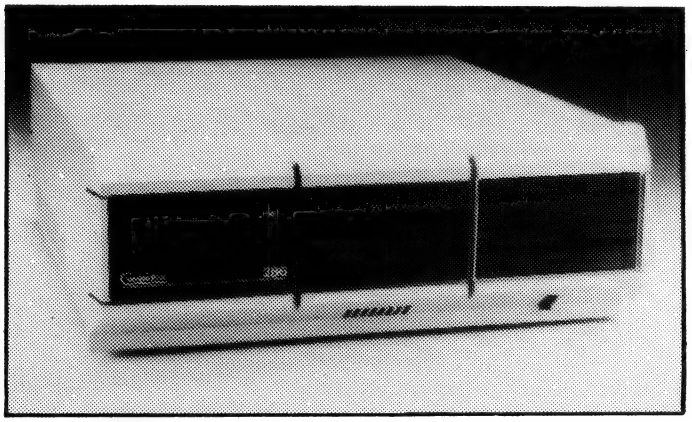

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Computing at Cameron Manor with Nigel and Ethel

It's been a pretty chaotic month (as usual) at Cameron Manor — but let Farquhar speak for himself . . .

IT'S BEEN A pretty chaotic month here at Cameron Manor, as usual — went to the Combined Services C Conference in Gundagai (and just by the way, I bumped into Gus O'Toole there and did up a bottle or two of Tequila with him — he's got some pretty neat stuff lined up which I'll be talking about in a later issue, specially the new multi-tasking system we've all been waiting for — Gus says it'll run sixty standard programs concurrently on just 12 bytes) and then come the 15th it was off to the Armidale Non Procedural Programmers Country and Western Convention, where there were some pretty heavy sounds coming down. Then a week holed up in a felt yurt in the Simpson Desert, where I finished off my new book, Guardians of Itchy-Koo Park (coming out in Spring '88, most of it written on Nigel, the laptop I've been raving about for the last six months — only had to change the batteries once), so what with one thing and another, we still haven't gotten around to helping Bill out with that new operating system. Real Soon Now.

Real Soon, anyway, if we can keep Great Gatsby running — when I got back from Helsinki and booted him up, his hard disk sounded like it was mounted on half a hundred weight of powdered glass, which wasn't real helpful, what with the pile of software that's been accumulating at the Manor while I've been on the road. Anyhoo, I got the lid off (we've got his lid on a block and tackle hooked up to a 12 horse power diesel engine for easy access), disconnected the controller and the power supply and once I'd scraped off the accumulated dreck of eleven years writing, I was able to haul the hard disk out (one of those old 7.5 Meg numbers which I picked up in Kabul back in the Sixties, but it's never given me a moment's grief and I've written seventy-eight books on it). Problem seemed to be a flaky bearing, so I called Abdul and he sent round a whole new one — one of the new hard card jobs, 5 ms search time, 112K (which I've partitioned into 4 logical drives) all in a half card — and I had it sitting in Great Gatsby's last free slot, base formatted and loaded with all my favourite programs in a couple of minutes, no sweat.

Then we started running into memory problems. Now Great Gatsby has 5 megabytes of RAM directly addressable by the system (special fix the people at the factory did for me and I'm not allowed to give away any secrets), so we shouldn't have had any trouble, but we'd get a couple of small pop-ups and a database running okay but then when we tried to boot a word processor, there'd be program too big messages all over the screen. Not helpful. Off with the lid again and heave out the RAM card — problem right there. Four of the 1 megabyte chips had lost their feet. It was three in the morning by this time and I really needed to get GG going and get some work done, so we packed the chips back in with glue and cotton wool, which seemed to sort things out. Sure hope he keeps running.

Four of the 1 megabyte chips had lost their feet.

Then we had to update the office, which was getting to look a bit tacky — we've gone for brown on the ceiling (masks the tobacco stains) and blue for the walls (matt vinyl), and four big electrostatic speakers linked through a 2000 watt valve amp to a laser disk autochanger programmed to play random largo movements from baroque concertoes. Lot of work, but it makes the whole entire work environment a lot easier to be in. Put up the cork board this afternoon — memory-resident message programs are OK but only one person can read them and we try to keep the lines of communication clear at the Manor. Maybe put in a Tintoretto some time — the people at the Guggenheim have been asking me to take one for months. And then we were ready to get down to some work.

Captain Goodwrite

For several months now I've been working with the new word processor Captain Goodwrite by Sputnik Software (who've had a copyright suit slapped on them by MicroCode for imitating the cursor shape of WordWrite, which seems just a bit off the wall). I'm using the ROM version in Nigel and the standard disk version on the Cameron Manor desktops with a bank of 11 400-terabyte CD drives and the Kwan-Yin Kanji card (which also does Kufitic script if you load the universal screen driver first). I still haven't gotten around to figuring out how the search-and-replace works and the manual sure doesn't help, but I'm getting to like this program a lot and I'm thinking of switching over to it permanently for book writing if we can port it to the CP/M environment for Great Gatsby and get the folks at Sputnik to rewrite the source code from scratch. Review of this in the pipeline.

Speaking of Nigel, he tends to fall off your lap if you use him in a '69 Chevvy at high speed but he's got an excellent screen and he's a good robust machine and I've used him in caravans and hotel rooms all over the place with no problems except when I tried sending one of my articles to the magazine at 9600 baud from a call box in downtown Cairo — I figured later that the Egyptian phone lines were

probably expecting characters reading right to left. Anyway, definitive review of Nigel coming Real Soon Now.

End of the financial year, which is when we build a bucket of Black and Tan here at Cameron Manor and boot up Cameron Accounting on Elderly Ethel, who's an old mainframe with ferrite core memory and vacuum tubes, the whole works. I've had her since way back in the before-before and she takes up a whole outbuilding in the Cameron Estates but I still love her — those punch cards sure take me back. Now, Cameron Accounting was written in a blind stupor with sharp knitting needles on a stack of old Camel packs, but I've kept it up to date with the new legislation and it'll run while I'm busy on other stuff. Which brings us to the Program of the Month, which I've been using on Great Gatsby for translating my books. Program of the month is Turbo Language from Softcraft. This is one lollopolooza — it's an AI program written in straight assembler with a Kantian Inferencing Engine and it'll translate from any natural language to any other, all in a pop-up and all in just over 3K of source code, any operating system. Had a little trouble to begin with running it with Great Gatsby's word processor, Multiword — files kept vanishing. But then I succumbed and read the manual, where lo and behold the problem is documented — just shows you, you should always read the manual even if you've been in the game since the year dot. Seems you can only use the program at the full moon with a mandrake root on the CPU and a bulb of garlic in your pocket. Bit limiting, maybe, for some users, but when they sort that one out, this program's going to be a must for anyone involved in multiple language work.

Game of the month is Mortician from Subterranean Applications. Interesting history behind this one — seemingly it started out as a stock control package for public morgues, but the Terminal Workers Union wouldn't have any of it, so the guys at Subterranean said, What the hell, we'll turn it into a game. And it's a really good game — I've spent far longer on it than I should. Needs 256K, DOS 2 or higher and a joy-stick to drive the hearse, and it comes with a cardboard cut-out mourner's uniform, black-bordered template for the keyboard, all the trimmings. Really first class presentation. This should take off in a big way — totally new slant on computer games.

Not much time for reading this month at the Manor so there's no Book of the Month as-such, but I've been skimming through a new edition of the Complete Works of William Shakespeare, the British writer. Love to get time to sit down and read it properly — the Sonnets I can take or leave, but there are some really good stories in the plays, which are also very well written and I can highly recommend it.

As usual, haven't covered everything — there's still a whole raft of assorted software sitting here waiting to be opened and nine computers that haven't come out of their boxes yet. Real Soon Now. But I'd better power up Horace, which is the machine we use for comms here at the Manor (we're using PolySend now), get this converted to some half way readable format and send it off to Andy at the YC board — it's two in the morning and I know Andy likes to get in a couple of hours in the sack now and again. □

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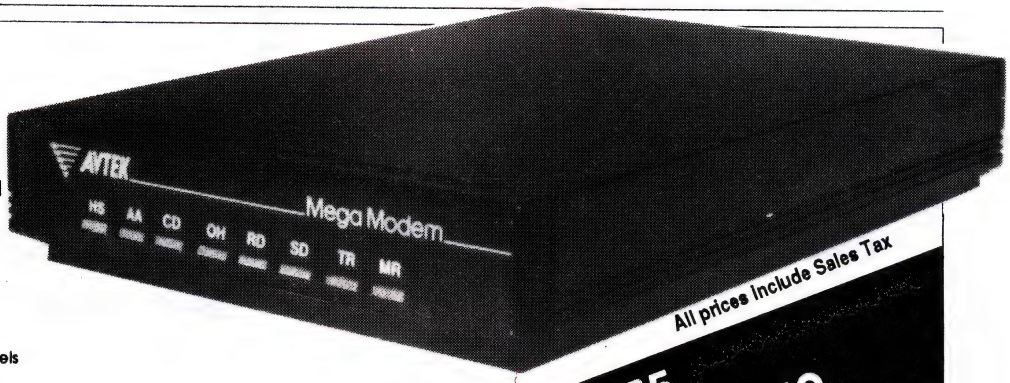

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KIDGAMES for Pre-Schoolers

Effective educational games for pre-schoolers are always a problem to find — but Brian Davey of AMSEC has found four plus a way to enhance them with a set of animation utilities and an automenu program!

KIDGAMES IS definitely at the top end of the Public Domain quality spectrum. It contains five educational games (for IBM JX/PC/XT/AT and compatibles) written for his pre-school children by Donald Pavia, and was released into the public domain in 1987. I tested all the games on my own pre-schooler, Owen, and on the children at the community school attended by my older son, Evan. They were an instant success.

Four of the games, namely Alphabet, Animal Maths, ClockGame and Mosaic, are definitely aimed at very young children. But the fifth, a version of HangMan, ('Not *another*!' I hear you say) is suitable for children at primary school and even beyond.

HangMan

This is not just another version of Hangman! Most versions do not aim at the very young. If they do, it is by presenting a pre-school word list containing very simple first words such as I, he, she, me, the, and it. These are soon learned and boredom sets in. Longer words are simply too hard since the clue that certain letters are in the word and others are not does not enable a young child to guess the word. Donald Pavia has overcome this by providing a small visual clue along with the usual clue of the number of letters in the word.

Anyone who owns an MS-DOS machine and has young children should buy Kidgames. I particularly recommend it to any primary school using IBM JXs.

For example, if the word is 'Santa' then a jolly little face complete with beard and red Santa hat appears on screen. These small graphic images are called sprites or icons. The dictionary which comes with HangMan contains 95 words of various degrees of difficulty and each has its own sprite in a Sprites subdirectory.

At all times displayed on the screen are the number of words already completed, the number of incorrect guesses on the current word and (in alphabetical order) the letters guessed so far. Eight incorrect guesses are allowed per word before the poor man is hanged yet again.

When HangMan starts up, the children enter their names and then choose whether to work through the dictionary in sequence or randomly. They can also choose to work without the clues, which may be more appropriate for older children. At the conclusion of each correctly guessed word a well known children's tune is played and a small dog runs across the screen. (The sound may be turned off when HangMan is started.) After 10 words a question mark appears as the clue.

Two utilities for customising HangMan are included. Makelist.com allows new words to be added to the dictionary or for a completely new dictionary to be created replacing the original. This is complemented by Makeicon.com which allows the corresponding new sprites to be created or the existing sprites to be edited. This turned out to be so popular with the children that I had to create a way for them to do it without damaging the original dictionary — see 'Adding a Menu' below. (An enhanced version of Makeicon.com is found along with animation utilities for Turbo Pascal programmers on the disk Turbosprites and Animation.)

The Alphabet Game

This game allows the children four choices: uppercase or lowercase matching and upper or lowercase sequence. Each choice begins by displaying the alphabet in very large letters while the alphabet song, otherwise known as 'Twinkle, Twinkle Little Star, is played. In each case the letters appear on the screen in alphabetical order.

In the matching games, the children press the letter which is on the screen while in the sequence games they must press the letter after the one presently being shown. After every six correct answers, 'Good Job' and a smiling face appear on screen and a nursery tune is played. The Alphabet Game was certainly

AMSEC
THIS REVIEW was written for AMSEC, a Melbourne based software reviewing group, by Brian Davey, who is a director of AMSEC and a Reader in Mathematics at La Trobe University. AMSEC may be contacted at PO BOX 360, World Trade Centre, Victoria 3005. □

successful at reinforcing letter recognition and alphabetical order. Nevertheless it was enjoyed in small doses since it lacks the variation needed to hold a young child's attention for a length of time.

Animal Maths

Again there are four choices at the beginning of this game: count objects, number sequences, addition and subtraction. With each of the four choices a correct answer is met with some musical notes and a tick on the screen. After eight correct answers 'Terrific, Wow, Awesome' or something similar appears on screen and a tune, which the children found to be overly long, is played.

In 'count objects' a number of animal figures appear in a pattern on the screen and the children must count them and then enter the number. As in the other three choices, an unlimited number of guesses is allowed; an incorrect answer being greeted with 'Sorry, try again.' Initially there is only a small number of animals (5 or less) to be counted but the number increases as the game goes on (up to 18 or more.)

Sets of animal figures are used as visual clues in 'addition' and 'subtraction' with the addition or subtraction problem (for example, 3 + 1 = ?) in large numerals across the bottom of the screen. The problems become a little harder as the children progress.

In 'number sequences' there are no visual clues other than the sequence of consecutive numerals on display. The sequences become higher and higher, beginning with (5 6 7 8 ?) and (0 1 2 3 ?) and working up to (26 27 28 29 ?) and beyond. This game is highly recommended for reinforcing basic numeracy skills. The kids really took to it even though the tune went on a little too long.

The Clock Game

The tune *Hickory Dickory Dock* begins this game and correct answers are followed by a small mouse running across the screen. A time is displayed on the screen in digital form (for example 10:55) and the children must move the hands to the corresponding position by pressing the H(our) and the M(inute) keys.

At the outset they choose problems involving full hours, half hours, quarter hours, multiples of five minutes or free play. This simple game was surprisingly popular especially amongst the youngsters who owned and could read the digital watch on their wrist but had trouble with the analog clock on the wall.

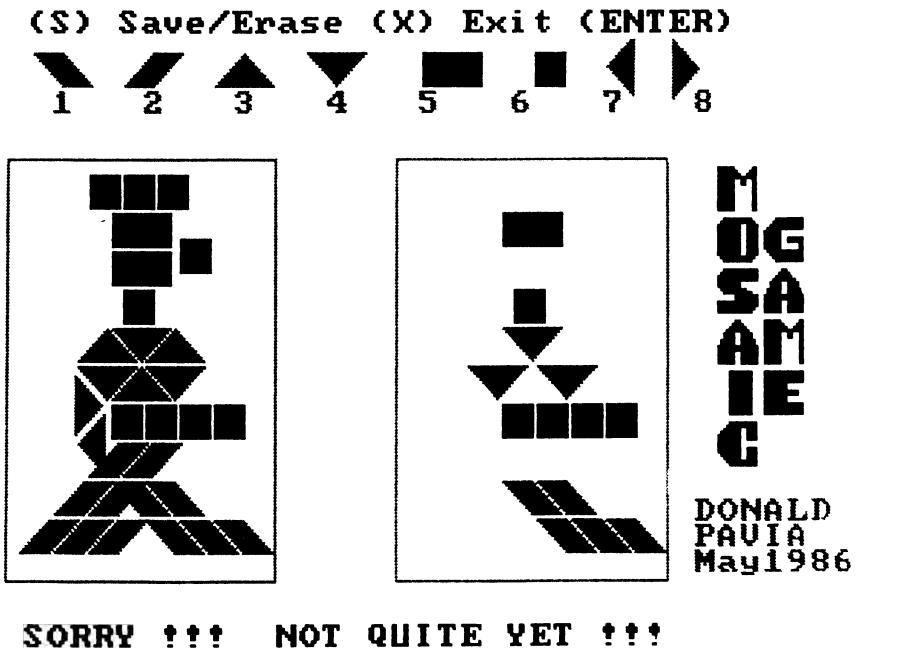


Figure 1. *In Mosaic, the children are asked to reproduce on the right half of the screen a pattern shown on the left. The pattern is built from red and green triangles with four different orientations, yellow squares and rectangles, and red and green parallelograms. Even though there are only six available patterns, the children continually return to this game.*

Mosaic

In the final game the children are asked to reproduce on the right half of the screen a pattern shown on the left half. The pattern is built from red and green triangles with four different orientations, yellow squares and rectangles, and red and green parallelograms.

The arrow keys move a shape around, and the shape to be moved is chosen by number. Six patterns are provided or free play may be chosen. (According to the list of choices, there is a 'design mode'. It doesn't appear to work, though this may be an unfair assessment as there is no documentation to say exactly what it should do.) Even though there are only six available patterns, the children continually return to this game. (I guess geometry is part of our soul.)

Adding a Menu

Before I continue let me point out that all programs require a color card and if your computer is turbo-charged then you should turn the turbo off otherwise you'll lose some of the graphics.

A point to look out for is that when the disk arrives it has zero bytes free so it is impossible to add further sprites. It is advisable to split the programs in two, putting the HangMan related files on one disk and the rest on another.

Once the children start creating their own sprites and adding words to the dictionary, a couple of potential improvements come to light. Naturally the children want to see their sprite and their word as soon as possible. Adding their word to the 95-word dictionary could mean a long wait, so having a choice of dictionaries would be of benefit. This would also allow different dictionaries to be set up for different year levels.

Another improvement would be the ability to edit the words already in the dictionary — at the moment it seems that this can be done only by retyping the whole dictionary. My four-year-old son added a non-word to the main dictionary (before I set up the menu described below) and were it not for the fact that a backup copy of the main dictionary is provided in a Dictnary subdirectory it would have remained there for all time.

I used a public domain menu system called Automenu (Ver 3.01) to set up my HangMan disk. There are a number of other menu systems in the public domain, but Automenu happens to be the one I know best. First, on a disk which has been freshly formatted with the system via Format A:/S, you must make subdirectories of

the root directory called Dictnary, Sprites0 and Sprites1 and for safety sake a subdirectory of Dictnary called Dictnary Backup. Follow the directions on the Automenu disk to transfer the Autoexec.-BAT and necessary Automenu files to the root directory of the HangMan disk. Then transfer all the HangMan files and the Makeicon.com and Makelist.com files to the HangMan disk, again into the root directory. You must also include Rendir.com in the root directory.

This handy little utility for renaming subdirectories is found on the Screen Handling Utilities disk. To make life easier put List.com and Dosedit.com on the disk as well. These excellent utilities are available on the Utilities #5 Disk. The Automenu.MDF required in the root directory is given in Figure 1. As a rough guide to what is going on in this listing it suffices to know that a line beginning with a '*' indicates what will appear in the menu and the lines beginning with a '+' which follow show which commands will be carried out when that choice is made.

To complete to system, you should put copies of the main dictionary, Hangman.dic, in the Dictnary and Dictnary Backup subdirectories and rename these copies Hangman0.dic. Go to DOS and use Makeicon to create a new(!) dictionary containing a single word — your name perhaps in recognition of all this hard work! and exit the Makeicon program. The original dictionary in the root directory is now replaced with your one-word version. Copy the new Hangman.dic from the root to the Dictnary subdirectory and rename it there as Hangman1.dic. Finally copy all the files from the Sprites subdirectory of the Kidgames disk into the Sprites0 subdirectory of your HangMan disk. Your HangMan disk is now complete!

The one-word dictionary which you created is now known to the outside world as the Kid's Dictionary. The system is designed to allow this dictionary to be extended or replaced without threat to the original dictionary. Any new sprites created will end up in the Sprites1 subdirectory and may be accessed by adding the corresponding word to the Kid's Dictionary.

Compared with all this, producing a menu for the disk containing the other games is easy and I leave it as a homework exercise.

```
%*** HANGMAN ***
*Play the Hangman Game with original dictionary
+echo off
+copy \dictnary\hangman0.dic hangman.dic
+rendir sprites0 sprites
+hangman
+rendir sprites sprites0
+auto
*Play the Hangman Game with the kids dictionary
+echo off
+copy \dictnary\hangman1.dic hangman.dic
+rendir sprites1 sprites
+hangman
+rendir sprites sprites1
+auto
*Design a new sprite for use with kids dictionary
+echo off
+cd\sprites1
+\makeicon
+cd\
+auto
*Add a new word to the kids dictionary
+echo off
+copy \dictnary\hangman1.dic hangman.dic
+makelist
+copy hangman.dic \dictnary\hangman1.dic
+auto
*Read the documentation on Hangman
+echo off
+list hangman.doc
+auto
*Exit to DOS (the Disk Operating System)
+echo off
+dosedit
+echo
+echo   D O S
+echo
+echo   Enter » auto «
+echo  to return to the Menu
+echo
# END OF DATA FOR AUTOMENU
```

Figure 2. Longer words in most versions of HangMan are too hard for young children — the author of this version has overcome this by providing a small visual clue along with the usual clue of the number of letters in the word.

Summary

Anyone who owns an MS-DOS machine and has young children should buy Kidgames. I particularly recommend it to any primary school using IBM JXs. Combined with a menu system like the one described above the games on this disk can compete on an equal footing with commercial software costing between $50 and $100. □

Product Details

Product: Kidgames PC-SIG #705; Turbo Sprites and Animation PC-SIG #511; Automenu Ver3.01 PC-SIG #608; Utilities #5 PC-SIG #255; Screen Handling Utilities PC-Blue #287
PC-SIG Distributor: Mannacom Pty Ltd, (02) 875 3538
Review Copies From: SME Systems, 22 Queen Street, Mitcham 3132 Vic. (03) 874 3666
Price: Available to members only: Yearly Membership (including Public Domain Catalog) $30 plus $8 per disk (includes postage).

BridgePal

Want to brush up your Bridge? Bert Mond, of AMSEC, has found a computer partner who doesn't criticise, no matter how foolish your playing.

THIS PUBLIC DOMAIN game should come with a warning that you may become addicted. If you enjoy the challenge of an interesting Bridge hand (as distinct from conversation with other Bridge players), you may find that whenever you have a few spare minutes (or hours) you are rushing to the computer to play a few hands.

Options

BridgePal offers a number of options. For example, it asks if you want to receive the hand with the highest point count. Since all Bridge players seem to want a hand with many high cards, the first few dozen times you play you will probably say 'yes'. Eventually one comes to the realization that some of the most interesting and challenging hands are those where your point count is not high.

You are asked if you want to play the game slowly or rapidly or somewhere in between. With a bit of practice you can determine the precise speed that best suits you; in other words, fast enough so that you aren't bored, but slow enough so that you can appreciate what's going on.

You can play alone (you are South while the computer bids and plays the other three hands) or in competition with a second player. This can be done by each of two people playing every second (but different) hand with the computer and the computer keeping a running score of the competition. Alternatively, the competition can be played in duplicate fashion with each of the two competitors playing the same hand. I must say that in our family over ninety percent of the games were played solo rather than in competition with a second player. The computer is always ready to play when you are; getting a second player makes the task much more complex.

There is one feature of this game that I would like to see adopted by people who produce software of any sort (particularly in the Public Domain). Paper documentation that comes with a disk almost never lasts as long as the disk itself. As a result of this and of not being a computer expert, I have accumulated a good number of programs without documentation that, at least at the moment, I don't know how to use. With Bridgepal the documentation is on the disk itself — as long as you have the program you have the documentation.

Of course, having the instructions does not mean you read it, though I would certainly advise you to do so. When playing with a human partner you can discuss beforehand what conventions you will use and what your bids will mean. With the computer you can either read the documentation or learn what the computer does through trial and error. For example, I once bid four clubs to determine how many aces my partner had in order to explore the possibility of a slam.

Imagine how I felt when the computer passed, leaving me to play clubs of which I had very few. I later found it clearly written in the documentation that the computer understands the Blackwood convention, that is to say, bid four no trump to ask for aces. Of course when something like this happens you can feel free to tell your partner, the computer, just what you think of his bidding and playing. Although this is probably not nearly as satisfying as yelling at a human partner, it's certainly much safer. Besides, when you make a mistake playing with a computer, your partner won't utter a word of condemnation.

Instructions

The need to read the documentation was brought home more forcibly when I sat down to explore BridgePal thoroughly so that I could write this review. When the contract went to North and South (remember that you are South), I found that something strange was happening. Since I was playing two hands (the declarer and dummy) I often played low as second (or first) hand, expecting to take the trick with a high card when playing last (or third). Lo and behold, instead of waiting for me to play my own hand, the computer would play the third (or fourth) hand for me. This would not have been too bad except that the computer always played low thus almost inevitably losing a sure trick for me.

Needless to say, I found this state of affairs most distressing. I was even more puzzled when my wife who had already played BridgePal hundreds of times told me that this had never happened to her. Why was the computer ruining *my* game? None of the experts I consulted could shed light on the apparent capriciousness of the computer. Following the tried and true adage, 'When all else fails, read the instructions', I discovered what was happening — if you wanted to play, say two hearts, you type '2h'. If you typed '2h' and hit the enter key, this was a signal to follow suit on your behalf *with a low card*.

What was happening was that I, having had a bit of computing experience, assumed that any instruction would not be acted on until I hit the enter key. Since my wife had never faced a computer before she started to play Bridge on one, it never occurred to her to hit the enter key.

As indicated, you can play and enjoy BridgePal even if you know nothing about computers (but have access to one). If you do not know anything about Bridge, you can still use BridgePal. There are written instructions about point counts and bidding. You can select an option that will bid and play all four hands for you. Indeed, by pressing the appropriate letter at any time during the bidding, it will give you your high point count.

Of course, I cannot speak from personal experience as to how effective it is for someone who is just learning how to play. But — it's clear that there are many features that should be helpful for the novice. Besides, if you are just starting to learn how to play Bridge, you might like the idea of playing with and against a partner who won't criticize no matter how foolish your bidding or playing might be. □

Product Details

Product: BridgePal PC-SIG #780
Distributor: Manacom Pty Ltd, PO Box 381, Pennant Hills 2120 NSW (02) 875 3538; Viatel *49000#
Price: $13 plus $5 postage and handling for any number of disks.

AMSEC

THIS REVIEW was prepared for software reviewing group AMSEC, PO Box 360, World Trade Centre 3005 Vic. □

ANUGraph

A new tool for graphing mathematical functions

AMSEC consultant Kaye Stacey has found a friendly tool for the Macintosh that takes the drudgery out of graphing mathematical functions.

ANUGRAPH IS A Macintosh program for drawing graphs of mathematical functions. It is designed principally for teachers and students of mathematics, but would also be an accurate and easily mastered tool for other users of mathematical functions. Written by mathematicians Martin Ward and Neville Smythe of the Australian National University, ANUGraph is the first venture by the Australian Association of Mathematics Teachers into the publication and distribution of software.

After numbers, the objects that users of mathematics deal with most frequently are functions: rules that link independent with dependent variables. At school, the transition from looking at numbers to looking at functions begins at about Year 9, when students work with linear functions like $y = 2x+3$ and quadratic functions like $y = x^2$.

Subsequently, the range of functions studied increases rapidly, usually including trig functions such as $y = \sin(x)$, which are useful in analysing waves of all descriptions and the exponential and log functions such as $y = e^x$ and $y = \log(x)$ which describe growth of many kinds. As names like linear imply, the best way to get an overall understanding of what a function is like is to draw its picture; the picture that speaks a thousand words about a function is called its graph. Because graphing is so intimately connected with understanding the general behaviour of a function, students spend a great deal of time learning to draw accurate and approximate graphs and users of mathematics usually turn to a graph as the first step towards understanding a function.

As would be expected for an important topic, there are already plenty of graphing programs, but for users of home and school micro-computers, the poor resolution of the Apple II series and similar machines has been a serious disadvantage. Now new hardware is opening up new possibilities. ANUGraph uses the high resolution of the Macintosh, making the results more satisfying and informative and consequently much more useful.

ANUGraph uses the high resolution of the Macintosh, making the results more satisfying and informative, and consequently much more useful.

The other striking advantage of ANUGraph is that formulas are entered in traditional mathematical notation by selecting mathematical symbols (such as <, sin, brackets and square roots) from a menu. Superscripts, subscripts and quotients appear in the form that they are handwritten. The function is graphed when an icon is clicked.

These features and the general accessibility of the Macintosh environment, are excellent for teaching purposes. Titles and labels pointing to features of interest can be added to the displayed graphs, but this facility is rudimentary, not allowing change of font or size.

Initially, the user need not worry about choice of scale as the graph is first drawn with standard axes. Scrolling enables more of the graph to be viewed. User-specified scales are available and the zoom function (both in and out) lets the user get the big picture or examine the exact behaviour of the function near one point. Zooming is very easy and very enticing — it would be useful if a small window showing the graph drawn to its original scale with the current zoom area marked could be added to help enthusiastic zoomers keep their bearings better.

Functions

Several functions can be graphed on the one set of axes, perhaps to find points of intersection or to compare graphs from a family such as $f(x) = \tan(ax+b)$ for various values of a and b. (Incidentally the program handles discontinuities and undefined points well, giving the user sensible options.) Values accurate to 9 decimal places can be read off the graphs and default and custom-made tables of values are readily available. As well as showing several functions on each set of axes, up to four separate windows of graphs can be displayed at once. This is a useful feature.

It enables, for example, the behaviour of a set of functions in the neighbourhood of four different points to be shown simultaneously or four different graphs can be compared with one graph without cluttering. The domain of definition of a function may be prescribed.

Printing the graphs is easy and the hardcopy from the LaserWriter can be used as a master for overhead transparencies. In Version 1.0 only tables of values, not graphs, can be transferred to other applications.

The 60 page manual is easy to follow. The first chapter gives three 'lessons' which introduce the basic features of the program. Later chapters describe each feature and also include hints for dealing with things that might go wrong. It is possible, for example, that the graph may entirely miss the section of the plane shown with the default scale. In this case, a Macintosh watch icon is displayed but no graph appears. Holding down the mouse button displays the values that are being calculated.

Teachers with a very specific purpose in mind (such as linear equations for Year 9 or parabolas for Year 10) may well find find that a special purpose graphing program is easier for students to use. However, students and teachers of tertiary or senior secondary mathematics will find the range of functions that can be dealt with by ANUGraph and its flexibility invaluable. There are still things it cannot do - as yet, ANUGraph only graphs functions of one real variable and the curves cannot be described parametrically or implicitly. Thus for example, it cannot plot the implicitly defined circle $x^2 + y^2 = 1$, but it can plot the semi-circle $y = (1 - x^2)^{1/2}$. It does not, as yet, draw tangents or compute areas but there are plans to add these things later. In fact, the authors request users to inform them of the features they would most like to see in a second version.

Fundamental Changes

Along with other advances in computing technology like the embryonic muMath (see the August 1987 issue of *Your Computer*), graphing programs, such as a later version of ANUGraph, could eventually make fundamental changes to the teaching, learning and doing of mathematics. Junior secondary mathematics concentrates on just two types of functions (linear and quadratic) not because these are the most important, but because other functions are too hard. Moreover, many students at school find graphing even these simple functions a tedious and difficult task — the myriad of sub-tasks involved prevent many of them seeing the underlying ideas and the purpose of what they are doing. A program like ANUGraph can help overcome this.

By removing the barrier of computational difficulty, the range of applications considered in school mathematics can be expanded to better reflect the real-world uses of what is being learned. When all students have access to computing power, the face of secondary school mathematics will have to change.

In summary, ANUGraph is a flexible and user friendly tool for anyone who needs to graph mathematical functions. It is particularly suitable for students and teachers of senior secondary and tertiary mathematics, for demonstrating and exploring new ideas, for a wide range of calculations and for the presentation of teaching materials. □

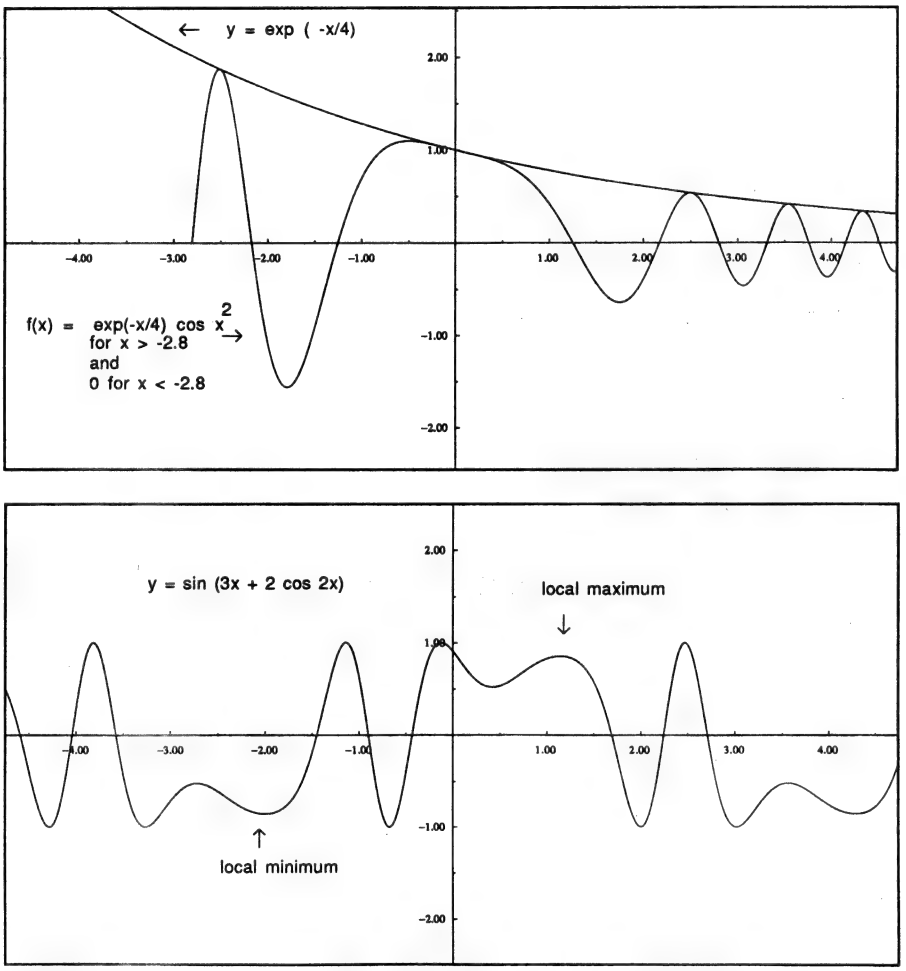


Figure 1. *Two sample graphs from ANUgraph, a Macintosh program for graphing mathematical functions.*

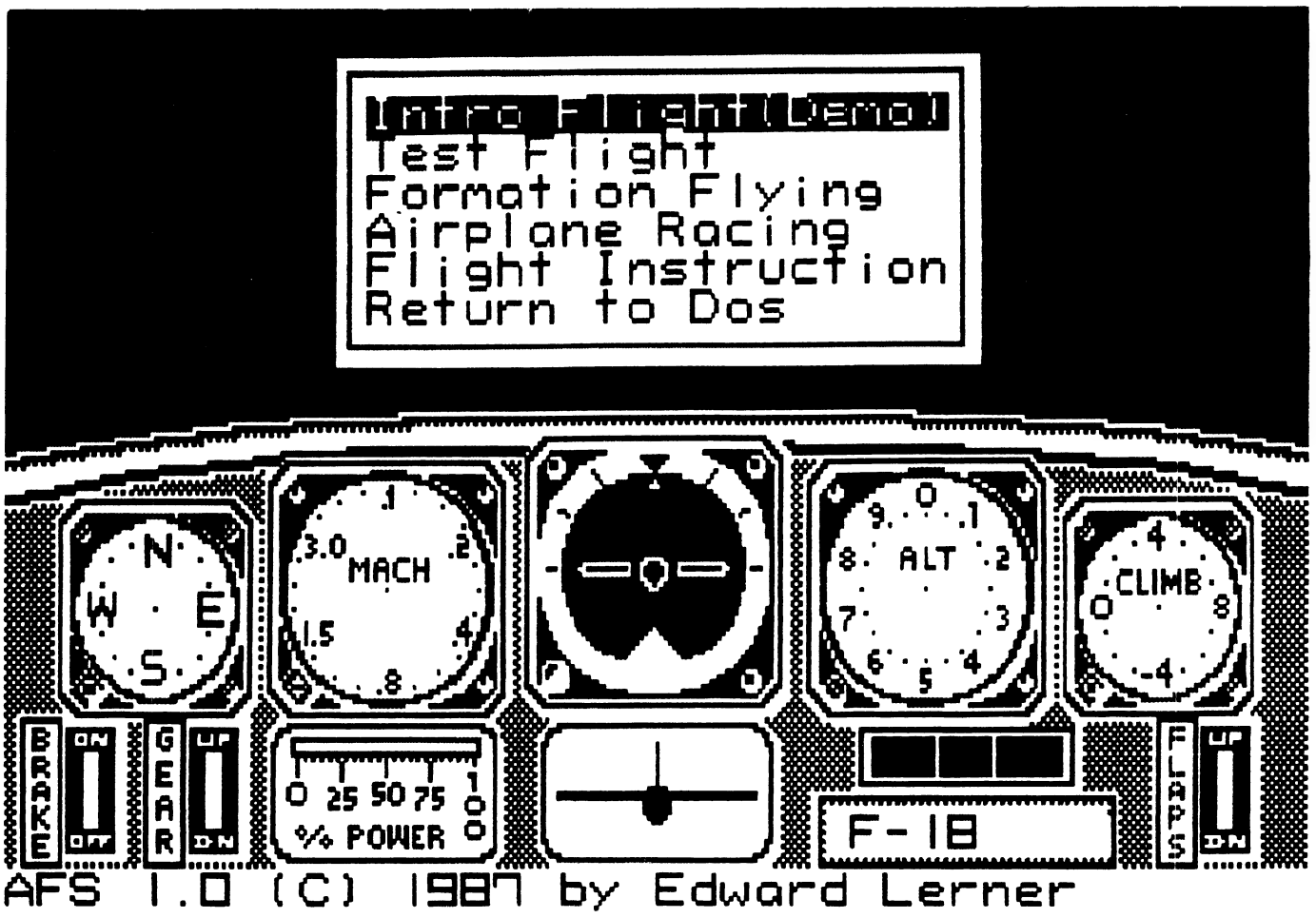
Product Details

Product: ANUGraph
From: ANU TECH and Australian Association of Mathematics Teachers
Distributor: AAMT Services Agent, 18 Bluehills Rd, O'Halloran Hill 5158 SA
Price: $65 (untaxed) for disk and instruction manual; $240 for lab set of 10 disks. Teacher's Notes are available for $10 with purchase of a disk or $14 separately.

AMSEC

THIS REVIEW was written by AMSEC consultant Kaye Stacey from the University of Melbourne. 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. □

Advanced Flight Simulator



Flying Around

You are on the tail of the chase plane heading straight for the ground, the white tracer obscures your vision for a split second and . . . Gregor Stronach is headed for cloud nine.

THERE ARE MANY types of games: adventure games (both graphic and text), mind games, interactive games, and others, but like most 14 year old boys, I like a bit of action. This is exactly what Chuck Yeager's Advanced Flight Simulator gives you.

In a game, I look for something that has real time action and not, like many adventure games, a situation where you do perhaps a day's walking in five minutes. Advanced Flight Simulator gives just that, real time action, such as the time it takes the Cherokee to get up to 70 miles per hour from a standing start in the hangar.

I also look for a good screen layout of the actual game, so that you can tell everything that goes on. Flight Simulator has just that in the cockpit layout, so that everything is easy to see, instead of having to search for many different things that are spread randomly all over the screen.

Fired Up

On fire up, you are offered the option to have a test flight demonstration in an XPG-12 Samurai jet. This demonstrates fully the operation of the game, with a flight through the obstacle course.

Next, is the test flight which you get to control. In this, you have a choice of 14 planes, ranging from a Sopwith Camel, a Cessna, through an XNL-16 Instigator jet, to everybody's favourite, the F-18. You can also choose the location of your starting point: in the hangar, 40 miles from the

hangar, or 10,000 feet (it is an American game) up in the air. There are also special locations, such as the slalom or obstacle courses.

One of the little touches of brilliance that makes this game so good, is the instant replay option. This allows you to see what you have just done, and learn from your mistakes, and gives you a chance to go over the steps while watching for the error.

During the game, you can go to the menus and change options, such as the view point. The game may be viewed as though looking from the belly of the plane you are flying, the chase plane, the airport control tower, or a satellite view. You can zoom the views up in size goes up by powers of two, all the way up to 256 times the normal size.

You have the choice of monitor type, including composite, RGB, or a different colour palette. You can turn off the sound, or operate the flying by joystick, keyboard, or mouse. I chose to play with a new joystick which I believe gives more realistic control than the keyboard.

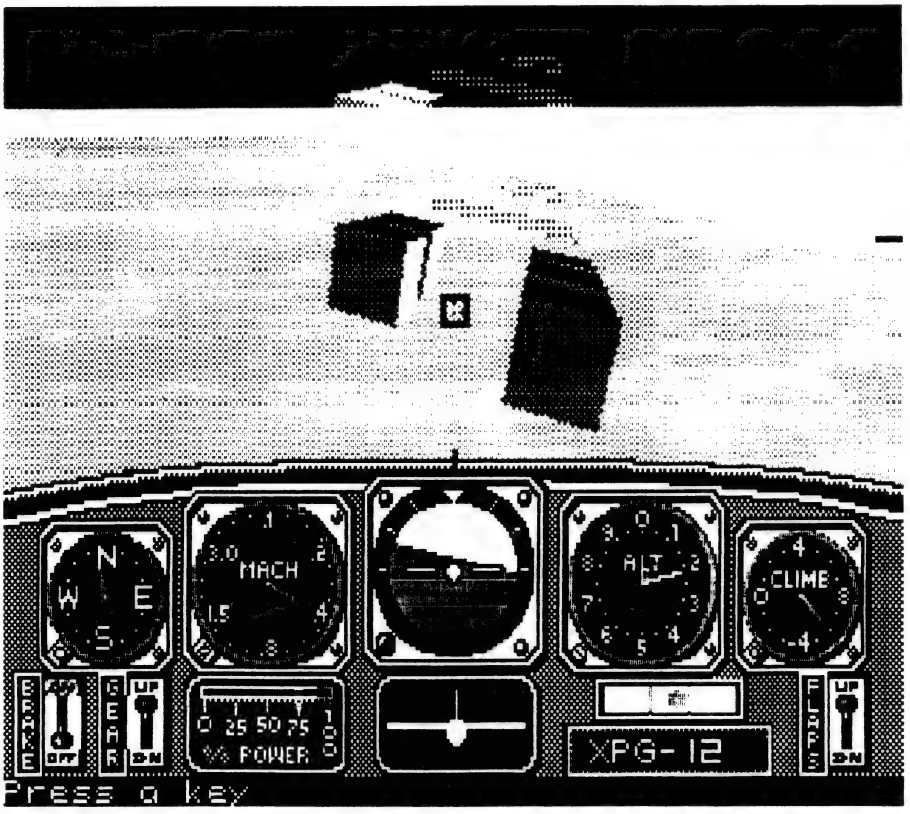
If you want to add a little more realism, there is also the option of having wind to hinder your flying abilities. This appears to be a totally random affair, picking a direction, then any number to represent wind velocity.

When you have the hang of flying the aircraft, you are ready to try your hand at formation flying. There are several manoeuvres to choose from, and an option to redo a stunt, do the next stunt, or record the manoeuvre that you have just done, and it will go into the manoeuvres menu for later replays. One choice is called 'Deadman's Manoeuvre' which has you following Chuck Yeager's lead plane through a slalom course. (How that finishes, I'll leave as a surprise.)

Then there is the racing, which appears to be the alternative to the normal combat mode. Once again, there are a few different courses, such as a straight line speed race, or a two mile square box. The racing mode is let down by having the aircraft chosen for you, so that if you want to fly the 10 mile closed course, you have to fly in the F-18. You may have the option of how many competitors you wish to race against or fly solo against the clock.

Taking Instructions

On then to flying instruction, starting at such basic skills as taking off, flying in a straight line, and landing the plane. Then there are the advanced lessons, teaching things like controlled stalls. Finally the aerobatics lessons where you learn to do stunts such as looping the loop, and the barrel roll. In all of these you have the choice of either watching the computer doing it, or actually doing it yourself. You can once again record the manoeuvre that you have just done.



The Let Downs

The AFS program is let down by not having any real scenery. There are no clouds or trees, which gives the impression of the area being really dry and barren (not a nice place to fly a plane around for fun).

Another slight let down is the fact that there isn't a combat mode. This is made up for by the racing simulation part of the game, which is a lot of fun when you learn how to fly the plane properly. (However, a combat mode is on the way according to the package.)

A fun point in the game is when Chuck Yeager's face comes onto the screen and gives you a humorous remark when you crash the plane. These remarks include 'You just dug a hole halfway to China', and 'Keep practicing pilot. One day you might fly my wing'. The response to the keyboard is instantaneous, the graphics are good, the choice of planes makes the game more interesting than just being stuck with the one game.

The documentation is very well presented. A good looking package like the slip cover of a record contains a 45 page, black and white booklet with clear and concise instruction backed by plenty of illustrations. The program is copy protected but an unprotected copy is offered to original buyers for an additional $10. The program may be installed on a hard disk, but still looks for the original disk in drive A as a key disk.

This game, when weighed against the original Flight Simulator from Microsoft, comes out ahead in most areas. The graphics are similar but the very wide choice of aircraft and competition modes outweigh the combat and weather variable modes of Flight Simulator. □

Product Details

Product: Advanced Flight Simulator
From: ECP Computer Products
Distributor: ECP, Unit 4,
18 Lawrence Dr, Nerange 4211 Qld.
(075) 963 488
Price: IBM $79.95; Commodore disk $89.95

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TOUCH

An Australian Typing Tutor

As computers become more common in the workplace, executives and managers find increasingly often they need typing skills — but when (and how) can they learn? Sid Morris, a Director of AMSEC, may have found the answer . . .

IT IS A LITTLE over one hundred years since typewriters appeared on the scene. Initially, they were used only by men as the female mind was considered too frail to survive a typing course! As the years passed and we moved from mechanical typewriters to electro-mechanical machines and then electronic ones, women dominated the so-called typing pool. Comparatively few men could touch-type. Then word processors and computers started to dominate the business world. Executives and managers, the majority of whom are male, suddenly find that they need typing skills. The education system, by and large, still does not provide that skill to males.

So what does the male executive do when he realizes he needs to touch-type? He doesn't have time for a typing course during the day, or in the evening for that matter. He could try to learn to touch-type from the typing book his wife gave him, as I did. (My wife would not forgive me for leaving the impression she is a typist . . . .no, she is a manager!) But typing books, one has to admit, provide a terribly dry and boring way to learn to type.

Learning to type on a computer has some attraction. It is interactive just like classroom lessons, but you can do the lessons at any time of the day or night. Looking at my records, I see that I did most of my lessons after 11 pm or on Sundays. Of course, you have to find a good computer typing course, and there are plenty of atrocious ones around.

Touch

I found Touch, produced here in Australia by Logistics, a superb package. It is available for the IBM JX/PC/XT/AT and compatibles, IBM PS/2 and the Apple II. Although I used it at home, it's also being used in a number of schools for a wide range of ages. Touch really is suitable for both adults and youngsters.

Touch comes on a single disk and is accompanied by a clearly written 28 page manual. The program consists of 49 graded exercises and five tests. It teaches you not only the standard QWERTY typewriter keyboard but also the numeric keypad. At all times the user is in control of the package rather than the reverse, so you can exit an exercise at any time, or check your speed and accuracy even in the middle of an exercise. You begin by typing the word Touch. You are then shown where to put your fingers on the keyboard, namely over the home keys ASDF JKL;. You can then choose which exercise you wish to commence this session with. After the first few exercises, you move from typing a sequence of letters to words and sentences. To avoid the temptation of looking at your fingers when typing, a diagram of the keyboard appears on the screen. The next letter to be typed is highlighted on this diagram. For advanced users the diagram can be removed by pressing the F3 function key. If you type an incorrect letter, the computer beeps at you to tell you to try again. If you type a lower case letter rather than an upper

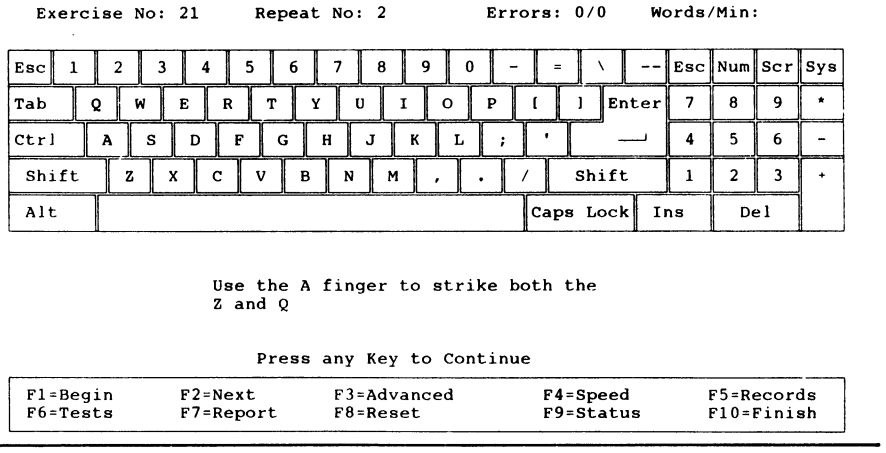

Figure 1. *The opening screen of a Touch exercise — five exercises are provided as part of the program, and four more can be added.*

case, then it gives you a different beep. Some educators would object to the 'beeping' as a form of negative reinforcement. Nevertheless, this is the usual approach and I do not know of a better alternative. You can turn the beeps off by pressing the F4 key and you should do so when running a speed test. At all times a status display at the top of the screen indicates your current typing speed and the number of errors you have made. At the end of an exercise you can, if you wish, press F5 and record for posterity your speed and accuracy on that exercise. And, if it annoys you to look at your number of errors or miserable speed, pressing F8 resets the statistics to zero. A record of your statistics over a number of exercises can be kept on disk and recalled to screen or printer by pressing F7.

The Exercises

Each exercise consists of a piece of text which you type five times. You can override this by pressing F2 to move on to the next exercise. Alternatively the default repeat number can be changed from five to the number of your choice using the set-up key, Alt-F1. Set-up also allows you to choose background, foreground and key struck colours, as well as selecting the keyboard your computer has. While you are still learning where the letters are and which fingers to use, the exercises are preceded by statements like: 'The next exercise uses the T G and H keys. Use the F finger for both T and G, and the J finger to strike H.' At the end of the exercise you are either encouraged to move on to the next one or faced with a statement like: 'You are having trouble with the H key, would you like to try this exercise again?' I very much appreciated the friendly, non-patronising style. When you are ready to test your typing speed and accuracy you can do so by pressing F6. There are five tests provided, but you can add up to four of your own — a useful feature for the classroom. Having chosen which test to try, the passage is displayed on the screen one line at a time. You type below the displayed line. At the end of the test your statistics are displayed. These are the number of keystrokes and errors, percentage accuracy, and speed in words per minute.

Summary

Touch is a well-designed program which makes learning to touch-type much less of a chore. It is suitable for private use by both adults and children and for the home and classroom. I highly recommend this package and look forward to trying out other educational materials from Logistics Software. □

Product Details

Product: Touch Typing Tutor
From: Logistics Software,
PO Box 64 Glen Iris, 3146 Vic.
(03) 299 1308
Price: IBM and compatibles $85 single copy; Apple version (callec Type) $50; corporate site licence $980
These prices are tax inclusive as a special offer to Your Computer readers.
Educational site licence $490 (no tax)

AMSEC

THIS REVIEW WAS prepared for AMSEC, a Melbourne-based software reviewing group, PO Box 360, World Trade Centre 3005 Vic. □

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The Newsletter for dBase II and III Users. Volume 3 Issue 3
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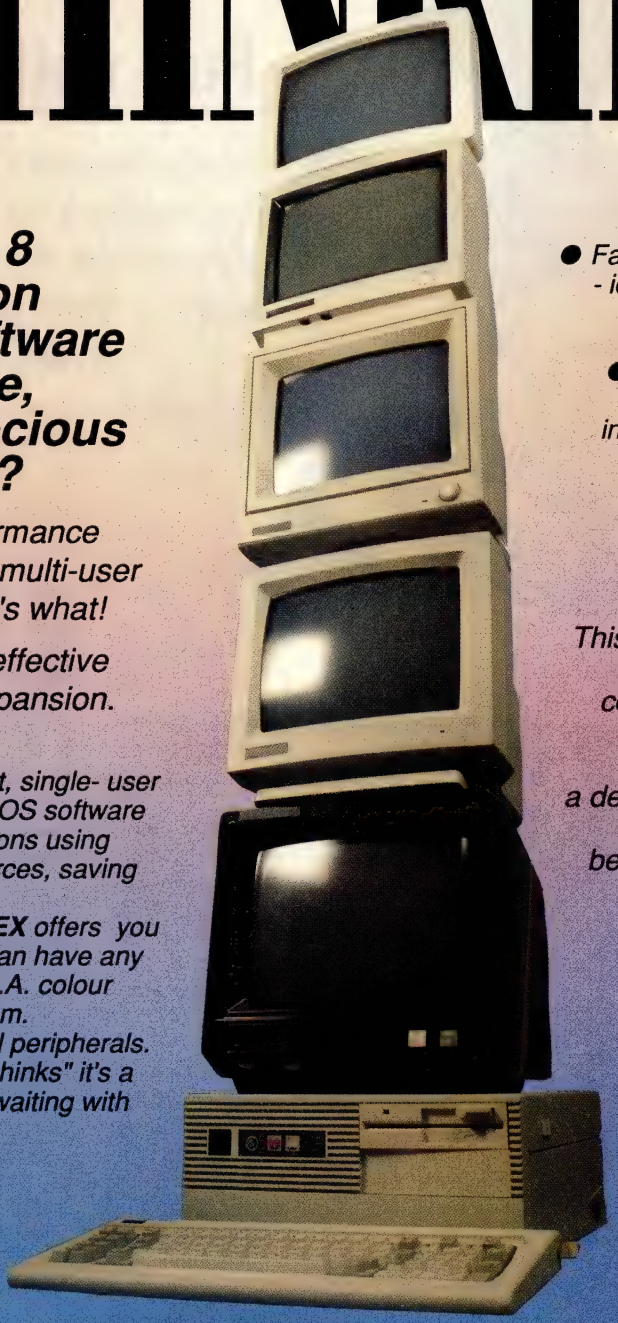

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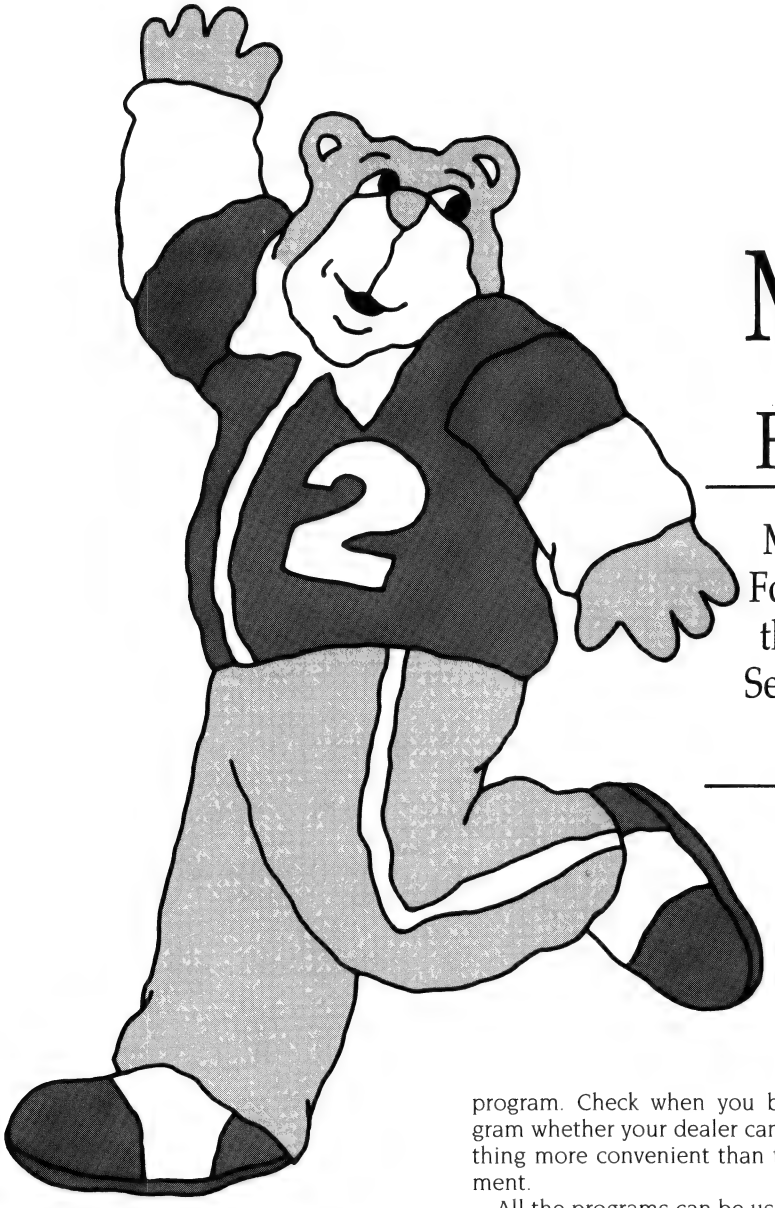

Stickybear Mathematics

Fun with Numbers!

Maths lessons CAN be fun as Colin Fox and his kids assure us after using three of the Stickybear Mathematics Series — Numbers, Math 2, and Math Word Problems.

NUMBERS, MATH 2 and Math Word Problems are just three of the many colourfully produced programs in the Stickybear series of educational software designed for use by children at home. In addition to the program diskette, each package contains Stickybear stickers and a poster, very readable instructions for using the programs, and, in the Numbers package, a hard covered story book.

A back-up copy of the diskette can be obtained from the US producers of the program. Check when you buy the program whether your dealer can offer something more convenient than this arrangement.

All the programs can be used by simply inserting the disk in the drive and switching on the computer. However, and especially in the case of Math 2 and Math Word Problems, a parent or older child should read the accompanying booklet to discover the full capability of the program.

The illustrations on these pages were taken from 'One Bear Two Bears', a hardcover storybook which is part of the Stickybear Numbers package.

Numbers

Numbers is for ages three to six. This program is, to quote from its instruction leaflet, 'a counting and number recognition computer program for children ages three to six'.

It achieves its aims with a charming simplicity. The style is direct in the tradition of all good children's counting books. A single number on the screen is matched with an animated picture containing that number of things (for example bouncing balls, arrows hitting a target and hearts).

The counting is also managed in an animated fashion. Pressing the space bar repeatedly counts down to zero (or up from zero to 9) with an object disappearing from, or appearing on, the screen as appropriate.

My only reservation about this package is that there appears to be little in it for your $60 plus. I say 'appears' with good reason. So often it is the simple idea or presentation which is most effective, and Numbers is no exception to this!

Math 2

For ages seven and up. I found this the least interesting of the three programs — my children voted it the best! The program has been 'designed to provide focused drill and practice in basic multiplication and division for children aged seven and up'. (There is a Math 1 from Stickybear doing the same with addition and subtraction.)

The 'focus' is achieved by having a large number (37) of graded levels of difficulty. These levels include, for example, Level 5 — division by 2 or 3, and Level 32 — multiplying two-digit numbers by four-digit numbers. The program adjusts the

level at which the child works according to the progress being made (I found the rate of adjustment rather tedious) and keeps a record of the child's progress.

One of the beauties of a computer monitoring progress is that the slow but accurate child is not penalised as can often happen in the classroom. The computer gives 100 per cent to the child who takes half an hour to answer 10 questions correctly, whereas, in class the same student answering the same questions may only be given time to answer 7, or 3 of the questions!

A parent, or indeed the child, can use the Control options in the program to alter the way the program runs. Instructions for doing this are written clearly and concisely in the booklet accompanying the disk.

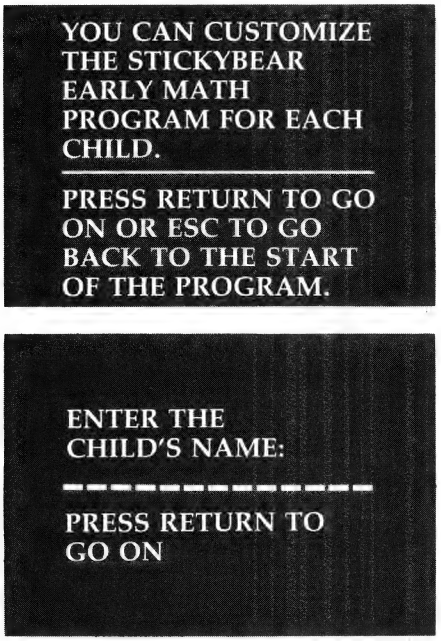

Figure 1. *The 'Parent's Guide' accompanying the Stickybear Math package tells how to use the Control options in the program to customise it.*

For example, a child may want to begin at a higher level than 1, or you may decide that five attempts at each question is too many and reduce this number, or you may be peeved at the fact that your spouse is achieving at a higher level than you, so you can delete her report from the disk!

While there is no attempt at instruction in this program, it does meet its objectives (quoted above) in an entertaining and, so my children assure me, stimulating way.

Math Word Problems

Math Word Problems is for ages eight and up. I thought this the best of the programs being reviewed. As well as providing drill and practice in an area that children often find difficult, its modest attempts at instruction have been carefully designed and were well received by my troup of young adjudicators.

To expect a program that runs on a 48K machine, and that costs less than a thousand dollars, to pay much more than lip service to the ideals of Computer Assisted Instruction is asking the impossible. Math Word Problems sets itself apart from other similar programs I have seen in two respects. The first is, as mentioned above, the instruction provided.

The second, and more important, is that the user can add up to 25 problems to those provided by the authors of the program. The booklet suggests that this can be the parent's (or teacher's role). My feeling is that, if the child provides the extra problems, then the learning experience is dramatically enriched. Not only must the problem be provided, but also an answer to the problem and a method of solution! The creation of these problems and solutions required a level of understanding a rung higher than that required for merely solving these word problems. The incentive provided by the challenge to set problems that will prove difficult for mum or dad or older siblings is considerable.

In Brief

This is a well designed program which can only be of benefit to children in the area of solving word problems in mathematics. Since it's an American product, there is the occasional problem involving miles — but this shouldn't be a deterrent to using the package. Indeed, two interesting questions immediately arise: 'What is a mile?' and 'How do I convert miles into kilometres?'

There are two things worth noting about the Stickybear series — First, the documentation contains useful hints for parents on the use of the programs with their children. Also, there are suggestions for activities away from the computer which will help reinforce the concepts presented in the programs. □

Product Details

Products: Stickybear Numbers Math 2, and Math Word Problems for 48K Apples
From: Weekly Reader Family Software
Middleton, Connecticut, USA
Distributed by: Edsoft
5/2 Apollo Court
Blackburn 3130 Vic.
Price: $59.95 each (untaxed)

More dBase Connections

Connecting Turbo Pascal and dBase is not as hard as it sounds, but, as Peter Hill explains, the interpretation of commands needs to be reconciled.

IN SEPTEMBER, I presented the first article which made the connection between Turbo Pascal and dBase. This month we will again look at the two and how to reconcile the interpretation of commands.

One of the significant differences between the Pascal and dBase programming languages is that whilst Pascal is a compiled language, dBase interprets its commands one at a time as each command is required. Obviously this is a slower method of operation; also if there is an error in a line of dBase code it will not become evident until dBase actually attempts to interpret the line. In complex code, this means that it is difficult to be sure that all parts of the code have been thoroughly tested prior to its release.

A solution is to process all the source code through a filter which tests for the most common errors; in dBase one of the most common is to fail to properly complete a processing loop, or to incorrectly close such a loop. This is an example of flawed (dBase III) code —

```
USE DATA
GO TOP
DO WHILE .NOT. EOF()
M=M+1
IF M<>999
REPLACE FIRSTFIELD WITH M
DO CASE
CASE SECONDFIELD=9
MYCOUNT=MYCOUNT+1
CASE SECONDFIELD=0
MYCOUNT=MYCOUNT-1
SKIP
ENDIF
?MYCOUNT
```

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The main flaw in this code example is not the deliberate errors, but rather the illegibility of the code, which in turn makes visually debugging the code difficult. What might have been intended is this:

```
* Type and initialise data
STORE 0 TO m
STORE 0 TO MyCount
* Open data file
USE Data
GO TOP
* Process file
*     Process  Depth
*0    1    2    3    4    5
DO WHILE .NOT. EOF()
     M=M+1
     IF M<>999
          REPLACE FirstField WITH m
     ENDIF
     DO CASE
          CASE SecondField=9
               MyCount:=MyCount+1
          CASE SecondField=0
               MCount=MyCount-1
     ENDCASE
     SKIP
ENDDO
* Show results
?MyCount
* Wind up
CLOSE Databases
```

As well as the comments and choice of capitalisation, we can see that the indenting of loops displays the structure and suggests the syntax required at each stage. This principle, together with the observation that DO CASE and DO WHILE are similar, is the key to the Turbo Pascal code presented here.

The code in Listing 1 implements a very simple version of the Finite State Machine principle. Essentially a Finite State Machine works on the premise that the processing of the task at any point is in some recognisable finite state, and that the particular state can be altered to another state by an event. By keeping track of the states as we process the file, at any time we can have an expected result.

To do this, all we need is a simple string variable; each step deeper into the structure (each additional indent) initiates two

steps. Firstly, the string keeping track of the state is incremented by a character representing the current state and hence creating a trail along which we can backtrack. Secondly (and most importantly) the current state (last character of the state string) creates an expectation of the manner in which the loop is to be closed.

The next event can be one of four types, namely: the expected closure of the loop is performed or a new opening is made (a further level of nesting), or an unexpected closure of a loop is performed, or end-of-file is reached.

Having established the basis of the state machine, it is simply a matter of reacting appropriately to the events as they arise. Some degree of parsing is involved to handle comments and text, but other than this the processing of dBLint is straight forward.

In a Finite State

Finite State Machines are very useful for tasks which you can categorise as parsing with uncertainty. This is the type of task where we have to analyse part of the input (a line, a word or a character or a token) and having formed an expectation, continue analysing until that expectation is either fulfilled or disappointed.

The code presented for dBLint is tailored for the IBM-PC and dBase III but, like dBTree presented previously, it is straight-forward to modify it to, say, a CP/M computer running dBase II. Those parts of the code which are special to the PC are marked as such, and a 'plain vanilla' version which will run on a CP/M system can be achieved by following the instructions in the code.

As an eccentric nod in the direction of the user, a fuel gauge is implemented to advise the progress to date.

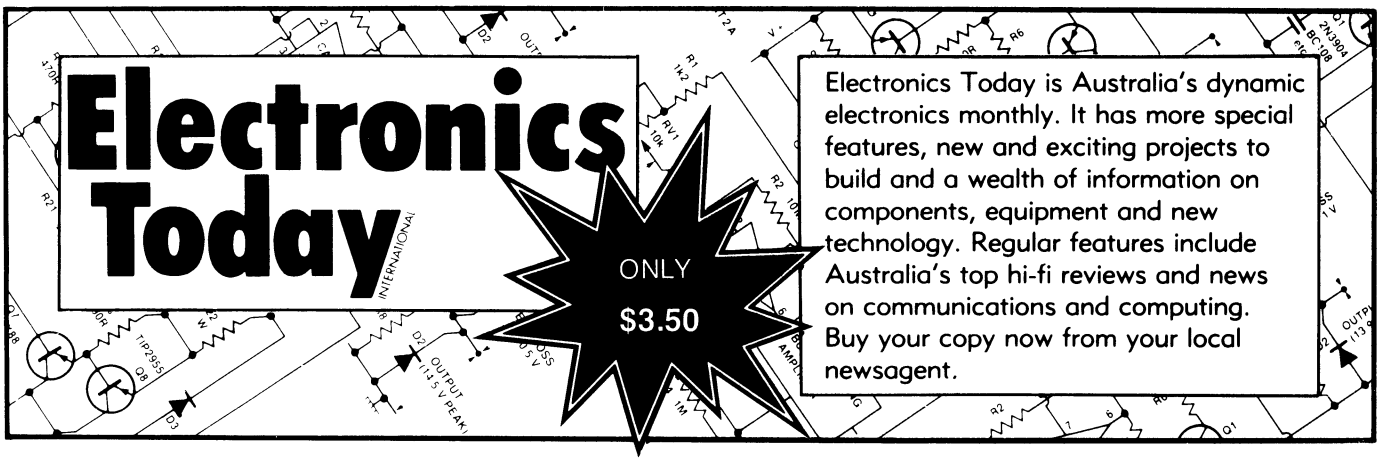
dBLint is best used after dBTree with the –o option, for instance: use dBTree to create a nested Procedure file, and then dBLint to analyse that file (and hence the whole of the task code) in one session.

Listing 1. *This code implements a very simple version of the Finite State Machine principle which works on the premise that the processing of the task at any point is in some recognisable finite state, and that the particular state can be altered to another state by an event.*

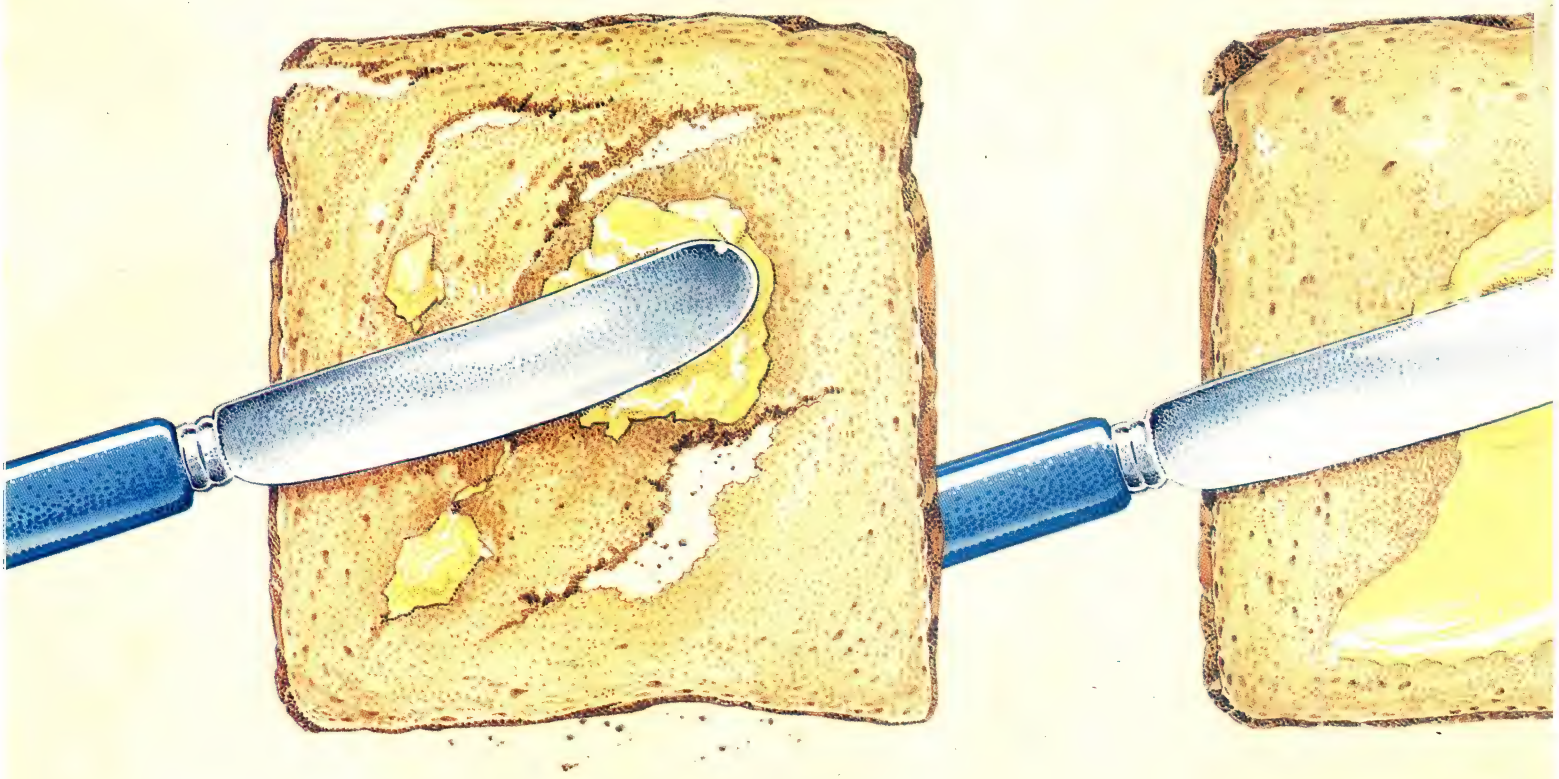
```
{-----------------------------------------------------------------
DATE      : May '87.
BY        : Peter Hill.
PURPOSE   : Analyse structure of dBase II/III  Command files.
USEAGE    : DBLINT InFile OutFile
REVISED   : June '87
REVISION  : General tidy up
-----------------------------------------------------------------}
{$F20}
PROGRAM DBLint;
CONST
   MaxSets = 4;                    {sets of loop control functions}

TYPE
   LongStr = STRING[255];       {lines limited to 255 characters}
   Str10 = STRING[10];

VAR
   InF          : TEXT[$800];    {for CP/M or Turbo 2.0 use TEXT}
   OutF         : TEXT[$800];    {for CP/M or Turbo 2.0 use TEXT}
   Depth        : INTEGER;                  {how deeply nested?}
   LineCount    : INTEGER;                  {how many lines to date}
   InFile       : LongStr;                    {input file name}
   OutFile      : LongStr;                   {output file name}
   State        : LongStr;           {see "finite state machine"}
   PartA,
   PartB        : ARRAY[1..MaxSets] OF Str10;     {loop elements}
   ErrCount     : INTEGER;                  {how many errors?}
   Bytes        : REAL;                      {how big is file?}
   BytesToDate  : REAL;                  {how many have we read?}

   FUNCTION Strip(DummyStr : LongStr) : LongStr;
   BEIN                                  {remove leading blanks}
      WHILE Copy(DummyStr, 1, 1) = ' ' DO Delete(DummyStr, 1, 1
         );
      Strip := DummyStr;
   END;

FUNCTION Exist(VAR FileName : LongStr) : BOOLEAN;
TYPE
   BigByte = ARRAY[1..128] OF BYTE;
VAR
   Fil : FILE OF BigByte;
BEGIN                          {determine whether a file exists}
   Exist := True;
   Assign(Fil, FileName);
   {$I-}
   Reset(Fil);
   {$I+}
   Exist := (IOResult = 0);
   Bytes := FileSize(fil);
   Close(Fil);
END;

FUNCTION UC(DummyStr : LongStr) : LongStr;
VAR
   Count : INTEGER;
BEGIN                          {convert a string to UPPER CASE}
   FOR Count := 1 TO Length(DummyStr) DO
      DummyStr[Count] := UpCase(DummyStr[Count]);
   UC := DummyStr;
END;

FUNCTION StateNow : CHAR;
BEGIN                             {what is the current state ?}
   StateNow := Copy(State, Length(State), 1);
END;

FUNCTION ScrnAddr : INTEGER;
BEGIN                                {what is the screen address}
   IF ((Mem[0:$410] AND $30) = $30) THEN ScrnAddr := $B000
   ELSE
      ScrnAddr := $B800;
END;

{The following Procedure is for PC/MS DOS only}
PROCEDURE WAL(Attr, C, R : INTEGER; CurrentStr : LongStr);
VAR
   Count, LenCurrentStr : INTEGER;
BEGIN                                                {Write-A-Line}
   LenCurrentStr := Length(CurrentStr);
   C := ((R-1)*160)+((C-1)*2);
   FOR Count := 1 TO LenCurrentStr DO
      BEGIN
         Mem[ScrnAddr:C] := Ord(CurrentStr[Count]);
         Mem[ScrnAddr:C+1] := Attr;
         C := C+2;
      END;
END;
{Use this procedure for non-IBM applications e.g. CP/M}
(*PROCEDURE WAL(Attr,C,R :INTEGER; Hld:LongStr);
BEGIN
GotoXY(C,R);
TextColor(Attr);
Write(Hld);
END;*)

PROCEDURE Msg(Mess : LongStr);
BEGIN
   Sound(200);                                    {PC/MS DOS ONLY}
   Delay(30);                                     {PC/MS DOS ONLY}
   Sound(400);                                    {PC/MS DOS ONLY}
   Delay(30);                                     {PC/MS DOS ONLY}
   NoSound;                                       {PC/MS DOS ONLY}
   WAL(113, 30-(Length(Mess) DIV 2), 25, Mess);
END;

PROCEDURE ClrMsg;
VAR
   Count : INTEGER;
BEGIN

   FOR Count := 1 TO 60 DO WAL(7, Count, 25, ' ');
   Msg('Press Ctrl-S to pause');
END;

{The following Procedure is for PC/MS DOS only}
PROCEDURE Frame(Name : LongStr; ULX, ULY, LRX, LRY : INTEGER
                );
VAR
   Count, Attr : INTEGER;
BEGIN                              {draw a box with a heading}
   Attr := 112;
   WAL(Attr, ULX, ULY, Chr(201));
   WAL(Attr, ULX, LRY, Chr(200));
   WAL(Attr, LRX, LRY, Chr(188));
   WAL(Attr, LRX, ULY, Chr(187));
   FOR Count := (ULX+1) to (LRX-1) DO
      BEGIN
         WAL(Attr, Count, ULY, Chr(205));
```

```
        WAL(Attr, Count, LRY, Chr(205));
      END;
   FOR Count := (ULY+1) to (LRY-1) DO
      BEGIN
         WAL(Attr, ULX, Count, Chr(186));
         WAL(Attr, LRX, Count, Chr(186));
      END;
   WAL(Attr, ((LRX-ULX) DIV 2)+ULX-(Length(Name) DIV 2), ULY
   , Name);
END;

PROCEDURE Initialise;
BEGIN
   ClrScr;
   LowVideo;
   Depth := 0;
   LineCount := 0;
   State := '0';
   ErrCount := 0;
   BytesToDate := 0;
   PartA[1] := 'DO WHILE';
   PartA[2] := 'IF ';
   PartA[3] := 'TEXT';
   PartA[4] := 'DO CASE';
   PartB[1] := 'ENDDO';
   PartB[2] := 'ENDIF';
   PartB[3] := 'ENDTEXT';
   PartB[4] := 'ENDCASE';
   WAL(7, 65, 22, 'Line:');
   WAL(7, 65, 23, 'Error:');
   WAL(7, 65, 24, 'Depth:');
   WAL(113, 4, 1, 'dBLin....by HillSoft... 1987.');
   WAL(113, 34, 1, ' Analysis of dBase II/III PRG files.');
   Frame('Source', 1, 3, 79, 19);              {PC/MS DOS ONLY}
   Frame('Module', 1, 21, 60, 23);             {PC/MS DOS ONLY}
   Frame('Status', 62, 21, 79, 25);            {PC/MS DOS ONLY}
   WAL(113, 1, 20, 'Progress:');
   Msg('Press Ctrl-S to pause');
   Window(3, 4, 78, 18);                       {PC/MS DOS ONLY}
   ClrScr;
END;

PROCEDURE Get_Parms;
BEGIN
   CASE ParamCount OF                          {PC/MS DOS ONLY}
      1 : BEGIN                                {PC/MS DOS ONLY}
            InFile := ParamStr(1);             {PC/MS DOS ONLY}
            Write('Output File name for result?');
            ReadLn(OutFile);                   {PC/MS DOS ONLY}
            IF Length(OutFile) = 0 THEN Halt;
          END;                                 {PC/MS DOS ONLY}
      2 : BEGIN                                {PC/MS DOS ONLY}
            InFile := ParamStr(1);             {PC/MS DOS ONLY}
            OutFile := ParamStr(2);            {PC/MS DOS ONLY}
          END;                                 {PC/MS DOS ONLY}
   ELSE BEGIN                                  {PC/MS DOS ONLY}
         Write('Input file name (including extension)?');
         ReadLn(InFile);
         Write('Output File name for result?');
         ReadLn(OutFile);
         IF ((Length(OutFile) = 0) OR (Length(InFile) = 0))
         THEN Halt;
      END;                                     {PC/MS DOS ONLY}
   END;                                        {PC/MS DOS ONLY}
END;

PROCEDURE Open_Files;
BEGIN
   IF Exist(InFile) THEN
      BEGIN
         Assign(Inf, InFile);
         Reset(Inf);                           {open for input}
      END
   ELSE
      BEGIN
         ClrScr;
        WriteLn('Aborting...input file not found.');
         Halt;
      END;
   Assign(OutF, OutFile);
   ReWrite(OutF);                              {open for output}
   WriteLn(OutF, '*Analysed bydBLint by HillSoft');
   WriteLn('Analysed by dBLint by HillSoft');
END;

PROCEDURE IncState(CLine : LongStr; LastNr : Str10);
VAR
   D     : LongStr;
   Count : INTEGER;
BEGIN                          {add a state marker to State}
   State := State+LastNr;
   Depth := Depth+1;                           {inc. depth}
   Str(Depth:5, D);
   WAL(113, 74, 24, D);                {update depth display}
   FOR Count := 2 TO 59 DO WAL(7, Count, 22, ' ');
   WAL(7, 2, 22, Copy(Strip(CLine), 1, 58));
END;

PROCEDURE DecState(CLine : LongStr);
VAR
   D     : LongStr;
   Count : INTEGER;
BEGIN                          {strip a state marker from State}
   State := Copy(State, 1, Length(State)-1);
   Depth := Depth-1;                                {dec. depth}
   Str(Depth:5, D);
   WAL(113, 74, 24, D);                {update depth display}
   FOR Count := 2 TO 59 DO WAL(7, Count, 22, ' ');
   WAL(7, 2, 22, Copy(Strip(CLine), 1, 58));
END;

PROCEDURE Process_File;
VAR
   CurrentLine : LongStr;

   PROCEDURE Eliminate_Comments;
   VAR
      Part1    : LongStr;
      FoundPos : INTEGER;

      PROCEDURE Cut_Off;
      BEGIN                    {eliminate continued comments}
         IF FoundPos <> 0 THEN
            BEGIN
               IF CurrentLine[Length(CurrentLine)] = ';'
               THEN
                  REPEAT
                     ReadLn(InFile[Depth], CurrentLine);
                  UNTIL (CurrentLine[Length(CurrentLine)]
                  <> ';') OR (Eof(Inf))
               ELSE CurrentLine := Copy(CurrentLine, 1,
                  FoundPos-1);
            END;
      END;                                    {procedure Cut_Off}

BEGIN                                  {eliminate all comments}
    CurrentLine := Strip(CurrentLine);
    {get rid of comments}
    FoundPos := Pos('*', CurrentLine);
    Cut_Off;
    oundPos := Pos('NOTE', CurrentLine);
    Cut_Off;
    FoundPos := Pos('&&', CurrentLine);  {dBase III /PLUS}
    Cut_Off;
    {get rid of @ }
    FoundPos := Pos('@', CurrentLine);
    Cut_Off;
    {get rid of ?}
    FoundPos := Pos('?', CurrentLine);
    Cut_Off;
    {get rid of "literals"}
    FoundPos := Pos('"', CurrentLine);
    IF FoundPos <> 0 THEN                                {for "}
       BEGIN
          Part1 := Copy(CurrentLine, FoundPos+1,
          Length(CurrentLine)-FoundPos);
          CurrentLine := Copy(CurrentLine, 1, FouncPos-1);
          FoundPos := Pos('"', Part1);
          IF FoundPos <> 0 THEN
             CurrentLine := CurrentLine+
             Copy(Part1, FoundPos+1, Length(Part1)-
             FoundPos-1);                  {without literals}
       END;
    FoundPos := Pos(''', CurrentLine);
    IF FoundPos <> 0 THEN                           {same for '}
       BEGIN
          Part1 := Copy(CurrentLine, FoundPos+1,
          Length(CurrentLine)-FoundPos);
          CurrentLine := Copy(CurrentLine, 1, FouncPos-1);
          FoundPos := Pos(''', Part1);
          IF FoundPos <> 0 THEN
             CurrentLine := CurrentLine+
             Copy(Part1, FoundPos+1, Length(Part1)-
             FoundPos-1);
       END;
END;                          {procedure Eliminate_Comments}

PROCEDURE Main_Process;
VAR
   ThisLine : LongStr;                        {this line (!)}
   LessInd  : BOOLEAN;
   Count,
   StrNr,
   Code     : INTEGER;
   NewStart,
   F        : BOOLEAN;
   LC, EC   : LongStr; {strings to hold line/error cont}

   PROCEDURE Query_New_Start;
   VAR
      Pos1, Count : INTEGER;
      StrPlus : Str10;
   BEGIN                        {are we starting a new loop?}
      NewStart := FLSE;
```

```
      LessInd := FALSE;
      FOR Count := 1 TO MaxSets DO   {for each loop type}
         BEGIN
            Pos1 := Pos(PartA[Count], CurrentLine);
            IF Pos1 <> 0 THEN
               BEGIN
                  Str(Count, StrPlus);  {increment state}
                  IncState(ThisLine, StrPlus);
                  LessInd := TRUE;
                  NewStart := TRUE;
               END;
         END;
   END;                          {procedure Query_New_Start}

PROCEDURE Query_Finish;
VAR
   Pos1, Count1, Count2 : INTEGER;
BEGIN                          {is this the end of a loop?}
   F := FALSE;
   FOR Count1 := 1 TO MaxSets DO
      BEGIN
         Pos1 := Pos(PartB[Count1], CurrentLine);
         IF Pos1 <> 0 THEN
            BEGIN
               VAL(StateNow, StrNr, Code);
               F := TRUE;
               IF StrNr <> Count1 THEN
                  BEGIN
                     FOR Count2 := 1 TO (Depth*3) DO
                        BEGIN
                           Write(OutF, ' ');
                           Write(' ');
                        END;
                     WriteLn(OutF, '*', PartB[StrNr],
                     '  expected!');          {suprise}
                     WriteLn(PartB[StrNr],
                     '  expected!');
                     ErrCount := ErrCount+1;
                     Str(ErrCount:5, EC);
                     WAL(113, 74, 23, EC);
                     Msg(PartB[StrNr]+
                     ' expeced....'+
                     'Press a key to continue');
                     REPEAT UNTIL KeyPressed;
                     ClrMsg;
                  END;
               DecState(ThisLine);
            END;
      END;
END;                           {procedure Query_Finish}

BEGIN
   WHILE NOT Eof(InF) DO
      BEGIN
         ReadLn(InF, CurrentLine);          {get a line}
         BytesToDate := BytesToDate+
         Length(CurrentLine)+2;              {inc bytes}
         ThisLine := CurrentLine;
         LineCount := LineCount+1;       {inc. linecount}
         CurrentLine := UC(CurrentLine); {to UPPER CASE}
         Eliminate_Comments;
         Query_New_Start;              {is it a new loop?}
         Query_Finish;                  {or end of a loop}
         IF (LessInd) AND NOT(NewStart AND F) THEN Depth
            :=
            Depth-1;                   {dec depth counter}
         FOR Count := 1 TO (Depth*3) DO
            BEGIN                      {indent the output}
               Write(OutF, ' ');
               Write(' ');
            END;
         IF (LessInd) AND NOT(NewStart AND F) THEN Depth
            :=
            Depth+1;
         {write the line less leading blanks}
         WriteLn(OutF, Strip(ThisLine));
         WriteLn(Strip(ThisLine));
         Str(LineCount:5, LC);
         WAL(113, 74, 22, LC);      {show new line count}
         FOR Count := 1 TO Trunc(BytesToDate/(2*Bytes))
            DO
               WAL(7, 10+Count, 20, Chr(221));      {update
                                                    progress}
      END;
   WHILE State <> '0' DO
      BEGIN           {we got to Eof() but not finished}
         VAL(StateNow, StrNr, Code);          {complain}
         WriteLn(OutF, '*Unexpected EOF; ', PartB[StrNr],
         ' expected!');
         WriteLn('Unexpected EOF; ', PartB[StrNr],
         ' expected!');
         ErrCount := ErrCount+1;
         Str(ErrCount:5, EC);
         WAL(113, 74, 23, EC);
         Msg(PartB[StrNr]+
         ' expected....Press a key to continue');
         REPEAT UNTIL KeyPressed;
         ClrMsg;
         DecState(ThisLine);       {test next state down}
      END;
END;                           {procedure Main_Process}


   BEGIN
      Main_Process;
   END;                              {procedure Process_File}

   PROCEDURE Wind_Up;
   BEGIN
      Msg('          Finished            ');
      {report on the results}
      WriteLn(OutF, '*Nr. of Lines processed was :', LineCount)
         ;
      WriteLn('Nr. of Lines processed was :', LineCount);
      WriteLn(OutF, '*Nr. of Errors flagged was :', ErrCount);
      WriteLn('Nr. of Errors flagged was :', ErrCount);
      Close(OutF);                                  {close shop}
      Close(Inf);
      Window(1, 1, 80, 25);                    {PC/MS DOS ONLY}
   END;                                      {procedure Wind_Up}

   {The following Procedure is for PC/MS DOS only}
   PROCEDURE Error(Errno, ErrAdr : INTEGER);
   BEGIN
      Window(1, 1, 80, 25);
      ClrScr;
      WriteLn('Error Number:', Hi(Errno), ',', Lo(ErrNo));
      WriteLn('An Irrecoverable Error Has Occurred...Sorry!');
      Close(OutF);
      Halt;
   END;

BEGIN
   ErrorPtr := Ofs(Error);                  {PC/MS DOS ONLY}
   Initialise;
   Get_Parms;
   Open_Files;
   Process_File;
   Wind_Up;
END.
```



A LOT HAS IMPROVED SINCE YO



BUTTER USED TO BE HARD TO USE.

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You're probably quite happy with your current word processing software. Then again, you were probably quite happy with hard butter. Certainly, hard and soft butter look and taste similar. But when soft butter came about, it made life a lot easier. Which is exactly what would happen should you use Microsoft Word 4 for IBM PS/2 P.C.'s and compatibles.

Word 4 has the best implementation of the features that are most requested by word processing users. In fact, Word 4 is everything you'd expect from the leaders in software technology.

Most importantly, all the improvements to Word 4 will improve your productivity.

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For a start, it's exceptionally fast. Word 4 beats all the major word processors when it comes to speed (some functions are more than twice as fast).

You'll find amazing speed improvements in scrolling, file load and save, cursor movements and pagination.

You'll also use half the keystrokes that you would use with any other word processing software.

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Some of the features include a clean screen option, line number printing, paragraph borders to create organizational charts and a line and column counter on the screen.

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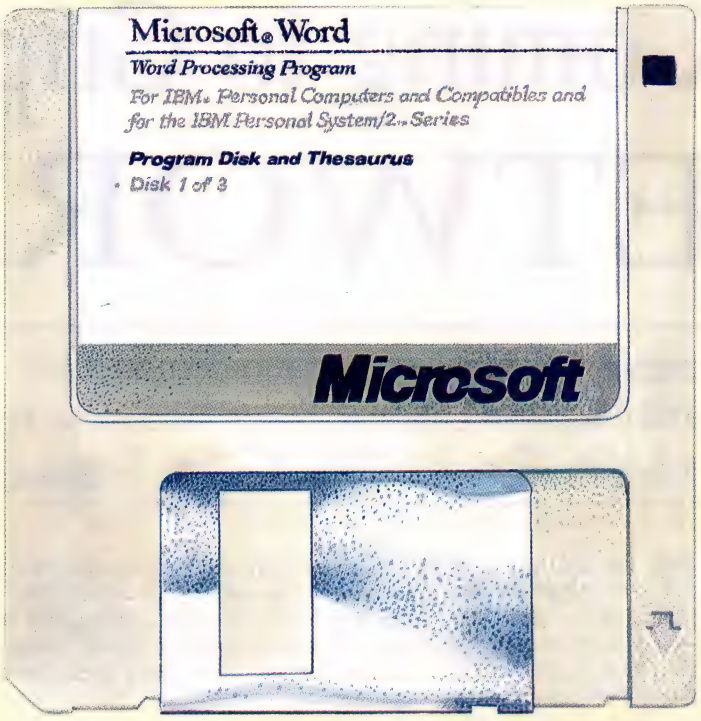

IT MORE VERSATILE.

THE SAME HAS HAPPENED TO W.P. SOFTWARE.

Word has document management and retrieval. This feature is designed to make it easy to search for and locate documents and manage large directories.

You don't need to remember a cryptic eight-character name as you do with other software.

A summary sheet contains such information as the author, date and time created, document title, and comments. Even words and phrases within the document can be used to search for it.

Style sheets are now even easier to create. Any formatting in your document can be copied and recorded as a named style and can be applied to other text.

This way, you don't have to re-key previous formatting, resulting in a consistent look within your document.

THE LARGEST PC-BASED THESAURUS IN THE WORLD.

Microsoft Word 4 has expanded its spelling dictionary. Now, 130,000 words can be easily checked. It also has a thesaurus, to help you find the right words for your thoughts.

You'll have many words to choose from, 220,000 to be exact, as it's the largest and most complete PC-based thesaurus in the world. Of course, one of the best things about Microsoft Word 4 is it can convert many popular word processing programs, so it's easy to switch over to Word 4. It's also easy to learn, so you'll have no changeover problems. To prove it, Microsoft is offering a Word 4 evaluation pack. It's available for only $25.

To see just how much better Word 4 is compared to your present word processing software, simply call Microsoft now on (02) 452 5088 or toll-free on 008 226 850 and ask about the $25 evaluation pack.

In fact, as Microsoft are always ahead of the field, you should call them for any of your software requirements.

Especially when it comes to your bread and butter.

For more information on Word 4, please send to Microsoft, Freepost 3, Forestville, New South Wales, 2087.

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Part 3

Coming to Grips with NETWORKING

In November, Stewart Fist introduced Local Area Networks and discussed Ethernet, the de facto industry standard for LANs. Now, let's look at Token Rings . . .

ONE OF THE earliest forms of local area networking which was around almost before the term LAN had been invented, was the Cambridge Ring, so named after the British university in which it was devised. As the second part of the name suggests, the Cambridge Ring has a circular topology where information is presented to the group in a repetitive sequence — it's an informational merry-go-round.

The problem with ring topologies is that they are fragile. Any break in the circle, no matter how small and insignificant, and the whole LAN fails. It's a case of 'one out — all out'.

Star topologies provide a much better solution to this failure problem. LANs inherited the star radiating linkage system from PABX telephones. They are designed with one central controlling unit and independent wire pairs radiating out to all 'nodes'. With the telephone-based origins of the star network, it is not surprising to find that the main player in the field is AT&T with its StarLan system. (A general discussion of ring and star topologies was given in Part 1, October '87.)

A true star network needs a central node processor, but this is okay since any LAN above the simple level of peripheral sharing usually needs at least one dedicated 'file server' to control the common database, and in star networks this machine can double as the network controller. If one of the nodes breaks down, the system continues to operate but, of course, if the central control unit fails, the whole system goes down.

IBM established a dominant position in the office connectivity field fairly late in the development of LANs, although it did have an early release of the PC Network for groups with low data exchange requirements.

A Star-Wired Ring!

IBM announced in early 1984 that its major LANs system was going to use a hybrid of the star and the ring, a 'star-wired ring' topology, and then sat back for a couple of years while they developed the token ring technology to run on it. This is now the IBM Token Ring LAN which was only released in late 1985 and, as predicted, it has proven to be highly popular.

Star-wired rings have most of the advantages of both the ring and the star topologies. They don't need a central network controller, but neither are they subject to the 'one out — all out' problems of simple ring wiring.

Gaps in Parts?

MISSED PARTS of any of our YC Tutorials? Well, you've got a second chance. We'll forward photocopies of 1 to 5 parts for $4, including postage and handling, and 6 or more parts for $8 (overseas postage additional). Please identify the Tutorial by its complete name, the issue it appeared in and the part number (if applicable). All but the latest of our Tutorials are listed in YC's Annual Index, published with our July 1987 issue. Refer to the Services page for information on how to obtain back issues.

Even though the cabelling radiates out from a series of central 'concentrators', IBM's Token Ring is 'logically' a circle. The network passes information around in a merry-go-round, with each computer in the system reading the frames of information and either acting upon that information or passing the frames on to its neighbour.

The key to obtaining the benefits of both the ring and the star elements lies in the use of a Multistation Access Unit (often called a 'Wiring Concentrator'), into which the radiating cables from the terminals/nodes connect. The specifications allow for normal twisted-pair telephone wires to be used, but recommends the use of special shielded twisted-pair cable. Fibre optics can also be used.

In the IBM system up to eight terminals can link into any one Access Unit, but Access Units are themselves linked together into the major network ring; this can have up to 260 PCs in the one system — plus bridges to other networks.

The key to overcoming the problems of the ring structure is the Access Unit, with relays which can automatically bypass a cabled connection by reacting to the presence or absence of a special test signal. The network is, therefore, able to instruct the Access Unit to isolate a device and drop it out of the chain if a fault occurs (or if the device is disconnected, or powered down).

If a break occurs in the ring, the next node downstream will react after not receiving a token for some time by sending out a special MAC-Control frame (discussed later) containing a 'beacon' signal with the address of its upstream neighbour. After a number of beacon signals have been received by the node, it will disconnect from the ring and the ring will automatically reconfigure.

The other major hardware component of the IBM Token Ring is the PC Adapter Card which plugs into the computer and

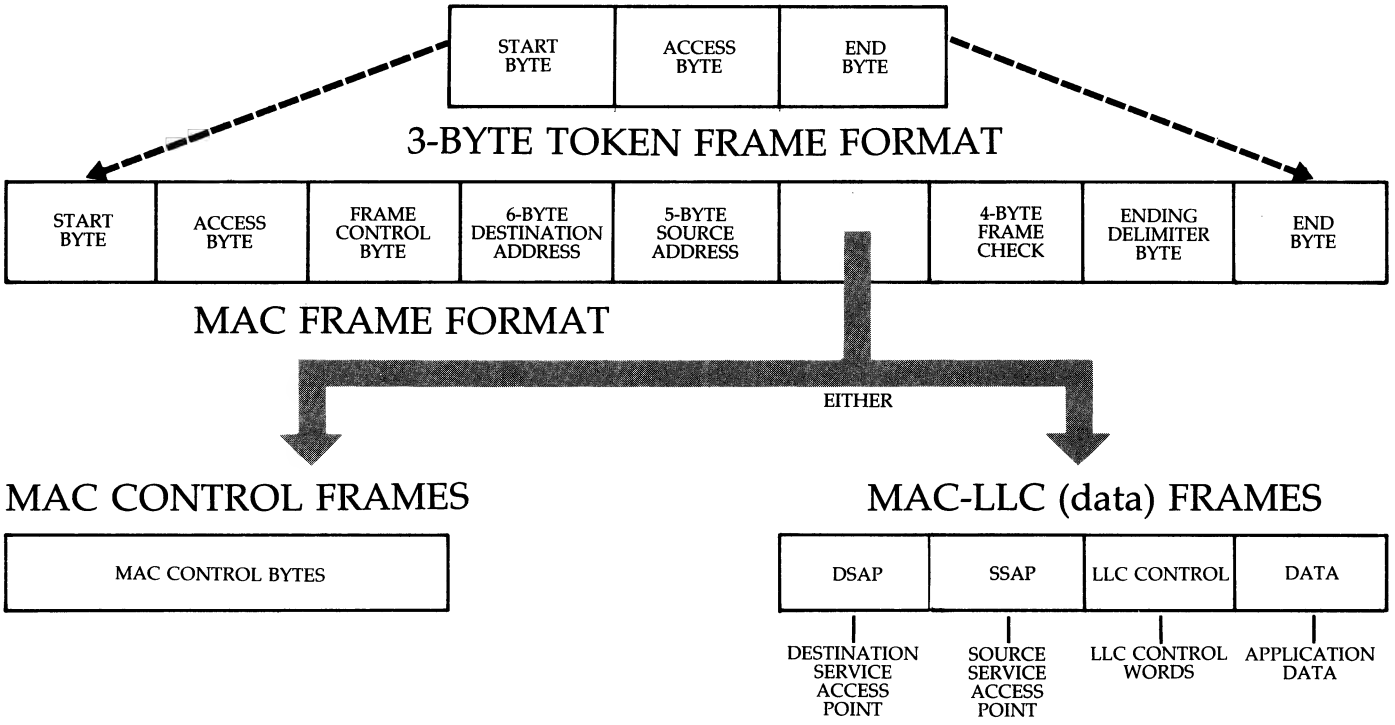

Figure 1. *The Token Ring Frame system.*

provides the logical link control functions and diagnostics for the system. The card contains a microprocessor operating under its own microcode.

It can transmit and receive data at a speed of 4 million bits per second, which sets the limits of the system since each node in a token ring system needs to read, reconstruct, and retransmit every frame of data as it travels around the system. Every node plays an active role with every piece of data on the system — unlike Carrier Sense (CSMA — see Part 2 for more information) systems where the nodes are passive until they recognise data addressed to them.

The real fundamental difference between IBM's Token Ring and Ethernet are the controlling protocols. Ethernet uses CSMA and IBM uses token-passing. IBM's game is very much like 'Pass the Parcel'; a 'token' (in this case a 3-byte frame of code) gets passed around the ring, and only the node holding the parcel can transmit. It's a sort of relay race, where only the man with the baton is allowed to run.

Ethernet's 'wait for a gap in the traffic' method is 'probabilistic', while token-passing is 'deterministic' in nature. There's no way of predicting when a particular node on an Ethernet line is going to be allowed to transmit — it takes its chances along with everyone else.

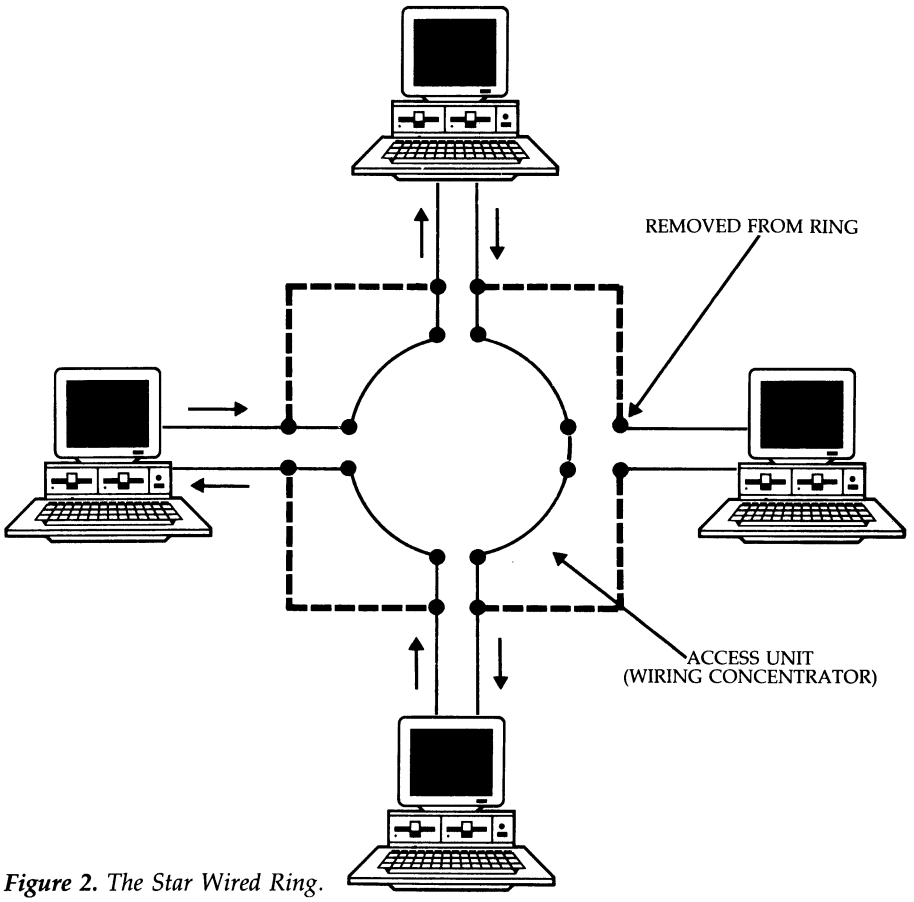

Figure 2. *The Star Wired Ring.*

With token-passing, however, we can enforce a strict order on the access. We can insist on the token being passed systematically around the ring, with each node getting equal transmission times. If we want, we can also choose to allocate priorities so that certain nodes have double, triple or quadruple the chance of using the system than others. With IBM's token ring network there is a system of priorities which allow important nodes to enforce access claims over the requirements of lesser mortals.

In the long-run, it could be this aspect of IBM's Token Ring that makes it win out over other LANs. It is difficult to transmit digitised speech on an Ethernet system, for instance, because you can never be sure that the next few syllables are going to arrive in time to keep the speech flowing. With token systems you can give speech the necessary priority so that the speech buffer never runs out. And the integration of voice and data is becoming increasingly important in LANs. The same objection to Ethernet is applied to Manufacturing Automated Protocols (MAP) which General Motors and other major industrial manufacturers are attempting to introduce as a world standard in machine control for factories.

Ethernet is the main competitor to MAP (which uses a token system but with a bus topology). The main objection, again, is that Ethernet's contention scheme means that the overall controlling system of a factory can never be sure that a control signal will reach a machine in time. It could be delayed through system overload.

So IBM's shift to token-passing protocols has some obvious advantages, but it is not without cost — mainly apparent in the expense of the PC Adapter Cards and the Access Unit. A lot of intelligence is needed to make a Token Ring system work.

IBM design is defined by the IEEE's 802.5 and 802.2 standards and it conforms to a couple of layers of the international OSI seven-layer model which is designed to standardise data communications between networking equipment. These two layers are also the same in IBM's own SNA communications layer model.

Medium Access Control

I don't intend to go into details about the competing layer-models, except to point out that the IEEE Standards for Token Ring only define the Physical Layer (Layer 1) which designates the type of wiring system to be used, and a part of the Data Link Layer (Layer 2) called Medium Access Control — or MAC, for short.

A second part of the Data Link layer, called the Logic Link Control (LLC) is common to all three IEEE LANs specifications (802.3 — CSMA/CD Ethernet, 802.4 — Token-bus MAP, 802.5 — IBM Token-ring IBM). The Logic Link Control itself is specified by IEEE 802.2. This MAC level subsection of the Data Link layer, specifies how the access method used by a LAN works. In this case the MAC level specifies the control of the token-passing system, which exists as firmware stored in the 16 kilobytes of ROM on the PC Adapter Card.

The problem with ring topologies is that they are fragile. Any break in the circle, no matter how small and insignificant, and the whole LAN fails. It's a case of 'one out — all out'.

This MAC control firmware can communicate with other nodes in the system without you being aware of its actions. It does this in order to both control the network and to correct faults in the system, and it is therefore given a higher access priority than the transmission of data.

The LLC level software is mainly concerned with the transmission of data around the network. There are actually two types of LLC frames specified by the IEEE. The first simply packages the data and sends it out on the network (errors are handled by higher levels), while the second expects an acknowledgement back from the receiver. This second type has a form of error detection and correction built-in, and is the way in which IBM Token Rings operate.

The information needed by the MAC to control the network is distributed by special MAC-Control frames, while the data distribution is handled by, so called, MAC-LLC frames (since MAC controls are needed on every frame). This sounds complex, but don't let it worry you, its not all that important anyway. (Figure 1 might help you sort it out.)

We saw in November how the Ethernet frame was formatted to include addresses and error checking information alone with the data. But token rings have a further complication in that the system needs to transfer control between nodes in a systematic way, and to do this they use a special three byte frame called a token.

This token frame circulates around the system in a predefined order, and part of one byte in the frame is a priority number from zero to seven.

When a terminal on the system receives the token, it first checks the token frame priority number against its own frame priority level. If the token priority level is higher, it will pass the token on without transmitting. It can add its own 'priority request' to the token before passing it on if it chooses, and if a change hasn't been made to this request as it passes around the ring, the originating node will take control and transmit its data the next time the token comes around.

Whenever a terminal frame's own priority level is equal to, or higher than the token priority, the node can begin to transmit immediately. A terminal will only release the token frame after it has finished transmitting, or after a predetermined time or set number of frames have been sent.

What actually happens is that the first and last bytes of the token are retained, and the terminal's information bytes with addresses, data and error checking, are inserted between these token 'book-ends' and sent on their way around the ring.

The receive part of the system listens all the time, and it can detect the returning header of its own information, while still transmitting the 'tail'. It checks this returning frame to see that it has been copied properly by the destination node.

At this stage, a new three-byte token is regenerated and passed off to the next terminal in line. This process ensures that there can only ever be one frame on the network at any one time, and it applies both to MAC-Control frames and MAC-LLC frames.

When a new terminal is connected to the ring it immediately sends out a special MAC-Control frame which includes the address number it proposes to use as identity. If this address isn't already in use, the frame is returned intact and the initialisation process begins.

The proposed number then becomes the terminal's network address and is used when sending or receiving frames. Incorporated into this address is a function code which identifies those nodes on the system that play special roles.

Ring Poll

One special form of the MAC-Control process worth mentioning is the Ring Poll which is initiated by the MAC-Control frame and causes each node on the system to transmit to its downstream neighbour. This node checks the incoming address against the one it has stored, and so detects whether unnoticed system changes have resulted in a new upstream neighbour. If it finds a discrepancy, it advises the Network Manager, if one exists in the system.

Small token ring systems don't need a special network control computer, but as they grow larger this function can be taken up by one member of the circle. Later still, when the system demands it, a dedicated network managing computer is usually installed.

The Network Manger is responsible for keeping a list of all nodes currently using the network, and it controls the insertion and deletion of nodes. This computer becomes the central recorder of ring status. Any node on the system can communicate with the Network Manager by using a MAC control frame with the Manager's node address incorporating the special function code. Without this code, the Network Manager terminal is just treated like any other node on the system.

The problem with ring topologies is that they are fragile.

Two sub-sections of the Network Manager control special functions. The Ring Parameter Server controls the insertion of a new node into the system and provides it with its addresses and priority codes. The Ring Error Monitor collects information about errors on the system and sends reports to the source address for correction. Error detection and correction is a divided responsibility in the larger token ring system. If there is a Network Manager on the system, then it will bear the major responsibility — if not, the role is played by the Active Monitor which can be any one of the terminals on the system.

After a network failure, or when the LAN is first fired up, all nodes actively contend for the role of Active Monitor by sending MAC-Control frames that claim the role. Usually the node with the highest address wins. The Active Monitor looks after the circulation of the token, and it sends reports on token errors and changes to the ring status if a node is inserted or deleted to the Network Manager. It monitors the system every 10 milliseconds, mainly to check the token for problems. If it finds a problem with the token, it will immediately purge the ring and send out a MAC-Control frame to check whether the ring is still functioning. This is the only case where a frame can be sent by a node without possession of the token.

If this MAC-Control frame travels around the ring and returns to the Active Monitor without error, a new token is created and set in circulation. If an error is returned, the Active Monitor will keep transmitting control frames until the faulty unit is isolated and removed from the ring by its Access Unit.

As you can imagine, the complexity of operation of the Token-ring system means that quite complex software is also needed, but I don't propose to go into this in this series. □

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GRAPHICS TECHNIQUES

In November, Miroslav Kostecki drew the fundamental concepts of computer graphics — now, he's in animated orbit (and flying)!

FROM THE TIME of their invention, computers have been designed to be ever faster. But why? To start, eliminating delays can have a powerful effect on programs, especially in the field of graphics. High quality, mathematically generated graphics are generally very processor intensive and, therefore, run very slow. Although, with the new wave of graphics orientated machines, such as the Amiga and Archimedes, speed is less of a problem.

If you don't have the fortune of owning a machine in the hyper-speed category, you realise that most of the current computers running a Basic interpreter are exceedingly slow. This has resulted in a number of techniques being developed in both software and hardware to speed things along.

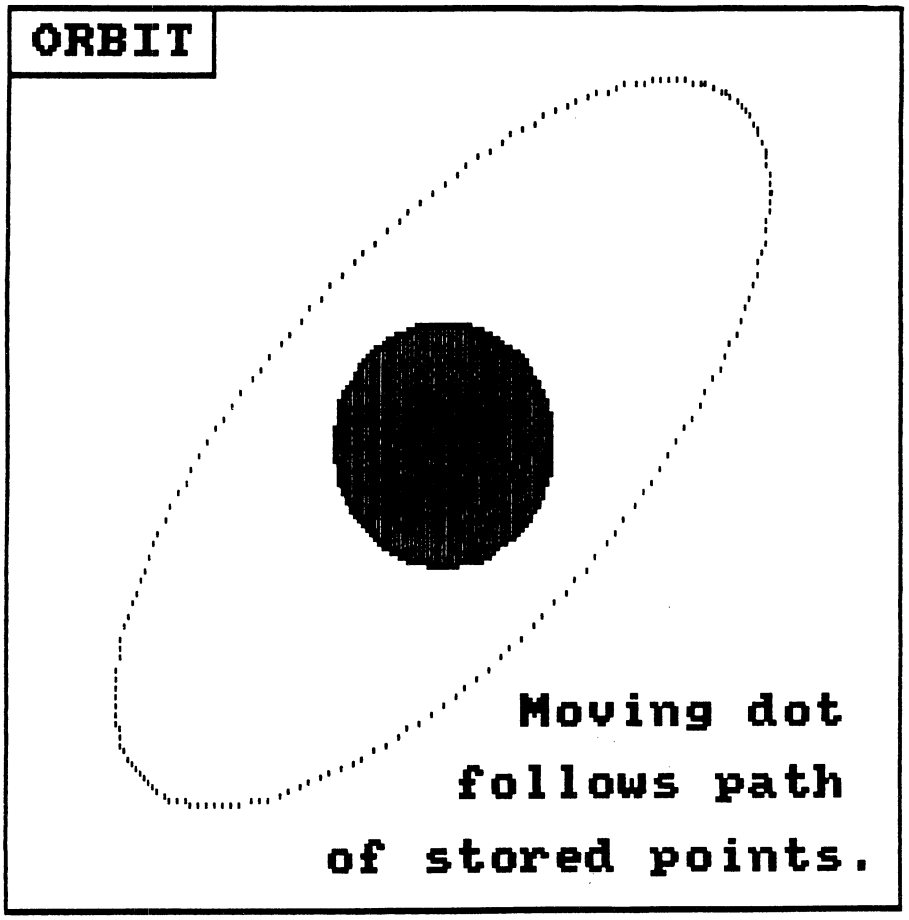

Figure 1. In Orbit — one dot quickly replaces another to give a flicker free image.

Which Language To Use?

Various languages have been developed which compare to Basic in ease of use, but compile into machine code to run at top speed -- usually 10 to 100 times faster than Basic. One example is Pascal, which seems to be well suited to graphics manipulation due to its structure. Otherwise, compilers are available for most versions of Basic (When choosing a compiler make sure it includes a large collection of graphics commands as many do not support graphics at all.)

Alternatively, you may create short sections of machine code and access them from your Basic program. Of course, a knowledge of the workings of your microprocessor is required to perform operations such as this, whereas compilers reduce this need. One good technique is to program a working version completely in Basic and then write machine code for the slower sections, one at a time.

There are two ways to create these machine code programs: if the program is short, you can enter the code straight into Data statements and then Poke these numbers into a portion of memory. The

```
10 ' ### ORBIT ###
20 ' Array storage Demonstration.
30 ' Miroslav Kostecki, Sept. 1987.
40 '
50 MODE 1: GRAPHICS PEN 1
60 DIM s(180), c(180)
70 DIM ax(180), ay(180)
80 '
90 DEG           'Store every 2 degrees
100 FOR dg=0 TO 180
110  s(dg)=SIN(dg+dg):c(dg)=COS(dg+dg)
120 NEXT dg
130 '
140 ox=320: oy=200         'Draw circle
150 size=160: ss=size/3
160 FOR dg=5 TO 180 STEP 5
170  MOVE c(dg-5)*ss+ox, s(dg-5)*ss+oy
180  DRAW c(dg)*ss+ox, s(dg)*ss+oy
190 NEXT dg
200 '
210 FOR dg=0 TO 180       'Store points
220  x=c(dg)*size+ox
230  y=s((dg+68) MOD 180)*size+oy
240  PLOT x,y
250  ax(dg)=x: ay(dg)=y
260 NEXT dg
270 '                     Move dot around
280 FOR dg=1 TO 180
290  PLOT ax(dg-1),ay(dg-1),0
300  PLOT ax(dg),ay(dg),1
310 NEXT dg
320 GOTO 280
```

Listing 1. Orbit gives a demonstration of array storage.

subroutine (CALL), can then be accessed directly from the Basic program when required.

The second option involves using a compiler or assembler to generate the machine code and save it separately. When the routine is wanted at a later period, it's loaded off the disk into the required memory area.

The examples presented throughout this series will be in Basic as the majority of computer users understand this language, and most computers come supplied with it as standard. However, it is the logic behind the program, the algorithm, which is of real interest. The demonstration programs will be simple and therefore easy to convert to other languages.

An Animated Concept

Generating screens while a program is running tends to be a long and tedious process. To counteract this, single screens of graphics can be stored and recalled later. However, real time movements, updated and animated screens must reach a certain speed to be useful. For example, when rotating a 3D model the calculations and complex screen manipulations must be made within a certain time period.

Essentially, animation gives the illusion of an object being 'alive'. Various procedures have been developed for this concept, the most common method is to draw an object in one position, calculate its next position and then erase the object and draw it in the new position. That's very similar to drawing pictures on the corner of a note pad and flicking through them to give the impression of movement.

However, there's the problem of a delay between erasing an object and redrawing it. This causes a blank period and introduces flicker. Ideally, the object should be erased and redrawn in the same instant of time, eliminating the blank period.

Another potential problem with flicker, is the fact that to make the movement appear smooth, each frame must be updated faster than the eye can detect. This flicker free speed is around 20 frames per second. Thus, each frame should last for no more than 1/20 th of a second. Although an acceptable speed may be slower, this speed can be readily achieved on small computers by applying certain techniques.

Tables and Arrays

Tables and arrays are used extensively in computers. Any group or sequence of numbers that must be easy to access either sequentially, or randomly, can be stored in an array. Computer graphics sys-

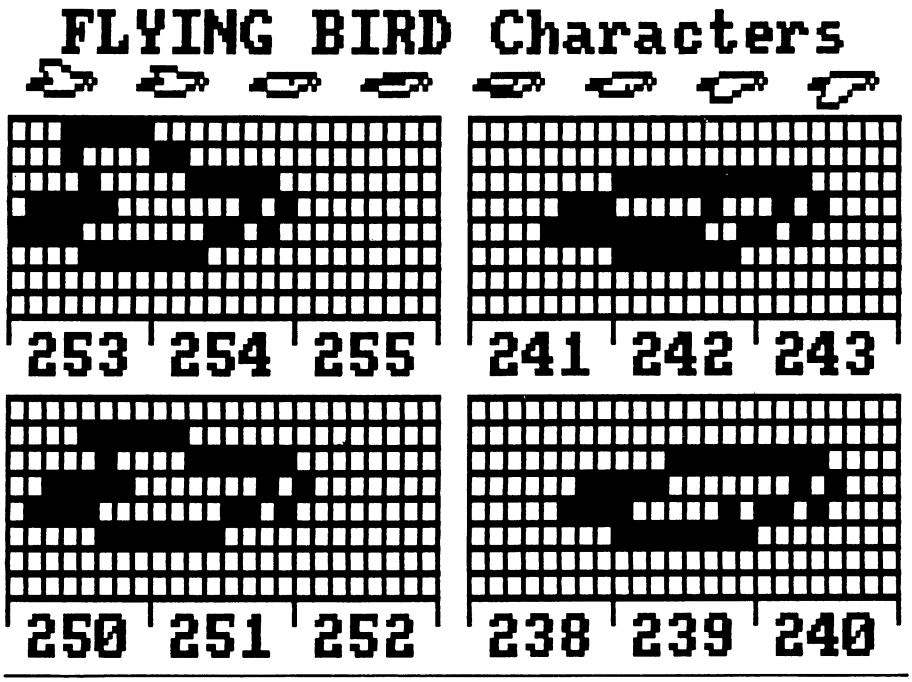

Figure 2. Flying Bird — the wings and body move one pixel at a time, so that the animation appears smooth.

```
10 ' ### FLYING BIRD ###
20 ' Demonstration of Animation using Programable Characters.
30 ' Miroslav Kostecki, September 1987.
40 '
50 DATA 31,16,8,124,240,15,0,0,0,192,62,5,26,224,0,0,0,0,0,0,0,0,0,943
60 DATA 0,15,4,62,120,7,0,0,0,192,63,2,13,240,0,0,0,0,0,128,0,0,0,0,846
70 DATA 0,0,3,28,60,3,0,0,0,0,255,17,6,248,0,0,0,0,128,64,128,0,0,0,940
80 DATA 0,0,0,15,30,1,0,0,0,0,255,248,3,252,0,0,0,0,192,160,64,0,0,0,1220
90 DATA 0,0,0,7,15,0,0,0,0,0,255,4,249,254,0,0,0,0,224,80,160,0,0,0,1248
100 DATA 0,0,0,3,7,0,0,0,0,0,31,224,130,255,0,0,0,0,240,40,208,0,0,0,1138
110 DATA 0,0,0,1,3,0,0,0,0,0,31,224,192,67,124,0,0,0,248,20,232,0,0,0,1142
120 DATA 0,0,0,0,1,0,0,0,0,0,15,240,224,32,67,124,0,0,252,10,116,128,0,0,1209
130 DATA 0,0,7,120,240,16,33,62,0,0,254,5,58,64,128,0,0,0,0,0,0,0,0,0,987
140 DATA 0,0,3,60,120,8,15,0,0,0,255,2,29,96,128,0,0,0,0,128,0,0,0,0,844
150 DATA 0,0,0,31,60,7,0,0,0,0,255,1,22,248,0,0,0,0,128,64,128,0,0,0,944
160 DATA 0,0,1,14,31,1,0,0,0,0,255,8,243,252,0,0,0,0,192,160,64,0,0,0,1221
170 DATA 0,0,0,7,15,0,0,0,0,0,127,252,1,254,0,0,0,0,224,80,160,0,0,0,1120
180 DATA 0,0,0,3,7,0,0,0,0,0,127,130,128,127,0,0,0,0,240,40,208,0,0,0,1010
190 DATA 0,0,0,1,3,0,0,0,0,0,126,33,240,192,63,0,0,0,0,248,20,104,128,0,0,1158
200 DATA 0,0,0,0,1,0,0,0,0,62,33,16,248,224,31,0,0,0,128,124,10,52,192,0,0,1121
210 DATA 17091
220 '
230 SYMBOL AFTER 208
240 DIM b$(16)
250 tt=0
260 FOR i=45 TO 0 STEP -3: t=0
270  FOR j=0 TO 2                          'Read data and setup characters
280   READ a1, a2, a3, a4, a5, a6, a7, a8
290   t=t +a1 +a2 +a3 +a4 +a5 +a6 +a7 +a8 '<<<checksum for errors
300   SYMBOL 208+i+j, a1, a2, a3, a4, a5, a6, a7, a8
310  NEXT j
320 '
330  READ s: IF s<>t THEN PRINT "Error in Data line";16-i/3: STOP
340  tt=tt+t '<<<2nd overall checksum
350  b$(16-i/3)=" " +CHR$(208+i) +CHR$(209+i) +CHR$(210+i)   'store groups
360 NEXT i
370 READ ss: IF ss<>tt THEN PRINT "Error in Data- check for double copies"
380 '
390 j=1: delay=20     ' Loop for movement
400 FOR i=1 TO 16
410  LOCATE j,10: PRINT b$(i);
420  FOR d=1 TO delay: NEXT d
430  IF i=8 OR i=16 THEN j=j+1
440 NEXT i
450 GOTO 400
```

Listing 2. Flying Bird demonstrates animation using programmable characters.

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tems make use of arrays to store representations of objects, to store sequences of movements, and many other attributes of the graphics screen, with its movement and calculations. This flexibility quickens execution of graphics and makes the program much easier to follow.

Storing numbers in a two dimensional array to represent objects on the screen has been standard practice for many years. Objects can be represented in an array where the program only tests and manipulates the array. In turn, a graphics program would use the array to produce the graphics on screen. A simple example would be to store either 0, 1 or 2 in a 3 *x* 3 array to represent a blank space, or a O or X in a game of tic-tac-toe. Similarly, image descriptions are stored for easy manipulation of 3D objects for rotation and movement.

Into Orbit

The Orbit program in Listing 1 reveals some of the routes arrays can take to speed up both the generating of still graphics and animated sequences.

Sines and cosines as well as any other functions can be stored in arrays for later access, especially if they take a long time to calculate. In this program we store the sine and cosine value for every degrees.

Shapes are much more quickly drawn using short lines between points so that only these particular points need to be calculated. In the program, a circle is drawn using lines from the preceding point to the current point in steps of 10 degrees.

If points are to be accessed frequently, store the points in an array for later use. The program also plots the stored points to show its workings more clearly.

The last section is the actual loop which moves the dot from point to point. The technique is to wipe out the last dot and plot the current dot as quickly as possible to avoid flicker due to the blank period.

Figure 1 shows a graphic printout of the process where one dot is quickly replaced by another to give a flicker free image. The points plotted here are principally blank except for one particular ever-changing pixel which gives the impression of moving around the circle by switching from one point to the next.

Programmable Characters

On the majority or graphics systems, you can program the individual characters which make up the text screen by defining the dots that the character consists off. Systems such as these are called programmable graphics, or symbols. Various alphanumeric styles and

In a different mode . . .

```
Rem NB include "Def fnoffset(x,y)=160 * y + (x Or 1)"

Sub Pdraw(zx,zy,dotcolor) Static
Rem draw a point
  dotnow = Peek(fnoffset(zx,zy))
  If zx Mod 2 <> 0 _
        Then   dotclr = (dotnow And &hf0) Or dotcolor _
        Else   dotclr = (dotnow And &hf) Or (dotcolor * 16)
  Poke fnoffset(zx,zy),dotclr
End Sub

Sub Ldraw(x1,y1,x2,y2,dotcolor) Static
Rem draw a line
  deltax = x2-x1:deltay=y2-y1
  If deltax<>0 Or deltay<>0 Goto Hline
  Call Pdraw(x1,y1,dotcolor)
  Exit Sub
Hline:
  If deltay<>0 Goto Vline
  For zx=x1 To x2 Step Sgn(deltax)
        Call Pdraw(zx,y1,dotcolor)
  next zx
  exit sub

Vline:
  If deltax<>0 Goto DPline
  For zy=y1 To y2 Step Sgn(deltay)
        Call Pdraw(x1,zy,dotcolor)
  Next zy
  Exit Sub

DPline:
  If Abs(deltay) < Abs(deltax) Goto DMline
  slope = deltax / deltay
  For zy=y1 To y2 Step Sgn(deltay)
        zx = slope * (zy-y1) + x1
        Call Pdraw(zx,zy,dotcolor)
  Next zy
  Exit Sub
DMline:
  slope = deltay / deltax
  For zx = x1 To x2 Step Sgn(deltax)
        zy = slope * (zx-x1) + y1
        Call Pdraw(zx,zy,dotcolor)
  Next zx
End Sub
Sub Setup Static
rem set-up for lo-res graphics
  Screen 0:Width 80
  Key Off:Cls
  Out &h3D8,9
  a=&h3D4:d=&h3D5
  Out a,4:Out d,&h7F
  Out a,6:Out d,&h64
  Out a,7:Out d,&h70
  Out a,9:Out d,1
  Def Seg = &hB800
  For c=0 To &h3FFE Step 2
        Poke c,&hDE:Poke c+1,0
  Next c
End Sub
Sub Rest Static
rem re-set to 80x25 text
  a=&h3D4:d=&h3D5
  Out a,4:Out d,&h1F
  Out a,6:Out d,&h19
  Out a,7:Out d,&h1C
  Out a,9:Out d,7
  Cls
End Sub
```

Listing 1. *Low resolution graphics for the IBM PC/XT.*

If you're feeling more adventurous, try these routines for low resolution graphics on the IBM PC/XT, compliments of Jeff Richards.

THE IBM PC XT CGA has a low resolution graphics mode that is not implemented in the BIOS and not documented. Using this mode involves resetting some of the screen controller's registers and doing direct screen access to control the pixels. Resolution in this mode is 160 x 100 with 16 colors (although 1 colour is black, and another is bright black!).

Three routines are presented here. The first is a collection of QuickBASIC subprograms to draw pixels and lines. the second and third are two programs that use the pixel-drawing subprogram to demonstrate the new mode. Scatter draws a display like a kaleidoscope. Lines creates 16 projectiles (2 are invisible) and bounces them around the screen leaving a coloured trail.

Note that the initialization subprogram (Setup) must be called before plotting any points, and the de-initialization subprogram (Rest) must be called before returning to the operating system.

The subprograms first appeared in a form for BASICA in *Dr Dobbs Journal* - Number 84, October 1983. To make life easier (for those of you with a modem), these listings are on YC's Bulletin Board).

```
Defint a-z
Def fnoffset(x,y)=160 * y + (x Or 1)
Dim dotc(15), xpos(15), ypos(15), cdir(15)

     Call Setup
     For i=0 to 15
       dotc(i) = i
       xpos(i) = 80
       ypos(i) = 50
       cdir(i) = Int(Rnd*4)+1
     Next i
     While Inkey$ = ""
       For i=0 to 15
         If rnd<.2 Then cdir(i) = Int(Rnd*4)+1
         xinc=1:If cdir(i)>2 Then xinc=-1
         yinc=1:If cdir(i) Mod 2 = 0 Then yinc=-1
         xpos(i)=xpos(i)+xinc:ypos(i)=ypos(i)+yinc
         If xpos(i)<0 Then xpos(i)=0:cdir(i)=cdir(i)+2 _
          Else If xpos(i)>159 Then xpos(i)=159:cdir(i)=cdir(i)-2
         If ypos(i)<0 Then ypos(i)=0:cdir(i)=cdir(i)-1 _
          Else If ypos(i)>99 Then ypos(i)=99:cdir(i)=cdir(i)+1
         Call Pdraw(xpos(i),ypos(i),dotc(i))
       Next i
     Wend
     Call Rest
     System
```

Listing 2. *Lines — a pixel drawing program to demonstrate the undocumented low resolution graphics mode.*

```
Defint a-z
Def fnoffset(x,y)=160 * y + (x or 1)

     Call Setup
     While Inkey$ = ""
       dotcolor = int(rnd*16)
       n = Int(Rnd*50):m=Int(Rnd*50)
       Call Pdraw(80-n,50-m,dotcolor)
       Call Pdraw(80-n,50+m,dotcolor)
       Call Pdraw(80+n,50-m,dotcolor)
       Call Pdraw(80+n,50+m,dotcolor)
       Call Pdraw(80-m,50-n,dotcolor)
       Call Pdraw(80-m,50+n,dotcolor)
       Call Pdraw(80+m,50-n,dotcolor)
       Call Pdraw(80+m,50+n,dotcolor)
     Wend
     Call Rest
     System
```

Listing 3. *Scatter — this program will give a kaleidoscope display with 16 lines bouncing around the screen leaving coloured trails.*

graphics symbols can be created with this method, and dedicated editors exist which help the process along.

Programmable characters have the superiority of being faster and simpler than plotting and drawing shapes, characters and graphics. However, as with most things in life, there are disadvantages: for example, they have to be located within a particular character position. This can be overcome on some computers by fixing the graphics system so that it prints characters onto the graphics screen in any dot position.

As a general rule, programmable characters can be displayed in only one shade or colour. By setting the background as transparent, though, some systems can overlap many layers to produce multiple coloured character blocks. On some graphics machines, such as the Commodore 64, automatic sprites are even possible. They are similar to programmable characters but contain a higher degree of flexibility. After specifying the direction, speed and distance, the computer moves the sprite without erasing the background. Automatic collision detection between sprites also exists.

In most cases, the characters are stored in strings and printed onto the screen whenever their services are required. Control Characters to locate these symbols anywhere on the screen are generally included. Animation is achieved by displaying one character and then switching to the next one, and the next, and so on. Movements can be generated by switching between transparencies.

Flying Bird Program

In Figure 2, you can see what has been done to the basic bird character . . . it has been moved forward step by step with its wings moving one pixel along each time, so that the animation appears smooth. It's not necessary to keep a character rigid.

The first thing you notice about the program is the heavy use of data (which is 'check-summed to reduce errors). The data is read and converted into symbols or programmable characters. The commands and technique differs slightly from machine to machine.

The characters are then stored in an array following the order that they are shown in.

The method of display here is: move to one location, display eight frames, move to the next location and display the next eight frames, and so on. This culminates in the creation of a life-like flying bird.

Next, we'll examine more sophisticated techniques to speed up animation. □

SizeA

Ron Lyth, President of the Melbourne PC Users Group, has donated this handy utility to the Public Domain — it tells how much space files to be copied would occupy on the target drive (and if there's room).

WE AT PENNY-FARTHING Programs had a problem which, I am sure, is shared by most users. When we wanted to copy a number of programs from one place to another, we could not easily determine whether there would be sufficient space on the destination drive.

The problem arises because of differing ways in which MS-DOS accounts for the space used on mass-storage devices. As MS-DOS is device independent, all the standard functions for accessing disk drives ignore the physical layout of the device, thereby ensuring that the use of the function calls is transparent. The problem is that this approach (the old ostrich technique) works superbly until it doesn't, and then all hell breaks loose.

MS-DOS maintains, in each directory entry, the size of the file and this is stored as two 2 2-byte unsigned binary integers stored with the high order byte-pair last. Thus a 10-byte file would be stored as 0A,00,00,00 hex, and most utilities would add this value to the total number of bytes to be copied. Unfortunately, DOS cannot allocate space in very small quantities, with the usual minimum allocation being 1 kilobyte for diskettes, 2 Kbyte for DOS 3.xx hard disks and 8 Kbyte for DOS 2.xx hard disks. To copy 100 bytes in 10 files of 10 bytes each would require either 10, 20 or 80 Kbytes of space on the target drive!

We therefore thought that, before you go ahead and copy your files, it would be nice to have a little program which would tell you how much space the files to be copied would occupy on the target drive, and to also tell you how much space was available on that drive. That's what this program and article are all about.

DOS Function Calls

MS-DOS (PC-DOS too) provides a number of useful functions which can be accessed from Turbo Pascal using the MsDos procedure which in turn requires the standard register record type declaration to be used. If you are not familiar with this level of Turbo Pascal programming don't worry, I will try to explain all.

In checking out the DOS function calls, the most likely to be useful were: 36 Hex (to determine available space on the destination drive), 4E Hex (to find the first match of a file and path specification), and 4F Hex (to find subsequent matches of the same specification).

Both 4E and 4F communicate via a DTA (Disk Transfer Area) which is located by default at offset 80 Hex from the program's code segment address. For this program I wanted to set a dummy DTA in Turbo's data space, so it was necessary to

```
type
   str12 = string[12];
   str64 = string[64];
   str80 = string[80];
   dtarec = record
               slab1:array[1..26] of byte;
               sizelo,
               sizehi:integer;
               slab2:array[1..13] of byte;
            end;
   regrec = record
               ax,bx,cx,dx,bp,
                si,di,ds,es,flags:integer;
            end;
var
   regs:regrec;
   dta:dtarec;
   fname:str80;
   dest:str80;
   sourcesize,destsize:real;
   clustersize,allocsize:real;
   numfiles:integer;

procedure incr(var n:integer);
begin
   n:=n+1;
end;

procedure heading;
begin
   writeln;
   writeln('  SizeA - from Penny-Farthing Programs.');
   writeln('Copyright 1987, Penny-Farthing Programs.');
   writeln;
end;

procedure errormsg(msg:str80);
begin
   heading;
   writeln('   ERROR DETECTED');
   writeln(msg);
   writeln('   Please try again.');
   halt;
end;
```

SIZEA

THE COPYRIGHT for SizeA is held by Penny-Farthing Programs. The program may be used for any purpose other than for profit or gain provided that the copyright notice is displayed in full. Penny-Farthing Programs would welcome your comments which can be directed to Ron Lyth, (03) 890 5003, or via *Your Computer*. This article (including the listing) is available for downloading from our Bulletin Board.

also include DOS call 1A Hex to set the DTA address.

The DTA is an interesting beasty and, for the purpose of this exercise, only the two binary integers were required. The declaration of the dtarec type -

```
"type
  dtarec = record
             slab1:array[1..26] of byte;
             sizelo;
             sizehi:integer;
             slab2:array[1..13] of byte;
           end;    "
```

— followed by declaring the variable 'dta' as type dtarec provides us with the prime structure for the program. Function 4E loads the dta with details of the first file found, while 4F overwrites certain areas, including the size data, with the values corresponding to subsequent files found. The use of Turbo Pascal for this purpose, while providing a simple and clean interface between DOS and the application, suffers from the fact that, while DOS uses unsigned integers, Turbo is limited to signed integers. To overcome this limitation, it is necessary to perform all calculations using real variables, hence the number of real declarations.

We now have a structure which can be used in an appropriate loop to count the number of files and their space requirements. Before we get this far we need to know about the destination drive; in particular, how big is its minimum space allocation unit, and how many of them are free. DOS call 36 provides all this data and the procedure, findspace, sets the global real variables, allocsize, clustersize and destsize. For further explanation of individual DOS functions, refer to the *DOS Technical Reference*, Peter Norton's *Programmer's Guide to the IBM PC*, or *Advanced MS-DOS* by Ray Duncan. The last two titles are from Microsoft Press, while the first should be carried by your PC supplier.

To simplify program design and usage, it was decided to utilise the ability of DOS to pass a set of command line parameters to a program. The paramstr and paramcount facilities of Turbo Version 3 enable this to be done easily, and it is a simple task to check for the correct usage. If the number of parameters is not correct, the program hands control to procedure CorrectUsage which displays the correct usage and returns to DOS for you to try again.

Getfiles

The bulk of the work is done within getfiles. The first requirement is to set the system DTA address to point to the dta

```
    procedure sourcesum(sizelo,sizehi:integer);
    var
       r,r1,r2:real;
    begin

    r:=sizelo*1.0;
    if r<0.0 then r:=r+65536.0;
    r1:=r/allocsize;
    r2:=int(r1);
    if r2<r1 then
       r2:= r2 + 1.0;
    r:=r2 * clustersize;
    sourcesize:=sourcesize+r;
    r:=sizehi*1.0;
    if r<0.0 then r:=r+65536.0;
    sourcesize:=sourcesize+
         (r*65536.0)/allocsize;
end;

function getfiles(var
        fname:str80;var dta:dtarec):boolean;
var
    found:boolean;
    r:real;
begin
    with regs do
    begin
       ds:=seg(dta);
       dx:=ofs(dta);
       ax:=$1A00;
       msdos(regs);
       fname[length(fname)+1]:=chr(0);
       ds:=seg(fname);
       dx:=ofs(fname)+1; { avoids the length byte }
       cx:=0;
       ax:=$4E00;
       msdos(regs);
       if(flags and 1)>0 then
       begin
          if ((ax=2)or(ax=18)) then
             errormsg
                 ('No files were found
                       to match your file specification.');
          if ax=3 then
             errormsg('The path you specified
                           was not found.');
       end;
       found:=true;
       incr(numfiles);
       sourcesum(dta.sizelo,dta.sizehi);
                                                repeat
          ax:=$4F00;
          msdos(regs);
          if ax<>18 then
          begin
             incr(numfiles);
             sourcesum(dta.sizelo,dta.sizehi);
          end;
       until ax=18;
    end;
    getfiles:=true;
end;
```

```
procedure findspace(dve:char);
var
   dvno:integer;

begin
   dve:=upcase(dve);
   dvno:=ord(dve)-64;
   with regs do
   begin
      dx:=dvno;
      ax:=$3600;
      msdos(regs);
      if ax=$FFFF then
         errormsg
           ('The destination drive
                specification is invalid.');
      allocsize:= (ax * 1.0) * (cx * 1.0);
      clustersize:=allocsize / 1024.0;
      destsize:=(bx*1.0)*clustersize;
   end;
end;

procedure correctusage;
begin
   heading;
   writeln('Correct usage is -
                : SIZEA <D:PATH\FNAME> <D:>');
   writeln('where the files to be copied
                are specified first and then');
   writeln('the target drive name
                is specified.  Try again...');
   halt;
end;

begin
   sourcesize:=0.0;
   destsize:=0.0;
   numfiles:=0;
   if paramcount<>2 then
      correctusage;
   fname:=paramstr(1);
   dest:=paramstr(2);
   dest:=copy(dest,1,1);
   findspace(dest);
   heading;
   if getfiles(fname,dta) then
   begin
      writeln('You want to copy ',
                sourcesize:8:0,' Kbytes in ',
                numfiles:3,' files.');
      writeln('The destination has',
                destsize:8:0,' Kbytes available.');
   end
   else
      writeln('Sorry but there were
                no matching files found.
                Try again.');
end.
```

Listing 1. *SizeA tells how much space files to be copied would occupy on the target drive, and how much space is available on that drive.*

variable space we have set aside. This is achieved by assigning the segment and offset for the dta variable to the ds and dx registers respectively and then executing DOS call 1A as follows –

```
"   with regs do
    begin
       ds:=seg(dta);
       dx:=ofs(dta);
       ax:=$1A00;
       msdos(regs);    "
```

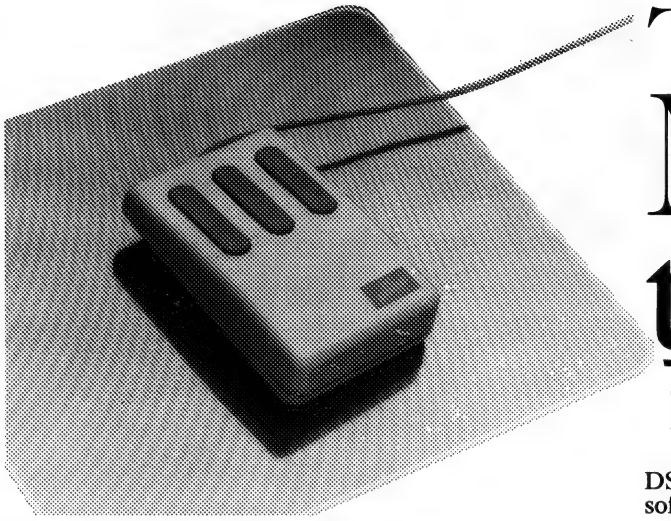
The next four lines set the registers for the 'find first match' routine. There is need for a little gymnastics to get the path string in an acceptable format. As you should know, Turbo Pascal strings are really an array of characters with the 0th element set to the binary value of the string length. DOS and many other programming languages (including C) use a different format known as ASCIIZ, where the string is terminated by the null character (ASCII value 0). This bit of code loads a null at the end of the string and then sets dx to point to the 1st character rather than the length byte. The value of 0 assigned to cx ensures that all normal files will be searched for —

```
"fname[length(fname)+1]:=
    chr(0); {sets ASCIIZ termination}
 ds:=seg(fname);
 dx:=ofs(fname)+1;
 cx:=0;     "
```

The next bit of code executes the call and tests the return conditions. An error is indicated by setting the carry flag. This is the 0th bit and the value for 'flags and 1' is 0 if the carry is not set and 1 if it is. The error values returned are 2, 3 or 18 and appropriate error messages are set for display in the errormsg procedure.

```
"  ax:=$4E00;
   msdos(regs);
   if(flags and 1)>0 then
   begin
     if ((ax=2)or(ax=18)) then
        errormsg('No files were found
              to match your file
                 specification.');
     if ax=3 then
        errormsg('The path you specified
                    was not found.');
   end;       "
```

The next section of code increments variables appropriately, while procedure sourcesum increments sourcesize in units of allocsize. After this we continue to find next files using function 4F until a return value of 18 indicates that there are no more matches. The getfiles function returns control to the main line and the results are displayed. □



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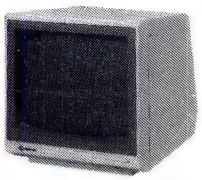

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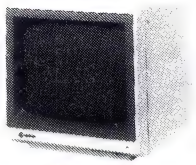

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Impedance: 75ohm, more than 6·8K ohm
Scanning frequency:
Horizontal: 15.75 KHz + – 0·1%/18·432KHz + – 0·1%
Vertical: 47-63Hz
Video bandwidth: 20MHz
Active display area:
Composite: 206(H) x 160(V)mm.
TTL: 216(H) x 160(V)mm
Display character: 80 characters 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.
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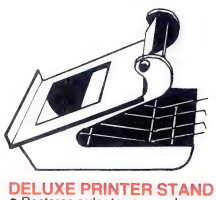

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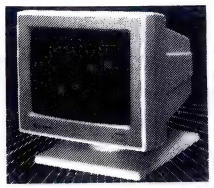

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Phosphor: Available in Green or Amber
Video input signal: Composite Signal
Polarity: Negative Sync
Level: 0·5-2·0Vp-p
Impedance: 75ohm
Scanning frequency:
Horizontal: 15.734 KHz + – 0·1%
Vertical: 50-60Hz
Video bandwidth: 20MHz
Active display area: 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
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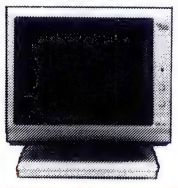

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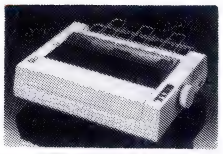
Stylish monitors available in green or amber displays and featuring swivel base that tilts forward and back 30 degrees and swivels right to left 60 degrees!

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.

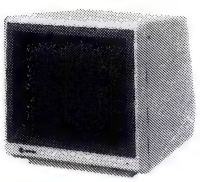
Green Cat. X14506..**Normally $235**
Amber Cat. X14508..**Normally $239**
NOW ONLY $169



PANASONIC KX-P1081 DOT MATRIX PRINTER

- 120 C.P.S.
- Pica or Elite character set
- Print Modes: NLQ, Dot Graphics, Proportional Font, Draft.
- Proportional Printing
- Reliable and Compact
- Proportional Printing
- Logic Seeking
- 1K Printer Buffer

Cat. C20035 ..... **only $595**



SAMSUNG TTL 12" MONITOR

- High contrast, non-glare screen
- Excellent value for money!

SPECIFICATIONS:
Picture tube: 12" diagonal 90° deflection
Mode: TTL
TTL input signal:
Polarity: TTL Positive
Level: 4V p-p + – 1·5V
Impedance: 75ohm
Video bandwidth: 16MHz (– 3dB)
Scanning frequency:
Horizontal: 18·432 + – 0·1KHz
Vertical: 50HZ + – 0·5%
Active display area: 216(H) x 160(V)mm
Display characters: 80 characters x 25 lines
Input connector: 9 pin connector
Controls:
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**

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)

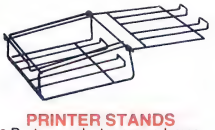
X14525 ..... **$895**

SAKATA 13" RGB COLOUR MONITOR

High quality IBM* compatible monitors, great with VCR's too!

SPECIFICATIONS:
CRT: 13", 90° deflection colour
Input Signal:
Video Signal: Separate video signal
Video: Positive
Sync.: Positive
Input Level: TTL Level
Scanning Frequency:
Horizontal: 15.7KHz
Vertical: 60Hz
Display Size: 245(H) x 182(V)mm
Resolution:
Horizontal: 640 dots
Vertical: 200 lines
Size: 343(H) x 362(W) x 421(D)mm
Weight: 11.6kg

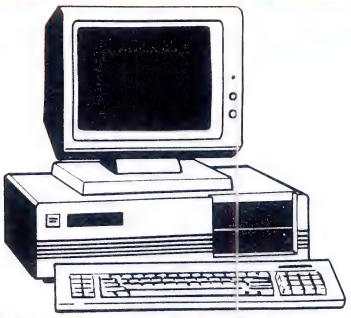
Cat. X14530 ..... **$695**



PRINTER STANDS

- Restores order to your work area.
- Conveniently stacks paper printout in document tray automatically
- Made of black plastic coated steel
- Suitable for most printers
- Excellent value at these prices!

C21054 (80 column) **$26.95**
C21056 (132 column) **$36.95**



IBM* XT* COMPATIBLE COMPUTERS $795*

Check these features and our prices. We're sure you'll agree they're exceptional value for money!

- **Assembled in Australia!**
- **Tested by us for 24 hours prior to delivery!**
- **150W power supply**
- **AT* style keyboard**
- **8 Slot motherboard**
- **6 months warranty!**

(Switchable 4·77/8MHz Turbo versions available for an extra $50)

* $795 COMPATIBLE COMPUTER

256K RAM Single Drive, Graphics and Disk Controller Card. **$795**

256K RAM COMPATIBLE COMPUTER

2 x 360K Disk Drives, Multifunction Card, Colour Graphics, Disk Controller, 1 Parallel Port. (Includes Timer Disk) **$945**

640K RAM COMPATIBLE COMPUTER

2 x 360K Disk Drives, Multifunction Card, Colour Graphics, Disk Controller, 1 Serial, 1 Parallel Port. (Includes Timer Disk). **$995**

WITH 20 M/BYTE HARD DISK:
& Single 360K Floppy Disk Drive ..... **only $1,595**
& Dual 360K Floppy Disk Drives ..... **only $1,795**

WITH 40 M/BYTE HARD DISK:
& Single 360K Floppy Disk Drive ..... **only $2,295**
& Dual 360K Floppy Disk Drives ..... **only $2,495**

WITH 80 M/BYTE HARD DISK:
& Single 360K Floppy Disk Drive ..... **only $3,795**
& Dual 360K Floppy Disk Drives ..... **only $3,995**

IBM* AT* COMPATIBLE $2,795

Assembled & Tested in Australia!

- 1 M/Byte Main Board
- 1.2 M/Byte Floppy Disk Drive
- Colour Graphics Display Card
- Floppy & Hard Disk Controller
- Printer Card and RS232
- 200W Power Supply
- 6 MHz
- 80286 CPU
- 8 Slots
- 20 M/Byte Hard Disk
- Keyboard
- 6 Months Warranty

IBM* BABY AT* COMPATIBLE .. $2,495

- 1 M/Byte Main Board
- 1.2 M/Byte Floppy Disk Drive
- Colour Graphics Display Card
- Floppy & Hard Disk Controller
- Printer Card and RS232
- 200W Power Supply
- Switchable 8/10/12 MHz
- 80286 CPU
- 8 Slots
- 20 M/Byte Hard Disk
- Keyboard
- 6 Months Warranty

Dimensions: 360(W) x 175(H) x 405(D)mm

TELECOMMUNICATIONS AUSTRALIAN STYLE ADAPTOR CABLE

- Australian socket to plug/socket
- Length 10 metres

Cat. Y16015 ..... **$14.95**

COPY HOLDER (YU-H32)

- Adjustable arms allows easy positioning
- Copy area 9½" x 11"
- Sliding line guide
- Clamp mounting

C21062 ..... **$39.95**

PRINTER RIBBONS

CP80, BX80, DP80, BX100, MB100
ALL A CRAZY LOW $9.95

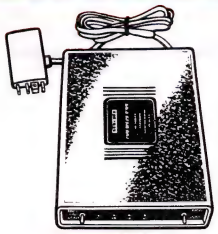
PRINTER RIBBONS TO SUIT EPSON MODELS...

MX100, FX100, RX100
(Cat. C22002) **$19.95**
MX70/80, FX70/80, RX70/80
(Cat. C22031) **$10.95**

COPY HOLDER (YU-H33)

- Copy area 9½" x 11"
- Sliding line guide
- Flat metal base

C21060 ..... **$39.95**



SENDATA DIRECT CONNECT MODEM

- CCITT V21 300 baud full duplex
- CCITT V23 1200/75
- Bell 103 300 Full duplex
- Bell 202 1200 Half duplex
- Auto answer
- LED display for Power, TX, RX, CD
- AC power adaptor included
- DB25 pin connector
- Telecom Approval N°.C83/37/1045

Cat. X19120 ..... **$295**
(SOFTWARE FOR VIATEL ... $95)

PRINTER LEAD FOR IBM*

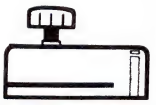
- Suits IBM* PC XT and compatibles
- 25 pin "D" plug (computer end) to Centronics 36 pin plug

Cat.P19029 1.8 metres .. **$17.95**
Cat.P19030 3 metres **$22.95**

HEAD CLEANER DISKS

It only takes a minute amount of dust, dirt or magnetic oxide particles on your drive heads to cause problems: errors, downtime or an expensive service call. Regular use of a head cleaner will keep your drive free of trouble causing dirt and help keep your system up and running. These disk cleaners are simple to use, and include cleaning solution and instructions.

CAT.No.	SIZE	PRICE
C12560	3½"	$6.95
C12555	5¼"	$6.95
C12851	8"	$14.95



DISK NOTCHER

Converts 5¼" single sided floppy disks to double sided by placing an appropiate notch in the floppy disk jacket.

C21070 ..... **$9.95**

VERBATIM DISK SPECIALS!

All prices 10 disk boxes!

Description	1-9 boxes	10+boxes
3½" 1S/2D	$44.95	$42.95
3½" 2S/2D	$46.95	$43.95
5¼" 1S/2D	$22.00	$21.00
5¼" 2S/2D	$26.00	$24.00
5¼" 2S/4D	$75.00	$70.00
5¼" 2S/HD	$42.95	$41.00

MICRODOT 5¼" DISKS!

DESCRIPTION	1-9 BOXES	10+ BOXES
5¼" S/S D/D	$12.95	$11.95
5¼" D/S D/D	$13.95	$12.95

(SEND $2 FOR SAMPLE DISK!)

"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 $0.85 EACH!!

10+DISKS	100+DISKS	1,000+DISKS
$9·50ea	$9ea	$8.50ea

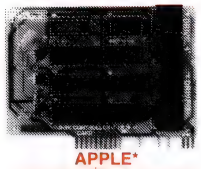
(ALL PRICES PER 10 DISKS. TAX EXEMPT PRICES LESS $1)

3½" "NO BRAND" DISKS!

10+DISKS	100+DISKS	1,000+DISKS
$29	$28	$27

(ALL PRICES PER 10 DISKS. TAX EXEMPT PRICES LESS $4)

Get more for your dollar with Rod Irving Electronics!



APPLE* COMPATIBLE CARDS

STOCK RUN OUT! BE QUICK TO CATCH THESE BARGAINS!

PRINTER CARD
Cat. X17029 ..... **ONLY $49**

DRIVE CARD
Cat. X17019 ..... **ONLY $55**

80 COLUMN CARD
Cat. X17025 ..... **ONLY $69**

SUPER SERIAL CARD
Cat. X17035 ..... **ONLY $79**

Z80 C/M CARD
Cat. X17041 ..... **ONLY $59**

APPLE* IIe COMPATIBLE CARDS

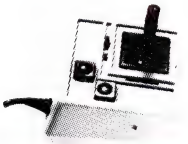
80 COLUMN/64K CARD
Cat. X **$99**

APPLE* COMPATIBLE SLIMLINE DISK DRIVE

Compatible with Apple 2+
Cat. X19901 ..... Normally $225
SPECIAL $179

APPLE* IIC COMPATIBLE DISK DRIVE

(including cable ..... **only $199**



JOYSTICK FOR IBM

Features Selectable "Spring centering" or "free floating". Electrical trim adjustments on both axis. 360 degree cursor control

Cat. C14205 ..... **$39.95**

3¼" 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**

SEMICONDUCTORS!

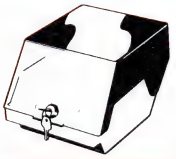
Always check our prices before you buy!

	1-9	10+	100+
MX232	$11.50	$10.50	
V-20 8MHz	$14.95	$13.95	
V-30	$39.95	$34.95	
TEA2000...	$11.95	$10.95	$9.95
ZN429	$9.95	$8.95	$7.95
ZNA234 ...	$39.50	$37.50	$36.50
SAB6456...	P.O.A.		
2114	$2.95	$2.75	$2.50
2716	$9.95	$9.50	$8.95
2732	$8.95	$8.50	$7.95
2764	$7.95	$7.50	$6.95
27128	$9.95	$8.95	$7.95
27256	$11.50	$10.50	$10.00
27512	$19.50	$18.50	$17.50
4116	$3.95	$3.50	$2.95
4164	$1.95	$1.85	$1.75
41256-150.	$5.95	$5.50	$5.25
41256-100.	$9.95	$9.75	$9.50
555 8 pin	$0.50	$0.40	$0.35
6116	$3.95	$3.75	$3.50
6264	$7.95	$6.95	$6.50
6802	$5.00	$4.00	$3.75
6821	$2.00	$1.80	$1.70
6845	$5.00	$4.00	$3.75
7406	$0.40	$0.30	$0.25
INS8250	$29.95	$27.95	
NE5534AN	$1.95	$1.85	$1.75
AM/EF7910	$19.95	$18.95	
MEL9501	$29.95	$27.95	
SC141D ...	$1.75	$1.50	
SC151D ...	$2.50	$2.25	
555	$0.40	$0.38	
741	$0.50	$0.45	

8087

Genuine Intel chips with manual and data sheets packed in boxes!

8087-3 (4.77MHz) **$269**
8087-2 (8MHz) **$385**
8087-1 (10MHz) **$585**
80287-6 (6MHz) **$475**
80287-7 (8MHz) **$679**



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**

5¼" DISK STORAGE (DD100-L)

Efficient and practical. Protect your disks from being damaged or lost!

Features...
- 100 x 5¼" disk capacity
- Smoked plastic hinged lid
- Lockable (2 keys supplied)
- High impact ABS plastic base.
- Contemporary design

C16020 ..... **only $19.95**

JUMBO 5¼" DISK STORAGE (DD120-L)

If you have lots of disks, you'll appreciate the extra capacity of this disk storage unit when it comes to locating a particular disk.

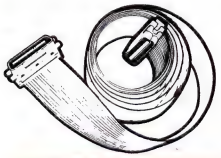
Features...
- 120 x 5¼" disk capacity
- Smoked plastic hinged lid
- Lockable (2 keys supplied)
- High impact plastic base

C16028 ..... **only $24.95**

3½" DISK STORAGE (DD80-L)

- Holds up to 80 x 3½" diskettes.
- Smoked plastic hinged lid
- Lockable (2 keys supplied)
- High impact plastic base
- Contemporary design

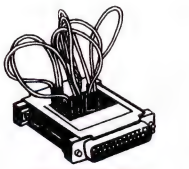
Cat. C16038 ..... **only $24.95**



IBM* FLOPPY DISK DRIVE EXTENSION CABLE

- DB37 Male to 34 way edge connector
- Length 0·5 metres

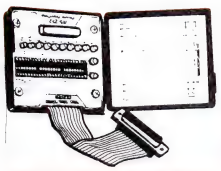
P19045 ..... **$95**



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 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**

RS232 FAST CABLER

Makes RS232 interface configurating fast and simple. 3 slide switches enable line swapping functions, positive and negative voltages are displayed on 6 tricolour LED's.

SPECIFICATIONS:
Connector: DB25 plug on 100mm cable and DB25 socket on 100mm cable.
Indicators: Tricolour LED's for pins 2(TD), 3(RD), 4(RTS), 5(CTS), 6(DSR), 20(DTR).
Switches: 3 Slide switches to swap leads.
Power: Interface power.
Enclosure: Black, high impact plastic
Dimensions: 85 x 95 x 30mm

X15710 ..... **$145**

Rod Irving Electronics

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425 High St, NORTHCOTE
Phone (03) 489 8866

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(03) 543 7877

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$10	$24.99	$3.00
$25	$49.99	$4.00
$50	$99.99	$5.00
$100	$199	$7.50
$200	$499	$10.00
$500 plus		$12.50

The above postage rates are for basic postage only. Road Freight, bulky and fragile items will be charged at different rates.

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NEW PRODUCTS

Software

Attache4

Attache Software
Phone: (02) 929 8744
Price: $999

The Attache range of accounting software for the IBM and compatibles is now available for the Apple Macintosh. Known as Attache4, it helps in the control of customer details with automated invoicing, statements, credit control and sales analysis, as well as controlling product, stock, and suppliers. A general ledger is featured. A free demonstration disk is available.

Ann Court Computer Services

Beekeeper II

Ann Court Computer Services
Phone: (03) 580 6424
Price: See below

A new version of the Beekeeper accounting package has been released by Ann Court Computer Services. Originally designed to run on Microbee CP/M 80 systems, the Beekeeper II now runs on the IBM PC, XT and compatibles. The latest version incorporates an integrated Cashbook facility, together with the Profit/-Loss and Balance Sheet. Pricing starts at $80 for the Cashbook, $96 for the accounting system or $126 for both as an integrated system. Sales tax and air mail postage included.

ASHTON·TATE

Byline

Ashton-Tate/Imagineering
Phone: (02) 697 8666 (Imagineering)
Price: $595 taxed

A desktop publishing package for the IBM PC has been released by Ashton-Tate. The package, known as Byline, will be distributed in Australia by Imagineering (phone number above). Byline is designed for users with no special knowledge of graphic arts and typography.

It includes a dBase merge feature that enables users to import dBase III+ databases into prestyled forms. It can also import and export files created by Multimate, WordPerfect, WordStar and Lotus 1-2-3. Byline operates on the IBM PC and 100 per cent compatibles with 384 kilobytes of RAM. It requires a CGA, Hercules, Hercules Plus or EGA graphics card and features WYSIWYG displays. Other features include adjustable type sizes from 8 to 144 point, a choice of 5 fonts, rules and borders, autoleaders and repeating characters, automatic kerning, multiple right and left master pages and automated text flow. Suggested applications include sales and marketing material, reports, memos and newsletters.

---

db/Lib

TCF Computer Systems
Phone: (02) 938 2522
Price: $395

db/Lib is a complete set of routines written in Assembly; the routines are designed to manage database and B-tree index sequential files from programs written with Microsoft's Quickbasic.

The package lets you combine Basic with the functionality of relational database management to develop business applications. db/Lib handles three kinds of files for applications programs: database, index sequential and memo text files. It eliminates the need for many Basic statements and replaces them with Call routines. This allows the programmer to create relational database file structures, access fields relationally by field names and manage over 4 billion bytes per file.

db/Lib conforms to dBase III's DBF, NDX and DBT file formats.

Expression

Canon
Phone: (03) 677 088
Price: Not supplied

Canon has released the Expression program for desktop publishing. Expression can be used to write and edit documents, insert pictures, switch typefaces and lay out pages. There are more than 100 typefaces to choose from. The system includes spelling checker and thesaurus functions.

According to Canon, the Expression package had been integrated with the A-200 EX computer, the new laser beam printer and the image scanner to form the Canon Express Desktop Publisher package. Expression uses WordStar commands, overcoming the need for operators to learn a new set of commands.

Generic CADD 3.0

CVA Computer and Peripheral Sales
Phone: (02) 476 6400
Price: $235 (central core only — taxed)

Generic CADD 3.0 is a full featured computer aided drafting and design package for IBM PCs and compatibles. The package has a central core plus a range of enhancement modules. The central core is all that is required to produce architectural and engineering drawings, floor plans, flow charts and business graphics. Those who require more facilities can add them via a range of productivity modules. These packages integrate fully with the core module and offer such enhancements as support for dot matrix and laser printers, auto dimensioning, drafting enhancements and auto conversions of files to Drawing Exchange Format.

Imagemaster Version 2

Personal Computer Software
Phone: (02) 923 2899
Price: $888

Personal Computer Software has released Imagemaster Version 2. Imagemaster is a PC Software system for image capture, forms design and page make-up. It requires a copy of Wordcraft running on an IBM XT, AT, PS/2 or compatible with at least 512 kilobytes of RAM with a mouse installed. It supports the Canon Laserbeam A2 or Series 2, Hewlett-Packard LaserJet Plus or Series 2 and Kyocera printers. The latest version has an extensive range of new features including on-line help, tutorials and an image library.

INGRES dBase Gateway

Relational Technology
Phone: (02) 439 6966
Price: Not supplied

A SQL relational database and forms system that allows users to manipulate data in dBase .DBF files as though they were actually relational tables has been released. Known as the INGRES dBase Gateway it allows users to run existing dBase applications and new 4GL applications with the same data. The product provides an easy migration path from dBase. It provides access to dBase files in the PC and MS-DOS environment using industry standard SQL.

Lotus 1-2-3 for the Mac

Lotus Development

Lotus Development has announced that it will be developing a new version of its successful Lotus 1-2-3 program for the Apple Macintosh. The announcement was made concurrently with Apple Computer at Apple's international sales conference held recently in the US. Details regarding the availability of Lotus 1-2-3 for the Mac will be announced in the second half of 1988. Lotus also announced that it would be releasing Modern Jazz in Australia after the first quarter of 1988.

FLETCHER DP SERVICES PTY. LTD.

POMS

Fletcher DP Services
Phone: (03) 537 2811
Price: See below

An enhanced version of POMS (Professional Organisation Membership System) has been released. The new release of POMS has an enquiry facility that ensures all reporting requirements are met. POMS also has a range of management and financial reports. It will run on any machine that supports MS-DOS,

CP/M or TurboDOS. A minimum of 128 kilobytes of RAM is needed. POMS can be used to store members, professional and financial details. A single user version is priced at $1750, while the multi user version is $2250. A demonstration version is available for $40.

Q&A Write

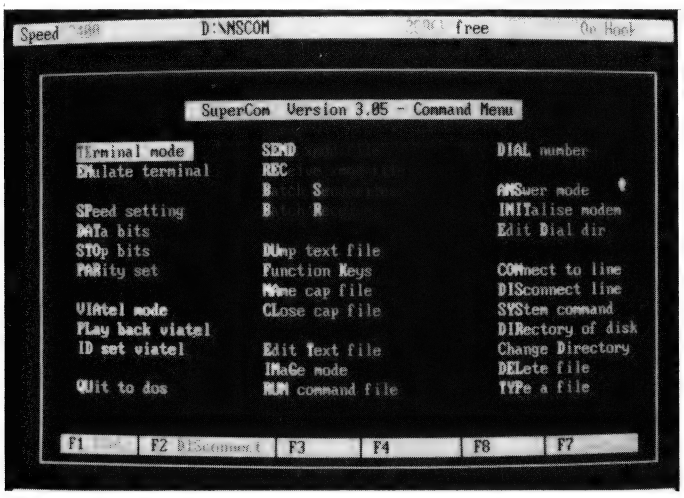
PC Extras
Phone: (02) 319 2155
Price: $377 (taxed)

PC Extras is now shipping the enhanced, standalone version of Q&A Write. It is an easy to use wordprocessor with laser printer support and integration with Lotus 1-2-3. Lotus can be run from within Q&A and spreadsheets can be imported directly into the wordprocessor for editing. A 'cardbox' style database and flexible mailmerge are builtin. A wide range of document importing facilities are also available and the wordprocessor will export in DCA or ASCII formats. ▼

SuperCom Executive Version 3.04

Logo Computer Centre
Phone: (02) 819 6811
Price: $199 (taxed)

SuperCom Executive has been significantly enhanced and the latest version is now available. New features include an easy to use 'point and shoot' screen for autodialling and password protection in ANSwer mode. It now supports the latest full Ymodem and Ymodem Batch specifications. Builtin diagnostics locate problems in communications setups. Using the Script facility, now SuperCom will automatically enter a particular terminal emulation when logging onto a remote source. ▼



TAS-Books

Business Tools Australasia
Phone: (08) 211 7922
Price: See below

An integrated suite of accounting software called TAS-Books and especially designed for small business users has been released. It has been written for Australian conditions and follows on from the success of the TAS+ accounting software.

The TAS-Books modules are General Ledger, Accounts Receivable and Invoicing, Accounts Payable and Purchase Orders, and Inventory Control. The accounts capacity is 65,000. Tas-Books is designed for the IBM PC, XT, AT or compatibles running MS-DOS Version 2.0 or or higher. One floppy disk (5¼ or 3½ inch) and a hard disk, as well as a minimum of 384 kilobytes of RAM are required. The system works with any 80 or 132 ASCII printer. TAS-Books sells for $699; with an optional relational database and source code the product costs $899.

VP/ix

Blue Sky Industries
Phone: (02) 419 5799
Price: See below

Intel '386 based microcomputers running SCO Xenix 386 will soon be able to run DOS as a task under Xenix by using the Xenix operating system extension VP/ix. It permits multiple DOS and Unix/Xenix applications to run concurrently from the system console under the control of the virtual screen manager. Pricing for two user version is $1182, multi purpose version $2202. All prices taxed.

Wordcraft 3

Personal Computer Software
Phone: (02) 923 2899

Personal Computer Software has announced that Wordcraft 3 now fully supports the Kyocera laser printer being marketed in Australia by Imagineering. Many different fonts and point sizes are available as well as the ability to include graphic images such as diagrams, graphs, illustrations and so on in the text. Wordcraft also supports Hewlett-Packard and Canon Laser printers.

WordStar

WordStar2000+ Release 3 Personal Edition

WordStar
Phone: (02) 411 7255
Price: $575 (untaxed)

WordStar is now available for desktop publishing purposes. WordStar Australia has released WordStar 2000+ Release 3 Personal Edition. Word processing, graphics, multiple typestyles and printing capabilities have been combined in WordStar 2000+ Companion software programs. Fill-A-Form helps users fill in preprinted forms while ShowText allows the creation of display material. The package runs on all IBM PCs and compatibles, as well as the PS/2 systems. It supports IBM CGA/EGA monochrome adaptors and a variety of printers.

Microsoft

Works 1.1

Microsoft
Phone: (02) 452 5088
Price: See below

A new version of Microsoft Works, Version 1.1, now supports the Apple Macintosh II and Appleshare. Version 1.1 also includes DEC VT 52 and VT 100 emulation.

Works is a set of four integrated business tools: a wordprocessor, spreadsheet, database and communications package. It requires a minimum of 512 kilobytes of memory. Works is priced at $495 (untaxed), with the update costing $25. The update is free of charge to owners who purchased works after 15 September, 1987.

New Machines

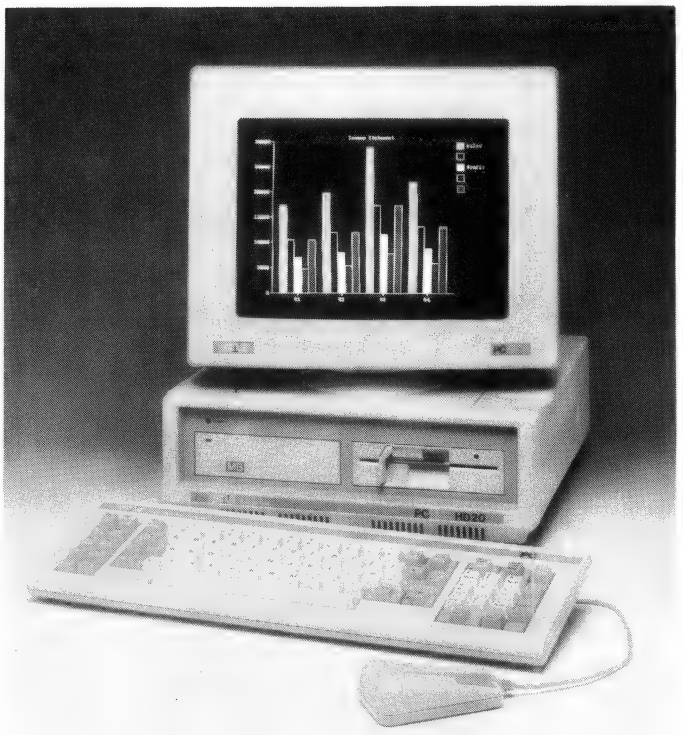
386 Express
Dicker Data
Phone: (02) 525 2122
Price: See below

Dicker Data has released an IBM compatible machine utilising an 80386 CPU running at 16 MHz. According to Dicker, this is equivalent to an 80286 running at 20 MHz. The 386 Express is switchable to 6 or 8 MHz if required. Standard RAM is 1 megabyte expandable to 2 Mbyte. The base memory plugs into a 32-bit memory data bus, compatible with the Compaq 386 system. An optional 2 or 4 Mbyte RAM piggy back expansion is offered. It includes 6 AT expansion slots, 1 parallel and 2 serial ports. Pricing starts at $5295 (taxed). Options extra.

Amstrad PC 1640 ▶
Mitsubishi Electric AWA
Phone: (02) 638 8444
Price: See below

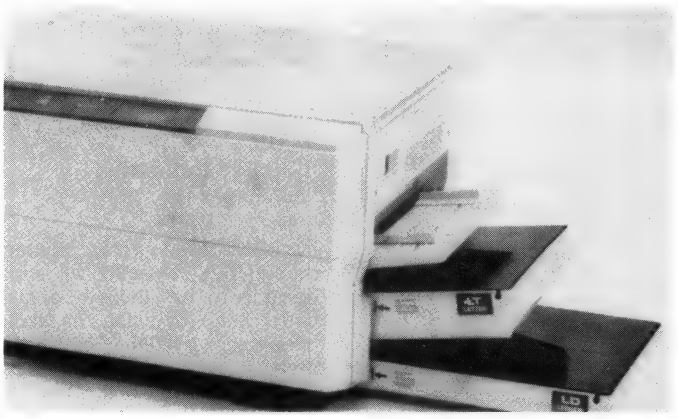
A new Amstrad PC has been released. The PC 1640 is IBM compatible and has an enhanced colour display. It comes complete with a mouse, MS-DOS 3.2 and GEM software. The PC 1640 comes in three configurations: a 20 megabyte hard disk, two 360 Kbyte 5¼ inch single floppy disks, or a single 360 Kbyte 5 1/4 floppy.

The motherboard includes RS232 serial parallel interfaces with standard connectors. It has 640 Kbyte of RAM, an 8 MHz 8086 microprocessor and an inbuilt Enhanced Graphics Adaptor as standard; it will also support Hercules graphics. It has three full expansion slots and a socket for an 8087 maths co-processor. Pricing starts at $1599 to $3699 for 20 Mbyte version. All prices taxed.



LZR-2665 ▶
Logo Computer Centre
Phone: (02) 819 6811
Price: Not supplied

Logo Computer Centre has been appointed distributor of the Dataproducts range of Postscript compatible laser printers. Its top of the range product is the LZR-2665. This printer prints 26 pages per minute with a maximum image area of A3 size paper in either portrait or landscape format. It has a resolution of 300 dots per inch. The LZR-2665 has a duty cycle of 80,000 pages per month.



Skai 386 computers
Porchester
Phone: (03) 537 2722
Price: See below

Porchester has released a range of '386 based machines. The Skai 386-20 runs at 20 MHz zero wait state clock speed while the Skai 386-50 runs at 25 MHz zero wait state. Both systems can be configured through the use of XT height memory boards to support 2 megabyte, 4 Mbyte, 8 Mbyte, 10 Mbyte and 16 Mbyte of 32-bit 0 wait state memory. The Skais come standard with dual serial ports and dual parallel ports. Graphics card used is CGA, EGA, MDA or Hercules. Skai 386-20 priced at $4000, Skai 386-50 at $9000. Prices are taxed.

Peripherals

Bit-slice processors
Texas Instruments
Phone: (02) 887 1122
Price: Not supplied

A new range of bit-slice processors from Texas Instruments (TI) are said by the company to outperform Intel's 80386 and Fairchild's Clipper in both speed and performance. Benchmarks rate the TI processors at up to 50 Mips — faster than the Intel chip by a factor of three or four, depending on the parameters of the comparative test.

Bit-slice processors currently being offered include 8-bit and 32-bit processors in both Bipolar and CMOS technologies. An 8-bit ECL family (50 Mips) is also now at the sampling stage. Bit-slice processors comprise an Arithmetic/Logic Unit (ALU) that can be cascaded to word widths in multiples of the single slice size. The present range from TI is suited to a number of applications including advanced workstations, as special purpose processors for graphics, and digital signal processing.

Endeavour 286 Board
Osborne Australia
Phone: (02) 290 1122
Price: $1150 (untaxed)

Osborne has released an AT mother board, the Endeavour 286 Board, designed to fit into slots occupied by standard motherboards. Onboard memory is a standard 1 megabyte. Osborne specified the Set Up instructions written into the board's Award Bios, version 3.01.

Bit Talk

IBM interfaces
Bit Talk
Phone: (03) 429 8844
Price: Not supplied

Bit Talk has announced a range

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MS-DOS software is suitable for IBM and close compatible systems. It is available in 5 1/4 and 3 1/2 inch format for all systems including the IBM JX and new PS2 series, as well as laptops. Some programs comprise more than one disk. This is noted .

Each disk is $10 for 5 1/4 inch format and $15 for 3 1/2 inch format. Prices are per disk and include sales tax. Postage and Handling is $3 per order.

MS500 SLIC WORKS: Excellent integrated Spreadsheet, Word Processer, database, and Communications package. easy to use and powerful. **TWO DISK SET**

MS502 PC-DESK: Great new program that allows you to keep addresses and use them for mail merge letters with its own built in word processer. Also includes calendar, dialler, and calculator!

MS510 COMPASS: Excellent integrated word processing, database, spreadsheet, and small accounting package, with interactive help! Great for home and business use!

MS1001 GALAXY: Fast RAM based word processer that has a wealth of features and is very easy to use thanks to its pull down menus.

MS1003 CHIWRITER: Excellent multi font word processer which allows you to view your fonts on screen and on your printer. Fonts include italics, script, greek, scientific, and mathematical symbols. Requires Epson or IBM graphics compatible printer.

MS1011 PAGEONE PUBLISHER: Great program for small desk top publishing needs. Allows you to format and print single page documents such as flyers, forms, etc.

MS1014 PCFOIL: Allows you to combine graphics with your word processing. Includes enhanced fonts, great for preparing any document were graphics can help get the point across.

MS1015 PC-OUTLINE: Excellent thought processing package. Allows you to outline and organise items and thoughts by constant rearrangement of items. Very useful for student and businessman alike.

MS1017 PC-STYLE: Very good writing style analysis tool. Determines the quality of your writing, and analyses it using a number of criteria. Great for students or anyone involved in any form of writing!

MS1018 EZ SPELL: New spelling checker program with its own large dictionary which can be added to easily.

MS1023 FREEFILE: Relational database management system which includes calculated fields, ability to import and export data easily, upto 10 indexes and 100 fields per database, online help, and more!

MS2025 SIDEFILE: Great new database/spreadsheet program with a million uses. Memory resident database allows upto 1000 record with very fast access. Enter data as database fields or free text. Allows you to perform spreadsheet functions on data easily. Includes sample files for chequebook and stock portfolio.

MS1043: ASEASY: Lotus compatible spreadsheet with very complete documentation on disk. Includes graphing, macros, financial and statistical functions, on screen help, and more!

MS1045: QUBECALC: Advanced spreadsheet for heavy users. True three dimensional spreadsheet with upto 262,144 cells! Very powerful.

MS2050 LOTUS BEGINNERS CLASS: Excellent tutorial on LOTUS 123 for new users. Includes number of sample files. Requires LOTUS-123.

MS1063 PC BOOKS GENERAL LEDGER: Easy to use menu driven general ledger program. Uses simple mnemonics for account codes instead of complicated numeric codes.

MS1069 MR BILL DEBTORS SYSTEM: Excellent debtors system for small to medium sized business. Capable of invoicing and statement generation, and wide range of reports on debtors. **TWO DISK SET.**

MS1076HOME ACCOUNTANT: Designed for the home book keeper who find a cheque book manager insufficient for their needs, but does not want to get involved with complex accounting systems. Very flexible package with upto 255 seperate accounts. Perform a net worth calculation in an instant.

MS2065 COSTBUSTERS CHEQUEBOOK: Chequeook maintenance program with 22 element menu which is very easy to use. Also maintains bills as well as all cheques including cancelled ones. Even reminds you when bils are due.

MS1081 MORTGAGE ANALYST: Excellent financial analysis package that allows you to evaluate loans using a number of criteria. More than mere amortisation. Allows you to produce your own financial plans.

MS1083 MSAV FINANCIAL ANALYSER: Interesting program in which you enter data about your income, expenses, economic climate etc and it prints out a report simulating your finacial future.

MS1091 PDS QUOTE: Prepare project quotations that can be expressed in terms of costs, including processing, materials, labor, and markup.

MS1097 PC-SELL: Point of sale system for retail outlets. Includes inventory, accounts receivable, and invoicing. Require hard disk for maximum effectiveness.

MS1100 RHM DESKTOP UTILITY: Excellent desktop utility, similar to sidekick. Memory resident. Provides appointment scheduler, text editor, DOS command interface, notepad, card filer and more all available from any program with the touch of a button.

MS1109 MAKE MY DAY: Great computerised time management system. Includes appointment calendar, job scheduler, time log, and expense account manager. Produces reports and worksheets.

MS1142 KWIKSTAT: Graphics oriented scientific statistical analysis program. Allows you to analyse data and produce it in text or graphical format. **TWO DISK SET.**

MS2150 FONTASTIC: Great printing program, uses dot graphics on Epson or compatible printers to print text in numerous fonts and sizes. Includes Roman, Script, and Rotated fonts in sizes from 8 to 24 point. Use it as a mini Desk Top Publisher. **TWO DISK SET.**

MS2151 SIGNSMIF: Sign printing utility to allow you to print impressive signs, transparencies,etc using upto four fonts on Epson or compatible printer.

MS2153 FLODRAW: Excellent graphics editor with what you see is what you get capabilities. Designed to handle symbols as well as function as a complete drawing package. Comes with a library of symbols for flowcharting, electrical design and more! **TWO DISK SET.**

MS1176 EXPRESSGRAPH: Easy to use business graphics program. Numbers can be analysed easily, and then displayed in a variety of graphic formats, and printed.

MS2225 EZTREE: Excellent new menu and directory program similar to XTREE. Allows you to enter subdirectories easily, and use your hard disk effectively. Highly recommended.

MS1236 VERSATILE PRINTER SETUP: Great generic printer setup utility that can be used for almost any printer to easily configure it the way you want. Can be used as memory resident utility. Includes setup for IBM, Epson, Gemini, NEC and HP Laserjet.

MS1260 Z80MU CP/M EMULATOR: Great software emulator for CP/M 2.2. Well documented and on screen help.

MS1303 I-TEL VIATEL PACKAGE: Excellent Viatel communication package. Supports modems with and without baud rate splitters. Very easy to use.

MS1403 P-BASIC: BASICA compatible basic interpretor. Allows you to run all basic programs. Suitable for all PC including AMSTRAD.

MS1513 MONOPOLY: Excellent colour version of the classic board game. Upto four players.

MS1520 TRIVIAL TOWERS: Excellent Trivial Pursuit type game. Lets you write your own questions as well as use the large number of questions on the disk. **TWO DISK SET.**

MS2510 TWO BIT POKER: Addictive copy of the arcade poker game seen at many pubs.

MS2520 DEFENDOR: Great new version of the arcade classic shoot em up game.

MS2522 STARSHIP: Action packed Star Trek type game. Command your starship and defend your base.

MS2525 GIN! Excellent computerised version of the old Gin Rummy game.

MS2530 NEBULA ADVENTURE: Great new space adventure game.

MS1637 PALM READING: Good program to help read your palm. With printout and graphics.

MS1640 ASTROVIEW: Excellent astronomy program which shows you to view the stars and planets on screen from any position on Earth, at any time between 1500 and 2500 AD.

MS1720 TYPING TUTOR: Excellent Learn To Type program for all levels.

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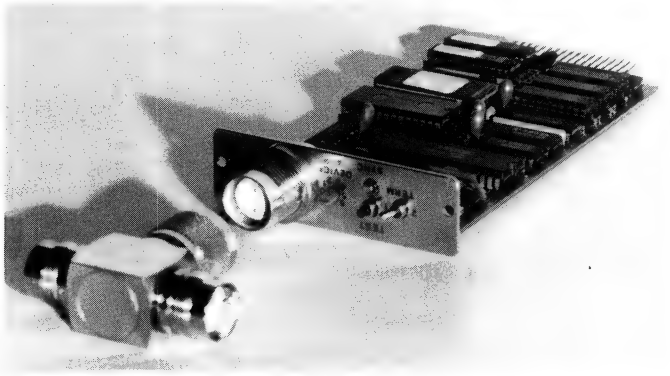
of IBM interfaces for the Hewlett-Packard Series II Laser from I-Data. They provide both Coax 3270 and Twinax System 36/38 interfaces.

Designated as the Ida LaserJet 3270 and 5219 the lasers fully emulate IBM 3287/68 and 5219 printers respectively. The Ida LaserJet 5219 fully supports Displaywrite 36 and Text 38 with the inclusion of 3812 Automatic Page Orientation and Computer Output Reduction. Extended H-P features are available in the IBM environment. ▼



FastTrap

Bryte Software
Phone: (02) 290 2844
Price: $299 (taxed)

The FastTrap, being a trackball, uses very little desk space, does not need a pad, and cannot get lint in its moving parts as it rolls across the desk. It connects to any serial port and doesn't need a power supply.

The FastTrap can emulate the Microsoft Mouse at the hardware level. Also, it can specify X, Y and Z axis input. As soon as new drivers are available, the FastTrap will be able to interact with a 3 dimensional Cad/cam package.

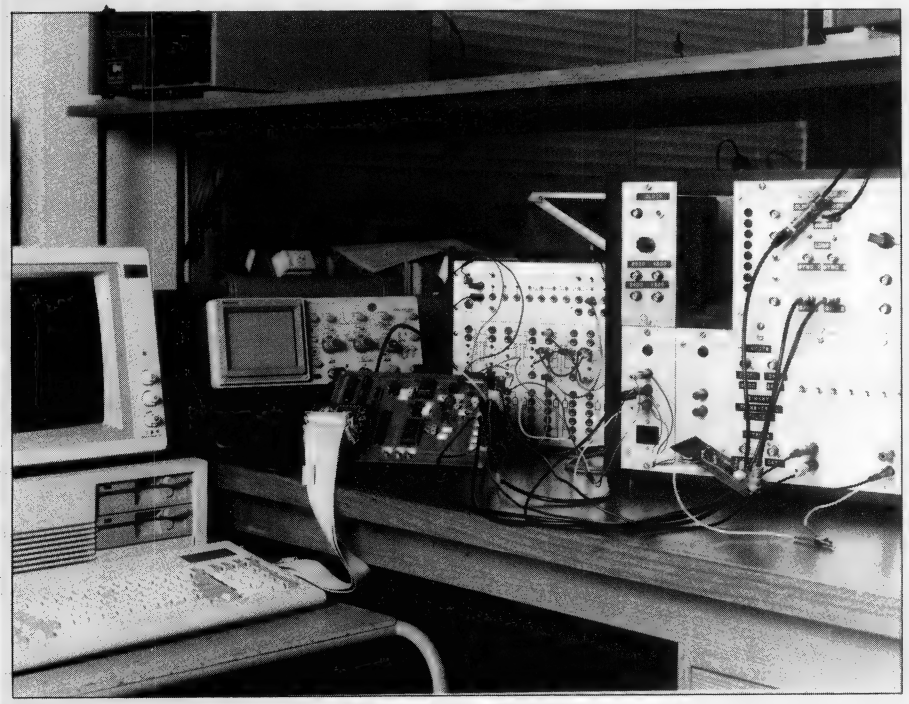
Moniterm VGA Controller Card

Megavision
Phone: (02) 957 5797
Price: Not supplied

The Moniterm VGA Controller card has been released. It will interface the 19 inch 'publishing resolution' monochrome Viking I monitor with the IBM PS/2 models 50, 60 and 80 PCs.

The VGA controller is designed to accommodate the IBM PS/2's smaller slot size and requirements for lower power consumption through a set of VLSI gate arrays. It interfaces the PS/2 series to the Viking I monitor in the publishing resolution mode for software support by Viking I screen drivers, creating an image at 1280 x 960 pixels screen resolution.

Texas Instruments Technology Award



DURING 1987, Texas Instruments (TI) sponsored various final year electrical engineering projects in the fields of Digital Signal Processing, Local Area Networks and Parallel Processing. One project was A Digital Baseband Echo Cancellation Test Set by C E. Chew, whose supervisor was Dr K. K. Pang —

Throughout the Australian telecommunications network, both two and four wire lines are widely used as transmission channels for voice and digital data. Because of the cost of laying cable to customer premises, many short haul lines are only two wires, however for long haul transmissions, four wire systems are used. A hybrid, which is essentially a bridge network is used to couple the two wire channel. However. due to the multitude of types of two wire circuits, it is not possible to ensure that the hybrid is balanced with both wire circuits. Any imbalance causes coupling between the transmission and reception signal paths, resulting in a leakage of transmitter power into the receiver circuit. This forms an echo which is classified as near end or far end, depending upon which hybrid causes the leakage.

In this project, a TMS32030 Digital Signal Processor was used to review and simulate some schemes for adaptively identifying the parameters of a leakage path through a hybrid and then cancelling the echo signal. In order to develop the test set, a TMS32030 card which plugs into an IBM PC was used. The echo cancelling software was developed on the PC and loaded into the processor for execution. An interface between the processor and the external world was then constructed in order to complete the test set.

Various algorithms for echo cancellation were examined, however the least mean square algorithm was considered to provide the greatest throughput for a given amount of computing power. The canceller has a transversal (tapped delay line) filter structure and a stochastic cost function. The convergence time is typically in the order of several thousand iterations. The test set generates an AMI line coded signal from an external Pseudo Random Binary Sequence (PRBS) generator. A resistive 120 ohm hybrid connects the test set to an external transmission line. A receiver circuit with a bandpass filter detects signals from the hybrid and feeds them to a 12-bit ADC circuit.

A TMS 32030 DSP roughs both the received and transmitted signal with the output observable after passing the signal through a DAC. The working system is pictured. □

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8. Dataflex		845
9. Microsoft Multiplan	345	262
10. Symphony	1150	835

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XYWrite III Plus	565
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Paradox 1.1i	650
R Base System	1095
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Q&A	460
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CT0610 SOFTWARE

Smalltalk

Kent Design
Phone: (03) 509 8751
Price: Not supplied

Kent Design has released the Smalltalk network coupler. It is designed for use in modified RS422 local ares networks (LANs) with the Macintosh and other equipment supporting AppleTalk. It measures 38 mm in diameter and 25 mm deep. The coupler comes with a mounting plate the same size as a standard power point, thus allowing use of standard electrical junction boxes, conduits and hardware for network cabling. Smalltalk, because of its miniaturisation, can also be directly fitted into most duct systems without the use of the plate; it requires a 33 mm diameter mounting hole in the cover. Cables from Smalltalk modules to equipment may be plugged in or out without affecting the LAN.

SpeedStor Series

CVA Computer and Peripheral Sales
Phone: (02) 476 6400
Price: Not supplied

CVA has announced a new series of complete, free standing hard disk subsystems for use in PCs, XTs and ATs. The SpeedStor Series drives provide from 70 to 320 megabytes of high speed (28 mS average access) storage for PCs and compatibles.

The drives utilise their own proprietory software system to break the 32 Mbyte barrier normally applying to DOS. They are completely compatible with DOS as well as Novell, Xenix and other local area networks (LAN) servers. Speedstor drives come configured in an external package; such packaging allows then to be implemented without occupying a slot in the host computer. Accompanying software allows for simple installation. Facilities include drive set-up, low level initialization, partition editor and an installable device driver. Other features with each SpeedStor include comprehensive diagnostics with extensive disc exerciser, media analysis and error mapping.

PC Transporter Card

Nalco Industries
Phone: (02) 638 2980
Price: Not supplied

Nalco Industries has released a card that will allow an Apple II+ or IIe to run IBM software. Known as the PC Transputer Card, it comes from Applied Engineering in the US.

In the Apple mode the PC card gives an additional 768 kilobytes for use with Apple programs. As it conforms to the Apple II memory expansion card protocol

XENIX SYSTEM V

The Unix for Business & Commerce

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XENIX 286: IBM AT & close compatibles, TI PRO, Olivetti M28, Compaq, NCR PC8, Mitsubishi 286, Corona ATP, Sperry PCIT.
XENIX 86: IBM XT & close compatibles, ITT, Olivetti M24, Sperry, Wyse, Compaq, Ericsson, Leading Edge, Mitsubishi, NCR PC86, Tandy 1200.
XENIX 68K: Macintosh XL.
XENIX 11: PDP-11/23, PDP-11/73, Pro 350, Pro 380. (Note: XENIX 11 is not System V).

WHY XENIX?

- Full commercial support and training.
- Wide and local area networking.
- Multi-user, Multi-tasking.
- User access controls.
- Enhancements: File and record locking; Shared Data, Automatic File System, check and recovery.
- Inter-process communications — signals, pipes, print spooler and semaphores.
- Xenix is an entire software family.
- Xenix lets users tailor their environments.
- Electronic mail.
- Small, fast kernel — Full Unix System V optimised for speed on microcomputers.
- Xenix has been installed on more microprocessor-based computers than all other UNIX based operating systems combined.
- Expanded and improved documentation.
- Xenix is full UNIX system V, only better.
- Xenix has superior multi-tasking design.
- Xenix is tuned for the micro-computer environment.

WHY BLUE SKY?

- We have been in business since 1978.
- We have been involved with computers since our inception.
- First Xenix sold in 1982.
- We know Xenix.
- Some of our customers include: NCR — Health Commission — Commonwealth Bank — Westpac — Telecom Australia — Philips — TAFE — WICAT — Dept. Science & Technology — University of New South Wales — Univesity of Sydney.

MEDIA TRANSFER

Blue Sky Industries designed and developed the extremely versatile system now marketed by NASHUA as the NASHUA DATA CONVERTER. • We provide a disk-to-(& from)-magnetic tape transfer bureau. • MAGTAPE — FLOPPY * UNIX — MSDOS — CP/M — CP/M-86 — PCDOS. 8" — 5.25" — 3.5"

SOFTWARE

NOW AVAILABLE

8 MPC
8 RS232 Ports with high-speed intelligent controller and Xenix Driver.

	XENIX V 8086	XENIX V 286	XENIX V 386	XENIX V HP VECTRA
XENIX SYSTEM V OPERATING V2.2	•	•	•	
XENIX SYSTEM V OPERATING SYSTEM VERSION 2.1.3				•
LYRIX WORD PROCESSING	•	•	•	•
SCO PROFESSIONAL (Lotus 1-2-3) workalike		•	•	•
MULTI PLAN	•	•	•	•
INFORMIX relational database	•	•	•	•
FOX BASE (D Base II workalike)	•	•	•	•
FOX BASE plus (D Base III workalike)		•	•	•
FOX BASE RUN TIME		•	•	•
FOX BASE PLUS RUN TIME		•	•	•
SCO XENIX 386 TOOL KIT		•	•	•
SCO XENIX NET		•	•	•
SCO UNIPATH SNA 3270 (COMMS)	•	•	•	•
MICRO FOCUS COBOL COMPACT LEVEL II	•	•	•	•
DEVELOPMENT TOOLS INC. animator and forms — 2	•	•	•	•
C — ISAM	•	•	•	•

NEW RELEASE

STATISTICIAN:
STATISTICS PACKAGE
MASTER PLAN:
PROJECT MANAGEMENT SYSTEM

NEW NEW NEW NEW

MICRO FOCUS COBOL VS COBOL	•	•	•
SOFTQUAD (publishing software)	•	•	•
MULTI VIEW (windowing environment)	•	•	•

HARDWARE

- Winchester disk controllers for S-100, IBM PC, stand-alone.
- 8 Port intelligent communications board for S-100, IBM PC, IBM AT.
- Streaming tape back-up for Xenix.
- Statistical Multiplexers 8-16-24 ports with error correction.

Australian Distributor

BLUE SKY

BLUE SKY INDUSTRIES PTY. LTD. Telex: 74994
2a Blakesley St., Chatswood 2067 National: (02) 419-5799 Int'l: +612 4195799
QLD/BLUE SKY COMPUTERS Ph: (07) 831-8666 Fax: (07) 832-1367
S.A./UNIQUE SOFTWARE Ph: (08) 363-1313 Fax: (08) 363-0546
W.A. MICROSYS Ph: (09) 474-1184 Fax: (09) 474-1034

it doubles as a memory expansion card. Most popular MS-DOS packages can be run using it. According to Nalco, most will run three times faster than an IBM PC XT.

MUX 25SM modem

Scitec
Phone: (02) 428 9555
Price: $2415 (taxed)

The new MUX 25SM multiplexing modem from Scitec is a 2400 bits per second automatic modem combined with an integral, fully featured, four port statistical multiplexor.

It operates in pairs to provide remote data communications to printers and terminals concentrating the data onto a single dial up or leased two wire telephone line. A pair of MUX 25SMs can be soft configured to automatically establish connection from power on, eliminating the need for operator training or intervention. The MUX 25SM's proprietary protocol and dial back security features provide secure communication via the Public Switched Telephone Network.

MB3-ESW Multiplexer

Datacraft
Phone: (03) 727 9111
Price: Not supplied

Datacraft has released the MB3-ESW Enhanced Synchronous Wideband Multiplexer Featurepak for the Micom Box Type 3 range of mutliplexers. The Featurepak allow the MB3 to operate as a wideband synchronous and asynchronous statistical multiplexer with composite data rates from 38.4 kbps to 72 kbps. Up to 16 asynchronous, 8 synchronous channels or combinations of these are supported. The Featurepak allows higher synchronous data throughput rates to be achieved and upgrades the MB3 to take advantage of emerging wideband digital data networks.

Miscellaneous

Voca-Fax 635 ▲

Voca Communications
Phone: (03) 697 7000
Price: Not supplied

A one touch, auto dialling, high speed facsimile machine, not much larger than a telephone book has been released by Voca Communications. The Voca-Fax 635 has a 70 station auto dialling facility. It has a transmission reserve facility which gives priority to documents being sent over those being received. The 635 also has a 16 step, half tone scanner for high quality reproduction of original photographs.

Comstar-64

Entertainment Systems & Design
Phone: (03) 862 1747
Price: Not supplied

Comstar-64 is a computer lighting controller for lighting designers that runs on the Commodore 64. It helps in the design of lighting or theatre, trade shows, rock or disco. It can be used direct from the keyboard of a computer or in tandem with a manual console.

The Comstar 64 has 64 output channels, is able to program 240 scenes, has 8 x 8 step chases or multi step chase loops for programming, independent fade, a times per channel per scene and full DOS commands. It has an output of 0 to 10 volts +/- DC.

Japan Computer Index 87

Infonet Incorporated
Phone: Japan (03) 7704483
Price: Not supplied

Infonet has announced the release of the *Japan Computer Index 87*. It is a comprehensive listing of the Japanese computer industry, for both hardware and software. The Index is in English and is designed to help readers quickly obtain data on each company. Information covered includes company name, head office, phone, fax and telex numbers, business line, sales breakdown, number of employees and product lines. Infonet can also be contacted at 5F The 7th Industry Bldg., 1-20-14 Jinnan, Shibuya-kin, Tokyo, Japan 150.

New outlet

Voca Communications
Phone: (03) 697 7000

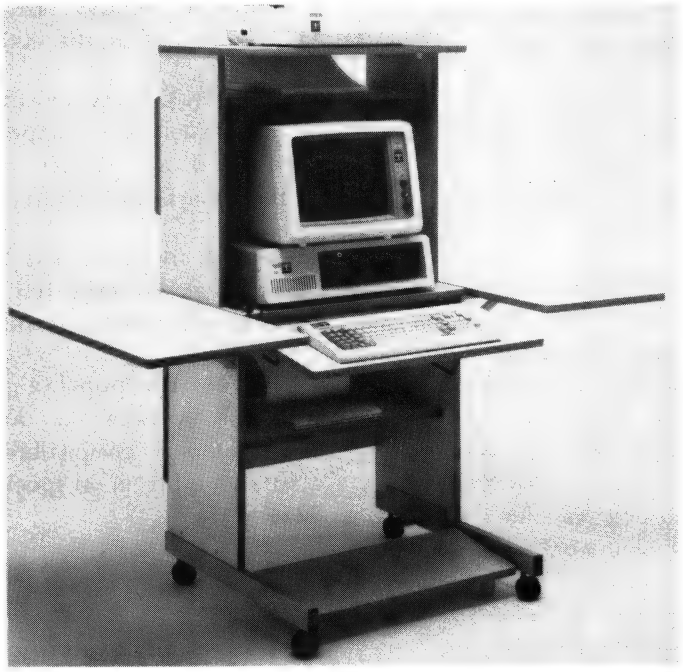
Voca Communications has opened its first retail outlet, for the sale direct to the public of its telecommunications products for home and office. The outlet is located at 176 Commercial Rd, Prahan, Victoria. It stocks the full range of Voca feature phones, cellular mobile phones, facsimile machines and paper, answering machines, pagers and other telephone accessories.

Furniture

Micromate ▶

Sylex
Phone: (02) 647 2888
Price: $665 (taxed)

Sylex has released its latest ergonomic workstation, the Micromate. It has a height and tilt adjustable keyboard rest. Work surfaces are set at 700 mm high. Features include locking castors, adjustable paper above the VDU, fold back footrest and the ability to place the Micromate against the wall because the paper refolds down under the work surface. Folding side work surfaces are featured. The workstation is in a grey laminate.



AT LAST

WENDIN-DOS A self-bootable MS-DOS workalike that is multi-user & multi- tasking based on the solid architecture of the VAX/VMS operating system kernal. 100% compatible with the MS-DOS file structure, supporting the same commands and switches that the user is accustomed to, but much more has been added to make it a more productive envioronment. Far too much to explain here; call us for a more explicit mailout. **$225.00**

C86PLUS C Compiler Based on a proprietry compiler design technology that applies artificial intelligence to produce highly optimised code. The new compiler benchmarks 20% faster than Microsoft & 70% faster than the earlier C86 v2.3. Includes functional equivalents to most UNIX V libraries & implements the latest ANSI C library features. Over 250 library functions 8087/80287 auto detect emulator, source level debugger support, optional assembly language output, Long double 80bit floating point & new type modifiers. 100% ROMABLE code. **$995.00**

INTRODUCING C An extremely useful educational tool or do-it-yourself C language package. Includes a 300 page manual incorporating examples, references & tutorial for fast learning and positive feedback. IC guides the user through the steps of programming C, syntax and functions as well as teaching structured style, fundamental logic and techniques. **$325.00**

FONTRIX For business, studies or fun graphics. Allows expression of ideas with visual eloquence. Larger than screen workspace uses the full resolution of the printer, NOT just the screen. Eleven fonts supplied & over 150 more available on FONTPAK volumes. FONTRIX can typeset from keyboard or directly from ASCII textfiles and can handle text and graphics from other programs. **$395.00**

PRINTRIX Uses batch processing techniques to handle desktop publishing. Text files prepared by your favourite word processor can have commands embedded to tell PRINTRIX how to format each page in minute detail. It then uses easily customised layout files to add fonts, page formatting & graphic insertions. Accepts both FONTRIX graphics and standard graphic files such as those "Bsaved" from basic. Apple II version now available. **$425.00**

LOOK & FEEL!

C-SCAPE Interface Management System with the Look & Feel Screen Designer is a breakthrough in professional development tools for C programmers. A really fast & flexible WYSIWYG screen development environment that will reduce your screen design & development times to a fraction of what they were. Import screen designs and automatically turn them into C code. **$595.00**

db_VISTA A high speed network model database written for C programmers. Design your database and compile your layout file with the Database Definition Language processor. Develop application programs making calls to db_Vista's C functions; edit and review using the Interactive Database Access utility; compile & l link with the db_Vista runtime library and your application is ready to run. No royalties! If you want a smart front end, tie it into C-Scape.(see above) Also available in multi-user, VAX & with source code. from **$375.00**

T/MASTER NEW RELEASE! This version marks T/Master's entry into two new areas - business graphics and desktop publishing. Eight types of high res charts may be prepared in colour or B&W. As well T/Master can print pictures from a number of sources. **$595.00**

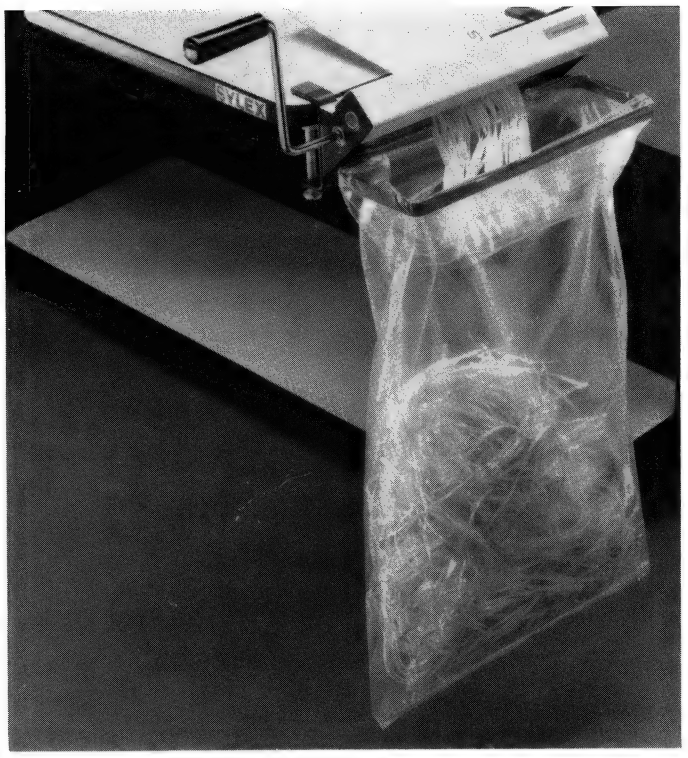
If you do not have T/Master, perhaps we can help liven up your Lotus 123! **XYZ CONSOLIDATE** will allow you to summarize numerous spreadsheets. Instantly you are able to compare and combine information across 12 worksheets in the small version & 255 in the large. from **$295.00**

3D GRAPHICS Does exactly that! 3D graphics from 123 spreadsheets; supports CGA,Hercules & EGA cards and all devices currently supported by the Lotus PrintGraph Utility. **$275.00**

JETSET A simple to use add-in for 123 that enables Lotus users to take full advantage of the powerful printing capability of their laser printers. **$275.00**

T/MAKER The popular predecessor to T/Master is still the answer as an integrated package for CP/M or non compatible PCs **$450.00**
Also available in a special version for the Amstrad 8256. **$350.00**

TCF Computer Systems Pty Ltd
214 Harbord Road Brookvale 2100 (02) 938-2922



Personal Shredder

Sylex Ergonomics
Phone: (02) 647 2888
Price: $159

▲ Sylex has released a desktop shredding unit, the Personal Shredder. It clamps onto the side of the desktop and is ready to shred paper from handwritten notes to computer printouts with a few turns of the handle. The handle fits front or back to make the shredder mount to any overhang. The handle is able to be removed when not in use.

R:Base System V Video Learning System

Micro Management
Phone: (02) 452 5966
Price: $842 (taxed)

Micro Management has released a training system on video for R:Base System V. The R:Base System V Video Learning System includes a two and a half hour video tape that encourages a hands-on approach to make users literate and skilled in a time efficient manner. The video has the combination of an on-camera instructor, real training situation and key concepts illustrated in dynamic graphics. Topics covered include reports, report menus, line definition menus, printing, data, and applications.

Telephone Safety Device (TSD)

ABE Computers
Phone: (03) 288 2144
Price: $29.50 (taxed)

ABE Computers has developed a telephone safety device which will protect a telephone user or connected equipment such as computers and modems from lightning strikes. The Telephone Safety Device (TSD) plugs directly into the Telecom wall plug and acts automatically when any greater voltages than that required to carry the telephone signal is detected. The device was originally developed to protect ABE's bulletin board. The TSD can also be used to protect telex, facsimile and answering machines.

Events

Technology Event PC88, Office 88 and Communications 88, has been rescheduled from February 7 — 10 to March 20 — 23. The event will still be held at the Sydney Exhibition Centre, Darling Harbour; all shows appear to be sold out. Phone Janelle Schreiber on (03) 267 4500.

The First Computer Pals Across the World conference, hosted by the Alice Springs Educational Computing Association, will be held from April 7 to 8 at the Sheraton in Alice Springs. The organisers are seeking papers and workshops on the theme: 'Sharing in a Global Classroom'. Phone Ralph Czerniejewski (089) 525 044.

The EDP Auditors Association will be holding an international conference at Jupiters Hotel from April 27 to 29. Contact Lex Page or Tony Muston on (02) 250 0500.

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.

The Victorian branch of the ACS will be holding a residential conference at Ballarat from March 4 to 6. It will be looking at Strategic Planning for Information Technology. For more details phone (03) 417 6220.

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.

Ausgraph '88 organisers are calling for previously unpublished papers dealing with Cad/-cam animation, scene simulation and image processing. The show will be held in Melbourne from July 4 to 8 at the Hyatt on Collins. Details (03) 387 9955.

The Personal Computer Conference '88, run by the NSW branch of the ACS, will be held at the Masonic Centre, Sydney, from February 8 to 10. Contact Mary Jordan (02) 233 1011.

The Sydney Expert Systems Group is calling for papers for the Fourth Australian Conference on Applications of Expert Systems, to be held in Sydney from May 11 to 13. The conference will include an exhibition of expert systems hardware, software and applications. Contact Marie Thill on (02) 218 9427.

The Joint International Symposium on Information Systems is calling for papers for its meeting to be held in Sydney from February 29 to March 2. Details on (02) 697 4413.

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.

Special Interest Groups for PC Users: CONSIG meets on the first Wednesday of each month in Sydney; contact (02) 290 2655. The DTP Graphics SIG meets on the first Tuesday of the month in Sydney; contact Mark Richards on (02) 929 5855. PCWEST meets on the first Monday of the month in Sydney; phone Bill McEwen (02) 627 2488.

The Australian FORTH Symposium is Australia's first symposium to feature Forth as a programming system for productivity. The symposium will be held on May 19 to 20 at the NSW Institute of Technology. Ring Roy Hill on (02) 217 3828. The symposium has been initiated by a group of professionally based Forth users (from both industrial and academic organisations).

Overseas Exhibitions

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 Pacific Telecommunications Council will hold its annual conference from February 15 to 18 at the Sheraton Waikiki Hotel, Honolulu, Hawaii. The theme is: 'Telecommunications and Pacific Development: Alternatives for the Next Decade'.

Electrex, a UK electrical and electronics exhibition, will be held in Birmingham from February 29 to March 4. Contact Keith Prowse (Australia) on (02) 953 8888.

The EDP Auditors Foundation Conference: The 18th Conference is to be held in Atlanta, Georgia, USA, from April 10 to 15, 1988. Write to The Program Chairman, The EDP Auditors Foundation, Box 88180, Carol Stream, IL 60188-0180 or telephone 312/653-0950. □

LARRY LEWIS

THE PROPHET

SINCE YOU HAVE have probably had enough politics and history for the year already, I thought it was about time for another foray into C. The bulletin board project (remember the 'Your own bulletin board' series?) is now ancient history (or is that just another way of saying utter failure?). However, there is C still to be written and functions created (the PROLIB functions described here should be available for general use by now).

I thought for an example we might get time/date related functions and have a look at some of the considerations that have gone into the library functions we have developed, and naturally the enhancements. Nothing particularly new and to some experienced programmers it would probably be a real yawn, but if it helps a few people then ....

The 'normal' C time based functions are usable when you just want something relatively simple — well almost, normal time functions since some C compilers get to be a real pain when they assume you want timezone processing done. Now, retrieval/storage of the time from your own data files is your responsibility, but how about the current date/time? The function available is time(), which returns the time (in seconds).

Now the problem is *what* time? The returned value can rely on a number of factors, the environment variable 'TZ (for TimeZone) can change the time returned, the function tzset() can affect the time. The point is that on my machine (and most other machines that people seem to use), the time is set at something sane, like the current *local* time.

So, when one of my programs grabs the time, I want it to get *my* local time. Nothing fancy, no frills, just the plan garden variety time fresh from the CPU. The function we have that does this is called timexget(). See Listing 1 — timexget() is pretty simple, it calls DOS to get the date and time, sets up the variables in a special time structure and then calls a decode function.

Also notice the code for timexget() takes no parameters — it simply returns the time in seconds. And, timexget() is included in timex(), being lazy I saw little point in creating another file and as it needs timex(), I thought they should live together.

Notice the number of overlapping functions to provide little bits of difference in result, gmtime() localtime() asctime()

```
/*TITLE  Timex - convert DD/MM/YY, HH:MM:SS to seconds. */

#include        <dos.h>
#include        <util.h>

        ...
static  month_tab[12] = { 31, 28, 31, 30, 31,
                                30, 31, 31, 30, 31, 30, 31 };

/*
 * Determine if year is a leapyear.
 */

static int isleap( yr )
int  yr;
{
     if( yr % 1000 == 0 )
     {
              return(1);
     }
     if( yr % 100 == 0 )
     {
              return(0);
     }
     if( yr % 4 == 0 )
     {
              return(1);
     }
     return(0);
}

long timex( xt )
struct  xtime_struct    *xt;
{
     long    seconds, days_gone;
     int     i, leaps;
     if( xt->year < 1000 )
     {
              if( xt->year < 70 )
              {
                       xt->year += 2000;
              }
              else
              {
                       xt->year += 1900;
              }

     }
     leaps = 0;
     for( i = 1970; i < xt->year; i++ )
     {
              leaps += isleap( i );
     }
     if( isleap( xt->year ) )
     {
              month_tab[1] = 29;
     }
     else
     {
              month_tab[1] = 28;

     }
     days_gone = (long)( xt->day - 1 ) + (long) leaps +
                       ( (long)( xt->year - 1970 ) * 365L );
     for( i = 0; i < xt->month - 1; i++ )
     {
              days_gone += (long) month_tab[ i ];
     }
     seconds = days_gone * 86400L;
     seconds += (long) xt->hour * 3600L +
                  (long) xt->minute * 60L + (long) xt->second;
     return( seconds );
}
```

```
/*SUBTITLE Get the time in seconds from the hardware clock */

long timexget()
{
      struct xtime_struct x_time;
      union REGS regs;

      regs.x.ax = 0x2a00;
      intdos( &regs, &regs );
      x_time.year      = regs.x.cx;
      x_time.month     = regs.h.dh;
      x_time.day       = regs.h.dl;
      regs.x.ax = 0x2c00;
      intdos( &regs, &regs );
      x_time.hour      = regs.h.ch;
      x_time.minute    = regs.h.cl;
      x_time.second    = regs.h.dh;
      return( timex( &x_time ) );
}
```

Listing 1. *Timexget() calls DOS to get the date and time, sets up the variables in a special time structure and then calls a decode function.*

ctime() and so on. They do all do things a bit differently, but in the course of writing programs we found that we were always calling multiple functions to give us the information needed.

Enter xtime() and timex() — firstly xtime(), it's not listed here, but it simply takes the time in seconds (as obtained from timexget(), time() or your data) and returns you the date in almost any state you could possibly want it! All in one call, you can display date, time (24 or 12 hour format), Julian date and so on.

With timex() you load the date/time and get back the seconds, but remember the time in seconds in C is the number of seconds elapsed since Midnight 1st January 1970 (a *big* number). This time in seconds is stored as a long integer (4 bytes of characters) and you can do almost any type of arithmetic you like with the it. (Yes I do know that DOS can only 'think' back as far as 1980, but C follows the Unix convention, good enough?)

A neat feature of timex() is that, say, you want to add a month to the date: simply add 1 to the month and call timex(), forget about change of year it looks after it for you. If you want 90 days in the future, add 90 to the days, call timex() and back comes the day 90 days in the future. Makes date playing ridiculously easy!

Ever asked someone to enter a date? The response varies from '18/12/88' to '18 12 88' and even '18 Dec 88' or '32 12 88'? Well, I've got another function: getdate(). When this function was written, the introduction went 'this function turns almost any rubbish into a valid date.' Now you can truly almost enter any sort of reasonable data and get the correct date back, nifty hey?' After the actual date, you can also put the time!

Have a browse of the function given here — the full library should be available by now on Prophet: it's called PROLib (Prophet Library) and will also have some other interesting features.

PAMS, PAMS, and More PAMS

STARTING WITH THE 8712 release of the Registry we are going to try an experiment: a few volunteer users from Prophet are going to upload the Registry lists onto some Sydney boards. The idea is to see if this causes the list to propagate further; if it's successful the poor state co-ordinators will have more on their plate.

Thanks to Mick Malloy, Chris Kelly and Stephen Ma for helping out, a favourable follow up (hopefully) will be in a later column. Also, the state co-ordinators who keep the Registry ticking along from month to month shouldn't be forgotten: Phil Harding (ACT), Rodney Creer (NSW), John Blackett-Smith (Vic), Brian Wendt (Qld), Grayham Smith (SA) and Graeme Platt (WA).

More changes are being made to the Registry — addition of SysOp supplied information will start soon and a new formatted list will be created (eXtended format) which will have this new information, the old Full format will lose some information — if you downloaded the 8711 Full format list you should have noticed that it is now paginated (pretty pages) to make it easier to put into a binder. Some other things? Well, how about a Telix and Qmodem dialling directory.

New Zealand has been added to the listings this month! □

NEW SOUTH WALES

*** Amended ***
Arco-Tel BBS
Sysop: Alex Sardo
Phone: (02) 683-3956
FIDO*net*: 713/601
Baud: V21.V22.V22bis.V23
Access: Mem
Computer: XT Clone
DOS: DOS
BBS*oftware*: Opus

*** Amended ***
Arknet
Sysop: Andrew Khoo
Phone: (02) 868-4836
Baud: V22.V22bis.B103
Access: Reg
Hours: 0000 — 1600
Computer: IBM AT
DOS: Xenix
Info: Logon as guest and mail user admin for access

*** Name Changed ***
Ausborne (Osborne) RCPM
Info: Now called Moebius Trip

*** Amended ***
Club Mac Remote Maccess System
Sysop: Jason Haines
Phone: (02) 73-1992
Baud: V21.V22.V22bis.V23
Access: Mem.LVA
C:*mputer*: Macintosh
DOS: HFS
BBS*oftware*: Red Ryder

*** NEW System ***
Cybersoft Opus
Sysop: Mark Fawcett
Phone: (02) 212-2261
FIDO*net*: 712/202
Baud: V22.V22bis.V23
Access: Reg.LVA
Computer: IBM-XT
DOS: PC-DOS
BBS*oftware*: Opus

*** Amended ***
Delta Net
Sysop: Geoff Arthur
Phone: (02) 457-8281
Baud: V21.V22.V23
Access: Public
BBS*oftware*: Opus

*** Offline ***
Dymock's Computer Bookline

*** Online ***
Galactic Federation
Sysop: Kevin Gladwin
Phone: (02) 233-5040
Baud: V22.V22bis
BBS*oftware*: Opus

*** Amended ***
Landover BBS
Sysop: Lance Lyon
Phone: (02) 550-1056
Baud: V21.V22.V22bis.V23.B103.B212
Access: Mem.LVA
Computer: Amiga 1000
DOS: Amiga DOS
BBS*oftware*: Custom BBS

*** Amended ***
Moebius Trip
Sysop: David Butler
Phone: (02) 439-7072
FIDO*net*: 711/408
Access: Mem.VA

*** NEW System ***
NetComm Australia
Sysop: Bill Bolton
Phone: (02) 887-3297
FIDO*net*: 712/801
Baud: V22.V22bis.PEP
Access: File Server
Hours: Weekdays: 1900 — 0900
Weekends: 24 Hours
Info: Software support system for FidoNet

SysOps — File Request ONLY
Wazoo and Bark requests honoured

*** NEW System ***
Newcastle Amiga BBS
Sysop: Stan White
Phone: (049) 58-7350
Baud: V21.V22.V22bis.V23
Access: Public
Computer: Amiga 1000
BBSoftware: BBS-PC!

*** Name Changed ***
Omega Line
Info: Now Called
Delta Net

*** Amended ***
Playground BeeBS
Sysop: Brett Selwood
Phone: (02) 53-9688
FIDOnet: 712/504
Baud: V21.V22.V23
Access: Mem.Reg.LVA
Computer: XT Compatible
DOS: MSDOS
BBSoftware: Opus

*** Amended ***
Shore BBS
Sysop: David Gill & Jason Shar
Phone: (02) 959-3936
Baud: V21
Access: Reg.VA
Hours: Weekdays: 1800 — 0730
Weekends: 24 Hours
Computer: Macintosh
DOS: HFS
BBSoftware: Red Ryder Host

*** Offline ***
Sorcerer Users Group

*** NEW System ***
Triops BBS
Phone: (063) 62-9715
Baud: V21
Access: Public
Hours: Daily: 2100 to 0900

*** Amended ***
Zeta RTRS
Sysop: Nick Andrew
Phone: (02) 627-4177
FIDOnet: 713/602
Baud:
V21.V22.V22bis.V23.B103.B212
Access: Mem.VA
Info: C, Unix & Minix Users

QUEENSLAND

*** Amended ***
Apple-Q Node 1
Sysop: Graham Black & Vince Crosdale
Phone: (07) 284-6145
Baud: V21.V22.V22bis.V23
Access: Mem
Computer: Apple //e
BBSoftware: GBBS PRO

*** NEW System ***
Commodore Computer Users Group
Phone: (07) 344-1833
Baud: V21.V22.V23

*** Online ***
Fix BBS
Sysop: Geoff Ryan
Phone: (07) 285-5814
Baud: V21.V23
DOS: PC-Dos
BBSoftware: Focus

*** Name Changed ***
Focus BBS
Info: Now Called
Fix BBS

*** Amended ***
Greenhorn Experimental
Sysop: Mike Richardson
Phone: (07) 345-5010
Baud: V21.V22.V22bis.V23
Access: Reg.VA
Computer: IBM-XT
DOS: MSDOS
BBSoftware: Opus

*** Online ***
Kangaroo Point TAFE
Sysop: Troy O'Malley
Phone: (07) 393-1763
Hours: Weekdays: 0900 — 2200
Weekends: 24 Hours

*** Amended ***
Marlin-Coast BBS
Sysop: Ray Chalmers
Phone: (070) 51-7220
FIDOnet: 640/501
Baud: V21.V22.V22bis.PEP
Access: Reg.VA
Computer: Clevland 286
BBSoftware: Opus

*** NEW System ***
Midnight Express
Sysop: Lloyd Ernst
Phone: (07) 391-4051
Baud: V21.V22.V23

*** Offline ***
Soft-Tech

*** Amended ***
Software 80 BBS
Sysop: Tony Melius
Phone: (07) 369-7103
Baud: V21
Access: Reg.VA
Hours: Weekdays: 1930 — 0800
Sat 1430 — Mon 0800

*** NEW System ***
Toowoomba RBBS
Sysop: Chris White
Phone: (076) 30-1762
Baud: V21
Access: Mem.Reg.LVA
Hours: Daily: 2100 to 0630
Computer: C-128

SOUTH AUSTRALIA

*** Amended ***
Club Opus CBCS
Sysop: John Pride
Phone: (08) 263-5181
FIDOnet: 680/802
Baud: V21.V22.V22bis.V23
Access: Reg.LVA
Computer: IBM-Clone
DOS: PC-DOS
BBSoftware: Opus

*** Amended ***
The Electronic Oracle IBBS
Sysop: Don Crago & Grayham Smith
Phone: (08) 260-6222
FIDOnet: 680/804
Baud: V21.V22.V22bis.V23
Access: Mem.LVA
Computer: President PC
DOS: MS-DOS
BBSoftware: IBBS
Info: Multiuser

TASMANIA

*** Amended ***
Tassie Bread Board System
Sysop: Ian Campbell
Phone: (003) 26-4248
FIDOnet: 631/330
Baud: V21.V22.V22bis.V23
Access: Mem.LVA
Computer: Kaypro PC
DOS: MSDOS 3.2
BBSoftware: TBBS

VICTORIA

*** Amended ***
Anzugs OPUS
Sysop: Miklos Bolvary & Gordon Castle
Phone: (03) 887-0678
FIDOnet: 631/326
Baud: V22.V22bis.B103.B212
Access: Public
Computer: XT Clone
DOS: PC-DOS 3.2
BBSoftware: Opus

*** Amended ***
Bayside
Sysop: Paddy Plebanowicz
Phone: (052) 53-1110
FIDOnet: 630/313
Baud: V21.V22.V23
Access: Reg.Public
Computer: IBM Clone
BBSoftware: Opus

*** Offline ***
Commodore Board

*** Amended ***
Custom Programming OPUS
Sysop: Allan Williamson
Phone: (03) 848-3331
FIDOnet: 632/340
Baud: V21.V22.V23.B103.B212
Access: Mem.VA
Computer: PC-Clone
DOS: PC-Dos
BBSoftware: Opus

*** Amended ***
Cycom
Sysop: Darren Hayson
Phone: (03) 727-1018
FIDOnet: 631/328
Baud: V21.V22.V23
Hours: Weekdays: 1800 — 0600
Weekends: 24 Hours

*** Amended ***
DECUS
Sysop: Peter Hill
Phone: (03) 62-5806
Baud: V21.V22.V22bis.V23
Access: Mem.VA

*** NEW System ***
East Suburb User Group
Sysop: Martin Axford
Phone: (03) 819-4246
Baud: V21.V22.V23.V23ORG

*** Amended ***
Eastwood R/ZSYS & PBBS
Sysop: Mick Stock
Phone: (03) 870-4623
FIDOnet: 632/343
Baud: V22.V23
Access: Reg.VA
DOS: ZR-DOS
BBSoftware: PBBS

*** NEW System ***
Entropy BBS
Sysop: John Hardy
Phone: (03) 583-9747
FIDOnet: 632/344
Baud: V21.V22.V23
Access: Public
Computer: IBM XT
DOS: MSDOS
BBSoftware: Opus

*** Offline ***
Harbourd-64

*** NEW System ***
Software Bank
Sysop: Simon Walsh
Phone: (03) 820-1632
FIDOnet: 632/342
Baud: V21.V22.V22bis.V23
Access: Reg.LVA
Computer: IBM-Clone
DOS: PC-DOS
BBSoftware: Opus

*** NEW System ***
The Software Bank
Sysop: Simon Walsh
Phone: (03) 820-1632
FIDOnet: 632/342
Baud:
V21.V22.V22bis.V23.B103.B212
Access: Reg.LVA
Computer: XT-Clone
DOS: PC-DOS
BBSoftware: Opus

*** NEW System ***
Yarra Valley BBS
Sysop: Frank Conner
Phone: (059) 64-3126
Baud: V21
Access: Mem.VA
Computer: C-64
BBSoftware: KBBS

WESTERN AUSTRALIA

*** NEW System ***
AMSNet BBS
Sysop: Ted Marsden
Phone: (09) 453-3590
FIDOnet: 690/906
Baud: V21.V22.V22bis.V23
Access: Reg
Computer: AMSTRAD PC1512
DOS: MSDOS
BBSoftware: Opus

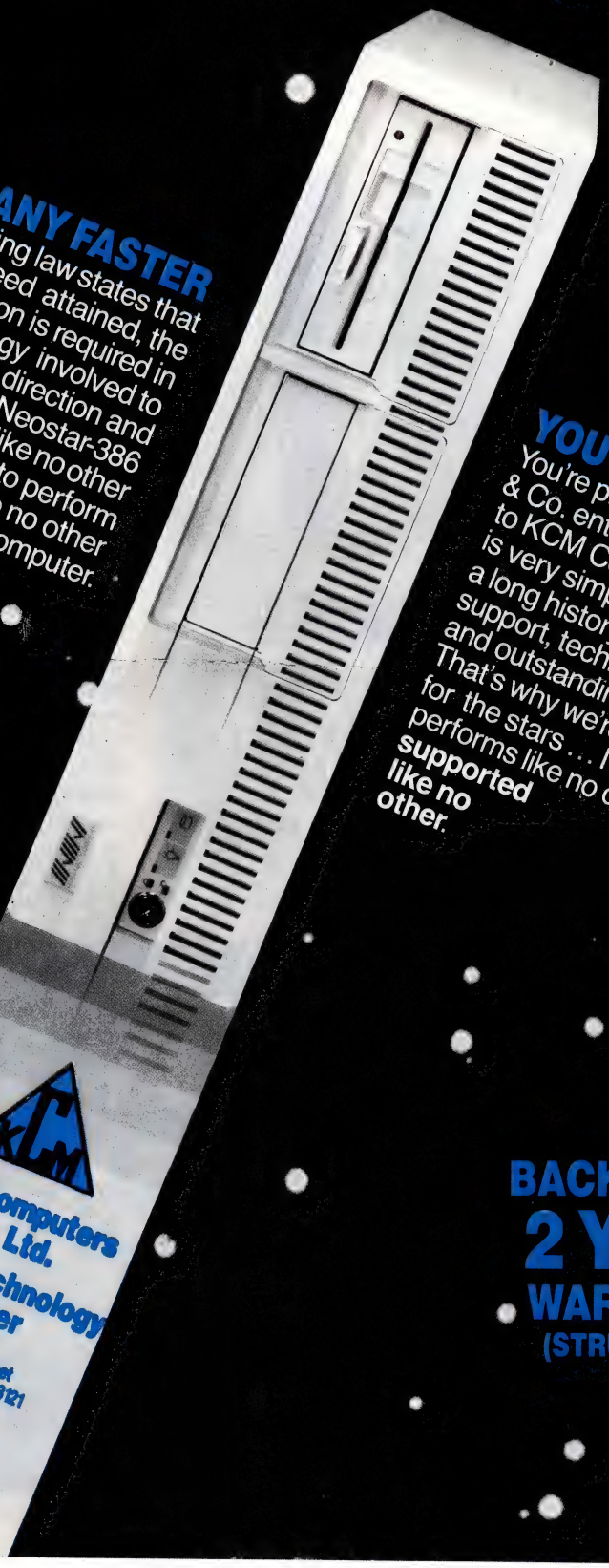
*** Offline ***
Apple BBS

*** Amended ***
Pegasus BBS
Sysop: Michael Russell
Phone: (09) 242-2099
FIDOnet: 690/907
Baud: V21.V22.V22bis.V23
Access: Public
Hours: Weekdays: 1700 — 0900
Weekends: 24 Hours
Computer: Epson AX
DOS: MS-Dos
BBSoftware: Opus

NEW ZEALAND

*** NEW System ***
Southern Express!
Sysop: Phil Walding
Phone: (024) 877-440
Baud: V21
Access: Reg.LVA
Computer: Atari 130 XE
BBSoftware: BBS Express!
Info: Logon either ASCII or ATASCII

NEOSTAR 386



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TIM HARTNELL

YOUR AMSTRAD

This month I'll be looking at a few tip for effective use of Mallard Basic or the PCW, use of the TYPE and PRINT commands on the PC, and a simple expert system program, in Basic, for the PC.

Mallard Basic

PCW owners will know that their computer comes supplied with Mallard Basic, written by Locomotive. Mallard is a very fast, solid implementation of the language. Unlike most Basics, Mallard is not resident on the computer. You have to load it in, by loading CP/M first (from side 2 of the PCW master disk, which is marked 'System/Utilities/Basic' and 'CP/M Plus'), then by entering the command BASIC and press the Return key.

The easiest way to clear the screen, when running Mallard, is to enter —

```
PRINT CHR$(27)+"E".
```

To send the cursor to the quaintly-named 'home' position (that is, snug up in the top left hand corner), enter —

```
PRINT CHR$(27)+"H".
```

To see the built-in graphics set on the PCW, which you can incorporate into your programs, just run the following —

```
10 PRINT CHR$(27)+"E"+CHR$(27)+"H"
20 FOR J=128 TO 159
30 PRINT J;CHR$(J);"  ";
40 NEXT J:PRINT
```

Many computers have a PRINT AT or PRINT @ or LOCATE command to put a word or character at a specified position. In Mallard Basic on the PCW, you can use

```
PRINT CHR$(27) + "Y" + CHR$(32+a)
        + CHR$(32+b) + "stuff"
```

— in which 'a' and 'b' are the row and column co-ordinates, and —

```
"stuff"
```

— is the material to be printed. You can create some very good effects by using this PRINT A along with some of the graphics characters you have discovered with the small routine above.

And by the way, I understand that the Basic is named after a record-breaking train called Mallard, and not some super-swift duck.

Printing from a queue

Amstrad PC owners probably know that you can read any document created on a wordprocessor, without loading the wordprocessor, simply by entering — following command:

```
A>TYPE NAME.DOC
```

The name of your document is, of course, substituted for 'name.doc', and you do have to enter the word 'type'. If you hold down the Ctrl key and press P, before entering the above line, the document will be printed out on your printer as well as on the screen. Now many wordprocessors (such as good old WordStar) include strange control characters within documents. Although these look pretty odd when you enter a 'type' command as suggested here, you can still recognise most of the words in the document, and thus tell what the file is without having to load in the wordprocessor, open the document and so on.

If you have a number of text files which you want to print out to the printer, you can set them up in a queue and then get on with other vital tasks while the computer is doing the printing.

You enter the command line —

```
A>PRINT NAME.DOC
```

The command Print is on the DOS Plus/Startup Utilities Disk 4 supplied with the PC, and it is easiest to copy it from this disk to the disk containing your text files. (The full name is PRINT.CMD on disk 4.) Once you've entered the line above you'll be asked to tell the computer the name of the device to which you want the file printed —

```
Name of list device [PRN]:
```

If, as is most likely, you want NAME.DOC to be sent to your printer, just press the Return key at this point. You'll then be told —

```
Resident part of PRINT installed
A:TEST.DOC is currently being printed
```

If you want to PRINT a number of files, you enter the command line —

```
A>PRINT NAME.DOC SECOND.DOC [and so on]
```

These files will then be printed in the order specified. If you change your mind while in the middle of a queue of names like these and you want to cancel one of them, you just enter —

```
A>PRINT THIRD.DOC/C
```

The /C option tells your PC that the selected file is to be cancelled from the print queue.

An expert opinion

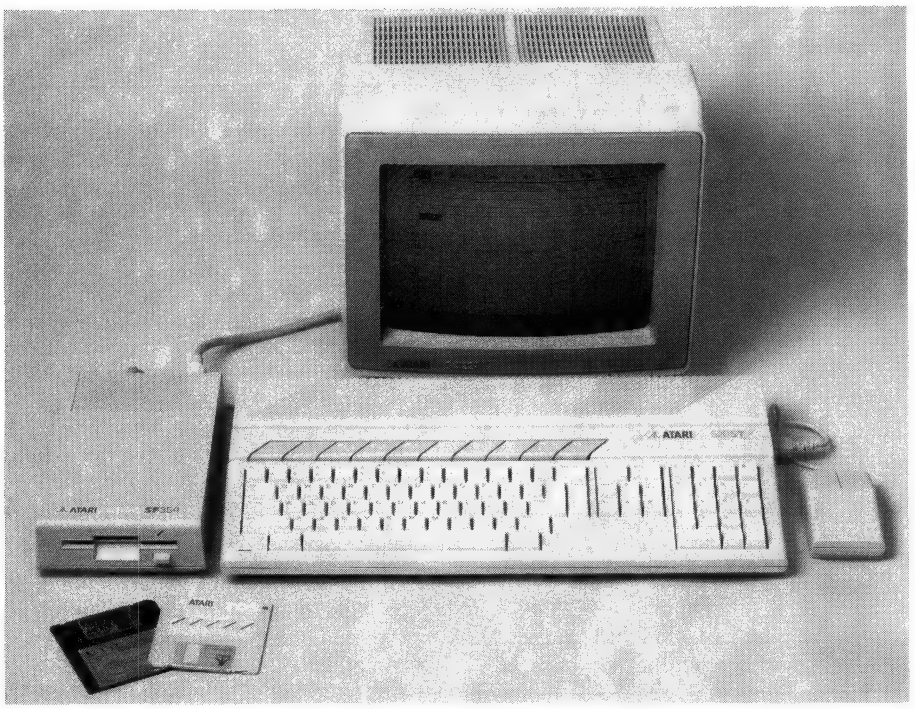
An 'expert system' is an artificial intelligence program which encodes human expertise so that non-experts can access it. The program shown in Listing 1, for running under Basic on the Amstrad PC, is the simplest expert system in the world — all it does is tell you whether you're thinking of a man, a horse or a sparrow — but it should give you a framework on which you can develop a few simple systems of your own. Just run the program and answer the questions, and you'll see.

I'd be more than happy to share any of your discoveries, hints, tips, comments and programs with other users. 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. □

```
REM SPURT
CLS
WHILE NOT ended
PRINT "I WANT YOU TO THINK OF A MAN, A HORSE"
PRINT TAB(6);"OR A SPARROW"
FOR j=1 TO 4000:NEXT j
PRINT:PRINT
GOSUB questions
PRINT
PRINT "-------------------------------"
PRINT:PRINT "PRESS 'RETURN' FOR ANOTHER ONE, OR"
PRINT "ANY KEY AND THEN 'RETURN' TO QUIT"
INPUT q$
IF q$<>"" THEN END
CLS
WEND
REM *************
LABEL questions
count=0
PRINT "DOES IT HAVE TWO LEGS"
GOSUB process_answer
PRINT "CAN IT WALK"
GOSUB process_answer
PRINT "CAN IT FLY"
GOSUB process_answer
PRINT "YOU WERE THINKING OF A ";
IF count=1 THEN PRINT "HORSE"
IF count=2 THEN PRINT "MAN"
IF count=3 THEN PRINT "SPARROW"
RETURN
REM ***************
LABEL process_answer
a$="":WHILE INKEY$<>"":WEND
PRINT "      Y OR N"
WHILE a$<>"n" AND a$<>"N" AND a$<>"y" AND a$<>"Y"
a$=INKEY$:WEND
IF a$="Y" OR a$="y" THEN count=count+1
PRINT
RETURN
```

Listing 1. This program is a simple expert system for running under Basic on the Amstrad PC.

YOUR ATARI



ALTHOUGH MOST Ataris are supplied with a single floppy disk drive, it is possible to purchase additional floppy or hard disk drives for the machine.

The hard disk can be partitioned and installed as a number of individual logical drives. A single hard disk can thus be installed as drive C:, D:, E: and so on. The partitions can be used for different types of applications, such as wordprocessing work on Drive C:, and accounts on Drive D:.

It would be nice to allocate each partition an easily identifiable icon on the GEM desktop. I would also like to show the RAM disk as a folder rather than a filing cabinet, to remind me that the storage is not permanent, and the folder has to be 'put away' before turning off the computer.

As it turns out, there is a simple way of achieving these ends.

On just about every disk you pop into the drive on your ST is a file called Desktop.inf. This is created by TOS when you execute the Save Desktop command. The Desktop.inf file is in standard ASCII format, which means you can alter it at will using any text editor (for example 1st Word in its non-wordprocessing mode).

Desktop.inf tells the operating system how the desktop should look when booted up. This includes the resolution, colour palette, and the number, appearance and placement of the icons and windows. A somewhat non-typical Desktop.inf file is shown in Listing 1. It is non-typical because I have doctored it to show a couple of interesting points.

```
#a000000
#b001000
#c77700070006000700552005055 5
  22207705570750555077031111 03
#d
#E DB 01
#W 00 00 36 01 18 16 0B @
#W 00 00 0C 01 15 17 00 @
#W 00 00 16 01 18 16 00 @
#W 00 00 0F 0A 15 0B 00 @
#M 00 00 00 FF A FLOPPY @ @
#M 00 01 01 FF B SLOPPY DISK @ @
#M 00 02 02 FF C JUNK DRIVE @ @
#M 01 00 03 FF E PROGRAMS @ @
#M 01 01 04 FF F DOCUMENTS @ @
#T 00 03 02 FF   RUBBISH @ @
#T 03 03 02 FF   SECOND BIN @ @
#F FF 04   @ *.*@
#D FF 01   @ *.*@
#G 03 FF   *.APP@ @
#G 03 FF   *.PRG@ @
#F 03 04   *.TOS@ @
#P 03 04   *.TTP@ @
#G 03 04   1ST_WORD.PRG@ *.DOC@
```

Listing 1. *A 'doctored' Desktop.inf file – refer to the text for an explanation. The screen created on bootup is shown in Figure 1.*

For the moment, ignore all lines except those which begin with 'M' or 'T'. The 'M' lines contain drive icon information, while the 'T' lines define the trash can.

Taking the first 'M' line, the information contained is as follows: The '#M' indicates that this line defines a drive icon. The first '00' is the column and the second '00' is the row which the icon appears in. The third '00' indicates the type of icon, as shown (0 is a Filing Cabinet; 1, a Folder; 2, Trash Can; 3, Program Icon; and 4, Document). 'FF' is just a delimiter, while the 'A' is the drive letter. The name assigned to the drive is next, and '@@' is a terminator.

In the low resolution screen, there can be up to four columns (00 to 04) and four rows.

The icons can be given any name at all, up to 12 characters long. The operating system doesn't care what the picture looks like, or what name it is given, but it is particularly fussy about the drive letter. You can, for instance, install a drive as Drive C:, call it 'Sloppy disk' and make it look like the trash can. TOS doesn't care, provided the 'C:' part is correct, as that is the only part it needs to find the right source or destination for your data.

The line starting with 'T' defines the trash can (or rubbish bin, depending on where you went to school). The same conventions as for drive icons apply, except that no drive letter is allocated. You can have a trash can which looks like a pile of documents and is called 'Black Hole'. You can even have multiple trash cans, if that takes your fancy.

```
#a000000
#b001000
#c77700070006000700552005055 5
  22207705570750555077031111 03
#d
#E DB 02
#W 00 00 2E 01 1E 17 08 A:\*.*@
#W 00 00 0D 08 2A 0B 00 @
#W 00 00 0E 09 2A 0B 00 @
#W 00 00 0F 0A 2A 0B 00 @
#M 00 00 00 FF A FLOPPY DISK@ @
#M 00 01 00 FF B FLOPPY DISK@ @
#T 00 03 02 FF   TRASH@ @
#F FF 04   @ *.*@
#D FF 01   @ *.*@
#G 03 FF   *.APP@ @
#G 03 FF   *.PRG@ @
#F 03 04   *.TOS@ @
#P 03 04   *.TTP@ @
```

Listing 2. *A 'conventional' Desktop.inf file — compare the differences with Listing 1.*

The screen dump in Figure 1 shows the result of booting up with Listing 1 as the Desktop.inf file, while Listing 2 gives a more conventional desktop. Try and see the differences between the listings and the changes they cause in the appearance of the desktop.

1st Word Printer Drivers

UNTIL RECENTLY, all STs were bundled with a swag of good gear including that excellent wordprocessor 1st Word. This policy seems to have been abandoned, primarily because of the enormous range of top quality software now available from third party sources.

However, 1st Word remains the word processor of choice for most ST users because it is simple to use, adequately powerful for most purposes, and cheap.

1st Word comes with a heap of printer drivers for just about any printer you can name. Each driver consists of a data file (in ASCII format) which is installed using a program called (logically enough) Install.prg. Each data file is named Printer.hex, where printer can be Epson, IBM, Star or whatever.

The file consists of three main sections, being the Miscellaneous Configurable Variables, the Printer Characteristics Table, and the Translation Table. The Translation Table provides a one-for-one translation of each of the 255 characters in the Atari set into something the printer can handle.

The Printer Characteristics table holds all the control codes which tell the printer which type face to print, whether to print on bold, italic or whatever.

Each character in the set can be defined as a string of hex numbers which is sent to the printer. For instance —

1, 1B, 52, 00, 7C, 08, 5E

— is the line in the translation table which defines how to print an up arrow on a Star NX-10. '1' is the character number (in hex, remember), '1B 52 00' (equivalent to ESC R 0) selects the US character set, '7C' is the vertical bar, '08' causes a backspace, and '5E' is the circumflex.

Having got that sorted out, the way is open to make use of some of the characters which would otherwise be wasted. The character set of the ST has a lot of characters which are not commonly used, such as Hebrew letters and a lot of French, Spanish and other European characters.

Most printers don't have Hebrew, and few would have the two halves of the Atari symbol. On the other hand, quite a few have the IBM character graphics set available and the four suites of cards. It is then a simple matter to map these useful characters into some of the unused Atari characters.

With an IBM compatible printer, characters 176 to 223 respectively will print as the IBM character graphics set. These can be a useful (if laborious) means of producing lines, rulers and graphs in a simple wordprocessor document. All that is necessary is to select the appropriate character from the 1st Word character table. I

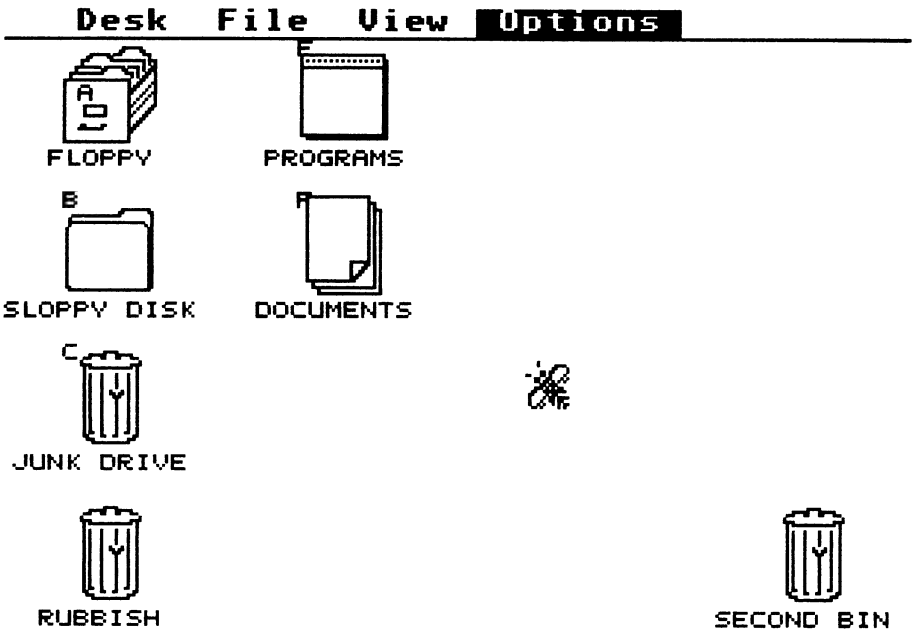


Figure 1. The screen after bootup using the Desktop.inf file in Listing 1.

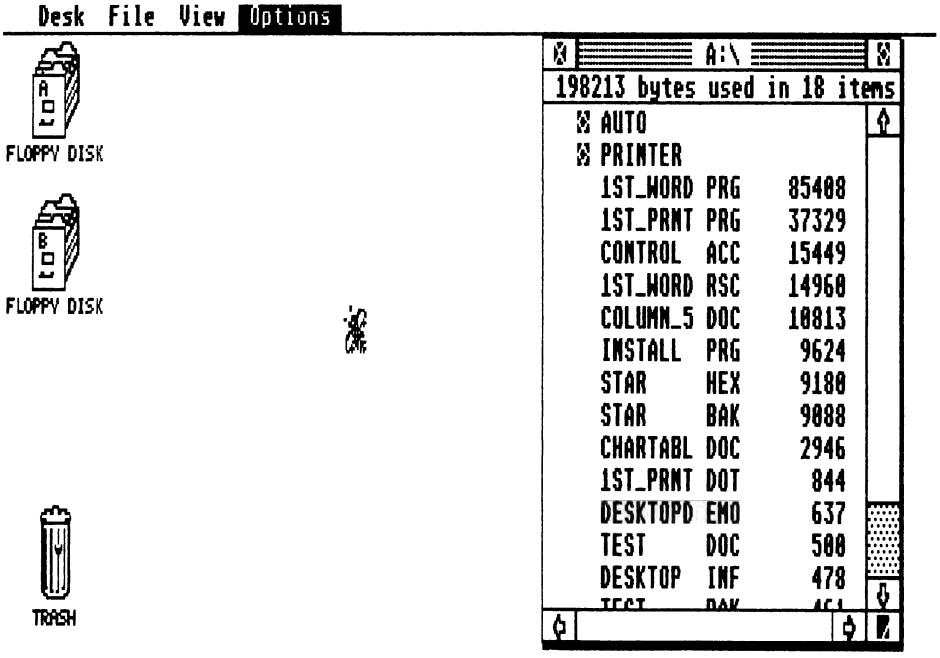


Figure 2. The screen after bootup using the Desktop.inf file in Listing 2.

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(2) NEC P2200. 168cps. push tractor & document feed. 6 fonts	779
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9 PIN NLQ	765
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(3) Epson EX800. 300cps. 2 fonts. push tractor	call
BUSINESS & PERSONAL 132 COLUMN PRINTERS	995
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Epson LQ1050. brand new release	810
NEC P7. 216cps. quiet. 10 fonts. (pin tractor +$135)	995
Fujitsu DL3400. 216cps. 2 fonts. push tractor	1040
9 PIN NLQ	
Epson FX1000. 240cps. 2 fonts. pull tractor	
(3) Epson EX1000. 300cps. 2 fonts. push tractor	
Fujitsu DX2400. 220cps. 2 fonts. push tractor	
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5 fonts (tractor +$110)	1440
(3) Epson LQ2500. 300cps. serial & parallel. push tractor. 5 fonts	1340
Fujitsu DL2400. 240cps. push tractor. 2 fonts. serial & parallel	2050
Microline 294. 400cps. serial & parallel. bottom feed tractor	1765
NEC P5(XL). 264cps. colour multistrike. parallel. 7 fonts	

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Epson GQ3500 - 6ppm. 7 fonts. 640K. parallel	4725
(4) NEC Silentwriter. LC890. 8ppm. 4 fonts. 1.4Mb. serial & parallel	3940
Qume Laserten. 10ppm. 33 fonts. 512Kb. serial & parallel	4385
Ricoh PC6000. 6ppm. 8 fonts. 1Mb. serial parallel	3250
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- POSTSCRIPT	9200
4N (4) NEC Silentwriter LC890. 8ppm. 35 fonts. 3Mb. serial & parallel	
Qume Scripten. 10ppm. call for more details	

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CT0710 PRINTERS

have found it has paid off to prepare a new printed character table showing the location of each new character relative to the old Atari set.

Using the right printer with the right driver, it is not at all hard to make 1st Word produce scientific notation such as the following . . .

$$\int \frac{5x^2 - 2y^{\frac{5}{3}}}{\theta + \sqrt[3]{\pi}}$$

In addition to substituting characters, it is possible to substitute control codes for characters.

Again taking the Star NX-10 as an example, it is possible to produce quad sized printing by replacing these lines in the Printer Characteristics Table —

```
E                * No LH Atari symbol
F                * No RH Atari symbol
```

with these —

```
E    1B 68 02 * Starts quad high print
F    1B 68 00 * Cancels enlarged print
```

Note that the words after the asterisk are ignored by the installation program — they are remarks only. When 1st Word tries to send a left-hand Atari symbol (chr$(&hE)), the printer receives the string 1B 68 02, which translates to ESC 'h' 2, and tells the printer to turn on quad height print. A chr$(&hF turns the big print off.

Having doctored the Star.hex (or whatever file) as described, install it using Install.prg to obtain a new 1st-Print.dot printer driver. When you want to print super big, just select the left hand Atari symbol from the character table, insert the appropriate text, and select the right-hand symbol to turn it off.

A further facility is to use any of the control key or drop-down menu codes for a different purpose. For instance, I cannot forsee *any* circumstance when I would want to print in the light mode, so I have set up lines E, F, 10 and 11 of the Printer Characteristics Table to turn on and off double-width print in both draft and NLQ modes. So, in order to get expanded print for headings and so on, I just have to press F4 and whatever is shown light on the screen will print double-width.

It is difficult to go into too much more detail, as each printer will have slightly different control codes for different functions, but I hope I've given you enough information to control your own printer through the hex files. □

JOHN HEPWORTH

IBM UNDERGROUND

TheDraw

When IBM designed the PC, and in particular the CGA video adapter, it took the standard ASCII set of alphanumeric characters and added a considerable number of block graphics characters which could be used to draw boxes and create shaded areas. From Basic it was easy to locate the cursor anywhere on screen, and control foreground and background colour, intensity, blink and underline.

The design of a screen took pencil and paper, and much planning, followed by careful writing of a program in Basic, Pascal or some other language. When TYPEing a text file to the screen the characters just appeared in sequence one after the other and the text scrolled up when the bottom of the screen was reached. In addition, when TYPEing a file to screen there was no control of colour and the text appeared in monochrome.

With DOS 2 came the concept of installable device drives, software extensions to DOS which allowed easy access to various hardware devices such as the screen. One of these is ANSI.SYS, which is invoked by the command DEVICE = ANSI.SYS in the file CONFIG.SYS on your boot disk. Now an escape character in a text file, followed by other character sequences can move the cursor to any screen position on the screen, and control the various video attributes of the character written there.

You can try it yourself. Create a file called MY-PC.ANS with your wordprocessor. Enter the following into it —

```
<esc>[10;10H <esc>[5mMy PC
  <esc>[0m <esc>[1;1H
```

— where —

```
<esc>
```

appears, the Escape character (decimal 27) is inserted. The method will vary from wordprocessor to wordprocessor, but with Microsoft Word merely hold down the Alt key and press 2 and then 7 on the numeric keypad, and release the Alt key. In Norton editor, Ctrl-P followed by pressing the Esc key does the trick.

```
<esc>[row;colH
```

moves the cursor to a place on screen, and

```
<Esc>?m
```

sets the character attribute — intensity, underline, blink, foreground and background colour.

Putting a few words on screen, blinking, is a major task. Just imagine creating a whole screen, in colour, and created with characters and block graphics written all over the screen in a user determined sequence.

TheDraw makes it easy. A screen can be created by placing individual characters or blocks wherever desired. Block moves are available so that a graphic element can be moved around the screen or copied from one location to another. Boxes can be drawn on screen by pressing Alt-M, and moving the cursor left, right, up and down. Corners are automatically created when the cursor changes direction and tees and crosses are created when one line meets another.

The base screen can be 'animated' onto the screen by displaying it from the top down or bottom up a row at a time, or from left to right or right to left a column at a time. Lines can be drawn on screen and the sequence in which they were drawn can be recorded and played back later. Complete control of foreground and background colour, and other video attributes, is available individually for each character or block graphic.

Screens can be saved in several forms. ANSI creates a file which can be sent to screen with the DOS TYPE command with random character locations. An ASCII file can be created which is written to screen with the Type command, but only one row at a time and from the top down, and also data statement can be created for use in Turbo Pascal, Basic and Assembler programs.

TheDraw (Version 2.04) is on the *Your Computer* Bulletin Board in a file called TheDraw5.ARC.

SimCga

Reviewing TheDraw brings up another problem and a matching Public Domain solution. The problem is that TheDraw is suited solely to running on machines with CGA adaptors. Hercules boards in their native and graphics modes simply do not work. Sure the program runs, and a screen can be created, but when saving the screen to disk TheDraw reads the video buffer, and looks at the addresses for the CGA. Nothing then gets recorded on disk.

There is a solution which reprograms the Hercules board hardware so that the computer and software thinks a CGA is installed. The program is SimCga, on the *Your Computer* Bulletin Board as SIMCGA-.ARC. It runs on my genuine IBM and genuine Hercules board very, very well. Flight Simulator, Microsoft Word and so on run extremely well, though screen response time is a little slower than with any normal video adaptor in native mode.

CtrlAlt

I have found CtrlAlt to be very useful, mainly for the ability to draw boxes within other applications. SimCga is one of those absolutely essential programs for users of Hercules boards. TheDraw is also essential, creating screens for use within batch files, welcome screens in colour for Bulletin Boards and rapidly creating data statements for creating stunning screens from various languages.

Drawing boxes within other applications programs, including wordprocessors and database programs, is just one of the many functions of another Public Domain program called CtrlAlt. It is a co-resident program which is loaded before your other application is run.

All the possible box characters can be drawn within an application as if they had been entered at the keyboard, by pressing Alt and one of the keys on the numeric keypad or the grey Plus or grey Minus keys. Alt-7, Alt-9, Alt-3 and Alt-1 draw top left, top right, bottom right and bottom left corners. Alt-5 draws two lines crossing and Alt-4, Alt-8, Alt-6 and Alt-2 draw one line meeting another. Alt-GreyPlus draws a vertical line and Alt-GreyMinus draws a horizontal line. There are several box character sets and these are selected by pressing Ctrl and Alt at the same time as also pressing one of the number keys across the top of the keyboard.

Normally the cursor moves to the right after a box character is written, but it is possible to select a mode where the cursor moves down or up after a vertical bar is written and left after a horizontal bar is written.

Emergency Exit

Ctrl-Alt-F9 is an emergency exit from any program which is out of control and will not respond to a Ctrl-Alt-Del. This must be used with care as all information will be lost.

CtrlAlt is on the *Your Computer Bulletin Board as CtrlAlt.ARC.* □

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YOUR MAC

Mac networking

Apple has made some extraordinary decisions with its AppleTalk/Apple Share local area network (LAN). Firstly, it designed a cabling system that was cheap and easy to install and promoted it as a small work-group solution. Then, for some odd reason, it added a file-server that requires an expensive dedicated Mac Plus (or better) with hard disk to make it work.

For small work-groups of say five or six, this makes the cost per connection about $100 for the cable, and $1000 for a share of the server. What you save on the swings, you more than loose on the roundabouts. It is no longer a small-group network.

Fortunately, Apple has upped the number of workstations that can be added to the AppleShare file-server (Version 1.1) from 25 to 50, so the system now becomes more suitable for larger networking groups. The cost of the dedicated server-Mac is therefore reduced. With 30 or more people on a system, the AppleShare-server and the AppleTalk components of the network could be about equal. But of course with the increased network load, you'd probably need to change to a Mac SE or II and increase the hard disk capacity — either by using a bigger disk, or by adding a couple of outboard SCSI drives in a daisy chain.

There is a common assumption that networks give you a cheap form of hard disk access. You do get 'hard disk access' if you apply the term only to the physical means, not the functionality. At this level, the hard disk is just a storage device which happens to have more capacity than a floppy. (The new Mac Prostation 1024 has 1 gigabyte.)

The LAN makes this storage available to a number of people, and so the value of the available space is obviously inversely proportional to the number of people using it. In physical terms, a 20 megabyte hard disk is only marginally better than a single 800 kilobyte floppy if there are 20 people on the network, all requiring about the same amount of space.

At the level of functionality, a hard disk is an extension of the internal memory of the computer. Data and applications can move in and out of RAM space at lightning speed, to the point where it is hard to distinguish between internal and external space.

In the IBM world, especially, this fast-disc access has been important in providing an alternative to good integrated programs and as a substitute for applications that allow you to stack multiple files on a desktop and swap easily between.

Unless you work all day on one repetitive task, the main value of integration is that you can swap almost instantly from a wordprocessor to a spreadsheet, then across to a database, and back again to the wordprocessor with hardly a second between. Most white-collar jobs require this — your computing requirements often change by the minute.

Desktop accessories have value for similar reasons. Quick access to a variety of application modules is the key factor in most business computing. With good integrated programs you can have a number of wordprocessing files on your desktop simultaneously and swap effortlessly between them. RAM disk partitioning lets you do almost the same thing.

The Mac does this multi-module swapping easily compared to the IBM — which is why, I guess, that hard-disks are more important to IBM users than they are in the Mac environment. And also why IBM users are fooling around with 80386 multitasking and OS 2 operating systems; they are looking to raw computing power, multitasking and RAM space to overcome some fundamental design problems.

A choice

If I had to choose between an integrated program that allows multiple files on the desktop, and a full-featured wordprocessor with super- and sub-script, multiple fonts, automatic footnotes, spelling checker, thesaurus, and ten-thousand other seldom-used features, I would buy the basic integrated program any time. Millions of owners of AppleWorks, Microsoft Works, and FrameWork will agree.

A hard disk gives you almost all the advantages of integration without the need for applications to simultaneously occupy RAM space. With the growing size of many applications and larger and larger spreadsheets, this feature is becoming important. This approach also allows you to choose the modules that you want to use — rather than having them foisted upon you by the programmer.

But pure mathematics tells us that the larger the applications get, the slower the lag in making changes; and already this is reaching the point of irritation and frustration, even with hard disks running at SCSI speeds

When you add to these standalone irritations the problems of contention-delays on a LAN (when a dozen or so people want to use the network at the same time) and the comparatively slow data-transport speed of AppleTalk (at only 230 kilobits per second) you no longer have the functionality of a hard disk — only a share of its storage capacity.

So the key features that make AppleTalk/AppleShare networks worthwhile are their ability to share stored information (common databases), share expensive peripherals (notably laser printers, minis and mainframes) and provide internal and external communications (electronic mail and packet-switching access).

The second LANs feature, electronic mail, is actually a poor substitute for the telephone in most cases. It depends on a company's mode of operations. It is popular in some companies, and dead or dying in others. Walk-net (or Adidas-net) is regaining popularity, with the coffee urn substituting for the e-mail file-server.

This leaves file-sharing as probably the major reason for going into networking — and for this reason gateways into large computers have now become a key feature in the LANs world.

It is interesting to see that the Macintosh is networked at a much higher rate than IBM PCs in proportion to their corporate numbers. Last year AppleTalk was the biggest seller of all LANs in terms of number of nodes.

What seems to have made the difference for the Macintosh is a spurt of development in mainframe and mini connectivity, bought on by the open architecture of the SE and II. I don't think Apple fully realised how much the closed-box approach was beginning to hurt it through the difficulties it imposed on third-party developers.

But the key to the Mac's recent success in networking is in Apple expanded communications strategy. John Sculley was the first Apple executive to talk openly about IBM market dominance, and he was instrumental in designing a long-term marketing plan that recognised market realities. Now people trust what he says.

Apple already make a IBM PC plug-in card that allows IBMs and clones to sit on AppleTalk networks and link through these to Ethernet systems. Now Apple has said it will support IBM's System Network Architecture (SNA), the LU6.2 peer-to-peer communications system, and eventually the OSI (Open Systems Interconnect) recommendations. In the corridors of Cupertino, 'connectivity' is the new catchphrase! □

YOUR APPLE

Benign neglect

Benign neglect, is the term that best seems to describe the way Apple have treated the Apple IIGs.

Here is a small computer that is a world-beater by any standards, that has the largest software base available to any computer, and which has a million or so fanatical supporters — but the company that owns it doesn't want to know, because they are afraid that it will provide competition to the Macintosh.

If the design of the GS was owned by any company other than Apple you can bet there'd be a lot of marketing men out there pushing it strongly. Commodore and Atari would have given their back teeth to have the features, the reputation *and* the fanatical support that the Apple II line has had over the years.

But even though Cupertino seem to be treating the machine like an illegitimate cousin from Hicksville, both the software and the hardware support continues to grow. It isn't easy going, but the Apple IIGS might yet make it into the Computer Hall of Fame — despite the lack of company support.

Applefest software

The annual AppleFest in the US turned up a number of new programs for the GS according to Peter Sandys. He arrived back in Australia this month with a list a yard long — more than a few of them using the 16-bit power of the machine.

There was still a preponderance of games, drawing, painting and animation programs, which I see as trivia on a 16-bit computer, but there were also seven new wordprocessors (overkill?), three desktop publishers, four database managers and some language utilities.

From my own point of view there were a couple of releases with particular interest. Checkmate Technologies has produced a plug-in called Memory Saver, which turns your expanded memory card into a pseudo-ROM pack. Memory Saver has its own power supply and battery back-up, and when you switch off your machine, this power supply keeps the RAM on your Apple IIGS memory card refreshed. When you turn your machine back on again, it will load immediately (if it has been directed to look at the RAM disk).

Quite frankly, I've never been able to understand why Apple and some of the other small computer makers haven't supplied battery-backed memory as standard — or at least an optional extra. I often use a small $600 Tandy 100 portable that's now getting rather ancient, and it has 36 kilobytes of non-volatile RAM on CMOS chips.

If the design of the GS was owned by any company other than Apple you can bet there'd be a lot of marketing men out there pushing it strongly.

The four pen-light batteries that drive the machine seem to last forever. At one stage I left the Tandy unused for over three months with a full memory and it still retained my programs and text files. If Tandy could do it a couple of years ago with a $600 portable, why haven't we got it on more expensive systems? It can't be all that difficult.

Apart from the obvious, there are another two extremely valuable consequences of non-volatile memory. The first is that it makes the computer almost foolproof — especially for novice users. You have got to actively discard a file to lose it — so you can't make the usual novice mistake of mis-saving a file, or destroying another of the same name — or any of those other idiotic mistakes you seem to make in your early days in computing.

The second not-so-obvious value of non-volatile memory is that instant access changes the way you use a computer. The machine is much more useful.

It's for this reason that I leave my home IIe up and running 24 hours a day, 7 days a week (it's got a fan), and also a major reason for using AppleWorks. When I want to note something, check something, or find some piece of information, the tools I want are there and waiting. I am genetically so lazy that time is important when I finally get down to work. I found long ago that I often don't use the computer if I have to wait a minute or so while it boots.

The problem with leaving the Apple running non-stop is that Sydney is subject to a lot of thunderstorms in summer and winter, and everytime one appears over the horizon I religiously dump all my files out of memory and close the computer down. This gets to be a real time-waster with the 1 megabyte GS because you can have such a lot of material in RAM. Actually it is a good argument for using a hard disk as a backup!

I don't run my GS around the clock like the IIe because the amount of heat it puts out (with 1 Mbyte of RAM and a few extra cards) seems to me to be a bit excessive, especially in summer. But battery-backed RAM would solve the problem by letting me turn the GS off and still have almost instant access.

For these reasons I will probably buy Memory Saver when it comes out: it looks like a winner. No distributor has been announced for Australia at present, but I'll keep you posted.

Other software

There are two other pieces of software released recently that complement Memory Saver, but without testing them I don't know which to buy

The first is Softswitch by Robert Wagner which is a ProDOS 8 version of Switcher for the Macintosh. It lets you keep three active programs up in the GS and switch between. You can also copy screens across.

Sounding even better still, is Ramup from Quality Computers, which allows you to allocate space in any Apple II extended memory card (with at least 512 Kbyte of RAM) for up to twenty programs. Ramup allows you to pre-allocate RAM space and save this allocation so that you don't need to go through this hassle every time you boot.

It appears to be especially suited for AppleWorks accessories allowing you to load both Pinpoint and Super Macroworks and/or partition RAM so that AppleWorks 2.0 doesn't use all the space.

These last two programs are evolutionary, rather than revolutionary, but they seem to be going in the right direction. When you finally get around to dressing up a IIe or IIGS with a Mbyte or more of memory, you've got to find something to do with it — and what better way that to create a multi-program environment. □

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YOUR AMIGA

To the cretin . . .

I'd like to start this month's column with a word or two addressed to the cretin responsible for the virus currently running riot through the Public Domain circuit. I'd like to address a couple of words to that cretin ... unfortunately Jake won't allow that sort of language in the magazine.

To write a 'virus' program is not difficult. It requires some knowledge of programming and of the machine environment. It also requires the same sort of mentality which thinks smashing windows in bus shelters is smart and insulting little old ladies is clever.

The virus in question is a small, machine language program which sits in sectors 0 and 1 of a disk, an area which most programs don't use. When an 'infected' disk is used to boot the Amiga the virus program copies a version of itself into a special part of the Amiga's memory. The virus will stay in this area of memory until the Amiga is turned off.

Each time a non-write-protected disk is inserted into the Amiga the virus copies itself from memory onto the disk. In this way the virus can spread quickly through a collection of disks. The first indication most people have of the virus presence is when programs start failing for no apparent reason, and reliable disks suddenly become corrupt. A message may be displayed which reads 'Something wonderful has happened — Your Amiga is alive'.

It is possible to check whether the virus is present in your Amiga by holding down the left mouse button as you press the Ctrl-A-A command to boot (reset) your Amiga. If the monitor screen becomes completely green for about one second during the booting sequence it is an indication that the virus is present in memory. To check for the presence of the virus on your disks is more complicated.

There are several utility packages available, both commercially and in the Public Domain which permit you to examine the contents of individual sectors of a disk. One of these is Sectorama which is available in the Public Domain as a Shareware product. Using such a utility you can examine sectors number 0 and 1 on each disk to check for the presence of the virus. It's presence is obvious as the text of the 'Something wonderful ...' message is stored in plain characters on sector 1.

Ensure that you write-protect all disks before you examine them, in order to avoid spreading the virus further.

Having separated your disks into 'infected' and 'uninfected', switch off your Amiga for a couple of minutes. This will ensure that the virus has been deleted from memory. While you wait, set the write-protect tab of each of your infected disks to the write-enabled position. Now boot your Amiga from an uninfected disk and enter the CLI environment. Use the CLI command Install on each of the infected disks, which will re-write sectors 0 and 1 of each of the infected disks. This process will destroy the virus on each disk.

To be completely sure, check all of your disks again with the sector examination utility. If the message doesn't appear in sector 1 of any disk, you have eliminated the virus, but beware. Every time you receive a disk from someone, keep it in quarantine until you are able to examine it with a sector examination utility. In this way we will all be able to gradually get rid of the virus for good.

Unless it is absolutely necessary to do otherwise, I always keep my disks in the write-protected state. Absolutely nothing, including a virus, can be written onto a disk which has the write-protect tab in the protected position.

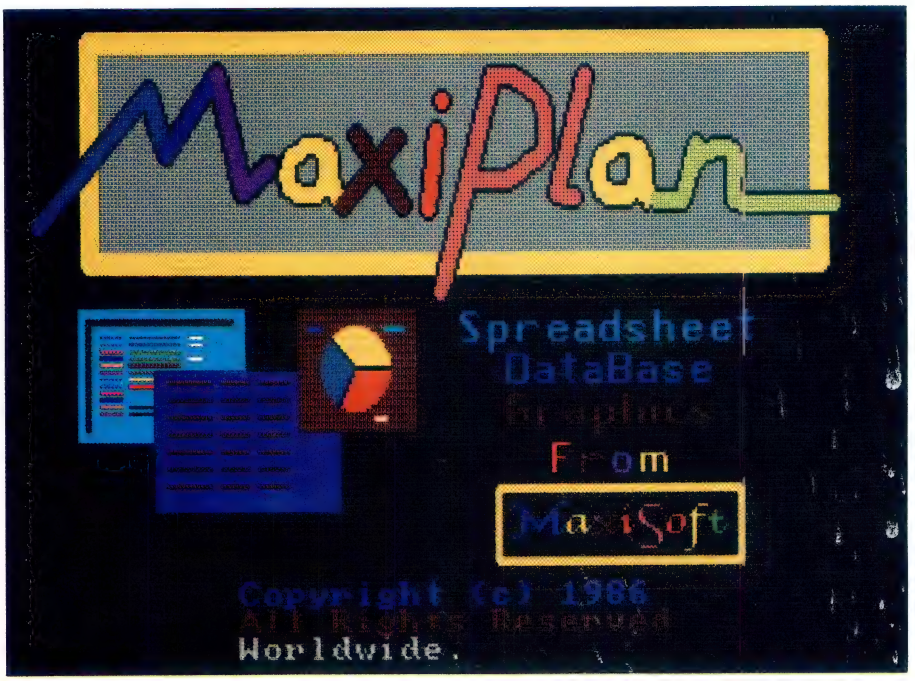

Figure 1. *Gregg Faulkner's favourite spreadsheet is Maxi Plan — it feels good (and if it feels good, he does it!). The image was captured using Grabbit, another favourite.*

Printmaster Plus

Sorry about the negative start to this month's column. To change the mood completely, let's take a look at a software package ideal for all Amiga owners. Printmaster Plus is manufactured in Sydney by Dataflow Computer Services, under license from Kyocera Unison Inc. of the US. Printmaster Plus makes it easy and quick to produce greeting cards, posters, calendars, banners and personalised stationery with your Amiga and a dot-matrix printer.

The Printmaster Plus disk contains, as well as the main program, 122 graphics images, and 10 fonts. The images range from no smoking symbols to Christmas trees, and include UFOs, turkeys, computers, animals and many more. There are images for every occasion and for every purpose. If that's not enough for you, there are two additional Art Gallery disks available which each provide another 140 images.

Printmaster Plus is very easy to use and

everyone from about eight upwards can have a lot of fun producing all sorts of documents. It only produces black and white documents, but then very few of us have colour printers anyway. At about $80 I think it's good value for the family. The extra Art Gallery disks are also $80 each which won't hurt the bank balance too badly.

The Printmaster Plus manual is well written and clearly illustrated. The package is easy to learn as it is menu driven — here meaning that at each stage the available options are presented for your choice. About the only fault I was able to find was near the printing stage. A requestor window says to press the left mouse button to print, or the right button to return to the previous menu. No matter which button is pressed the package prints. As I said, only a small glitch, but one worth noting.

The Cook really likes Printmaster Plus and our friends and relatives all received various calendars, posters and so on for Christmas thanks to her efforts. Recommended for the whole family.

New Owners

With the astronomical sales figures for Amiga 500s experienced through December, it would seem that we have a lot of new Amiga owners joining our ranks. We probably all know someone who has asked our advice on a computer to buy for the family, and generally we would have recommended an Amiga. Not always though ... if I know that the person only wants a wordprocessor and is not prepared to buy software, but would rather pirate it from friends I always recommend an IBM clone. That way they won't be upset when I refuse requests to copy mine.

For the benefit of newcomers to the ranks of Amiga owners, let me briefly summarise what I consider to be the best value software available in Australia. An Amiga without a great paint program is only half a machine, and the greatest of the paint programs has to be Deluxe Paint II. It's easy enough for the youngster in the family to use, yet powerful enough to extend the capabilities of a professional artist. A close second would be Aegis Images, and if you can afford both then so much the better as they complement each other beautifully.

In the area of wordprocessors I have very strong feelings. A wordprocessor is probably going to be the most frequently used package in your software library, and is going to last you for years, so get the best. WordPerfect is the best. It's horribly expensive at $595, but when you consider the value you will get from it ... I really disagree with people who justify cheap and nasty wordprocessors by saying that 'it's only for the kids'. WordPerfect is a professional quality wordprocessor and kids can operate it just as easily as adults can. After only a short learning session anyone (kids included) can be using WordPerfect very effectively.

To start kids on a cheap and nasty wordprocessor is to do them a disservice. If they're going to be encouraged to write, and surely all kids should be, then give them the best tool available.

Music packages! I have some mixed feelings here, but I think I would have to lean toward Aegis Sonix as the best package for home use. I know many Amiga owners will be outraged and will argue for Deluxe Music Construction Set, Music Studio or Instant Music or whatever. I will stand by my decision, regardless. Aegis Sonix allows the creation of music by 'traditional' scoring or by direct keyboard input, and it provides a synthesiser capability for creation of new instruments. If you really want to see, or hear, what is possible in Amiga music, ask your dealer to play the Aegis Sonix demo of John Farnham's 'You're the Voice'. It's an absolutely stunning mixture of computer generated sounds and digitised sequences.

My favourite spreadsheet is Maxi Plan which is easy to use, colourful, friendly, probably not as fast as some, and easy to learn. I guess a lot of people will argue that my selection criteria are up the creek, but so what! I'm just telling it the way I see it. To me Maxi Plan just feels good, and if it feels good I do it!

Utility packages

There are a few utility packages which are an absolute necessity if you are to get the best from Your Amiga. Marauder II is a vital necessity while some software manufacturers continue to copy-protect their disks. *Never* use your original disk to run a package. The first thing you should do with a new software package is copy it onto a blank disk. Then put your original disk away in a safe, cool, dry place *well away from anything magnetic*. Then if anything happens to damage your working copy, you are able to make another working copy from your original disk. Marauder II is the best of the generally available backup utility programs.

Gizmoz Productivity Tools Version 2 is an excellent set of utility programs which can make your life easier and more fun. Gizmoz includes a simple database, a diary, a cuckoo clock (what next!), a nice version of the Life game (an old computer classic), and much more. Another very useful utility set is Grabbit. Grabbit allows the user to 'grab' any screen at any time and save it to disk or send it directly to the printer. I use Grabbit to capture most of the images which accompany these articles.

Climate is a very useful utility which will help you to learn about the Disk Operating System, or DOS, which Commodore for some really weird reason insist on calling CLI. Keyboard Cadet is a fun typing tutor which will also let you learn to use the Dvorak style keyboard, in case you should ever be lucky enough to find one. And finally, Diskwik is a useful utility which can save your bacon if you should be unlucky enough to accidentally delete a wanted file or something similar. It is a set of disk repair and maintenance utilities.

Flight Simulator II is the greatest thing ever to happen to PCs, and with the release of several scenery disks it's more fun than ever. Fly around the sights of the American East Coast in a Cessna 182 or a Lear Jet. If you so desire, fly a World War I bi-plane fighter in combat with the Red Baron. For the maximum thrill, connect your Amiga to another via the serial ports and fly formation with a mate. After a particularly trying day at the office I love to come home and fly for a couple of hours just to relax.

I haven't yet mentioned any games. Let me keep it nice and simple by saying that I've personally tried and enjoyed, and would thoroughly recommend the following: Artic Fox, Archon, The Pawn, Starglider, Faery Tale, Hard Ball, Balance Of Power, Deja Vu, Chessmaster 2000, Marble Madness, Defender Of The Crown, Leaderboard, Shangai, Secret Service and Sinbad and The Throne Of The Falcon.

Now to balance the article, I will dare to present The Cook's list of software to stay well away from. These are the sort of programs you would only buy to give to someone you really hate. At the bottom of the heap is the really awful Hollywood Strip Poker, definitely only for sniffers of bicycle seats. Somewhere at the lousy level is One On One Basketball and SDI, and a few others like Skyfox and Leather Goddesses. Fortunately the very worst don't last long as the grapevine sees to that.

That's enough from me for now. Happy Amiga-ing. □

DOF DICKINSON & SHARON FRANCE

MICROBEE FILE

Snippets

There is not a lot coming out of Microbee Systems at the moment as far as information about the future is concerned. That is not to say there is no future, quite the contrary, there is talk of some interesting things on the horizon.

However, we are not being bowled over by a rush of 'real soon now' promises which are part and parcel of the computer industry in general. Unfortunately, in the past Microbee has had its share of the industry's answer to the magic act — now you see it, now you don't ... or as it is more commonly referred to — vapourware.

All of these, of course, are weak excuses and were a vain attempt to justify not needing or wanting a mouse . . .

At the moment there is almost an expectant air about Microbee Systems. There are mutterings that the amalgamation with Impact is starting to have benefits in the actual manufacturing process of the Microbee. For some time Impact has been using custom made chips in its 'intelligent' laser printers — a measure which cuts the size and cost of the unit, while branding the product as being unique to the manufacturer. Through the Impact connection, it is alleged that Microbee will tread the same path and we will see a 'Bee that will be faster, more reliable and cheaper.

Although one could mutter 'promises promises' into one's beard, I believe that it will indeed be possible for Microbee to produce the goods.

Microbee mice are nice

When you don't have something, isn't it funny how you take up a lot of time and effort justifying not having it and rationalising why it would be of little benefit anyway. At least that is how I was about mice. While those Mac-ites (and other mouse maniacs) around me were skimming across their mouse mate pads and clicking on and off, I was silently brooding, working on a list of why mice were inconvenient. Even if my CP/M based Microbee could support a rodent I wouldn't want one because:

— They take up too much room on a busy desk.
— Typing in commands is so much faster and accurate than pointing, clicking and selecting this and that.
— Using the keyboard exclusively is a more pure pursuit; your fingers need never leave their workplace and dilly dally somewhere else.
— I'm keyboard literate, why should I take time out to learn how to use a new device?
— Other input devices (especially where drawing programs such as Electric Paintbrush are concerned) are just as good if not better. For example, with a chalkboard-like tablet you know where you stand; there is a close one to one spacial relationship between the tablet and the screen, which is not the case with a mouse.
— They are expensive.
— They can be frustrating: if you have one and get used to using it, one day you will find that you will want to plug something else into the serial port, and can't, without sacrificing the mouse.
— They contribute to the cable chaos of computers.

All of these, of course, are weak excuses and were a vain attempt to justify not needing or wanting a mouse (when deep down inside I desperately had to get my hands on one). Good old Festinger and his Cognitive Dissonance Theory rears his ugly head!

Of course, after a half hour play with a mouse (of the two buttoned Microbee NEOS variety) all of the above arguments can be refuted by simply saying that 'Mice are fun!'. Hang the expense and the space (trivial considerations, really) and if you have a 256TC, you won't need to use the serial port for a modem anyway. The luxury of it all!

Microbee Mouse Mania is now possible due to the magic of increased PCG in the Premium Microbees and the new 256TC (sorry, the technology of the standard Microbees can only stretch so far). The interface for the device is built into the BIOS of these machines and is not externally apparent. I borrowed a mouse to put the new version of Electric Paintbrush through its paces, and was absolutely delighted to discover that it works with a number of the standard pieces of Microbee software. Apart from Electric Paintbrush, which was designed to be mouse-bound, it is possible to drive the Shell, Transfer, Init and the user defined software utilities.

What we all need to see is more mouse minded programs.

Using a mouse to get what you want from the Microbee Shell is simplicity itself. No more mistyping. Just point to the programs and the files you wish to operate on (for example, you can chain things together to form a command line — WS, followed by your file — FRED.DOC) and click them into submission. (As an aside, I found the new Shell for the Microbee — version 3.01 to have some very nice touches — half and full tones and a time and date display; all very professional.)

Utilities

As mentioned, several of the utilities, as displayed along the bottom of the screen, can be accessed using the mouse. Just point to the User Defined Icon (the Bee), Init (the disk) or Transfer (the arrow), click and away you go. With some of these utilities, that is as far as you get with the mouse. With Init, for example, the mouse has penetrated the sanctum of screen positioning and the like so that it is all under the rodent's control. Devious little device!

With this two buttoned (eyed? eared?) mammal, depressing the left hand side allows selection, while the right hand button means activation. I had no manual to go by in running this device, but it was all pretty much common sense stuff.

Of course, the mouse really comes into its own when used with dedicated drawing programs such as Electric Paintbrush (but more about this in a later column). What we all need to see is more mouse minded programs. For those software writers interested in whipping their programs into shape to take a mouse, all of the relevant information is available in the Microbee 256K TC Technical Manual (this apparently also covers the 128K Premiums).

However, if you are in doubt and do not have said manual, drop a line to Microbee and ask for a photocopy of the pages referring to the mouse driver and the software cursor controls. I'm sure that they'll oblige. Soon we will see more mice programs, which will mean more mice scurrying along Microbee desktops across the country-side (sounds like we may need to call on the Pied Piper of Hamlyn!).

All present and accounted for

If there is one piece of software that should be in every teacher's drawer, it's a computerised markbook. You may be the type who enjoys sitting down at the end of the day and writing out lists of names, photocopying and toting up scores from tests and term grades. But you'd be in the minority. Most teachers have quickly woken up to the labour-saving benefits offered by a good markbook program. All of the programs on offer promise to be easy to use and do everything you need quickly and efficiently. We look at four which were readily available at the time of review. There are others on the market, which we may have the opportunity to look at, at some later date.

GTMark

GTMark allows you to keep records of up to 350 students, with up to 20 scores per student on any one file. Typically, teachers create a file of names of each class they teach. Then they record assessments for three or four topics per term in separate mark files. An average file would contain about 30 names and there may be up to 24 of these on any data disk by the end of the year.

At the end of the term, teachers may transfer totals for each topic to a summary file. Other teachers of the same course do the same. The summary files from each teacher are merged and used for grading purposes. The resulting file, which could contain 200 or 300 names each with 20 scores recorded, is 18 kilobytes.

The first thing you do when you receive your disk is print out the documentation contained in a WordStar compatible file called GTMARK-1.DOC. This information can also be accessed through the Help file during the program.

GTMark is easy to operate because it has menus at every stage which tell you exactly what to do and how. If in doubt, you can move backwards through the programs by pressing the ESC key at any stage. The opening menu of GTMark presents 7 options:

1) Open file to edit name columns
2) Open file to edit score columns
3) Open file to print class reports
4) Open file to print reports
5) Open file for term stats
6) File operation
7) Help

On-screen windows also show you which drive you're using, how to switch to a different drive and how to select and load existing files.

GTMark is easy to operate because it has menus at every stage which tell you exactly what to do and how.

There are a number of demonstration files on the disk which you use to familiarise yourself with the program. I opened a demo file to practise editing the name column. It contained a colourful, but familiar bunch: Horner, Jack; Peep, Bo; Spratt, Jack and so on. It's easy to add a new student so I put in Hearts, Queen of, for good measure. You're allowed up to 20 characters for each name, which is a useful feature when you are dealing with students with long names. Next to the name you can record up to three pieces of information of six characters in length, such as year, class, group, age and so on. You can also shift students to different classes and use Ctrl-Y to kill them (you may have often wished to do this, but in this case it just means delete). By the way, when you do kill a student, a little 'poof!' message appears on screen — a nice touch! You find students by searching for names or parts of names (Horn for Jack Horner for instance). When you've finished, you type Ctrl-K to save your amended list.

The only annoying aspect so far for me is that you have to use control commands to edit files: Ctrl-K to save, Ctrl-W and Ctrl-Z to move up and down lists of names, Ctrl-G to delete and so on; however, you can use arrow keys if you have a Premium keyboard. As any hater of WordStar will know, such commands are fine if you can remember them by heart, otherwise you have to keep referring to the on-screen prompts and this slows you down. Still, if you know your WordStar you should be fine. And I should have to add that many teachers use WordStar and might well consider these familiar control commands a bonus rather than a burden.

If you wish to edit score columns, you are given the choice of:

1) Edit test details and scores
2) Edit scores
3) Delete all scores
4) Transfer total % to other file

I opted to edit test details and scores and decided to add a new test. It was the B.A. — well Miss Muffet must have been doing something on her tuffet besides eating all these years. Anyway, I lined my class up and gave them marks out of 100.

You can record raw marks from 0 to 100 and scale them as you need. If students are absent, the program will calculate an average of all other marks to form a total percentage which is calculated and recorded for each student.

Your life is made easy by the program as you rekey each student's name to allot a mark; the program automatically calls each one up for you and you either enter a score or an 'a' for absent.

A useful feature is the ability to moderate a set of marks against an exam result. This would be particularly useful amongst secondary teachers when several teachers have classes doing the same course. The accumulated assessments or term marks for each class may be moderated against a common exam. Using a linear function, the term marks are standardised against the exam score.

When it comes to printing out, the program allows you the flexibility of deciding in which order and what information will be printed on you page. You can also print a simple histogram charting the class total results.

Then comes the real bonus — you can print out individual reports. You know, those ghastly things that comes up at least once a term to be scrutinised by parents and grandparents alike. And what's even better, you don't even have to think up cryptic little comments to describe the student's progress (Cecil's work has been quite extraordinary this term); there's a bank of ready-made comments for you to

choose from with relevant and useful comments such as: 'has achieved all the objectives of the course' or 'has maintained excellent achievement'. These are just two listed under 'excellent'. Needless to say, the praise diminishes as the categories descend. If you're not satisfied with the ones provided, the program allows you to add your own. There is nothing worse than seeing the exact same comment from teachers of the same student!

The latest version supports an individual report with up to 66 lines. This is handy for primary teachers who need to record a larger number of items on a larger report card.

Another useful feature is that the files are WordStar compatible, so you can transfer them into a text file if you wish to carry out more extensive work with them.

I warmed to this program as I went along. I started out finding it inhospitable, but it was purely a question of learning how it operated. I ended up with a great respect for it. It does everything you require and is thorough. If you are prepared to work a little at learning it, this program will save you hours and hours of time. The documentation is very precise and clear.

A Primary Teacher's Rollbook

A Primary Teacher's Rollbook allows you to record up to 15 marks in all subjects against 45 pupils.

Load this program and you are presented with a prompt which says: Awaiting Command .....

So there you go, all you types like me who refuse to read the manual unless it is absolutely necessary — get out of that one! I typed HELP and, much to my delight, help appeared in the form of several screen pages of commands, key functions and error messages which I jotted down needlessly, as it turned out, for they are all printed in the manual. But of course, the non-manual reading types among you will all have had experiences like this many times already . . . and we never learn!

It becomes clear after reading the commands that the creator of A Primary Teacher's Rollbook has done his or her best to make it a user friendly program. It accepts the commands ERASE, REMOVE and DELETE to remove a file or mark, thus allowing for our individual quirkiness as to which expression we habitually use. In fact, you can even create you own strings of commands. One teacher may key in ERASE MATHS MARK, another REMOVE MATHS MARK to achieve the same end result. This for me is the most appealing aspect of the program.

It becomes clear after reading the commands that the creator of A Primary Teacher's Rollbook has done his or her best to make it a user friendly program.

The program is also looser in format than GTMark. It puts you in charge. Because you're not presented with any menus, you simply tell the computer what you wish it to do next: SCALE, PRINT and so on. There is no fixed way of proceeding, but the first thing you'll do will be to enter the names of your class of students by typing CREATE.

At this stage, the 14 character limit on names will cause you problems. It means that you can't enter full names, but will have to opt for initial plus surname. Make sure you separate them with a space and not a full point or a comma. As you key in the names, they appear in columns of three down the screen page. Don't worry if you make a typing error, it is easy to EDIT mistakes. If you key in SORT when you have completed your list, the names will be automatically placed into alphabetical order — very neat!

The next thing you might wish to do is, for example, key in the results for a test. You'd type NEW MATHS MARK and the computer then checks with you that this is the first one. This verified, your class list appears on screen. Having given the maximum mark (again, any number up to 100) you can key in the results. By keying AUTO, the computer will automatically bring up each pupil's name for you to enter the mark against. This program also accepts A or RETURN with no mark entered for absent. If you're looking for a particular pupil, you can key his or her name, or just part of it, to rapidly bring that student's record up on screen.

You can DISPLAY your pupils' marks at any stage. You can also type RANK to look at the class positions or RANK MATHS, for example, to look at the maths results. GRAND TOTALS are available for all the marks and you can WEIGHT marks to ensure they are given appropriate emphasis.

Printing is easy, too. You simply tell the computer what you wish to print and you're away. PRINT TOTALS will bring up all the scores plus a total mark, while PRINT MATHS will just bring up maths and so on.

Another handy feature is the ability to GRAPH results — either subjects or totals.

SCALE and DESCALE are two neat commands which allow you to scale one subject or all, or to change your mind and to descale them. And once you are happy with your work using a Primary Teacher's Rollbook, you can type FINISH, END, QUIT, BASIC or CP/M to leave the program!

A Primary Teacher's Rollbook is an extremely flexible, friendly program. If you are clear and confident about your aims, this program is for you. □

Product Details

Product: GTMark
From: GT Software
30 Edlaston Rd,
Corine 6020 WA
(09) 448 7201
Price: $45 (3.5 inch or 5.25 inch)
$160 site licence (up to 5 copies)

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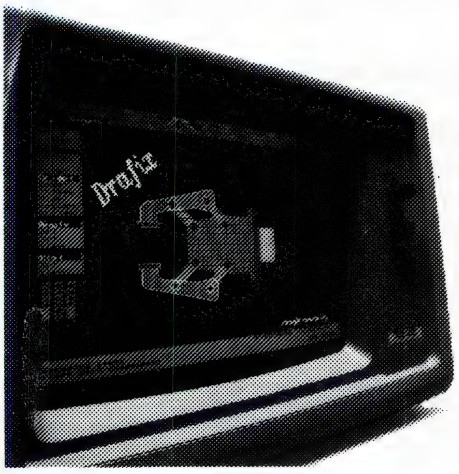

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Why Your Hard Disk May Be Only Seconds Away From Total Failure!

WELCOME TO THE INNER WORLD OF HARD DISKS: WHERE MICROSCOPIC PROBLEMS CAUSE MAJOR CATASTROPHIES.

A typical 20-megabyte hard disk contains over *200,000,000 bits.* If *only one bit* changes or fails, you can lose *everything* on your disk. Hard disks are subject to so many inherent, uncontrollable conditions that random failures occur with alarming frequency. You already may have been tortured by one of these hard disk error messages: **DATA ERROR, GENERAL FAILURE, ERROR READING, WRITE FAULT, BAD SECTOR, SECTOR NOT FOUND, FILE ALLOCATION TABLE BAD, DISK ERROR READING FAT, DISK NOT READY, INVALID DRIVE SPECIFICATION, NON-SYSTEM DISK OR DISK ERROR, READ FAULT, BAD DATA, ABORT-RETRY-IGNORE** — plus hundreds more that we simply don't have space to mention. Here is why:

PROBLEM ONE: OUT OF ALIGNMENT. There are hundreds of circular tracks packed into every inch of your hard disk's magnetic recording media. They are *extremely* thin, about as thick as a single strand of hair. Perfectly aligned tracks on a new, out-of-the-carton hard disk look like those in **figure 1**. Your programs read, but *never* write, to any of the special Track and Sector ID areas shown in black.

When your system has been off and is cold — in the morning, for instance — head positioning mechanics shrink, causing heads to read and write towards the inside. As the unit warms they expand and tend to read and write towards the outside. Add friction, wear-and-tear, play, torquing, repeatability, vibration, irregular platter and surface expansion, etc. — and within a very short time your data, program and system sectors can go out of alignment like those shown in **figure 2**. This is a continual, serious problem: valuable data may be written so far off current head tracking that it is no longer readable, resulting in devastating errors and lost data.

Disk Technician[tm] Automatic AI Software System's early warning detection *must be used daily* to keep data, program and system sectors in perfect alignment. When even the slightest change is detected, Disk Technician safely removes any data and stores it in your computer's RAM, then restores perfect alignment by rewriting the *entire* track, *including* the "read only" Track and Sector ID areas, using Disk Technician's own *factory low-level, Real format.* This new track is then thoroughly retested, *and only if has been perfectly repaired,* will Disk Technician allow your valuable programs and data to use it again. If retesting reveals that any bit is not perfect, data is relocated to a good area and the bad area is safely blocked from future DOS use. When Disk Technician repairs an area, it *specially monitors* that spot on all subsequent tests to make certain it *stays* repaired. *This is a totally automatic, unattended process.*

PROBLEM TWO: MEDIA AND DISTANCE. The typical distance between the head and the media is about 25 millionths of an inch. By comparison, a smoke particle is about 10 times greater and a human hair is over 100 times greater! Expansion and contraction caused by normal heating and cooling, wear-and-tear, media degradation, vibration, humidity, platter wobble and aging all cause this distance to vary (see **figure 3**). *Read and write quality varies directly with these distance changes.*

No matter how carefully the hard disk media was manufactured, there still will be variations in coating thickness, smoothness and magnetic density (see **figure 3**). Add aging and magnetic retentivity changes, and some spots may change from "good" to "unreliable" *overnight.* Magnetic hard disks act just like old photos: they fade away — along with *your* data! *Disk Technician is the only total solution to these problems.*

Disk Technician *reads, writes* and *tests every single bit on the hard disk, occupied or not,* using special proprietary testing and repair algorithms to check for soft error rate, magnetic retentivity, and the ability to read and write *perfectly.* If even the smallest marginality or error is found, Disk Technician will automatically proceed with its complete repair and restoration process. DOS and other programs can only tell you after 10 to 30 errors have been made. Our testing reveals that once a spot makes more than 3 to 5 soft errors, total failure is imminent. *Disk Technician's daily preventive testing, repair and recovery is the only real cure.*

PROBLEM THREE: POWER. Static electricity, turning power on-and-off, brownouts, surges, spikes and static electricity all can cause the heads to write meaningless "garbage" into whatever tracks they happen to be located over. Although hard disks and computers are designed to minimize accidental head writes, they *still* occur and cause devastating damage — often wiping out an entire disk. *Disk Technician takes a new approach to cure these problems.*

When Disk Technician is run, it automatically installs SafePark[tm] memory resident software program and creates a "safe zone" on your hard disk, safely relocating any data in this area. Then, whenever you boot from your hard disk, SafePark becomes memory resident and operates with all of your programs all of the time. When there is no disk activity for approximately 7 seconds (user adjustable), SafePark automatically moves the heads to the safe zone. Once the heads have been moved — which will almost *always* be the case — and there is static electricity or a power glitch, any damage will be confined to the safe zone: *protecting your valuable data and programs.*

WHY SUFFER AND TORTURE YOURSELF WITH HARD DISK GRIEF? Disk Technician virtually eliminates *all* your problems! It is so easy to use — *absolutely no technical skill is needed — and takes less than 60 seconds of operator time daily.* ***BUY NOW! HEAD-OFF HARD DISK DISASTERS BEFORE THEY COST YOU TIME AND MONEY!***

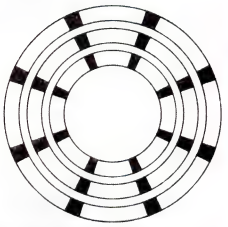

Figure 1* Perfectly aligned tracks. The black areas are "read only." These store *critical* track and sector ID information. The white areas are data sectors and store your system, programs and data.

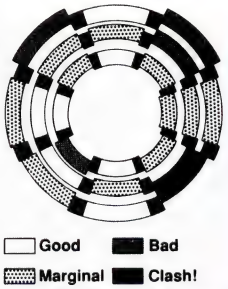

Figure 2* Sectors out of alignment with the track. The most frequent cause of lost or unreadable data. See *Problem One.*

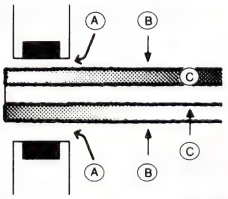

Figure 3* Heads, media and platter. A: The distance from the heads to the media continually changes. **B:** The magnetic coating varies in thickness and smoothness. **C:** Magnetic retentivity varies and decays. See *Problem Two.*

*Magnified and simplified for clarity.

Disk Technician[tm]

Automated AI Software System

TECHNICAL SPECIFICATIONS

- Works on a *single system* of any IBM PC, XT, AT, derivative. COMPAQ or true IBM clone.
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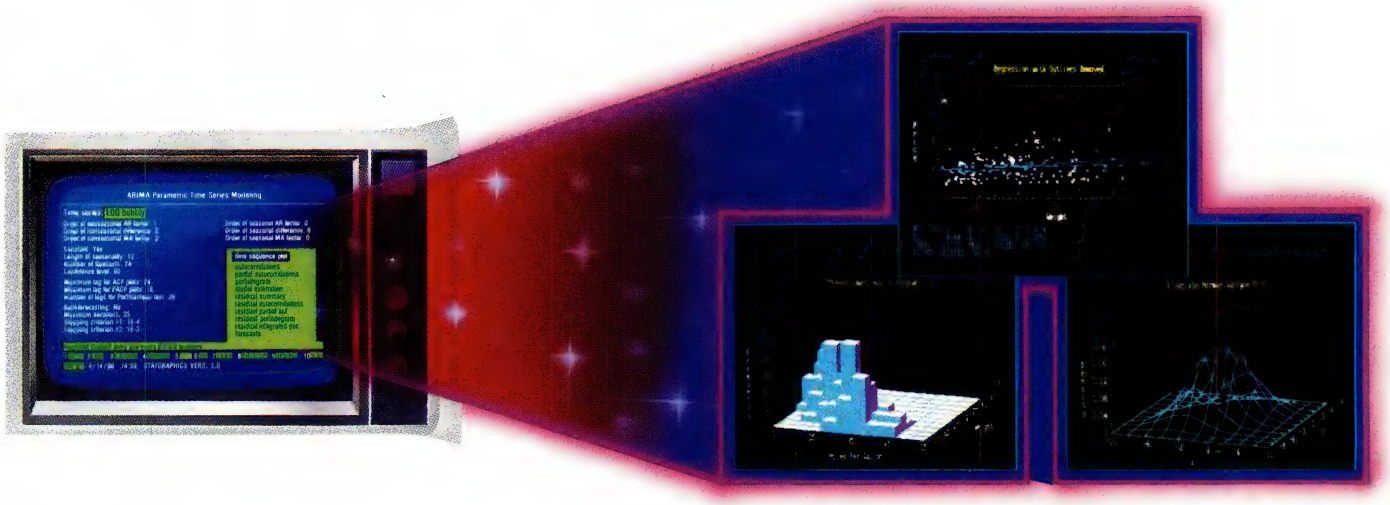

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JOHN HEPWORTH

YOUR IBM

One of the things which seems to confuse most users is the way a PC starts up, or in the jargon, is booted. The process seems complicated, but it is really quite simple, and essential, to understand.

A computer is just a pile of dumb, useless, humming electronics until a program is loaded into it. That program then tells the computer what to do and when to do it. When most users think of programs, they only think of applications programs like Microsoft Word or PC-File, but these applications programs cannot and do not tell the hardware directly what to do. Beneath them is another, far more necessary, program. This program is more commonly known as the operating system. On IBM PCs and clones it is known as PC-DOS or MS-DOS, and comes in various flavours and versions. OS/2 is another operating system, but this month I won't address OS/2!

PC-DOS and MS-DOS

PC-DOS and MS-DOS are programs which are customised for the hardware of individual clones or PCs. Many people think of PC-DOS as the version of MS-DOS which was customised for the IBM PC. Both PC-DOS and MS-DOS take care of access to the disk drives, keyboard, screen, and other devices. They also carry out many essential housekeeping services like copying of files and disks and listing the names of files on a disk.

When a PC is first turned on (a cold boot, in the jargon), or restarted after it has been running by pressing Ctrl, Alt and Del at the same time (a warm boot or reboot), it reads in PC-DOS or MS-DOS from a disk (called the boot disk), sets itself up and is ready for the user to load and use an application program like a spreadsheet. The boot disk can be a floppy disk or the PC-DOS (or MS-DOS) files can be on a hard disk so that the system boots up without intervention or needing the operator to insert a floppy disk at all.

The three files which form DOS are stored in specific locations on the boot disk.

Three Essential Files

Both MS-DOS and PC-DOS consist of three essential files. The PC DOS files are IBMBIO.COM, IBMDOS.COM and COMMAND.COM, and the MS-DOS equivalents are IO.SYS, MSDOS.SYS and COMMAND.COM. If you do a Dir of the boot disk to see what files are present you will see the name of COMMAND.COM, but the other two files (the names depend on which DOS you have) won't be listed as these are hidden files. The three essential files are known as system files.

When applications programs are loaded into memory from disk, DOS is able to read the disk directory information and know where on the disk to find the necessary bits of the file. Until DOS is loaded the machine is dumb, so how can it find the files which form DOS without DOS already being loaded? A real Catch-22 situation if ever there was one.

The answer is simple. The three files which form DOS are stored in specific locations on the boot disk. In a chip in the PC is a very short program which merely tells the machine to look at the location on the boot disk where IBMBIO.COM or IO.SYS should be, load it and run it. Now the machine is still pretty dumb, but it is getting smarter and can now find and load IBMDOS.COM or MSDOS.SYS, and in turn that loads COMMAND.COM which interprets the user commands like Copy, Dir or Erase, and which also loads and executes applications programs.

Device Drivers

It is possible to run DOS with only the three files mentioned above for each version, but there are many enhancements possible. Starting with DOS 2, the ability to customise DOS was added so that new hardware devices can be recognised. This is done by loading short programs into memory after COMMAND.COM, which give DOS the ability to see and control these devices.

The short programs are called device drivers and typically have a filename with the extension .SYS. One such program is ANSI.SYS, which allows one to randomly locate a cursor anywhere on screen (even from a batch file), and to control character colour in the same way. If you have ever tried to run a program and seen strings of characters with little arrows pointing left, square brackets and so on you know you are running a program which needs ANSI.SYS to be active.

CONFIG.SYS

Device drivers are loaded at boot time by listing them in another file, called CONFIG.SYS. As DOS loads it looks for a CONFIG.SYS file on the boot disk. DOS then configures itself according to the commands in the CONFIG.SYS file. To implement a device driver, using a copy of ANSI.SYS located on the C drive in the DOS subdirectory as an example, one simply adds a line to an existing CONFIG.SYS file (or creates a new CONFIG.SYS file containing the same line) which reads –

```
DEVICE=C:\DOS\ANSI.SYS
```

CONFIG.SYS does far more than just activate device drivers. It also configures DOS and the system in many other ways. In PC-DOS 3.3 it can specify when the system should check the Ctrl-Break key combination to stop a running program, the maximum number of files which can be simultaneously open, the number of buffers allocated in memory for data transfer to and from disk, the country for which the date and time format is to be used, and other characteristics. Of these, those most commonly needing to be specified, rather than relying on the default values, are Buffers and Files.

Many applications require more files to open at a time than the 8 that DOS allows as a default, and 20 is a far from common recommendation. Buffers defaults to a value between 2 and 15, and again many applications recommend 20. As either number is increased a small amount of memory is put away for the purpose, and also in the case of buffers a little more time is required for DOS to search the buffers for required information, and so there is a compromise value between optimum speed and convenience.

To set buffers to 20 and files to 20, two more lines need to be added to the CONFIG.SYS file, so it reads –

```
DEVICE=C:\DOS\CONFIG.SYS
FILES=20
BUFFERS=20
```

Adding more device drivers to that CONFIG.SYS file would turn it into something like –

```
DEVICE=C:\DOS\CONFIG.SYS
FILES=20
BUFFERS=20
DEVICE=xxxxxxx
DEVICE=yyyyyyy
```

More than one device driver can be active at a time, and while I have been spared conflicts between device drivers, I cannot guarantee that it is impossible.

AUTOEXEC.BAT

Strictly speaking, after the three component files of DOS have been loaded, and CONFIG.SYS has configured DOS and loaded the device drivers, the boot procedure is finished, but there is one more file to execute which many users may think is part of loading DOS. PC-DOS and MS-DOS can be driven manually from the keyboard, typing in one command after another to load and execute one program after another. Commands can be strung together and stored in a batch file and executed automatically one after another. Batch files have a name of the form filename.BAT, where the filename can be any 8 letter word but which always ends with the extension .BAT. Batch files are manually executed by typing their filename (without the .BAT), and then automatically execute one after another the commands listed in them.

So much for the theory of batch files generally, but there is one special batch file name. DOS looks for a batch file named AUTOEXEC.BAT on the boot disk immediately after CONFIG.SYS is executed. This allows the user to set up an AUTOEXEC.BAT file which runs every time the system is booted. It could read a battery powered clock/calendar chip and set the DOS time and date, load print spooling programs and other resident programs, and then run a particular program or exit to DOS. If you don't have an AUTOEXEC.BAT file you will be prompted by DOS to set the time and date. Just remember that if you have an AUTOEXEC.BAT file you must explicitly include in it the commands that either read a clock chip or allow you to set time and date manually.

Creating A Boot Disk

Boot floppies are created by using the normal FORMAT.COM program to format the disk, but adding an extra parameter to tell FORMAT.COM to put the system files on the newly formatted disk. With your copy of the DOS disk carrying FORMAT.COM in drive A, formatting a boot disk in drive B is done with the command —

```
A> FORMAT B: /S
```

Now copy ANSI.SYS onto your newly created boot disk and use a wordprocessor in non-document mode, or ASCII mode, to create the CONFIG.SYS file without embedding in it any characters used for fancy document formatting. If you don't have a text editor or wordprocessor you could use EDLIN (on your DOS disk), but you can create a short file using the DOS Copy command. Rename your existing CONFIG.SYS file (if any) as CONFIG.OLD, and use the procedure in Listing 1 to create a new one. If you don't rename the old file, it will be destroyed and cannot be recovered if you prefer it to the new file.

```
A> copy CONFIG.SYS CONFIG.OLD
A> copy CON CONFIG.SYS
   BUFFERS=20
   FILES=20
   DEVICE=ANSI.SYS
     (now press the F6 key and then
      the ENTER key to tell DOS you
      have finished the new CONFIG.SYS
      file and to save it to disk)
```

Listing 1. *Rename your existing CONFIG.SYS file (if any) as CONFIG.OLD, and use this procedure to create a new one.*

Safety First

CONFIG.SYS and AUTOEXEC.BAT files are essential and vulnerable. The installation programs that come with some packages modify or replace either or both, sometimes without warning the user. I play safe by keeping a copy of each named AUTOEXEC.OLD and CONFIG.OLD, so I can recover them if necessary. □

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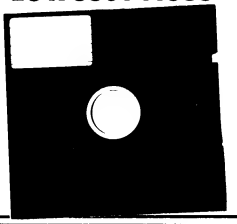
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SERVICES PAGE

LETTERS TO THE EDITOR

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All Contributions: should include your name, address, and home and office phone numbers (in case we need to check details). Each page of your submission, and any material sent with it, should also carry your name.

Contributions by Telephone: Contributors who have modems and suitable software (in the MODEM7/YAM mould — see our stories on Christensen Protocols in the May and June 1983 issues) can arrange direct transfer to our computers through our Bulletin Board system, which is on-line 24 hours a day, seven days a week. Contact our office by phone for details on transferring material in this way.

Contributions on Disk: Contributions can be accepted in most disk formats, although some have to be converted outside our offices, which will add to the (often lengthy) delay between receipt and acknowledgement. The preferred medium is IBM standard format single-sided, single-density, 20 cm CP/M disks or IBM PC-DOS minifloppies. We can also handle, in-office, most soft-sectored 13 cm disks, thanks to PC-Alien — so unless you have a particularly strange format, send it on disk straight from your machine. Please pack them extremely carefully if posting and label all disks with your name, address and phone number.

Listings: Unless it is absolutely impossible, we want listings produced on the computer. This reduces the risk of error — if the computer typed it, the computer probably accepted it. Print listings with a dark — preferably new — ribbon on white paper, and try to format the output to a narrow (40 characters) width. If they can't be produced on a printer, borrow a good typewriter — hand-written material is likely to sit around the office for a year before someone can find time to type it all out for you! Please provide an account of what the program does, how it works and so on. Any comments on the program should refer to the address, line number or label rather than to a page number. Any comments on modifying the program to work on other machines will be appreciated. Try to include a printout of at least part of a sample run if possible.

Style: All items should be typed (or printed) and double-spaced on plain white paper. We will only accept original copies — no photostats. Include your name, address, telephone number and the date on the first page of your manuscript (all manuscript pages should have your surname and page number in the top right-hand corner). Be clear and concise, and keep jargon and adjectives to a minimum. □

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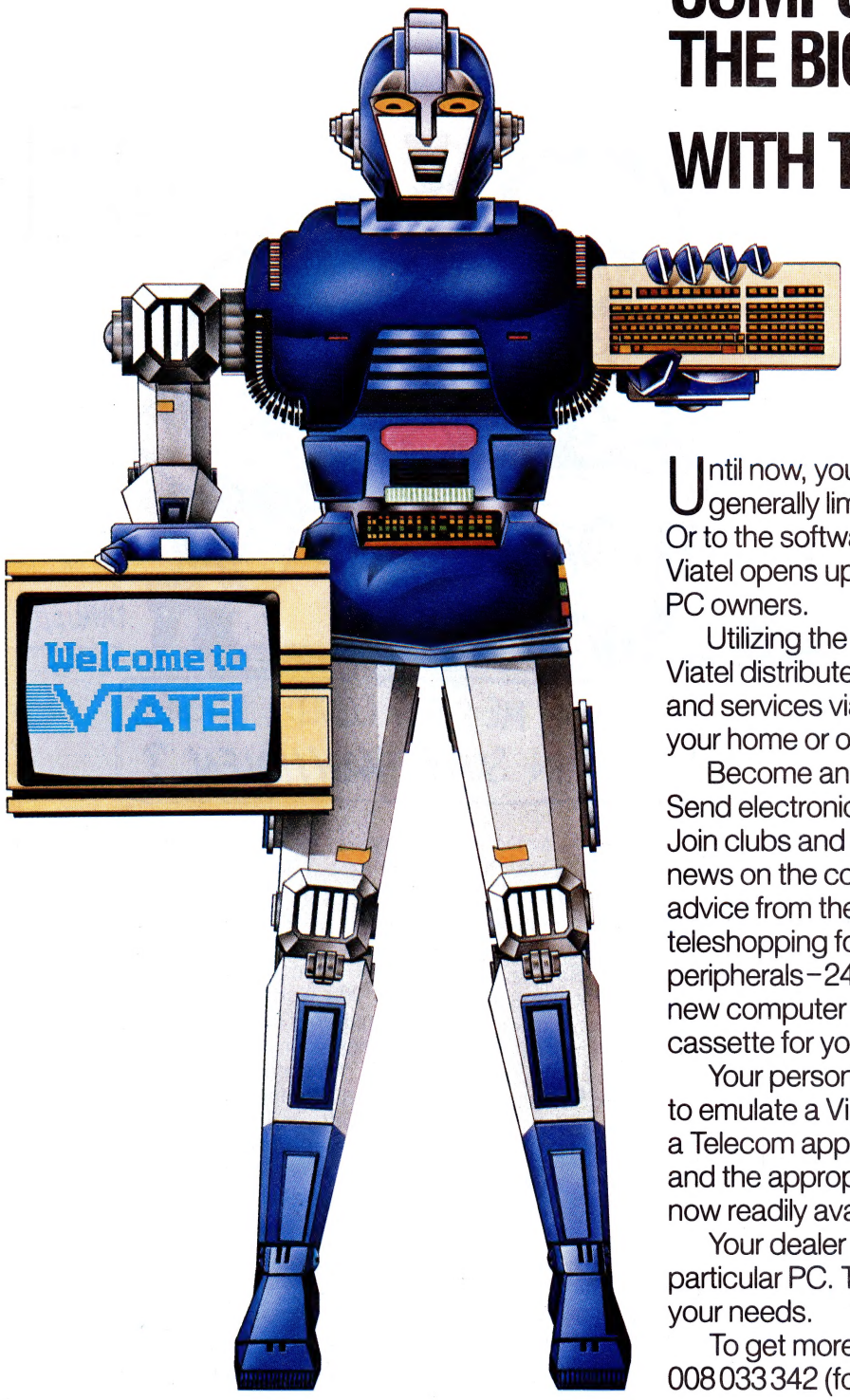

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CURSORY GLANCE

Our nasty new jargon department reports two horrors this month. An American out here to promote an accounting package said it had been set up to handle vertical markets. The way he put it was that the program had been 'verticalised'. The other shocker was from a dBase programmer who had solved a problem by making one of the things causing the problem a variable, instead of it being a fixed quantity. He had 'variablised' it. Neither blinked as they said it, nor when I asked what they meant.

■ Someone recently had to get a cable made up for some obscure computer-peripheral connection. It took three versions before the (very expensive) cable finally worked. The cable had to have a male plug on one end with a metal skirt around the plug to match up with the peculiar plug on the peripheral. We finally worked out that it was neither a traditional male plug (which has prongs sticking out — hence the name) nor a traditional female (despite the skirt). So in the end we named it a Scottish plug — a male with a kilt.

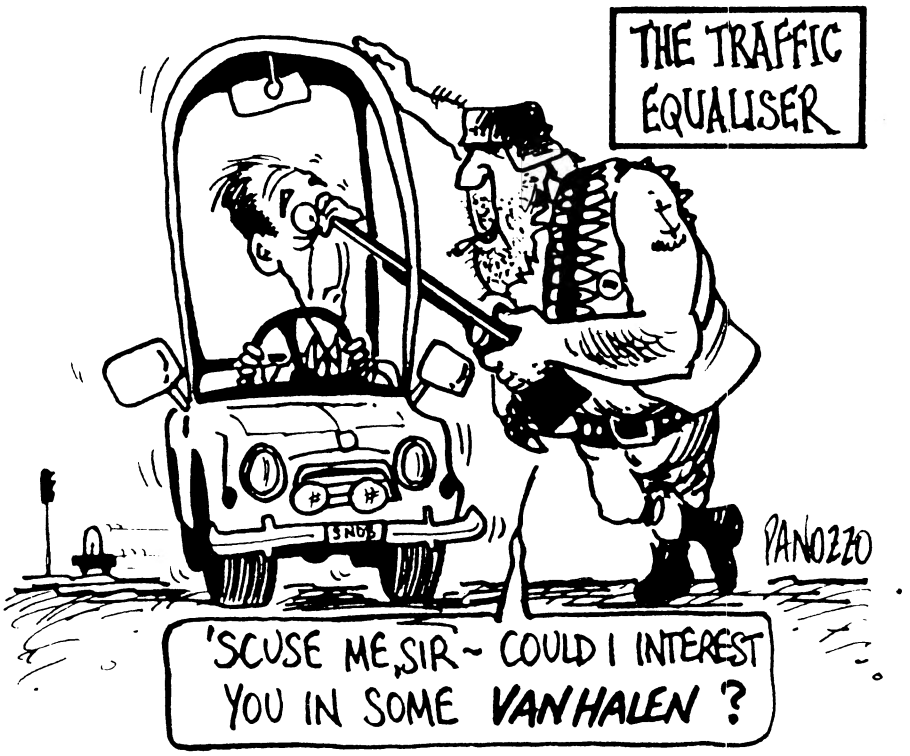
■ Definitions you need to know: Top-down Programming — all this means is that if the boss walks into the room your head will be down and your tail up. Bottoms up Programming — means that the programming takes place mostly in the pub. Bottom-Down Programming is only used for very short programs these days.

■ More definitions you need to know: Mega is a prefix which starts out before the word 'bytes' and ends up before the word 'bucks'. After-Sales Service is one of those commands which all too often brings up a message like: 'Does not compute' or 'Syntax error'.

■ Desktop publishing indeed. I need a desktop excavation program. But will my life with desktop publishing be as cluttered as my desk? I've grown quite accustomed to the clutter.

■ This is a sad but all too-true tale which I publish as a warning, particularly to our young folk. It is a telling comment on modern times and I have included it here as a community service. It was told to me recently by a poor suffering wretch on the end of the Compucounsel telephone line:

I became a computer software junkie. I started going to swap parties, sharing disks. Then I got in deep, couldn't stop, I was up all night. Then what brought it all home to me, how I had ruined my family life, was the night my online counselor told me the terrible news. I had computer AIDS. *Be warned, you could be next. Watch out for that telltale first swap party.* So there it is, and there he went.



■ I am often asked for a good simple word processing program — easy to learn, and particularly to understand, flowing, with good cursor control, non-intrusive when you are thinking about what you want to write, preferably reasonably priced. There are lots which claim to be, but I've yet to find one which delivers. Have you had any more success?

■ Feel like getting into drag? Get a mouse and all the joys of drag can be yours as you pull icons across the screen.

Bootstrap

With the increase in the amount of electronics in cars it was no surprise to me that someone invented the Traffic Equaliser.

You've no doubt seen and heard the incessant ads for Graphic Equalisers. These are gadgets which allow you to balance the low, mid and high range notes in your music. As far as I'm concerned, they are over-complicated versions of the treble and bass controls.

No doubt I've offended tens of thousands of readers of our sibling publication *Electronics Australia* by saying this, but there you have it. My ears are $250 ears. I can't afford the auditory grafts necessary to appreciate $2500 stereos. So, that's the Graphic Equaliser story according to me.

But you go right ahead, trundle along with 200 Watts of butch stereo blasting through your car's Graphic Equaliser while you bop your iridescent socks off in peak traffic. Then along comes some turkey in a similarly-equipped car, but he's got a megawatt and he's playing Mozart . . . whoever he is. So you hit this polluter of the airwaves with your *Traffic Equaliser.*

Part graphic equaliser, part Arnold Schwarzenegger, part Supermicrocircuitry, it zaps his stereo. You send the latest Annie Lennox and Eurythmics into his amplifiers' pickup circuits and Bingo! His system plays your bidding. Unless, of course, he has a traffic equaliser too. In which case it could be your Schwarzenegger versus his Sylvester Stallone. Mad Max in your stereo. And remember, none of these guys *ever* loses.

□ *Michael Burlace is an independent computer consultant operating from the Sydney Information Technology Centre (Itec). He may be contacted by writing to* PO Box 57, Broadway 2007 *or by phoning* (02) 281 2111 □

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