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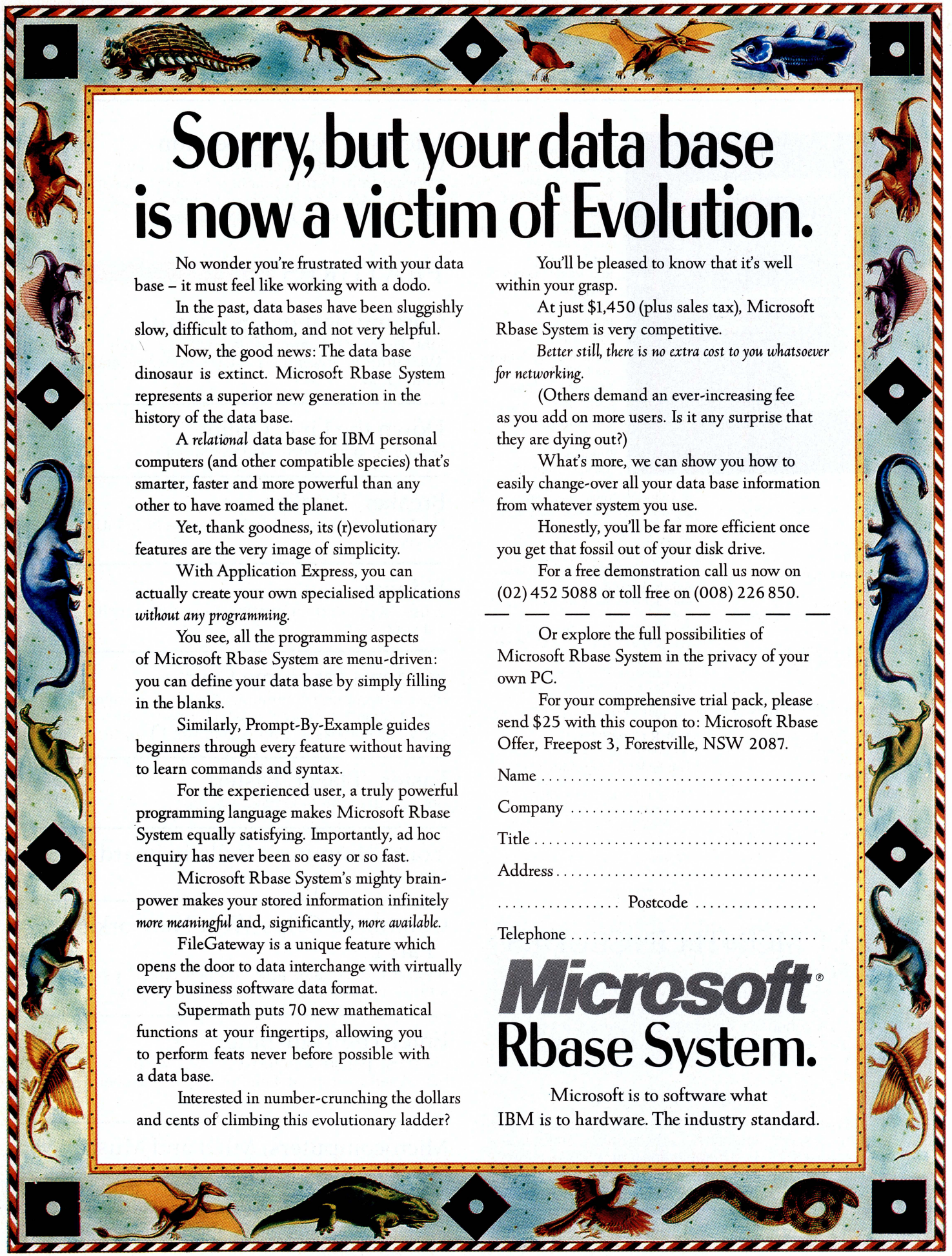

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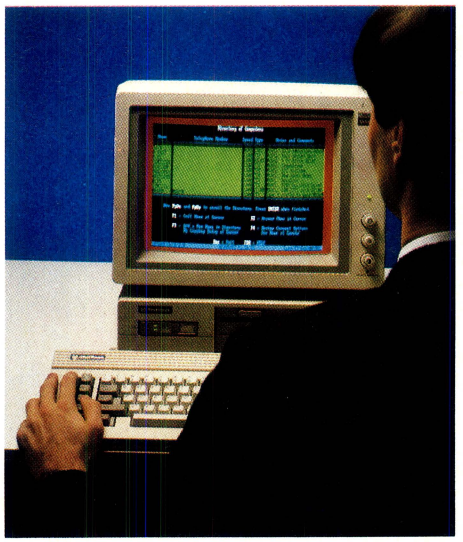
CONTENTS



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ISSN 0725-3931.

NEXT MONTH INCLUDES

Cad Feature

We whet your appetite with applications, and reviews on three packages that span the range, and then present a comprehensive coverage of the graphics and Cad market — hi-res monitors, graphics and accelerator cards, suitable computers, printers and software packages.

Plus

DOS Dirty Tricks, Networking, 8086 Assembly Language Programming, two databases for home and small businesses, an exciting Forth application and a tale of two companies happily going under with computers!

Microsoft Art Competition 8
Win $10,000 worth of computer, printer and software from Earth Computer Systems, Epson and Microsoft (can you show technical merit, programming style *and* artistic appeal?).

FEATURES

Communications Software 16
John Hepworth communicates with Crosstalk XVI, Mirror II, Softerm PC, Microsoft Access and Relay Gold.

Down the Line, Online 22
What's changed since 'Dad was a lad'?

Breaker, Breaker 29
NetComm have just made Telecom (a little bit) obsolete

Fidonet 30
A user-supported international electronic mail network

Modems for Home Users 34
Basic to computer communications is a modem — but how do you decide which one to buy? Larry Lewis looks at five to help you connect.

Faster, 'Blazer, Faster! 40
Bet you thought 2400 baud was fast . . .

Your Computer's Bulletin Board 44
Welcome . . . and Welcome Back!

Coming to Grips With Networking - Part 1 46
Stewart Fist explains how LANs encompasses almost all known communication technology

Enter The Transputer 54
For those purists who insist on real world benchmarks, it runs at 4 million Whetstones per second.

Microcomputers, MIDI and Music 98
Features and pitfalls of real-time music composition peripherals

REVIEWS

Laser Amazers 60
TI's 2108 and 2115 OmniLasers and Epson's GQ-3500 laser printer

HAMfisted Publishing 64
When big guns like Hewlett-Packard, Aldus and Microsoft get together you have to take it seriously — even if it does get labelled the HAM alliance.

Words, Words, Words 84
Wordperfect V4.2 and Xywrite III V3.14 — power processors for power users

INSTRUCTION SET

Turbo Tips 78
Create your own calculator

The Attainment of Assembly 93
— or How to Program Yourself!

Going BATty 104
Clever tricks with batch files — and a chance to win a box of floppies

PUBLIC DOMAIN

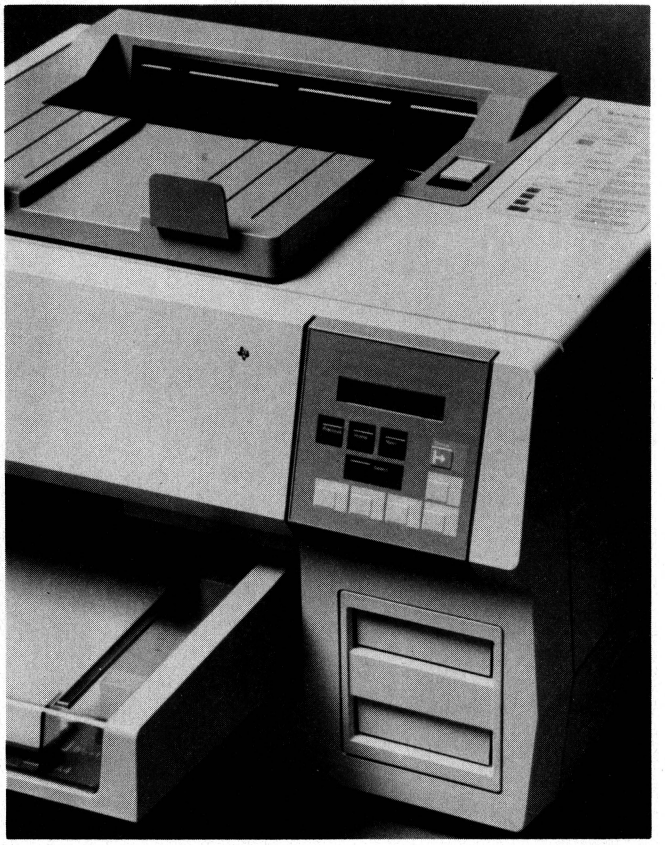
National PAMS Listing 108
Hundred of Bulletin Boards!

New Products 126
Colourful floppies, graphics software, and a printer or two are just some of the offerings

Your Amstrad 134
If you are thinking of some serious designing on your Amstrad, then DRAW up some plans.

Your Microbee 135
Enhanced BIOS for the 128K

Your IBM 140
A proposal to close all Bulletin Boards and force users on to Viatel



Your Amiga 142
Genlock and the Fred Fish collection

Your Atari 149
DEGAS for the serious and Neochrome for the doodlers

Your C64 151
Utilising the DOS "*" filename

Your Mac 157
Running 30 programs at a time with a Mac II

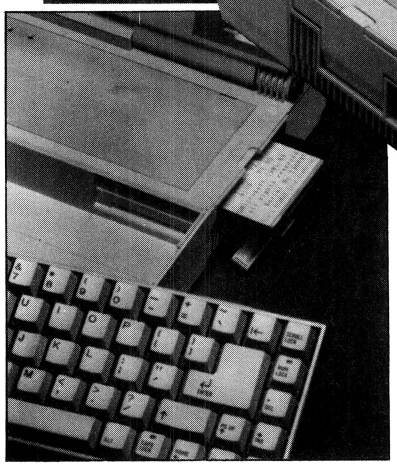
Reader's Classifieds 159
Recycled printer ribbons, an APC III, a Must and more . . .

Services 160
For Back Issues, Tutorials and reading in the lift

Cursory Glance 162
How to spot a hacker and surgery by robots (would you risk your body?).

WE CAN'T KEEP THE LID ON THIS!

NEW RELEASE



At last! A portable Personal Computer with all the features you want at a price you can afford. The new Hitachi HL 300 laptop computer has so many features you'd never believe it could be so portable. From the office to the poolside the HL 300 is at home anywhere, running on mains power or its own recharge-able battery, the HL 300 is always ready to store and communicate your ideas.

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- ❍ Contrast control
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- ❍ IBM PCXT compatible
- ❍ External modem connection

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Liquid Crystal Display,
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25 lines x 40 characters/line
Graphic Mode:
640 x 200 dots resolution
320 x 200 dots resolution

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U.S. ASCII based 78 keys
Parallel Interfaces - for printer
Disk Drive Interface - for external 5.25" disk drive (option)
Serial Interface - RS.232.C
Rechargeable Ni-Cad Battery - 6 hour cycle
Dimensions:
358(W) x 276(D) x 72(H) mm

Weight: 5.6kg, excluding AC adaptor
Starter Kit:
User's Manual
MS-DOS V2.11 Manual
MS-DOS V2.11 3.5" Disk
Accessories:
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AC Power Cable
Battery Charge Cable
DC Power Cable
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BYRNE & STEWART HIT5/1066

NO to ID Card



Normally, in writing these editorials, I do my best to avoid repeating myself but this month I make no apology for touching again on a subject of vital importance to all Australians: the Australia Card. Sometimes, I just get so angry!!!

There are enormous dangers associated with this legislation. Firstly, there is the lack of safeguards associated with the creation of a large distributed database. In particular, the Government proposes to introduce the Card first, then create a Data Protection Agency to police its use, and only finally, to specify the purposes of the Card. This is the reverse of the right way to do things.

Although the Card is to be introduced to minimise tax evasion and social security fraud, and will be used by three Government departments only, another 17 are interested in accessing the Australia Card register; the Government has stated that the Card may be put to other uses later. Just what *they* may be, we can only wonder.

The data which is to be collected by the first three Government agencies using the card, the Australian Taxation Office, the Department of Social Security and the Health Insurance Commission (others are almost certain to follow) will be associated with each individual through the use of a unique identifier in the form of the Australia Card number. This will be used to create a relational database. Other information maintained by the private sector, relating to employment records, bank accounts and so on, will likewise be keyed to the number.

This means that once someone knows your number from its use in one context, they can access information about you on other systems. The potential for abuse is staggering. Already, in one case, the Health Insurance Commission has released data concerning abortions, causing at the least, embarrassment, and often more serious concerns to the women involved. Although the data was supposed to be privileged, the commission released it anyway, on the basis that the benefit to the public good outweighed the individual's promised right to privacy.

The Card's proponents point out that the proposed legislation restricts the occasions on which the Australia Card may be demanded. What utter rubbish — in order to misuse the system an individual need never sight a card. Furthermore, the proponents ignore overseas experience with ID cards; for example, the US Social Security Card is frequently accepted as proof of identity (which it is not).

The fact that Cards held by young people will carry their date of birth points to another obvious misuse — the use of the Card as proof of age for admission to licensed premises. While proprietors cannot legally demand the Card as proof, most people would naturally produce it and while this may not in itself be a serious misuse, it sets a precedent for further misuses.

There is the possibility of further abuses such as the the possibility of access to information by people who should not or need not have it.

Contrary to popular belief, computer databases are not comprehensive, free-form and all-encompassing; mass storage is simply too expensive. Instead, they contain as much information as is deemed necessary, and no more, rather like loan application forms. Consequently, they cannot paint a complete picture of any individual and one has to question the validity of assessments and decisions made by public servants on the basis of such a database.

Finally, the actions of the Government in recent months are questionable, to say the least. The Australia Card issue was claimed to be one of the key reasons for the double dissolution and consequent election, yet in the run-up to the election, the Government was conspicuously silent on the whole issue. With the Government returned, the Card is back in the spotlight; if the Government now claims a mandate for its introduction, that will be a blatant lie.

In summary, if the Government can guarantee that the information in the databases will be accurate and up-to-date, that access will be restricted to only government employees with legitimate need to access it, that none of these users will misuse or abuse the information, then I might buy the idea of the Australia Card. None of the these things can be guaranteed; Australians are certain to be disadvantaged as a result, and as a consequence, the Australia Card must not be allowed to proceed.

LES BELL

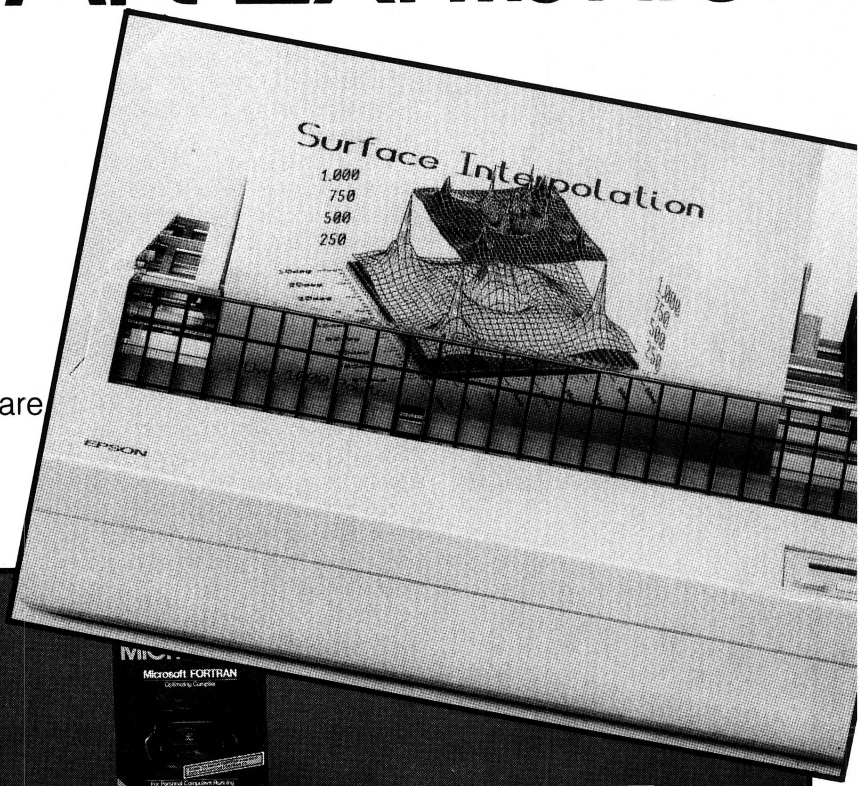
Microsoft Computer Program Art Exhibition

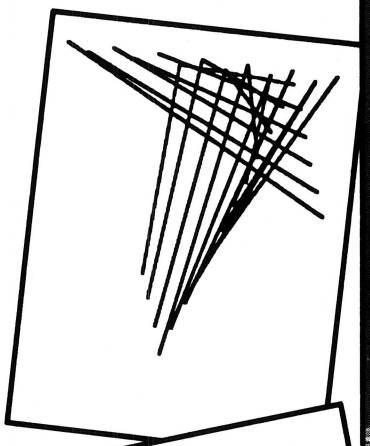
Prizes

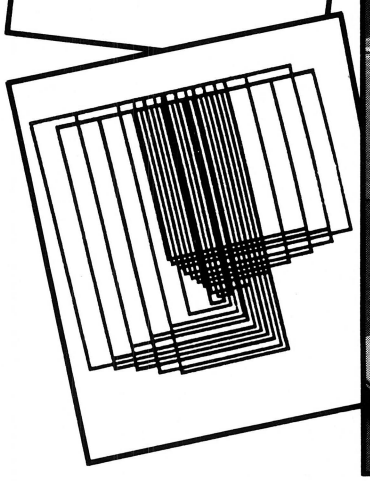
First Prize An Earth Computer System (valued at $6000), an Epson LQ2500 Colour Printer (valued at $3000), and Microsoft Software of your choice to the value of $2000.

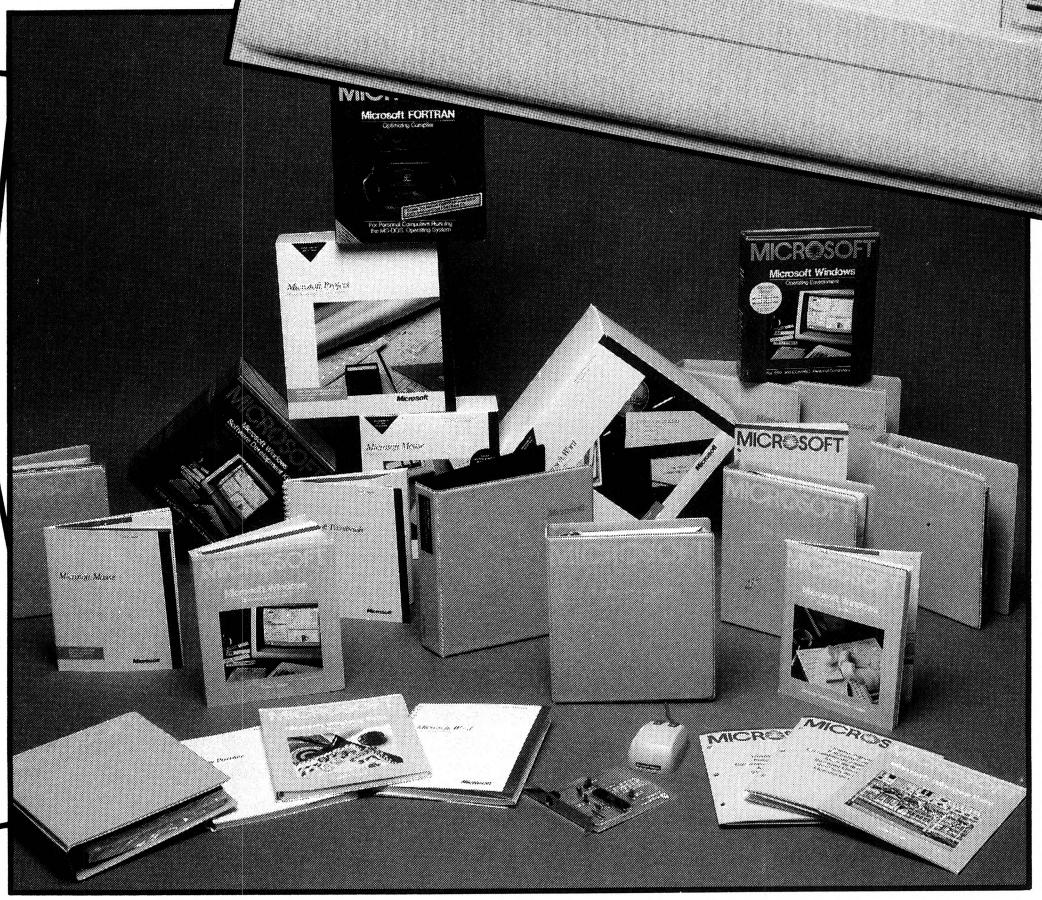
Second Prize Microsoft Software of your choice to the value of $2000.

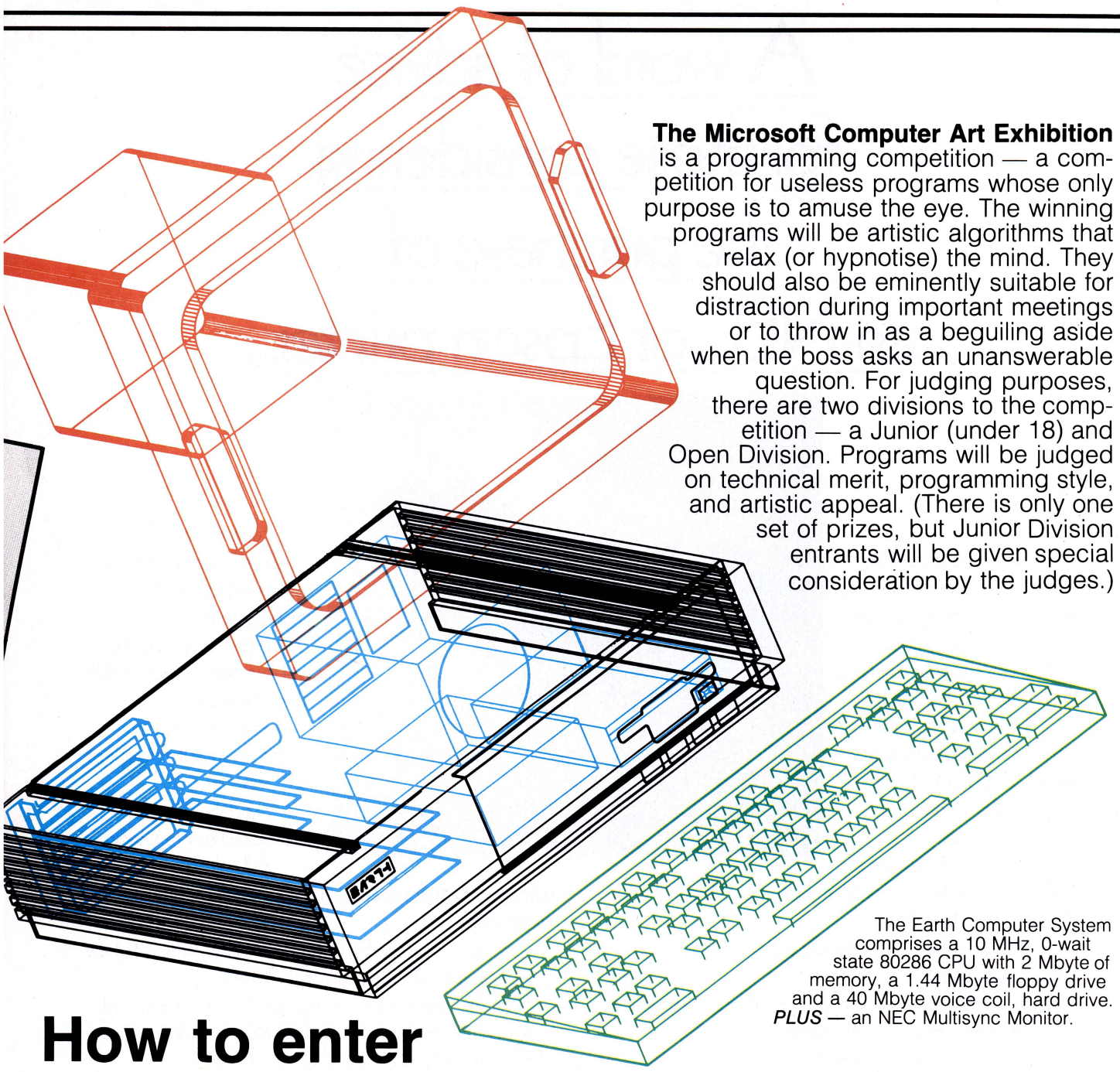
Third Prize Microsoft software to the value of $1000.











The Microsoft Computer Art Exhibition is a programming competition — a competition for useless programs whose only purpose is to amuse the eye. The winning programs will be artistic algorithms that relax (or hypnotise) the mind. They should also be eminently suitable for distraction during important meetings or to throw in as a beguiling aside when the boss asks an unanswerable question. For judging purposes, there are two divisions to the competition — a Junior (under 18) and Open Division. Programs will be judged on technical merit, programming style, and artistic appeal. (There is only one set of prizes, but Junior Division entrants will be given special consideration by the judges.)

The Earth Computer System comprises a 10 MHz, 0-wait state 80286 CPU with 2 Mbyte of memory, a 1.44 Mbyte floppy drive and a 40 Mbyte voice coil, hard drive. *PLUS* — an NEC Multisync Monitor.

How to enter

1. The competition is open to all MS-DOS and PC-DOS programmers using IBM (or compatible) equipment and writing in ANY programming language (and happening to live in Australia).

2. The TOTAL size of the source code must be less than 200 lines.

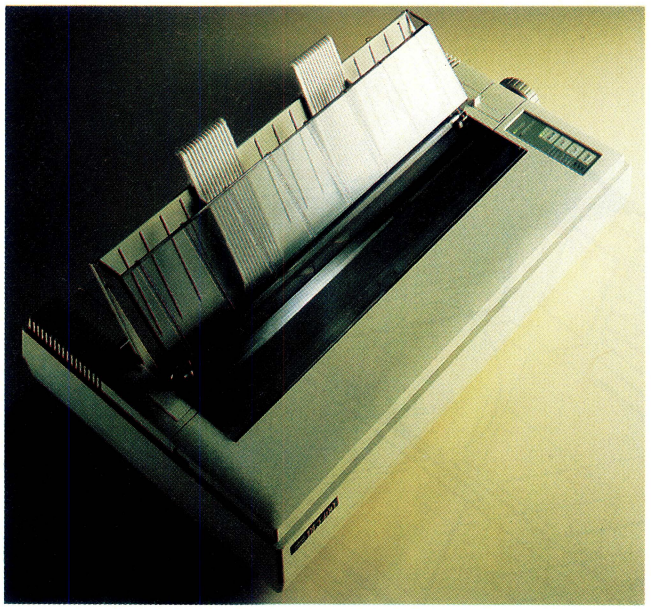
3. Entries will only be accepted on disk in executable form. The source code must be supplied on the disk. Programs written in interpreted Basic must be supplied in unprotected form.

4. Entries must not require the presence of an 8087 or 80287 numerical coprocessor. Only IBM (or compatible) CGA or EGA graphics cards may be used.

5. Forward entries to Art Competition, Your Computer, PO Box 227 Waterloo 2015. The competition commences on 1 Oct.'87 and closes with the last mail on 5 Nov.'87.

CONDITIONS: (1) Employees of The Federal Publishing Co, Microsoft, Epson and Earth Computer Systems (and their families) — wherever they live — are not eligible. **(2)** All winning entries will be placed into the Public Domain via the Your Computer Bulletin Board. **(3)** Descriptions of the competition and instructions on how to enter, form part of the competition. (*That's the legal department's contribution.*) **(4)** The prizes are as described here; there will be no cash alternatives or exchanges. Entrants for the Junior Division must supply proof of age if requested by the promoter. **(5)** Entries will be judged entirely on the skill of the competitors (with allowance for age if entrants are made in the Junior Division); every entry will be given fair and equal consideration. Entries will be judged by the Editor of Your Computer magazine and a nominee of each of the other sponsors, and and an independent artist. **(6)** The panel's decisions will be final and no correspondence will be entered into regarding the entries. **(7)** The competition sponsors will forward the prizes (remember, you're all living in Australia) within one month of the winners' being notified. **(8)** Winners will be notified by telegram and announced in the January 1988 issue of Your Computer. **(9)** The promoter is The Federal Publishing Co, 180 Bourke Rd, Alexandria 2015.

A word of advice for those considering the purchase of an NEC or Epson printer...



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The Fujitsu offers a simple, plug-in colour option.

The Fujitsu offers additional fonts in cartridge form.

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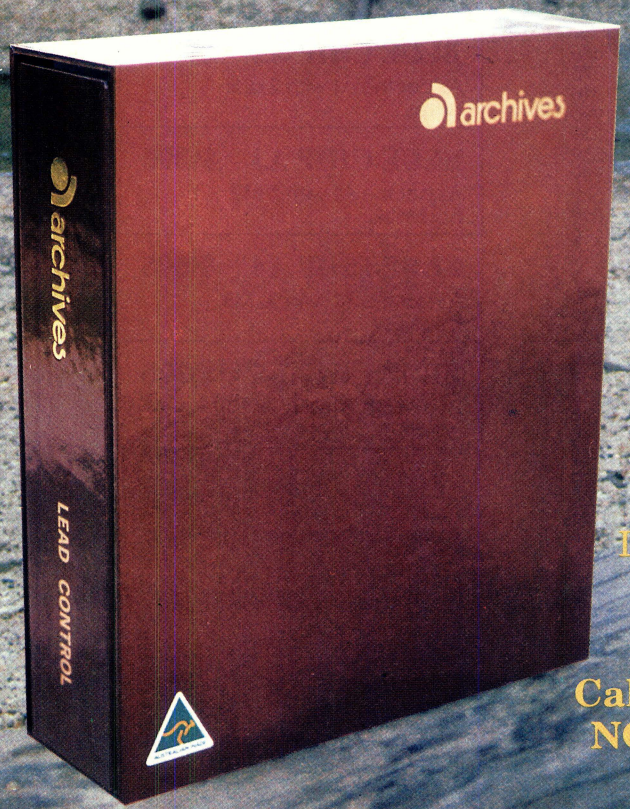

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American Graffiti

Cad/cam Essay

AS SOMEONE who has used computers over a period of about 15 years to help me design things, I'm very happy, for several reasons, to see affordable Cad/cam products appear for microcomputers.

My reasons are personal as well as philosophical: personal, because when I first did some very modest Cad on a mainframe, my workmates looked at me a little funny; and philosophical, because it bears out a theory I've had for a long time, that PCs are a powerful democratising tool which helps even the score between large and small enterprises.

I still remember vividly the first time I saw Cad in action. It was two decades ago, and at the time, I was doing 'plain-vanilla' financial programming on a second-generation machine; my former college roommate, by then a graphics freak, had wangled some time at an IBM research facility in New York City, and invited me to drop by if I wanted to see some 'neat stuff.'

Sitting at a large monochrome screen, he pulled up a wire-frame drawing of some type and rotated it — slowly; I could almost hear some creaking somewhere as it rotated. By today's standards it was primitive, but for its time, it was nevertheless beautiful, and 'all' it took was a roomful of hardware and Lord-knows how many manhours of effort.

A few years after that, as I contemplated a personal project, I recalled that demo and decided that I'd find a way to use my computer to help me with some of the design.

I'd decided it would be neat to have a place of my own in ski country. As a kid, I'd done a bit of 'kid-carpentry' — essentially, nailing boards together with little concern for aesthetics or craftsmanship — so I figured the actual hammering-and-sawing part would be a snap.

At the time, I was a mainframe programmer for the First National 'We're Real Big but Still Friendly' Bank in New York. The project I was working on was mired in all kinds of high-level Machiavellian goings-on, which left me with a lot of extra time on my hands.

What I actually did was quite primitive. Using characters such as dashes, underlining characters, periods, and others, I 'drew' pictures (in the interests of technical accuracy, print lines) showing the placement of studs, rafters, and so on.

That experience got me thinking about a lot of other aspects of designing things, and how computers could help. (Alas, my thinking was not systematic or advanced enough for me to have quit that job for one with a company making Cad/cam software. If I had, I'd probably have gotten rich enough to retire and not have to labor designing magazine commentaries.)

'Today, computers have become indispensable for many tasks . . .'

Today, computers have become indispensable for many tasks; serious writing, for example, or heavy-duty spreadsheeting. It's getting to be the same way for all aspects of design.

To be honest, plenty of vanished ancient structures might still be around today if their architects and design engineers had had the benefit of computer-aided design . . . Maybe some day I'll do a column on 'If the Ancients had had Cad/cam . . .' Conversely, plenty of things that have had the 'benefit' of Cad/cam have not fared especially well. Detroit still puts out cars that have to be recalled because of poor design; New York City had some well-publicized experiences a few years back with buses, designed by a company known for its advanced technology, cracking under the strain; and you still read about the odd building collapsing now and then — usually, one that's fairly new or that boasts some connection with the computer age.

For all its very real usefulness so far, though, Cad/cam has still had only a limited impact in certain areas, and that's really too bad. Cad/cam products addressing the needs of the average home computer user would undoubtedly be a smash.

For example, kids are computer users, and kids do a lot of building of various projects — clubhouses, electrical projects, soapbox racers, things like that. Cad software for micros could probably be very educational. And they'd probably save a lot of wear and tear on parents, since kids would make much less mess if they did their experiments via keyboard and CRT.

Another market would be home handymen or weekend do-it-yourselfers. Right now, amateur craftsmen can turn to all kinds of conventional hardcopy do-it-yourself books and plans for help in designing Rover's doghouse. Oddly, however, one area that microcomputer vendors seem to have overlooked is Cad products for micros for around-the-house projects. Think of it: Cad products for designing the plumbing for your cabin; Cad products for helping you wire Junior's electric train set; Cad products for designing your own advanced electrical projects just like the ones Dick Smith Electronics sells; where will it all end?

Personally, I'm looking for a computer design tool that will help me to do two things: design a work schedule that will give me adequate time during the month to meet all my work commitments, and design a column that will come out to the right length every month, with a good zinger of an ending.

If you're interested in the State of the Cad Art, don't miss our Cad Feature next month.

News Bytes

□ Open architecture: The saga continues as IBM is moving to license the functions of the PS/2 bus to would-be clone makers.

The move will reassure many users and clone-makers who had been worried by hints from speeches by IBMers recently that IBM would move aggressively to close off markets to clones, and that the PS/2 would end the open-architecture tradition that IBM established with the PC (and which undoubtedly contributed heavily to the PC's fantastic success).

IBM has been negotiating with chip-makers and others recently who want to provide the functionality of the PS/2 bus, without infringing on the actual design of the bus. □

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Datalock 1234SA X25	1329	1836
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Crosstalk-XVI	160	314

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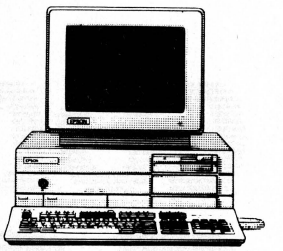

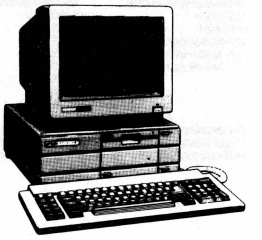

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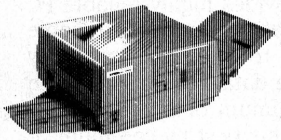

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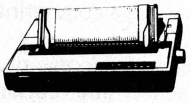
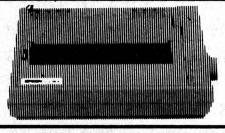
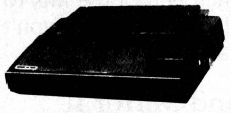


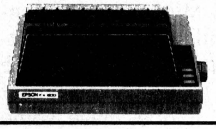
EPSON SQ 2500 136 col, 24 nozzle ink jet dot matrix, 540 cps. Virtually silent (45dB in LQ Mode). Reformulated ink chemistry ensuring smooth ink flow. 5 letter quality fonts, built in parallel serial interface.
EPSON IX-800 80 col, 9 nozzle ink jet dot matrix, 240 cps (54 dB). 2 built in NLQ fonts & parallel & serial interface.



LQ2500 top of the line 136 Col impact dot matrix printer, 24 pin, 324 cps 5 letter quality font styles, serial & parallel interfaces. Letter quality. Color optional.
LQ1000 136 col, 24 pin, 216 cps, interface and LQ roman font, letter quality.
LQ800 8 col, 24 pin, 216 cps, interface and LQ roman font, letter quality.



EX 1000 136 col, 300 cps, 9 pin dot matrix impact printer. 2 NLQ fonts push tractor included, interface. Color optional.
EX 800 80 col 300 cps 9 pin, newsletter quality 2 fonts, interface push tractor included — color optional.



FX 1000 136 col, 240 cps, 9 pin 2 newsletter quality fonts, word processing capability.
FX 800 80 col, 240 cps, 9 pin 2 newsletter quality fonts, word processing capability.

LX 800 80 col, 180 cps, 9 pin dot matrix, 2 NLQ fonts with word processing capability.

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COMMUNICATIONS SOFTWARE

Part 1

The latest buzzword is 'connectivity' — a horrible American bit of jargon which emphasises that now, more than ever, computer users want one machine to exchange data and files with another. John Hepworth asked five PC communications packages for their views . . .

Apart from the use of networks and of terminals attached to mainframes and minis, the area of interest to almost all users of PCs is communications: making a PC talk to another computer. This is the first in a series of occasional overviews of communications software for the IBM PC and compatibles. While both space and time preclude in-depth testing, it is important to many users that you get basic information on the availability of products in this arena.

First Five

Many users wishing to contact Bulletin boards and not much more, will be quite satisfied with Public Domain and user supported software, which I review from time to time in IBM Underground. There are other needs and users that are better addressed by commercial products. The five products this month are CrossTalk XVI, Mirror II, Microsoft Access, Softerm PC, and Relay Gold.

CrossTalk XVI and Mirror II are close to the high end Public Domain products, aimed at the general purpose PC to PC communications market. Access, Softerm, and Relay Gold are aimed squarely at the corporate market.

Access is primarily marketed at those executives who want to log onto one of the commercial information services with the minimum of fuss and provides painless access to online information services.

Softerm PC gives universal communications with a vast range of terminal emulations and file transfer protocols. It is aimed at communications with mainframes.

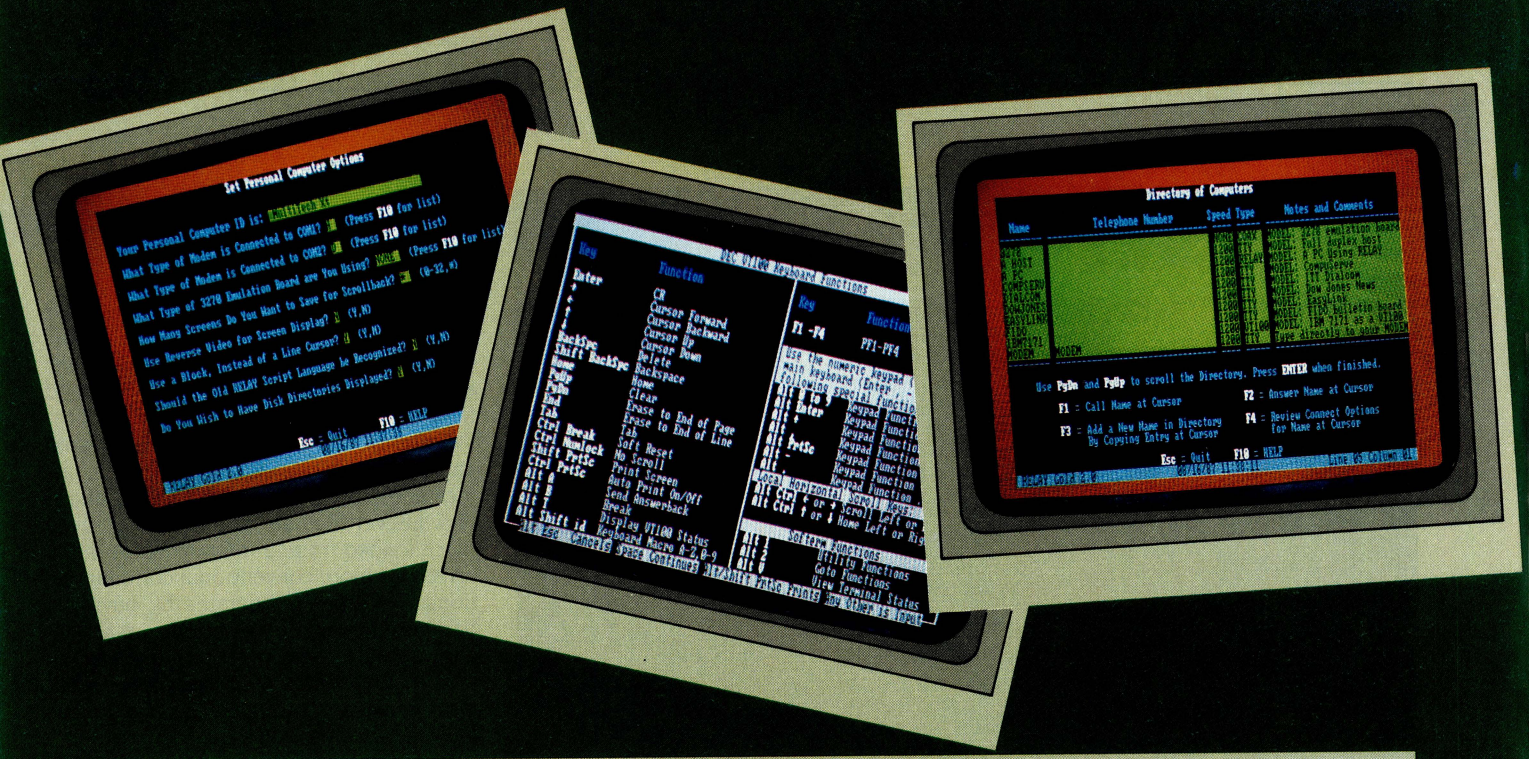
Relay Gold provides highly reliable PC to PC communications and also reliable communications to mainframes. Relay Gold is for secure data transmission with the absolute minimum of introduced errors. It achieves this best by communication with another PC running Relay Gold, or with a mainframe running a compatible product from the same stable.

None of the packages are copy protected in the usual sense and backup copies can be made with COPY or DISKCOPY, subject to the provisions of the licensing agreements. To discourage users buying one copy and using it at both ends of a communications link, Relay Gold requires the copy at each end of the link to have different serial numbers and won't run if they are the same.

Crosstalk XVI and Mirror II

Crosstalk XVI and Mirror II are intentionally very similar programs. SoftKlone wrote the original Mirror to emulate Crosstalk right down to the command set and screen displays. It does have some added features including more terminal emulations, protocols, and the addition of features iike background communications, allowing a second program to be run over the top of Mirror while it is in the process of conducting a communications transfer. Following the recent court action in the US, the cosmetic similarity has been removed from Mirror without removing the compatibility of commands. Access to Viatel has been announced for Mirror II but

Figure 1. *Crosstalk XVI (bottom) relies on a terse command structure supplemented with help screens.*



CROSSTALK - XVI Status Screen — Off line

NAme Crosstalk default settings
NUmber

LOaded C:STD.XTK
CApture Off

Communications parameters

SPeed 1200 PArity None DUplex Full
DAta 8 STop 1 EMulate None
PORt 1 MOde Call

Filter settings

DEBug Off LFauto Off
TAbex Off BLankex Off
INfilter On OUtfiltr On

Key settings

ATten Esc COmmand ETX (^C)
SWitch Home BReak End

SEnd control settings

CWait None
LWait None

Available command files

1) MANLY 2) NEWUSER 3) SETUP 4) SOURCE 5) STD

Enter number for file to use (1 - 5):

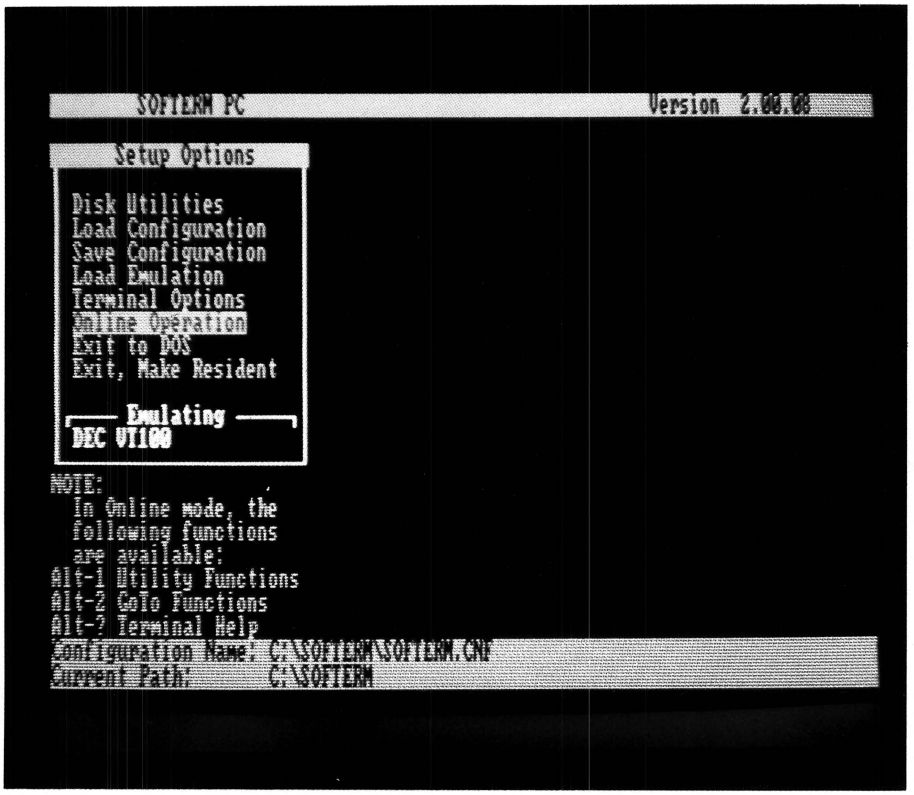


Figure 2. *Softerm PC supports the greater range of terminals and protocols.*

was not included in the copy overviewed. Registered users will be sent an update with Viatel when available.

Neither Crosstalk nor Mirror II use extensive menus, which can be frustrating to the experienced user, and both rely on a somewhat terse command structure supplemented with help screens. When in terminal mode, communicating with another machine, pressing Escape suspends communications and Crosstalk or Mirror transfers to Command mode, and many and varied commands can be entered. As an example, typing HE (for help) brings up the help screens. The screens used in Crosstalk are rather more useful than the rewritten screens in Mirror II.

Users can create a file for each host system they wish to call with details of the phone number and communications parameters. Script files can also be created which automate a session when calling into a host. Both can be set to auto answer and the remote user calling in can upload and download after a simple password security system is used.

Mirror's addition of background mode is of great use to many people, as the user can start a file transfer, hit both shift keys, and Mirror goes into the background and the DOS prompt is again displayed. Another program, such as Microsoft Word, can be used in the foreground for another purpose such as editing a file while the file transfer continues uninterrupted in the background.

Getting the best out of the packages does take a little bit of dedication, as neither has a particularly good manual, though the Mirror manual is much more extensive than the Crosstalk manual. The legion of users is such that I have even noticed a text book for users of Crosstalk (and hence Mirror by default) in one of the Sydney bookshops. A new version of Crosstalk, Mk 4, has been announced and will be discussed in a later overview. It will supplement, and not replace, the current version.

Softerm PC

Softerm PC supports the greatest range of terminal emulations and protocols of any of the products in this overview. New terminal emulations are made available to Softerm PC users free of charge. It also has an extensive range of modems, though as is typical of most American communications software, only US made modems get a mention. Softerm PC includes a built in 64 kilobyte text editor and data captured in an online session can be viewed and edited before being saved to disk.

Installation is easy. All that is required is to create a sub-directory and manually copy files across. A hard disk makes this easier but the system could be installed on a floppy system.

Softerm PC can handle up to 4 serial and 3 parallel ports simultaneously. In use it can be hidden from users, as their dBase or whatever files are automatically saved to, or loaded from, a mainframe, or menu driven for more conventional communications. Softerm PC operates by having a background communications manager and separate foreground terminal emulation that interacts with the communications manager through the same means as other external software.

One of the claims of Softerm PC is that it can be executed from behind another application (such as Lotus) which then sees Softerm PC as an additional disk drive. The application reads and writes data to a remote host. It is also claimed that this can be set up by an experienced user so that naive users are unaware of it; this method stores all files in a safe place away from the PC on a mainframe or mini. Without a mini or mainframe at my disposal, this aspect could not be tested. Queue management is also available and serial or parallel I/O can be scheduled for specific times of day. Networks are also supported.

Softerm PC is undoubtedly a most powerful product, but it is a little unconventional in the use of function keys and menus, probably to avoid problems with some of those terminal emulations. Help is always available by pressing Alt-? and a couple of the menus are popped up by pressing Alt-1 and Alt-2. In each of these cases, the popped up area is cancelled by pressing Alt-Escape. It is clearly a product with great promise, and users who take the time to master it will be well rewarded.

Microsoft Access

Access is radically different to Softerm PC. It has a limited number of emulations and protocols and is aimed at executives and professionals with little need or desire to achieve high levels of computer skills who need to communicate with information databases and the like. Microsoft has taken great pains to make using Access as easy as it is possible to make using any communications software.

Installation is a breeze. The product comes on 3 disks and on the utility disk is

MACOPY.EXE. Running it prompts the user for the name of the directory into which the files are to be copied, and for details of the default configuration. MACOPY then creates the directories if necessary, and loads the files. It then exits to DOS or to run Access.

Users familiar with Microsoft Word or Multiplan will feel right at home with Access which uses a similar menu system. While in a communications session, pressing F10 drops he user into the menu. After selecting an option from the menu by pressing the leading letter, a number of choices can be made. Typically the item to be changed is selected with Tab or Shift-Tab and pressing any of the cursor keys to display the available options.

Access offers the ability to learn logon sequences to the user's preferred databases as well as easy creation and manipulation of the 'phonebook' (dialing directory in most other programs). Script files can be created with an extensive internal programming language to allow hands-free operation. It is possible with such files to have Access call a remote site at night while the user is asleep, logon, download, and log off! The limitation with Access is the available file transfer protocols.

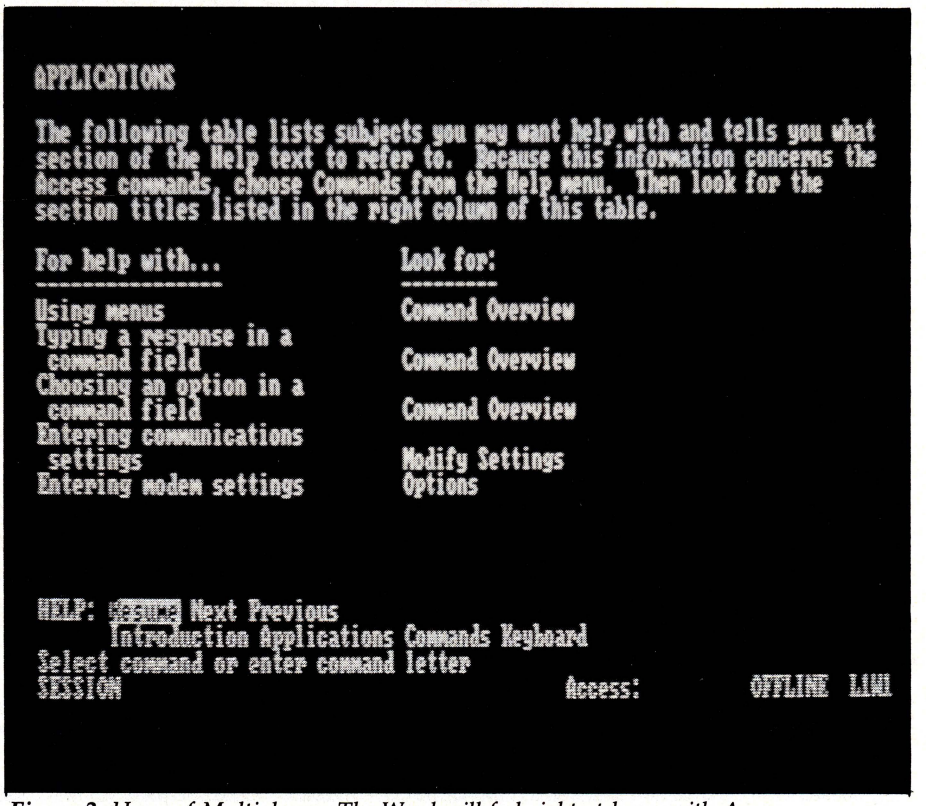


Figure 3. *Users of Multiplan or The Word will feel right at home with Access.*

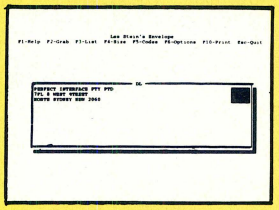
Notes:
(1) *Maximum speeds depend on the computer used.* (2) *When used with the same product, it requires different serial numbers at each end of link.* (3) *Announced, but not in the copy tested.* (4) *A higher speed can be set, but the lower speed is the practical maximum.*

Product:	Crosstalk XVI	Mirror	Softerm PC	Access	Relay Gold
Version:	3.61	3.6.11	2.00.08	1.01	2.0
From:	MicroStuff	SoftKlone			
Copy Protected:	No	No	No	No	(2)
Number Of Disks:	1	1	3	3	3
Documentation (pages):	345	350	653	430	650
Max Speeds:	38400 115200 (4)	38400 115200 (4)	9600 38400 (1)	9600	300 19200
Background communications:	No	Yes	Yes	No	Yes
Disk tutorial:	No	No	No	-	Yes
Memory required:	NA	192kB	210kB	256kB	192kB
Network:	A (3)	-	Yes	-	-

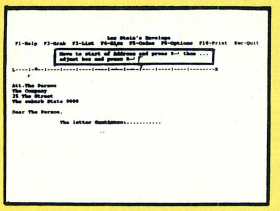
Table 1. *Except for Mirror and Crosstalk, these communications products cannot be directly compared — their design, aims and uses are radically different: Crosstalk is the industry standard of PC to PC communications, Mirror adds features to Crosstalk at a very competitive price, Microsoft Access makes corporate access to external data a breeze, Softerm PC has multiple emulations and (almost) multi-tasking external access in the background, and Relay Gold is unmatched for PC to mainframe and PC to PC communications.*

Les Stein's Envelope

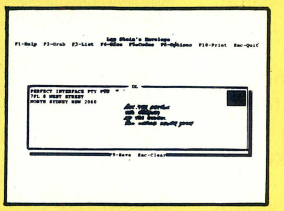
AUTOMATICALLY ADDRESSES ENVELOPES & PRINTS LISTS OF NAMES



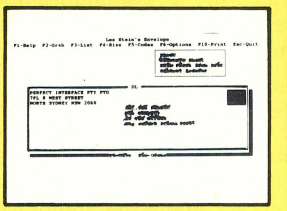
1. Hit ALT +



2. Point to the address.



3. Hit F2 — position address on envelope.



4. Hit FIO print.

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Les Stein's Envelope is a ram resident program that pops up in your word processor and prints your envelope. Point at the address in the letter and it will jump into an envelope on screen — then print.

■ Any address can be stored into an address list for use next time.

■ Type directly onto the sceen envelope, grab an address from the screen or get one from your address list.

■ Use any size envelope; A4, DL, etc., or a set of labels 1, 2 or 3 across.

■ Do a bulk addressing from part or all of your address list.

■ Look up any Postcode in Australia in a second and insert into your address.

■ Automatically prints your return address.

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Card expires _____ Signature _____

Name _____ Company _____

Address _____

Phone No. _____

The manual is typical Microsoft — well written, well illustrated and complete. It is in two sections, both in the one ring binder. The first section is tutorial material on the use of the product while the second half is reference material.

The subtitle for Microsoft Access is 'Business Information Access Program' and it achieves just that. Script files are included for the major US database providers like Dow-Jones. While these are of little direct use to Australians, they are good models of the scripts required for local information providers.

Relay Gold

Relay Gold is one of a family of products, offering both PC to PC communications and PC to mainframe communications. Relay Silver has the PC to PC communications but eliminates the PC to mainframe abilities, and Relay VM runs on the mainframe and is the other end of the PC to mainframe link.

Installation is again simple. After creating a target directory on the hard disk, the program disk is inserted in the A drive and the command INSTALL starts the process. The user is prompted to change to the Extras and Help disk at the appropriate time, and the system is configured almost automatically.

Once installed things are simple to run despite the awesome power. Relay Gold can be used for normal serial communications via the RS232 port and also used with coaxial ports such as on IRMA boards for mainframe communications. It even includes emulation of the IBM 3270 mainframe terminal.

Two manuals are provided — a reference manual and a getting started manual. In addition there is an excellent tutorial on disk which takes the user by the hand and shows the way to get the best from Relay Gold.

On entering Relay Gold a menu appears. Pressing one of the ten function keys initiates a call, answers a call, reviews the 'directory of computers' (dialing directory), sets the options, edits a file, prints a file, runs a program, stops printing or displays a help screen. Esc exits the program. The directory comes with a couple of dozen sample entries pre-configured. When entering details of a new host, the cursor is placed on the line with the most similar existing entry and pressing F3 copies it; it is then simply modified to suit.

Relay Gold has the reputation of being something very special, with amazing power and versatility and with one of the most powerful script languages around. It did not disappoint me and for a powerful package was amazingly user friendly. A toolbox is available for creation of custom scripts to allow the DP department to customise the front end, especially when Relay Gold is used by relatively inexperienced people to access mainframes and their valuable data.

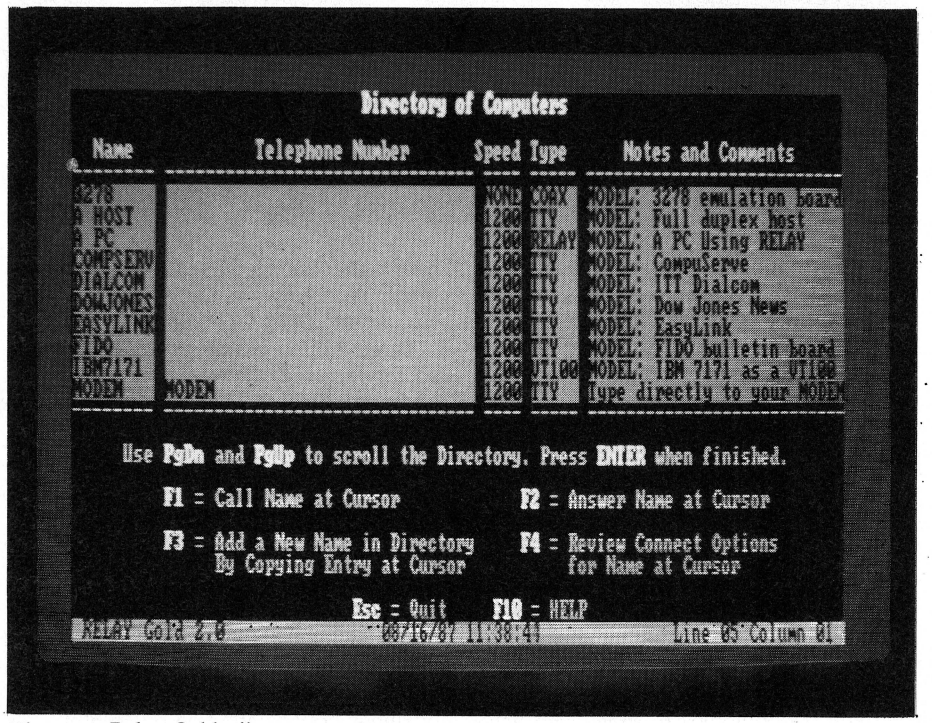

Figure 4. *Relay Gold offers unmatched PC to mainframe or PC to PC communications.*

Conclusion

The five packages I have briefly examined here cannot be directly compared (except for Mirror vs Crosstalk); their design, aims and uses are so radically different. Each is a worthy product for inclusion on any short list. Crosstalk, for being the industry standard of PC to PC communications, Mirror for adding features to Crosstalk at a very competitive price, Microsoft Access for making corporate access to external data a breeze, and Softerm PC for the multiple emulations and (almost) multi-tasking external access in the background. Relay Gold deserves a mention for its unmatched PC to mainframe and PC to PC communications. □

Product Details
Product: Crosstalk XVI V3.61
From: MicroStuff
Distributor: Sourceware, 586 Pacific Hwy, Chatswood 2067 NSW
(02) 411 5711
Price: $314 taxed

Product Details
Product: Mirror II V3.6.11
From: SoftKlone
Distributor: PC Extras, PO Box K9, Haymarket 2000 NSW
(02) 319 2155
Price: $125 taxed

Product Details
Product: Softerm PC V2.00.08
From: Softronics
Distributor: Wordcomm, 120 Pacific Hwy, St Leonards 2965 NSW
(02) 439 7144
Price: $499 taxed

Product Details
Product: Access V1.01
From: Microsoft
Distributor: Microsoft, PO Box 85, Forrestville 2087 NSW
(02) 452 5088
Price: $475 untaxed

Product Details
Product: Relay Gold V2.0
From: VM Personal Computing
Distributor: Kowhai Systems, 165 Queens Rd, Connells Point 2221 NSW
(02) 546 6499
Price: $455 untaxed

Down the line, ONLINE

Gerry Lacey suggests the practicalities of communications haven't altered since the days of carrier pigeons (but changes are in the mail).



WHEN MY FATHER started work on a country newspaper some 50 years ago, they used to send copy to the printer, 30 miles away, by pigeon post. Today, it's feasible to produce a newspaper on the other side of the world without moving a step away from home.

The average reaction to this kind of information is, 'Yes, isn't it wonderful what they can do these days — it's so hard to keep up with all the changes.' But — communications hasn't changed since Dad was a lad. Consider that only three things were required for an efficient pigeon post: a pigeon loft at the dispatch end and someone to attach the message to the bird; pigeons which knew where they were supposed to be going; and a pigeon loft at the other end with someone ready to detach the message on arrival.

Essentially the same process is needed for modern communications — a way of sending the message (say, a facsimile machine or a PC with a modem); a system to carry the message safely to the right place; and someone at the other end capable of receiving it.

This comparison may seem simplistic, but it goes to the heart of communications technology and the way we use, or fail to use, it.

Like many revolutions, the communications revolution is high on ideals but tends to fall down when it comes to basic practicalities; this is changing fairly quickly as user education starts take effect. In a utopian world, everybody would be able to communicate instantly with everybody else using the technology which is now available. The fact that they cannot do so is what keeps postmen and couriers in work.

Just a Minitel

The nearest we've come to our dream world so far is in France, where they did away with telephone directories two years ago and decided to give those who wanted, a free Minitel computer terminal instead. My apologies to those who have heard the French story before, but it's worth repeating — not least because it was a state body which did it.

Three million *citoyens* and *citoyennes* have so far received their Minitel screen and keyboard, linking them via the telephone to the national videotex network, Teletel. Of the 22 million calls they make a month, a sixth are for telephone directory inquiries — and more than half are for data of the romantic kind.

Two-thirds of the users are under 40, which happens to be the age group of acquisitive yuppies. Advertisers have been quick to realise the significance of this and most now include a Minitel reference number in their ads — half of France's business houses are now on Teletel.

Viatel

This brings us to Australia's equivalent service, Viatel. First the bad news: there's no chance of Telecom Australia dispensing free computers instead of telephone directories to eager little Aussie households. According to Telecom, this is a commercial decision, meaning that firstly it would be very expensive and secondly Telecom already makes a lot of money out of the directories through advertising in the Yellow Pages.

Viatel hardly needs to offer such a bait, though, for it has been an outstanding success. The service has its knockers, who say it offers too little for the amount of money users have to spend. But with 28,000 users, it has the second highest penetration in the world, after the French. Compare that with Britain's Prestel, which has 60,000 users in a population four times that of Australia and is generally considered a raging success.

Note that we are talking about the number of user passwords, rather than the people who might use each one. If an average of five people (Mum, Dad, two kids and the next door neighbour) use each password, Viatel has 140,000 people online.

When it comes information available, Viatel doesn't line up so well against Prestel. The British system has more than 2 million pages, or frames, available. Indeed, when it was launched in 1977 it offered 30,000 pages, and that for only 1,000 initial users. Viatel is so far up to 120,000 frames.



Figure 1. *The 60,000 users of Britain's Prestel have a choice of some 2 million frames.*

Fax About Communication

Many see faxes as quite ancient technology lauding it over the new arrivals in communications for a long time to come. There are basic reasons for its attractiveness: costs are low and it's so simple even a managing director can use one. It's flexible enough to handle all shapes and sizes of text and graphics, although it won't render the half-tones in photographs as they appear originally. And it's reasonably quick.

Against this, there are a few disadvantages. Bad telephone lines with 'noise' can produce some strange results; the thermal paper still used by most machines does go brown with age; quality, at 200 dots per second, is some way off the original, though quite good enough unless you want to use it as finished art; and there is the possible problem of junk mail, which could tie up a machine and cost you money for paper.

Different machines work at different speeds, from a few seconds to two or three minutes per page. The new Group 4 machines which will go into service when the telephone system eventually goes digital, will bring transmission time down to about four seconds.

Transmission time, though, is only part of the story. You can spend more time finding out that the number you want is engaged and trying again later than you will waiting as the document is sent. In a busy office, with plenty coming in as well as going out, it doesn't take much to produce a queue at the fax.

In the end, though, it's the number of fax machines in operation which is the great argument for getting one; if most of the people I need to send documents to are on fax, then I'll feel inclined to join them. There are still more telex machines in Australia then facsimile machines, but fax is likely to grab the lead soon.

In the near future, facsimile transmission is going to improve, although it will cost more. Telecom is bringing in a new service, FaxStream, for people who use fax a lot. FaxStream will provide direct access to an electronic exchange with connection to a noise-free line where possible. Telecom believes this will mean almost all transmissions going through at the highest speed normally possible, 9,600 bits per second. At the moment, about four-fifths go at this speed, with most of the rest trotting along at the slightly lower rate of 7,200 bits per second.

The service will cost about $600 a year, plus a charge for each fax sent — whatever the distance. There will also be a one-off charge which will depend on how far the business concerned is from the nearest electronic exchange.

This is quite a switch from the present system under which all it costs is the price of a telephone call. It should mean that short-distance calls cost more and long-distance calls less. For those who have been in the habit of faxing a note to the chap a couple of blocks away, rather than going to the trouble of ringing him and fighting past his secretary, this is not such good news.

Telememo and Minerva Marry

More relevant to the use of your personal computer is the upgrading of electronic mail services through the linking of OTC and Telecom in a common service called Keylink.

This narrows the number of electronic mail services to Keylink and Information Express. Although fewer, the systems have greater backing, and a common standard for data transfer.

Keylink is going through Telecom Australia's packet switching network, Austpac, which links you through to the world very easily, from the comfort of your home PC.

Not only can you send mail around Australia very easily, with the minimum of fuss, but the same approach is taken for the access of international data and the sending of mail globally.

If you are already a subscriber to Minerva or Telememo, you would have been switched into Keylink and told all the overseas contacts and information you can obtain. For those thinking of joining, the system is impressive, with literally every corner of the world covered.

The UK equivalent of OTC has a database called PTT Hostess which is an online directory of host addresses in the UK; you can also buy Tymnet and Telenet directories for the US.

Sending and receiving data interstate or overseas, is relatively cheap these days if it is in a compact form and you have a 2400 bits per second (or faster) modem.

Even using a dedicated phone line (lines that only service data, not voice), which costs around $2 a minute to the US or Europe, you can still transfer 1000 words for around $1. This is as cheap as sending it airmail.

But — if you want to contact an overseas database and search through files, then dedicated phone lines are just not financially feasible yet.

Packet-Switching

Packet-switching provides a more efficient form of communicating, allowing dozens of people to use the one line. The heart of packet-switching lies in breaking up long messages into short groups of characters called packets. Each packet is automatically preceded by the 'address code' of the destination in the form of a multi-bit code.

The address codes on the front of each packet are added by the primary 'node' computer which has been instructed by your computer where to send the data when you logged on. Information returning from the host is then also packet-switched back through the network of cables and nodes to your terminal in the same way.

All 'node' computers (half way stations), have large buffered areas of memory, so if the linking lines are overloaded for a second, then your packet will be stored temporarily and forwarded when the line is cleared. This store and forward characteristic has the advantage of avoiding long delays and the packet-switching system can be made to work to 100 per cent of its capacity.

The greatest advantage of the packet-switching services is that they can link terminal which have different data speeds and differing protocols, while also working with anything on the market now or from the past.

ISO/OSI

ON A GRANDER SCALE, where most people are concerned about a communications standard setup in their local area, countries are still having headaches trying to communicate with other countries. The development of communications or data transfer standards, by individual countries, until recently, was like asking for directions in a foreign country.

This confusion and the resulting critical incompatibility of some systems, has been the impetus for international bodies to start standardising.

In 1977 the International Standards Organisation (ISO) formed Technical Committee 9 (TC97), and sub-committee 16 (SC16) to address and solve the problem of international data transfer incompatibilities. Thus was born the Open Systems Interconnect (OSI).

It was the sub-committee which was chartered to develop an architecture that would be a reference framework for defining standards linking the international networks.

The decision by ISO to create the standard, was made in Sydney in 1977. In November 1980 the third version of the ISO reference model was released. This had the input from bodies in the US, Canada, UK, Japan and Germany.

Positive results from OSI appeared in 1981 when General Motors (GM), developed the Manufacturing Automation Protocols (MAP) using the OSI model. A year later Boeing and the US National Bureau of Standards developed their own OSI-based protocol, TOP.

Two groups demonstrated the first multivendor network at Autofact '85 which utilised four networks, linked together with 21 vendors and 26 nodes running MAP/-TOP.

What does this mean for us? In the future all text sent around the world will be presented on your screen as a newsletter in a standard format, usable and sendable by any PC.

If it was left up to the OSI standard and the initiatives of US corporations such as GM and Boeing then the system would probably be in place in Australia and worldwide, but there are other players (typical of the computer industry) with at least one player still trying to make their system standard.

IBM and SNA

As might have been expected of IBM, it threw its own offering into the ring — Systems Network Architecture (SNA). To add to the confusion, Japan tossed in Data Communications Network Architecture (DCNA). The situation has been similar to three selfish and stubborn children saying their toy is the only one worth playing with (but *you* can't play with it).

The SNA architecture was developed much earlier than OSI; it was set up in 1974 to allow IBM to have all its machines communicate with each other.

In Australia we are one of the biggest users of SNA in the world, and IBM's approach to the linking of SNA and OSI has been thought provoking, to say the least.

While the ISO have been trying to make OSI the standard for all computers, IBM has maintained that it would only use OSI by for external communications, while relying on its SNA networking for its internal LANs.

Provisions made by IBM for OSI have been in the form of gateways, which are a poor second compared to full integration of the systems into one standard.

This course of action by IBM has lost it many battles and gained it little recognition or acceptance from Europe. The alternative reason for the reticence on the part of ISO or the International Telegraph and Telephone Consultative Committee (CCITT), the governing mediator in this whole mess, is the two year lead that IBM would have on the world if their system

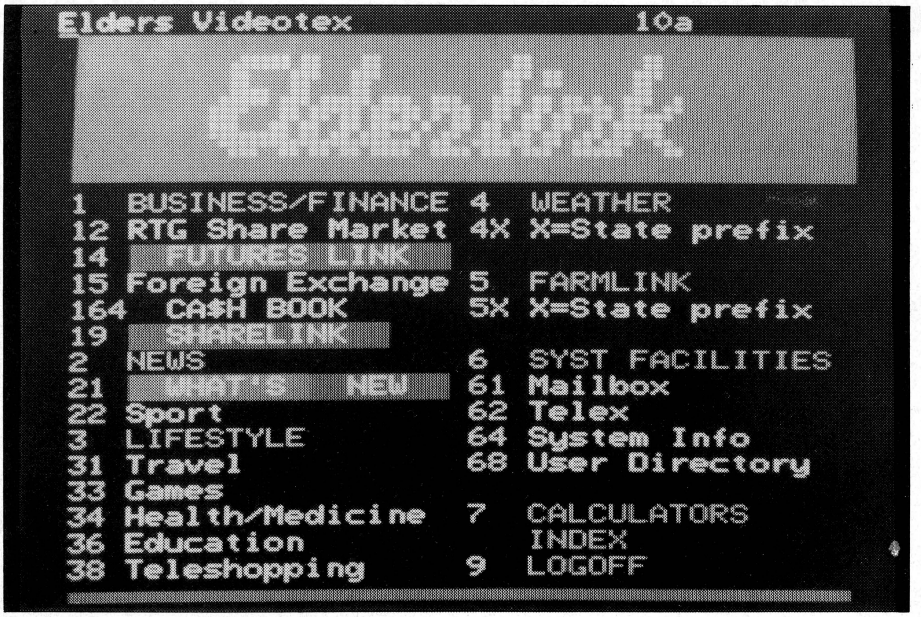

Figure 2. *Elder's Pastoral is a comprehensive online service designed for Australia's rural sector.*

was accepted completely (a fact that IBM is only too well aware of).

IBM's official approach now is that SNA will work with OSI but only as far as their machines have to connect to the outside world. The rest can go with OSI and they would stay with SNA. In short: SNA is not a standard, it is an IBM child trying to be a standard.

Teletext and Videotex

If there was an area that suffered from semantic confusion then this is it — Videotex is not the same as videotext, and you can be further confused with teletex, teletext and Teletext.

To clear the muddle, Teletext (with the 't' on the end) is the generic title for a range of related technologies, usually linked to television broadcasting. In short Teletext is broadcast, as distinct from wire carried videotex.

The vertical blanking interval, which is a wasted part of the television signal, is used to send text and graphics over normal broadcast channels.

This is usually achieved by the installation of a decoder pack which is fitted to the back of most TVs. Through the system you can get information about the weather, transportation, news flashes, sports results and the like.

This is Teletext and it has evolved into different guises in various countries. In the UK it is Oracle or Ceefax; in France it is Antiope; in Canada, Telidon; and in Japan, Captain. Throughout Australia, the varying systems come under differing titles such as Sydney's most popular service, Seventext on, of course, Channel 7; these all follow the Ceefax system.

Videotex

Videotex is something similar to broadcast teletext except for the fact that it is available through the telephone system, although it can be piggybacked on a television.

Like Teletext, Videotex comes in varying styles of system, but Telecom, the major user through its Viatel service, uses the UK Prestel system. Prestel and Viatel are from the same family of technologies as Seventext, Ceefax and Oracle, with the only differences being the form of wire or broadcast transmissions.

How does the difference between wire and broadcast services affect you? With Teletext you only have a one-way flow of information. The TV station transmits the whole selection of information and you key in which set pages you want to view.

There are also limitations to this system due to the lack of availability of lines and the time that it takes each user to scroll through the set number of pages to find a particular page. The time is cut down if you know where the page is and you can dial it up immediately from the menu.

Since Videotex uses the telephone lines to connect directly to mainframe, or equivalent systems, then you basically turn your PC into into a terminal, allowing you to talk to the mainframe.

Delays don't depend on page transmission cycles, but purely on the number of people accessing the system at the same time and the speed at which the data can be sent and received down the line.

The Prestel system in the UK has millions of pages of information. At Teletext rates of transmission, the retrieval time would be somewhere around 12 hours, so you can see the advantages of Videotex on

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An effective sorting process has occured with Teletext being used in its most effective role of a general broadcaster, through television waves, while Videotex is specialising in the more serious personal interactive roles, with computers for banking and other security conscious activities.

The versatility of a Videotex system such as Britain's Prestel system, has seen similar developments in countries like West Germany with its Bildschirmtext, as well as systems in Austria, the Nederlands, Sweden, Belgium and Finland. The most successful country is France with its Teletel, or Minitel services.

In the US, the confusion over state boundaries and company rivalry until AT&T took over Bell has meant that most of the existing services are Prestel based independent set ups. The introduction of NAPLPS from AT&T has had a stabilising effect on the US videotex market but the response is still not phenomenal.

Westpac's Handyline

With the introduction of Handyline, a home banking system using a PC, Australia has ventured into an area that has yet to be developed elsewhere. Since its introduction in November 1986, 13,000 users have joined the system, which was was developed by Melbourne based company, Elite Computers.

Handyline spokesman, Glen Davis, pointed out that the service doesn't introduce people to PCs, but provides existing users with an additional service their computers can provide.

'It is the first in the world for this type of configuration where the user can access such a range of information and services via their micro. In the US many of the banks provide one service or the other with the only other system coming close to ours being the one for the Banco De Santander in Spain,' he said.

The Commonwealth Bank provides a similar service called Telebank, which runs through Viatel and allows access to bank accounts and financial money market information. However, Telebank runs on a completely separate system which does not provide the same information that it would do if connected to the Commonwealth's internal mainframes.

Westpac has linked its service to its main computers at the highest level of access, providing the same financial information that their corporate clients receive.

'We have had many attempts at hacking into the system,' said Davis, 'but no one has got through as they can't log on that easily, especially to the top end information.'

This all sounds wonderful but where is the catch? To use the service at home you have to invest in a little bit of British technology since Handyline is based on the UK Prestel Videotex system and requires specialised equipment — a videotex adaptor, videotex terminal or a PC with Prestel videotex.

Other Services

The list of online services, most of them specialised databases, is changing constantly — currently there are about 60 different ones available in Australia. A selection of these is given in the accompanying box. □

Online Services — A Selection

Aust Bibliographic Network: This database contains five million citations of books, maps, magazines, films and sound recordings, all cross-indexed by publishers. For more information, contact The Executive Officer, ABN Office National Library of Australia, Canberra ACT 2600; (062) 62 1546.

CSIRONET: This is actually a combination of two databases: Austats, which offers information from the Australian Bureau of Statistics and the Dunn and Bradstreet Market Identifier, and Australis, which offers 13 sub-databases including agriculture, energy, computing, water, CSIRO research and marine science. A new service called the Dunn and Bradstreet Market Indicator (DMI) was released in March this year. The new database lists companies and fields of work, in what could be described as a nationwide Yellow Pages of companies. The service can be interrogated to find companies in certain states, occupations, or fields. It was developed in Australia and is customised for the Australian marketplace. Contact the CSIRO Central Information Resources Unit, GPO Box 1800 Canberra ACT 2601; (062) 43 3299.

CTC: Computer Telecommunications Corporation (CTC) offers a database for schools and students. It contains the Macquarie range of publications, including adult and junior dictionaries and thesaurus, encyclopaedic dictionary, dictionary of motoring and others. It also contains the complete US Grolier Encyclopaedia, which is updated every 90 days. A reporting service on education news called ERIC (Education Resource

THE MODEM WITH THE LOT

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MODEMS MULTIPLEXERS TEST EQUIPMENT DATA PABX'S

Investigation Service), is also provided; (02) 251 4066.

Elderlink/Farmlink/Sharelink: One of the most comprehensive country/business database online services in Australia is Elders Pastoral's Elderlink service. Subscribers to the system lease dedicated Tandata TD 2500 terminals. In conjunction with accounting firm, Price Waterhouse, Elderlink offers an interactive accounting package, Cash Book, which allows access to accounts and financial computations 24 hours a day. Other features of the service include Sharelink which looks at the seven major Australian share markets with constant updates; and Farmlink which specialises in information on meat and livestock markets through Computer Aided Livestock Marketing (CALM). Contact Elders Pastoral 27 Currie Street, Adelaide, SA 5000; (08) 218 4626.

Ausinet: Through Ausinet, ACI offer a specialised (and relatively expensive) databank used by legal and accounting practitioners and merchant banks. It has some 50 databases compiled from the *Australian Financial Review*, *Australian Business*, BRW, *The Bulletin*, *Financial Times*, *and the Business Who's Who*. Contact ACI Computer Services, Electronic Publishing Division, 310 Ferntree Gully Road, Clayton, Victoria 3168; (03) 541 6500.

Information Express: This packaged business and electronic mail service covers updates on the share markets and futures markets directly from the stock exchanges in Melbourne and Sydney, including the options market. Portfolio monitoring and realtime access to foreign exchange, money market and international commodities, regular bulletins on agriculture, business and general news are also offered. Contact Information Express, 1155 Malvern Road, Malvern Vic 3144; (03) 209 2222.

Infobank: Based on information provided by the Australian Bureau of Statistics regarding vehicle registration, municipal affairs, retail sales and details of the 1986 census, the services functions primarily as a source for market research. More information on (02) 439 0033.

Telebank: The Commonwealth home banking service allows customers to access their accounts through Viatel. Payments can be made to some 1000 companies; there is a travel service, and comprehensive international financial updates for companies. The Commonwealth Bank also offers Telebroking which offers the ability to sell or buy shares on the stock exchange in conjunction with stockbroker, Dominguez Barry Samuel Montagu. Contact (02) 261 4144.

Moneycentre: This is an Australianised version of the US Knight Rider Business Information Service and is now being offered by Stockwatch. Users can access foreign exchange, commodity future and equity markets in all major trading centres around the world. UPI, Agence France Presse, Deutche Press Agentur and other news wires are also available. Contact Stockwatch, Level 4, 60 Foveaux St, Surry Hills NSW 2010; (02) 281 1666.

APAIS-AGP: A combination of two databases which offers information from the Australian Public Affairs Information Services (APAIS) and Australian Government Publications. APAIS contains information dating back to 1978 on general public affairs matters; AGP started in 1983 and covers general government publications. For more information contact (062) 62 1536.

CLIRS: Computerised Legal Information Retrieval System is a database which provides access to primary legal material covering court cases, legislation, specialised series of cases, criminal law, local government acts, trade acts and government information. It also offers search facilities for land titles, documents from the Corporate Affairs Commission and legal information on areas covering construction, mining and commercial property. Write to CLIRS, Level 39, 19 Martin Place, Sydney NSW 2000; (02) 233 1955.

Maynelaw: For solicitors — this NSW based legal system is used for conveyancing, property searches, and property transactions. It automatically searches the records of relevant government departments. (02) 387 0911.

Australian Medline Network: This is actually a network of four databases: Medlar contains information on health planning and administration, as well as extracts from medical reports and journals dating back to 1975; ATECS is a registry of the toxic effects of chemical substances and contains details on 60,000 chemicals; Serline covers US biomedical serials; and Catline is the catalogue of the US Library of Medicine and the Australian Medical Index. Contact them through the Medline Principal Librarian, Life Sciences Section, National Library of Australia, Canberra ACT 2600; (062) 62 1523.

PressCom: An electronic archive of every local, interstate and overseas article published in the Adelaide Advertiser since January 1, 1886; (08) 218 9645. □

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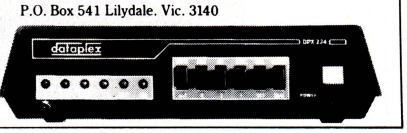

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XENIX 86: IBM XT & close compatibles, ITT, Olivetti M24, Sperry, Wyse, Compaq, Ericsson, Leading Edge, Mitsubishi, NCR PC86, Tandy 1200.
XENIX 68K: Macintosh XL.
XENIX 11: PDP-11/23, PDP-11/73, Pro 350, Pro 380. (Note: XENIX 11 is not System V).

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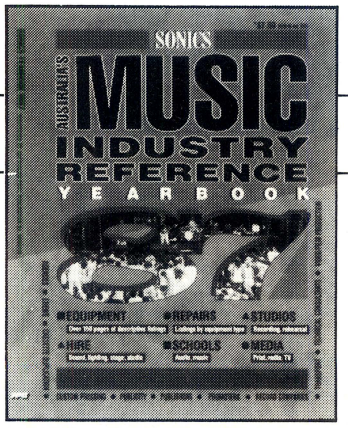

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Breaker, Breaker?

The First Australian Radio Modem

NetComm has just made computer cables and telephone lines obsolete (almost). Let Gerry Hui tell you of the Radio Modem.

WITH THE EVER increasing telephone call charge, especially STD calls, people have to think twice before they log on to a remote database or bulletin board. For people who often use the computer for communications, such as a student living in the bush committed to a remote school computer for doing assignments, the situation could get worse. Telecom has said that it is considering charging by the minute for local phone calls, as it is already doing with STD calls.

Recently, as the reduced prices of PCs put them into thousands of more homes, the sales of modems went up sharply. This enlarged modem market encouraged R&D and now NetComm has announced the CPU-100 Radio Modem.

Radio Modem

As the name suggests, the modem does not require a telephone link at all. The audio output from the radio modem plugs directly into any standard two-way CB radio through to the SSB system. Its general purpose RS232 digital input/output talks to most PCs in full duplex mode. The operating distance is solely dependent on the CB radio characteristics and geographical factors — the same sort of factors one would worry about when trying to get a better reception on a TV. An operating range as far as 650 kilometres has been achieved successfully, according to NetComm.

Endowed with wireless ability, the radio modem opens up a whole new world in data communication. For instance, traffic information can be fed directly into the computer in the control centre by the chopper pilot via a wireless modem link. Or, civil engineers on a construction site could find out the floor plan or certain detailed information from the headquarter's computer.

The abilities of the Radio Modem are not limited to wireless operation, though. Considering the type of applications the modem may be used for, it will be useless if it does not provide error free communication at a reasonable speed.

NetComm is sponsoring a turbo-charged Nissan Skyline equipped with a computerised engine management system in the Australian Touring Car Championships. Sensors have been placed on the car's systems and data is sent back to the central computer for monitoring the engine, temperature, fuel and so on, to achieve the best performance. The driver can just concentrate on his driving without even have to worry about watching the gauges. The fine tuning of the car relies completely on the success and speed of data exchange between the racing car and the monitoring computer at the pit. Doppler shift, electrical noise, acoustic noise and severe vibration are all combined to torture the poor modem. To be qualified as a top end product, reliable data communication has to be achieved with reasonable baud rate under such hazardous conditions.

Problems To Overcome

Due to heavily congested radio frequency bands that are used, a half duplex system is standard in radio communication. Unlike telephone conversations in which transmit and receive can happen simultaneously, the 'talk' button has to be depressed for a CB radio to transmit while the other end can only receive. This introduces a conflict with the full duplex data communication that exists between data the terminal equipment (DTE) and computers to be used in a radio link. Essentially, the problem is that characters typed on a terminal will take too long to be echoed up on the screen.

Furthermore, the reliability of the communication is subject to the radio link, which in turn depends heavily on the weather conditions, the RF signal power, and the physical environment in the vicinity of the modems. Indeed, the theory of a radio modem may sound very straightforward but all those problems would have to be overcome before it is usable in a practical sense.

The Trick

Instead of developing a great piece of hardware to overcome the problems inherent in nature, the NetComm radio modem uses a unique software protocol to kill many birds at once. The Block Exchange Compelled Sequence Protocol (BECSP) allows a fully error corrected data path over the radio link. In terminal mode, echoing is done locally by the DTE. Characters presented to the radio modem are stored in the buffer and assembled into a BECS block before being transmitted over the radio link. The block consists of an ID number, checksum and a variable length of data block. The receiving modem will do the checking and, if correct, respond to the sending modem with an acknowledgement for further transmission.

Software Compatibility

When using a PC in terminal mode, any software which supports flow control and local echoing will run the modem happily. The flow control can either be an RS232 hardware handshake or the XON/XOFF software handshake. Most of the common terminal software in the market like YAM, Carbon Copy, Blast, Mirror and Procomm will support that. If you want to transfer files, the modem BECS block is almost transparent to most file transfer software in the market.

I predict this handy little machine is going to find its way into a lot of applications, many of which aren't even thought of yet. □

Product Details

Product: CPU-100 series Radio Modem.
From: NetComm Australia, PO Box 284, Pymble 2073 NSW
(02)888 5533
Price: $1995 taxed

FIDONET

Bulletin Boards that Don't Bark!

There is a rapidly growing worldwide Amateur Electronic Mail Network that is quietly revolutionising Bulletin Boards. Bill Bolton keeps us posted . . .

ANYONE WHO regularly checks out the Bulletin Board systems available in their area cannot have failed to notice the quiet revolution that is taking place amongst the IBM PC based systems. These boards are linking together into an electronic mail network that not only covers Australia but extends through South East Asia, Europe and North America.

The network is called Fidonet. This article is an introduction to Fidonet and what it could mean to you.

Why is Fidonet Different?

Fidonet systems exchange mail. Stand alone Bulletin Board Systems (BBS) generally provide message facilities and file transfer facilities to their users. Fidonet systems do those things too, but in the middle of the night they call each other up and exchange electronic mail messages.

Beginnings

Fidonet started in the US about 4 years ago. In its fledgling form it was a very simple mail system that could exchange messages between bulletin boards running Tom Jennings' Fido BBS software. For quite a while all the systems were in one big network but as the number of Fido systems grew it became obvious that something better was needed. Jennings developed Fido software that would handle multiple nets and from this Fido started to spread rapidly across North America.

The Fido BBS software found its way into the PC-Blue Public Domain software collection; through this it reached Europe and Australia. Fido found fertile ground in Holland; a European network started to develop and linked back to the North American networks. Meanwhile, in Australia a small group of systems in Melbourne started running a local Fidonet but weren't linked into the North American Network. Unaware that there was any activity in Melbourne, a couple of Fido systems started in Sydney and did link into the North American net.

Fido found fertile ground in Holland; a European network started to develop and linked back to the North American networks.

The Melbourne and Sydney systems linked together in the second half of 1986. Since then the network in Australia has grown to 75 systems covering all states and the ACT (as at August 1987).

What is Fidonet?

It's an Amateur Electronic Mail Network. In the same way that ham radio operators run their own amateur communications systems in parallel with commercial radio communications systems, Fidonet runs in parallel with commercial electronic mail systems.

The tag 'amateur' doesn't mean shoddy or that it's not a serious activity. It simply means that no one attempts to make any money out of it.

Fidonet mail exists in two forms. They aren't really different in a technical sense, in that they both move across the network in the same way, but there is a big difference in the way that they are used.

Netmail

The first form is called 'netmail' and is simple person to person communications. It's an electronic version of writing to Aunt Jane, addressing it to her house, sticking a stamp on the letter and popping it in the post box (except that the electronic version will probably get there a lot quicker). To use netmail you need to understand a little bit about how Fidonet works. Get set for some more buzzwords here, there will be quite a few flying around.

Fidonet is a 'multi-layer' network. That means that it consists of several layers of system grouping. The basic building block of Fidonet is called a 'node'. A node is an individual, independent BBS system. Nodes join together to form 'nets'. Typically, a net will consist of around 10 nodes. Nets join together to form a 're-

gion', which is just an administrative unit and doesn't actually take part in mail handling. Regions join together to make a 'Zone'.

This is pretty much like the postal system. You have your house (a node) which is serviced by your local post office (a net) and which in turn is part of a state postal system (a region) which is part of the whole Australian post operation (a zone).

Each node in Fidonet has a unique address. That address is made up of three parts. The first is a Zone identifier, the second is a net identifier, and the third is a node identifier. So the address of my own Software Tools system is:

```
        3:711/403
          |  |   |
Zone 3    |  |   Node 403
          |
          Net 711
```

Zone 3 covers the Western Pacific area including Australia. Net 711 is the 'Sydney North' net and node 403 is 'Software Tools'.

Let's take a look at another address. This one belongs to Jon Sabol, one of the many friends that I have made through Fidonet. Jon is located in the Big D (that's right, Dallas, Texas!) and his network address is:

```
        1:124/210
          |  |   |
Zone 1    |  |   Node 210
          |
          Net 124
```

Zone 1 covers North America, Net 124 is 'Metroplex: Dallas' net and node 124 is Jon's 'Hardwired' system.

Now that you understand all about Fidonet addressing — don't worry to much about it, there is on-line help on most systems to assist you — you can send a netmail message to someone.

Like most electronic mail systems, you can only send a message to someone who you know is a user of a system in Fidonet. There is no master directory of who uses what system, so you have to know already that they use a particular system. In general, you will want to send netmail to someone because you have learned of their existence by reading the other type of mail that we'll get to shortly, so it's not generally a problem knowing what network address to address mail.

A netmail message is passed along between systems on the network until it reaches the destination address. At the time of writing this article, netmail facilities are free on most Fidonet system in Australia. This is possible through the sponsorship of mail costs by individual sysops and a few commercial organisations. This free mail service applies to both domestic and international netmail. There's no guarantee that netmail will always be free but the network has been successful in doing so to date and is certainly aiming to keep it that way as long as possible.

So, netmail is basically private mail to a single person on another system. As long as you know the network address you want to send it to, the network software takes care of the rest of the delivery process for you.

Enter Echomail

Netmail was the only form of mail in Fidonet for a long time. Fidonet Bulletin Boards traditionally had a 'netmail' message area for send and receiving message form other systems. They would also have 'local' message areas for discussing specific topics of interest to the users of the system, such as Communications, PC Technical Questions or Games.

One day a group of Fidonet sysops in Dallas were throwing ideas around about sharing some of the local message areas on their Fido system. Jeff Rush took the ideas from that discussion and came up with the concept and software for 'echomail'.

Echomail allows message areas on specific topics to be shared among many Fidonet systems. These shared areas are called echomail conferences.

The idea with echomail is on each system taking part in a particular conference there is a message area dedicated to that conference. Lets work though an example. On Software Tools I have an area named Australian PC Technical Conference. This is an echomail conference about the technical aspects of PCs. Many other Fidonet systems around Australia also carry this conference so you'll find a message area with a similar (but not identical) title on the National system in Melbourne, Soft Tech in Brisbane or the Lightning system in Perth.

If someone from Perth enters a question about, say, EGAs in the PC Tech conference, within a few days it will be on every other system in Australia that carries the conference. A reply may come from any one of those systems and it will be seen on all of them within a few days.

How Echomail Works

Echomail works through software that appends a special tag to a message that says, for example, 'I belong in the Australian PC Tech Conference'. The message is then automatically passed along to the next system in the echomail 'chain' as a normal netmail message where the echomail software look for the various 'I belong . . . ' tags and puts the message into the appropriate area. The software also keeps track of which systems have seen the message already to keep it moving along in the right direction.

At present, there are over 100 echomail conferences running in various parts of the world. A few of those conferences would go to nearly every system in Fidonet, worldwide, others are very wide spread, while some are quite specialised and only shared among a few systems.

In Australia many echomail conferences are shared with Europe and North America. This means that if you are after information you have, through echomail, a potential audience of tens of thousands of people who may be able to answer your question, rather than just the few hundred that use a local BBS.

The nice thing about echomail is that you don't have to worry about network addresses and the suchlike. If you see a message from someone else in an echomail conference that you want to reply to, you can use the 'reply' facilities of all Fidonet software and your message will automatically get echoed back to the system the original message came from. It's not private, however, so everyone who reads the conference will see the reply.

Accessing Fidonet

You don't need anything special, just a communications program for your microcomputer. If you have ANSI or VT-100 terminal emulation built into your communications software you will generally get a prettier display and may be able to use extra facilities, but ANSI or VT-100 capability isn't essential.

For file transfer, Xmodem is supported by all Fidonet systems but, again, having access to a better protocol such as Ymodem, SEAlink, SuperKermit or (especially) Zmodem in your communications software will generally make life even more pleasant in a Fidonet environment.

The Software

For a long while, the only Fidonet software was the Fido BBS software. Over time number of Fidonet compatible BBS software packages have appeared, so that

You could always start out with the Your Computer Opus system on (02) 669-1385.

now Fido systems are probably a minority in the network, both in Australia and around the world.

The most widely used Fidonet software system is called Opus. The Opus software is fairly new and has a number of very nice user facilities, including colour and full screen message editing (if you can support ANSI graphics). Opus is an actively evolving software system and has new high performance communications protocols such as Zmodem available for both downloading and mail transfers and support for high speed modems such as the Trailblazer.

Opus also offers very good flexibility for the sysop to customise the overall appearance and facilities available through an Opus system; though as the developers point out this is a two edged sword that needs to be treated carefully. Opus is a militantly Public Domain program and is widely available for downloading from Fidonet systems.

The commercial TBBS system now has a Fidonet interface and there are a couple of TBBS systems linked into Fidonet in Australia, with many more on line in North America.

Fidonet is still mostly the domain of IBM PC and compatible machines, however, that is changing. The Zeta system in Sydney has been running a Fidonet interface on TRS-80 to RTRS software. A Macintosh Fidonet BBS called Tabbie is currently in the final testing stages. Device driver software to allow the IBM PC Fidonet systems to run on Compupro hardware is also available.

The technical interface standards for the Fidonet work have been published by the Fidonet Technical Standards Committee and are readily available for anyone who is interested in developing a software interface to link their BBS software to Fidonet.

Fidonet systems have available a wide range of support software and echomail conferences specifically for most of the major types of system software. This makes it a lot easier to get any of the Fidonet systems going as once the system is basically operational and plugged into the network, the full resources of the network worldwide (that is, the other sysops) are available to answer questions and provide help through both netmail and echomail channels.

Point Software

There is a lot more coming from Fidonet. One of the latest developments is 'point' software. A point is a new level below a node and allows you to run a private electronic mail system on your PC without having to run a full BBS system. I'll have more to say about this and other aspects of Fidonet in future articles.

Fidonet systems are clearly marked in the Australian PAMS list so if you haven't logged into a Fidonet system why not try one out today. You could always start out with the Your Computer Opus system on (02) 669-1385. □

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MODEMS for Home Users

Basic to computer communications is a modem — but how do you decide which to buy? Larry Lewis looks at the features of six to help you connect.

THIS IS NOT intended as a review of every modem on the market, rather as a general look at modems and their various features. Part of the review process was to actually use the modems to get a feel for how they perform in a day-to-day situations.

I set out to look for the Best Budget Modem for normal use (priced under about $800), and a top of the line one for home, the Best User Modem. I probably should explain why 'budget' is about $800: if you're after a 'cheap' modem, then you have to do without most (*all*?) of the features like autodial, and Hayes compatibility. If it's really cheap, then you get V21 only (that's 300 baud or 30 characters a second). Just about all of these modems are built with the same (lack of) features and, generally, they are based on the World 7910 modem chip — which is a very reliable system for V21 (and V23), incidentally.

The Best Budget Modem is defined as having the most features and best reliability for the price. As a minimum, I expected the units to support the Hayes command set with V21/V23/V22 (that is 300, 1200/75 and 1200/1200 baud).

The Best User Modem is based on what the Budget modem had plus V22bis (2400/2400), error correction availability, and just generally, more features that make life easier than in the Budget modem. Some of the things I didn't consider important were dial back security, dialling directories and all those other catchy type features, since I'm trying to help the normal home and small business user find a modem that suits their needs and wallets.

Now before the grand announcement of the winners, let's look at each modem individually. This will allow you to make your own assessment and also to use the points covered to assess other modems.

I had a good sniff around for any other modems that might have been able to beat the winners, but didn't find anything else on the market that really made much impression. We could talk about a Trailblazer, but I'll leave that to Matt Whelan — I can't even afford the box it comes in!

Bit Blitzer

This one is the only fully imported modem reviewed here. (It has an Aussie tie though: it's manufactured by ex-Australian David Hartley's Hong Kong company, Banksia Information Technology, BIT). When you open up the box, which is a little smaller than expected, you spy this *tiny* modem — in fact, the manual is bigger than the modem! But: this tiny thing is a V21/V22 (300/300 & 1200/1200) modem. (It doesn't support V23 1200/75, so you can't use if for Viatel, though).

It's not a super smart modem — no autoranging, for example — but it does use the Hayes AT (ATtention) command set and teamed with a good terminal program, this is a *really good* modem.

The manual isn't too bad; it's not written in the jinglish that you generally get with imported equipment.

Product Details
Product: Bit Blitzer
From: Banksia Information Technology, Hong Kong
Distributed by: Dick Smith Electronics, (02) 888 3200
Review Product From: Mike Boorne Electronics, 3/16A Hill St, Roseville 2069 NSW
(02) 46 3015
Price: $395 untaxed

The only thing I have against the modem is that it isn't Australian made, but then the price almost makes up for that. If you wanna chepa modem thata no falla offa the back of a truck, this one might be the go.

Dataplex DPX 224

The Dataplex DPX 224 has all the features you would expect from a modem of its price, *plus* it works on the very dirty telephone lines in my area!

It supports V21/23/22/22bis and Bell 103/212; it defaults to CCITT so you have to tell it you want Bell support if you're making a US call.

As opposed to some autoranging modems, it will connect with almost any other modem that uses this type of autodetection. It's very reliable and includes the ability to autosense whether the other modem is using the error correction protocol (although I couldn't enable this on my Bulletin Board since I lost too many callers).

The DPX 224 is a bit larger than some others in the range, but this is mainly due to the power supply's being built into the main case. That means no external supply to play with, which is a real boon to those who hate all those extra cables hanging around.

The modem implements the Hayes AT command set and the manual is *usable* (more on that later). This is an excellent modem for use by, say Bulletin Boards, although it may be a bit of out of the price range of many users. The unit has a rugged feel to it, not like the plastic feel of so many others — it has a very 'business like' appearance, and it is quite safe to stack them up on top of each other (if you can afford more than one — *sigh*).

The manual is a bit of a disappointment in that it presents the information as a reference book, not a user's manual. The only figures in the book are two pictures of the modem and logic diagrams in the discussion on test mode; all the rest of the manual is text (with tables in the AT reference section).

There is no help for a neophyte in this book, the installation instructions read like a pre-flight checklist: 'Connect the modem to the DTE by attaching the RS-232-C ...' I understand that, but someone who's just bought a modem might have trouble with the jargon.

As with all modems in this class you get on-line help, dial back security, dialling directory and a number of other features not available on lesser units. The DPX 224 is an excellent modem and offers the features you'd expect for the price. The particular modem you buy is going to depend a great deal on the one *you* find that *you* feel comfortable with — don't just try one before you buy, try a few different brands and models.

Product Details

Product: DPX 2400
From: Dataplex Pty Ltd, Lilydale Vic.
Review Product From: Rosser Communications, 4/1051 Pacific Hway, Pymble 2073 NSW
(02) 449 8233
Price: $1288 untaxed

Data Bridge DSP 1200

The Data Bridge DSP 1200 modem is a single speed unit which communicates at 1200/1200 baud (V22, 120 characters per second). The unit is more aimed at fixed purpose connections (say a company that needs a point to point modem) rather than a general purpose modem. Data Bridge are about to release a multispeed machine (like the NetComm 1234) and we hope to review one when it becomes available.

This unit is fairly large compared to most other modems (although it does have a built in power supply). It was actually designed to sit under your telephone.

The manual is easy to use (and to follow). One nice feature it incorporates is a table of all of the default software settings for the modem. Little bits of thoughtfulness like this makes customising so much easier.

The unit has 16 LEDs (an incredible number — you don't not need a breakout box with this one); the only indicator missing is the one to tell you it's time for coffee.

The modem is very reliable and gave me no trouble at all. It has the Hayes AT command set, and because it is a single speed modem, it is *very* easy to drive. If you want V22 only in a good modem, it'd be hard to beat this one.



Figure 1. *The V21/V22 Bit Blitzer from Banksia Information Technology, Hong Kong.*

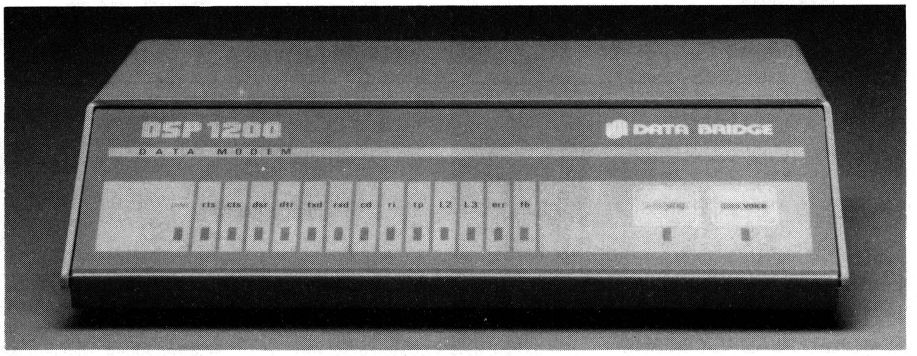

Figure 2. *The single-speed Databridge DSP 1200 was designed to fit under a telephone.*



Figure 3. *Maestro's GPA Supermodem is a basic unit (with some basic problems).*

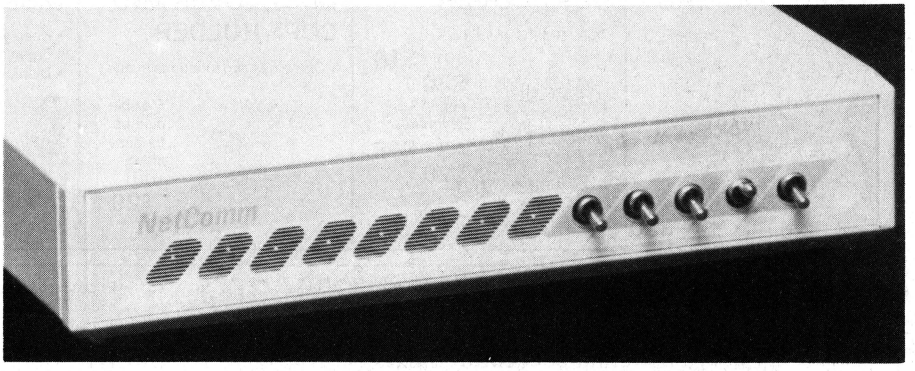

Figure 4. *The NetComm 1234A has been superseded by the 1234SA (shown above) which supports synchronous transmission.*

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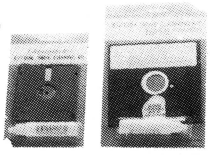

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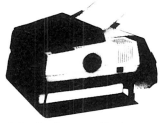

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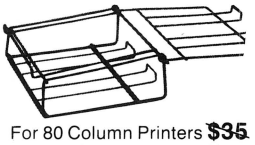

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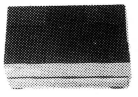

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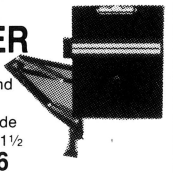

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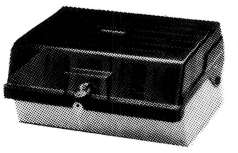

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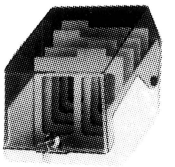

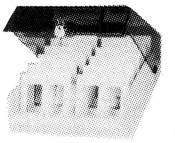

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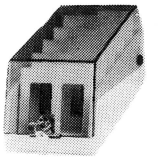

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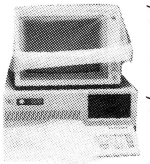

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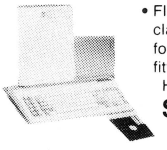

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Product Details

Product: DSP 1200
Distributed by: Databridge, 408 Henry Lawson Centre, Carey St, Drummoyne 2947 NSW
(02) 819 6474
Price: $850 untaxed
(There should also be a V22bis version available by the time you read this.)

Maestro GPA Supermodem

There's no question that this is a cheap modem — almost cheap and nasty (almost!). It's a basic modem, with a few problems, but once you sort those out, you've got a modem at just about a rock bottom price.

The documentation is rock bottom too: it's stapled photocopies. The GPA supports V21 and V23 in its basic configuration, which also offers autodial, and V22 as an option. It only has 3 S registers, which would probably be sufficient for 'basic' and occasional uses.

But down to the nitty gritty: I found a few frustrating things about the Supermodem — for a start, having to press the reset button every time I start a session. The manual mentions not needing to access the modem once it's set up, but I found that unless I reset it none of the four different computers I tried it with thought a modem was there. (Micro-Ed suggested ATZ to reset but that was no help if the modem wasn't listening yet.)

I also found that with certain phone numbers the modem would hang itself up after the first ring. I called the distributor and was told there was a bug in the ROM. Nice guys: they sent me a new chip, but that's all, no instructions, warnings, information — just a chip wrapped in foil. (Too bad if you aren't confident enough to take the lid off a box and do the dirty work yourself.)

The new chip didn't fix the 'losing every 20th character or so in V23' problem that I also found. This became one of those 'you're going to have to get it back to us' problems.

Product Details

Product: GPA Supermodem
From: Maestro, Sth Kincumber NSW
(043) 692913
Distributed by: Micro-Educational, 8/235 Darby St, Cooks Hill 2300 NSW
(049) 26 4122
Price: $395 taxed

Communications Terminology

Baud: The number of transmissions per second along a data communications line.
Bit: Binary digit, being the basic unit of data storage. Either 1 or 0, off or on, true or false.
Binary Synchronous Communications: A type of protocol that synchronises both ends of the communication line, then transmits binary data across the line.
Byte: A computer word eight bits wide. A byte in memory can hold a character or a binary number between 0 and 255 (or –128 and 127), or a computer instruction.
CCITT: Consultative Committee on International Telegraphy and Telephony. The committee sets standards for various aspects of telephone and telegraph usage.
EBCDIC: Extended Binary Coded Decimal Interchange Code; an 8-bit character-coding system — IBM's answer to ASCII.
DCE: Data Communications Equipment — one end of the RS232 connection. It needs to be set up differently (some wires reversed) to the other end, DTE. Modems are typically DCE.
DTE: Data Terminal Equipment: the other end . . . a computer configured as DTE will talk to a modem configured as DCE. If the gods are willing and the moon is right a straight-through cable should do the trick.
File Transfer Protocol: A protocol that only exchanges disk files with the host. This type of protocol does not allow you to communicate interactively with the host.
Handshaking: A technique for controlling data communication between two devices; data flow only occurs when the receiving device sends a signal indicating it is ready to receive.
Host: The computer that is in control in a data communications network. The host may be a mainframe, mini or microcomputer.
Interactive Protocol: A protocol that lets you communicate interactively with the host. In this kind of protocol, part or all of the contents of the screen display are sent to the host when you press RETURN; you do not have to communicate with the host by sending it disk files.
Interface: The (hardware or software) connection between any two devices.
Modem: MOdulator/DEModulator Device used to link a computer to the telephone line. It encodes digital bits into frequencies, and vice versa.
Packet Switching: A system of communicating data by dividing it into small packets addressed to particular receivers.
Parity: An extra bit on the end of a character or byte, which is used for error detection.
Protocol: The rules governing the exchange of information between two devices.
RS232: (also RS232C) Registered Standard 232C. A widely used standard for connecting components in a computer system.
Synchronous: A mode of transmission in which the transmitter and receiver are in step with each other.
Serial Transmission: Movement of data one bit at a time. One byte will be sent as eight bits, one following the other. Cheap and slow.
UART: This is a Universal Asynchronous Receiver/Transmitter, which handles the serial-to-parallel and parallel-to-serial conversion of bits in a data message. □

NetComm 1234A

Until the release of the Trailblazer recently, the 1234A was the 'flagship' of the extensive NetComm modem line.

The 1234A has the support of an excellent technical team and it has become the defacto standard for use on Bulletin Boards (although this is much a comment on NetComm's policy of discounting to sysops, as it is a comment on the modem itself).

Presentation is second to none — sleek and clean and compact enough to be hidden away almost anywhere. The 1234A uses an external power supply, but the cable is long enough to position the supply out of the way.

The manual is well written, clear, and easy to use. As opposed to most other manuals the layout is logical — it tells you what you need to know first up the front, with the reference stuff towards the back.

This organisation makes it very simple when you get the modem and want to use it since you can just follow your nose and have the thing working quickly and properly with a minimum of fuss. The reference section on AT commands is very good with a judicious use of tables to explain obscure commands.

There is not really too much to say about the equipment, not because it isn't good, but because it uses the Rockwell chipset which practically guarantees a reliable modem no matter who uses it (but it's not cheap either!). The modem has such excellent features as control over what baud rates are to be scanned for and in what order.



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O'Keefe Communications 1698

Just a quick mention of the software that comes with the modem — it's called the NetComm program and it's quite a handy piece of basic communications software.

While writing the review, NetComm advised me that they have replaced the 1234A with the 1234SA which has the same basic features but adds synchronous transmission.

Product Details

Product: NetComm 1234A
From: NetComm Australia, B/25 Paul St North, North Ryde 2113 NSW (02) 888 5533
Price: *Note: the 1234A reviewed has been replaced by the 1234SA, priced at $1499 taxed; and by the Automodem 1234, priced at $1125, which doesn't have autoranging capabilities or the NetComm program.*

The Nice Modem 2

I remember playing with one of the very early Nice Modem 2 units that came out and to say I hated it would be the understatement of all time. It looked good, but it would not connect with most other modems (and sometimes not even with another Nice Modem 2).

All that has changed, although it still has one of my pet hates — an external power supply. It's a fully Australian modem (except for the chips themselves). The technical support offered by the Nice Computer Company is very good for a company of their size — they're really trying.

The modem is capable of V21/V23/V22 (that's 300/300, 1200/75 and 75/1200, and 1200/1200) and Bell 103/212. Nice have advised us that by the time you read this, there should be a 2400 baud upgrade available. The Modem 2 uses a superset of the Hayes AT command set (that means that you get more commands).

Some of the current features of the Nice Modem 2 have been added as a result of Bulletin Board sysops requesting features to make their Boards better. For example, they've added the ATBRn command, which lets the user set the speed the modem talks to the computer at. You can also disable scanning for certain baud rates when originating and answering calls (this means that if you want to force a connect at a certain speed with both modems autoranging, you can). One nice (pun intended) feature is that when I need to call the United States, the modem automatically senses the Bell tones and connect.

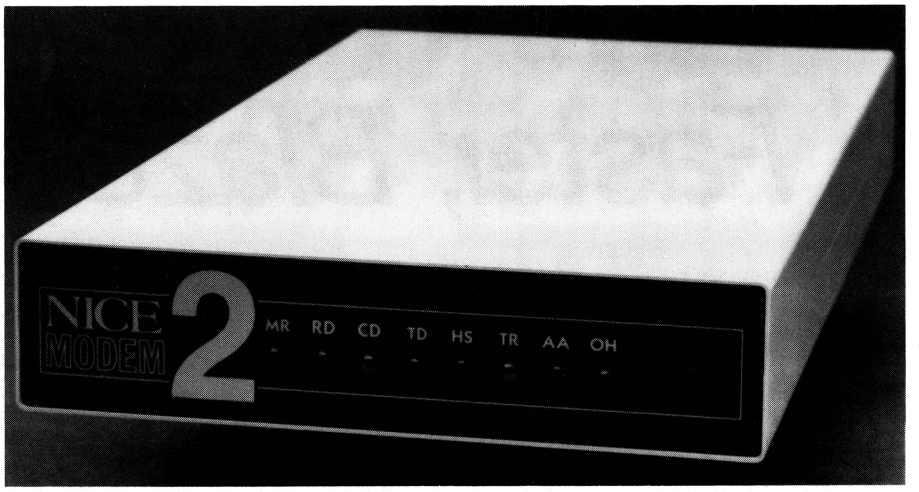


Figure 5. *The Nice Modem 2 offers a dialing directory and ring-back security.*

The Nice Modem 2 also has some features that you would not really expect to find in a modem of this price — there is a dialling directory that can hold 10 numbers; another is ring-back security (when the modem is rung, it asks for a name and password; it then disconnects and, if it has verified the user, it rings them back!).

An on-line help facility comes as standard and lists all the commands and their effects, and you can also display the setting of the S registers.

The manual is very good and contains all the information you need to use the modem. It also includes help for things like modem to computer connections and some of the common things that go wrong when using the modem.

Product Details

Product: Nice Modem 2
From: The Nice Computer Company, 3/41 Rawson St, Epping 2121 NSW (02) 869 8777
Price: $749 taxed

And the Winners Are . . .

For all of the reasons you've just read, the Best Budget Modem just has to be the Nice Modem 2 from the Nice Computer Company. The Best User Modem? The Dataplex DPX224 which only won by a whisker from the NetComm 1234A (which is no now not available anyway).

But — these are *my* winners. Pick your own modem to match your needs and wallet. We've offered this brief look at a wide range of modems so you can do your own shopping better prepared. □

Modem Suppliers

IF YOU'RE shopping for a modem, it's worth checking out the range of one or more of these suppliers, in addition to those mentioned in the text. You're going to have to live with the modem many a late night, so make sure you get what you want —

New South Wales

Sendata Communications Products
67 Nicholson Street,
St Leonards 2065.
(02) 438 4255

Rosser Communications
4/1051 Pacific Highway, Pymble 2073.
(02) 449 8233

Scitec Corporation Australia
3 Apollo Place, Lane Cove 2066.
(02) 428 9555

Microbee Systems Limited
Koala Crescent, W Gosford 2250.
(043) 487 2711

Data Sat
5/522 Kingsway, Miranda 2228.
(02) 525 6688

Communications & Peripherals Australia
1/9 Pioneer Ave, Thornleigh 2120.
(02) 848 8533

Systems Technology
154 Clarence St, Sydney 2000.
(02) 29 3834

J N Almgren
16 Smith St, Chatswood 2067.
(02) 406 6177

System Development Corporation
64 Parramatta Rd, Camperdown 2150.
(02) 692 8565

Victoria

Consolidated Electronics
15A Anderson Rd, Thornbury 3071.
(03) 484 0791

Pulsar Electronics
Cataline Drive, Tullamarine 3043.
(03) 330 2555

Datacraft
PO Box 353, Croydon 3136.
(03) 727 9111

Faster, 'Blazer, Faster!

HOW WOULD you like to transfer a full PC disk of information, by telephone, in a little over four minutes? It can be done, and without too much expense. Netcomm's Trailblazer modem is capable of blasting information down the line at that speed and as good as guarantees error-free reception into the bargain.

It's just the thing for speed freaks like me, but it does have its disappointments: for starters, it takes only minutes to bust my daily download limit on Bill Bolton's Software Tools Bulletin Board!

Now, on top of the speed advantages which have always made it good value for money (it could quickly pay for itself in saved phone costs for interstate or international users), Netcomm has brought the price down to a level most businesses (and even quite a few dedicated hobbyists) can afford.

A year ago we thought Netcomm's Trailblazer modem was 'interesting', but not relevant to us. More important than the $5000 price tag at the time was our belief (or assumption) that it could only be used to talk to another Trailblazer.

How wrong we were! Perhaps one of the best-kept secrets about the Trailblazer is the fact that it is also a fully-functional, Hayes compatible multi-standard modem which can talk at our 1200 and 2400 bits per second standards, as well as the US Bell 300 and 1200 bits per second standards. It does not do V21 (our 300 bits per second) or V23 (1200/75), but they are almost totally irrelevant these days anyway . . . unless you happen to be a Viatel fan, in which case you probably deserve what you get.

So the Trailblazer is capable of talking to just about any modem-based service or PC you'd want to know about, as well as providing its blinding speed when linked to another Trailblazer. But there's a lot more to it than that . . .

Netcomm's Bull Story

Remember the Netcomm advertisements announcing the Trailblazer? They featured a large bull overstamped with the crossed red ring of the international NO ———— (fill in a word appropriate to the situation) symbol. The message, roughly paraphrased: 'When industry experts heard about the Trailblazer's speed capabilities, they said: ' ———— ' '.

Well, the truth is one of the leading industry experts who said the Trailblazer claims (being made by its US manufacturer, Telebit), were a load of cow dung was none other than Netcomm managing director Chris Howells. That was his reaction when first told about it two years ago, but he was smart (and curious) enough to investigate anyway.

The result: within six month's of the revolutionary modem's US release it was being sold here by Netcomm, under the No ————-banner.

The PEP Talk

The Trailblazer truly is revolutionary. It takes a completely different approach to conventional modem technologies and scores breakthroughs on two fronts — raw speed (our favourite) and the ability to carry error-free, high-speed transmissions on low-quality phone lines (worse even than Telecom's).

First, let's get the formalities out of our way by acknowledging the acronyms defined for this technology. PEP and DAMQAM might sound like something you'd get at a Sri Lankan restaurant, but they really mean fast, fast, and *more* fast. PEP is Packetised Ensemble Protocol (now you understand, huh?), while DAMQAM (Dynamically Adaptive Multicarrier Quadrature Amplitude Modulation) is normally served as an entree.

(Forgive me for being irreverent, but I hate to see the technicalities of the subject frighten anyone off a simple appreciation of the brilliance of the result.)

Some discussion of how it's done is, however, in order. The key words are Dynamically Adaptive Multicarrier (any old modem manufacturer can manage the QAM bit). Normal modems divide a phone line's frequency band up into a couple of large channels and squirt their data through these. The faster they go, the harder it gets to do this reliably as portions of the band break down, suffer from interference, get 'spiked' by poor switching gear along the way, and so on.

> We can't get a high-speed anything into the office without Matt Whelan turning up like the prodigal son — the day something fast turns up, so does he. He latched onto our shiny new pair of Netcomm Trailblazer modems, muttered something like XYZZY, and vanished into the darkness.

The Trailblazer divides the line up into 512 separate, tiny, frequency channels, each one capable of carrying up to 6 bits of information. When two Trailblazers connect, they spend a short time analysing the phone line, deciding where its bad spots are, and agree on using around 400 of these channels. They also agree how many bits of information each one is capable of supporting, so the clean portions of the line carry 6 bits, the almost-clean, 4 bits, and the poor ones, 2 bits, while the really noisy ones are 'struck from the list'.

If line conditions change dramatically during a call, they simply re-run the analysis process (without losing any data) and continue on.

As the host computer sends information, its modem collects it into packets, attaches header information and a 16-bit checksum, and fires it down this 400-lane highway. At the other end the Trailblazer funnels all the incoming bits back into a packet and calculates its own checksum. If

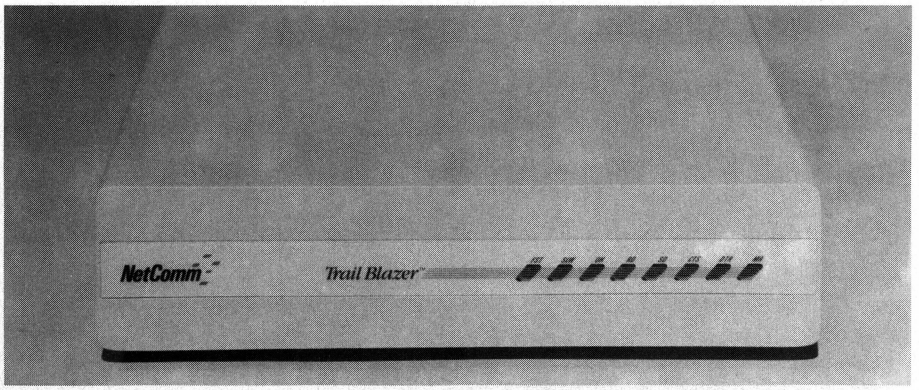


Figure 1. *Perhaps one of the best-kept secrets about the Trailblazer is the fact it is also a fully-functional, Hayes compatible multi-standard modem which can talk at our 1200 and 2400 bits per second, as well as the US Bell 300 and 1200 bits per second standards. It doesn't do V21 (our 300 bits per second) or V23 (1200/75), but they are almost totally irrelevant these days anyway.*

line errors force a mismatch, it asks its mate for a resend (only the bad packet is re-sent, based on the header identification).

The result is usually one of two things:

1) On a good line, incredibly fast, error-free transmission averaging between 1200 and 1400-plus characters per second (cps) actual throughput.

2) On a bad line, incredibly fast (given the line-quality), error-free transmission achieving between 600 and 1200 cps.

Note I am talking *characters per second*: I believe the only sane way to measure speed on these fast modems is actual throughput of information which, after all, is what we're buying them for. My best transfers with the Trailblazer notched up 18,031 bits per second, but a proportion of that figure is consumed as overhead with packet headers, checksums, and so on.

My worst case was a dismal less-than-400 cps. Dismal? Hah! I couldn't even get a connect at 2400 or 1200 bits per second on that link, between here and the United States — and I tried several times. Each time the 2400 bits per second modems recognised each other, my screen would fill with garbage and the line would drop out, yet the Trailblazer-to-Trailblazer link got me the file I wanted, totally error-free, at almost twice the speed of a 2400 on a clean local link.

Low-Tech Phone Lines

Performance on poor-quality phone lines is where the Trailblazer kills any opposition it might have had. I know of several cases where phone line quality was so bad that 300 bits per second transmission was the best that could be had, *when it worked*. Trailblazers installed in these situations are managing 6000 bits per second. The Department of Trade is testing the 'Blazer for its links to places like China, where the average line quality is so bad, reliable communications has been impossible.

And PEP technology is being considered by the CCITT for endorsement as a standard for impaired-quality phone circuits. It is also seen as a solution to 'modem-unfriendly' developments like ADPCM signal encoding, which is being built into long-haul circuits such as submarine cables and satellites.

Driving In The Fast Lane

The biggest problem Netcomm has had with Trailblazer buyers (and sellers, for that matter) has been teaching them to 'drive'. You can guarantee disappointment with this unit if you just plug it into your machine in place of your old 300 bits per second modem and let it run. Many people have connected limp-brained 8088-based PCs to the Trailblazer with an interface speed of 9600 bits per second and wondered why it wasn't running at 14,000 bits per second or better.

It needs to be driven hard (like any good GT!). The ideal setup is a high-speed AT running into an interface locked at 19,200 bits per second with CTS/RTS handshaking; that is, the computer has to send information to the modem faster than the modem can transfer it, so there is never a pause just because the modem has nothing to do.

Your choice of software is important. Much of the PC-based communications software available today uses an error-checking protocol, usually the industry-standard XModem protocol. XModem has served us well, but its time is past now that we are using high-speed (from 1200 bits per second up) modems. XModem sends a packet of information and then waits for acknowledgment from the other end. While it waits, the modem waits, twiddling its thumbs (as it were).

I'm totally confident that, because of the built-in error-checking in the Trailblazer, you don't need a protocol at all. But because I'm not a trusting soul (and because I don't trust the computer-modem link as much as I trust the modems) I want an extra check. Using a protocol like XModem, however, is like letting the air out of your GT's tyres.

Enter Zmodem, the best of a recent bunch of 'sliding-window' and 'streaming' protocols. The packeting and checksumming of information is still performed (with improvements) but the receiving end keeps its mouth shut unless it detects an error. That way, there is no waiting for acknowledgment, and no extraneous information on the line: the modems can get on with the job.

Zmodem is becoming available in an increasing number of public domain and shareware communications packages, as well as commercial packages like Pro-Yam (from Zmodem's creator, Chuck Forsberg). It is supported by the latest bulletin board software such as Opus. It's well worth using, if only to increase the speed of your 1200 and 2400 bits per second transfers. (Zmodem is available for downloading from YC's Bulletin Board, as a matter of fact.) If you have a Trailblazer, it's the protocol of choice.

Telebit has been aware of the comms software limiting its modems from the start, and has engaged in an active education campaign for commercial software developers. It sat down with Microstuff very early on to develop Crosstalk Fast and now publishes a Fastlane Software list for its dealers and customers showing packages which have been modified to take advantage of the modem's capabilities.

Network manufacturers, 3Com and Novell, also support the Trailblazer for high-speed links, although their software is being further developed to bring it up to the modem's potential.

Easy! Almost . . .

Despite the paranoia of Netcomm's Trailblazer product manager, Wayne

Pickett, I found the Trailblazer easy to use and easy to extract performance from. Once you have the key concepts clear — drive it hard and use the right software — it's a breeze, despite extensions to the Hayes command set which result in a 'quick-reference' card with three times the information you'd normally find.

The Trailblazer has a Hayes-compatible AT command set, but adds a number of new ones to go with its extra features, while the list of status registers seems to go on forever! They control important things like interface speed, transmission mode and flow control — most of which can be 'locked in' or left on automatic pilot, depending on how the unit will be used.

A particularly nice feature is the set of status registers which tells you the result of the Trailblazer's line analysis — you can find out the current maximum transmit and receive rates, how many packets have been sent (and how many had to be resent because of line errors), and even get a full breakdown of the 512 channels, both in the number of bits being carried on each and the line noise profile for each.

You can even query the line quality in non-PEP mode, to see how reliable your 1200/2400 bits per second connects are likely to be.

The right comms software can interrogate these registers and make a decision — based on the quality of the line — whether to continue or whether to re-dial in the hope of getting a better (faster!) connect.

Xmodem Revived

As I was completing this review, Telebit and Netcomm announced an upgrade to the Trailblazer which, among other things, highlights its 'un-supersedeable' design. The 'Blazer, unlike most modems which rely on dedicated chipsets, is almost totally re-configurable in firmware. It is based around two very powerful processors, the Motorola 68000 (yes, this modem is a more powerful computer than many of the computers it's connected to) and the Texas Instruments 32010 signal processor.

It's comforting, at a time when so many different high-speed modem manufacturers are trying to establish different standards, to know only Telebit can say 'whatever the standard, we can do it.' Because it is not locked into a hardware solution, a ROM upgrade is probably all that would be needed to switch to a new standard if one was established.

The recent announcement (the new model will be on sale at about the time you read this; existing models require only a ROM upgrade) solves the dreaded 'throughput killed by the protocol' problem many people, particularly in minicomputer and mainframe installations, can't get away from.

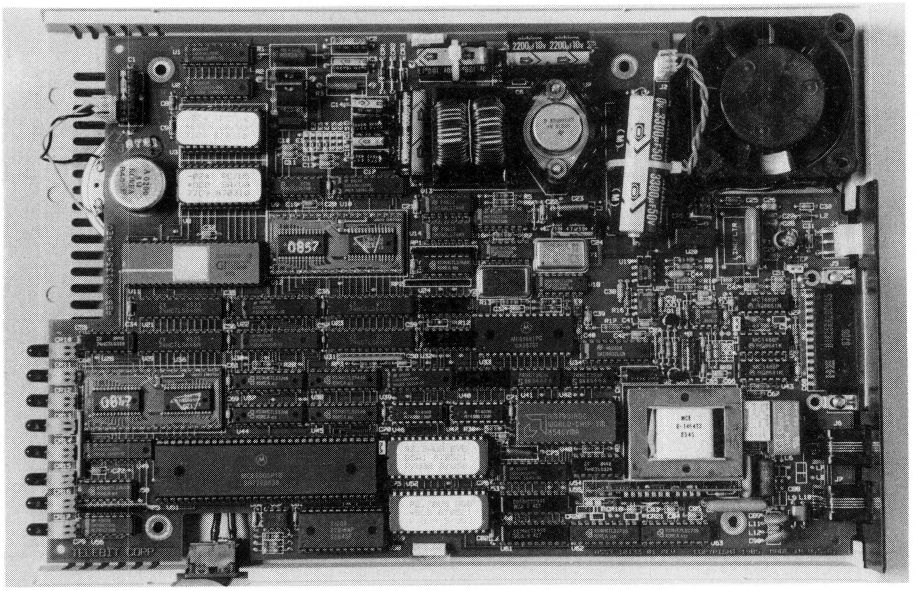


***Figure 2.** The Trailblazer is almost totally re-configurable in firmware — it's based around two very powerful processors: the Motorola 68000 microprocessor and the TI 32010 signal processor.*

In early August, Telebit announced the modem industry's first integrated support within a modem for the widely-used communications protocols Kermit, UUCP, Xmodem, and Ymodem. Software added to the TrailBlazer allows it to automatically support these protocols at speeds up to six times faster than any other dial-up modem.

Kermit, UUCP, Xmodem, and Ymodem are used in more computing environments than any other protocols, with an estimated 90 percent of all commercial communications software packages incorporating one or more of them. Kermit, for example, is supported on more than 200 types of CPUs from microcomputers to mainframes.

UUCP resides as a utility under the UNIX operating system for communications primarily among workstations and minicomputers. Xmodem and Ymodem are popular public domain protocols for PC-to-PC communications.

The Trailblazer effectively 'fools' the host by acknowledging packets rather than waiting for the other end, allowing rapid filling of its transmit buffers. It then carries out its normal packetising and error-correction between modems; the receiving modem also keeps the protocol local between it and its host computer. This way it achieves full-speed throughput despite the protocol while retaining the security of the protocol's error checking and correction.

In addition to the protocol support, the software release also contains MNP error correction for error-free communications at 2400, 1200, and 300 bits per second.

Would I Buy One?

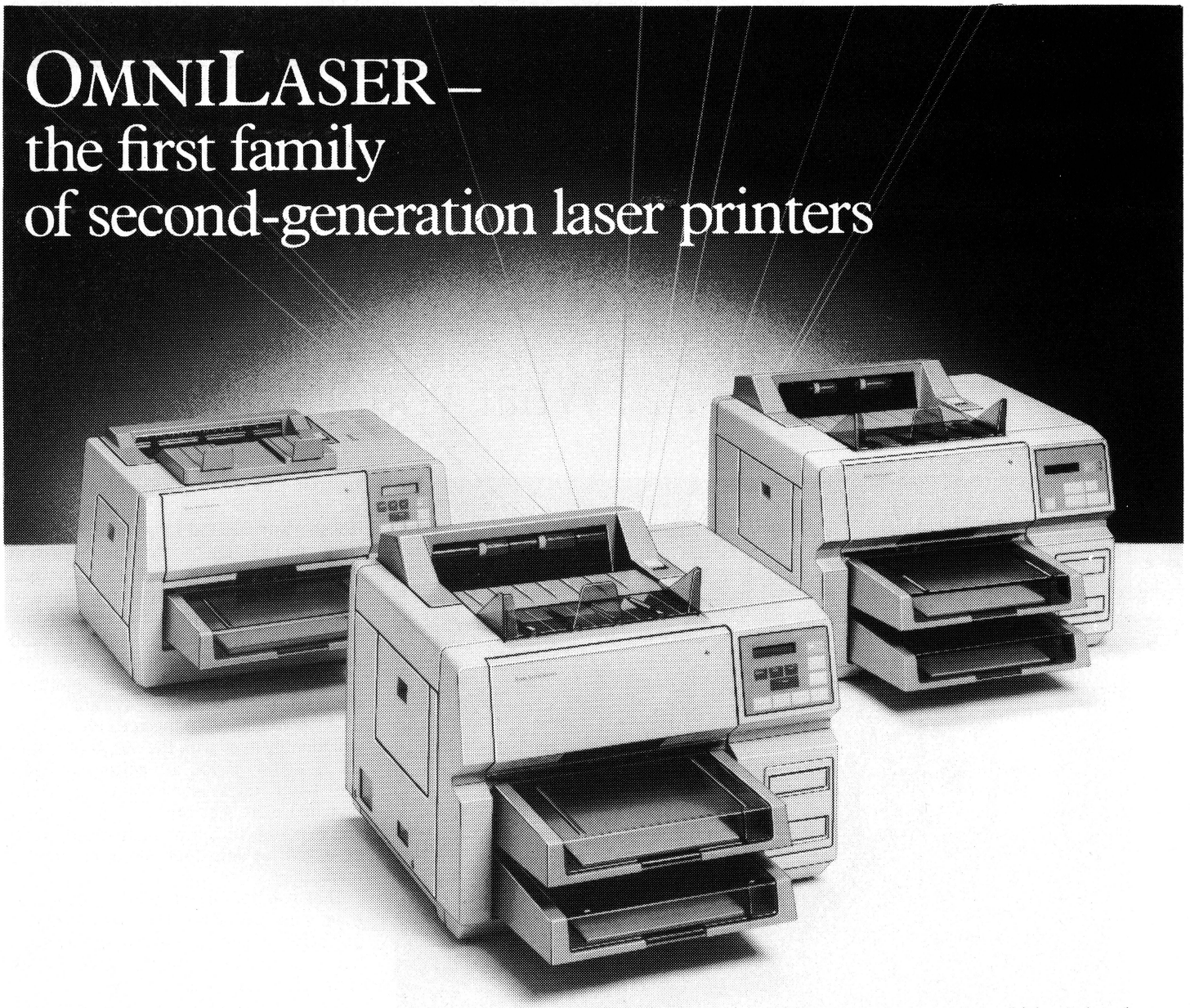
The best measure of a reviewer's conviction? Would he (or she) buy this thing being praised? ('Well, it's lovely and I think you should buy it. I wouldn't buy it, of course, but believe me . . .').

My answer, in the case of the Trailblazer, is a definite yes. I'm going to call Chris Howells at Netcomm as soon as I've finished the review and tell him I'll rip his arms off if he doesn't sell me this dirty, worn-out Trailblazer for the second-hand price it so obviously deserves. If he says no, I'll pay the full price (but don't you tell him that!). □

Product Details

Product: Trailblazer Modem
From: Telebit, California USA
Distributor: Netcomm Australia, PO Box 284, Pymble 2073 NSW (02) 888 5533
Price: $3468 taxed

OMNILASER – the first family of second-generation laser printers



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YC 3460

Your Computer's Bulletin Board . . . What you'll find



YYAHOO!! Its alive! It's all working and everything seems to be going according to schedule — the all new Your Computer Bulletin Board is away! Lets see what we have and what it might mean to you . . .

The Bulletin Board is primarily what its name indicates — a place to post messages and files (!) so others can read and use them. A computer bulletin board requires a dedicated piece of software that acts as an operating system to control where things are kept (and how to get them back again) and generally make life simple for the user. The system in use on the YC BBS is called Opus and we've got it running on a President AT with two 20 megabyte hard drives, connected to an enhanced NetComm 1234A. The Opus software was written by an ingenious fellow named Wynn Wagner III (yes, that's for real) who has donated his work to the public domain. This was a brilliant move on Wynn's part, because his program has generated so much interest, that it now virtually supports itself. It's currently installed on over 2000 boards all over the world — that's proof that it works, and works well — and it's only just over a year old! (For more background on Opus and Fidonet, see Bill Bolton's *Fidonet* on page 30.)

Sysops (system operators) are the ones who take Wynn's Opus program, and turn it into a workable system. If you'd like to see how workable, let's have a look starting a 'session' on YC's board — Hookup a modem to your computer; set the modem to talk at 8 data bits, 1 stop bit, and no parity, then tell it to call the system - (02) 669 1385. Now you'll have to wait for the modems to connect. (If you can't get them to connect, you've got problems — the most common one is that your modem doesn't wait around long enough for the right signal to latch onto. The modem at this end must autorange through several baud rates and may try a few different ones before it gets around to yours. If your modem doesn't seem to want to wait around, see if you can extend it's wait time — for example, on a NetComm Smartmodem, set 'S' register 7 to, say, 30.)

Once you have connected, the system will identify itself with the message: OPUS CBCS 1.03 — if you are getting garbage, the baud rates somewhere are mismatched; sort that out and call again. If you've connected at the right speed, you'll be asked for your first name and you've made it!

Then you'll be asked your last name and then your password. The password you make up yourself, so don't make it simple, because someone might guess it — its your name, your responsibility.

After you've entered your password, you're presented with the System Bulletins. This is where the sysop will post messages about new things happening on the board. After a bit of general information, you'll get to the Main Menu and be ready to start the session proper.

From the Main Menu, the two most interesting selections are the M = Message area and the D = Download area. The Download area is where you'll find programs and files that you can transfer to your own system and use — there is everything from benchmarks to games to CP/M programs (and we take requests).

On these pages you'll find a selection from some of the international conferences we are carrying on our board. Note that these same conferences are available to *any* Fidonet Board — check the PAMs List in this issue to find one close to home. If your local board isn't carrying a conference you're interested in, leave a message to the sysop. □

DBASE BOOKS

J,
in the process of reviewing a pile o
so. The best I've read so far is "dB
niques" by Cary Prague and James Ha
, but if you've already done some p
it a useful resource. I'll keep my
oductory stuff, and let you know i
ose from all the vast array in the
Regards, R V

v1.35

Origin: ABCOM - Kingswood/Penrith

EN-BY: 711/403 712/0 60 301 303 3
* This is a reply to #80.

om: J V
: D L
bject: CLIPPER/dBASE CTTY comma

e: CLIPPER/dBASE
The CTTY command worked very w
t no longer works. The reason
rites and no longer goes throu
just before starting dBASE III
emote terminal as it did in c

There are programs that can
MicroStuf's REMOTE or "PC-AN
I've seen CLIPPER applicatio

---
* Origin: DEC-USER (129/15

From:
To:
Subje

Re:
SORR

---
*
Fr
To
Su

All
Subject: Memory Expansion

For anyone looking for memory expansion for the
asecond mortgage to afford it, I recently bo
Proton Microelectronics in South Aust
canrecommend them. The board h
passesthrough the buss
theaddition of a daugh
real-timeclock and sour
Even without auto-c
copy the programs 'addme
disk and add the line 'm
finds any expansion memor
freed by the Kickstart El
These boards come in 5
compatible.
They are available in M
Ultraphase Compute
318 Lit. Collins St

---
* Origin: Down Under AMIGA/IBM

From: D T
To: M V
Subject: Re: MINIX DISKS

M, the SCSI interface....how much c
where does it plug in?..

D.

--- TBBS v2.0
* Origin: Paragon Bulletin Board - Sy
*** This is a reply to #147.

From: J F
To: P B
Subject: Re: MEMORY

Msg #163, 22-Aug-87 1

Quicksilver and Clipper both are fast and each offer features that aren't
included in dBase 3+. Take a look at the bench marks in this months issue
PC World. Clipper beat out Quicksilver in some test and
visa versa. Myself I prefer Quicksilver for it's windowing capability.
It also supports overlays, allowing compiled programs larger than the
memory of the computer they are running on. Automatic memory variables
can also be used to cut down on the length of your code. What I like mos
about the Wordtech Compiler is that it has a companion program
called DBXL, an interactive program development environment that is
much eaiser to use than dbase. Using it can cut debugging time in half.

--- ConfMail v3.0
* Origin: BEACH CITY_RB, Redondo Beach CA (213) 376-9567 (1:102/139)

Msg #77, 17-Aug-87 08:30pm

From: E C
To: J M
Subject: Prices

Is that how much they charge for DBXL and Quicksilver over there ? Y
are getting ripped off !!!!!

--- ConfMail v3.0
* Origin: BEACH CITY_RB, Redondo Beach CA (213) 376-9567 (1:102/13

Msg #78, 17-Aug-87 07:01am

From: F H
To: B P
Subject: SNAP

Re: Snap
SNAP is indeed an excellent tool for documentating dBASE II or II
The latest version I have seen is SNAP202 which is posted on BAM

Msg #80, 18-Aug-87 08:3

From: M Sp
To: R H
Subject: Re: Graphics

I know of only one graphics package for Clipper. It's called,
enough, "Flipper". It's sold by a company in Oregon. Flipper
a memory resident driver but a Clipper library to be included
link time. I don't know the phone number off-hand, but if you
up a copy of Data Based Advisor, they've always got an ad in

TOPS, Pleasanton, CA (16

From: B F
To: J S
Subject: Re: Memory

Msg #152, 22-Aug-87 01:10a

> Hi all, can anyone give me some info on extra memory.
> I am looking at about 2 megs for a reasonable price. I've
> heard about problems with some boards (one from Adelaide,
> I think) and also that the insider is rather good, but
> at the moment is max 1.5 megs. I guess that would be allright
> as that would bring up the total to 2 megs. Any
> and/or experience would be appreciated,
J.
>

J - I have a unit made by a Melb company.
without any problems. They have avoided the pro
power supply by supplying an external unit.

You can contact the designer of this unit for m
BTW the unit I have is a 2 Meg soon to be upgra

drac();

---
* Origin: AmigaLink Melbourne Australia (Opus 3
*** Part of a conversation.

From: G H
To: B O
Subject: Re: PUBLIC DOMAIN

Msg #161

Hi B,

SWOOPER is NOT public domain. It comes f
GERMANY. I have been trying to ascertain their ad
avail...

Regards, G. (Down Under Software - The AMIGA softw
---
* Origin: Down Under AMIGA/IBM Opus BBS (Opus 3:6
*** Part of a conversation.

From: G H
To: P P
Subject: Re: Buying an Amiga

Msg #162,

Hi P,

Yes by all means BUY an Amiga ! But if you
suggest you keep your clone as well, and forget abo
what's the point ?

Regards, G.
---
* Origin: Down Under AMIGA/IBM Opus BBS (6

[189] Highest: 189
ECHO area 10 ... Amiga Conference [Echomail]
Type '?' by itself for help

A = Change Area N = Read Next msg. P = Read Prev msg. E = Enter Message
R = Reply to msg. = = Read non-stop - = Read Original + = Read Reply
H = List Headings S = Scan Messages I = Inquire M = Main Menu
G = Say Goodbye D = Delete message T = Transport msg. F = Forward (copy)
U = Upload a msg. X = Save as File

Select: 150=
From: C B
To: J S

Msg #150, 24-Aug-87 01:21pm

Subject: BOTH

How about buying an Amiga and Sidecar, I have found the Sidecar is the best way
to get a workable system on the Amiga. I got my sidecar second hand for $950,
add a 20 meg hard drive for around $700 and away you go - you can also fix the
fuzzy screen bits by doing your text work on the Sidecar and getting a Mono
Screen.

C.L.B
JANUS LIVES

---
* Origin: Software Tools - You'll Never WOC Alone, Sydney OZ (Opus 3:711/403)

From: B F
To: B H

Msg #151, 22-Aug-87 01:07am

Subject: Re: Rj Mical

> How nice. Then it must have been HIM who put all the warning
> messages in the 1000's ROMS, like "we did a good job designing
> this machine; now Commodore's ruined it".
>

Have you tried looking for the messages ???
---
* Origin: AmigaLink Melbourne Australia (Opus 3:631/324)
*** This is a reply to #53.

Part 1

COMING TO GRIPS WITH NETWORKING

Stewart Fist begins his new series on networking by explaining why, when you try to talk about LANs, you are almost encompassing the whole universe of computer communications.

I SUPPOSE THE most primitive form of Local Area Network (LAN) is the cable that connects your computer to your printer. It's a network of sorts, even though it only provides a link to a peripheral. For a number of years I have had two PCs linked to the same daisy wheel printer. There's just one length of cable with an extra plug soldered onto the middle. I could have gone to all the trouble to put switches in the system, but everything works fine as long as both computers don't attempt to print at the same time.

You may reject the claim that a cable link between one computer and a printer is a LAN, but what about two? My double-link to the printer is a three 'node' (two computers, one peripheral) network without any collision avoidance scheme — if you don't count the yell: 'Are you using the printer?' before we hit return.

The point is that there are LANs and there are LANs. At one end of the spectrum we have simple cable systems for peripheral sharing at distances of only a couple of metres and at the other we have complex broadband communications networks with voice, video, and data streaming down cables and over micro-wave links spanning dozens of kilometres. These days when you talk about LANs, you are almost encompassing the whole universe of computer communications.

So we need to create our own definition. If we reject the PC-printer connections as being too simple, there are probably three criteria that define a LAN:

1) The devices on the network share information along common pathways.

2) A method exists which prevents data from one user being corrupted by data from another. If they share common pathways, then it is essential that the system has some way to avoid data collision and corruption.

These days when you talk about LANs, you are almost encompassing the whole universe of computer communications.

3) The devices are addressable — if I need to send data to a hard disk unit, it won't also simultaneously appear on the printer, or on the screens of other computer users in the system.

As a general principle, to satisfy these requirements the data needs to be transmitted along the common pathway like a train with numerous characters in a chain. These trains of data are called 'packets' or 'frames' and each frame will need to contain a header with the address information (where is it going to and who is it from?), the position of this packet in the sequence (is this the third or fourth frame?), then the data, followed by some form of checking sequence to make sure everything sent has arrived.

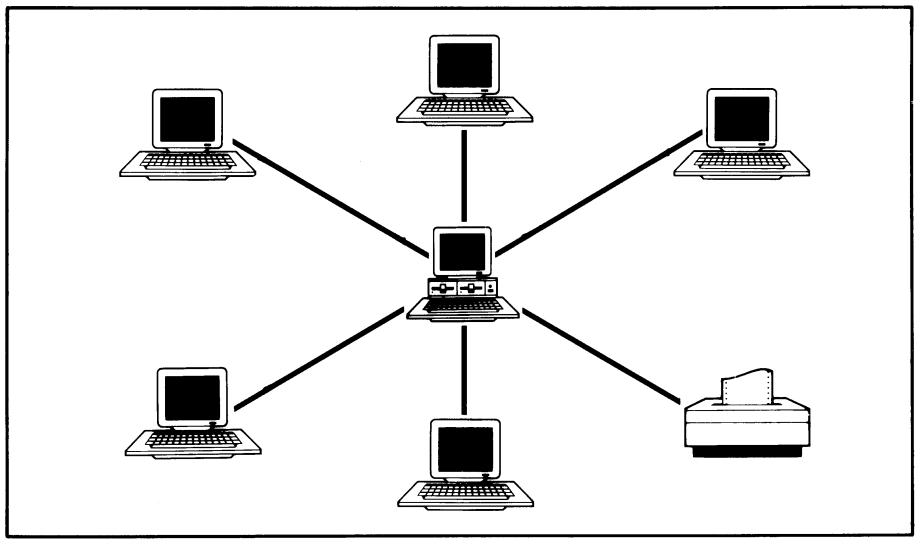
AppleTalk

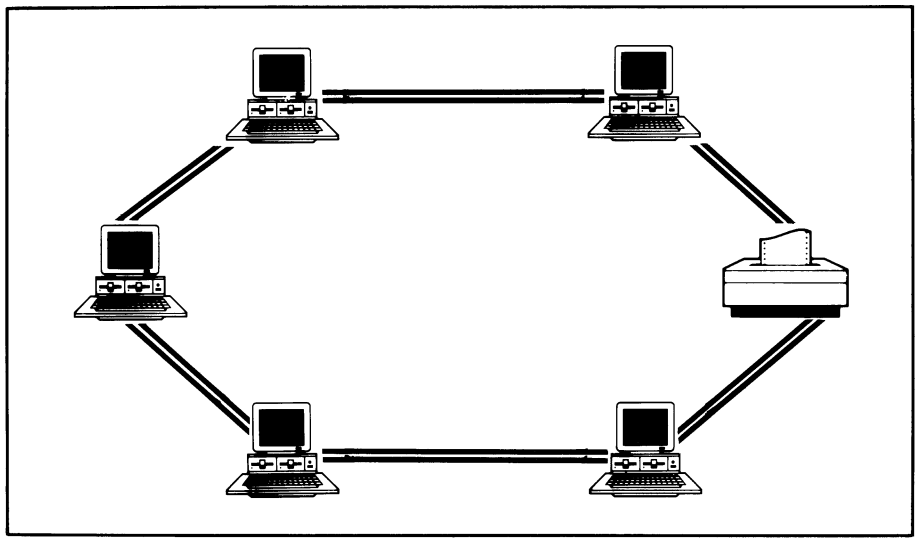
AppleTalk is pretty well the lowest form of network life that we can classify as a member of the LAN family if we accept the above as adequate. (Although I'll be discussing Apple and AppleTalk in particular in this article, the principles generally remain the same regardless of the system.) And despite some early criticism that Apple didn't have a file-server (it does now), AppleTalk has proved to be an excellent work-group solution to the problem of peripheral and resource sharing.

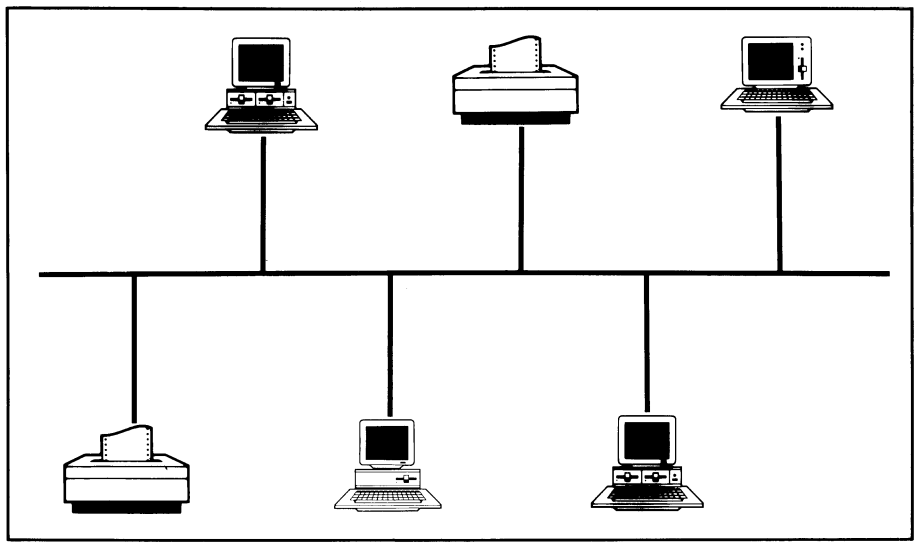
It is a low-to-medium speed LAN with a raw-data transmission rate of only 230.4K bits per second and it can handle only 32 nodes over a distance of 300 metres, maximum. So it's certainly not the Superman of the network world, but it is a good starting point for looking at LANs.

First of all we need to look at topography — an erudite way of saying 'what is the basic design?' There are three choices (plus a number of combinations and sub-choices). We can link everything together in one line; we can join the ends of this together to form a ring; or we can radiate all our links out from some central hub. Respectively, these three are the Linear Bus, Ring or Star topographies.

AppleTalk is a linear bus design which uses multi-drop lines linking the bus nodes to each computer or peripheral. Surprisingly little hardware is involved and the system has a lot of flexibility.







The Hardware

The 'network' itself is a series of shielded, twisted-pair cables with an impedance of 79 ohms. You can buy made-up cables with three pin DIN connectors attached in lengths of two and ten metres from Apple, or you can make your own. The cables are used to provide the links between 'connection modules' which give a passive junction between each 'node' (device) and the main trunk cable. This passivity is important because it means that a node can be added or removed with only a minor disruption to the service. If any one part of the system fails, it probably won't disturb the overall functioning.

The connection module is a plastic box the size of a cigarette packet which surrounds a transformer and a few resistors and capacitors. A 45 cm cable links this box to the 'node' (computer, printer, and so on) while two DIN sockets on the sides provide links from and to the next module in the chain. The two pins in one DIN connector are electrically continuous with the two pins in the other whenever a cable is plugged in.

The transformer isolates the node-link from the main trunk while a resistor provides an automatically switched terminat-

Star Network: *Star designs (top) need a network server (usually a dedicated computer at the 'hub' of the star). If the network server crashes, the whole network goes with it; however, if a peripheral fails, the system continues uninterrupted. Over distances up to 600 metres, star networks are usually connected by twisted-pair cables (as are telephones, incidentally); for longer distances, coaxial cable or optical fibre can be used.*

Ring Network: *The ring (center), also known as a daisy chain, is a large electronic traffic circle. All PCs and peripherals are connected together in a circle and all information passes through each node in the system. There is usually a parallel path around each node which provides a detour if a peripheral crashes. The nodes can be connected to twisted-pairs, coaxial cables or optical fibre.*

Linear Bus Network: *A bus structure (bottom) usually uses a main trunk twisted-pair or multi-wired cable into which the peripherals and PCs are connected. One of the advantages of bus topography is that a wide range of equipment can be hung on the LAN without problem. Dissimilar equipment — Macs, IBM PCs, Apple IIs, LaserWriters, and different modems — may not be able to talk to each other but they can share the use of the cable and compatible peripherals.*

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ing load across the line if a second extension cable is not plugged into the module; for example, if it is the end of the line. This is needed to stop data pulses 'echoing' back down the line from the open end — like an organ pipe.

All the other capacitors and resistors increase the noise immunity of the nodes and provide protection from possible ground-loop currents. The result is an electrically balanced, transformer-isolated, serial-communications, multi-drop chain which, for all the jargon, is very cheap and easy to build.

AppleTalk can handle up to 32 nodes per network, but networks can be interlinked by bridges and translators so the range of possible connections on one 'internet' is very large — more about bridges and translators later.

You simply plug in the connection modules, link them with shielded cables, plug in your software, and go!

If you've got a number of Apple Macintoshs in an office, the above is more than you will ever need to know about the hardware. AppleTalk is relatively foolproof and anyone can set up a system. You simply plug in the connection modules, link them with shielded cables, plug in your software, and go!

The Mac is able to provide this simplicity because it has a lot of network electronics already built in. You can connect Apple IIs and IBM PCs into an AppleTalk network but you need a special communications board/serial interface for each.

AppleTalk is based around the use of Zilog's 8530 programmable communications chip; it is a highly flexible device that can be programmed to use a variety of communications methods and protocols including RS-232C and RS-422 (virtually a balanced version of RS-232C). AppleTalk uses RS-422 because balanced lines are less likely to suffer interference over distance.

There are two more chips that provide support for the RS-422; a driver chip (26LS30) and a receiver chip (26LS32) which are both low-cost and readily available. In operation the receiver chip is always listening on the line and it will pass on any data to the Zilog controller chip for processing. The driver chip is only activated when the node is transmitting and ideally only one driver is connected to the system at any one time.

The entire hardware (physical) layer of the AppleTalk system is well specified but flexible. It is called upon to perform bit encoding and decoding, bit transmission and reception, signal synchronisation, and carrier sensing; the entire physical layer can be replaced by some other medium as long as these functions are provided. The specifications aren't tied to chips and hardware, only to functions.

The 8530 chip is programmed to use the Synchronous Data-Link Control (SDLC) as a bit-oriented line protocol which establishes the way data transmission is regulated. SDLC was widely used for communication with IBM mainframes and so this control capability is built into many communications chips.

The main function of the 8530 chip is to assemble the data and retrieve it from 'packets' or 'frames' which have been marked by special bit-patterns known as 'flags'. These frames can be up to 600 bytes (characters) long, but since SDLC treats everything in terms of bits (rather than bytes) there is no necessity to conform to the standard 8-bit byte size.

The chip has a mode known as FM0 which encodes the bits by a process known as bi-phase space encoding. This uses the transitions in voltage levels on the line to represent the 1s and 0s, rather than the absolute voltage levels themselves — a system somewhat analogous to the phase-shift keying (PSK) principle used in high-speed modems.

Software

While the hardware is reasonably straightforward, AppleTalk's software is much more complex, although it has been compressed into only 6 kilobytes of code which becomes part of the Mac's operating system. The software has to provide translation of names and functions into network addresses, delivery of the data to the right address, routing, and error checking.

AppleTalk follows the conceptual ISO seven-layered reference model for the connection of computer systems, with each layer building on the services provided by those beneath it. However, most of AppleTalk's layers are simplified versions of the OSI standards.

Protocols in the top five layers — physical, data link, network, transportation, and session — are at the core of the AppleTalk

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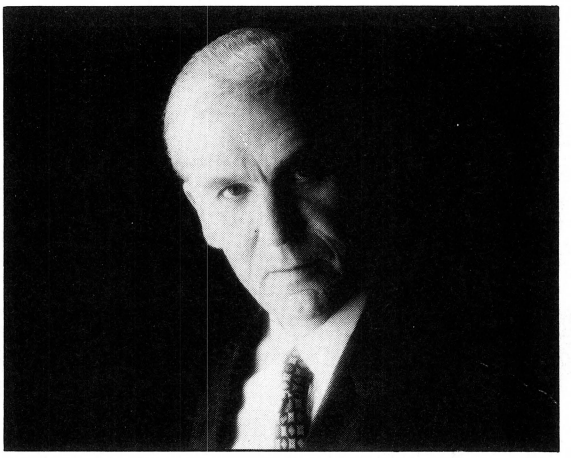

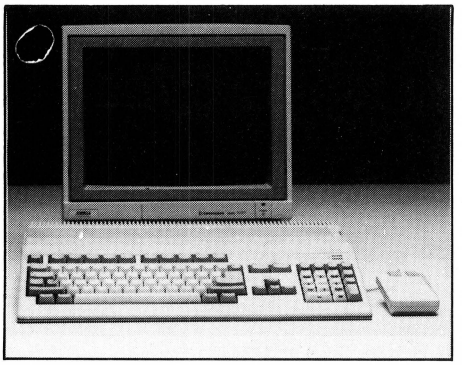

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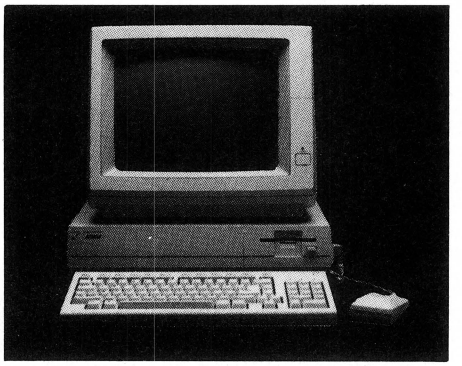
4096 colours	4 independent stereo channels, built in music and voice synthesiser	no
SOFTWARE		
More than 500 commercially released programs available		



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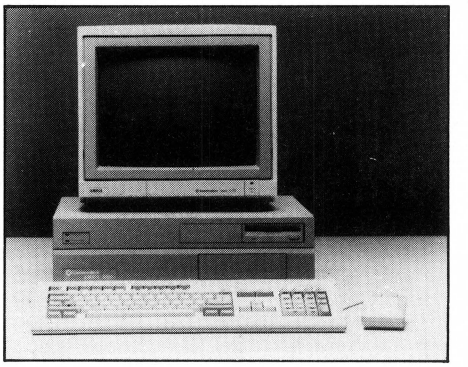
4096 colours	4 independent stereo channels, built in music and voice synthesiser	yes*
SOFTWARE		
More than 500 commercially released programs available		



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software and these are included in a set of routines and a pair of device drivers that are called the AppleTalk Manager. This becomes part of the operating system when installed and provides the link between the network and the application program.

There are several different software layers. The Link Access Protocol is responsible for finding out when the main trunk line is free. It also sends out data and recognises which data should be received by reading the frame address. It therefore provides the bridge between individual computer functions and the network hardware and flow of data, so it is the most important part of the network for developers to understand.

Link Access Protocol uses CSMA/CA for access control. The acronym stands for Carrier Sense Multiple Access with Collision Avoidance. The Carrier Sense part of the phrase means that a node wanting to transmit first listens on the line to see if it is in use. If it is, it defers to the on-going transmission.

It's a first-come, first-served operation which is okay for small networks but, as you can imagine, large networks using Carrier Sense could be locked up by one computer transferring masses of data and hogging the whole system.

The term Collision Avoidance defines the technique used to avoid data colliding in the unlikely event that two computers on the network begin transmitting at exactly the same time (within the limits of the detection delay). On AppleTalk, all transmitters wait listening on the line for a short period of time after any data flow ceases. Then, to minimise the chances that all will begin to transmit at once, each computer adds an additional random delay which varies according to the perceived network traffic.

If by chance two stations start up at the same time, it is up to the other layers in the network to detect the garbled messages on the line and request a retransmission of that particular frame.

There is also a very similar access system known as CSMA/CD, where the CD stands for Collision Detection. Here the station listens on the line as it begins to transmit and if it detects that its own message is being garbled, it stops, waits a random amount of time, and then if the line is still clear it begins again. There are subtle difference between CA and CD schemes.

AppleTalk's Datagram Delivery Protocol works in conjunction with Link access by handling data routing. This includes the forwarding of data over 'bridges' between various networks. To do this it must work in conjunction with the Routing Table Maintenance Protocol which each bridge uses to keep track of all other networks available to fit it and also which bridges provide the shortest pathway to the destination.

Your applications would link to AppleTalk through software entry points known as 'sockets' and the system provides two alternative protocols for supporting these sockets. If you are involved in question and answer type sessions (transaction-oriented use), the Transaction Protocol manages the message sequencing and timing of the request/response format.

Long streams of data — sending or receiving — are handled by the Data Stream Protocol which changes the streams into packets and sends them on their way. It also checks received packets for errors, demands retransmission if errors are detected, and makes sure that duplicate packets are removed. The integrity of each packet is ensured by the use of a 2 byte (16-bit CRC) checksum at the end of each frame.

There are a number of other protocols: a Transaction Protocol which handles requests and responses between applications and the 'sockets', a Name Binding Protocol which allows you to use your own names to indicate network nodes and Filing and Printer Access Protocols which handle the file-servers and the printers, including any LaserWriters.

AppleTalk uses a 1 byte (8-bit) addressing number which is attached to the head of each frame of data. This node identification can therefore be any number up to 255, although 255 itself is reserved for broadcast use — everyone on the system will read it.

The node IDs aren't fixed, but are allocated at random by the system software itself. When a machine first comes on line it generates a random number as a trial ID. It then butts into the network and sends a dummy message to this ID. If it doesn't get acknowledgement it knows that this number is free and it will continue to use it for the duration of the on-line session. If not, it will try again.

In a way this typifies the whole approach that the AppleTalk designers have taken. It's not an elegant solution to the problems of identification but it does work and it doesn't require the time and attention of a network specialist — and this is a philosophy that Apple strictly adhere to.

In the next part of the series we'll be looking deeper into networking. Until then, keep a grip on the LAN situation. □

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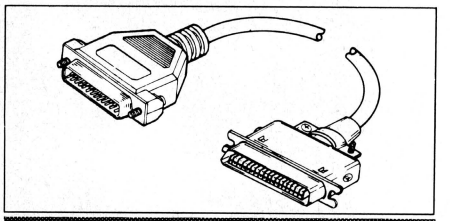

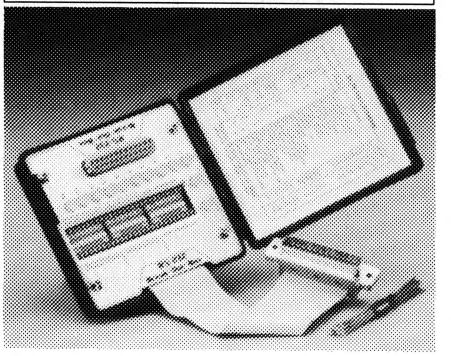

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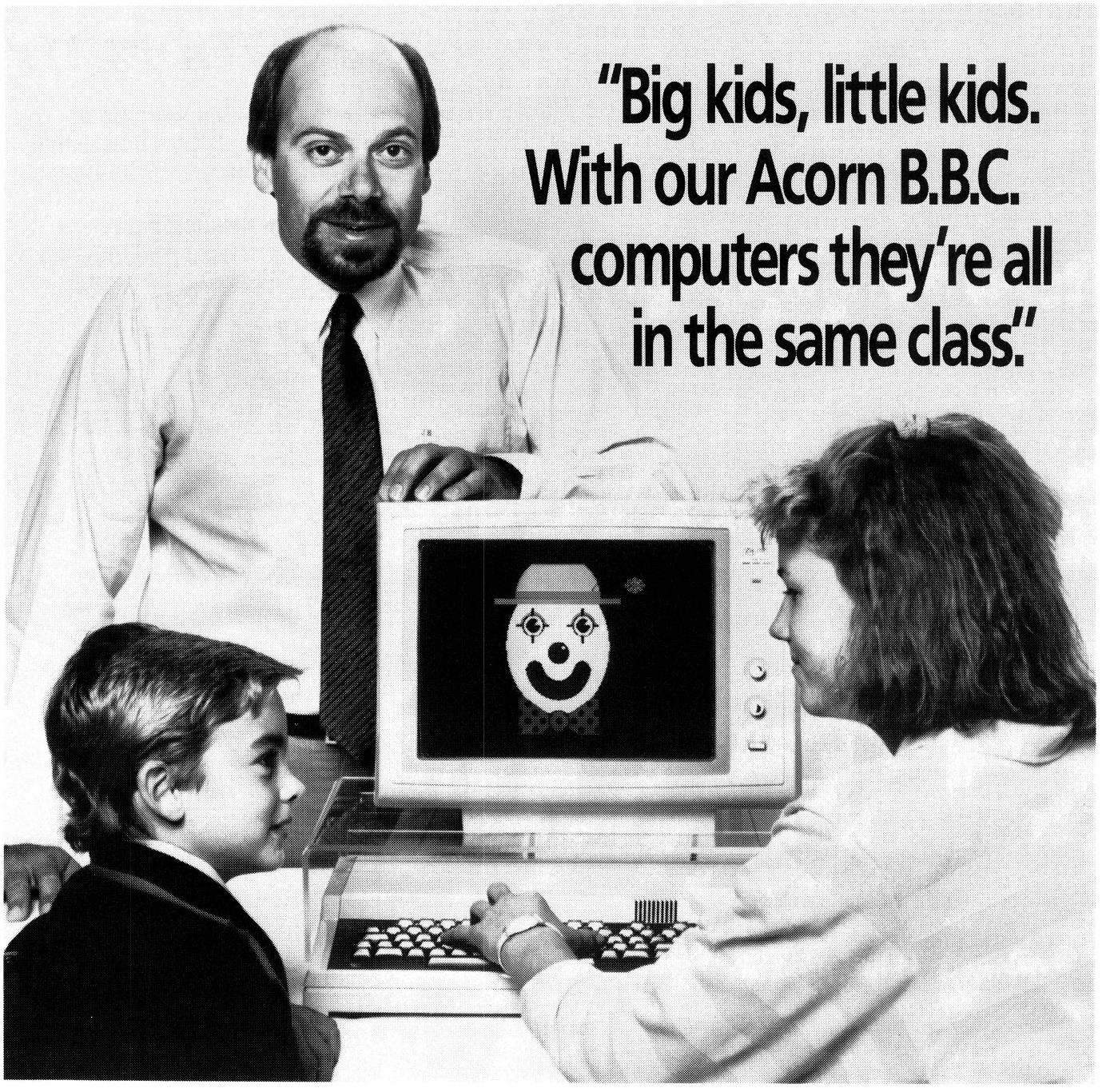

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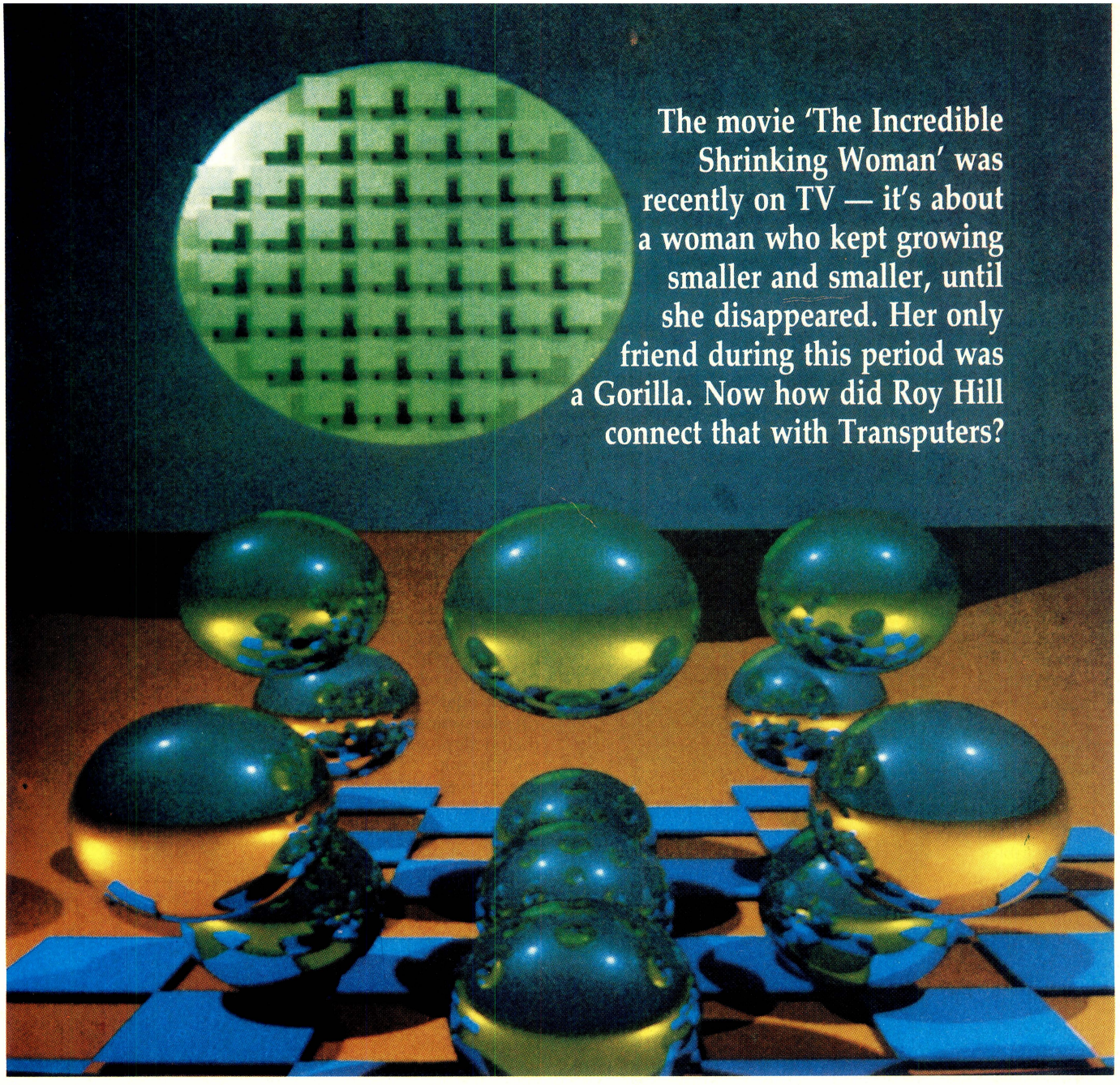


The movie 'The Incredible Shrinking Woman' was recently on TV — it's about a woman who kept growing smaller and smaller, until she disappeared. Her only friend during this period was a Gorilla. Now how did Roy Hill connect that with Transputers?

Enter the Transputer

THERE'S AN analogy I noticed between this Shrinking Woman and the current trend in microprocessors. Microprocessors keep getting smaller and smaller, and at the same time their power (Gorilla?) keeps growing and growing. Is there a limit to the amount of miniaturisation that can occur? The answer is a very definite *yes*. Current microprocessor architecture is approaching the limits of Newtonian Physics. The microscopic metallic lines on a microprocessor chip that inter-connect the various operating parts of the circuit are now becoming so small (1.5 micrometers — that's 1.5×10^{-6} meters), that we are are starting to talk about their widths in terms of thousands of atoms wide.

We are rapidly approaching the time when we cannot make the lines smaller. Likewise, the silicon (or gallium arsenide) transistor is reaching its geometric limits. Even with the possibility of a new transistor design, the best improvement that we can hope for is a greater magnitude of improvement in the current performance; but users are demanding thousands of times more speed and power, as they seek to solve more and more complex problems (world weather patterns, tracking ocean currents, enhancing faint images from stars and Voyager spacecraft, deciphering railway timetables . . . .) which demand higher speeds and more memory.

The ultimate stumbling block is not so much the geometrical limits (they are still about 20 years away), but rather the fundamental design of the modern computer. This design — shown in Figure 3 — is the same model as the one with which computers started and is called the Von Neumann model, after the person who de-

Current microprocessor architecture is approaching the limits of Newtonian Physics.

veloped the concept of the modern computer's architecture. Von Neumann referred to each of the five units in the diagram as 'organs.'

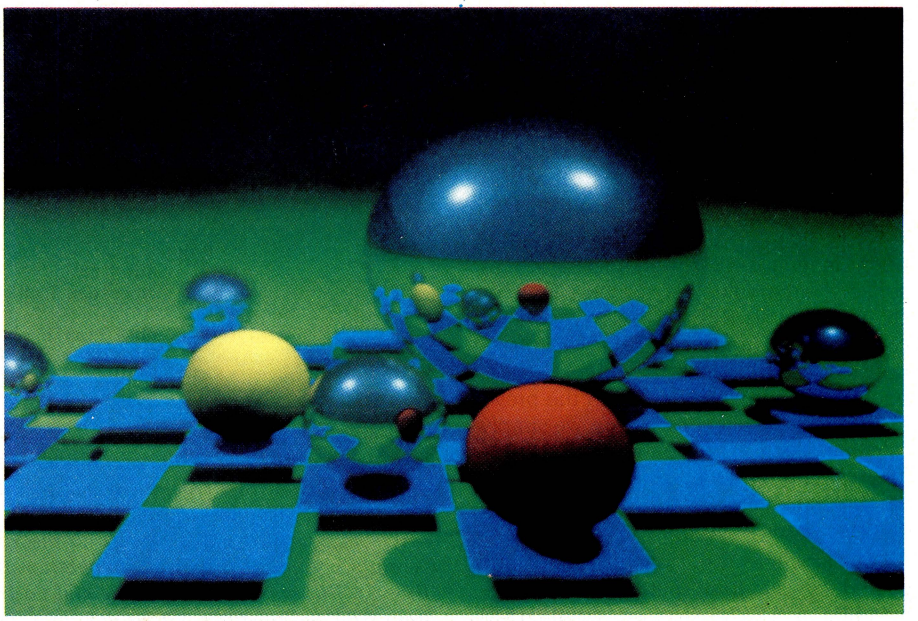
From Figure 3 we can see that all data communication from both the external peripherals and the internal units must take place through the microprocessor. The addition of maths co-processor chips doesn't speed things up as much as it should, because the data must still be transferred to the co-processor via the micro. Additionally, all of the current languages are constrained by the 'Von Neumann Bottleneck' — the requirement that all data must pass through the micro to be processed. Even Fifth Generation computer languages (such as LISP, Prolog, and HOPE) can't have their full power exploited on the current microprocessors, without finding some means of by-passing the Von Neumann Bottleneck. The apparent solution lies in the introduction of parallel processing.

Parallel Processing

Parallel Processing is almost self descriptive. It means making the processor perform more than one task at the same time. The more tasks the micro can perform at the same time, the higher the data throughput and, hence, the greater the overall processing speed of the micro. Manufacturers of the current batch of 32-bit micros have been searching for some way of overcoming the processing bottleneck by incorporating a degree of parallel architecture into the heart of the micro.

The first of the manufacturers to produce a working model with some degree of parallelism is Texas Instruments, with their 32020 32-bit micro. According to *Signal Processing — A Big Switch to Digital* this chip contains a 're-configurable twin RAM organisation, three parallel shifters, a hardware multiplier, an auxiliary address computation unit, a hardware timer and a multi-processing interface,'. The design is at best a compromise between standard Von Neumann architecture and some of the more important aspects of parallel processing, however, it is a step in the right direction.

Most complex problems are easily adapted to parallel processing. As a fairly



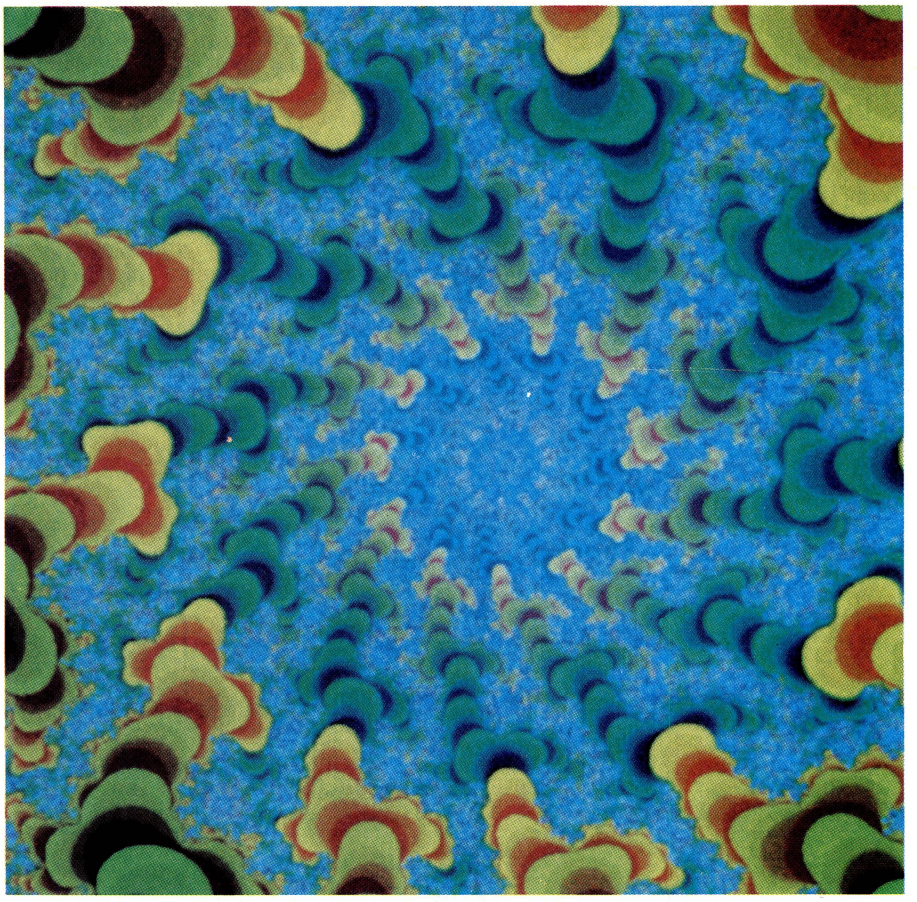


Figure 1. (Top) *A ray trace image that took 40 Transputers 23 minutes to process. A conventional chip set (the 80386/80387 combination, say) would have taken over a week to produce the same image.*

Figure 2. (Bottom) *A Mandelbrot Set — four Transputers in series can draw this pretty picture in 20 to 60 seconds; a VAX 11/780 takes about an hour.*

trivial example, consider the calculation of the value of 'e' (used as the basis for calculating natural, or Naperian, logarithms). This calculation is typical of those mentioned above and relies on determining and adding ever smaller fractions to a previous total — Taylor's Series to the mathematicians.

We could solve this problem in a traditional language, by simply picking a reasonably large value for a FOR-NEXT, or DO-WHILE, or REPEAT-UNTIL type of construct. The limitation is that each fraction in the series must be calculated sequentially and then added it to the previous total. In parallel processing, we simply calculate each term concurrently (hopefully using a maths co-processor) using a parallel language, or we use more than one processor running in parallel.

This is where the Transputer (a name coined by the firm that invented it — meaning a TRANSistorised comPUTER) comes into its own. But, I prefer the concept of the Transputer being a TRANSition of the comPUTER, from the Von Neumann model to the multiple parallel processor model. The Transputer was developed by the British firm Inmos in the early 80's and commercial systems are now starting to become available in Australia. The Transputer not only handles parallel processing (more about this later), but uses a new language called Occam to take advantage of the parallel nature of the Transputer. (Occam compilers are available for some of the existing non-parallel processors).

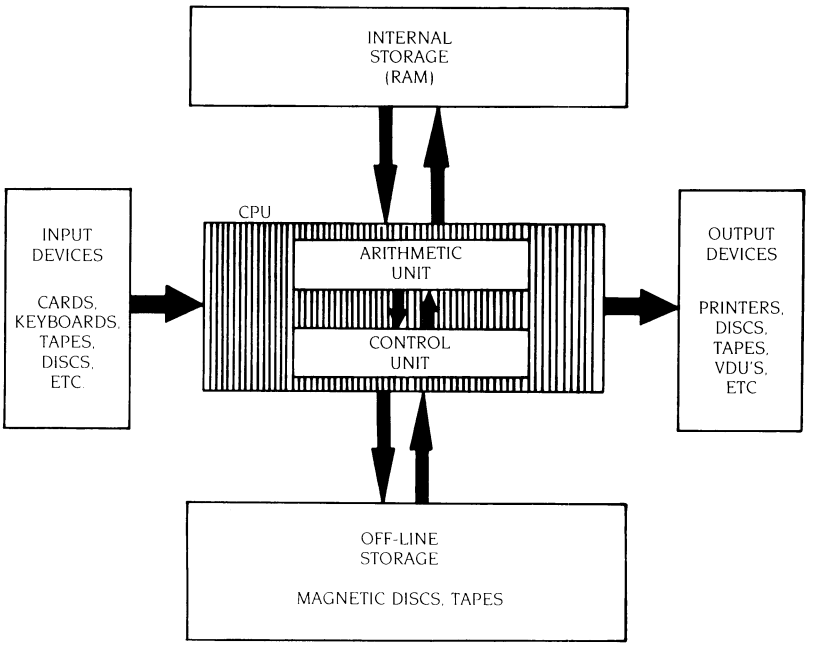
```
PROC keyboard.handler(CHAN OF INT in , out , to.screen)
  INT ch:                          --declaration section
  VAL stopch IS INT '@' :          --use an '@' to signal end of input
  BOOL running:                    --running is Boolean 'TRUE' or 'FALSE'

  SEQ                              --a sequential process
    running := TRUE                -- intialise the flag to 'TRUE'
    WHILE running
      SEQ
        in ? ch                    -- get input from the keyboard

        PAR                        -- and here is a parallel process
          out ! ch
          to.screen ! ch           --and send it "to.screen"
        IF
          ch = stopch              -- finished yet?
          running = FALSE -- if so, set Boolean to 'FALSE'
          TRUE
          SKIP                     -- otherwise 'SKIP' to next section
                                      -- the colon = end of procedure
```

Figure 4. *Part of the procedure for a keyboard handler written in Occam (the double dash indicates a comment). Note the use of the SEQ and PAR constructs to specify those operations that may be performed in parallel, or those that must be performed in sequence — it looks much like Pascal, except for the SEQ/PAR/ALT constructs. In the design of an Occam program, each area of computation that can be treated as an entity is called a 'Process' (the subroutines of Basic and Fortran are typical entities). The Process takes input data and produces output data in a stand-alone mode (analogous to the manner in which a Forth 'word' works). A collection of Processes may themselves form a Process, which may then be linked to form the complete program. All inter-Process communication takes place along the explicitly defined 'link' channels. These link channels may be connected to either I/O devices or other processors — thus the program is optimised at the design stage for maximum processor throughput. This, of course, places a fair burden on the programmer — not only does the program need to be written, but it must be optimised for SEQ/PAR performance.*

Figure 3. *The fundamental design of computers is still based on the Von Neumann model of computer architecture (shown above). Von Neumann referred to each of the five units in the diagram as 'organs.'*



Occam

Occam is one of the new breed of RISC type languages (Reduced Instruction Set Computer languages), in that it has a very simple language set. (The name is derived from a fourteenth century philosopher, William of Occam; he is only famous for his dictum, called Occam's Razor: *Entia non sunt Multiplicanda praeter Necessitatum*. Transputed, this means 'don't complicate things unnecessarily.')

A typical Occam program uses this language set to specify the nature of the action to be taken during the execution of a program or procedure. An example, part of the procedure for a keyboard handler, is given in Figure 4.

Conventional languages such as C, Pascal, and Fortran have also been implemented by Inmos to compile to Occam. The Fortran package conforms to the Fortran-77 standard, whilst the Pascal compiler conforms to the newly established ISO 7185. However, there are optional extensions which enhance the capabilities of both these packages. In the Fortran-77 compiler, for example, the enhancements include lower case in the program text, double complex data typing, Do . . . .While constructs, and 32 characters in identifiers.

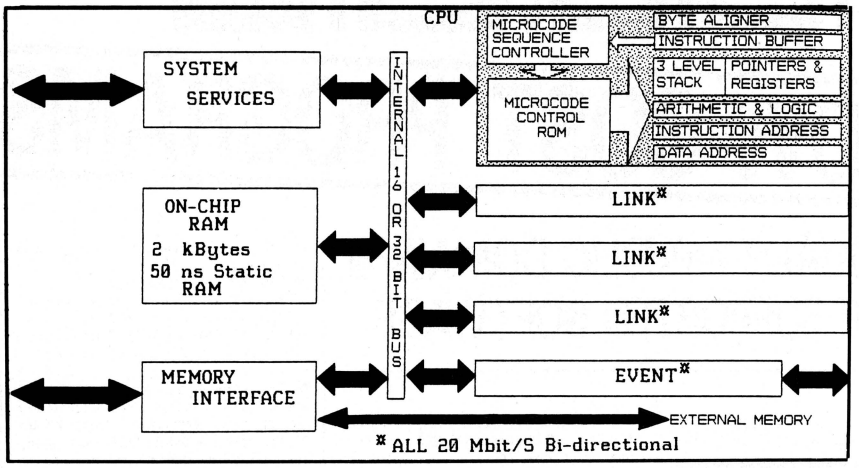


Figure 5. *Transputer Architecture — a generalised block diagram.*

The Transputer

The Transputer has been around now for five years — the first commercial processor was designated the T212. This is a *true* 16-bit processor, supplied in either a 68 pin J-lead ceramic chip carrier, or a 68 pin grid array. The T414 is the *true* 32-bit processor in an 84 pin equivalent package. The T414 is totally compatible with the T212 at both the programming and interface level, although they are obviously not pin compatible. Another distinct advantage of these chips is that they all only require a single 5 volt power supply. Figure 5 shows a generalised block diagram of the architecture.

The newcomer to the stable is the T800 transputer (see *Electronics*, Nov. 27, 1986). This is also a 32-bit chip, but it includes an on-chip floating point co-processor which is a serial pipelined logic structure, rather than a 'flash multiplier,' or 'barrel and funnel shifter' or 'parallel multiplier.' The design was chosen to enable the floating point co-processor (FPC) to be realised in silicon on the chip itself, rather than being provided as a 'two chip' set. As such, it outperforms the 80286/80287 by a factor of 12, the 68020/68881 by a factor of 6 and the 32032/32100 by a factor of 4. For those purists who insist on real-world benchmarks, it runs at 4 million Whetstones per second.

Whilst the performance specifications for the Transputer on its own are fairly impressive; 10 mips (million instructions per second) for both the T212 and the T414, it is when they are linked together that they become super-impressive. And they can be linked in a ring or a serial network, or in a two-dimensional array, which is a cross-linked ring.

Inmos claim that there is almost a linear increase in processing power (speed) as the number of Transputers in the system is increased — I would dearly like to have several dozen of these chips to play with. Unfortunately, price prohibits the purchase, as the T414 costs $950 each and the T212, $750. These prices are liable to take a real tumble in the near future as the market starts to use them and the T212 should shortly be within reach of the home hobbyist.

The areas where transputers will find rapid acceptance is in the area of Digital Signal Processing (DSP), which requires very large number crunching capabilities for such high powered applications as Fast Fourier Transforms (FFT) — used for enhancing signal-to-noise ratios of analogue data — Finite Impulse Response (FIR) analysis, Vector Processing (a similar exercise to calculating Taylor's Series), and the world of Graphics Processing.

Two examples of the work of the Transputer applied to Graphics Processing are shown in Figures 1 and 2.

Evaluation Boards

This now leads us to a discussion of the types of evaluation boards available to check out the power of this mighty new computer. In the same vein as the Definicon series of co-processors (68020 and 32032 boards for the IBM), Inmos has produced a co-processor board for the IBM — the B004-2. The board and its associated development system (Occam compiler, link adaptors and so on) is not ready for the home enthusiast yet — $7066 for the board and $7066 for the software development set — however, as I mentioned earlier, prices should start dropping fairly shortly.

Each of the language compilers costs $1850. The other board of interest (there are quite a few, including VAX compatible boards) is the B003-1, which costs $8850. The board contains four transputers and can be used in any of the three configurations mentioned above. This board can also be linked to the IBM plugin board — in this configuration one has a computer guaranteed to outperform a VAX 11/780. Any takers?

There are quite a few projects in Australia that are taking advantage of this brilliant new computer. Most of these are oriented towards graphics and DSP applications. I know of of two graphics projects involving multiple Transputers and a company called Meiko (founded by ex-Inmos employees) is producing a Supercomputer (based on the T800 chip) that will run at around 360 Megaflops when completed.

Meiko demonstrated a 3 billion instruction per second supercomputer based on 311 of the T414 Transputers at the 1986 Siggraph conference. They now plan to replace all 311 T414s with the new T800, which is expected to increase the throughput by a factor of 10. The designers are also quite adamant that their forecast throughput is a typical throughput, rather than a maximum throughput, as often quoted by chip manufacturers. I am looking forward to the next 12 months with the greatest anticipation.

Inmos are represented in Australia by Hawk Electronics Pty Ltd, (02) 32 5530. I would like to thank Trevor Evans, the managing director, for his support and the provision of photographs and diagrams for inclusion in this article. □

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U24. FILE MANAGER with execution facility for running programmes. Will also copy, view, delete, etc.
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U30. ALLBUT the programmes you specify can be acted on. Eg, delete, copy, etc.
U31. MEASURE the time your computer takes to execute commands.
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U134. SET 132 COLUMNS PER PAGE on Epson compatible computer.
U135. SET UNDERLINE MODE on Epson compatible printer.
U136. SET COMPRESSED PRINT on Epson compatible printer.
U137. SET ENLARGED PRINT on Epson compatible printer.
U138. SET WIDE PRINT on Epson compatible printer.
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U412. TRACK MEMORY as programs are running. Has windows and more.
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U414. MULTI-SCREEN. Allows output to be directed to more than one screen. Needs CGA. Multitasking features.
U415. NEW ANSI.SYS that may aid screen presentation and allow faster execution of many functions.
U416. BLACK & WHITE MODE can be switched on colour graphics card.
U417. TIMEPARK HEAD of hard disk after a specified time has elapsed.
U418. SET 40 or 80 screen columns BW mode on colour systems.
U419. STATUS REPORT on system, including information about drives, memory available.
U420. SPEED TEST (1) checks processor speed and compares with IBM-PC. Similar to Norton test.
U421. SPEED TEST (2) checks computer speed in two areas, including Sieve calculation and track to track access time, and compares with IBM-PC.
U422. SPEED TEST (3) comprehensive checks on processing, including block write, register/memory, multiply, divide, stack operations, far jumps, etc, and compares with IBM-PC.
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U425. EXPAND DOS ENVIRONMENT SPACE TO 1K.
U426. FLIP ON/OFF (TOGGLE) DOS PARAMETERS. Works on several standard Dos parameters.
U427. WHAT PROCESSOR? Examines and identifies the processor/s being used, such as 8088, 8086, etc.
U428. WHAT DEVICE DRIVERS? Examines and reports on devices (eg ports) installed in your computer.
U429. WHAT DOS CONFIGURATION? Examines and reports on memory, vector addresses, and statistical information about version of Dos you are using.
U430. WHAT EQUIPMENT? Examines your equipment and reports on the installed drives, type of cards (eg, printer, colour, mono, RS232) etc.
U431. EDIT RAM STORAGE in your computer.
U432. DRIVE STATUS. Reports on no. of bytes, sectors, clusters-what capacity is and how much is free.
U433. DIAGNOSTICS. Performs large number of computer diagnostics and reports on serial, parallel ports, video, etc.
U434. DRIVE TEST. Floppy disk test drive utility.
U435. SLOW AMSTRAD 1512 Programs e.g. games that run too fast.

FILE MOVING

U511. HARD DISK UNERASE. Exceptional features. Most unerase utilities don't work on hard disk – this one does!
U512. DELETE ALL BUT those programs you identify.
U513. INTELLIGENT COPY PROGRAM that creates sub-directories as part of the transfer. Also renames rather than over writes.
U514. SUPERIOR COPY PROGRAM that checks and evaluates target before copying. Eg, copies last dated version.
U515. UNIQUE COPY PROGRAM with same function as £.£ but does not copy those already on target disk.
U516. TREE SURGERY. Prune files unwanted/ duplicated on hard disk. Has source code and compares files with the same name.
U517. KILLDIR. Delete a branch of a directory. Reduces steps and saves time.
U518. MOVE DIRECTORY around if you prefer it stored in different location.

FILE ORGANISATION & CHECKING

U611. BOMB ALERT. Examines new files for malicious intent and reports on possible danger to other files.
U612. BASIC MENU GENERATOR. Better access to your Basic files through a menu. For Basica/GWBasic.
U613. UNSQUEEZE ARC FILES. Small, efficient utility that occupies less space and is simpler to use than Arc.Exe.
U614. HARD DISK OPTIMISER. Related group of files that optimise hard disk usage and eliminate file fragmentation. Helps pack the disk.
U615. FILE RE-ORGANISER. Regroups a fragmented file into contiguous sectors on a disk for more efficient disk access.
U616. RECOVER BAD SECTORS. Re-records data on disk. Does 12 retries and thus may recover bad sectors.
U617. COLLECT BAD SECTORS. Marks bad sectors for collection into a separate file that will not be used. Works with floppies and hard disk.
U618. ADVANCED COMPARE facility that can save as edlin script, generate and update deck.

SPECIAL FEATURES

U805. PREPROCESSOR FOR "C" COMPILERS. Has "C" source and helps organise coding into efficient form for compiling.
U806. VOICE EMULATION. Compiled with Basica source module which allows extensions, revision or use as tutorial.
U807. DEMONSTRATION OF COMPUTER GRAPHICS for those who have CGA.
U808. DAYS SINCE JAN 1ST. Calculate no. of days elapsed since beginning of year. Needs Basica/GWBasic.
U809. BINARY FILE CONVERTER. Converts files from machine language to hex equivalent for examination and modification.
U810. CAPTURE BIOS contents and store in a separate file.
U811. EXPLORE FAT (FILE ALLOCATION TABLE). Shows the table entries, starting clusters of files, etc.
U812. MINICALC. A small, easy to use spread sheet with 11 x 22 cells for quick every day use.
U813. PROGRAMMER'S CALCULATOR which does special hex and other calculations for those writing programs.

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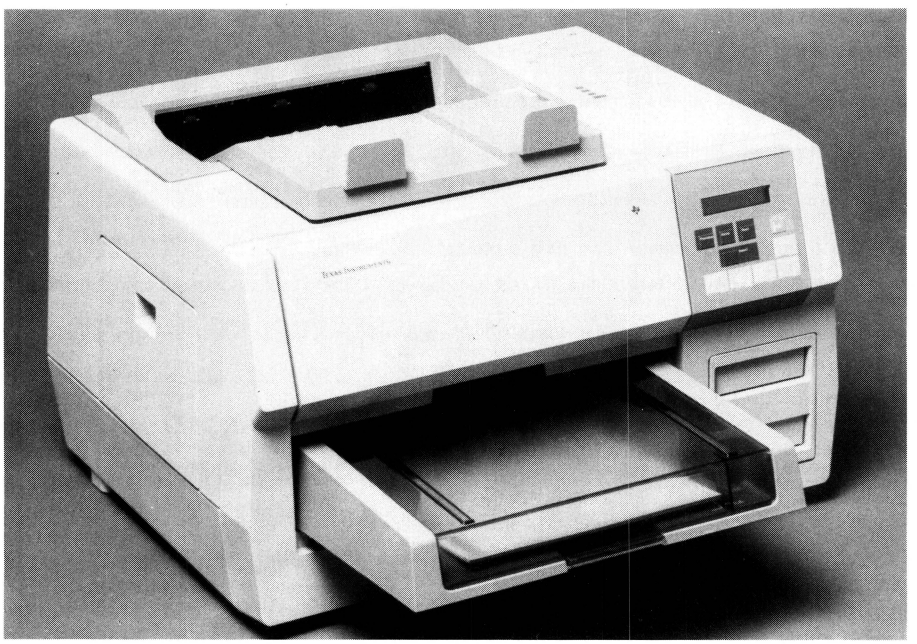
LASER AMAZERS

TI has produced two 'super-emulators' in their Omnilaser series (and Matt Whelan offers a postscript), while the Epson GQ-3500 introduces portable font cards to a competitive machine.



TI'S Omnilaser 2108

Unlike the new wave of laser printers released lately, the Omni-Laser is big, measuring in at 53 x 59 x 37 cms. Most of the new machines are around two thirds of that size.

Installation of the 2108 is involved but relatively easy. The accessories come supplied in a separate box and include manuals for installation and operation, two toner cartridges, the optical printing cartridge (OPC), the 250 page capacity paper tray, sample paper and the power cord.

Perhaps the best design feature of the printer is the paper feeder bin, which slots into the bottom front of the printer. TI did very well in designing a paper bin which allows topping up of the A4 paper via opening a lid, without having to pull the whole bin out.

Another good design feature is that the 250 page paper feeder bin sends the paper through to a 250 page receiving bin on the top of the printer, with the pages arriving face down — that means it stacks in the order it's printed. And the big receiving bin is one of the many thoughtful features — so many 'high throughput' lasers offer a small output bin that overflows almost as soon as you get started.

The 2108 can handle a variety of label sizes (even with the curved paper path) and overhead transparency materials.

The control panel is touch sensitive and colour coded. The 2 line, 16 character liquid crystal display (LCD) reports on the mode or menu selection (top line), the font selections available and error messages (bottom line).

The green online button is the standard online switch. It has to be *on* to receive information and *off* to do all the switching selections. Some of the selections can be done without the printer being offline.

The remaining buttons on the control panel are split into blue buttons across the bottom of the panel which deal with the options and brown buttons on the top which are the menu switches.

The blue Setup/Test button lets you test the printer and select the hardware or software interface or miscellaneous parameters. The Font button allows access to the selection of fonts in the printer but most users will probably find it more convenient to control fonts from the keyboard. The Form Feed button cleans out the remaining data in the printer buffer (a very useful feature) and ejects the page. Portrait/Landscape switches between the portrait mode (normal printing) and landscape mode (printing down the length of the paper). The last button is the Reset which stops the job being printed and resets the printer to the defaults.

The brown keys are to 'page' through the list of options forward or backward. A handy Home button gets you out of the current mode and takes you back to the previous setting.

Quality

Whether it was a quirk of the review machine, or an inherent problem with the Ricoh engine, I don't know, but the printing was fuzzy around the edges. The text and graphics were true black, so no complaints there — I think the prob-

lem with the fuzziness comes from too much toner being attracted to the photo-sensitive belt and spreading when put through the heating coils. This showed up especially on small characters like **e** and **a** and produced a hazy graphics image.

We found a similar problem with the Dataproducts LZR 2665 reviewed in our June '87 issue. In that case, it appeared to be a problem with clearing a fully charged belt so that it did not attract toner.

Be prepared for a fairly noisy and slow operation when printing. As the manual said, it can print up to eight pages a minute, but this is slowed to about half when putting through a page that takes a lot of printing: for example, 55 lines of solid text or an involved graphics image.

Additional fonts and graphics sets are available through cartridges that fit into two slots in the bottom right hand front of the printer.

If you're after a medium-priced laser printer that can support just about any application you care to throw at it, then this one is worth a serious look — especially if you think it's time to get into desktop publishing but haven't settled on a package yet.

The Workings

The 2108's printing selections can be controlled from the front panel or software driven via the computer. A much appreciated surprise is that PostScript is provided as well as AppleTalk. On a more mundane level, serial and parallel connections are provided around the back. This allows you to use any of six software interfaces: Diablo 630, HP LaserJet Plus, TI Model 855, HP 7475A Plotter and PostScript batch and interactive modes.

There are 13 fonts held in the printer's 2 Megabyte of RAM. Handling these from the control panel or the keyboard is made almost simple by the excellent *OmniLaser Technical Reference Manual*.

The Epson GQ-3500

Epson have gone the way of the Hewlett-Packard's LaserJet Series II with a very similar low profile design, using the Ricoh belt engine rather than the Canon drum engine on their printer.

The GQ-3500 is one of the new batch of 6 ppm printers, compared to the 8 ppm that everyone was releasing a year ago — this is reflected in the fact that Epson are introducing a printer at around $4000, about half the price of similar machines 12 months ago.

How Epson will compete in the classy laser market is still open to question — the GQ-3500 is its first offering. Many companies are releasing similar machines, using the same Ricoh engine, at the same speed, and at competitive prices.

The Machine

The outside dimensions of the Epson GQ-3500 are: 22 *x* 41 *x* 42 cm and it weighs in at 35 kgs, which includes the input and output trays, drum cartridge and toner cartridge. Its durability clocks in at five years or 180,000 sheets (3000 per month *x* 12 months).

The toner and drum are installed by opening the printer and releasing a catch on the front which pivots the whole top of the printer back. There is one toner cartridge which slips inside the printer and clips into a slot. By working the arm of the ratchet (which is located at the end of the toner cartridge) back and forth, the plastic seal on the bottom is rolled into a compartment — no mess.

The drum is about half the size of most other lasers. It just slips into a slot in the middle of the printer. The drum is easy to install *if* you follow the clear instructions in the manual.

The GQ-3500 offers a selectable paper path, providing the choice of either a flat path for labels, or the face down path which dumps the paper on the top of the printer (in the same order it was printed).

The Card!

Epson have developed a number of cards for their printers which provide portable fonts. They are the same size as a credit card but three times as thick. Apart from the fonts available on many of these cards, there is an 'identity card' which sets the printer up so that it acts fully as an HP Laserjet Plus laser printer.

Before installing the identity card you have to set the dip switches. (Yes, the GQ-3500 does have dip switches at a time when most printers are trying to get away from them.)

The printer is restricted to using either the serial or parallel interfaces which come on interface boards inserted in the back of the printer. If you have a parallel interface, no dip switches are involved in setting the machine up.

The serial interface, however, needs the dip switches changed. This is done by undoing the two knobs located either side of the interface board. There are 3 sets of 8 dip switches which are referred to in the serial interface booklet, with an additional 3 switches on the outside of the board.

In the booklet which details the uses of the identity card, there is listed the limitations of the cards' functions in relation to the real HP LaserJet. The two machines have different control panels and even the serial interfaces are dissimilar configurations.

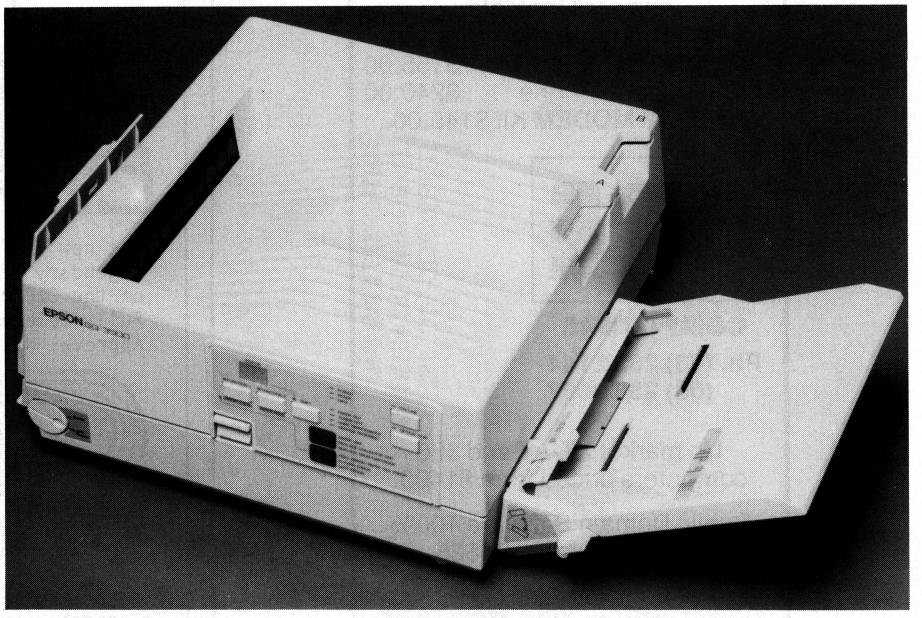


***Figure 2.** Epson's first laser offering — the 6 ppm, Ricoh-engined GQ-3500.*

Take Epson's word when it says, '. . . because of differences in printer mechanisms, memory capacity, and so forth, the GQ-3500 may not produce exactly the same results as the HP LaserJet Plus every time you print.'

In the manual, Epson is typically thorough in its listing of features. It seems very honest about the limitations compared to the machine it is trying to emulate, while also providing a thorough step by step look at the machine using clearly explained diagrams.

Having Control

The control panel consists of five buttons, nine indicator lights and a two digit status indicator, on a large panel on the front of the machine.

There is an online button to the top right of the panel with an on/off indicator, although the printer automatically goes online when it is switched on. If a fault occurs the printer will go offline until you fix it and select online again. The button can also be used to terminate the internal self test option.

The button under online is the optional 250 page tray selector which only operates when you have the tray connected.

A line of LEDs grace the middle of the panel, each being labelled as to what it indicates. Under these is a listing of possible error messages, which are elaborated on in the user's manual.

The shift button toward the middle of the panel puts you in Selectype mode and allows the manual setting up of parameters, such as paper size and angle. The SelecType settings are only temporary and are lost when the printer is turned off.

The Error Clear function of the first button is limited to 6 error occurrences, such as buffer overflow, or paper jam. The other errors are covered indepth in the reference manual.

The remaining button, the Function 2/Paper Feed, clears any text held in the buffer, selects details for a particular function in the SelecType mode, prints the test pattern that is pressed down when turning on the machine, or prints out the remaining copies if the multicopy has been selected with SelecType.

Selection is made through nine functions which are then split up into several sections each, offering various set alternatives and optional alternatives with the inclusion of the IC font cards.

The verdict — with the Epson name (and service) behind it, this one will probably lead the pack of Ricoh engined machines (and the price doesn't hurt either). □

Product Details

Product: Omnilasers 2108 and 2115
From: Texas Instruments, PO Box 106 North Ryde NSW 2113
(02) 887 1122
Price: $11,500 taxed Omnilaser 2108
$16,600 taxed Omnilaser 2115.

Product Details

Product: Epson GQ-3500
From: Epson Australia, 3/17 Rodborough Road, Frenchs Forest NSW 2086
(02) 452 5222
Price: $4,790 untaxed

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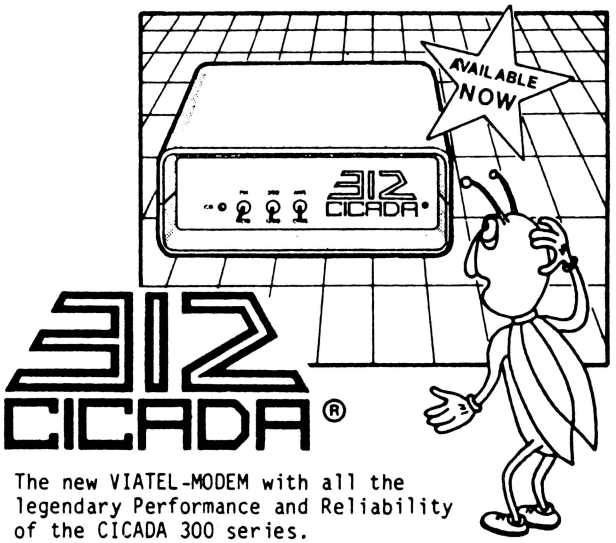

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Omnilaser 2115

TEXAS INSTRUMENTS sent a very large, threatening looking chap around to my house to pick up our review Omnilaser. When he turned up at the door, the kids took one look and dived into their rooms and the cats headed for the rooftop.

His name was Guido and he turned out to be a lot friendlier than he looked — well, he was friendly *after* I gave him the Omnilaser. He said it wasn't because I was late in returning it; he denied it was because I'd told Jake I loved it and wouldn't give it back.

No, he muttered, TI had borrowed him from his usual employer (an SP bookie) to pick it up because it was heavy . . .

In fact, it is only the size and weight which stops me from being totally hooked on the Omnilaser 2115 and then only because it has to fit into my too-small study (which is already crowded out with four computers, two desks, more than 1000 disks and bookshelves of reference material and manuals).

In other respects it is close to my ideal printer. It does so many things — and does them well — it is, perhaps, the *best* printer currently available for IBM-based desktop publishing (DTP).

PostScript For Starters

Naturally, the TI features the PostScript page description language — I wouldn't consider it a 'serious' DTP printer if it didn't. What sets it apart from other PostScript printers like the Apple LaserWriter is its versatility when connected to a PC.

One of the biggest drawbacks in running something like the LaserWriter from the PC so far has been the lack of support for PostScript outside the major desktop publishing packages and a few word processors like Microsoft Word.

The only worthwhile broad-range laser printer support in PC software is for the HP LaserJet and even that has been long enough coming. So the big decision facing potential desktop publishers has been whether to go for the quality and versatility of PostScript for DTP and miss out elsewhere, or to stick with the LaserJet (because more software understands it) and accept lower quality DTP. A tough one, especially for those who already had a vital application running which needs the LaserJet.

One less than satisfactory solution was to go for the LaserWriter and use it in its Diablo emulation mode when not running your DTP software. All PostScript printers can emulate a Diablo, but the effect is *lower* quality and flexibility than even a base-model LaserJet because of the limited command set and font capability of the daisywheel.

The Supreme Emulator

Texas Instruments to the rescue. The Omnilaser range (the eight-page-a-minute 2108 and my favourite, the 15-page 2115) is really an Apple LaserWriter (with a few advantages), a Hewlett-Packard LaserJet Plus, a TI 855 dot-matrix printer, an Epson dot-matrix, a Qume Sprint daisywheel, and a Hewlett-Packard plotter (the Epson and Qume emulations were already there in the draft and WP modes of the TI 855). I dare you to find me some software it can't handle!

It not only provides all these emulations but also extends their command sets to allow switching between them — so if there is something you can't do in one mode, you can send it a command to switch, do the required job and send it a command to switch back.

I know several people who would pay dearly to be able to switch their LaserWriters back and forth from PostScript to Diablo mode without flicking the switch on the side of the printer — this feature alone, in certain applications, would be worth the extra cost of the machine.

All the emulations are also selectable from the front panel of the printer, of course, as are many of its operating parameters like interface type (you have a choice of standard parallel or serial, or the Appletalk/RS422 9-pin connection), speed, font selection and so on. The control panel is an easy-to-use, multi-tiered menu system that a lot of other manufacturers would do well to copy.

They would do well to copy the manuals, too: they're comprehensive *and* comprehensible — a rarity in the printer world. TI provides both an Operator's manual (with basic maintenance, setup, installation, operation and troubleshooting details) and a technical reference manual (covering all the emulations, plus interfacing including sample cable wiring for various machines).

And The Bad News?

There is very little. I'm not particularly keen on the Ricoh laser engine, on which the TI is based, because it is bigger, hotter and noisier than the Canon engines used in the LaserJet and LaserWriter.

But it's also a heavier-duty unit, so these differences are understandable. And its advantages in paper-handling (two 250-sheet trays, with a 500-sheet output bin) and the write-white technology, which make for much crisper blacks than the older Canon engine (as used in the previous LaserJet and the current LaserWriter) tend to make up for any complaints.

One real disappointment is in the font selection — these days we're starting to consider the 11 font families of the LaserWriter Plus inadequate, yet the TI comes standard with only the basic mandatory PostScript fonts, Times Helvetica, Courier and Symbol. A trip to your TI store for some optional fonts will be in order if you want a little variety.

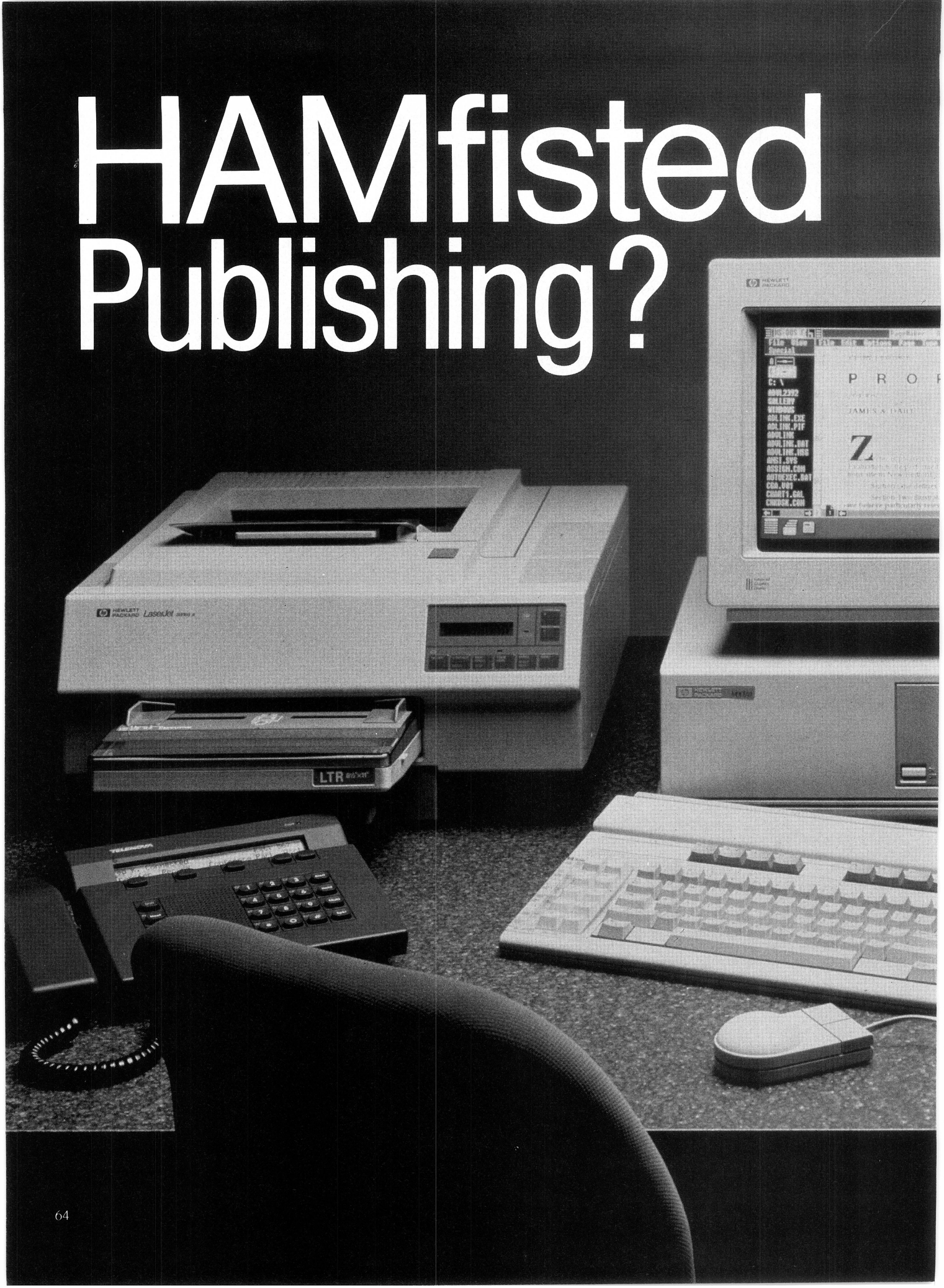
The fast Omnilaser, the 2115, is a little expensive at around $17,000, although on a speed-and-features rating it is still ahead of the opposition. But at that price I would have liked the extra fonts.

Don't compare this unit to something like the LaserWriter, however, the under $12,000 model 2108, with the same speed rating as the Apple, gives a much fairer contest. And, if you want quality and versatility in a PC-connected laser, it's no contest. □

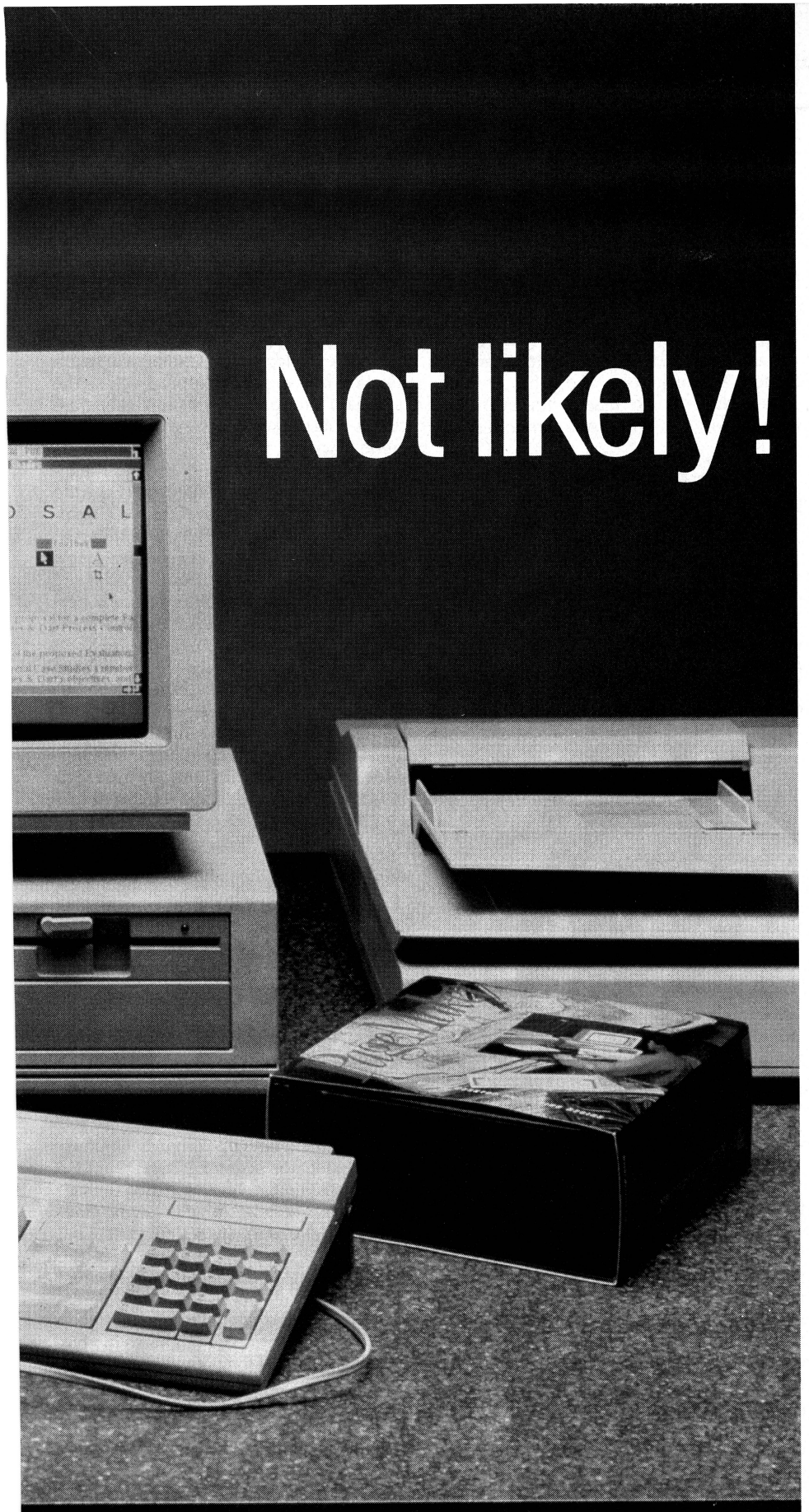


The 15 ppm Omnilaser 2115 is a combination Apple LaserWriter, a Hewleti-Packard LaserJet Plus, a TI 855 dot-matrix printer, an Epson dot-matrix, a Qume Sprint daisywheel, and a Hewlett-Packard plotter (the Epson and Qume emulations were already there in the draft and WP modes of the TI 855).

HAMfisted Publishing?



Not likely!



The package presented by the HAM Alliance is an impressive, complete Desktop Publishing and document processing system.

Can you desktop publish without a page description language? Is a bit-mapped laser printer like the H-P Laserjet up to the task? Matt Whelan keeps telling us PostScript is the answer, so we had him try the alternative. 'Stick your PostScript in your, er, back pocket,' we said, 'and give this H-P system a try — then you can open your mouth again . . .'

Normally I'm intensely suspicious of 'packaged' desktop publishing (DTP) systems; the 'get it all in one place' approach is often an attempt to cover up the inadequacies of individual components. But when big guns like Hewlett-Packard, Aldus, and Microsoft get together you have to take the result seriously, even if it does get labelled the HAM Alliance.

Each of these companies *does* have something to 'cover up' in its DTP offerings but, despite my suspicious nature, that's not what they're doing here. More to the point, they're recognising those individual deficiencies and joining forces to present a complete product.

Aldus PageMaker is a brilliant design / page makeup program, but it's far from ideal for processing large amounts of text. Enter Microsoft with Word 3.1, a very advanced word processing package with enough control over type and enough document-handling features (indexing, table of contents, section numbering, style sheets, footnotes, comprehensive laser support, and so on). The two together cover most possibilities.

Microsoft also gets something out of the deal. Its Windows is a great operating environment *without* a worthwhile mass-

market application to drive it in the marketplace. Enter Aldus with PageMaker . . . are we going around in circles?

Both of them need all the hardware help they can get. Windows' multi-tasking (or near enough) thrashes the hell out of all but the fastest computers, and PageMaker is a BIG program. Enter H-P, with its 80286-based Vectra; not the fastest AT-compatible we've tested, but fast enough with its recent hard-disk upgrade and with excellent engineering, reputation and reliability.

You might have guessed: H-P also gets something out of this.

Its Laserjet is the market leader in laser printers, but it's facing a lot stiffer competition these days — and H-P's delay in coming out with a page-description language (a must for 'real' DTP, an opinion I'll explain later) leaves it under serious threat in this burgeoning market.

Enter (to the sound of a cavalry bugle?) Aldus and Microsoft with a software combination which gets the most out of the H-P printer and proves to the market that it is a serious DTP 'engine'.

A Tidy Package

The package, as presented by the HAM(it up?) alliance, is an impressive, complete DTP and document processing system.

It comprises three important pieces of hardware from H-P: the Vectra, the Laserjet Series II, and one of the most significant options a desktop publisher can ask for, the Scanjet image scanner and Optical Character Recognition (OCR) system.

I liked the Vectra the first time I saw it, and I still do. While it wouldn't necessarily be my machine of choice these days (you know I've always been power-greedy — nothing less than a 386 for me!), it's one of the few around I would be happy to have on my desk. H-P's upgrade to a voice-coil hard disk (not fitted to the test machine, which we reviewed before the new model arrived) should remove my last reservations about its speed compared to other ATalikes.

What I most liked about it was the design; H-P is one of the few to avoid slavish cloning, providing AT functionality in a noticeably smaller, neater package. And it has a few *design breakthroughs* — a cunning genius at H-P's development centre came up with revolutionary ideas, like putting the power switch on the front where the user can reach it!

This small item highlights one of my pet gripes about clones: just because no one at IBM has ever heard of industrial design (or at least hadn't before the Personal System/2 machines, and they're not perfect)there is no reason for everyone else to skip this important component.

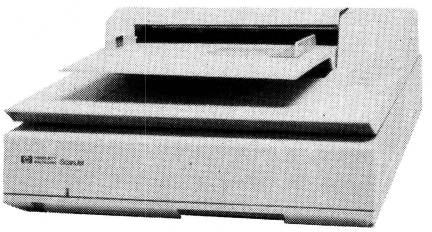


Figure 1: *The Scanjet from H-P uses Windows-based software and includes the emerging standard Tagged Image File Format.*



Figure 2. *The Vectra from H-P provides AT functionality in a noticeably smaller, neater package.*

Why should users have to reach around to the rear of the machine to switch it on or off? Can you imagine a television set with a feature like that? Just because the power supply happens to be at the back is no excuse, as H-P (and others like Compaq) have realised. H-P's solution is a plastic bar which stretches from the rear of the machine (inside the casing) to the front panel, providing a push-on/off toggle right where it should be.

Another nice touch is H-P's refusal to descend to the finger-painting quality of IBM's Colour Graphics Adapter (CGA) 'standard'. The enhanced EGA-quality resolution provided in the Vectra is really appreciated once you get into packages like PageMaker.

The Vectra keyboard has also seen a designer's touch and looks distinctly different from the 'standard' (damn, that word is getting even further from the truth these days) layout. Much of the different appearance is due to the colouring and typography/design of the keytops, but there are welcome additions like extra function keys along the top, as well as the 'standard' group at the left, and a separate cursor-control key block next to the numeric keypad.

I liked the extras and the well-engineered feel, but the design looks a little confusing at first: however, that's a comment based on familiarity with a different keyboard, and is the sort of thing a new owner would get used to quickly.

Apart from those points — and, perhaps, its PAM (Personal Application Manager) function-key driven, menu-like shell — the Vectra is basically your standard AT-style performance machine. Fitted out as it is with a full complement of memory, hard disk, and high-resolution screen, could perhaps be called an ideal DTP machine (well, that's not entirely true . . . a 386 is more my style of *ideal*, but you know what I mean.)

Fanjet Scanjet

The H-P Scanjet is one of the nicest scanners I've used, thanks mostly to its delightful Windows-based software. The bad news, at least at the time of our test, was the fact the software wasn't finished.

The important parts such as scanning images, saving them to disk and converting them to a number of useful graphics formats including the emerging standard, TIFF (Tagged Image File Format) are all there, but the niceties of the image-editing software were missing.

The Scanjet starts up with two windows, a small one for scanning control and a full-screen one for editing. All of the options in the first window, involving fine-tuning of the scan type, contrast, and resolution, are enabled but many of the editing options of the second window just don't work yet.

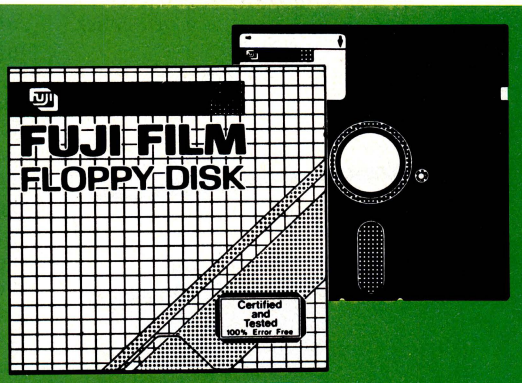
The completed product may well exist by the time you read this, and H-P has been up-front all along about the missing portions, warning buyers and promising a free upgrade to the finished version.

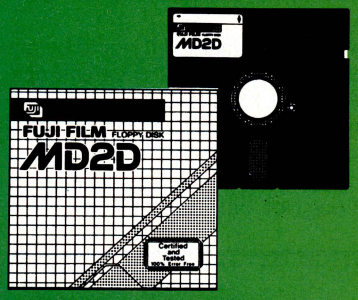
I'd be happy to wait for the finished version. Apart from President's specialised Megabuffer system, the H-P Scan Gallery software is the best I've used.

Standard procedure, after setting the various parameters, is to do a 'preview' scan, a fast run over the image at low reso-

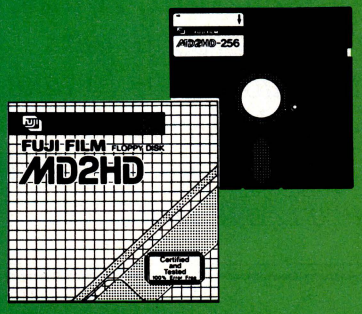
FOR THOSE interested in Desktop Publishing, Matt Whelan sorted out DTP software in our June '87 issue and gave the answer to the hassle and heartache of hardware selection in our July '87 issue.

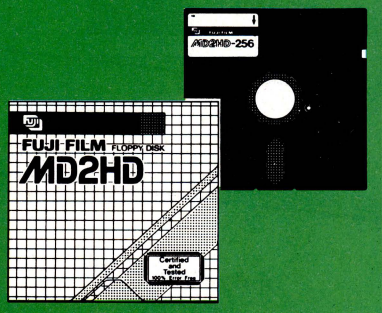
Fabulous FUJI FLOPPY DISK... Giveaway















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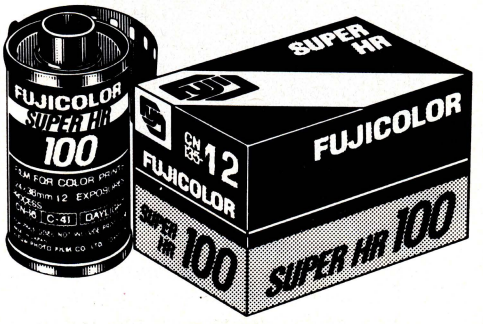

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Figure 3: *Pagemaker is built totally around the layout artist's work pattern. Shown on the left is a typical example of page design for a newsletter.*

Figure 4. *Not only can you use the Scanjet to capture images from books and so on, but it also allows for more accurate results.*

Figure 5: *On a bit-image printer like the Laserjet, each individual size and style of font of each font in a family has to be stored as a bit-image of its own.*

lution. This is shown in the small window, and the user then selects with the mouse the area of the page for the final scan. This is quick, easy, and effective — a far cry from the lengthy full-resolution experiments or measure-and-guess arrangements on other systems.

Of all the scanning software I have used, this would be my system of choice. (I'm ignoring systems like the President which use hardware aids, like a large specialised memory buffer, for the sake of a fair comparison).

Similarly, the Scanjet itself would be my unit of choice in its market segment, and probably overall because of its excellent value for money, ease of use, and the Scan Gallery software. It's a flatbed design (made by Canon), the only type to have in my opinion. Not only can you use it to capture images from books and so on (try fitting them in a roll-through type scanner!), but also it allows for more accurate results. Documents or graphics fed through a roller-type scanner tend to skew, turning straight lines into jagged ones.

But when big guns like Hewlett-Packard, Aldus, and Microsoft get together you have to take the result seriously — even if it does get labelled the HAM Alliance.

The Non-PostScript Printer

I was told to forget PostScript for a while, right? Okay, I won't mention it. The Laserjet doesn't have it.

I've spoken on this subject several times in these pages, including our recent DTP hardware selection guide, so I won't go into too much detail here. But I must reiterate that a Page Description Language like PostScript is vital to high-quality, totally flexible DTP. Most DTP printers just don't have the range of font styles, weights and sizes to do the job the way I think it should be done.

Remember, though, that I have a background in publishing. I know I need fonts up to at least 48-point for my style of work, and I know I need quite a range of sizes



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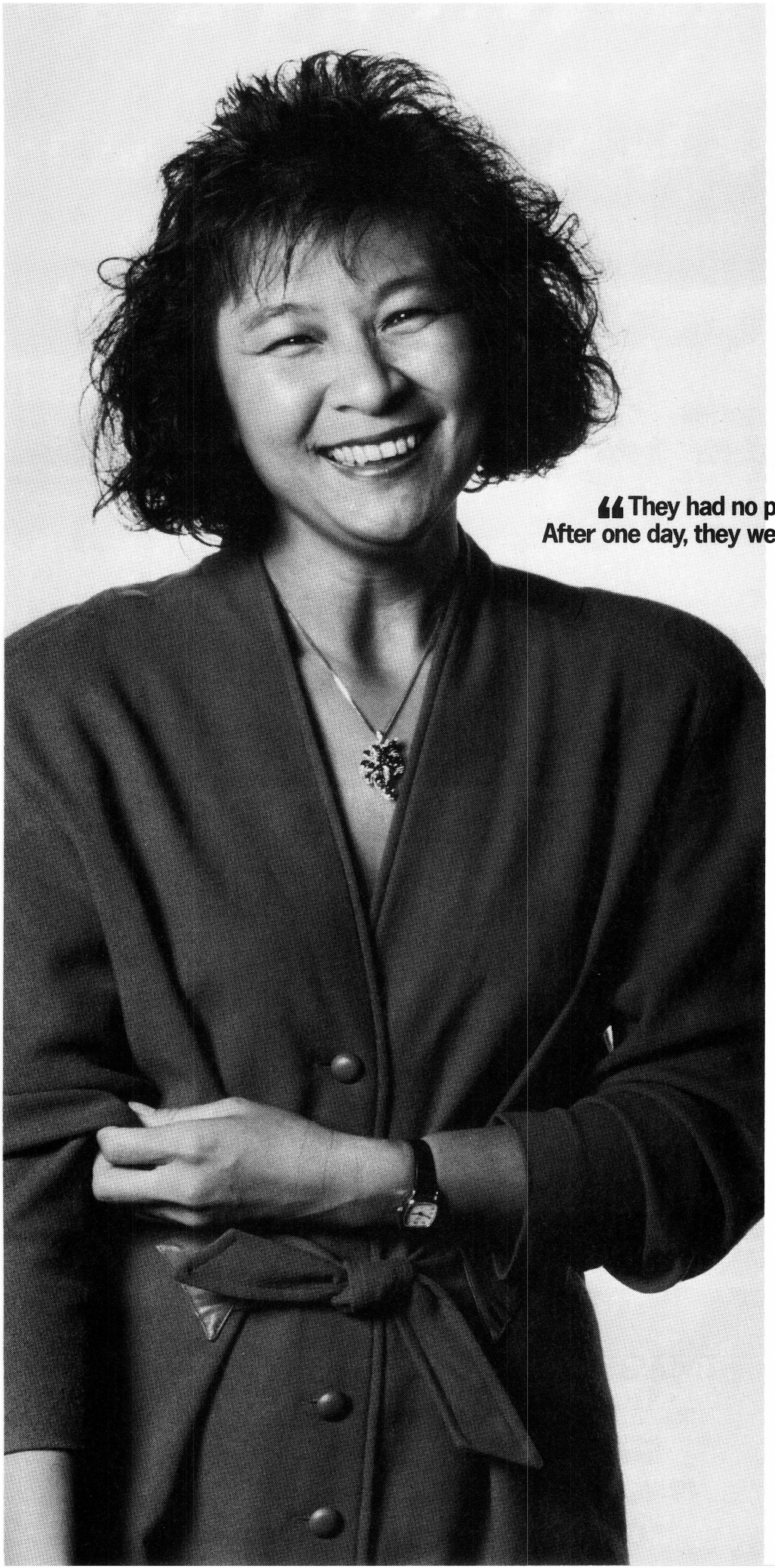

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Deborah Wong, C.E. Instructor, Unisys.

The group chosen was to be given the best possible training, which is why Ford came to us. It was an interesting idea and quite a challenge, since none of them had any previous experience.

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and weights even within one font family. With two megabytes of hard disk space devoted to downloadable fonts, the Laserjet still doesn't have anywhere near the range built in to a PostScript printer.

The difference is this: in PostScript, you store a font only once, as a mathematical description, and this can then be scaled to any size you want. On bit-image printers like the Laserjet, each individual size and style of each individual font within each family has to be stored as a bit image of its own.

I believe you must have PostScript for true desktop publishing! Having got that off my chest, let me tell you why I just bought a H-P Laserjet Series II, bit-images and all, for myself . . .

First, I got the Laserjet for half the price of a PostScript printer. I believe the PostScript printers are worth the money, I just didn't happen to have that much spare change.

Second, the Laserjet uses the new Canon SX engine, which is a vast improvement on the CX used in the previous model and still used in Apple's LaserWriters. It's much sleeker and lighter and uses a different print technology to ensure real blacks, where the old engine faded to grey on any solid black bigger than 20-point type. I could not face investing the money in the current LaserWriter realising Apple would have to release a machine based on the new engine within months.

Third, for 80 percent of the work I do (and, therefore, 100 percent of the work many potential DTP users will do) the Laserjet does a great job. Seminar manuals, program documentation, and the like come out beautifully on the H-P. It's only when I get to newsletters (like *dLetter*) and magazine layouts that its restricted font sizes get in the way.

Fourth, virtually all the important software I use on the AT knows about the Laserjet, where only a few applications speak PostScript (although this is changing fast, and PostScript machines are able to be switched to a Diablo emulation mode).

And, fifth, H-P is going to release a PostScript upgrade, later in the year when I may be able to afford it!

So for all my talk — and, believe me, PostScript is *the* way to go for DTP — I have found enough good reasons to buy a Laserjet, and I'm happy with it. (*Satisfied, Mr Editor?*) But storing all those fonts and not being able to use all the ones I want *does* drive me crazy at times. (*There, I've had my say!*).



Figure 6. *A different print technology is now used on the Laserjet to ensure real blacks. Another feature is that most software packages are able to speak to the Laserjet.*

The Software

I am not going to say too much about PageMaker and MicroSoft Word as individual items — both have been covered extensively in these pages. (*PageMaker for the* IBM *was reviewed in our Feb.'87 issue — the beta test version contributed the cover; Microsoft Word V3.1 was reviewed in our May '87 issue.*)

They do help make this a powerful, attractive system. Word is probably the word processing package I'd choose if it wasn't for the wonders of WordStar (I'm an old-timer, remember). It's extremely powerful, friendly, and easy to use, especially when driven with the mouse you need for DTP anyway.

However, you need to study it to tap its power (a WordStar user should complain?), and it isn't my recommended solution for DTP-style processing of long documents. If this is what you need, then I would have to recommend a look at Ventura Publisher.

As a word processor I have no argument with it. And it *is* amazingly competent at driving a laser printer for desktop-published results; at least one company I know of in the US uses it exclusively to typeset a newspaper. However, for most new users the visual aid of Ventura's WYSIWYG operation — it has the power and speed provided by style sheets, *and* you can see the results on screen — is a better solution.

It is an ideal designer's program, and is built totally around the layout artist's work pattern.

PageMaker, as many of you will know, is one of my favourite programs. It is particularly easy to use, powerful, and typographically more competent than most packages on the market. It is an ideal designer's program, and is built totally around the layout artist's work pattern. For magazine and newsletter layouts, brochures, or anything which is an individual design, it is unbeatable.

I would recommend it above all others for beginners — it's one of the few programs on the PC where you don't need the manual. Of course, reading it will benefit you enormously, but the point is it is a perfect translation of the Macintosh-style user-friendly interface. The Mac version it improves on is YC's Software Product of the Year.

But I will never push PageMaker to the exclusion of Ventura. It is vital to remember that this field is a real 'horses-for-courses' decision. Long and/or standardised-document processing is Ventura's forte, interactive design flexibility is PageMaker's. Judge it on *your* work requirement, not others' opinions.

HAM It All, Man . . .

Is this packaged system a cover-up, a con? No. It's an excellent combination. It's one you may put together at less cost from individual clone suppliers, but the solidity and capability of the HAM-packaged DTP system is extremely attractive.

And with companies like H-P, Aldus (Infomagic here, but we won't accede to their request to call HAM a HIM), and Microsoft standing behind it in a way which gives you a focus for complaints, it's decidedly reassuring. □

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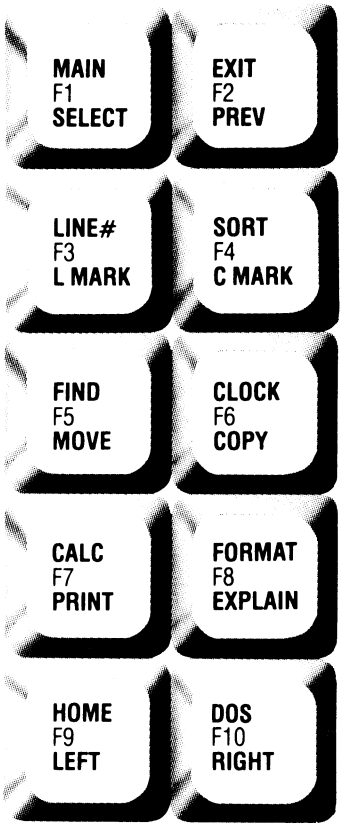

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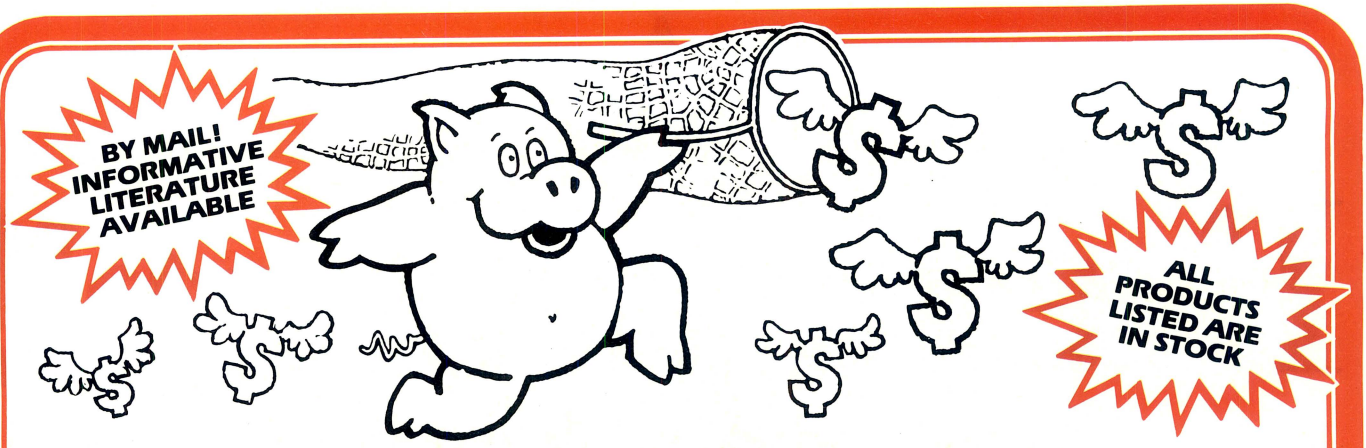

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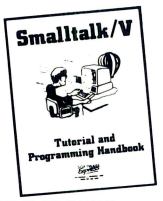

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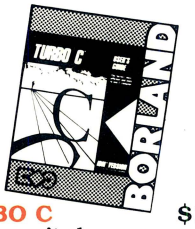

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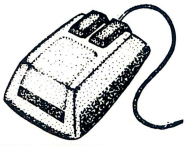

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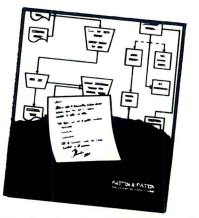

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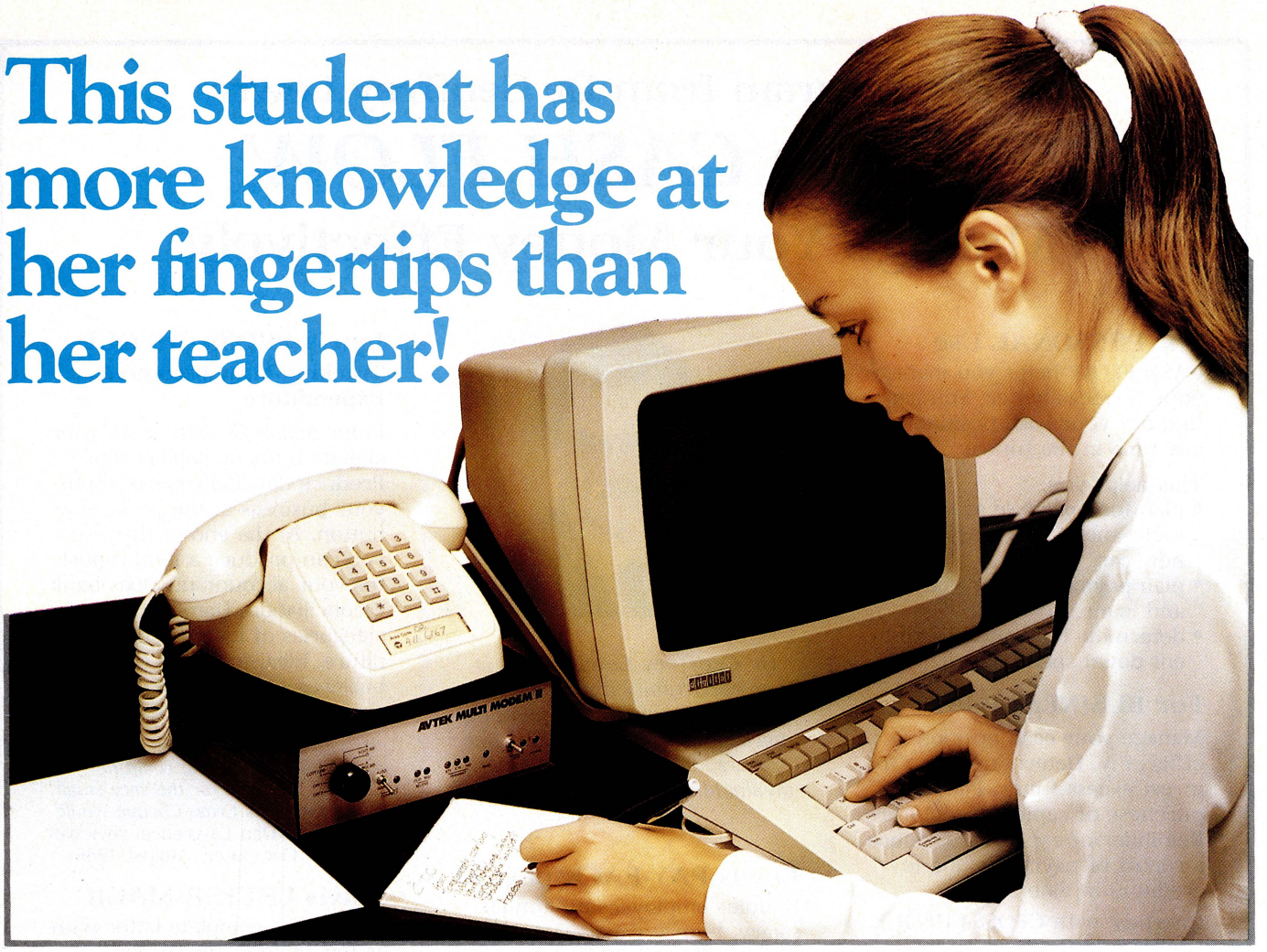

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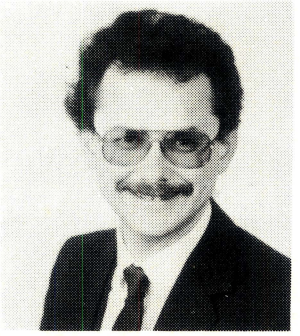

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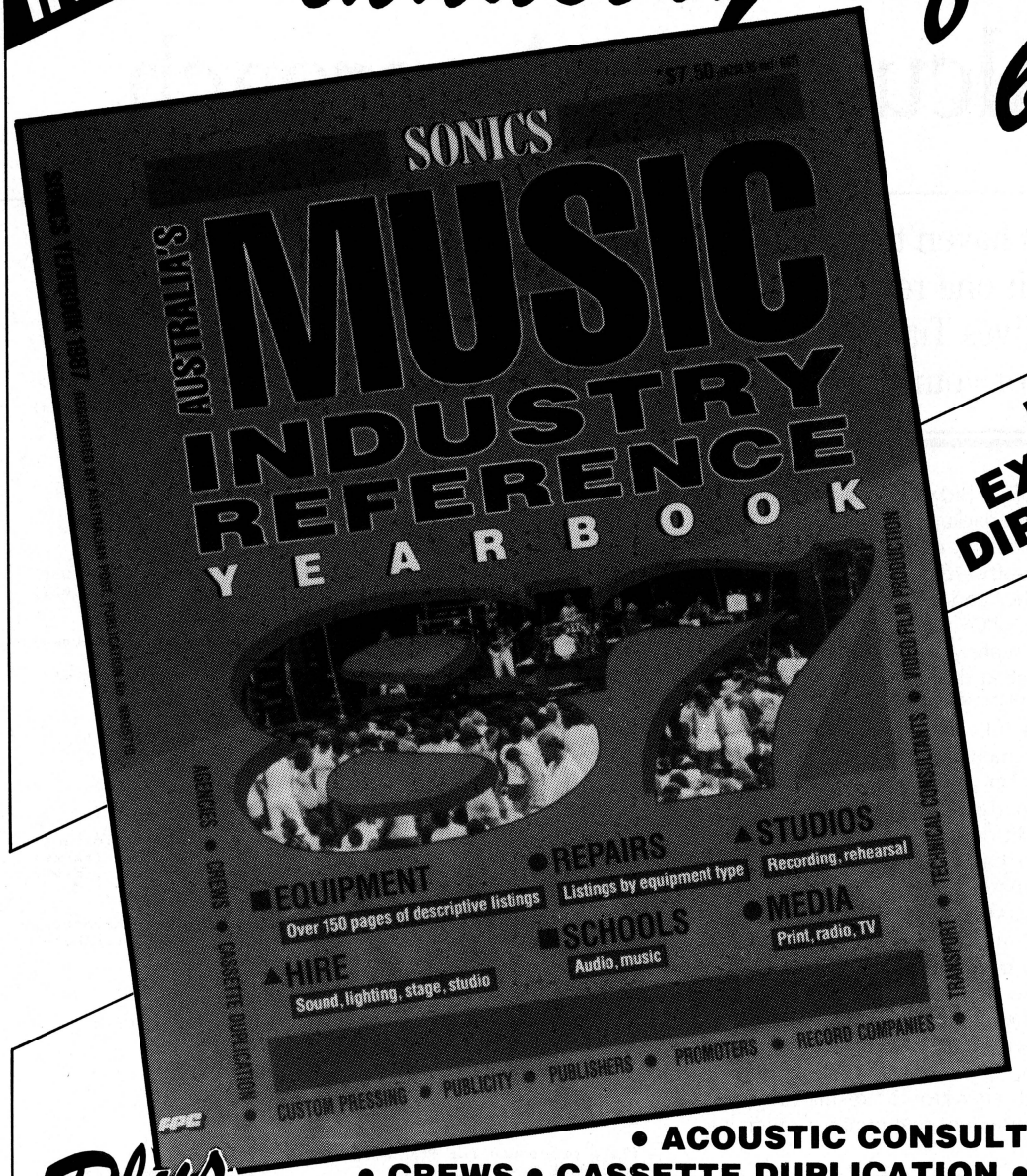

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TURBO TIPS

A Calculating Approach

Need a calculator, but haven't got the cash to buy software with one resident? This month, Peter Hill gives Tips on how to create one for yourself.

FOR THE IBM PC or near offer, SideKick and a number of other 'desktop' RAM-resident packages provide a calculator as part of the package; typically it can be called up during the operation of any other software package. It is not, however, necessary to purchase SideKick and use up precious RAM to have a calculator available at the DOS prompt, nor during any other Pascal package which you create yourself. Indeed, it is just as easy to create a calculator to use at the CP/M prompt or within CP/M programs as it is for the MS-DOS family.

The code in Listing 1 presents a fully functional calculator with a number of features including: a memory, square root function, natural logarithms, factorial function, and percentage function.

More importantly it presents an algorithm for handling potential overflow and underflow conditions in real number calculations within Turbo Pascal. Turbo Pascal has an error trapping procedure for the PC, but unfortunately (unlike, for example, MS Basic) the error procedure requires the user to terminate by calling the Halt; Standard Procedure. It is therefore greatly preferable to trap potential errors *before* they occur and hence avoid calling the error handler except *in extremis*.

What we wish to achieve, therefore, is a way of predicting events such as overflow and underflow prior to their occurrence. A concrete example is the multiplication of two large, real numbers. If we multiply them together without regard for the result, there is a risk that the result will exceed the largest real number which we can represent on our machine.

BigReal?

The prediction of overflow is achieved by definition of a large, real constant which I call BigReal, that we set as the upper limit on the result. In the sample program in Listing 1, I have shown BigReal as 1000000000.0, but it can be as large as your computer will allow as the upper limit of real numbers. To precheck a multiplication, simply determine whether BigReal *divided* by one of the factors is larger than the other factor. If it is, then the result of the multiplication will be less than BigReal so it's acceptable to proceed with the multiplication.

Once the general principle is grasped, the use of BigReal for other mathematical operations is obvious. Managing the addition of two large real numbers is a (near-trivial) example; if BigReal *less*

```
{-------------------------------------------------------------
PURPOSE :A simple calculator
BY      :P.R.Hill
DATE    :May '87
REVISED :2 June '87
REVISION:Ln revised, notes for CP/M version added.
-------------------------------------------------------------}

PROCEDURE H_Do_Calc;
CONST
   White_Black = 15;       {local constants for WAL procedures}
   Grey_Black  = 7;
   Blue_Grey   = 113;
   Red_White   = 116;
   Flash       = 143;

TYPE
   LongStr     = STRING[80];

VAR
   ScreenData  : ARRAY[1..4000] OF Byte;       {PC/MS DOS ONLY}
   OldX, OldY  : INTEGER;                      {PC/MS DOS ONLY}

   {This function for PC/MS DOS ONLY}
   FUNCTION ScrnAddr : INTEGER;    {find address of the screen}
   BEGIN
      IF ((Mem[0:$410] AND $30) = $30) THEN      {is it a CGA?}
      ScrnAddr := $B000 ELSE
         ScrnAddr := $B800;
   END;

   {Following procedure for PC/MS DOS ONLY}
   PROCEDURE WAL(Attr, C, R : INTEGER; Hld : LongStr);
   VAR
      Len, I : INTEGER;
   BEGIN
      Len := Ord(Hld[0]);       {equivalent to Length(Hld) but
                                                        faster}
      C := ((R-1)*160)+((C-1)*2);    {calculate initial offset}
      FOR I := 1 TO Len DO
         BEGIN
            Mem[ScrnAddr:C] := Ord(Hld[I]);     {set character}
            Mem[ScrnAddr:C+1] := Attr;   {set colour attribute}
            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;*)

   {This procedure for PC/MS DOS ONLY}
   PROCEDURE Save_Screen;              {save the whole screen}
   BEGIN
      Move(Mem[ScrnAddr:1], ScreenData[1], 4000);
   END;

   {This procedure for PC/MS DOS ONLY}
   PROCEDURE Fix_Screen;            {retrieve the whole screen}
   BEGIN
      Move(ScreenData[1], Mem[ScrnAddr:1], 4000);
   END;

   PROCEDURE Calc;
   TYPE
      LongString = String[50];
```

Listing 1: *The code to a fully functional calculator with memory, square root, natural logarithms, factorial function, and percentage function.*

one of the factors is greater than the other factor, it is safe to continue with the addition. Further features can easily be added to the calculator, using the same basic approach.

The balance of the code required is to display the calculator, read the keyboard and memorise and refresh the screen.

Much of this latter part of the code is specific to the IBM PC. I have shown the actual face of the calculator using the extended ASCII codes available on the PC. To input these characters in the Turbo Pascal editor, follow these steps: press down and hold the Alt key, using the numeric keypad, enter the three digit code for the box drawing character and release the Alt key.

The codes required are found on an extended ASCII table; one of these can be found in the IBM Basic manual, or you can do as I do and use SideKick's ASCII table.

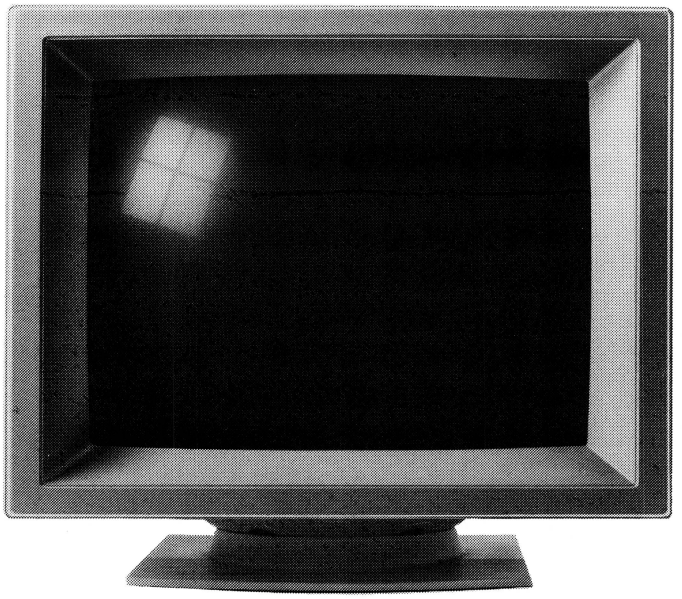
To make a plain-vanilla version of the program, three simple steps are required: delete those parts of the code that are marked {PC/MS-DOS ONLY}; substitute = , - and ! signs for the IBM box drawing characters and adjust the colour values to suit your system.

It's interesting to reflect on the hypothesis that shortcomings of a language implementation (like the error handling in Turbo Pascal) sometimes generate the most interesting code. Until Borland provide a more universal and flexible Error Procedure, we can expect to see a number of 'work-arounds' designed to avoid calling Error; perhaps the best code would be stimulated by a language which was *completely* crippled (?). □

```
VAR
   Quit    : BOOLEAN;                    {for WHILE NOT Quit...}
   LastOp  : INTEGER;                    {hold the last operation}
   M1, M2  : REAL;                       {current variable and stack}
   SM1     : LongString;                          {a string for M1}
   Memory  : REAL;                                {the single memory }

   PROCEDURE Clear_Display;              {clear display and stack}
   VAR
      Count : INTEGER;
   BEGIN
      FOR Count := 0 TO 17 DO
         BEGIN
            WAL(Grey_Black, 47+Count, 7, ' ');
            WAL(Blue_Grey, 54+Count, 5, ' ');
         END;
      FOR Count := 18 TO 24 DO           {the working window is
                                    longer than the stack window}
         BEGIN
            WAL(Grey_Black, 47+Count, 7, ' ');
         END;
   END;                                  {procedure  Clear_Display}

   PROCEDURE Show_Calculator;
   BEGIN

      WAL(Grey_Black, 45, 3,
      '╔═══════════════════╗');
      WAL(Red_White, 45, 4, '╠═══════════════════╣')
      ; WAL(Grey_Black, 74, 4, '╠');
      WAL(Red_White, 45, 5, '╠  Stack:           ╣')
      ; WAL(Grey_Black, 74, 5, '╠');
      WAL(Red_White, 45, 6, '╠═══════════════════╣')
      ; WAL(Grey_Black, 74, 6, '╠');
      WAL(Red_White, 45, 7, '╠                   ╣')
      ; WAL(Grey_Black, 74, 7, '╠');
      WAL(Red_White, 45, 8, '╠═══════════════════╣')
      ; WAL(Grey_Black, 74, 8, '╠');
      WAL(Red_White, 45, 9, '╠═══════════════════╣')
      ; WAL(Grey_Black, 74, 9, '╠');
      WAL(Red_White, 45, 10, '╠  lear   uit      em   M ╣'
      ); WAL(Grey_Black, 74, 10, '╠');
      WAL(Red_White, 45, 11, '╠  qrRt   age    (fact)   n ╣'
      ); WAL(Grey_Black, 74, 11, '╠');
      WAL(Red_White, 45, 12, '╠═══╤═══╤═══╤═══╤═══╣'
      ); WAL(Grey_Black, 74, 12, '╠');
      WAL(Red_White, 45, 13, '╠ 7 │ 8 │ 9 │ * ╣'
      ); WAL(Grey_Black, 74, 13, '╠');
      WAL(Red_White, 45, 14, '╠═══╪═══╪═══╪═══╣'
      ); WAL(Grey_Black, 74, 14, '╠');
      WAL(Red_White, 45, 15, '╠ 4 │ 5 │ 6 │ / ╣'
      ); WAL(Grey_Black, 74, 15, '╠');
      WAL(Red_White, 45, 16, '╠═══╪═══╪═══╪═══╣'
      ); WAL(Grey_Black, 74, 16, '╠');
      WAL(Red_White, 45, 17, '╠ 1 │ 2 │ 3 │ - ╣'
      ); WAL(Grey_Black, 74, 17, '╠');
      WAL(Red_White, 45, 18, '╠═══╪═══╪═══╪═══╣'
      ); WAL(Grey_Black, 74, 18, '╠');
      WAL(Red_White, 45, 19, '╠ 0 │ . │ ^ │ + ╣'
      ); WAL(Grey_Black, 74, 19, '╠');
      WAL(Red_White, 45, 20, '╚═══╧═══╧═══╧═══╝'
      ); WAL(Grey_Black, 74, 20, '╝');
      WAL(White_Black, 47, 10, 'C');
      WAL(White_Black, 47, 11, 'S');
      WAL(White_Black, 54, 10, 'Q');
      WAL(White_Black, 54, 11, '%');
      WAL(White_Black, 61, 11, '!');
      WAL(White_Black, 61, 10, '=');
      WAL(White_Black, 65, 10, 'M');
      WAL(White_Black, 70, 10, 'R');
      WAL(White_Black, 70, 11, 'L');
      Clear_Display;
   END;                                  {procedure Show_Calculator}
```

```
PROCEDURE Display(VAR DummyString : LongString);
BEGIN                                    {show the current value}
   Clear_Display;
   WAL(White_Black, 72-Length(DummyString), 7,
   DummyString);
END;                                     {procedure Display}

PROCEDURE Calculate;
VAR
   InKey : Char;

   PROCEDURE Add_To_String;
   BEGIN
      IF Length(SM1) = 8 THEN Exit;  {up to eight digits}
      SM1 := SM1+InKey;
      Display(SM1);
   END;                                {procedure Add_To_String}

   PROCEDURE Shift_Mem;
   CONST
      BigReal = 1000000000.0;      {to check for overflow}
   VAR
      Code     : INTEGER;
      Interim  : REAL;
      Surprise : LongString;
      Mstr     : LongString;

      PROCEDURE Oops;
      BEGIN
         Display(Surprise);
         Sound(100);                          {PC/MS DOS ONLY}
         Delay(50);                           {PC/MS DOS ONLY}
         Sound(200);                          {PC/MS DOS ONLY}
         Delay(50);                           {PC/MS DOS ONLY}
         NoSound;                             {PC/MS DOS ONLY}
         REPEAT UNTIL KeyPressed;
      END;                                    {procedure Oops}

   BEGIN
      M1 := M2;
      Surprise := 'Overflow..press a key';
      VAL(SM1, M2, Code);           {put last entry in m2}
      SM1 := '';                                {clear string}
      CASE LastOp OF     {depending on last op do new m2}
         1 : BEGIN                                {multiply}
               IF BigReal/M1 > M2 THEN M2 := M1*M2 ELSE
               Oops;
             END;
         2 : BEGIN                                  {divide}
               IF M2 = 0 THEN Oops
               ELSE
                  M2 := M1/M2;
             END;
         3 : BEGIN                                    {add}
               IF BigReal-M2 < M1 THEN Oops
               ELSE
                  M2 := M1+M2;
             END;
         4 : BEGIN                               {subtract}
               IF (M1+BigReal) < M2 THEN Oops
               ELSE
                  M2 := M1-M2;
             END;
         5 : BEGIN                                  {X^Y}
               IF M1 <= 0 THEN Oops
               ELSE
                  IF M2*(Ln(M1)) > Ln(BigReal) THEN Oops
                  ELSE
                     M2 := Exp(M2*(Ln(M1)));
             END;
         6 : BEGIN                           {Square root}
               IF M2 <= 0 THEN Oops
               ELSE
                  M2 := Sqrt(M2);
             END;
         7 : BEGIN                             {Percentage}
               IF M2 = 0 THEN Oops
               ELSE
                  M2 := 100*(M1/M2);
```

```
            END;
         8 : BEGIN                                   {Factorial}
               IF ((M2 < 1) OR (M2 > 10)) THEN Oops
               ELSE
                  BEGIN
                     Interim := M2;
                     REPEAT
                        M2 := M2-1;
                        Interim := Interim*M2;
                     UNTIL M2 < 2;
                     M2 := Interim;
                  END;
            END;
         9 : BEGIN                          {Natural logarithm}
               IF M2 <= 0 THEN Oops
               ELSE
                  M2 := Ln(M2);
            END;
        10 : M2 := M2;                                {Equals}
      END;
      Clear_Display;
      Str(M2:12:8, MStr);                {convert to a string}
      WAL(White_Black, 47, 7, MStr);
      Str(M1:12:8, MStr);                {convert to a string}
      WAL(Blue_Grey, 55, 5, MStr);
      IF InKey = ^M THEN InKey := '='; {return same as =}
      WAL(Blue_Grey, 72, 5, InKey);
      CASE UpCase(Inkey) OF                  {what operation}
         '*' : LastOp := 1;
         '/' : LastOp := 2;
         '+' : LastOp := 3;
         '-' : LastOp := 4;
         '^' : LastOp := 5;
         'S' : LastOp := 6;
         '%' : LastOp := 7;
         '!' : LastOp := 8;
         'L' : LastOp := 9;
         '=' : LastOp := 10;
      END;
   END;                                  {procedure Shift_Mem}

   PROCEDURE Clear_Memory;      {clear the memory variable}
   VAR
      MStr : LongStr;
   BEGIN
      M1 := 0;
      M2 := 0;
      SM1 := '';
      Display(SM1);
      Str(M1:12:8, MStr);
      WAL(Blue_Grey, 55, 5, MStr);
   END;                             {procedure Clear_Memeory}

   PROCEDURE Memorise;           {save current as mem. var}
   BEGIN
      Memory := M2;
      WAL(Flash, 46, 5, 'M');
   END;                                  {procedure Memorise}
   PROCEDURE Remember;         {recall the value of memory}
   VAR
      MStr : LongStr;
   BEGIN
      M2 := Memory;
      WAL(Blue_Grey, 46, 5, ' ');
      Clear_Display;
      Str(M2:12:8, MStr);
      WAL(White_Black, 47, 7, MStr);
   END;                                  {procedure Remember}

   BEGIN
      Read(Kbd, InKey);
      CASE UpCase(InKey) OF
         '.', '0'..'9' : Add_To_String;
         '=', ^M, '+', '-', '/', '*', '^', '%', 'S', '!',
         'L' : Shift_Mem;
         'C' : Clear_Memory;
         ^[, 'Q' : Quit := True;
         'M' : Memorise;
         'R' : Remember;
      END;
   END;                                  {procedure Calculate}

   BEGIN
      SM1 := '';                    {initialise the display string}
      M1 := 1; M2 := 0; Memory := 0;          {initialise values}
      LastOp := 10;                                   {start by =}
      Quit := False;
      Show_Calculator;
      WHILE NOT Quit DO Calculate;
   END;                                          {procedure Calc}

   BEGIN
      OldX := WhereX;                                {PC/MS DOS ONLY}
      OldY := WhereY;                                {PC/MS DOS ONLY}
      Save_Screen;                                   {PC/MS DOS ONLY}
      Calc;
      Fix_Screen;                                    {PC/MS DOS ONLY}
      GotoXY(1, OldY-1);                             {PC/MS DOS ONLY}
      ClrEol;                                        {PC/MS DOS ONLY}
      GotoXY(OldX, OldY-2);                          {PC/MS DOS ONLY}
   END;                                      {procedure H_Do_Calc}

   BEGIN
   H_Do_Calc;
   END.
```

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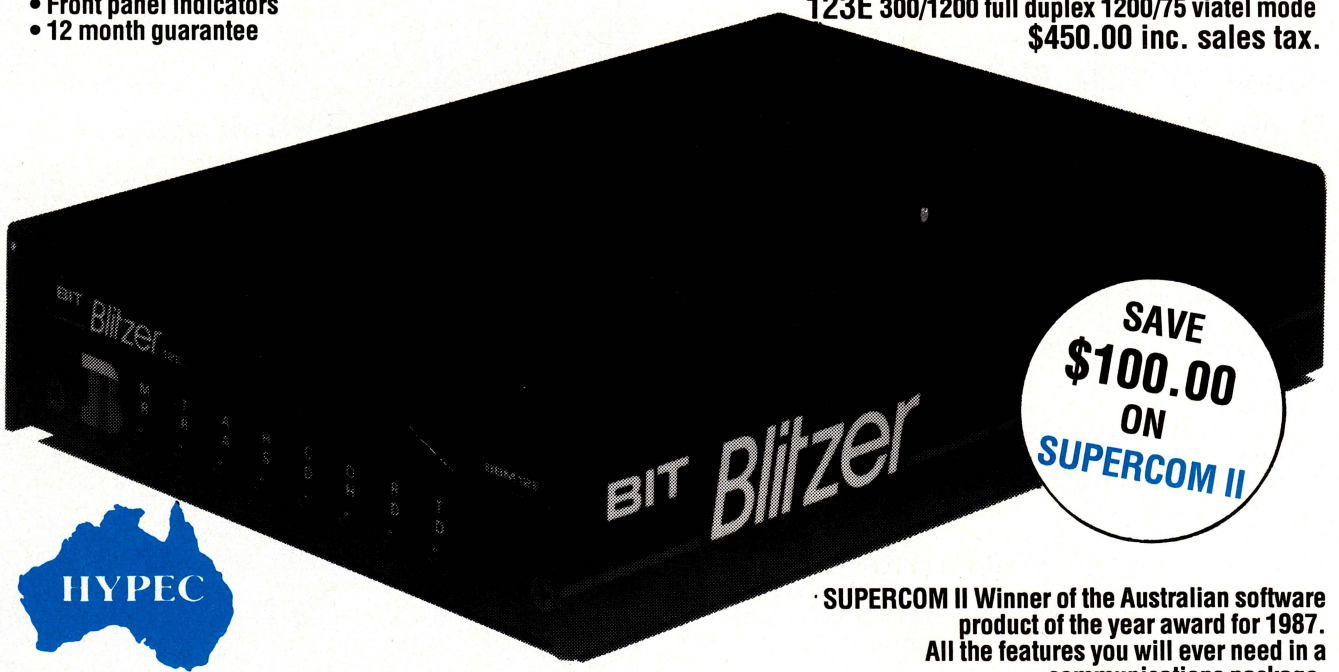

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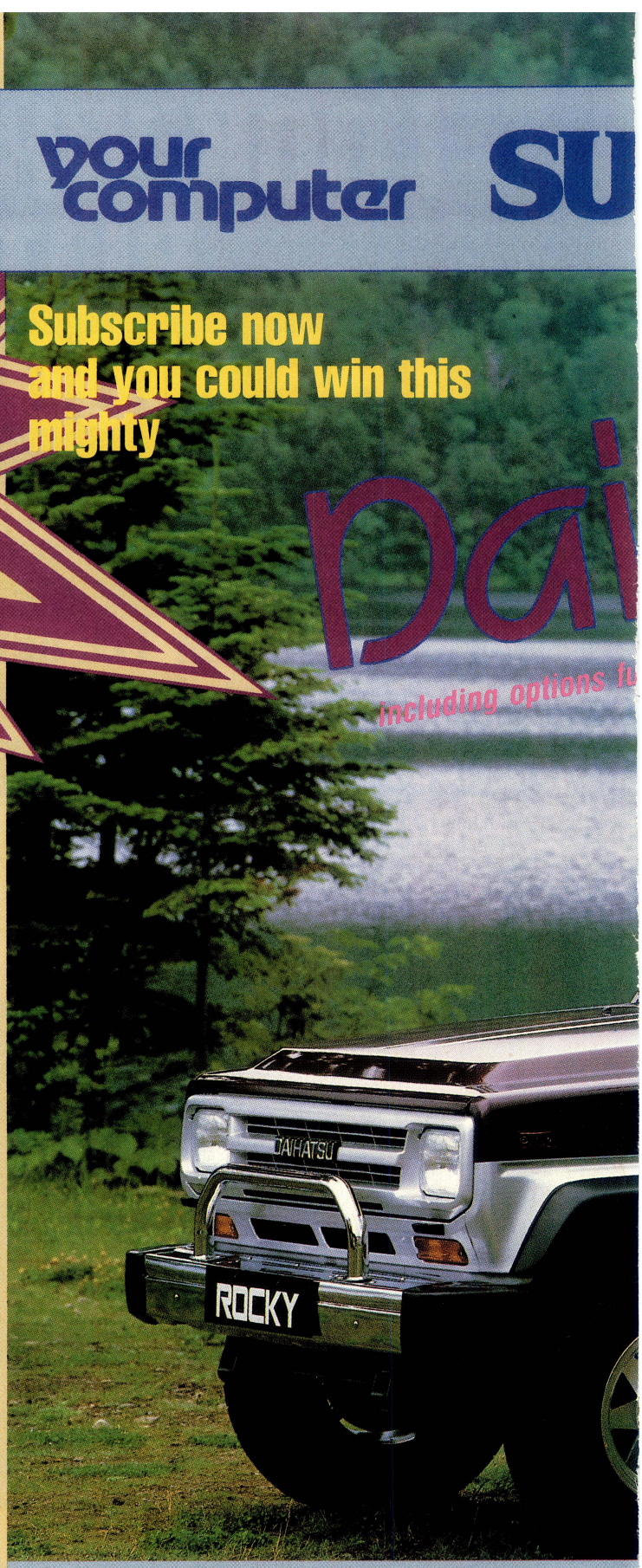

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WORDS, WORDS, WORDS

WordPerfect V4.2 and Xywrite III V3.14

This month, the words of Keith Mackay process two power programs — one with (almost) every feature possible and the other, (almost) a language of its own.

WordPerfect

WORDPERFECT V4.2 is very much a power program, offering virtually everything a wordprocessor could possibly have: thesaurus, spelling checker, mail merge, highly sophisticated automatic footnoting, macros, maths functions, dual text editing, column display, and a good deal more. For the hard-to-please, WordPerfect Corporation offers a suite of additional utilities, the 'Library' package.

The program operates under PC/MS-DOS 2.0 or later. There is also an Apple version and I understand a Macintosh version is to be released toward the end of this year. WordPerfect requires a minimum of 256 Kbyte, although more RAM will allow fuller use of the program's features; and 384 Kbyte is needed to run it memory resident. It will perform quite acceptably on a twin-floppy system, but a hard disk is preferable. WordPerfect is not copy-protected.

The documentation consists of an extremely bulky manual. This is reasonably informative compared to the literature accompanying most software, but is still far from perfect — in particular, it is rather scant on technical information, and the index is scarcely an advertisement for the program's indexing feature. Furthermore, the decision to present so many pages in the customary ring binder can only have been made by someone with prehensile feet and yoga experience.

The standard WordPerfect package comprises six floppy disks: the program itself; the thesaurus; the spelling checker; the tutorial disk — which also contains a very full help file — and two disks for printer installation. The tutorial disk also supplies a convert utility which will translate files written under other wordprocessors to WordPerfect format and vice versa; and a cursor utility to change the wee beasty to the shape, size, and colour required. A template is also supplied to fit around the function keys and describe their various uses.

WORDS, WORDS WORDS

IN OUR September '87 issue Keith Mackay reviewed Micropro's Easy V1.5 and PFS:Professional Write; in June, WordStar 4; and in May, WordStar 3 and Microsoft's Word V3.1. Next month we keep our promise (of last month), and he reviews Perfect Software's Perfect Writer V2.5 and Micropro's WordStar 2000 Release 2.

Installation

WordPerfect's installation procedure is surprisingly simple in such a powerful program, offering options only for the location of the dictionaries and thesaurus; initial settings for print and screen display; and timed back up, an excellent feature which automatically saves the active file at given intervals. Many of the defaults can be modified from within the program itself.

One thing which cannot permanently be changed, however, is the default drive for text files, which is always the system drive. This is not a problem if the program is booted from floppy disk and run memory resident, since the system disk can be removed. Running on a 256 Kbyte machine, however, it would be necessary to change the default each time the program was loaded. Full printer installation — and I mean *full* — is carried out with the printer install program on the 'Printing' disks.

The tutorial, although not so patronising as other programs, congratulates the user on pressing the correct key, which is wearisome and entirely unwarranted; a tutorial which treats the user as an intelligent adult would have been preferable. Most of the basic aspects of the program are covered, but a number of the more advanced features are not dealt with.

The program can be loaded in various ways; of especial interest is the loading option WP/R-D, where D is a drive name — given sufficient RAM, this will load WordPerfect memory resident with the overflow files which the program creates being directed to the drive specified. In addition to the increased speed when the program is memory resident, on a twin floppy system the program disk could be replaced with the thesaurus disk or the tutorial.

Screen Display

WordPerfect's initial screen display is very clean, there being nothing but a cursor at the top left and a message at the bottom right reading 'DOC 1 PG 1 Ln 1 Pos *n*', where *n* is the margin setting. Twenty-four lines of text are displayed and both cursor movement and scrolling are rapid. Search-and-replace is very fast and if unconfirmed is not displayed on screen until the last change has been made. Movement through from top to bottom of a text is likewise brisk.

WordPerfect is not entirely WYSIWYG (What You See Is What You Get): it will show underlines, boldface and strikethrough on an appropriately configured monitor, but although it will print right-justified text, it is not possible to display it on the screen other than as a print preview. To me, this is one of the program's few defects — I spend far more time looking at screen display than at hard copy and I find ragged-right unattractive and much harder to read than a justified display; and since screen columns are allowed in WordPerfect, this seems a curious omission. On the other hand, screen justification can create search-and-replace problems in any wordprocessor: spaces incorporated in the text will disqualify a phrase from global replacement and this may be why the feature was not included.

WordPerfect is command-driven, its structure being based on the use of the Function keys, either alone or in combination with the Shift, Alt or Control keys. There is much talk of easy-to-learn and 'intuitive' wordprocessor commands, most of it a waste of breath. A number of programs — Wordstar 2000, for example — make some attempt at mnemonic commands, such as ^L for 'Locate'. Making commands mnemonic does not seem especially important, since frequent use will soon lead to proficiency.

Three far more important considerations are whether the program's overall command structure is consistent; whether commands are physically easy to enter; and whether they conform to the conventions of personal computer use. WordPerfect's command structure scores reasonably high on the first of these and higher on the second — on a standard IBM PC keyboard with the Function keys arranged in the usual manner most commands can be invoked with two fingers of one hand. The score is low for adherence to convention, however — people used to other programs will be vexed to begin with by a number of somewhat unorthodox key assignments: F1 instead of Return to load a text file; Esc rather than Return to trigger a search-and-replace, and so on. More vexing yet is the inconsistency involved — some commands are executed in the customary manner.

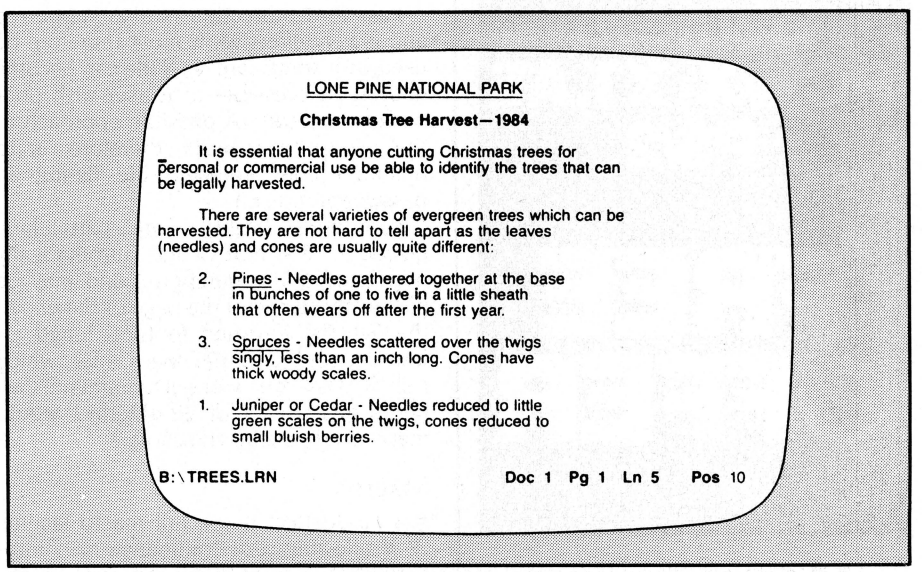

Figure 1. *WordPerfect's 24-line screen display is very clean — a cursor at the top left and a message at the bottom right reading 'DOC 1 PG 1 Ln 1 Pos n', where 'n' is the margin setting.*

I look forward to the day when all computer monitors will offer displays at least the size of an A4 page, preferably larger, and when all wordprocessors will drive them. WordPerfect, indeed, will do just that — the installation procedure allows screen size to be defined up to 133 character columns (I was not able to determine the limit for rows), and there are a number of monitors available to the wealthier among us which will allow displays exceeding the paltry norm of 24 lines. Since I am limited to a standard issue screen, I was unable to investigate this aspect of the program, but the distributors assure me that WordPerfect will 'take anything you throw at it'.

Fast, Efficient and Well Read

The spelling checker is fast, efficient and well enough educated not to cavil at British orthography — both American and British dictionaries are available (the review copy came with the British). Checking may be carried out on a single word, a page or an entire text file. Words may also be looked up 'phonetically' — the term is used rather loosely to mean 'according to a certain pattern': if a word pattern is entered, all words in the program's dictionaries conforming to that pattern will be displayed. Thus entering 'sycology' produced 'psychology' and 'sociology', although entering 'psychophant' did not, as it should, produce 'sycophant.'

The speller also flags words repeated side by side, such as 'the the', a variety of error to which I for one am very prone, and offers to delete the repetition. It does not appear, however, to have been told that 'had had' is the pluperfect tense of the verb 'to have' and therefore quite acceptable. Double word checking can be disabled if this becomes annoying, although I would be prepared to live with it — it is a is decidedly useful feature. Perhaps the next release of the program will rectify this rather obvious glitch.

Most wordprocessors with any pretensions to power — and a number whose pretensions are altogether unfounded — have a thesaurus. WordPerfect's thesaurus is also fast, efficient and well read, although the command to access it is not consistent with the dictionary command: the latter is Ctrl F2, while the thesaurus command is Alt F1. Words are displayed by the thesaurus according to their grammatical function; and those words which are accessible of further investigation are marked as head words.

While many wordprocessors have an Undo command to revoke the last edit, WordPerfect goes one better — two better, in fact, allowing the last three deletions to be resurrected, although this feature stops short of reviving whole files.

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Password protection is also supported and is very effective. It must therefore be used with some care, as a file can become entirely inaccessible to a user with poor powers of recall. (A possible approach to the use of passwords, therefore, is to maintain one protected file listing all passwords in use.)

Footnoting facilities are particularly powerful. Footnotes are automatically numbered and renumbered and may be placed at the end of the page or the end of the text. The maximum footnote length allowed is said to be 300 pages, a fact which I shall pass over without comment. Certainly this aspect of WordPerfect would make it very useful to scholars.

Macros

WordPerfect has a full macro facility, allowing text, commands or combinations thereof to be placed under a single key. The playback of a macro is impressively rapid — a ten-line text macro comes up on screen instantaneously. Macros may be either temporary — used only during the current work session — or permanently stored on disk. Since permanent macros are saved in the same way as text files, the only limitation on their length is disk capacity. Pauses may be included in macros to allow text to be entered from the keyboard.

Macros can be chained together, and conditional macros will perform a task only if given conditions are fulfilled. In combination with the formidably powerful merge facility (which allows record storage also to the limit of disk capacity and permits an unlimited number of fields), the macro feature will allow the most elaborate mail merge to be completely automated.

The macro system has two shortcomings, however: one is that a listing of macros can only be obtained from the disk directory, which of course does not allow any descriptions. It is surprising that such an obvious need is not met by a program which in other respects has such polish.

The second defect is that it's not possible to edit a macro as text within WordPerfect: the macro editor which comes with the Library package is required for the job. This is not important in the case of relatively simple macros, firstly because a macro need not be displayed until all its instructions have been read, which avoids the inelegance of errors being corrected on screen; and secondly because if you really louse it up you can start again. The latter is not a desirable approach in the case of a lengthy conditional macro, on the other hand — it can take a fair while to create such a thing, and to have to start again from scratch is extremely irritating.

Considerations of space will not allow a full treatment of the Library package, which comes on two floppy disks and is accompanied by substantial documentation. Briefly, however, the package consists of the macro editor on one disk and a set of utilities on the other: a clipboard, which is an area of RAM for temporary storage of data to be moved from one program to another; a calculator with financial and statistical functions; a hard disk file manager; a notebook; a calendar which accommodates memos, to-do lists, and appointments, which can be programmed days, weeks, months or even years in advance to pop reminder messages onto the screen with a cheery beep.

In sum, WordPerfect is a force to be reckoned with. It has one or two defects but they detract little from the great power, versatility and elegance of a program which is not only easy to learn but easy to use. As I suggested in an earlier review, simplicity in the first of these areas is by no means coterminous with simplicity in the second: a program which is easy to learn is likely to become intrusive to the experienced user, while one which is transparent to the experienced user is likely to be demanding to the learner. WordPerfect manages to cater to the needs of both; and its name is certainly not undeserved.

Product Details

Product: WordPerfect V4.2
From: WordPerfect Corp, Utah USA
Distributor: Sourceware, 586 Pacific Hwy, Chatswood 2067 NSW
(02) 411 5711
Price: $870 taxed
$240 taxed Library package

XyWrite III VERSION 3.14

XYWRITE (pronounced to rhyme with 'highlight'), runs under DOS 2 or greater, and since the only two essential files — the printer and the editor — occupy only some 150 Kbytes of disk space, it could at a pinch be used on a single drive system. The recommended minimum configuration, however, is two floppy drives and 256 Kbytes of RAM, although a hard disk and a generous supply of RAM is

a far better set up, as it is for any power wordprocessor. And XyWrite is nothing if not a power wordprocessor — as will be come apparent, indeed, XyWrite is virtually a wordprocessor language.

The program is supplied on three floppy disks, not copy protected, and is accompanied by no fewer than five volumes of documentation, ranging in size from the very slim installation manual through three tutorials of increasing complexity and thickness to the bulky ring-bound reference manual (you may care to see the WordPerfect review above for my observations on ring-binders).

Although marred by occasional sloppy grammar (and one inaccuracy concerning the accents used in Spanish), the documentation is acceptably well organised, gives a complete, if occasionally cryptic, account of the program, and is not ashamed of offering technical details. The training disk presents a brief introduction to the basic operations but is by no means a full tutorial. Extensive on-screen help, however, is available from the help files.

Installation

The installation program allows a printer to be selected from a reasonably full list, including laser printers, as well as establishing whether a colour or monochrome screen is being used. Either of two help files may be chosen: a long one for use on a hard disk or a short one for a floppy system; and if the long one is chosen, the program can be set up to display an appropriate help screen when an erroneous command is given. A dictionary containing exceptions to XyWrite's hyphenation rules can also be set up to load when the program is booted. However, customisation by no means stops there — virtually every aspect of XyWrite can be altered.

At a simple level, for example, a default drive can be established for text files; windows can be set to open and close automatically as required; and a keyboard click can be turned on at any tone and intensity required (many people, myself included, find a keyboard click improves typing accuracy); and at a more sophisticated level, the program's entire command structure can be rewritten. I shall return to this aspect of XyWrite later.

Text is loaded directly into RAM, making all text operations extremely rapid. The maximum file size depends on two factors: the amount of RAM available and amount of RAM occupied by XyWrite. This in its turn depends on the extent to which the program has been modified by the user and whether extra files such as the help files or the Hyphen Exception Dictionary have been loaded. By running with 256 Kbyte and allowing 40 Kbyte for DOS and 120 Kbyte for XyWrite, a 96 Kbyte file may be loaded. Clearly, with a 640 Kbyte system, much longer files — and more importantly, longer multiple files — become viable. XyWrite assigns a buffer to each file as it is created and saves overflow to disk.

However, problems can be met in moving or copying blocks of text in long files:

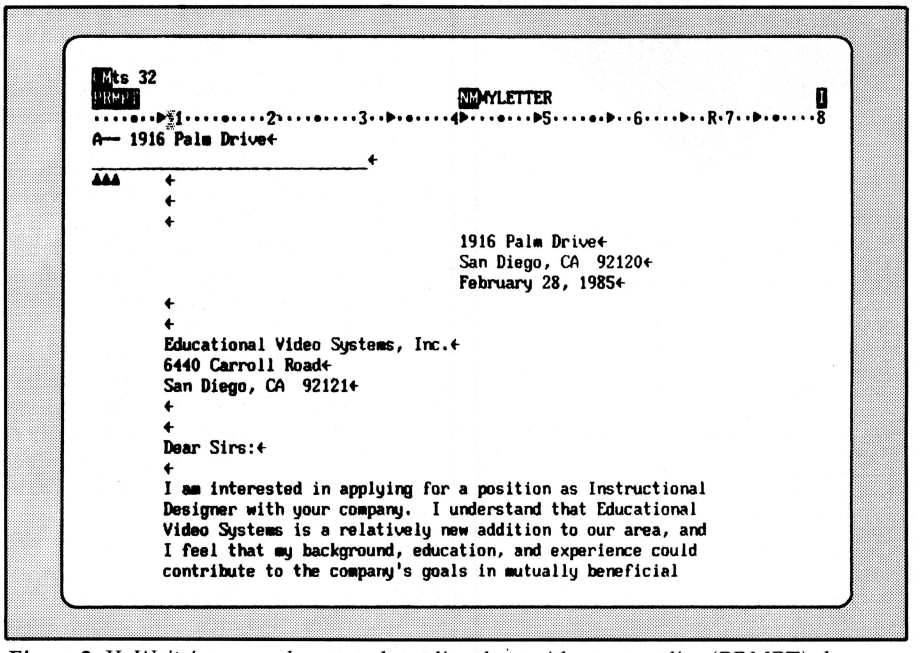

Figure 2. XyWrite's screen shows a ruler at line three with a prompt line (PRMPT) above it and a command line (CM) above that, the latter two serving respectively for entering commands and displaying messages from the program. An echo of the cursor moves along the ruler line as text is entered, and the name and directory of the active file are displayed in the prompt line.

blocks may not exceed the length of the Primary File Buffer and may not be moved farther than the length of the Primary File Buffer. Only the 256 standard ASCII characters are used, which means that text written under XyWrite is readily transportable — this section of the article was written under XyWrite, and both WordStar and WordPerfect were able to read it without difficulty. If problems are encountered in this area, it is possible to strip out XyWrite commands and turn word wraps into hard carriage returns.

Screens

XyWrite's screen shows a ruler at line three with a prompt line above it and a command line above that, the latter two serving respectively for entering commands and displaying messages from the program. There are 22 lines that are thus left free for display, the last line of the screen being repeated on the following screen. Text may not ordinarily be displayed right-justified — as I mentioned earlier, this is something I find slightly distressing. The various symbols used to indicate embedded commands can be disabled — indeed, almost anything can be disabled, changed, modified, turned upside down and put back the way it was; wherefore I should make it clear that throughout this review I am speaking of XyWrite in its standard form.

XyWrite is quite literally command driven: file, text and display manipulation are controlled by commands entered in the command line, the majority of them being readily understandable English words and the majority of them also being reducible to two or three letters: AB aborts the screen display, and SA saves a file, for example. A number of these commands are placed by default on the function keys, both on their own and in combination with the Alt, Shift, and Control keys. Reassigning these commands to any key or key combination is among the ways in which the program may be modified.

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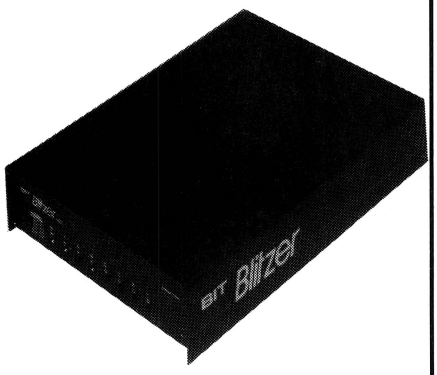

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Editing

XyWrite allows up to nine documents to be edited simultaneously, either on full screens or in windows of user-defined size and shape on one screen, and the combination Alt-F10 allows switching between active text files. It is also possible to leave XyWrite temporarily and perform any DOS task or run any other program from any drive or directory, providing there is enough RAM.

Text may be marked in terms of words, lines, sentences and paragraphs, as well as in blocks which do not readily fit any of these categories. This appears at first sight to be an unnecessarily complex way of going about things, but after I had become used to it, I found it very much quicker and more efficient to mark a block in one of the predefined ways and move, copy or erase it than it is in wordprocessors which rely on cursor movement for block marking. The default keys for text marking are consistent: F4 for a line, Alt F4 for a word, Shift F4 for a paragraph and Control F4 for a sentence. There being no other variations of the F4 key, F2 marks any other section of text.

Search and search-and-replace are rather clumsy: the command in either case is given on the command line, and the strings for search and replacement must be enclosed within markers, which can be any characters not included in the string.

Macros

XyWrite's macro facility is known as the 'save/get' feature and allows text, commands or a combination thereof to be placed under any of the alphanumeric keys in combination with the Alt key. These macros may either be used for one editing session only or saved to disk and automatically loaded with the program. A listing of macros defined in this way can be viewed.

As in WordPerfect, however, it is not possible to edit macros directly — to edit a macro, it is necessary to play it back, mark the block, and save it as a text file after editing. It may then be redefined as a macro under the same or another key There seems to be no practical limit to the size of macros — the manual refers to macros 20 Kbyte in length. A macro may be embedded as a print command rather than inserted in the text itself — this will, for example, allow a form letter to be composed almost entirely of macros.

Customisability

XyWrite's customisability hinges on the file startup.int, which is read when the program is booted. This file is the equivalent of the DOS autoexec.bat file and instructs XyWrite to activate defaults and to load specified printer files, keyboard files or user-written files. Thus the line default bk=1 in the startup.int file will set XyWrite to make back up files; the line default dt=3 will inhibit the display of carriage.return marks and print controls; and so on.

XyWrite offers a number of keyboard files and it is by modifying one or another of these and calling it from the startup.int file that the program's commands can be completely reassigned. The IBM keyboard file, for example, lists the default definition for every key on the keyboard, and by changing the default to any other command or combination of commands, XyWrite can be modified beyond recognition — it would be possible, to, say, customise it to recognise WordStar commands.

It is a remarkable and perhaps a unique wordprocessor, standing in the same relationship to other wordprocessors as the dBase family to databases: just as dBase can be used either as it comes from the manufacturer or can be tailored to specific needs, so XyWrite can be used in its default mode or can be modified for specific purposes or to suit the user's tastes and way of working. Although WordStar 3 can also be modified to quite a considerable extent, doing so demands a working knowledge of the DOS debug utility. Modifying XyWrite does not involve any such arcane learning, although it is certainly not something that can be done over a quick cup of coffee.

These two programs are in the top rank of the high performance bracket, and either of them will meet the needs of the most demanding of users. Both are extremely versatile, albeit they follow very different paths to achieve this quality: WordPerfect does it on sheer size — the full package including the Library runs to approximately one and a half megabytes — while XyWrite is a far leaner program and relies on the user to take advantage of its vast scope for modification. Both, furthermore, are easy to learn in the initial stages and open up greater possibilities as the user becomes more aware of their power and studies them more closely Using either of them to the full involves considerable work, either in studying and exploiting the system to its greatest potential (WordPerfect) or in careful analysis of requirements and design of strategies to meet them (XyWrite). The choice between them perhaps depends ultimately on the way one's mind worked.

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XyWrite III Plus

SINCE THIS article was written, Version III Plus of XyWrite has been released. The upgrade now occupies five disks and 384 kilobytes is required to run the program at full steam (244 Kbyte without the spell checker). The main program file has grown from just over 142 Kbyte to almost 169 Kbyte, while the long help file has swollen from 177 Kbyte to 195 Kbyte. New keyboard files have been included for the Tandy 1000 and the Zenith 181: users of these computers must load the relevant file in order to run XyWrite.

A minor bug turned up when I installed the program using the driver file for monochrome screens with colour adaptor, B-W.PRN: a semi-colon is missing before a format symbol. This produces no inconvenience beyond an error message when the program is booted and the problem can be rectified either by deleting the offending line or by adding the missing punctuation. A more serious problem arose in moving between command line and text: the keys which control this function occasionally had no effect at all, and at other times the cursor in the command line would migrate to the far right of the screen. In both cases, either switching to another window or invoking help declagged things. On the subject of problems, it is claimed that XyWrite will now coexist with TSR programs without the special keyboard configuration file which was necessary in earlier releases. However, I ran into some difficulty using Metro, the new Lotus pop-up — the system hung when I called the calculator, and had to be rebooted.

A thesaurus and spelling checker are now an integral part of the program, although they are not in-house products. A single word, a marked block or a file (including a stored file) can be checked, and the normal options of the more powerful spelling checkers are available: add unrecognised word to dictionary, replace with suggested correction, edit manually, or ignore; and another option allows a word to be saved to RAM, permitting the creation of a temporary dictionary. Duplicated words are flagged and XyWrite will make appropriate deletions, although like every other wordprocessor I have seen with this feature, it does not recognise 'had had'. The dictionary runs to about 100,000 words, but makes no useful suggestions for common typing errors such as 'hte'.

A new command, SORT, allows a file or marked block to be arranged in alphabetical order, and another, IN, allows a file (including a non-XyWrite file) to be merged with the document being printed. Another new command counts words in a defined block or an active file. 'Redlining' is yet another new feature — this keeps track of changes made to files and can be used when text has been edited by a third party and the changes are to be reviewed. With this function active, additions to the original text are displayed in bold and deletions in reverse video.

The new release certainly has a number of useful enhancements, but I am a little concerned that XyQuest's policy of a new release every year or so has in this case led to a product which has not been fully deloused: the minor bug I mentioned in connection with the screen driver is perhaps symptomatic, and the difficulties I ran into with the command line and Metro, unless they are a product of my own computer, do tend to support this view. □

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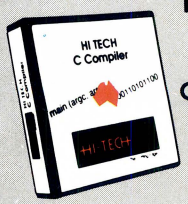

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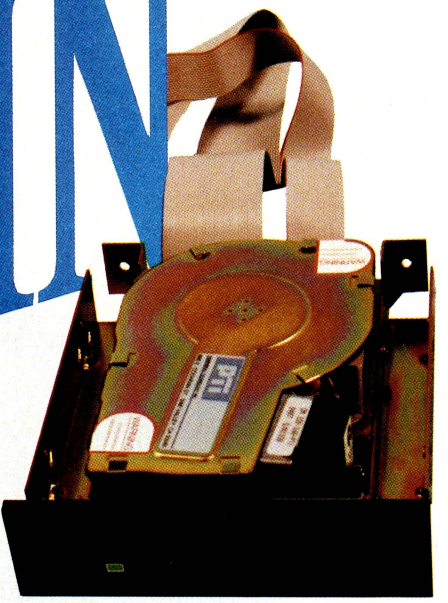

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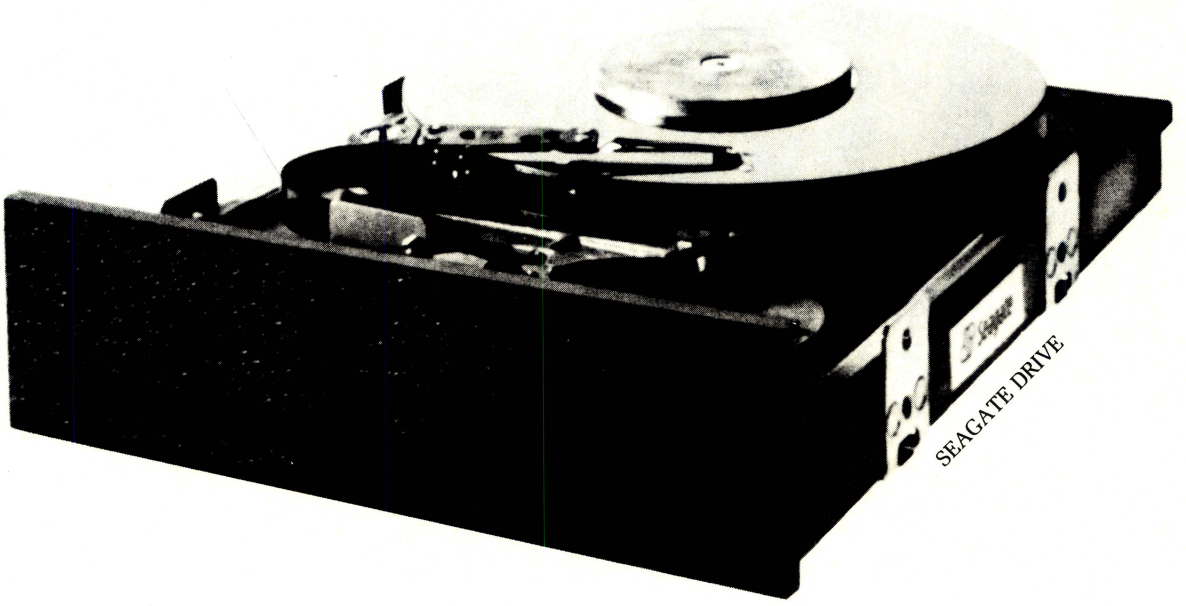

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The Attainment of Assembly

Or How You Can Program Yourself — Part 1.

So! You want to find out about programming in an Assembly language, do you? In the first part of a new series, John Summerfield tells you why you should — and should not — program in Assembly.

ONE OF THE MOST asked for features by *Your Computer* readers is more articles on programming. Being the Assembly freak that I am here is the first part of a series on on learning to program in, you guessed it, Assembly. I have concentrated it around the 8086 based machines.

There are a number of machines using the 8086 family of microprocessor chips. The computers using one of these processors include: the IBM PC and most copies using the 8088, or some copies using the 8086 (for example the Olivetti M24) and some other IBM PC copies using the 80186 (I believe the Cleveland is in this category). At least one (an Australian machine built by Earth Computer Systems) has a PC/XT equivalent using an 80286. There are numerous IBM PC/AT type machines using the 80286 and also the emergent PC/AT equivalent machines using the 80386. Finally, there are the newly-announced IBM Personal System /2 computers using the 8086 (Model 30), 80286 (Models 50 and 60), 80386 (Model 80), and the Tandy 2000.

There are also some machines around that use the NEC V20 or NEC V30 processors; these are plug-in replacements for the 8088 and 8086 processors respectively, and, due to improved design, give 20 to 30 percent better through-put with the same clock speed. I speeded up my APC with a V30; many have done it to their IBM PCs (and copies) with the V20.

Of course, there are also many manufacturers who did things their own way but who still used one of these processors: DEC with the Rainbow, NEC with the APC and APC III, AED with some S100 boards, Ortex, and MICA in Canberra. If your computer is able to run MS-DOS or PC-DOS, it uses one of these processors.

Some people have added so-called 'turbo' boards to their machines to make them go faster by using a more powerful processor at greater speed. In general, the bigger the number of the processor, the faster it gets things done.

There are add-on boards or attachments for some computers to give them software compatibility with the IBM PC: for example, for the Commodore Amiga, and for the IBM PC/RT (which is really very incompatible with the IBM PC).

Well, if you have ready access to one of these machines, you meet the most basic requirement for following this course.

Why Assembly?

There are various reasons to use assembler: First: because you can't do it in your other language of choice. For example — I use PI/I-86 a lot; one of the things it can't do is issue DOS calls directly. However, sometimes it's nice to be able to find out the files on a particular disk. I like to be able to start up my favourite editor (WordStar) from within PL/I programs. PL/I can call subroutines, pass them information in all sorts of different ways and get results back in all sorts of different ways.

Second: You want to do it often and your other language of choice takes too long. Typically, well-written assembler routines run about ten times as fast as equivalent code generated by a good compiler. For example, my PL/I compiler generates nine instructions, including one subroutine call, just to compare two character strings and select an instruction-path. I would generally do the same thing in about four machine instructions. If you have a routine where lots of data needs to be moved around lots of times, for example, a sort program, an assembler subroutine can be an excellent solution.

Third — The compiler generates too much code. One of the failings of my PL/I compiler is that it cannot have more than 64 kilobytes of code, or machine instructions. While this might seem a lot, I had an application where I was exceeding 60 Kbyte and I did all the other tricks I could find. It is now back to about 50 Kbyte as I replaced some PL/I subroutines with Assembler ones.

Fourth — It's more fun. (This won't win any points with your boss, but for our purposes it will do.)

We should also have a look at why not to use Assembler. It does take longer to develop and there are two reasons for this: you need more lines of source code for the same task and the programs are more difficult to understand. Both of these reasons are inter-related and this example illustrates both; to the PL/I compiler, A=B; is one instruction: it doesn't matter whether A and B are character, numeric or something else. In Assembler you might need two instructions if both are integer; about six to ten if they are character, and perhaps fifty or so if one is numeric and the other is character.

Another reason for not using Assembler is that programs are more difficult to debug. Quite apart from the extra code that needs to be debugged, there is a whole new world of things that can go wrong.

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You have probably found out by now that the computer doesn't know the difference between data and useful program instructions. Indeed, the difference can be quite arbitrary. Just think about the output from a compiler, after it's finally ready for execution. When the program was written to disk, it was regarded as data . . . .

One of the things that will happen to you is that the distinction will become blurred at just the wrong moment and you will use your data for program instructions, or your program instructions as data. You will find your programs going where you don't want them to go or that your computer ignores you from time to time.

You may hear strange noises from strange places. I have on various occasions found my printer retreating rather than advancing the paper, my hard disk making peculiar noises (it's generally impossible to tell even whether it's turned on, except by the little green light), the computer's noise box making endless noise, the computer refusing to re-boot except after being turned off, and holes cut in the platen on my printer by printing the same line repeatedly for several hours without advancing the paper . . . I have also destroyed the directory of a couple of floppy disks. Don't be deterred when things like these happen to you: you won't be the first. Just take your normal backup precautions, especially with your hard disk. Some of these events probably only happen on the machine I was using at the time, others aren't too likely if you keep your fingers out of the danger areas; for example, if you use the standard operating systems to manipulate directories, you aren't very likely to damage them.

For those of you who wish to participate, I will assume you have access to the following tools:

A computer system that runs MS-DOS,
A printer,
Microsoft Macro Assembler, MASM,
Microsoft linker,
Microsoft program librarian,
and DEBUG.

IBM's equivalent products are fine. You can use other tools if you want, but any translations will be up to you. If you have an assembler that will accept and assemble source code prepared for MASM, you won't have much trouble. If you use some other assembler, such as Digital Research's RASM-86, you will have some changes to make.

Things will be easiest if you have an IBM PC or copy (including PC/ATs), but if you have some other machine, such as a NEC APC you may learn more. As the course develops, we may use some features particular to the IBM PC but they will probably be capable of being translated to other machines.

Course Objectives

This is a programming course. I am not giving away software. People who undertake the course are free, however, to use the programs for their own non-profit purposes and of course, to use the knowledge they gain for any purpose at all. Since I want to teach people to program, I have asked the editor not to make the source code available on the YC Bulletin Board: if you key it in and debug your mistakes, you will learn far better than if you just copy it by electronic means.

Although it is not a course objective, since we will be using operating facilities to perform I/O to console, disks, and the such like, you will learn quite a lot more about DOS than most programmers.

Course Prerequisites

It is necessary that people undertaking to follow the series are *able to program in a high-level language such as* PL/I, *Pascal,* COBOL, *Fortran, or in another assembly language.* I do not think that products such as dBase would provide a suitable background.

I will assume that people who undertake to follow the series are familiar with the relevant aspects of the theory of number systems and are familiar with hexadecimal arithmetic.

Course Content

I will outline briefly the architecture of the 8086 as it affects programming. For our purposes, we will assume the 8088, 80186, 80188, 80286, 80386, V20, and V30 are identical. I will cover this because we need to understand our tools in order to use them effectively.

I will always refer to the microprocessor as an 8086. Very nearly all programs written for the 8086 will run without alteration on all the other processors in the family. The 8088 has the same set of instructions as the 8086 while the V20, V30, 80186, 80188, 80286, and 80386 have some additional instructions.

Also, I will outline the instructions, or directives, required by MASM to direct it in its translation of our source code to object code. The instructions which are translated into a form suitable for the 8086 to process directly: that is the machine's instructions will also be outlined.

In a few cases, there are slight differences in the way some instructions are executed between the different CPUs in the 8086 family. For most purposes these do not matter, but if you need to know exactly how an instruction is processed by your machine, there is no substitute for the manufacturer's documentation.

Caveat: I will try to describe the instructions accurately. However, I don't expect I will manage to achieve that objective any more than programmers write bug-free programs! Use my material for tutorial documentation, refer to official reference material for definitive descriptions where necessary.

I aim to have either a new working program, not necessarily of great utility, or working extensions to an earlier program, each month. Most final versions will be of continuing use after their completion and I will use them to build up a library of subroutines which can be re-used in future programs. By using separately-assembled subroutines we can achieve some of the benefits of using high-level languages while retaining those of Assembly language.

Well, you now know what I want to achieve. Next month we will have a look at the architecture of the 8086 as it affects us as programmers. There is a lot of additional material which we won't cover: knowing about things like instruction prefetch queue doesn't help us program it.

We will be looking at the 8086 register and how it addresses its main storage. We will also write our first program: it won't do much, except introduce you to the basics of coding an 8086 assembly language program. Hopefully, these articles will produce some more Assembly freaks!

Recommended Reading

THE 8086 *Book* by Russel Rector & George Alexy, Osborne/McGraw-Hill, 1980, is essential — the coverage of 8086 microprocessors is about an inch thick, including detailed coverage of the instruction set. Overall, an excellent book.

I also have a book which do not recommend — 8086/88 *Assembly Language Programming* by Leo J Scanlon, published by Robert J Brady Co. I bought it because it is well-presented, somewhat tutorial and reasonably small (about 200 pages). However, I have found three errors in it, so don't use it. It contains some information on number systems and how to use an assembler, the architecture of the 8086, the instruction set and some applications. If the author had his facts straight, it would be an excellent book and better suited to our series than *The* 8086 *Book*. □

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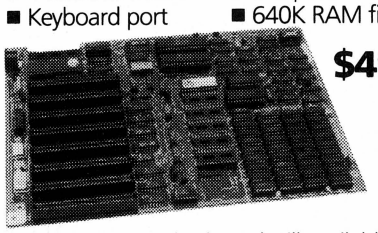

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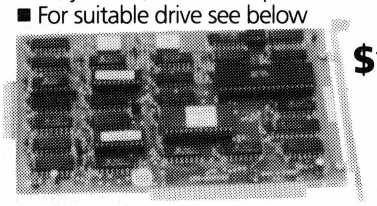

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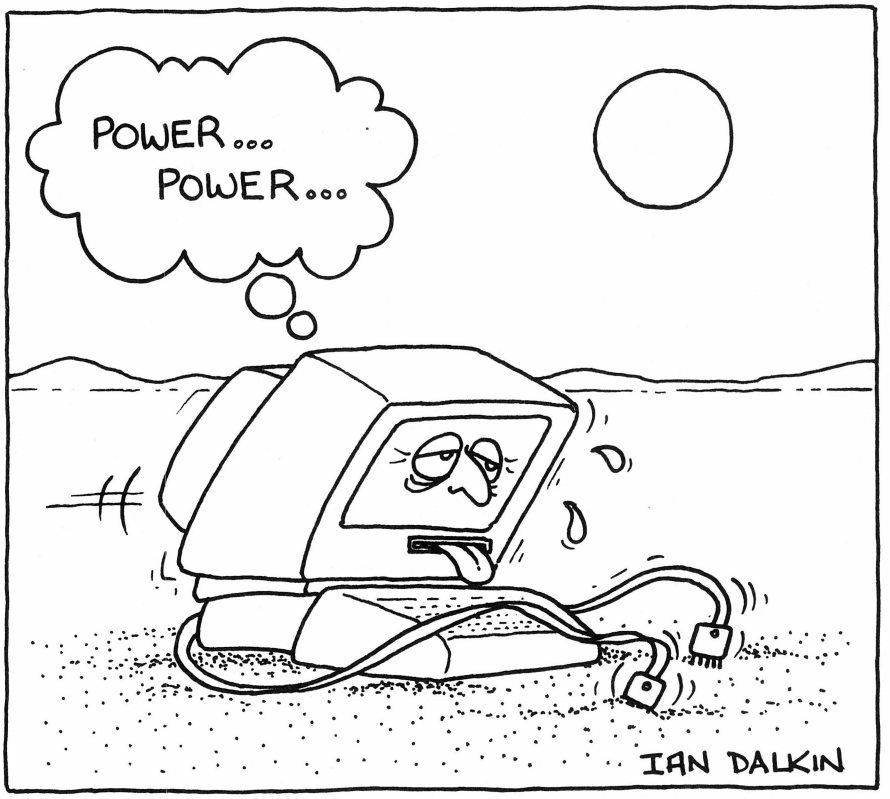

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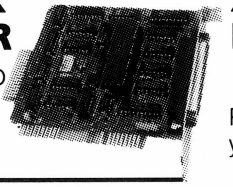

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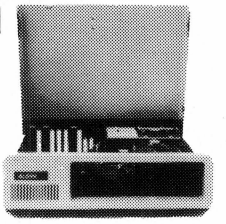

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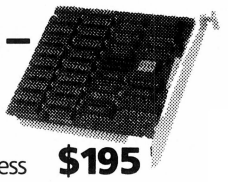

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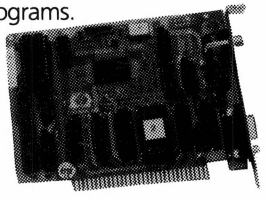

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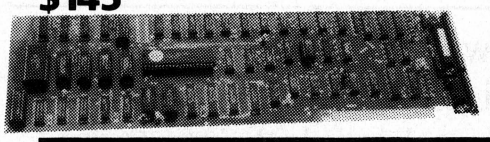

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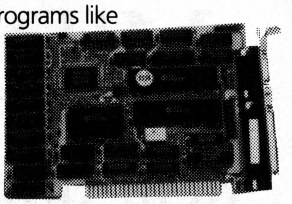

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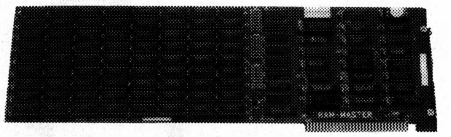

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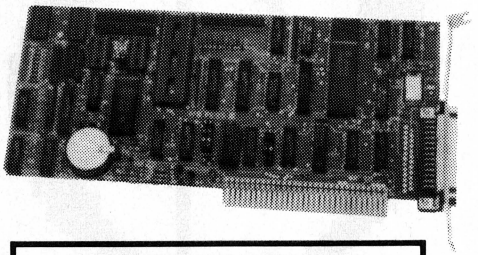

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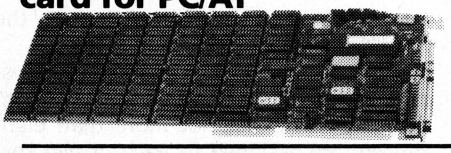

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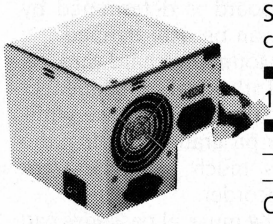

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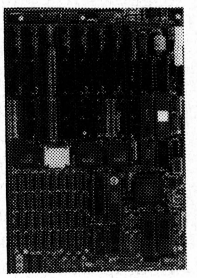

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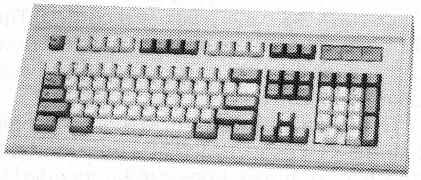

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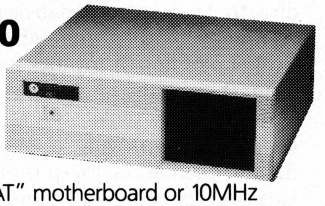

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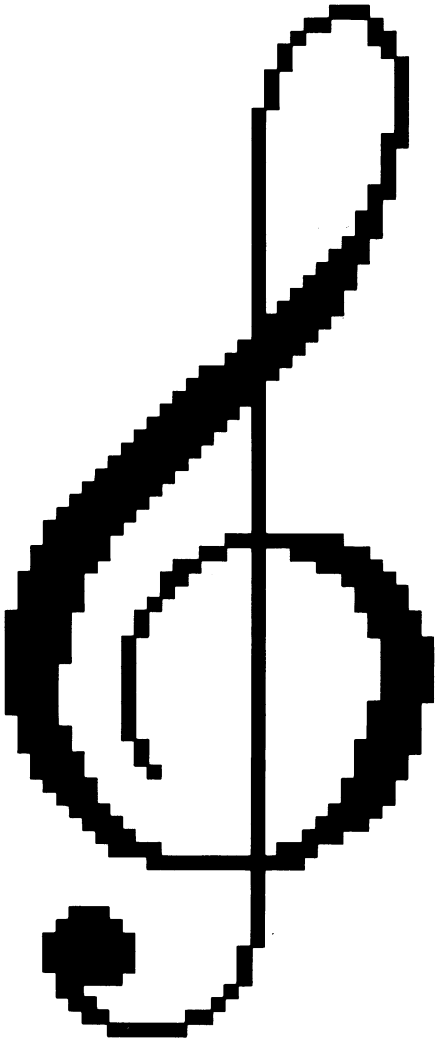

Microcomputers, MIDI and Music

Real-time Music Composition

Continuing his overview of computers and music, Andrew Symaniz examines several real-time music composition peripherals and reveals their features (and some pitfalls.)

LAST MONTH WE examined the major features of one of the first 'serious' music composition peripherals available for a personal computer — the Mountain Computer MusicSystem.

This primordial musical package for the Apple II may have been fine for electronics musicians wanting to delve into the theories of digital synthesis. And it was great also for music composers not particularly virtuosic in key/fret board gymnastics. But most performers considered the Mountain's non real-time composition software (and the continual disk and program swapping) severely curtailed spontaneous musical expression . . .

There was no way to play music in real-time, or to directly monitor an edited performance. To hear any piece of music you first had to save the edited data as a song-file on disk, then re-load the file back into the machine for processing and playback by the player-program. There was even a separate utility that needed to be called up to merge individual composition files together to complete a composition.

Passport Designs' Soundchaser

In 1982, fledgling computer music developers from California, Passport Designs, introduced their Soundchaser digital keyboard and performance software. In a unique marketing arrangement with the Mountain company, Passport were able to integrate Mountain's digital oscillator boards within their Soundchaser design.

Whereas the initial Mountain system was considered primarily a composer's tool, the keyboard/interface/software set from Soundchaser was aimed more at the average musician. In essence, the package contained a multivoice, digital synthesiser with real-time sequencing and sound storage capabilities for 16 memories (called presets).

The Soundchaser five-octave, organ-style keyboard and interface card attach directly to a spare expansion slot on the computer. Either the Apple keyboard, games paddles or joystick can be used in interacting with the system software.

As you may recall, the Mountain hardware boards provide a maximum of 16 digital oscillators for producing sounds. However, because of inherent limitations in the structure of this hardware, the 16 voices have to be distributed evenly between two groups of eight voices on the Soundchaser.

For this reason, the Soundchaser system *can* have a maximum polyphony of 16 voices *provided* that not more than eight presets are assigned to each of two keyboard 'split-segments'. The actual split-point on the keyboard is determined by the software and can be user-defined.

Driving the Mountain hardware is Soundchaser's Turbo-Traks sequencer which is fast, versatile and intuitive. Without further disk or program swapping, the program operates much like a 16-track multitrack tape recorder.

Relatively lengthy musical passages can be played into the computer and stored in RAM, in real-time, via the Soundchaser keyboard. The composer may then record consecutive 'overdubs' on other tracks whilst simultaneously listening to previously recorded material. The performer ensures the whole musical arrangement stays in sync by playing to a metronome 'click-track' as each piece is recorded. The 48 Kbyte Apple provides about 2800 note capacity and a 64K machine handles twice this much data.

The initial software release allows only one track to be recorded at a time, and the only way 'botched' lines can be mended is by re-recording the entire track from scratch. This software does not allow the player to simply 'drop-in' at some desired point within a track to fix mistakes. Naturally, limitations such as these can be extremely frustrating for the less experi-

enced keyboard player (or musical perfectionist).

However, each recorded track within a completed composition can be individually controlled for volume and preset assignment. This is particularly useful for rearranging sounds and adjusting levels prior to 'mixdown' onto an external recording machine such as stereo cassette.

Since the Soundchaser's recording process is not structured around concepts of traditional music notation for developing compositions, the original software does not support options for printing musical scores on paper. Eventually however, utilities became available for sequence editing and music transcription.

Some time ago, Passport re-designed the Soundchaser's music transcription utilities and several other educational (ear training) packages for MIDI operation.

The audio quality and sound range of the Soundchaser system is similar to that of its Mountain predecessor, since both systems are constructed around the same hardware base. Sounds are created through Fourier (additive) synthesis, and over 100 presets are provided on disk as part of the system.

Sound parameter changes can be monitored in real-time and modified individually for each of the 16 oscillators. These include: pitch (by octave), envelope shaping and frequency modulation. An LFO (low frequency oscillator) can be employed to enable vibrato, de-tuning phasing or chorus effects.

The Fourier synthesis facilities of the Wavemaker software resemble those of the Mountain system. However, only the first 16 harmonics are controllable (though relative amplitudes are specified in 255 increments on a bar graph — similar in design to the former system). Also, *any* stored waveforms can be used as harmonics, in place of simple sine waves.

Another improvement over the Mountain system is that new waveforms can be drawn directly onto the screen using an Apple games paddle or joystick. An existing waveform can be plotted on the screen in hi-res graphics, altered and combined with other complex waves to produce even more interesting sounds.

The AlphaSyntauri

The alphaSyntauri package is similar in specification and capability to the Soundchaser since it too commandeers Mountain Computer hardware. But, the Syntauri system tops Passport's provisions for real-time performance responsiveness, and 'musician-friendly' sequencing software. For example, alphaSyntauri's five-octave keyboard supports sustain, portamento and 'velocity-sensitivity'.

One way to enhance the articulation and expression of music is by using sustain. The sustain pedal provided with this system can be used whilst notes are being played. This action causes real-time variation of the software ADSR's decay and release times. The degree of this variation is selected by an appropriate key entry. Similarly, the portamento pedal can be used to glide between notes according to values entered in software.

Since the alphaSyntauri keyboard is also velocity-sensitive, the harder the piano-style keys are struck, the louder the musical notes will sound. This effect is accomplished by the Apple using look-up tables: The computer calculates the delay between two switch contacts on the keys, and updates the attack rate and volume parameters accordingly. The range of sensitivity can also be controlled via software. By 1984, the standard alphaSyntauri software set included:

1) An advanced studio-style sequencer — Metatrak II,

2) The basic operating system — alphaplus (that incorporated two sub-programs for structuring and fine-tuning sounds — Quickwave and Wave), and

3) And, a bonus set of waveform creation programs — Draw Wave, Auto-Pulse and B-3 Wavemaker.

On a 64K Apple, Metatrak — the 16-track real-time sequencer — can record up to 3000 notes in layered tracks. Any track can be edited, given detailed performance expressions or mixed with another track. Drop-in editing can be performed at any point in a track to correct playing mistakes. And specified musical segments or chord sequences can be 'looped' to play ad infinitum — great for massaging out subconscious musical ideas . . .

Also supported by this software is the ability to 'fast-forward' through a sequence, and to modify playing tempos of recorded tracks whilst adding new material at different speeds. Other special features include a software metronome that produces 1-280 bpm (beats/minute) with 'triggering' capabilities — for syncing to rhythm machines or analogue tape recorders.

Metatrak also allows the keyboard to be split into as many as eight independent segments. Split-points are user-definable, as are the presets assigned to each segment. Split configurations and preset specifications can be stored as files on disk for future use.

An additional multivoice real-time sequencer containing most of the features of Metatrak is also incorporated in the alphaPlus software. However, in this environment the system can only provide eight independent tracks at a time, since it employs *two* oscillators per voice to define a sound.

This method is used for producing a much 'thicker' sounding composition — but at the expense of providing only half the number of tracks (and voices) for composition. Extra voices may be brought into play by syncing the system to analogue recordings of previous alphaSyntauri ensembles.

Since the alphaSyntauri keyboard is also velocity-sensitive, the harder the piano-style keys are struck, the louder the musical notes will sound.

The alphaPlus Quickwave sub-program uses Fourier synthesis to program waveforms in similar fashion to the other packages we've discussed. The main difference here is that you can take any waveform that has been designed, and 'retune' the sound by changing the amplitude levels of its component harmonics (using Apple cursor and key commands). This method for building up new sounds is very fast and direct: the changes in timbre can be immediately heard by playing them on the keyboard.

Alphaplus's Wave sub-program, however, takes time to compile waveforms from specified harmonics. And you are not able to hear the sounds as they are being developed. Ultimately though, it is a much more powerful option: Wave allows you the precision of specifying up to 255 individual harmonic components for sound production. This is at the expense of a little inconvenience — the resulting waveforms have to be saved, then reloaded back into the machine for audible checking. The trio of waveform utilities also bundled with the alphaSyntauri system provide different ways for creating new waveforms from scratch.

Draw Wave

Draw Wave enables waveforms to be drawn directly onto the screen using the games paddles or by charting x,y co-ordinates. Auto-Pulse creates dynamic pulse-waveforms (with duty cycles of 0 and 50 per cent). The B-3 Wavemaker can be used to duplicate almost any sound from a Hammond B-3 organ; sounds are specified by marking drawbar positions — as on the original Hammond instrument.

Also included in the software are routines for alternate tuning (just, meantime or microtonal), chorus, pitch-bend, pitch-sweep, pitch-scan, timbre-scan and other special effects.

Other utilities, originally offered as options by Syntauri, include MusicMaster (an interactive ear-training and music-theory education course) and Composer's Assistant.

This score-transcription package enables musical performances, captured either on the Metatrak or alphaPlus sequencers, to be printed out in hi-res graphics in conventional music notation. First, the music is transcribed for viewing on the video monitor, one measure at a time. Then, titles, performance instructions and even lyrics may be added to the score directly from the Apple's keyboard. The original music can then be printed using an Epson MX-series printer.

Although the Soundchaser and alphaSyntauri systems are no longer being actively represented in Australia, they can still be picked up through advertisements in music trade columns (Ikon Distribution, (02) 692-9875, still have a few alphaSyntauri's left . . .)

Of course, the main factor for the current lack-of-support for these kinds of peripherals, lately, has been the rise (and rise) of the latest generation of sophisticated MIDI playthings. (We will be taking a closer look at some of these components of MIDI-networking, soon . . .)

However, the two intrepid computer music peripherals considered here broke an enormous amount of new ground in their prime. In fact, they have remained popular as Fourier synthesis demonstrators and compositional aids at several educational institutions around the country. The SUESS (Sydney University Experimental Sound Studio) for example, has been able to provide a Soundchaser system for students since 1983.

Ian Fredericks, composer of electronic music and music lecturer at Sydney University, continues to praise the technical capabilities and ease of programmability of Mountain Computer's hardware. He has performed live, several times in the past few years, demonstrating his custom-designed Fourier synthesis software that drives Mountain hardware.

Some of his experimental work has included real-time continuous manipulation of timbres through space. Using multi-dimensional joysticks, he can re-organise the ratios of the levels of a number of harmonics — quite effortlessly, in real-time — across four discrete channels of sound.

1984 was the year the MIDI-revolution changed the face of the synthesised music world, forever. For our topic next month, we'll take a look at some of the micro-controlled analogue synthesiser systems that were also around at this critical point in electronic music history. □

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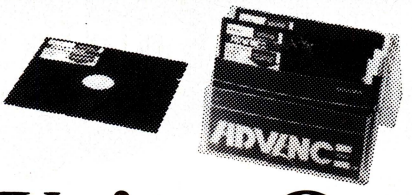

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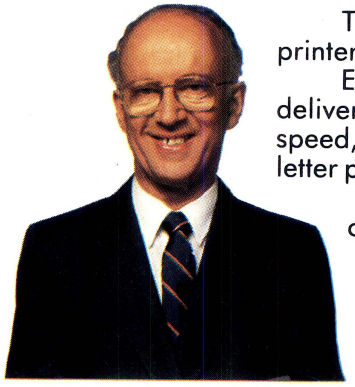

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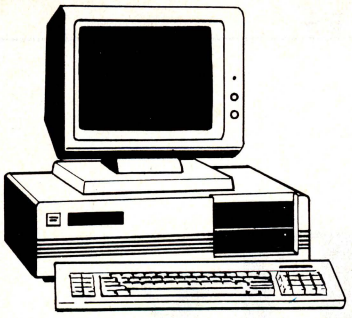

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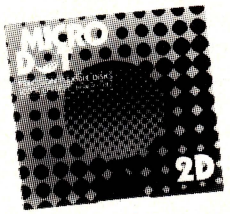

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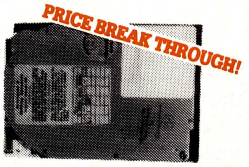

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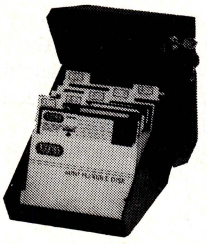

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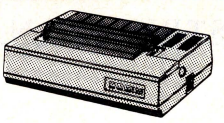

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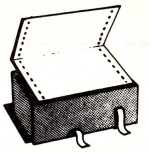

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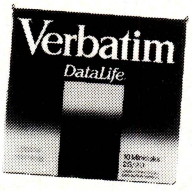

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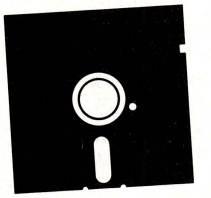

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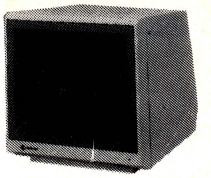

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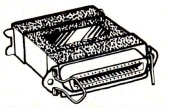

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Going BATty

Clever Tricks with Batch Files

John Summerfield has gone BATty and thought up some clever little programming tricks with Batch files (and given you a chance to win a box of floppies from Energy Control).

I HAVE BEEN resisting fashion for some years now, using an NEC APC with Concurrent CP/M-86, WordStar, PL/1-86, and dBase II. The fashion-conscious, of course, would use an under-powered IBM PC or compatible. However, I recently acquired a new toy, a shiny new Toshiba T3100 Superportable Supermicro which only runs (at the moment) MS-DOS. And MS-DOS 2.11 at that! I have stuck with WordStar and PL/1-86; dBase II remains on the APC.

I must say at this point that the T3100 is no 90 pound weakling — for the work I do, it runs about four times the speed of an APC with a hard disk and about four times the speed of an APC III with floppies.

Lately I have been doing all sorts of clever things with SUB files on the APC and wanted to do some equally clever things on my superfast but dumb (it can only do one thing at a time) T3100.

So — here are some clever tricks with Batch files. Please be warned, you may need your MS-DOS manual nearby; I tell you the tricks, not the function of all the commands though I have included some explanations for those of you reasonably competent but who don't understand the finer points of things like I/O redirection, or if you haven't come across some of the programs used.

You should note that I have some 'response' files set up. There is one called NULL: which contains an empty line (CR,LF). I use file redirection to satisfy those programs that are happy with a null-line in response to a question. Another is called Y: and it is used for things like CHKDSK when I want to fix up my directories (Concurrent CP/M-86 doesn't give so much trouble stuffing up directories), and one called N; these contain Y (or) followed by CR, LF.

Clever Trick 1

I like to backup data on my hard disk as I don't fancy using floppies, even at 720 kilobytes each. Usually I backup the contents of selected subdirectories, particularly the one containing the programs I am working on.

For the source directory, I back up all the .PLI files and PL1 (programs), .DCL (DECLARE or Include files), .SMP (screen maps), and .DOC files. I alternate between two back up disks, using the older one each time. Certainly I could keep track each time I used a back up disk, or by putting it at the back of the pile after using. I am too clumsy to rely on these ways, so I use a .BAT file to both backups and to time-stamp the disk. Here's the file –

```
dir A: <c:\source.pli\lastback.up
date >a:@date <null
copy *.doc a:\bakup
COPY *.PL? A:\bakup
COPY *.DCL A:\bakup
COPY *.SMP A:\bakup
```

The first line of the file shown is my source code directory, the date of my last backup (the date LASTBACK.UP was created) and which disk I used (it's in the file LASTBACK.UP because my disks are labelled). The second line time-stamps the disk, the rest does the backups.

Clever Trick 2

When I am writing and testing programs, the usual work program is like this —

a) Change a program,
b) compile it,
c) if there are any compilation errors to goto step *a*,
d) link the program,
e) then run it,
f) if it doesn't work, I then goto step *a*.

The point of it is that I usually compile one program several times in succession. I could type in all the commands necessary to perform each action when I want to do it, but I am too lazy. It is a lot easier to use a .BAT file set up to compile and link a program which I name in the command line. This is a not only a lot easier and but also less error prone. Listing 2 shows one

```
 echo off
IF `%1' == `' GOTO NOSET
SET PGM=%1
:NOSET
chkdsk d: /f <y
del d:*.chk
cls
tm >>\log
echo compile with link %pgm% >>\log
tm start
pli d:$PGM% $k >list
tm stop
link 86 c:%pgm%=d:%PGM%,d:am86pli.186.186,
     d:hairlib.186[s],d:util.186[s] >>list
tm stop
del d:%pgm%.ogj
more <list
```

Listing 1. *You can use .BAT files to make it easier to compile and list a program. This is one .BAT file procedure that can be used.*

of the procedures I use.

In Listing 2, the first line turns off the .BAT file listing. The second line tests for the presence of the first parameter; if there isn't one, execution skips down to the label :NOSET (labels begin with a colon). Otherwise, I store the program name in the environment variable PGM.

I then clean up my RAM disk (drive D on my system) with CHKDSK (/F to fix, <Y to read my response file as the answer to its question asking whether I wanted it fixed) and DEL to delete the junk.

TM is a Norton program and is used in the file shown in Listing 2 to identify when an event took place (I redirect its output to my Log file) and to time things like compilations (/Start begins a time interval, /Stop displays the elapsed time since the last time interval started, and >>\ Log causes the message to be added to the end of the file Log, which is is in the root directory). The second Echo command writes a message to my Log file recording what I am doing and to what.

After all this, the program is then compiled and its messages directed to a file called List. Note that the file is created if it does not already exist and emptied if it does. The command TM/Stop tells me how long the compilation took.

The program is linked and Link86's messages added to the end (>>means extend the file — see Listing 2) of the file List. *Note that this line is split here so it can be printed without sticking out too far; in the* .BAT *file it is one line.* There is another TM command which tells me how long the compile and link combined took.

Then the procedure deletes the .OBJ file created by the compiler and pages through the listing created by PLI and Link86 so I can see whether anything went wrong.

I compile all my programs from the RAM disk. Well, sort of. The PL/1 compiler can't be told where to put its output and work files. It puts them on the same disk as the source program. So, I tell it the source program is on the RAM disk, even though it isn't. The trickery is in a natty little program available from FBN Software, (062) 86 1102, for a song and called Spath. It is rather like the Path command, but operates for data files (but only for read access). It's wonderful for overlays for PL/1, WordStar and for include files. It even finds the .BAT files I am copying into this document!

Clever Trick 3

I am not using Clever Trick 3 on MS-DOS at present (although it works) but I use it a lot on Concurrent CP/M-86. You can include escape sequences in messages displayed on the screen. I use it like this: I have a series on commands in a .SUB file (equivalent to .BAT) which compile a program. Sometimes the compilation is successful, sometimes not. Then it stores the object code in a library; this is always successful if the compilation is so. Finally, it links a program.

Before the compilation, there is a comment containing the sequence ESC,"[25;1H" which positions the cursor at the bottom of the screen. After the compilation, another escape sequence is sent to position the cursor to the top of the screen. The library utility starts there and works down towards the compiler's messages; there aren't enough to get back, though. A third sequence moves the cursor back to the bottom of the screen for the linker's messages. The result is that the linker's message immediately follows the compiler's and those of less interest get scrolled off the top first.

For those of you wondering why I bothered, this process takes around 7½ minutes on the APC and the APC III I use. I have time to read books and dig the garden (true, I did) while it's going ahead with all this. And I've a good chance of seeing the summary of what happened afterwards, too.

Clever Trick 4

Some of you will have read about and/or used the For command. One way of using it is to type –

```
FOR %F IN(*.PLI) DO TYPE %F
```

This would cause MS-DOS to find all the files on the current disk with the file type PLI and type them on the screen. You can, of course, use any command you like — it could be PLI (to compile them), Fred (to Fred them), or whatever.

The clever trick is to use the Echo command with redirected output to create a list of all the files, together with some other text. For an example see Listing 3.

The procedure shown in Listing 3 will produce a file containing commands to compile every PL/1 program in sight, in the file List; Sort them into the file List.BAT; and then execute the new .BAT file. The $PL tells the compiler to send the output to the printer (P) and to produce a program listing (L).

For those of you who can't see the obvious, the listings are printed in *alphabetical order*. Unless you want them some other way, you can just take the printout off the printer when it's finished, split them up, and file them in the correct order.

Clever Trick 5

Although I haven't done it, I could have set up my response files on the RAM disk by having commands like ECHO Y >Y in my AUTOEXEC.BAT file. For special occasions, such as formatting new disks, you could have a .BAT file (I don't have one yet) that you use like this — "FMT A FRED".

The disk is in Drive A, and you want to call it Fred (or Barney, even). You run the Format command and note down what responses it wants. You then create a .BAT file containing the Echo commands necessary to put *all* the responses into *one* file, perhaps called Resp. Remember, Echo message >RESP will create the file RESP, Echo message >>RESP adds the message to the end of the file RESP. After all the responses have been set up, you then have a command such as —

```
FORMAT %1: /S /V <RESP.
```

This tells FORMAT to format a disk (which one is determined by the first parameter on the FMT command), that it's to be a SYSTEM disk (/S) and that you want a volume label (/V). FORMAT formats the disk before it asks you what to call it; you have, of course, put the volume name in the RESP file, along with the other responses required.

A word of warning: if you get it wrong, you may need to reboot the system. Don't let that stop you from trying; my systems get hung up quite regularly.

Clever Trick 6

Sometimes I want to have a program process one or several sets of data consecutively. It's convenient to have a .BAT file that can do this. By using the SHIFT command in the .BAT file, this can be achieved. I sometimes want to compile several programs and store the object code in a library. The .BAT file I use is shown in Listing 4.

```
DEL LIST
FOR %%F IN(*.PLI) DO ECHO PLI %%F $PL >>LIST
SORT <LIST >LIST.BAT
LIST
```

Listing 2. *This procedure compiles files of a particular type, in this case PLI, then sorts them into the file List.BAT and executes the new .BAT file.*

```
del listing
:loop
pli d:%1 >>listing
chkdsk d: /f <y
del d:*.chk
lib86 d:hairlib=d:hairlib.186[del[%1]],
      d:%1 >>listing
del d:%1.obj
shift
IF NOT `%1' == `' GOTO loop
copy d:hairlib.186 c:\ram
more <listing
```

Listing 3. A .BAT file can also be used to process one or several sets of data consecutively. This procedure is for compiling several programs and storing the object code in a library.

The .BAT file in Listing 4 can be invoked by a command such as –

CL pgm1 pgm2 pgm3

When I want all the listings in one file so I can see what happened when all the dust has settled, I delete the Listing file, to ensure it's empty. (Les Bell please note: this is easier than creating an empty one.) The line containing ":loop" is a label. We'll get back to it in a moment.

In Listing 4, the line beginning PLI compiles a program; MS-DOS replaces the %1 with the first parameter, pgm1. Its listing is appended to the end of the Listing file; if it doesn't exist, it is created.

The procedure then cleans up my RAM disk with CHKDSK and DEL. If PLI gets syntax errors, it forgets to close some of its files. MS-DOS knows the space is allocated, but not to which file.

I then use the library maintenance utility, LIB86, to replace the version of pgm1 in the library and use DEL to delete the object file.

We then come to the SHIFT command. This makes all the parameters behave like kids (well-behaved kids, that is) queuing for icecreams; pgm1 is taken out of the queue and all the others move up one place. We then test the new parameter %1 (previously know as %2), and if it's present, the procedure jumps back to the second line, :loop.

These steps are repeated until all the programs named have been compiled; we are only limited by the maximum size of a command line. When there are no more programs to compile, the updated library is copied back onto my hard disk and all the messages are fed through MORE — to be examined when I have finished gardening and had my cup of tea! □

Energy Control!

IF YOU'VE written your own clever Batch files (and would like to offer them to the Public Domain), send them in. We'll award a box of floppies (5¼ or 3½ inch) — compliments of Energy Control, Sumner Qld. — to the best of those we publish. □

Encyclopaedia of Batch File Programming

FOR THOSE interested in batch files, Les Bell's Encyclopaedia of Batch File Programming appeared in our December '86, and January '87 issues. These articles are also available on our Bulletin Board. □

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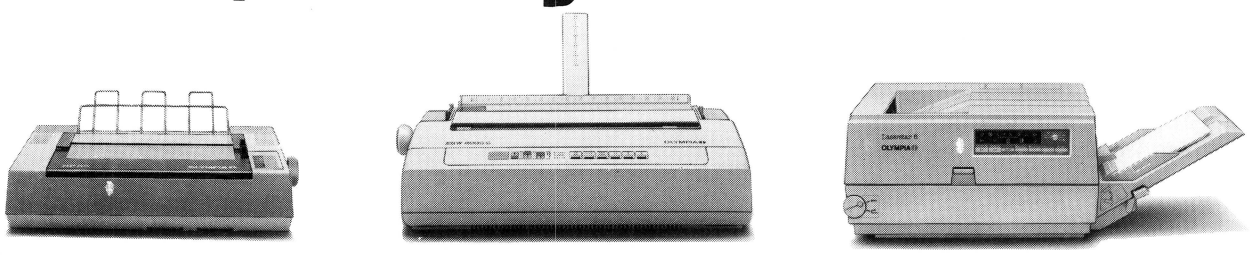

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LARRY LEWIS

THE PROPHET SPEAKS

HELLO AND WELCOME. First off this month, some clarification — the PAMS listings are for everyone to use, not just sysops. To show how far this ethic is carried, Steve Withers (APC's answer to the Prophet) and I share any information we receive; we do this to benefit any of you who like to have a look around Bulletin Boards to see what you can find, or use them to help answer any niggling problems.

The State Co-ordinators in the PAMS List always have the latest version as I transfer them directly. Fido system operators should be receiving the latest listings from their Net Co-ordinators each month — that means that every Fido system in Australia should, theoretically, have the current listings for you to download.

To encourage all system operators to keep their system details up to date, *Your Computer* provides a free one year subscription (on request) to *any* system operator who supplies full details of their system to the registry. Incidentally, as I mentioned last month, YC will also be covering the expenses for maintaining the registry.

Now — the registry is updated monthly (usually the first week of each month), if you miss an update please make sure you get the next month's changes. Starting this month, I will always put the latest information up on the AUST-PAMS Fido Conference so you can see what changes I have processed.

Bear in mind that the Listing here in the magazine is always at least one month behind the current one because of the time it takes to organize printing and publication, so check your system to get the latest information. I have had a few people say things like 'I checked for the changes I sent you a week ago and it wasn't in the magazine' — be reasonable, the article you are reading now was written in August (!) which is not unusual for a magazine (get the picture?).

The Australian Pams Registry was formed to attempt to resolve the age old problem of obsolete Bulletin Board lists and that querulous *Hello?* on the other end of the line as your modem tries to connect. That's not only a waste of your time and money, but some of those poor people have continually had calls in the middle of the night, which doesn't do much for our reputation. As I mentioned, the Listing is updated regularly to keep it useful, so you usually have no excuse for waking some poor soul.

With that *proviso*, permission is granted to use the List, or part of it, so long as the release number is included and acknowledgment is given to the Registry in the form 'List compiled by the Australian PAMS Registry.'

Most Australian Fido systems carry the current list but this does not mean that the lists are Fido only, they are for everyone. Look for the listings on your favourite system and if they aren't there, ask your sysop to get them for you, otherwise call your State Co-ordinator's Board and get it from there, or try your nearest Fido system. If all else fails dial (02) 628 5222.

The PAMS Registration Form

If you have the registry file on disk, complete the form with your wordprocessor. That makes it easier to read and there's a lot less chance of mistakes. If you have to print it out, please fill it in legibly — you might be able to read it, but some of the forms I have been getting are pretty bad.

Either send the form as NetMail (not on the public conference AUST-PAMS since anyone can read it) to me at 712/606 or post it to PO Box E41, Emerton NSW 2770. You can also supply the information to one of the State Co-ordinators, listed in the 'PAMSCORD.TXT' file.

The Form

The System Name is the name of your board, but try and avoid having 'The' at the front. For example, 'The Glory Board' will be listed under 'T' *not* 'G'. Another thing to avoid is putting the name of your BBS software in the name, since you may change software later. Try and keep your name reasonably short and if it's a user group system, remember to add your region. We do have cases where user groups are known by the same name in different places.

The Board's Telephone Number — after you've filled it in, check it about 100 times — a few wrong numbers have gotten into the list, most of the time it's my fault, but it's often wrong on the form.

Online Sysop Name is the name you are generally know to your users by — Charles Willy might like to be Chuck Willy on his system. It's just your usual signature name.

Machine, Operating System, and BBS Software are just for prospective users' information — keep it short (very short): for machine, just the type/style (IBM XT, Apple IIe); for operating system the same — something like MS-DOS, LDOS, and CP/M80 are enough.

The BBS Software: I get some that say 'Opus/Seadog/Brinkers & Barf' — Opus, is all we want, in this case.

Hours of Operation: 24 hours or the times (in military time, 2400 style) that the system is available. If you are one of those systems that are available from 0900-1000 Mon & Tue, 0100-2200 Thur, don't be surprised if we are a bit unimpressed.

Modem type doesn't mean the brand, but the speeds (in CCITT & Bell) V21, V23, V22, V22bis, V23ORG (Back channel 1200 instead of 75), Bell 103, & Bell 212, or others, like the Trailblazer.

User Access — you have the choices of Member (full access), Registered User (registration required), Public (open to all), Visitor (available to most functions), and Limited Visitor (limited visitor access available). You can not be all of the above!

The dreaded Other Information consists of things like packet radio information (see AMPAK in the Qld list). We *don't* want to have your latest system developments.

Fido Address — If you are part of the Fido network, make sure you put this information in — I don't reference the nodelist.

Confidential Information is for the registry to use. The reason for getting this information is so that we (the co-ordinators in each state or me) can get in touch with you if we get a report about problems with your system. All we ask is your address and telephone number (*voice line, please* - the after hours one is the most important, since most of us work during the day and do all this at night. And don't forget your postcode.

Baud information:

V21 — 300 Tx/300 Rx CCITT
V22 — 1200 Tx/1200 Rx CCITT
V22bis — 2400 Tx/2400 Rx CCITT
V23 — 1200 Tx/75 Rx CCITT
V23ORG — 75 Tx/1200 Rx CCITT V23 set to originate
B103 — 300 Tx/300 Rx Bell (US)
B212 — 1200 Tx/1200 Rx Bell (US)

Unless it's otherwise shown all systems are assumed to be 8 bit bytes, 1 stop bit, no parity, V21.

Christensen Protocol

The Christensen file transfer protocol (also called Modem and Xmodem) has been around for quite a few years now and like many things from the past, it's veiled in mystery and misunderstood by many.

The protocol sends data in 128 byte blocks within sequentially numbered packets. Each packet includes a packet header, the data, and a checksum of the packet (excluding the checksum itself which is sent as a separate byte after the 128 byte block). As the receiving computer stores the incoming data in its memory, it performs its own checksum of the packet, then compares it with that in the packet. A successful comparison means that all of the information was sent correctly and the receiving computer acknowledges this by sending an ACK (ASCII for Acknowledge Hex 06) to the sending computer. If the comparison fails, the receiving computer tells the sender to resend the packet by sending a NAK (ASCII for Negative Acknowledge Hex 15).

When a file transfer is initiated there is a possible problem in that the sending computer will wait for the receiving computer and vice versa, which would mean that you get nowhere at all! What happens is that the receiving computer sends a NAK to the sender to initiate the transfer; if that doesn't happen, the sending computer starts transmitting the first block after 10 seconds. This consists of a SOH (ASCII for Start of Heading, Hex 01), the block number, and the two's complement of the block number, then the 128 bytes of data followed by the checksum (132 bytes all up) — see Figure a).

This process continues with the next packet of information. What happens when the receiving computer sends a NAK? Simply, the sender transmits it again (just like when someone says 'Beg your pardon?' when you're talking — see Figure b). What happens if the sending computer doesn't 'see' the ACK/NAK that the receiver sends? Well, after 10 seconds it will resend the packet; the receiving computer knows it already has that packet and just sends an ACK when the packet ends — all fixed!

How does the receiver know what packet it's getting? The block number is incremented by one for each packet sent and the receiver also adds the SOH, Block Number, and the two's complement of the block number and it should get zero (for example 01 [SOH] + 01 + FE is 00) — so there is a double check of the block number, in addition to the check on the whole packet.

Normal completion of a file transfer is when the sending computer transmits an EOT (ASCII for End of Transmission Hex 04), the receiving computer then sends a confirmatory ACK — see Figure c), if the EOT is lost then the receiver will continue to wait for the next block, sending NAKs every 10 seconds; after 10 NAKs, it'll give up and time out.

One thing that is often overlooked is that the receiving computer must be capable of receiving the entire packet at the full speed of the communication link; if it can't, this can cause problems at high speeds. □

```
Receiving Computer
----/NAK/----------------------/ACK/------------------------
     15H                          06H


Sending Computer
-------/SOH/BLK#/BLK2/DATA/CSUM/---/SOH/BLK#/BLK2/DATA/.....
        01H 01H  FEH  .... ddH      01H 02H  FDH  ....
```

Figure a) *Packet Organisation and Block Numbering.*

```
Receiving Computer
-----/ACK/----------------------/NAK/------------------------
      06H                          15H


Sending Computer
CSUM/---/SOH/BLK#/BLK2/DATA/CSUM/---/SOH/BLK#/BLK2/DATA/.....
         01H 03H  FCH  .... ddH      01H 03H  FCH  ....
```

Figure b) *'Beg your pardon?'*

```
Receiving Computer
-----/ACK/---/ACK/ Back to command prompt
      06H     06H


Sending Computer
CSUM/---/EOT/---/ Back to command prompt
         04H
```

Figure c) *End of file sequence.*

NEW SOUTH WALES

NSW Contact:
Prophet TBBS (02) 6285222
FidoNet [712/606]

***** AMENDED *****
ABCOM
Sysop: Ben Sharif
FIDO*net*: [712/304]
Phone: (047) 364165
Baud: V21.V22.V22bis.V23
Access: Mem.VA
Computer: IBM XT
DOS: PCDOS
BBS*oftware*: Fido

ACE (NSW) BBS
Sysop: Larry O'Keefe
Phone: (02) 5292059
Baud: V21

Access: Mem.Reg.LVA
Computer: Atari
DOS: Atari
BBS*oftware*: Michtron

***** AMENDED *****
Alpha Juno BBS
Sysop: Kevin Withnall
FIDO*net*: [620/701]
Phone: (02) 7741543
Baud: V21.V22.V22bis

***** AMENDED *****
Amstrad ABBS
Sysop: Riccay Schmahl
FIDO*net*: [711/903]
Phone: (02) 9812966
Baud: V21.V22.V22bis.V23
Access: Reg.VA
Computer: Amstrad PC1512
DOS: MSDOS 3.2

BBS*oftware*: Opus

Apple Users Group BBS
Sysop: Matthew Barnes & Andrew Riley
Phone: (02) 4987084
Baud: V21.V22.V22bis.V23
Access: Mem.VA

***** AMENDED *****
ArcoTel BBS
Sysop: Alex Szx
FIDO*net*: [620/601]
Phone: (02) 6833956
Baud: V21.V22.V22bis.V23
Access: Mem.VA
BBS*oftware*: Opus

***** AMENDED *****
AUGUR TBBS
Sysop: Mark James
Phone: (02) 6614739

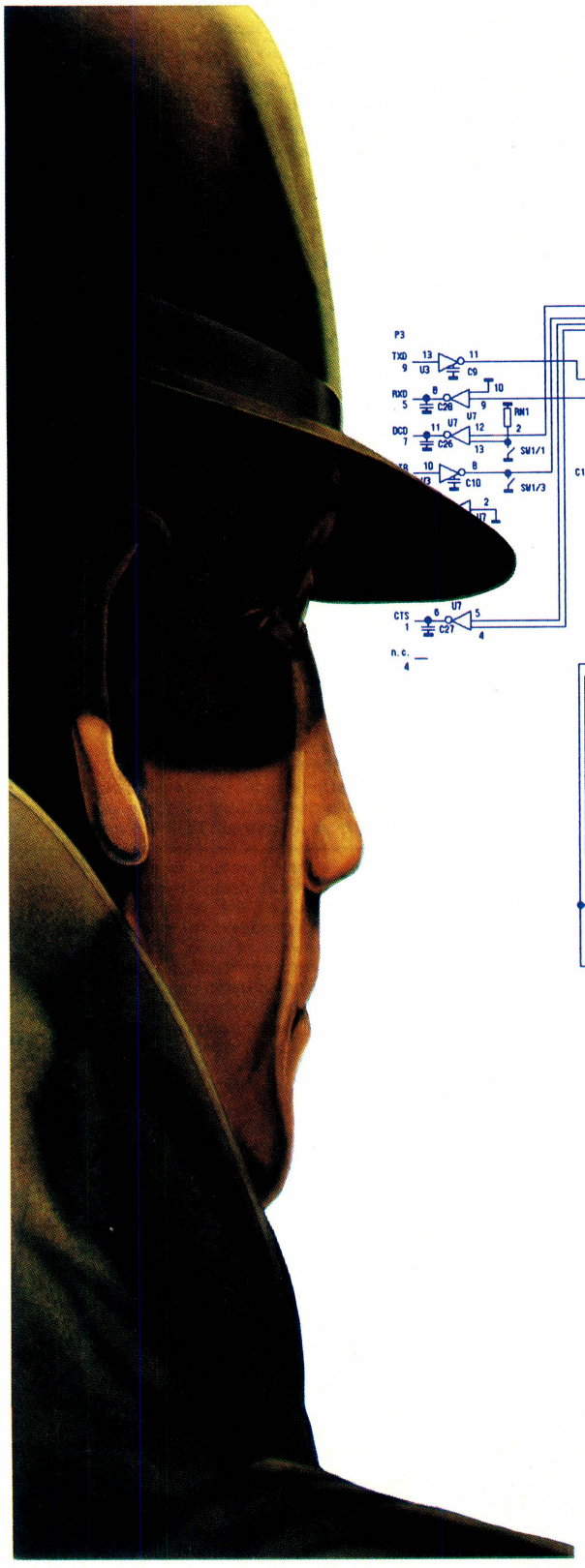
Baud: V21.V22.V22bis.V23
Access: Reg.VA
Computer: PC Clone
DOS: PC
BBS*oftware*: TBBS 2.0m

Ausborne (Osborne) RCPM
Sysop: Daniel Moran
Phone: (02) 4397072
Access: Mem.VA

Australian Pick User's BBS
Sysop: Kurt Johannessen
Phone: (02) 6318603
Baud: V21.V22.V22bis.V23
Access: Reg.VA

BeeHive BBS
Sysop: Paul Pinches
Phone: (02) 5205181
Baud: V21.V22
Access: Mem.Reg

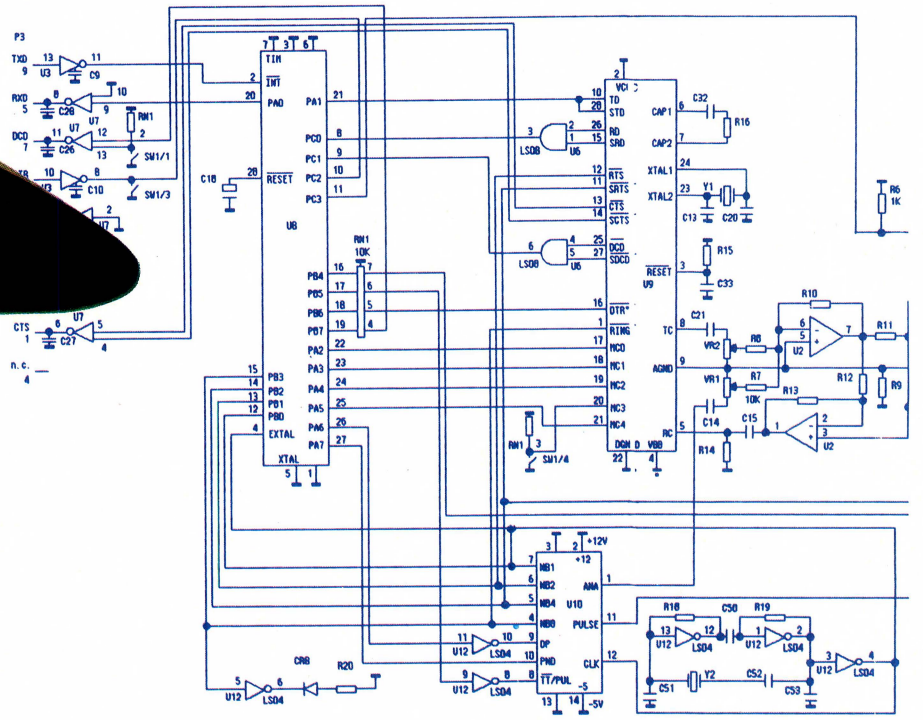
THE CIA WOULD LOVE TO GET THEIR HANDS ON THESE.



If the CIA was in the market for new modems we don't believe they could go past NetComm's new DataLock® models.

We don't believe they could get past DataLock either. Because they're designed to put a security lock on vital information.

DataLock modems are secure. Passwords check the credentials of incoming callers to make sure you know who is accessing your data. Two levels of protection, using the powerful Data Encryption Standard, secure valuable data from interception in the telephone system.



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We have to admit, even the CIA will be impressed with the new DataLock modems.

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DOS: CP/M80
BBS*oftware*: ROS 4.0

Bert BBS (Videotext)
Phone: (02) 2110855
Baud: V23
Access: Public

Blackboard BBS
Sysop: Will Black
Phone: (02) 5261343
Baud: V21
Access: Reg.VA

Books BBS
Sysop: Chris Ruwoldt
FIDO*net*: [712/503]
Phone: (02) 5255781
Baud: V21.V22.V22bis.V23
Access: Public
Computer: IBMXT Compat
DOS: MSDOS
BBS*oftware*: OPUS

Club Amiga BBS
Sysop: Ross Kellaway
Phone: (02) 5216338
Baud: V21.V22.B103.B212
Access: Mem.LVA
Computer: Amiga 1000
BBS*oftware*: BBSPC

*** AMENDED ***
Club Mac BBS
Sysop: Jason Haines
Phone: (02) 731992
Baud: V21.V22.V22bis.V23
Access: Mem.LVA
Computer: Macintosh
DOS: HSS
BBS*oftware*: Red Wyder

*** AMENDED ***
Club80 RTRS
Sysop: Michael Cooper
Phone: (02) 3322494
Baud: V21.V23
Access: Mem.VA
Computer: TRS80 Model 4
DOS: LDOS 5.3

*** AMENDED ***
CoCo Connection
Sysop: Barry Darnton
Phone: (02) 6183591
Baud: V21.V22.V22bis
Access: Reg.LVA

Comet C64 BBS
Sysop: Eric Davis
Phone: (02) 5997342
Access: Mem.VA
Info: Requires RTERM

*** OFFLINE ***
Comm Link KBBS

*** ONLINE ***
CommLink BBS
Sysop: Jeff Campbell
Phone: (043) 413135
Baud: V21
Access: Mem.Reg.VA
Computer: Commodore
DOS: Basic IEEE
BBS*oftware*: Comtel

*** AMENDED ***
Commodore C64 BBS
Sysop: Graham Lee
Phone: (02) 6642334
Baud: V21.V23
Access: Mem.VA
Computer: C64
BBS*oftware*: KBBS

*** AMENDED ***
Commodore KBBS
Sysop: Warren Hillsdon
Phone: (02) 5229507
Baud: V21.V22.V23
Access: Mem.VA
Computer: C64
BBS*oftware*: KBBS

Computer Connection
Sysop: Hamish Bowly
Phone: (02) 572463
Access: Reg.LVA

*** OFFLINE ***
Contact BBS

CSACE BBS
Sysop: Larry O'Keefe
Phone: (02) 5298249
Baud: V21
Access: Mem.LVA
Computer: Atari 800
DOS: Atari
BBS*oftware*: AMIS V 36
Info: Atari protocol only, logon delay answering machine for 30 seconds then BBS

*** OFFLINE ***
Datacom KBBS

Dick Smiths RIBM
Sysop: Mark Grimmond
Phone: (02) 8872276
Access: Public

*** AMENDED ***
Dingo's Den BBS
Sysop: David Harvey
FIDO*net*: [711/802]
Phone: (02) 8882203
Baud: V21.V22.V22bis.V23
Access: Reg.LVA
Computer: XT Clone
DOS: MSDOS
BBS*oftware*: Opus

Dymock's Computer Bookline
Sysop: Bob Richards
Phone: (02) 2323061
Baud: V21.V22.V23
Access: Reg.VA
Hours: Weekdays: 1000 0830
Weekends: 24 Hours
Computer: IBM XT
DOS: PCDOS
BBS*oftware*: Fido

*** AMENDED ***
Eagle's Nest C64 BBS
Sysop: Philip Dean
Phone: (02) 4510535
Baud: V21
Access: Mem.VA
Computer: C64
BBS*oftware*: KBBS

Fantasy C64
Phone: (02) 935225
Access: Reg.VA
Hours: 2100 0730 Daily

*** AMENDED ***
Fido Australia
Sysop: B & L Gatenby & R Morgan
FIDO*net*: [620/901]
Phone: (02) 9593712
Baud: V21.V22.V22bis
BBS*oftware*: Fido

*** AMENDED ***
First Nice MIDILine
Sysop: Andrew Khoo
FIDO*net*: [711/805]
Phone: (02) 8684347
Baud: V22.V22bis.B103
Access: public
Computer: IBM XT
DOS: PCDOS 3.2
BBS*oftware*: Opus
Info: Level 3 MNP Supported

Galactic Federation
Phone: (02) 2335040

Galaxy RAPL
Sysop: Chris Nelligan
Phone: (02) 8753943
Baud: V21
Access: Mem.LVA

Griffith Computer Association
Sysop: Greg Bodger
Phone: (069) 627272
Baud: V21.V23
Access: Public
Info: * RING BACK *

*** NEW System ***
HighTech
Sysop: Ross Wheeler
FIDO*net*: [712/201]
Phone: (060) 251813
Baud:
V21.V22.V22bis.V23.B103.B212
Access: Reg.LVA
Computer: XT Clone
DOS: MSDOS 3.1
BBS*oftware*: Opus
Info: 147.575 MHz VK2DGY (Radio) 1200 bps Amateur Packet Radio

*** AMENDED ***
Illwarra C64 BBS
Sysop: John Simon
Phone: (042) 618230
Access: Reg.VA
Computer: C64
BBS*oftware*: KBBS

InfoCentre BBS
Sysop: Paris Radio
Phone: (02) 3449511
Access: Mem.VA

*** OFFLINE ***
InterTan FIDO

Manly BBS
Sysop: Chris Patten
Phone: (02) 9776820
Access: Reg.VA
Info: C64 Needs Rterm or Ultraterm

Micro Design Lab
Sysop: Kevin Lowton & Lindsay Gorrie
Phone: (02) 6630151
Access: Reg.VA

Micro Mart C Users
Sysop: Rick Polito
FIDO*net*: [712/501]
Phone: (02) 5603607
Baud: V21.V22.V22bis.V23
Access: Reg.LVA
Computer: DECA AT
DOS: MSDOS 3.1
BBS*oftware*: Opus
Info: C & dBase User System

*** AMENDED ***
Microlink BBS
Sysop: Tony Callahan
Phone: (02) 4777509
Baud: V21.V22
Access: Reg
Computer: C64
BBS*oftware*: BBS.64.4.2

Mudgee Connection
Sysop: George Rhedey
Phone: (063) 721898
Baud: V21.V22.V23
Access: Public
Hours: 2100 0700

*** OFFLINE ***
NABAProphet BBS

Nebula BBS
Sysop: Sean Craig
Phone: (02) 4072729
Baud: V21
Access: Mem.VA

*** AMENDED ***
Newcastle Micro Club RCPM
Sysop: Tony Nicholson
Phone: (049) 685385
Baud: V21.V22.V22bis.V23
Access: Mem.VA
Hours: Weekdays: 1700 0830
Weekends: 24 Hours
Computer: Ferguson Big Board
DOS: CP/M80
BBS*oftware*: ROS

Omega Line
Sysop: Geoff Arthur
FIDO*net*: [59/12]
Phone: (02) 4578281
Baud: V21.V22.V23
Access: Public
BBS*oftware*: Opus

Omen RTRS
Sysop: Ted Romer
Phone: (02) 4982495
Baud: V21.V23
Access: Public
Hours: Weekdays: 1630 0900
Weekends: 24 Hours

Palantir C64 BBS
Sysop: Steve Sharp
Phone: (02) 4516576
Baud: V21.V22.V23
Access: Reg.VA

*** AMENDED ***
Paragon Bulletin Board
Sysop: Jennifer Allen
FIDO*net*: [712/502]
Phone: (02) 5977007
Baud: V21.V22.V22bis.V23
Access: Reg.VA
BBS*oftware*: TBBS

*** AMENDED ***
Phantomland
Sysop: Bob James
Phone: (02) 3997716
Access: Reg.VA
Computer: C64
BBS*oftware*: KBBS

Playground BeeBS
Sysop: Brett Selwood
Phone: (02) 539688
Baud: V21.V22.V23
Access: Mem.Reg.LVA

*** AMENDED ***

Prophet TBBS
Sysop: Larry Lewis
FIDOnet: [712/600]
Phone: (02) 6285222
Baud: V21.V22.V22bis.V23
Access: Public
Computer: XT Clone
DOS: PCDOS 3.2
BBSoftware: TBBS 2.0m

RCOM C64 BBS
Sysop: Simon Finch
Phone: (02) 6671930
Access: Reg.VA
Info: Needs RTERM on C64
*** OFFLINE ***

Realtors
*** OFFLINE ***

Renegade

RUNX
Sysop: Mark Webster
Phone: (02) 4872533
Baud: V21
Access: Mem.LVA
Computer: PDP11/73
DOS: Xenix
Info: 3 Lines
*** STATUS UNKNOWN ***

Samilon

SciFi BBS
Sysop: Greg Hope
Phone: (02) 6464865
Baud: V21.V23
Access: Public
*** AMENDED ***

Sentry
Sysop: Trev Roydhouse
FIDOnet: [711/401]
Phone: (02) 4284687
Baud: V21.V22.V22bis.V23
Access: Mem.VA
Computer: XTClone
BBSoftware: Opus

Shore BBS
Phone: (02) 9593936
Baud: V21
Access: Reg.VA

SMUG Bee RCP/M
Sysop: Bob Fryer
Phone: (02) 6077584
Baud: V21.V22.V23
Access: Reg.VA
Computer: MicroBee

Software Connection
Sysop: Graeme Nichols
FIDOnet: [711/404]
Phone: (02) 4512954
Baud: V21.V22.V22bis.V23
Access: Reg.VA
*** AMENDED ***

Software Tools
Sysop: Bill Bolton
FIDOnet: [711/403]
Phone: (02) 4492618
Baud: V22.V22bis.TrailBlazer
Access: Reg.VA
Computer: Sharp 7501 AT
DOS: PCDOS
BBSoftware: Opus
*** AMENDED ***

Sorcerer Users Group
Sysop: John Cepak
Phone: (02) 6268020
Baud: V21.V22
Access: Mem.VA
BBSoftware: Opus

Sydney PC Users RIBM
Sysop: Geoff May
Phone: (02) 2389034
Baud: V21
Access: Mem.VA

Tachyonics
Sysop: Richard Lenz
FIDOnet: [620/402]
Phone: (02) 4382682
Access: Reg.VA
Hours: 2200 0600 Daily

Tesseract RCPM
Sysop: Noel Levy
Phone: (02) 5580129
Baud: V21.V22.V22bis.V23
Access: Reg.VA

Texpac Electronic Magazine
Phone: (02) 3191009
Access: Mem.LVA

The Bulletin Board
Sysop: Brian Houlahan
Phone: (02) 803681
Baud: V21
Access: Reg.VA

The Galactic Federation
Sysop: Kevin Gladwin
Phone: (02) 2335040
Baud: V21.V22.V22bis.V23
Hours: Weekdays: 1700 0900
Weekends: 24 Hours
Computer: IBM Compat

The Idiom
Sysop: Stephen Beeby
Phone: (02) 4384060
Baud: V22.V22bis
Access: Reg.VA

TNT Shuttle
Sysop: Paul Birch
Phone: (02) 2812476
Baud:
V21.V22.V22bis.V23.B103.B212
Access: Reg.LVA
Computer: IBM System/2
DOS: OS2
BBSoftware: RBBS V151a

Warringah BBS
Sysop: Brian Wilde
FIDOnet: [711/902]
Phone: (02) 9770323
Baud: V21.V22.V23.B103.B212
Access: Mem.VA
BBSoftware: Opus

***Your Computer* BBS**
Sysop: Andy Farkas
FIDOnet: [712/622]
Phone: (02) 669 1385
Baud:
V21.V22.V22bis.V23.B103.B212
Access: Reg.LVA
Computer: President AT
DOS: DOS 3.2
BBSoftware: Opus

Zeta RTRS
Sysop: Nick Andrew
FIDOnet: [712/602]
Phone: (02) 6274177
Baud:
V21.V22.V22bis.V23.B103.B212
Access: Mem.VA

ACT

ACT Contact:
PC Exchange RIBM (062) 581406
FidoNet [626/220]
*** AMENDED ***

ACT Amiga BBS (Line 1)
Sysop: Mike HurstMeyers
FIDOnet: [626/218]
Phone: (062) 591137
Baud: V21.V22.V22bis.V23.B103.B212
Access: Reg.LVA
Computer: IBM Clone
DOS: PCDOS 3.1
BBSoftware: Opus
*** NEW System ***

ACT Amiga BBS (Line 2)
Sysop: Mike HurstMeyers
Phone: (062) 591440
Baud: V22.V22bis.B103.B212
Access: Reg.LVA
Computer: IBM Clone
DOS: PCDOS 3.1
BBSoftware: Opus

Canberra KBBS
Sysop: GEO
Phone: (062) 880412
Baud: V21
Access: Mem.Reg.LVA
Computer: Commodore 64
BBSoftware: KBBS

Commodore Users Group BBS
Sysop: James Hacker
Phone: (062) 810847

Datalink
Sysop: Fred
Phone: (062) 991543
Baud: V21
Access: Public

MICSIG
Sysop: Ross Boys
Phone: (062) 851026
Baud: V21.V22.V23
Access: Public

PC Exchange RIBM
Sysop: Phil Harding
FIDOnet: [626/220]
Phone: (062) 581406
Baud: V21.V22.V22bis.V23
Access: Mem.LVA

PCUG Bulletin Board
Sysop: Alan Salmon
FIDOnet: [626/229]
Phone: (062) 591244
Baud: V21.V22.V22bis.V23
Access: Mem.LVA
Computer: IBM PCAT
DOS: PCDOS 3.1
BBSoftware: Opus
Info: Access free to members of PCUG $15pa incl monthly newsletter
*** AMENDED ***

Pharmacy BBS
Sysop: Michael Pye
FIDOnet: [626/223]
Phone: (062) 923875
Baud: V21.V22.V22bis.V23.B103.B212
Access: Reg.Public
Computer: Kaypro 16
DOS: MSDOS
BBSoftware: Opus
*** OFFLINE ***

The Gateway AIBBS

NORTHERN TERRITORY

NT Contact:
The Electronic Oracle (08) 2606222

Outback RCPM
Sysop: Phil Sampson
Phone: (089) 277111

PAPUA NEW GUINEA

PNG One
Sysop: Daltron
FIDOnet: [710/11]
Phone: (675) 256984
Baud:
V21.V22.V22bis.V23.B103.B212

QUEENSLAND

Queensland Contact:
AMPAK RCP/M (07) 2637070
*** AMENDED ***

AMPAK PBBS/RCPM
Sysop: Brian Wendt & John Bews
Phone: (07) 2637070
Baud:
V21.V22.V22bis.V23.B103.B212
Access: Mem.Public
Computer: AMPRO
DOS: CP/M80
BBSoftware: PBBS
Info: 147.600 MHz VK4KJB1 (Radio) 1200 bps Amateur Packet Radio

AppleQ RABBS
Sysop: Graham Black
Phone: (07) 2846145
Baud:
V21.V22.V22bis.V23.B103.B212
Access: Mem
Computer: Apple //e
BBSoftware: GBBS

Brisbane Commodore User Group
Sysop: Colin Canfield
Phone: (07) 3956725
Baud: V21.V22.V23
Access: Mem.VA

Brisbane Experimental RCPM
Sysop: Rick Dalley
Phone: (07) 3951809
Access: Mem.VA
Info: User Works Node 4

Brisbane MicroBee User Group
Sysop: Graham Scott
Phone: (07) 384833
Access: Mem.VA
Info: User Works Node 2

Cairns & District IBBS
Sysop: Neil Barker
Phone: (070) 511360

COM ONE
Phone: (057) 625150
Baud: V21
Access: Public
*** AMENDED ***

Comtel BBS
Sysop: Warren Mason
Phone: (077) 753636
Baud: V21
Access: Mem.VA
Computer: Commodore
DOS: Basic IEEE
BBSoftware: Comtel

CORPLEX
Sysop: Scott Pierce, Lloyd Ernst
Phone: (07) 3501300
Hours: Weekdays: 1800 0600
Weekends: 24 Hours

Cynthia
Sysop: Martin Josephson
Phone: (07) 2621269
Educational RCPM

Electric Dreams BBS
Sysop: Joe Altoff
Phone: (07) 3991322
Baud: V21.V23
Access: Mem.VA
Info: User Works Node 5

Focus BBS
Phone: (07) 2855814
Baud: V21.V23

Futex C64
Sysop: Paul Salanitri
Phone: (07) 2832034

HiTech CBBS
Sysop: Clyde Smith-Stubbs
Phone: (07) 386872
Hotline

Mackay High School BBS
Sysop: Bob Chalmers
Phone: (079) 514815
Access: Public
Hours: Weekdays: 1600 0730
Weekends: 24 Hours

MarlinCoast BBS
Sysop: Ray Chalmers
FIDO*net*: |640/501|
Phone: (070) 517220
Baud: V21.V22.V22bis.V23
Access: Reg.VA
Computer: Clevland 286
BBS*oftware*: Opus

*** Status Changed ***
MicroLYNX BBS

Ozforum
Sysop: Greg Noonan & Dirk Vanbruggen
Phone: (07) 2094294
Baud: V21
Access: Reg
Hours: Weekdays: 1700 0700
Weekends: 24 Hours

Rapple Q
Sysop: T Sweetser G Black V Crosdale
Phone: (07) 2846145
Baud: V21.V22.V22bisV23

*** AMENDED ***
Redcliffe Library
Sysop: Andrew Osborne
FIDO*net*: |640/203|
Phone: (07) 2830315
Baud: V21.V22.V22bis.V23
Access: Reg.VA
Hours: Weekdays: After Hours
Weekends: 24 Hours
Computer: IBM Compatible
BBS*oftware*: Fido

*** AMENDED ***
SoftTech
Sysop: Alwyn Smith
FIDO*net*: |640/201|
Phone: (07) 2036864
Baud: V21.V22.V22bis.V23.B103.B212
Access: Public

Software 80 BBS
Sysop: Tony Melius
Phone: (07) 3697103
Baud: V21.V23
Access: Reg.VA
Hours: Weekdays: 1930 0800
Sat 1430 Mon 0800

*** AMENDED ***
Sun City Opus
Sysop: Tony Smith
FIDO*net*: |640/702|
Phone: (077) 741552
Baud: V21.V22.V22bis.V23
Access: Mem.LVA
Computer: IBM Clone
DOS: MSDOS
BBS*oftware*: Opus

SVIRBBS
Sysop: Brendan Pratt
Phone: (075) 463252
Baud: V21
Access: Mem.Reg
Computer: Spectravideo
DOS: CP/M80
BBS*oftware*: TurboBBS
Info: User works node 7

The Focus BBS
Sysop: Geoff Ryan
Phone: (07) 2855814
Baud: V21.V23
Access: Mem.VA
Info: User Works Node 6

Tommorrowland RMSD
Sysop: Darrell Lewis
FIDO*net*: |713/301|
Phone: (07) 3942300
Toowoomba Computer Centre

*** NEW System ***
Townsville RBBS
Info: Now called Sun City Opus

SOUTH AUSTRALIA

SA Contact:
The Electronic Oracle (08) 2606222

Adelaide Micro User Group BBS
Sysop: Richard Newcombe
Phone: (08) 2712043
Baud: V21
Access: Reg.LVA

Adelaide MicroBee BBS
Sysop: Ron Carson & Mark Hammond
Phone: (08) 2126569
Hours: Mon Thu 1800 0800
Fri 2100 Mon 0830

Cadzow Fido
Sysop: Scott Cadzow
Phone: (08) 793091
Baud: V21.V23
Access: Public

Multiple System BBS
Sysop: Danny Vozzo
Phone: (08) 2555116
Baud: V21
Access: Reg.LVA

Nexus Education Dept BBS
Phone: (08) 2432477
Access: Reg

Omen V
Sysop: Richard Siggs
Phone: (08) 3567939
Access: Reg.LVA

SA Commodore BBS
Sysop: Peter Hinton
Phone: (08) 3710435
Access: Reg.VA
Info: Commodore only

The Electronic Oracle IBBS
Sysop: Don Crago & Grayham Smith
Phone: (08) 2606222
Baud: V21.V22.V22bis.V23
Access: Mem.LVA
Computer: President PC
DOS: MSDOS
BBS*oftware*: IBBS
Info: M ultiuser

The IDN Board
Sysop: Dave Winfield
Phone: (08) 3522252
Baud: V21.V22
Access: Reg.VA
Hours: Weekdays: 1730 0900
Weekends: 24 Hours

Trivia BBS
Sysop: Daron Ryan
Phone: (08) 3770049
Baud: V21
Hours: Weekdays: 1800 0800
Sat 1400 Mon 0800

TASMANIA

Tasmanian Contact:
Tassie Bread Board System (003) 264248

Hobart Users BBS
Sysop: Denise Webber
Phone: (002) 494405
Baud: V21
Access: Mem.LVA
Hours: Weekdays: 1500 0700
Weekends: 24 Hours

Tassie Bread Board System
Sysop: Ian Campbell
Phone: (003) 264248
Baud: V21.V22.V22bis.V23
Access: Mem.LVA
Computer: Kaypro PC
DOS: MSDOS 3.2
BBS*oftware*: TBBS

VICTORIA

Victorian Contact:
The National Fido BBS (03) 256904

*** AMENDED ***
ABACUS RCPM
Sysop: Maurice Copeland
Phone: (057) 831964
Baud: V21.V22.V23.V23ORG
Access: Public
Hours: Weekdays: 0812 1623
Weekends: 24 Hours

ABE
Sysop: Richard Gardiner
Phone: (03) 2883599
Baud: V21.V22
Access: Public

*** AMENDED ***
AMNET RTDOS
Sysop: Peter Hallgarten
Phone: (03) 3667055
Baud: V21.V23
Access: Mem.VA
Computer: Pulsar 8000
DOS: TurboDos
BBS*oftware*: RBBS4
Info: 147.600 Mhz VK3RPA (Radio) 1200 bps Amateur Packet Radio

AmigaLink
Sysop: Bohdan Ferens
Phone: (03) 7923918
Baud: V21.V22.V23

Angler's Den
Phone: (03) 8764118
Baud: V21.V22.V23
Hours: Weekdays: 1800
Weekends: 24*Hours*

Apple Hackers BBS
Sysop: John Forbes
Phone: (03) 7621582

Atlantis RBBSPC
Sysop: John Edwards
Phone: (03) 2776824
Access: Public

AUSOM System #1
Sysop: Grahame Willis
Phone: (03) 8771990
Access: Public

AUSOM System #2
Phone: (03) 4359152
Access: Public

Basic Users Group RCPM
Sysop: Sol Green
Phone: (03) 5000562 *Hours*: Mon Sat 0000 1800
Sun 0000 1200

Bayside
Sysop: Paddy Plebanowicz
FIDO*net*: |630/313|
Phone: (052) 514110
Baud: V21.V22.V23
Access: Reg.Public
Computer: IBM Clone
BBS*oftware*: Opus

C64 BBS
Sysop: Alan Miles
Phone: (03) 4894555
Access: Public

Castle Mania
Sysop: Mike Purdy
Phone: (03) 3795123
Hours: 0700 0000 Daily

Colour C64 BBS
Sysop: Alard Eales
Phone: (03) 5792147
Hours: 2300 0800 Daily

Commodore Board
Sysop: Keith Jarvis *Phone*: (03) 8751023
Access: Public
Hours: 2200 0800 Daily

Custom Programming IBBS
Sysop: Allan Williamson

Phone: (03) 8483331
Baud: V21
Access: Public

Cycom
Sysop: Darren Hayson
FIDO*net*: |630/311|
Phone: (03) 7271018
Baud: V21.V22.V23
Hours: Weekdays: 1800 0600
Weekends: 24 Hours

*** AMENDED ***
DECUS
Sysop: Peter Hill
FIDO*net*: |630/310|
Phone: (03) 639133
Baud: V21.V22.V22bis.V23
Access: Mem.VA

Devil's Playground
Sysop: Nick Todd
Phone: (03) 5532728
Baud: V21

Down Under Software #1
Sysop: Greg Hudson
FIDO*net*: |630/307|
Phone: (03) 4298079
Baud: V21.V22.V22bis.V23

Down Under Software #2
Sysop: Greg Hudson
FIDO*net*: |630/306|
Phone: (03) 4295819
Baud: V21.V22.V22bis.V23

Eastcomm BBS
Sysop: Maurice Halkier
FIDO*net*: |630/312|
Phone: (03) 2880775
Baud: V21.V22.V23.V23ORG
Access: Reg.VA
Computer: PCAT Clone
DOS: PCDOS 3.1
BBS*oftware*: Opus

*** AMENDED ***
Eastwood R/ZSYS & PBBS
S *ysop*: Mick Stock
Phone: (03) 8704623
Baud: V21.V22.V23
Access: Mem.VA
Hours: V21 0000 1000
DOS: ZRDOS
BBS*oftware*: ZCPR3

Electronic CrossOver BBS
Sysop: Stephen Paddon
Phone: (03) 3675816
Baud: V21

Further Regions BBS
Sysop: Chris Brunton
Phone: (03) 7253732
Baud: V21

Gippsland MailBus
Sysop: Max Moore
Phone: (051) 277245

Harbourd64
Sysop: David Harbour
Phone: (03) 5872504
Access: Mem.LVA

Macboard BBS
Phone: (03) 4359152
Baud: V21.V22
Access: Public

Maxitel BBS
Sysop: Mark Micallef
Phone: (03) 8826188
Access: Public

MBUG Australia Inc
Sysop: Mike Thompson
Phone: (03) 8821571
Baud: V21.V23
Access: Mem

*** NEW System ***
Melbourne Atari BBS
Phone: (03) 3915927
Hours: Weekends ONLY

Melbourne Data Exchange
Sysop: Robert Broomhead
FIDO*net*: |631/321|
Phone: (03) 5616556
Baud: V21.V22
Access: Reg.VA
Info: Supports ANSI graphics only

Micom BBS
Sysop: Peter Jetson
Phone: (03) 7625088

MICROLINK
Sysop: Mike Thompson
Phone: (03) 2330230
Baud: V21.V23
Access: Public

Midnight Frog BBS
Sysop: Scott Enwright
FIDO*net*: |630/303|
Phone: (03) 5961589
Baud: V21.V22.V22bis.V23
Access: Public

Mike's Bullboard
Sysop: Mike Lewis
Phone: (03) 4596439
Baud: V21

MINNET BBS
Sysop: Max Fields
Phone: (054) 413013
Access: Public

*** NEW System ***
MouseText
Sysop: Glen McBride
Phone: (059) 425528
Baud: V23
Hours: 1000 2200
BBS*oftware*: Videotext
Info: Videotext Compatible ONLY

Omega BBS
Sysop: Mark Gregson
Phone: (052) 221670
Hours: 1900 0200 Daily

Omen IV RTRS
Sysop: Philip West
Phone: (03) 8464034
Access: Public

Osborne Australian BB
Sysop: Craig Orr
Phone: (03) 5293519
Access: Reg.LVA

Outer Limits BBS
Sysop: Peter Dorell
Phone: (03) 7256650
Baud: V21

Pacific Island
Sysop: Craig Bowen
Phone: (03) 8902174

PC Connection IBBS
Sysop: Lloyd Barrett
Phone: (03) 5283750
Baud: V21.V22

*** NEW System ***
PC User BBS
Sysop: Charles Sandercock
FIDO*net*: |631/323|
Phone: (03) 8195392
Access: Public
DOS: MSDOS
BBS*oftware*: Opus

**** OFFLINE ***
PCDomain BBS

PCOasis System
Sysop: Craig Wilson
Phone: (03) 8983922

*** OFFLINE ***
Profit

Public Resource 1
Sysop: D Harvey
Phone: (03) 8782918
Baud: V22.B103
Access: Public

Public Resource 2
Sysop: D Harvey, W Clarke, R Nagy
Phone: (03) 6907220
Access: Public

Real Connection
Sysop: Carla Miller & Andrew Moore
Phone: (03) 2880331
Access: Public

Sams
Sysop: Alan Haslar
FIDO*net*: |630/305|
Phone: (03) 5631117
Baud: V21.V22.V22bis.V23
Access: Public

Sorcerer RCPM
Sysop: David Woodberry
Phone: (03) 7545081
Access: Mem.VA

Supermicros RBBS
Sysop: Richard Tolhurst
Phone: (03) 7992041
Baud: V21.V22.V23

Supermicros RBBS
Sysop: Richard Tolhurst
Phone: (03) 7992001
Baud: V21

Tardis RCPM
Sysop: Malcolm Miles
Phone: (03) 677760
Hours: Weekdays: 1800 0800
Weekends: 24 Hours

Telegraph Road BBSPC
Sysop: Craig Wilson
Phone: (03) 7436173
Baud: V21
Access: Reg.LVA

*** NEW System ***
Teletex Connection
Sysop: Darren Sapwell
Phone: (03) 4706827
Baud: V23
Hours: 0600 2200
BBS*oftware*: Videotext
Info: Videotext Compatible ONLY

Ten to One Amiga BBS
Sysop: Mike Beckett
Phone: (03) 7627961
Baud: V21

TERMICOMNET
Phone: (03) 5891692
Access: Public

*** AMENDED ***
The Deepseas BBS
Sysop: John Drinkwater
FIDO*net*: |630/308|
Phone: (03) 7629204
Baud: V21.V22.V23
Access: Public
Computer: PCXT Clone
BBS*oftware*: Opus

The InfoSource BBS
Sysop: Clement Maloney
Phone: (03) 3971165
Baud: V21.V22.V22bis.V23.B103.B212
Access: Mem.VA

The Inner Sanctum BBS
Sysop: Robert Swaab
Phone: (03) 2338346
Baud: V21
Access: Mem.VA
Hours: *Weekdays*: 1930 0730
Weekends: 24 Hours

*** OFFLINE ***
The Magic Pudding BBS

The National
Sysop: John BlackettSmith
FIDO*net*: |630/301|
Phone: (03) 256904
Access: Public

The Ultimate C64
Sysop: Mike Kabiolke
Phone: (03) 7355551
Baud: V21.V22.V22bis.V23

ThunderNet Amiga
Sysop: John Herks
Phone: (03) 7911124
Baud: V21.V22.V23
Access: Public

*** AMENDED ***
VIDEOTEXT/4000
Sysop: Luke Groeveneld
Phone: (03) 7413295
Baud: V23
Hours: 0600 2300
BBS*oftware*: Videotext
Info: Videotext Compatible ONLY

Zoist
Sysop: Bob Fletcher
Phone: (03) 4672871
Baud: V21

WESTERN AUSTRALIA

WA Contact:
Nemo Multiple BBS RAPL (09) 3701855

***** ONLINE *****
Apple BBS
Sysop: Don Pugh
Phone: (09) 3816061
Baud: V21
Access: Public
Computer: Apple II+
DOS: DOS 3.3

Atari Forever
Sysop: Ray Spencer
Phone: (09) 3423739
Access: Reg.LVA

Computex BBS
Sysop: Russell Stokes
Phone: (09) 4470522
Access: Reg.VA

Lightning BBS
Sysop: Simon Blears
FIDO*net*: [690/903]
Phone: (09) 2757900
Baud: V21.V22.V22bis.V23
Access: Reg.LVA
Computer: IBM XT Clone
DOS: MSDOS 3.1
BBS*oftware*: Opus

```
Just a few notes to help with you use the PAMSLIST information -


                          ---- Access information ----
                Mem    - Membersip required for full access, cost and
                         other details shown if available.
                Reg    - Registration required, details show if known.
                VA     - Visitor access Available to most functions.
                LVA    - Limited Visitor Access available.
                Pulic - Public board, open to all.
-------------------------------------------------------------------------
Baud information: V21     -   300 Tx /  300 Rx CCITT
                  V22     -  1200 Tx / 1200 Rx CCITT
                  V22bis    2400 Tx / 2400 Rx CCITT
                  V23     -  1200 Tx /   75 Rx CCITT
                  V23ORG  -    75 Tx / 1200 Rx CCITT V23 set to originate
                  B103    -   300 Tx /  300 Rx Bell (US)
                  B212    -  1200 Tx / 1200 Rx Bell (US)
Unless otherwise shown all systems are 8 bit bytes, 1 stop bit, no parity V21
-------------------------------------------------------------------------

                        Bulletin Board Information

Type: New System / Change

System Name: ____________________________________________________________

Short Name (11 character Max): _____________ Operating System: ___________

Board Telephone number: (____)  ____-_________

Online Sysop Name: ______________________________________________________

Machine: ___________________________    Operating System: _________________

BBS Software: _________________________

Hours of operation: 24hours / ___________________________________________

Modem Type: _________________________ [V21/23 etc]

User Access: Member / Registered User / Public / Visitor / Limited Visitor
             [Delete as required]

Other     ____________________________________________________________________
Online
Info      ____________________________________________________________________

Fido Address: [_____/_____]


                         Confidential Information

Sysop Name: ____________________________________________________________

Telephone number BH: (____)  ____-_________      AH: (____)  ____-_________

Address: ____________________________________________________________________

         ____________________________________________________________________

         ____________________________________Postcode: ____________________

Please forward changes or new listings to: Australian PAMS Co-ordinator
                                           Prophet Bulletin Board
Electronic address: BBS  (02) 628-7030     PO Box E41
                    Fido [   /   ]         Emerton NSW 2770
```

Mouse Exchange BBS
Sysop: Leonard Hollings
FIDO*net*: [690/901]
Phone: (09) 3396890
Baud: V21.V23
Access: Public

***** NEW System *****
Murdoch University ESBBS1
Sysop: Roger Atkinson
Phone: (09) 3322604
Baud: V21
Access: Mem.VA
Computer: Commodore 128D
DOS: CP/M 3.0
BBS*oftware*: Turbo BBS

Nemo 3
Sysop: Graeme Platt
Phone: (09) 3703333
Baud: V21.V23
Access: Mem

Nemo Games Machine
Sysop: Graeme Platt
Phone: (09) 3702666
Baud: V21.V23
Access: Mem.LVA

Nemo Multiple BBS RAPL
Sysop: Graeme Platt
Phone: (09) 3701855
Baud: V21.V22.V23

Omen III RTRS
Sysop: Greg Watkins & Mark Dignam
Phone: (09) 2762777
Baud: V21.V23
Access: Reg.LVA
BBS*oftware*: Omen

Perth PC Users BBS
Phone: (09) 2279229

***** OFFLINE *****
Streamline BBS

Student Access Message Service
Sysop: Peter Walton & John Bramley
Phone: (09) 3219721
Baud: V21.V22.V23
Access: Reg.VA

***** Status Changed *****
The Apple Board

The Gathering BBS
Sysop: Ken Peters
FIDO*net*: [690/904]
Phone: (09) 2724711
Baud: V21.V22.V23

***** AMENDED *****
WA Atari BBS
Sysop: Graham Basden
Phone: (09) 3062134
Access: Reg.LVA

West Coast BBS
Sysop: Mark Gaynor
Phone: (09) 4453080
Access: Reg.VA

ZNode 62
Sysop: Lindsay Allen
Phone: (09) 4500200

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Lotus 123 ..... $ 560

IBM SOFTWARE

Above Disk ...	$199
Clipper	$799
Coda	$525
Copywrite	$ 85
Crosstalk Mk4	$350
Crosstalk XVI	$140
dBase III plus	$799
Eureka: The Solver	$155
Fastback	$170
Fox Base+ Multiuser	$760
Framework II	$899
Freelance Plus	$675
Harvard Professional Publisher	$850
Harvard Total Project Manager	$669
Javelin	$330
Lotus HAL	$220
Lotus 123	$560
Lotus Manuscript	$675
Microsoft Word	$680
Mirror	$ 49
MultiMate Graphlink	$120
MultiMate 3.3	$615
MultiMate Advantage II	$680
Norton Advanced	$219
Norton Utilities ver. 4	$130
Paradox 2 Multiuser	$950
PC Alien	$ 94
RapidFile	$485
Ready	$ 59
Reflex 1.1	$229

Clipper ..... $ 799

IBM SOFTWARE

Silk	$270
Super Calc 4	$585
Supercom	$150
Symphony	$875
Timeline	$585
Turbo Basic	$155
Turbo C	$155
Ventura Publisher	$1450
VP Planner	$150
Word Perfect	$485
Word Star Easy Extra	$120

MODEMS

NetComm 3+ 12 modem	$229
NetComm Smart 123A	$860
NetComm Smart 1234A	$1050
NetComm In/Modem	$350
NetComm In/Modem 1234	$859
NetComm In/Modem 123	$695
NetComm In/Modem 1200	$529
NetComm Smart 2400	$819
NetComm Smart 1200	$579
NetComm Trailblazer	$Call

PRINTERS

Brother M1709	$999
Epson LQ1000	$1325
Epson RX 100+ incl. csf	$650
Impact LS800-3	$6500
NEC P5 Pinwriter	$1769

Toshiba P 341 ..... $ 990

PRINTERS

NEC P6	$880
NEC P7	$1190
Toshiba P351	$1695
Toshiba P341	$990

STORAGE SYSTEMS

Archive 45 MB	$1525
DSDD floppies (10)	$18
DSDD floppies (100)	$150
Irwin 10MB tape internal	$1150
Miniscribe 30MB	$750
Plus HardCard 20 MB	$1250
Plus HardCard 40 MB	$1950
Seagate 30 MB Kit	$700

IBM HARDWARE

Hercules Ram Font	$499
Hypertec Multifunction 512 KB	$399
Intel Above Board	$599
Microphonics Voice Command	$999
Microsoft Mouse	$260
NEC Multisync	$1199
Qubie 6 Pak 384KB	$429
Sigma Color 400	$990
Tall Tree JLaser+ AT	$1100
Taxan Super Vision IV	$1350
TVM EGA MD7	$950
8087	$279

DISCWARE

DISCWARE (02) 212-6933

5th Floor, 3 Smail St., Broadway, NSW 2007. TLX: AA23509

ALL PRICES INCLUDE SALES TAX. AVAILABILITY MAY BE LIMITED AT PRICES ADVERTISED. PRICES APPLY TO STOCK HELD AS AT 25/8/87.

DISCWARE

The Best Amongst the Best

Clearance Sale – All Products Latest Versions

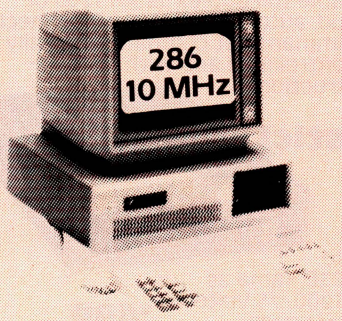
Toshiba T 3100/20 MB $6550

AT-286/40 MB $3995

Kaypro 286i $2800

THE DISCWARE AT-286 – MADE IN USA

INTRODUCTORY PRICE $2995



CPU:	80286, 8/10 MHz
RAM:	1 MB RAM
ROM:	IBM AT compatible.
DISK STORAGE:	1.2 MB Floppy Drive, 20 MB Tandon Hard Disk.
EXPANSION:	6 x 16 bit slots. 2 x 8 bit slots.
INPUT/OUTPUT:	Parallel/Serial.
POWER:	180 watt power supply.
OPTIONS INC:	Mono or Colour Card. Key Lock 12 months warranty. 45 MB option.

LIMITED QUANTITY AVAILABLE AT THIS PRICE

TOSHIBA T3100

THE AT FOR THOSE ON THE GO

CPU:	8 MHz 80286
RAM:	640 KB expandable internally to 2.5 MB
ROM:	IBM AT compatible
DISK STORAGE:	720 KB 3.5" floppy disk drive, one 20 MB hard disk, connection for external 360 KB 5.25" floppy disk drive.
EXPANSION:	Internal expansion slot
INPUT/OUTPUT:	Serial and parallel ports.



KAYPRO

THE PERFORMANCE SETTERS

Kaypro 386

CPU:	16 MHz 80386.
RAM:	2.5 MB 32 Bit wide RAM, expandable to 16 MB.
ROM:	IBM AT compatible.
DISK STORAGE:	1.2 MB floppy, one 40 MB High Speed hard disk.
EXPANSION:	One 32 Bit, three 16 Bit and two 8 Bit slots.

Kaypro 286i

CPU:	10 MHz 80286.
RAM:	640 KB expandable to 15 MB.
ROM:	IBM AT compatible.
DISK STORAGE:	1.2 MB floppy, one 40 MB High Speed hard disk.
EXPANSION:	Eight expansion slots.

Kaypro PC/PC30

CPU:	8.0 MHz 8088/V20.
RAM:	768 KB
ROM:	IBM PC/XT compatible.
DISK STORAGE:	2 x 360 KB/1 x 360 plus 30 MB hard disk.
EXPANSION:	Nine expansion slots.

DISCWARE

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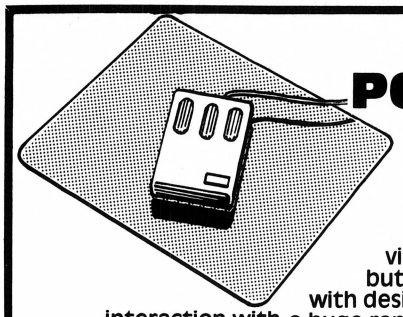
ONE STOP computer shop



It's no illusion! PC Optical Mouse

Computer software handling is now easier than ever before! PC Mouse, the optical mouse, is faster, smoother, more versatile and more accurate!

With no moving parts PC Mouse is virtually maintenance free! There are nine button-touch program options and it comes with designer Pop-up menus for interaction with a huge range of popular software. Cat X-3800 **$249**

BUY BOTH AND SAVE $49

Cat X-3801 ONLY $299

The Picasso of Computer Art!

With PC Paint Plus computer art is easier than ever! The software which allows you to draw and edit images in up to 16 colours or B&W in a huge variety of sizes and resolutions.

Total image flexibility for reports, graphs, charts... anything! A must for that professional finish! Cat X-9500 **$99**

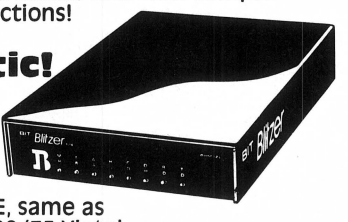
Magic Modem!

The Bit Blitzer 12E, the best thing to happen to modems in years! Fully automatic communications at your fingertips.

With selectable full duplex 1200/1200 or 300/300 baud, auto answer/dial/disconnect. Hayes AT command set compatibility, fully keyboard controllable and with comprehensive instructions!

Cat X-3306

Fantastic! $399



Also available Bit Blitzer 123E, same as above plus 1200/75 Viatel operation. Cat X-3307 **$499**

Bargain Modem

The DSE Dataphone 1200 is ideal for business or the computer buff! Amazing value! With 300/300 full duplex, 600/75 or 1200/75 selectable Baud rates. Comes with push-button telephone ready to plug in!

Cat X-3300 **$299**

SENSATIONAL VALUE! COMPUTER 'ADD-ON' CARDS!

Baby 'AT' Motherboard!

Process those files and documents in a fraction of the time with this fantastic Baby 'AT' Motherboard! Gives selectable 6/8/10 or 12Mhz clock speeds. Cat X-1000 **$995**

Hard/Floppy Disk Controller!

Whether you're building your own or improving your existing system you'll find this hard to beat. Quality combined Hard/Floppy Disk Controller cards at this low, low price! Cat X-2008 **$399**

3 in 1 Display Cards

Saves room and gives your machine more flexibility! CGA, MDA and MGA graphics capability on one card. Cat X-2006 **$249**

MGA and Printer Card

Hercules-compatible card for software requiring MGA standard. Includes a parallel printer port!

Cat X-8141 **$149**

Serial/Parallel Game Card

Suits 'AT'! Haven't got a games card or want to run another printer with your system? Well, here's the answer. Cat X-2012 **$139**

EGA Card with Hercules!

Enhanced Graphics Adaptor to simulate MDA, CGA and EGA format. With true Hercules compatibility for high resolution monochrome operation. Cat X-2013 **$399**

Combined CGA and Printer Card!

Great value! The combined colour graphics adaptor (CGA) and printer card. It's like getting two for the price of one. Cat X-2010 **$129**

All cards are complete with full, easy to read documentation. No more struggling with Jinglish manuals and never quite knowing if you've got it right.

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B454/TI

A lesson in Desktop Publishing from President

Desktop Publishing is the most significant advancement in the computerized world today. President have composed the following information on Desktop Publishing to inform you what D.T.P. is really all about and reading this, perhaps you will have more appreciation on how D.T.P. can decrease your costs, improve the quality of every day documentation, reduce turn around time and improve productivity in your company's printing requirements. Also most importantly you will understand how Desktop Publishing works.

How is conventional company printing achieved? Well, first you form an idea for a promotion, advert or document. This might be settled on in a meeting in which an advertising agency is called in, the idea is discussed and the agency goes away and translates this into a "rough layout" which is brought back to you for approval. Once approved, the agency then has graphic designers produce the graphics and typesetters set the text, and the page layout is finished. The layout then comes back to you again for proofing and correction, final changes are made by the agency. When this time consuming process has been completed, and again approved by you, bromides or metal plates are made if necessary, then the finished layout goes to an offset printer for reproduction. However with Desktop Publishing this could have all been done in house at a fraction of time and cost.

turn the page

Old steps and procedures

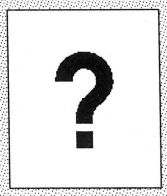
The Idea.

MEETING



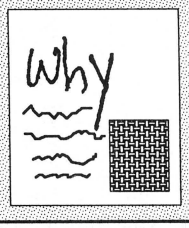
1.

ROUGH DESIGN TO COMMERCIAL ARTIST



2.

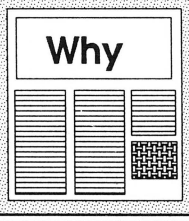
HAND DRAW THEIR CONCEPT FOR APPROVAL



3.

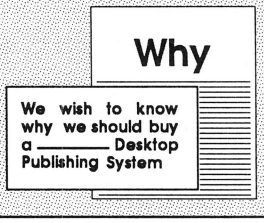
Layout Approval

GRAPHICS / TEXT CUT & PASTE



6.

COMMERCIAL ARTIST TYPESETS SEGMENTS



5

APPROVAL OF DESIGN MEETING



4.

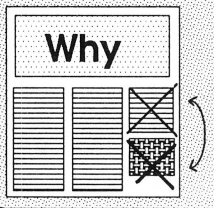
Final Artwork changed and approved.

FINAL APPROVAL, CHANGES & CORRECTION



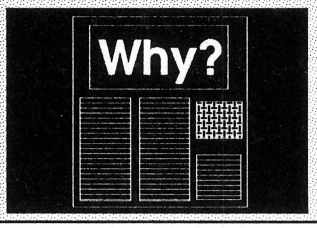
7.

LAST CHANGES MADE BY DESIGNER



8.

BROMIDE PLATES MADE



9.

All steps render transport and courier costs, to and from each stage.

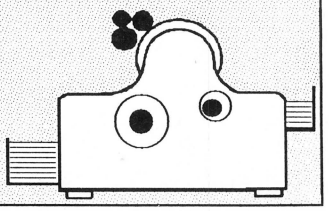
Management time wasted

Commercial Artist costs.

Typesetting costs etc. etc.

Await Printing

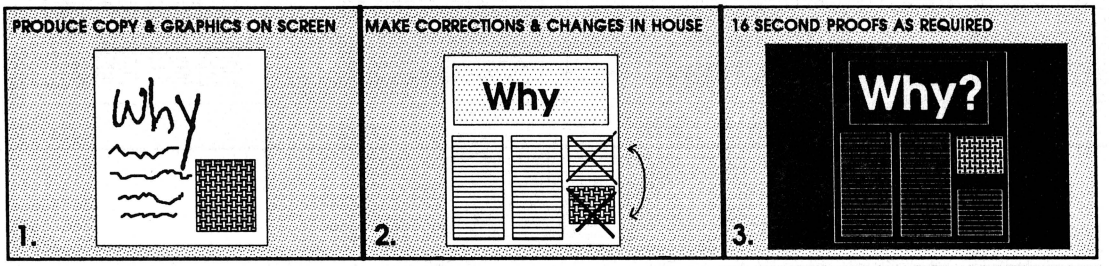
SENT TO PRINTER FOR REPRODUCTION



10.

In house publishing

Procedure



All steps in house

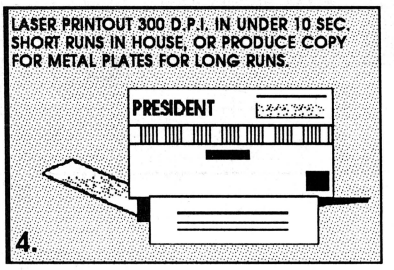
All approvals in house

Minimum time loss

Last minute changes made

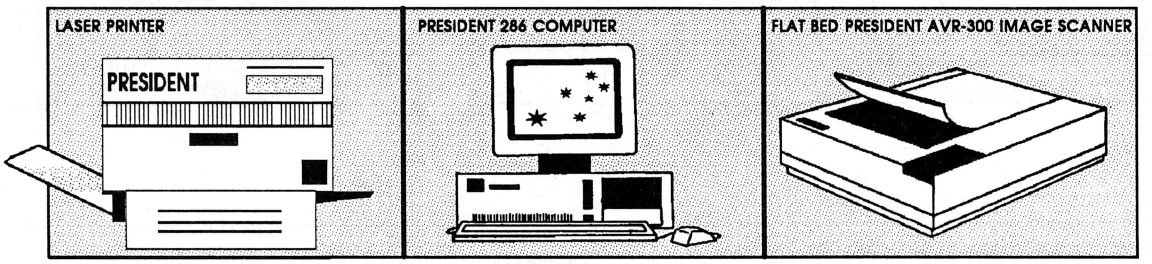
Cost savings 40 to 70%

Result

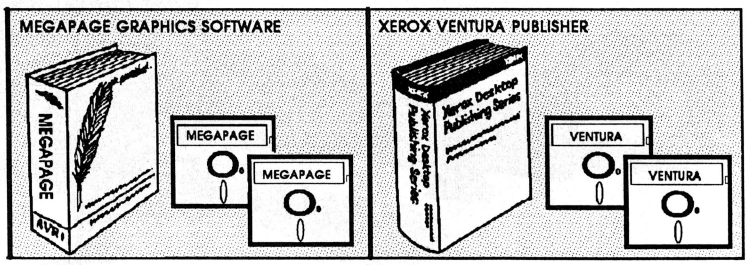


President MegaPage IV "the complete system"

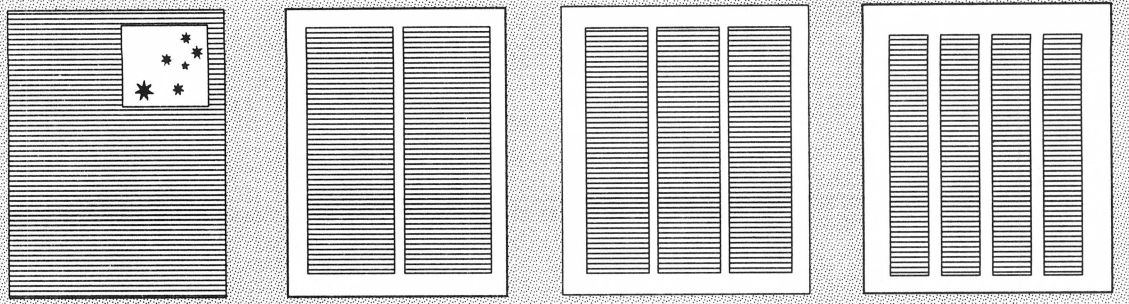
Hardware



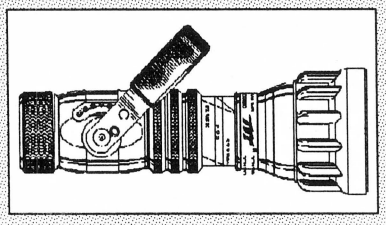
Software

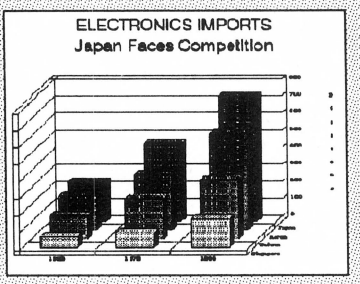


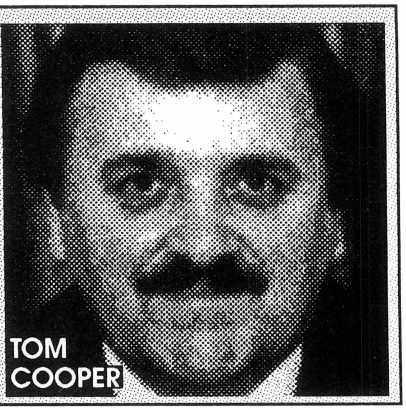
21 STYLE SHEETS TO CHOOSE FROM OR YOU CAN DESIGN YOUR OWN.



CAD DRAWING OR LOTUS GRAPHS CAN BE CAPTURED
AND INCORPORATED, ALSO COLOUR PHOTO'S CAN BE SCANNED.



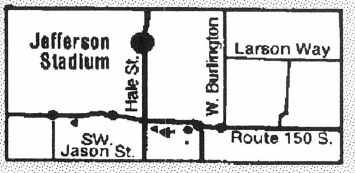




CLIP ART, HAND DRAWINGS AND LOGO'S CAN BE SCANNED.

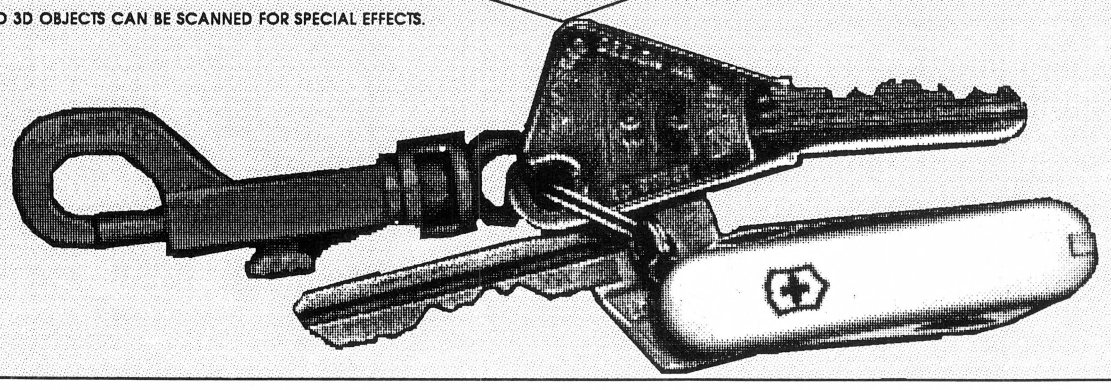


SHOW SOME SPIRIT !





ALSO 3D OBJECTS CAN BE SCANNED FOR SPECIAL EFFECTS.



Why Desktop Publishing

- Less steps to produce a finished document.
- Encourages experimentation & promotes individual creativity.
- Reduce turn around time to create a document and circulate it.
- In house control on all steps
- Reduce costs in -
  - Development time
  - Personnel
  - Equipment

Why XEROX Ventura Publisher

- Full Wyslwyg
- Accepts files from -
  - ASCII & most Word Processors
  - More that 500 graphics packages
  - President A.V.R. Scanner
- Professional Style Sheet Facility
- Automatic Index and Table of Contents
- We choose Ventura 1.1 because we think its simply the best

Why MegaPAGE

- Total graphics control
- Five Levels of Zoom
- Editing Graphics/Text to Individual Pixel level 300 DPI
- 10 Seconds output to Laser printer for whole A4 full page at 300 D.P.I.
- Incorporate text using more than 800 available fonts
- Fax Interface on board
- Scan directly into Ventura
- and much much more

Full System Features

B.R.W.'S PC OF THE YEAR

President Publisher 286

40 M/Byte Voice Coil Hard Disk
60 M/Byte Streaming Tape Backup
1.3 M/Byte MegaBuffer Ram Card
Laser Printer 300 Dots Per Inch 8 P.P.M.
EGA Monitor (Wyse Optional)
AVR-300 Image Scanner (10 sec) Scanning
101 Publisher Keyboard

MegaPAGE Software

Scanning, copying, reverse text, flow, patterns, rotate left/right, halftone, darken, lighten, photo enhance, vertical flip, mirror image, justify word-left-right, centre, scale, outline and more.

Ventura Software

21 Style sheets, kerning, leading, widows & orphans, footers, headers, footnotes, captions, superscript, subscript, indexing, table of contents, formatting, graphics, drawing, patterns, landscape to name just a few.

Options :-

Postscript Laser Top.
Full A4 or Wyse high resolution screens.
MegaFAX facsimile upgrade.
MegaREAD optical character recognition.

Why XEROX Ventura + MegaPAGE

Desktop publishing consists of text and images. VENTURA is to document formatting what MEGAPAGE is to Graphic editing. Only with Ventura and MegaPage you will be able to produce a document the special way you imagine it, and there is no limit to your imagination.

Why President

Because you want to be productive from the first day.
You dont want to run around looking for interfaces.
You want the support of a genuine Australian Company with branches in all capital cities, and with 18 years in the industry.
Because you want to deal with only one supplier that will give you the system, software, installation, service, training and on going support.

CALL ★ president NOW

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Ph: (02) 4762700	Ph: (03) 3470555	Ph: (07) 8462228	Ph: (08) 2313063	Ph: (062) 804804	Ph: (075)374788

President Established 18 Years and Proudly Australian!

NEW PRODUCTS

Software

Oops — Free AutoCAD 2.6 Offer

Entercom
Phone: (03) 429 9888

Purchasers of AutoCAD 2.53i were delighted when told they could upgrade to 2.6 (YC *Jun.*'87) — unfortunately, we neglected to mention that the offer was only available through authorised AutoCad dealers and only valid until shipping of version 2.6 began. We apologise for any inconvenience this omission may have caused.

Wordcraft 3.2

Personal Computer Software
Phone: (02) 923 2899
Price: $888 taxed

A new version of Wordcraft, Wordcraft 3.2, containing 26 new features has been released. According to Wordcraft, most of the new features are relatively minor when compared with the list of features that Wordcraft offers users, but the authors felt they were important enough to include.

ASHTON·TATE

Master Graphics Presentation Package

Ashton-Tate
Phone: (02) 868 3600
Price: $970

The latest release from Ashton Tate, Master Graphics Presentation Pack, combines the Chart-Master, Sign-Master, and Diagram-Master graphics products into one unit. The Pack is available in both 5¼ and 3½ inch formatted disk versions and is also available from Australian distributor Tech Pacific. An 'umbrella' menu for easy installation on hard drive systems is available. Seven typestyles in 16 sizes, 94 symbols, and highlighting with italics, colour and underlining are featured. Over 130 printers, plotters, and film recorders are supported. Automatic features help users make graphic decisions. Chart-Master allows users to create presentation-quality bar, area, scatter, pie, and line charts. Sign-Master is for the creation of colourful word charts such as title pages, summaries, outlines, schedules, and tables. Diagram-Master provides prompt-driven applications for the quick creation of presentation quality organisation and Gantt charts. (Map Master is not included in the Pack but operates with it if installed.)

The Office Publisher

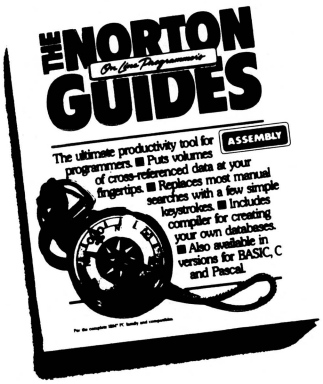
Pantek
Phone: (03) 836 9633
Price: $1995 taxed

A comprehensive professional desktop publishing package which incorporates more than 1,000 different font and type styles has been released in Australia. The Office Publisher was designed for the IBM PC and compatibles. Automatic generation of ruled forms through an existing library of evenly spaced forms generation is one option available. A broad range of standardised and specialised forms can be created quickly and documents of more than 30,000 pages can be generated. The layout grid is user definable and commands for editing include Cut, Copy, Paste, Search, and Replace Text. The Office Publisher is compatible with most word processing packages, laser printers, and scanners.

Norton On-line Programmer's Guides

PC Extras
Phone: (02) 319 2155
Price: $185 taxed

A new range of products from Peter Norton Computing are now available. The Norton On-line Programmer's Guides is a series of memory-resident, instant access programmes covering the C, Pascal, Basic, and Assembly programming languages. Each is a full-blown database containing extensive information on the languages, saving hours of frustrating and sometimes futile searching in reference works and manuals. The Guides reduce long manual searches to just a few keystrokes, providing all the information on screen. Features include full-screen or moveable split-screen mode, language syntax information, and conversion and reference tables. There is detailed listing of built-in and library functions for C, Pascal, and



Basic. A library of DOS services calls, interrupts, and ROM BIOS routines are featured for Assembly. In addition, each Guide comes complete with a built-in compiler so the user can create databases complete with electronic indexing and cross-referencing.

Microsoft C Version 5.0

Microsoft
Phone: (02) 452 5088
Price: $925 untaxed

Microsoft has further enhanced its C compiler with Version 5.0. Included in the latest release is QuickC, which gives program developers the ability to prototype applications through the use of an in-memory compiler, editor, program maintenance system and debugger. In this new version of the C compiler, compilation speed has increased over Version 4.0 by roughly 30 per cent. C 5.0 also has an enhanced version of Codeview Debugger (*see* YC *review Sept.*'87). As well, the latest C compiler has enhanced documentation and more than 100 new library functions, including a full graphics package library and BIOS and DOS calls. QuickC is also available as a separate product. Microsoft recommends the compiler for use by beginner C language programmers as it will give an introduction to the power and features of C as well as a development path to higher level systems. Quick C and C 5.0 are compatible at source and object code levels. C 5.0 conforms to IBM's System Application Architecture and supports the proposed ANSI C standard. Applications developed on C 5.0 can be ported directly to Microsoft's Operating System/2.

BMS

Boeing Graph

BMS
Phone: (03) 51 1572
Price: $895 untaxed

Boeing Graph is a full three dimensional colour graphics system designed for enhanced graphics computers, including IBM's new Personal System/2. The package has the ability to read Boeing Calc, Lotus, Symphony, and dBase data. It then graphs this in three dimensions. Graphs are chosen from 32 predefined graph types with unlimited colours and viewing angles. Boeing Graph supports over 200 printers and plotters, ranging from simple black and white dot matrix printers, to sophisticated high resolution colour and laser printers. The fine print options will produce resolution to the maximum capability of each printer.

microway™
SOFTWARE & HARDWARE

Turbo Optimizer

Microway
Phone: (03) 555 4544
Price: $319 taxed

Turbo Optimizer is a collection of tools which fine tune compiled Turbo programs to make them

considerably smaller and faster. It can also save time and effort by precompiling Turbo routines into relocatable object format which can then simply be called from Turbo programs. Turbo Optimizer can remove the unused portions of the Turbo Pascal runtime library, as well as unused procedures in the user's own code. Small programs that were 12 kilobytes are reduced to as small as 2 Kbyte. With Turbo Optimizer program sizes are smaller and can run up to 30 per cent faster by identifying and removing unnecessary or inefficient instructions, such as null jumps and register reloads, from compiled programs. The Object Librarian program in Turbo Optimizer saves time and effort by storing compiled versions of often used procedures in an object library.

SCO Xenix 386 System V Operating System

Microprocessor Applications
Phone: (03) 894 1500
Price: Not supplied

MPA has released the SCO Xenix 386 System V Operating System and the SCO Xenix 386 System V Development System for 80386 based AT compatible machines. Xenix System V is a commercially- enhanced, fully licensed version of AT&T's Unix System V Operating System. SCO Xenix 386 runs on 386AT class PCs as well as IBM PC AT compatible machines which have been turbo charged with a 386 accelerator card. SCO Xenix 386 also supports all 286 based Xenix applications currently available. The 32 bit native mode code used in the SCO Xenix 386 Operating System and generated by the SCO Xenix Development System is extremely compact and optimised due to the use of the Microsoft C Compiler Version 5.0 needed on the screen.

Peripherals

Fujitsu DL5600 Printer ▼

Fujitsu
Phone: (02) 959 6555
Price: $4400

Fujitsu has extended its range of 24-pin printers with the release of the DL5600 24-wire dot matrix printer. The DL5600 is said to print 486 characters per second (cps) in draft mode at 12 pitch, 405 cps in draft mode at 10 pitch, and 135 cps for letter quality. It has a noise level rating of 55dBA with an MTBF of 8,000 hours. Printhead life is rated at over 400 million strikes per wire. Frequently used settings can be stored in memory. As a standard feature, the printer also offers a 32 kilobyte buffer, equivalent to 16 screens of data. The DL5600 is designed especially for heavy duty use and is capable of printing an original plus five copies. Fujitsu have also incorporated a feature which offers automatic platen adjustment, eliminating the need for the operator to manually correct platen adjustment every time there is a change of stationary. Parallel and serial interfaces are standard. The The DL5600 emulates the Fujitsu DPL24, Diablo D630API, and the IBM Proprinter. There are also plug-in font cards, about the size of a credit card, together with the colour version of the DL5600 which provides seven colours from a four colour ribbon.



ERS-2000 Card

Electronic Solutions
Phone: (02) 427 4422
Price: $995 including tax

An additional 2048 kilobytes of memory can be provided on your IBM PC, XT, or AT using the ERS-2000 Card. Up to four cards can be fitted, mounting up to 8 megabytes of RAM. On board dip switches split the board's memory as either conventional or expanded memory. The expanded memory can be accessed by a paging technique compatible with the Lotus/Intel Expansion Memory Specification. Memory is fully socketed with parity check.

DMP 4000 Printer

Mitsubishi/AWA
Phone: (02) 638 8444
Price: $799 untaxed

The DMP 4000 dot matrix printer from Amstrad has been released in Australia by Mitsubishi Electric AWA. It is for the IBM PC or compatible; it's rated at 200 cps as standard or 50 cps in near letter quality mode. There are more than 100 different print style combinations available. The DMP 4000 will handle both tractor and sheet fed paper up to 15 inches (A3) wide. It's designed to operate with any IBM PC or compatible that incorporates a standard parallel interface.

XT 4175 and XT 3270

CVA Computer Peripheral
Phone: (02) 476 6400
Price: See below

A new 170 Mbyte 3½ inch Winchester disk drive have been released by Maxtor through its distributor, CVA Computer Peripheral Sales. The drive comes in two industry standards, SCSI (known as the XT 3170) and ESDI (known as the XT 4175). The XT 3170 is fully compatible with the complete SCSI command set. Both offer average seek times as low as 20 mS. Data transfer rates are around 10 Mbytes per second. The mounting and power requirements of the new drives are fully compatible with 3½ inch industry standards. In addition, the drives will be available with a half height 5¼ inch standard frame mounting for situations where they are to be used in place of a normal 5 ¼ inch drive. The SCSI interface version incorporates an automatic error detection and correction system employing ECC coding. There is full automatic retry on seek or read errors is provided. The drive will also support multiple host/multiple drives with disconnect/reconnect and arbitration.

IRMA 2

Sourceware
Phone: (02) 411 5711
Price: $2598

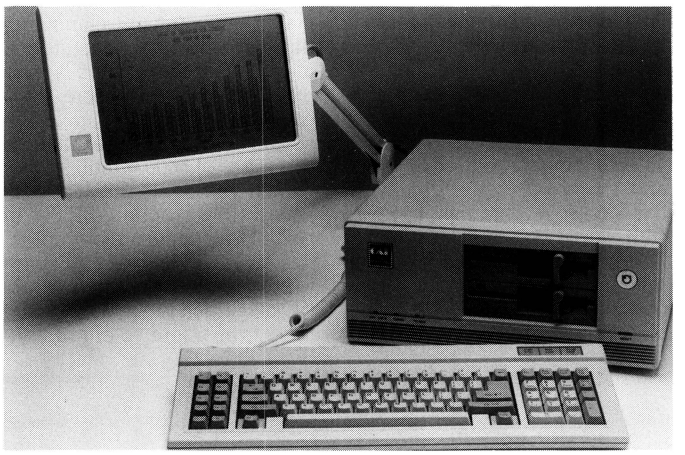
A micro to mainframe communications board, IRMA 2, has been released by Sourceware. It transforms a single PC or Personal System/2 into an IBM mainframe connection. Developed by Digital Communications Associates of the US, IRMA 2 enables users to upgrade to Distributed Function Terminal (DFT) technology and take advantage of multiple host sessions as well as All Points Addressable (APA) graphics. IRMA 2 is for users of the IBM PC, XT, AT, and Personal System/2 Model 30, 50, 60, and 80. Software in the 3 ½ inch format for the PS/2 range is standard with the IRMA 2. It

comes with RAM based hardware, new E78 Plus terminal emulation software, and IRMAlink FT/TSO and FT/CMS file transfer software for both the MVS and VM environments. The IRMAlink FT/3270 provides compatibility with IBM's send and receive file transfer programs on the PS/PC or PROFS PCC. The hardware supports both the IRMA and Forte PJ hardware interfaces, allowing all user applications written for these to run on IRMA 2.

Flat Screen Monitor and Overhead

Pantek Corporation
Phone: (03) 836 9633
Price: $2410 taxed

A monitor and a screen which sits atop an overhead projector, are the two latest products from ASK LCD of Norway to be released in Australia. The Flat Screen Monitor is a 12 inch diagonal liquid crystal display (LCD) monitor that is 1 inch thick. It is mounted an a flexible ergonomic arm and has a no radiation emission screen. The Flat Screen Monitor provides total IBM CGA attribute capability in monochrome mode at 640 *x* 200 resolution. Screen glare is virtually nonexistent due to the LCD. The Flat Screen Overhead also comes with a LCD. It will project clear, clean images up to 100 feet. Pantek says that training or sales organisations with an IBM PC or close compatible could use the Overhead to present their message in a normally lighted room environment. The Overhead comes with a 17 foot cable between the screen and the computer. A six foot computer keyboard extension cable is available as an option.



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WARNING: EDD is sold for making archival copies only.

EPSON

Epson LX-800 Printer

Epson
Phone: (02) 452 5222
Price: $580 plus tax

A range of new features have been added to Epson's LX-80 printer and a new printer, the LX-800 has been released. The LX-800 offers faster printing and throughput speeds, with additional built-in functions. It prints at 180 characters per second (cps) in draft elite and 150 cps in draft pica. The draft mode throughput now runs faster than previous models by 25 per cent. The print buffer has been enlarged to 3 Kilobytes. The SelecType front control panel allows auto single sheet loading. In addition to Roman, Sans Serif is now included in the resident fonts. The tractor paper feed unit is built-in, with the single bin cut sheetfeeder available as an option. A new ribbon cartridge now prints 3 million characters, three times more than before. Download character capability is 6 characters. Elite, Italic, Superscript, and Sub-scripts are supported in both draft and near letter quality modes.

Bit Talk

The Octaport

Bit Talk
Phone: (03) 429 8844
Price: $495

The Octaport is a low cost 9 port (8 in, 1 out) serial print share device designed and built in Australia. The Model One is an electronic switch that scans the input data from the 8 ports in and, when detected, automatically sends the data to the attached printer. The Model Two will have 256 kilobyte buffering and code translation facilities. Another feature of Model Two is that it can store logos, letterheads, and forms designed within the unit and send them to any output port on command.

Ideal CHRISTMAS Gifts

HOW TO DESIGN ELECTRONIC PROJECTS
R. A. Penfold **BP0127**
The aim of this book is to help the reader to put together projects from standard circuit blocks with a minimum of trial and error, but without resorting to any advanced mathematics. Hints on designing circuit blocks to meet your special requirements where no "stock" design is available are also provided. *128 pages* **$9.00**

ELECTRONIC MUSIC PROJECTS
R. A. Penfold **BP0074**
Provides the constructor with a number of practical circuits for the less complex items of electronic music equipment, including such things as fuzz box, waa-waa pedal, sustain unit, reverberation and phaser units, termelo geneator, etc. The text is divided into four chapters as follows:
Chapter 1, Guitar Effects Units; Chapter 2, General Effects Units; Chapter 3, Sound General Projects; Chapter 4, Accessories. *112 pages* **$9.50**

ELECTRONIC SECURITY DEVICES
R. A. Penfold **BP0056**
Many people associate the term "security device" with only burglar alarms of various types, but in fact, any piece of equipment which helps to protect people and property against any form of danger could be termed a "security device".
Therefore this book, besides including both simple and more sophisticated burglar alarm circuits using light, infra-red and ultrasonics, also includes many other types of circuits as well, such as gas and smoke detectors, flood alarms, doorphone and baby alarms, etc.
112 pages **$9.50**

AN INTRODUCTION TO Z80 MACHINE CODE
R. A. & J. W. Penfold **BP0152**
Takes the reader through the basics of microprocessors and machine code programming with no previous knowledge of these being assumed. The microprocessor dealt with is the Z80 which is used in many popular home computers and simple programming examples are given for Z80-based machines including the Sinclair ZX-81 and Spectrum, Memotech and the Amstrad CPC 464. Also applicable to the Amstrad CPC 664 and 6128. *114 pages* **$10.00**

COIL DESIGN AND CONSTRUCTION MANUAL
B. B. Babani **BP0160**
A complete book for the home constructor on "how to make" RF, IF, audio and power coils, chokes and transformers. Practically every possible type is discussed and calculations necessary are given and explained in detail. All mathematical data is simplified for use by everyone.
96 pages **$9.50**

HOW TO GET YOUR ELECTRONIC PROJECTS WORKING
R. A. Penfold **BP0110**
The aim of this book is to help the reader overcome problems by indicating how and where to start looking for many of the common faults that can occur when building up projects.
Chapter 1 deals with mechanical faults such as tracing dry joints, short-circuits, broken P.C.B. tracks, etc. The construction and use of a tristate continuity tester, to help in the above, is also covered. Chapter 2 deals with linear analogue circuits and also covers the use and construction of a signal injector/tracer which can be used to locate and isolate the faulty areas in a project.
Chapter 3 considers ways of testing the more common components such as resistors, capacitors, op amps, diodes, transistors, SCRs, unijunctions, etc., with the aid of only a limited amount of test equipment.
Chapter 4 deals with both TTL and CMOS logic circuits and includes the use and construction of a pulse generator to help fault-finding. *96 pages* **$8.50**

A Z-80 WORKSHOP MANUAL
E. A. Parr **BP0112**
This book is intended for people who wish to progress beyond the stage of BASIC programming to topics such as machine code and assembly language programming, or need hardware details of a Z-80 based computer.
192 pages **$12.00**

ELECTRONIC CIRCUITS FOR THE COMPUTER CONTROL OF ROBOTS
R. A. Penfold **BP0179**
Provides information and circuits on computer control of electric motors (including stepper types). plus a range of useful sensors including visible light, infra-red, and ultrasonic types. *96 pages* **$11.00**

IC 555 PROJECTS
E. A. Parr **BP0044**
Every so often a device appears that is so useful that one wonders how life went on before without it. The 555 timer is such a device. Included in this book are basic and general circuits, motorcar and model railway circuits, alarms and noise-makers as well as a section on the 566, 568 and 569 timers.
$9.50
176 pages

HOW TO DESIGN AND MAKE YOUR OWN P.C.B.s
R. A. Penfold **BP0121**
Chapter 1 deals with the simple methods of copying printed circuit board designs from magazines and books and covers all aspects of simple P.C.B. construction as comprehensively as possible. Chapter 2 covers photographic methods of producing p.c.b.s and Chapter 3 deals with most aspects of designing your own printed circuit board layouts.
$6.50
80 pages

BABANI BOOKS Best Sellers



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A TV-DXERS HANDBOOK
R. Bunney **BP0176**
Completely revised and updated by Roger Bunney who is probably one of the leading authorities in this country on the subject. Includes many units and devices which have been designed and used by active enthusiasts, and often, considerable ingenuity and thought have gone into the development of such units to overcome individual problems.
A practical and authoritative reference to this unusual aspect of electronics. *(Large Format)* ~~$18.00~~ **$14.00**

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J. W. Penfold **BP0189**
Covers such things as tracks, sectors and formatting. AMDOS and CP M operating systems including rules and regulations, filing from BASIC, file copying and transfer; program development including MERGE and CHAIN MERGE. CP M turnkey discs etc.
~~$11.00~~ **$9.00**
96 pages

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25 SIMPLE AMATEUR BAND AERIALS
E. M. Noll **BP0125**
This concise book describes how to build 25 amateur band aerials that are simple and inexpensive to construct and perform well. The designs start with the simple dipole and proceed to beam, triangle and even a mini-rhombic made from four TV masts and about 400 feet of wire.
You will find a complete set of dimension tables that will help you spot an aerial on a particular frequency. Dimensions are given for various style aerials and other data needed for spacing and cutting phasing lengths. Also included are dimensions for the the new WARC bands.
80 pages ~~$6.50~~ **$5.00**

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YC/10/87

New Machines

APC IV Powermate

NEC
Phone: (02) 438 3544
Price: See below

Two new versions of the APC IV Powermate have been released by NEC. The company will introduce the Operating System/2 into its range early next year. The first Powermate enhancement is a version of the 80286-bases Powermate 1 with a 40 Mbyte hard disk. The Powermate 1, released in February, is now available with either dual floppy disk drives or with an internal 20 or 40 Mbyte hard disk. Basic price for the 40 Mbyte unit is $6222 while the 20 Mbyte system retails for $5426. Taking over from the APC IV as the flagship of NEC's PC range, is the new Powermate 2. It has a 66 Mbyte voice coil hard disk, 10 MHz running speed, two RS232 serial ports, and a parallel printer port. The keyboard has 101 keys and the Powermate 2 has a high resolution monitor. The starting price is $7472.

DRS Professional Workstation

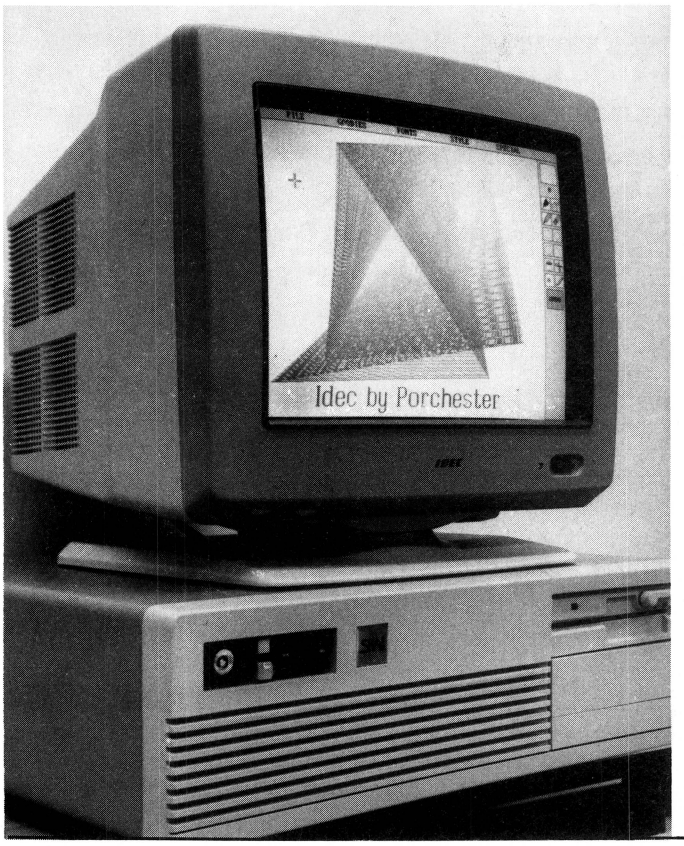
ICL
Phone: (02) 452 9900
Price: $9122 plus tax

The Professional Workstation (PWS) is a desktop PC with networking capability, multi-tasking, and access to industry standard software. It has communications options that let it connect to ICL's Open Systems Local Area Network (OSLAN), to share files, pass messages, and conduct mainframe sessions. PWS is fully MS-DOS compatible, letting users run such popular packages as dBase III and Lotus 1-2-3 in one screen, while conducting a mainframe or Clan session running Unix in another screen. The system comprises an 80286 micro-processor running at 8 Mhz with 1 to 4 Mbyte of zero wait state main memory. Disk capacity ranges from 20 to 90 Mbyte, while users have the option of 1.2 Mbyte and/or 360 kilobyte floppy disk drives. Users can choose a 12 inch monochrome or a 14 inch high resolution colour monitor. The operating system is MS-DOS version 4.2, with Microsoft Windows as standard.

Wyse WY-99GT

Microprocessor Applications
Phone: (03) 894 1500
Price: $1645 taxed

The Wyse WY-99GT offers full ANSI, ASCII, and personal computer terminal compatibility, plus graphics. It has more than a dozen compatibility modes for text and graphics applications. The WY-99GT allows users to work in the ANSI/DEC VT-220, multi-user PC, or ASCII terminal environments. The dedicated graphics co-processor provides compatibility for the most popular graphics standards, including Tektronix 4010/4014, Hercules, and the IBM CGA. When used as a low cost PC terminal, the WY-99GT supports both the Hercules (720 x 348 resolution) and monochrome simulation of IBM CGA (640 x 200) graphics standards. It also runs most of the popular PC programs such as Lotus 1-2-3, AutoCAD, and the Xerox Ventura desktop publishing package. The WY-GT99 is also compatible with the WY-50 terminal, plus a new native ASCII mode that supports the applications of the WY-50. Proprietary VLSI gate array technology has been used. It is ergonomically designed with a small footprint and 14 inch amber screen.





Multiflat Colour Monitor ◄

Porchester Computers
Phone: (03) 537 2722
Price: $1745 taxed

Porchester Computers are now Australian distributors for IDEC's new Multiflat colour monitor. The Multiflat has full automatic scanning from 15.5 Khz to 37 Khz, making it compatible with most microcomputers on the market, including the IBM Personal System/2 range. It supports a variety of video standards, including monochrome, Hercules, CGA, EGA, PGA and VGA. The dot pitch is 0.31 mm and maximum resolution is 800 x 600 □

ADE

Opal AT-286 ▲

ADE Computers
Phone: (03) 543 2677
Price: $3600 taxed

A small business computer based on the 80286 MPU is the latest offering from ADE Computers. The Opal AT-286 is fully compatible with the IBM AT at 8 Mhz. The CPU board is the size of an I/O adaptor and one adaptor board contains FDD, HDD, Serial, and Parallel Control. ADE claim that the Opal AT-286 is 1.8 times faster than the IBM AT and it has MS-DOS 3.2 support four times larger than IBM PC-DOS. Up to four half height 5¼ inch FDD or HDD are incorporated in the front panel design.

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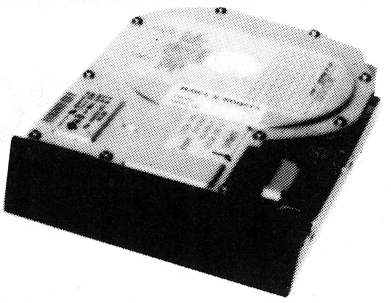

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All Hard Disk drives and Tape Streamers have a full 12 months warranty.

SERIOUS SOFTWARE

A tiny sample of the huge range of software we can source. Please call for items not listed.

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Ability	187	225
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dBase III+	950	1470
EBA Business Accounting	564	675
EBA Prelude	60	69
Fastback	166	198
First Choice	237	329
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Lotus 123	660	1099
Mace & Utilities	165	195
Microsoft Chart	533	654
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Microsoft Word	790	960
Microsoft Windows	204	256
Mirror	90	123
Multimate Advantage	866	1203
Norton Utilities	133	166
Norton Utilities Advanced	233	302
PC-Introduction	61	74
Prodesign II	592	714
Sidekick unprotected	117	172
Sideways	127	153
Silk	278	345
Supercom Executive	168	198
Symphony	977	1470
TAS Plus Data Base	196	227
TimeL (TimeLine)	706	892
Twin	292	364
Typequick	76	86
Wordperfect Ver 4.2	643	789
Xtree	92	112

AMUSEMENTS

	H&R	RRP
Ancient Art of War	83	96
Archon	54	61
Flight Simulator	117	131
Gato	60	68
Hitch Hiker's Guide	68	79
Jet	105	114
Leather Goddess	68	79
Newsmaster	142	160
Pitstop II	54	57
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Rogue	54	57
Sargon III	83	113
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LOGITECH

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PMI M-2/86 Macro2	158	171
PMI M-2/86 ModBase	158	171
Mice		
Logimouse Plus Pack	215	233
Logipaint Plus & PC Paintbrush	261	284
LogiCad Plus & Generic Cad	315	351
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All Logitech Mice are available in Bus or Serial versions, please specify.

BORLAND INTERNATIONAL

	H&R	RRP
Eureka	155	210
Reflex Data Base	231	298
Reflex Workshop	116	146
Superkey	140	185
Turbo Prolog Toolbox	155	207
Turbo Prolog	155	210
Turbo Basic	155	207
Turbo Gameworks	116	146
Turbo Graphix Toolbox	116	146
Turbo Lightning	155	207
Turbo Numerical Methods Toolbox	155	207
Turbo Editor Toolbox	116	146
Turbo Database Toolbox	116	146
Turbo Pascal Ver 3 & 8087 & BCD	155	207
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ACCESSORIES

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PC Off Desk Stand suits virtually all PC/XT/AT computers. Stands your PC vertically on the floor at the end of your desk and lets you use the top of the desk for what it was intended **$35**

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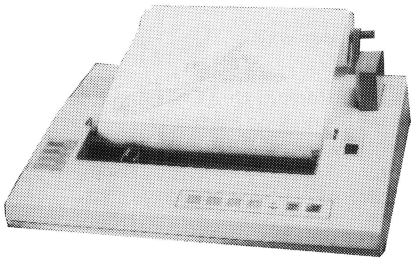

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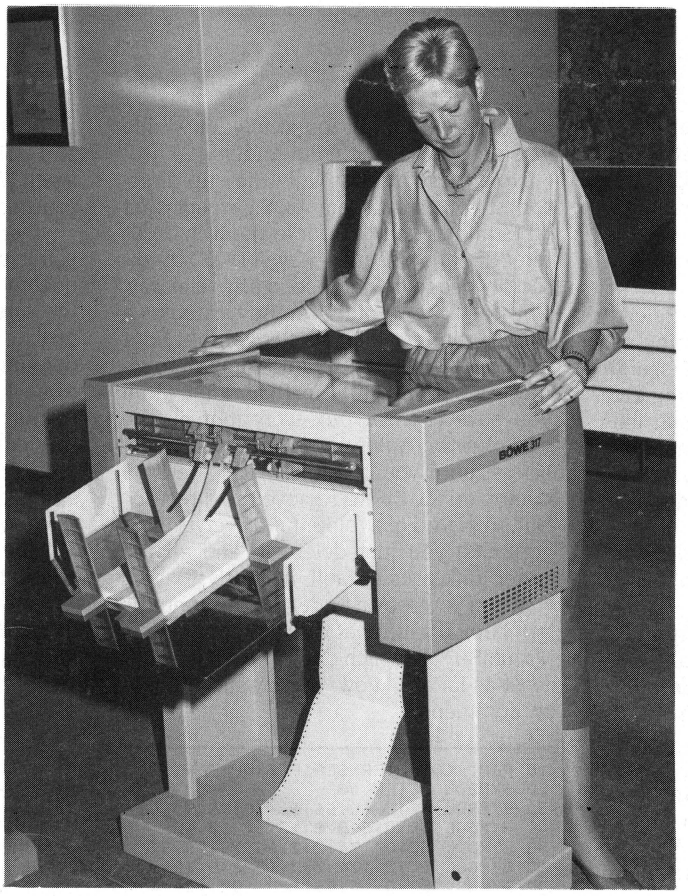
A German manufactured guillotine designed for cutting continuous computer print outs into individual forms is now available from DBE Australia. It features a touch sensitive operator's panel that is colour co-ordinated and easily understood. At the touch of a button, the cutting pitch can be altered from 1/6 inch to 1/8 inch. It handles stock weights from 40 to 200 gsm and can cut up to 19,000 forms with a depth of four inches per hour. The microprocessor allows variable intake speeds and a wreck detector is standard, so forms are not wasted. A built-in margin trim chopper with waste bin means that margins are immediately and tidily removed, with minimum waste buildup. Electronic interfaces are provided for routine checks, as well as later extension and connection of other modules, such as optical mark recognition or a dropping stacker.



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Price: See below

It is well known that computer and peripheral manufacturers seemed to have adopted Henry Ford's adage of 'any colour you like so long as its black' — in the computers' and peripherals' case the colours being either grey or beige. While this state of affairs may not have troubled your average user, there are plenty of situations where the ability to give disks an obvious and distinctive appearance would be desirable.

For instance, many business or government departments could well find it useful to be able to distinguish disks containing sensitive information from those that don't. It also solves the problem of differentiating company disks from those belonging to staff. Software houses would find it not only makes for a more attractive product, but also as a help deterring commercial scale piracy. (It's harder to pass off a forgery as an original if users know the real thing has your logo laminated onto the program disk itself.)

A Melbourne based disk manufacturer, Memron Australia, is now one of two companies in the world with a printing process of sufficient quality to reproduce photographs onto disks. Memron also has a slightly simpler screen printing type method suitable for lower resolution graphics.

Total cost (including the disk), is around $2.05 per copy excluding tax for a minimum run of 500 disks. Memron also offer a disk duplication service which will cost an additional 50 odd cents per disk. The finished disks can be presented in a non-static sleeve so that the full effect of the printing stands out. □



TIM HARTNELL

YOUR AMSTRAD

LET'S start with a few shortcuts when using GEM Paint on the Amstrad PC-1512, some hints (and a bug) for LocoScript users on the PCW, and go on from there . . .

GEM Paint Hints

Just as you can double-click the Selector to select all of your current painting surface and double-click on the Eraser to wipe out everything on the painting area, if you double-click the Paint Brush icon, you'll end up with the Brush Shape option. That's much easier than using the Brush Shape command from the drop-down Tools men.

Two other useful double-click ideas — If you double-click on any pattern in the Pattern Palette, it will change that pattern, just as if you picked the Edit Pattern option from the Patterns menu. Finally, double-clicking on the Spraycan icon allows you to choose the brush shape for the sprayer.

In case you hadn't discovered it yet; if you change your mind about an action when using GEM Paint, you can undo it simply by pressing the Esc key. This has the same effect as choosing the Undo option from the Edit menu.

Note that GEM Paint is a considerably less sophisticated artist's tool than its sister program, Gem DRAW. If you want to do some serious design work on your Amstrad PC (or, for that matter, on any PC fitted with a graphics board and mouse), you should really think seriously about investing in Draw. It's streets ahead of Paint for most applications.

Note that pictures created in both GEM Paint and GEM Draw can be incorporated into GEM Write. However, Write is a pretty limited word processor when compared to many available for the PC, so unless you want to bring in your artistic masterpieces, you may be happier working with a standard wordprocessor operating under DOS, rather than GEM.

Real Computer Persons Don't Use GEM

If you're a died-in-the-wool MS-DOS user, you might have thought all those pretty icons and mouses are fine for raw recruits to the world of computing, but that they only get in the way for an old hand like yourself. Well, even if you can get along without GEM for most of your computing life, remember that GEM has one very valuable feature not found in your vanilla version of DOS, the GEM folders.

Now these are basically the sub-directories you know from DOS, except that GEM allows you to handle them in a different — and useful — way. A DOS sub-directory has to be handled in a special way, whereas a GEM folder can be treated as a whole unit. To make this clear, think about the hoops you have to jump through to remove a sub-directory in DOS. First of all you have to clear out every item in the sub-directory (plus in any sub-sub-directories) until you can finally use the DOS command RMDIR to remove the directory. But, to get rid of a folder (and everything it contains) you just delete it, and all the other junk goes as well, instantly.

When you copy a folder, all the contents get copied, automatically. Compare this with MS-DOS, which doesn't even have (at least as far as I know) a 'copy sub-directory' command.

```
10 REM 'COMPUTER-SCRIPT' NUMBERS
20 SYMBOL AFTER 48
30 SYMBOL 48,0,60,66,66,98,98,98,60
40 SYMBOL 49,0,8,8,8,12,12,12,12
50 SYMBOL 50,0,124,2,2,60,96,96,62
60 SYMBOL 51,0,124,2,2,60,6,6,126
70 SYMBOL 52,0,64,96,100,100,126,4,4
80 SYMBOL 53,0,62,64,64,60,6,6,126
90 SYMBOL 54,0,62,64,124,70,70,126
100 SYMBOL 55,0,120,8,8,12,12,12,12
110 SYMBOL 56,0,60,66,66,60,70,70,60
120 SYMBOL 57,0,60,66,66,60,6,6,126
```

***Redefining Numbers** — If you'd like to have your 464 or 6128 producing numbers on screen like the 'computer script' ones you see on the bottom of cheques, just insert the following routine at the start of your program.*

LocoScript on the PCW

There's a bug in version 1.2 of LocoScript (which has been corrected in later versions) that can have dire results. If a right justification code follows an indent tab, the whole system will crash, and have to be rebooted from the start. If anyone's found a way around this let me know so I can pass it on.

Here's a tip from Peter Johnson of Bundaberg, Queensland, — As you've probably discovered, if you're working on a document on your PCW, and you try to save it on a disk which doesn't have enough room to hold it, you'll get the distressing message 'Drive A is full'. Pressing ENTER to run the disk manager will simply cause your precious text to happily glide off the screen. Instead of screaming and doing a reset in order to take control again (and, of course, losing all your text), proceed as follows.

When you run the disk manager option, you'll see the message 'Make space for document' near the top left hand corner of the screen. The PCW is still holding your text in its innards and you can save it by deleting a file or files on the disk to make room for it. Erase one of your old documents, press EXIT, and you'll be back in the editing mode with your deathless prose visible. Try and save it again. If you still get a disk full message, go through all the above routine again, to delete another old file, and you should be able to save your latest document.

Martin Richards from Launceston pointed out some very useful key combinations on the PCW which can save you a bit of time. If you press the ALT and ENTER keys at the same time, you'll engage Caps Lock, while pressing ALT and RELAY gives you access to the figures on the right of the keyboard as a numeric keypad. If you want to do both at once (that is, engage Caps Lock and use the numeric keypad), just press ALT and ENTER at the same time, and follow this by RELAY.

Graphic Commands in Basic2

If you're experimenting with Basic2, you should really investigate the commands it provides which are not available to those poor fools who live with lesser Basics. SHAPE, for example, allows you to create polygons by specifying a large number of co-ordinates. The command then draws a continuous line through these points. You can create pentagrams (I think that's the official name for five-pointed stars) with a line like: SHAPE 6000;5000, 7000;2000, 4425;3875, 7575;3875, 5000;2000. If you want the outer arms of your star to be in a colour, follow this line with FILL COLOUR n, or use FILL WITH n COLOUR m (when n is a pattern, and m is the colour). If you haven't tried Basic2 yet, you should — it's better than MS Basic, BasicA or GWBAsic. Read my review in YC, Dec.'86. □

Amstradians!!

I'D BE more than happy to share any of your Amstrad discoveries, hints, tips, comments, and programs with other users. Please send them to Your Amstrad, Tim Hartnell, Your Computer, PO Box 227, Waterloo 2015 NSW. □

JAN ROBERTS

YOUR MICROBEE

Last month I introduced Peter Broughton's Enhanced Bios for 128K Microbees and the 'Chooks', and said it was great; this month some more details. In August, I told how I had added a disk-drive, doubling its online storage capacity, and allowing it to run two different disk sizes. This month I will explain the software needed to run it.



Running Disk Drives of Different Types and Sizes

If you want to permanently run both 5¼ and 3½ inch drives — or to swop between the various configurations of the 3½ inch drive, you need a program like SETSYS.COM. If you want to temporarily change the nature of a drive (without changing the disk size), then a you need a program like SETDISK.COM.

The software supplied with the memory transplants (which bring a Chook up to 256K and a 128K up to 512K) includes SETSYS.COM, RAMDISK.COM and FORMATM.COM. The transplants are available through user groups in Melbourne, Adelaide and Perth (and perhaps others, but I haven't heard).

SETSYS is an enhanced version of Microbee's INIT.COM. It allows you to load and save various Systems to System tracks or to a disk.file on any drive. Thus you could reconfigure your computer as an old 56K or put in your own system. It's great if you like fiddling with systems! It also allows you to set either Premium or Standard Colours and to set a longer initial boot command (and more).

But it is especially invaluable when you want to add a disk drive to your system as it allows you to change and save your disk drive configurations; Microbee's INIT.COM doesn't have this flexibility.

You will also require from your local Microbee Shop a copy of the appropriate INIT.COM to format the 3½ inch drive in the standard Microbee formats (SS and DS) if you bought a 5¼ inch machine.

You can *temporarily* change a disk drive to a different type of Microbee drive or to about 90 other computers' drives, by using the Public Domain Program SETDISK. (I haven't found this necessary for Microbee disks. I just use SETSYS and save to system tracks each time.)

RAMDISK.COM makes the Memory drive the A:drive and the old A:drive the M:drive. This fools software that needs to be in the A:drive but works faster in the Memory drive. FORMATM.COM totally erases the M:drive contents.

The Enhanced Shell System

Peter's latest enhancement to the Microbee system is still in its preliminary version (and may not be developed further) — but this can be obtained via the Melbourne User Group for $20.

It's first brilliant feature (accessed at almost any time with a Ctrl-9) opens up a neatly drawn window in the centre of your screen presenting a menu of options; Esc will make it vanish as if it never existed. The window can be opened in the middle of the Shell, at any time in WordStar and in the midst of many other programs; I've found it doesn't work with Microsoft Basic and some games.

There are six options given on the menu: W for Warmboot allows for a full warmboot with a reloading of the system files into the spare page of memory secreted away on the 512K system, or, alternatively, a straight reboot to the Shell or to CCP. (CPM).

F is for Function Keys: number keys plus Ctrl and Shift can have up to 14 permanently accessible functions set to them. A special control (N) assigns the numbers 1 to 8 to Function Keys 1 to 8 which lets you retain the Function Keys while allowing Simply Write or other programs to use the Ctrl-Number commands. The Cursor Keys on the Premium can also have other Functions assigned to them.

K stands for Key Click which can be set at varying degrees of loudness. (I just changed key click right in the middle of writing this without having to reboot — a most adaptable system.)

T stands for Clock Functions — if you've got a clock, you can set Time and Date using WordStar Controls and you can time and date stamp documents.

You can also readjust the position of the screen and change colours both for the background and foreground of the Window as well as for the rest of the screen. Also, you can toggle the status line *and* the function keys on and off. Y s — you have a Status Line — a twenty-fifth line on the bottom of the screen that tells you if the Function Keys are active, if you have Cap Lock on and it will give the the time (if you have a clock fitted).

This is an extremely useful addition to the Microbee's capabilities for a very modest price; these enhancements bring CP/M on a long way. What with the Microbee Shell, the Premium Graphics, ramdisks of various sizes and more, MS-DOS looks positively clumsy!

The One Bug

Peter himself brought the bug in the Broughton Expanded BIOS to my attention: in Telcom it can only transfer files at 300 baud. When I tested this, I had problems at 300 baud as well — so I finished up getting a copy of an old disk with an old system and booting with its system.

A Permanent Part of Memory

One other feature of the standard Microbee that I have come to really appreciate is its ability to always check on the A:drive as well as the logged drive if you call up a program. This allows you to effectively use a program disk in drive A: as a permanent part of computer memory.

The more I use other computers without this facility, the more I appreciate it — it certainly goes a long way to compensate for the limited memory addressing of a Z80 chip.

The Future

I have noticed that the price of AT clones over the past months has tumbled down and down. Prices have fallen to close on $2,000 from some outlets. The old standard IBM clone is now well and truely dying, if not buried (unless heavily enhanced with add-on cards). This means machines with a megabyte and more of RAM are rapidly becoming the norm.

It is this kind of memory that is needed for reasonably quick desktop publishing, fine graphics, speech controls and plain language artificial intelligence instructions — all of which will soon be standard abilities. New machines with Reduced Instruction Sets are now on the way from companies like BBC (they will be able to run rings around any AT).

But despite all this, Microbee's standard machines still hold their own as friendly, low-cost and easy to use, with good support from user groups. Their enhanced operating systems are a far cry from the older CP/M machines — and can do many things easier than high-flying programs like Gem and Windows which, for a start, have nothing like USR.COM allowing easy operations of batch commands.

It's easy to get power-crazy with computers — and to lust after more and more megabytes of memory. But it is the tailoring of systems to specific needs that is all important. It's crazy to say that such a neat piece of engineering as the Z80 chip at the heart of each Microbee has had its day simply because it's over four years old! New uses are still being found for it every day.

KWIKKEY.MWB

KWIKKEY.MWB works like Qwikkey, but inside Basic, and has now become available on Bulletin Boards (at least on Melbourne's MBUG, (03) 882 1571). Just think of the time it can save you with repetitive commands assigned to one key! You can change your choices on the run or store sets of commands for particular occasions.

And a Shell!

BASMENU.MWB gives you a screen of basic file names around which you can move with the cursor keys. In my opinion, it should always be loaded when you load Basic — just set both to load on the same key with Qwikkey, USR.COM, (or the Broughton Function keys!).

In the July issue of *Sting*, from the West Australian User group I saw a very helpful article about the kit clock that you can add to your 128K machine — you get a calendar clock with a daily alarm in a 12 or 24 hour format and it can even support daylight saving! □

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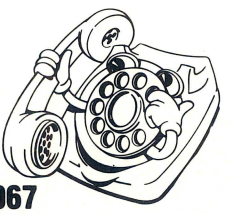

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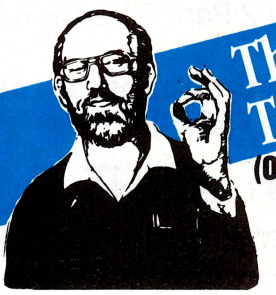

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BY JOHN HEPWORTH

YOUR IBM

User Groups

In IBM Underground in the June 87 *Your Computer* issue, I asked User Group librarians to give me details of their libraries and the ways users can get access to them. Two of the most respected groups in the country have so far contacted me. In each case the information sent goes far beyond details of the Public Domain Software Library and so I will use this column rather than IBM Underground to pass on the information. The two groups I will feature this month are the Sydney PC Users Group, and the Melbourne PC User's Group.

User Groups are the lifeblood of the PC revolution. They are a source of information and inspiration and a focus for the mutual assistance that users give each other. Without them, PC applications could not have become as powerful as they now are, and new users would have little or no unbiased advice available.

The Melbourne PC User's Group

One of the first PC User's Groups in Australia, the Melbourne group has been operating for around four years. They hold a number of meetings each month, one general meeting and a number of Special Interest Group (SIG) meetings.

SIGs are held on Communications, Databases, Desktop Publishing, Turbo Pascal, Technical Matters, and Public Domain Software. The general meetings are held at 6.00 pm on the first Wednesday of each month at Clunies Ross House, 191 Royal Parade, Parkville. The postal address is GPO Box 1728P, Melbourne, Vic, 3001. Fax is (03) 602 2989 and the Group's Bulletin Board is on (03) 819 5392.

Most SIGs are held at different days, times and venues, but the Public Domain Software SIG is held at 7.30 pm on the fourth Tuesday of each month at St Mark's Anglican Church Hall, Canterbury and Bourke Rds, Camberwell. Public Domain software can be purchased by mail, at the general meeting or at the Public Domain SIG meeting.

The Melbourne PC User Group Library Catalogue is on three disks, ready for you to print out or just scroll through on screen with a wordprocessor or scrolling utility program. After selecting a desired disk it can be ordered from the librarian. All software in the library is fully legitimate public domain or user supported software and no pirate software gets near the Melbourne group or any other group like it.

The library catalogue currently costs $20, and any disk in the library is $10. Postage for any quantity of disks is $3. The group is currently reviewing these charges with a view to reducing them.

The Group's newsletter is a very professional, 32 page, monthly magazine, good enough that many people outside Victoria joined the group just to get it. Membership is $25 for individuals and $15 for students. Corporations may join at $50 for the first two representatives and an extra $25 per additional representative.

Sydney PC User Group

The Sydney PC User Group was formed a short time after the Melbourne Group, having been in existence a little over three years. Like the Melbourne Group it has a number of SIG which hold meetings in addition to the main meeting at the Masonic Centre, Castlereagh and Goulburn Sts, Sydney on the Fourth Monday of each month at 6.15 pm. In addition, a regional general meeting is held as the PC West SIG at Parramatta, and the former Challenger User Group, is affiliated with the Sydney PC User Group and holds Challenger SIG meetings.

SIGs include Business Applications, Desktop Publishing/Graphics, Communications, Consulting, Languages and Public Domain Software.

The Public Domain SIG holds its meeting at 14-16 York St Sydney at 5.45 pm on the third Wednesday of each month.

The Sydney Public Domain Library cata-

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logue is also on disk, in this case on five disks, costing $25. A range of disks is on sale at meetings for $10 each ($13 for 3½ inch) or may be ordered. Postage is $3 for each four disks.

The group publishes an impressive 16 page monthly magazine using the latest Desktop Publishing hardware and software. Membership is $35. Postal Address is GPO Box 5010, Sydney, 2001, and the Group may be phoned on (02) 29 7033. The Group's two Bulletin Boards are on (02) 29 3747 and (02) 221 5520.

I would like to repeat my plea to the Secretaries and Librarians of all user groups — please keep me informed of the details of your group so that readers can be advised.

Telecom Charges

Like many other users I gain a great deal of benefit and pleasure form the many bulletin boards currently available, and make next to no use of Viatel. Rumbling around at the moment from Telecom is a proposal which could have the effect, even if Telecom does not intend it, of closing all the free, volunteer bulletin boards and forcing all users onto Viatel.

After using 2400 baud and/or Trailblazers, who would ever willingly put up with 1200/75 and screens 40 characters wide? Who would pay connection time by the minute and frame charges to download?

Telecom proposes charging the people running dial up data services approximately $3 per hour per line (totaling several thousand dollars per year per line). It is intended to discourage those big companies who have found it far cheaper to dial across a big city like Sydney once for one local call fee and establish a near permanent connection rather than paying for a leased phone line.

In this regard, Bulletin Boards and their users are not at fault, for not only do Bulletin Boards limit the time any one user may be connected per day, but most of their calls are made out of business hours and therefore use equipment which would otherwise be idle.

In Australia we have traditionally enjoyed untimed local voice calls, with the 30 second calls subsidising the one or two hour calls. In many other countries all calls, local and STD, are timed, and the caller pays by the minute.

What is dramatically different about the Telecom proposal is that the service receiving the call pays by the minute rather than the person initiating the call. In addition, there has not appeared any proposal for Viatel to pay the charge as an internal accounting procedure and it then would have an effective competitive edge as a result.

Bulletin Board Sysops have no effective way of raising the cost of the Telecom tax from their users and would have to go off air. We, as users, would lose the ability to share news, tips, software and far more, and the whole user community would suffer. Surely Telecom has in the past gained immense benefit from information or software one or more of its employees have obtained from Bulletin Boards.

Telecom has a monopoly, but they are providing a commercial activity (Viatel) and then are arranging charges and conditions to wipe out the opposition. Surely, if any calls are to be timed, voice calls as well as data calls should be treated the same.

Even if commercial boards are treated differently to voice, they and Viatel should be on the same footing. Volunteer run Bulletin Boards with one line should be treated as a special case, and charged as if they are voice services. Maybe we should all man the barricades.

Formatting

One of the real risks in allowing new users to format floppies on a hard disk machine running DOS 2.x, is that, if they run FORMAT.COM from the hard disk and don't specify the drive to be formatted, then the hard disk could be formatted accidentally.

I have got over this problem with two simple steps. First I renamed FORMAT.COM to PCFORMAT.COM. Now typing FORMAT would simply give a file-not-found error message. I run PCFORMAT.COM from a one line batch file called FORMAT.BAT, which contains —

```
echo off
echo This program will format the disk in
drive B.
echo All data on the disk will be erased.
echo Press Ctrl-C to exit, or
pause
PCFORMAT B:
echo on
```

This has a number of benefits. If a floppy boot disk is used it will be in the A drive and cannot easily be formatted. Hard disks, likewise, cannot accidently be formatted.

A different problem arises when one opens a new packet of disks. I make it a rule to format a whole box of disks as soon as I remove the shrink wrap. if I buy bulk disks with 50 in a plastic bag, I format the 50 in a session. Doing it using one drive wastes the time it takes to change disks. I use a simple batch file to alternately format the disks in the A and B drives, so that while changing the disk in one drive the disk in the other drive is being formatted.

```
MULTFORM.DAT (DOS 2.x)

nnnnnnnnnnnnnnnnnn


MULTFORM.BAT

echo off
cls
echo :
echo :
echo Insert disks in A drive and B drive.
echo All information on the disks will be lost.
echo :
echo Press Ctrl and C at the same time to exit
echo Press any other key to continue.
echo :
PAUSE > nul
:top
echo :
echo Formatting drive A
PCFORMAT a: < MULTFORM.DAT > nul
chkdsk a:
echo ^G
echo :
echo Change disk in A drive
echo :
echo Formatting drive b
PCFORMAT b: < MULTFORM.DAT > nul
chkdsk b:
echo ^G
echo ^G
echo :
echo Change disk in B drive
goto top
```

To do this I use the program MULTFORM.BAT to drive PCFORMAT.COM. Running MULTFORM.BAT prompts the user to put a disk into the A drive and another into the B drive. After formatting the disk in the A drive it beeps the speaker once, and prompts the user to change the disk in the A drive. After formatting the disk in the B drive the speaker is beeped twice and the user prompted to change the B disk. When each disk is formatted, a CHKDSK is performed to confirm that all is well. The only exit from MULTFORM.BAT is by pressing Ctrl-C, as the concept of the batch file is to minimise operator input.

Normally PCFORMAT.COM needs the user to enter answers to its prompts. I created a datafile called MULTFORM.DAT and use the DOS redirection facility to read from it. A string of 'nnnnn' responses in MULTFORM.DAT works well with DOS 2.x, but users of DOS 3 will need to modify MULTFORM.DAT.

Unwanted messages are suppressed by the use of redirection, the '> nul' in the batch file dumps messages from PCFORMAT and PAUSE to the NUL device, and they do not appear on screen. The ^G is shorthand for Control-G and beeps the speaker. Enter it with your editor or word processor. In WordStar or Norton Editor pressing Ctrl-P and then Ctrl-G enters Ctrl-G into the file, and other editors should have a similar facility. □

GREGG FAULKNER

YOUR AMIGA

Genlock

Recently, I've spent some time with the Amiga A8600 Video Controller, more commonly known as Genlock. The hardware unit slides into the recess under the rear of the Amiga 1000 system box. The A8600 connects to the Amiga monitor port, audio output and, if required, to the parallel port. It's also available for the Amiga 2000. All cables are provided with the unit and it all fits together very quickly and easily.

The A8600 allows an external video signal from a camera or a video-recorder to be combined with the Amiga's graphics output in several ways. In the default mode, the background colour of the Amiga display, the blue in a standard workbench, can be replaced by an external video image. The combined image can then be recorded onto another video-recorder. This mode allows you to superimpose text and graphics onto a conventional television image.

A second mode allows the external video signal to replace any single colour selected from the Amiga's palette. This enables you to produce a computer graphic image with a real television image appearing in one part of the picture.

A third mode makes only the external video image visible, while a fourth makes only the Amiga graphics visible. All modes are software selectable and the external video image can be faded in and out under software control.

This device has enormous potential in training and education spheres and even for the home video enthusiast. It is now possible to produce truly professional titling and overlays for your own video productions at a manageable price.

Pro Video CG1

To compliment the A8600, Acme Software, (03) 596 6732, is distributing Pro Video CG1 — a professional character generation facility aimed squarely at video production houses and corporate video facilities. It uses a screen resolution of 640 by 500, which permits the text lines to cover the complete PAL television image area.

Higher than normal resolution requires more than usual memory and the CG1 package requires at least one megabyte of RAM to run. The 512 kilobyte Alegra expansion on my A1000 handled it fine.

With CG1 and A8600 both fired up it was quick and easy to create overlays, titles, and credits to rival those of network TV stations. At about $1500 for the A8600 and about $500 for CG1, professional results are now within the reach of most small video facilities.

Games

I try keep this column largely free of games reviews, but every now and then ... This month the game is Star Glider — the best arcade style shoot-everything-in-sight game yet to hit the Amiga. The vector graphics are dazzlingly fast and the control response is amazingly quick. When I loaded up Flight Simulator after playing Star Glider, it seemed to be running at walking speed.

The 'novella' supplied with Star Glider is interesting but not a lot of help in working out what the game is all about. The intrigue lies in trying to stay alive long enough to work out what you're trying to achieve. It's great fun.

Two other packages I've been playing with lately are Aegis' Sonix and Deluxe Music Construction Set from Electronic Arts. Look out for a forthcoming feature article on music and the Amiga.

Utilities

A couple of utilities which all Amiga owners should have handy are Marauder II and the Mirror Hacker Pack. Marauder II is my preferred tool for backing up my precious original disks of commercial software. Several software publishers are still engaged in that annoying game of creating illegal length sector gaps and other oddities on their disks, supposedly to prevent illegal copying. All honest software owners need a means of making a working copy of their disks. With 'brain file 13' now available, the list of 'protected' software which Marauder II will back-up would fill this page.

I am *not* advocating piracy, but the honest purchaser should not be disadvantaged when, as we all know, the pirates are able to crack the protection anyhow. The recent move by some software publishers to leave disks unprotected but require a word from the manual to be entered seems to be a move in the right direction.

The Mirror Hacker Pack is a disk full of utilities, not dissimilar to the famous Norton Utilities for that large blue coloured thing. With Hacker Pack, one is able to recover deleted files, recover files from damaged disks and much more. You can even examine your commercial disks to see what sort of silly games the manufacturer has played in the name of protection.

I've said it before and I'll say it again, the one thing which will kill software piracy stone dead is reasonably priced software. When an Australian Amiga owner sees a package advertised in American magazines for US$49.95 and then sees the same package on the shelf for A$215, who can blame the owner for feeling disgruntled. At last count the Australian dollar was worth about 70 cents US.

I've said it before and I'll say it again, the one thing which will kill software piracy stone dead is reasonably priced software.

By my calculation that makes $US49.95 worth about $A71.36. Add importer's mark-up and tax and let's round it out to $A115. So where's the other $100 going?

The scenery disks for Flight Simulator are selling for $US19.95 in the US, but out here they are $A79.95 — *Why?* Until software suppliers start to consider the customers' desires in terms of unprotected master disks and reasonable pricing I'm not about to get too choked up when they cry about piracy. (I guess that just about kills my chances of getting any more review copies of software, eh?)

(Incidently, the Cook wishes it to be known that her lips definitely *do not* move when she's reading (*Your Amiga, Aug.*'87) — It was an easy mistake, it must be the only time they stop.

Club Amiga

Members of Commodore's Club Amiga were delighted to receive free of charge a copy of the Amiga World Special Issue 87. Silly old me wrote off to the States for a copy and, what with airmail rates and the like, it cost me about $20 all together — looks as though the much maligned Club Amiga is paying off after all. Craig Tegel at Commodore has been organising some 'special buys' for Club Amiga members who can save heaps on selected software.

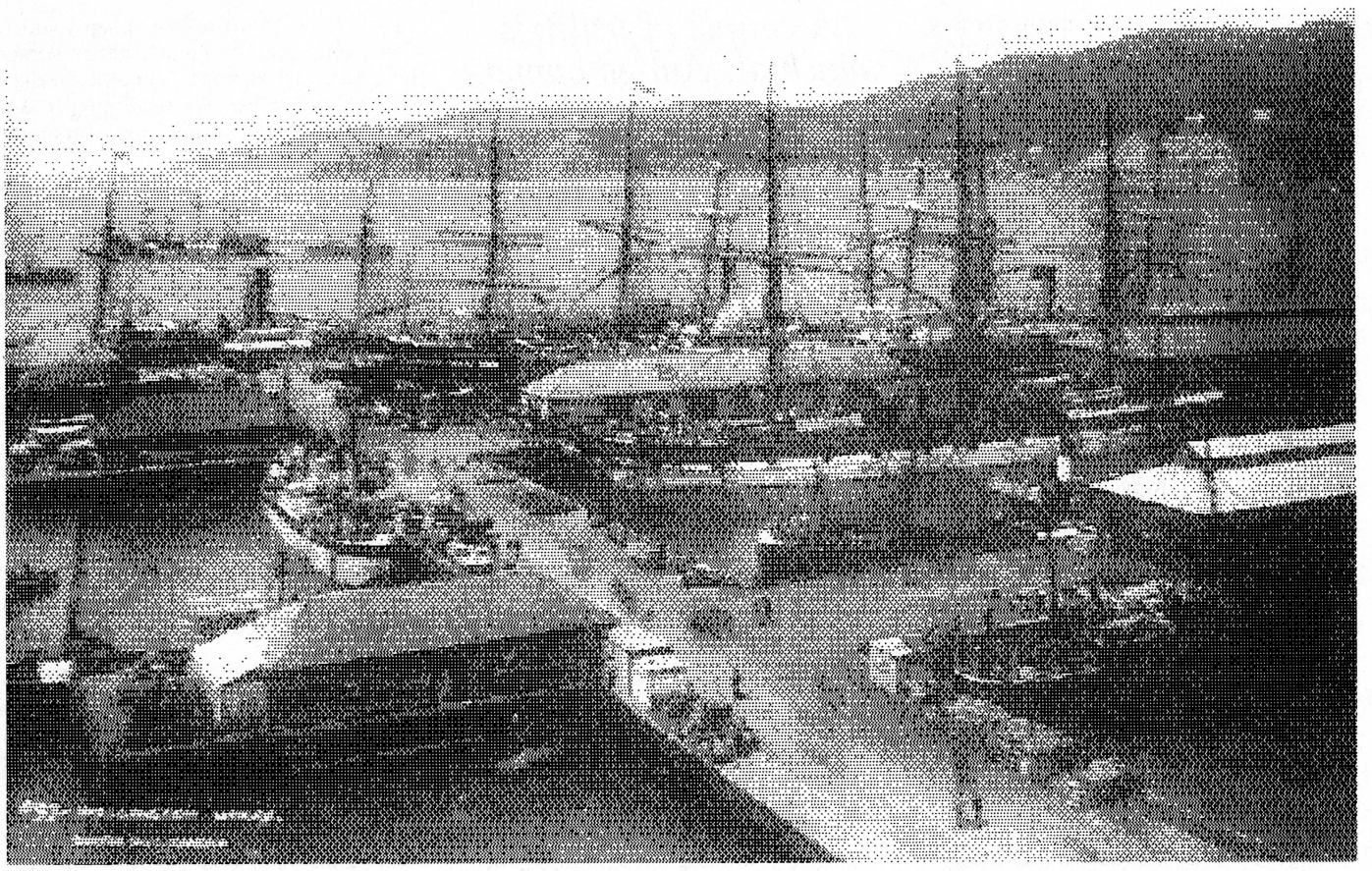

Figure 1. *This image of Wellington Harbour is just one of the many on Disk 72 of the Fred Fish collection of Public Domain — the images range from good to great.*

Keep up the good work Craig, more, more!

The last $300 cashback offer on the Amiga 1000 must have resulted in cosmic sales figures — I'm really delighted to hear of the enormous sales of the Amiga because every time another one is sold it makes software producers that much more interested in writing new and exciting software for the machine.

By the way, I get to use Big Blue's latest offering, the Personal System/2, quite a lot in the course of my work and it's not a bad machine at all. In fact if they keep improving at this rate they'll catch up to the Amiga in another year or three!

Fred Fish cont'd . . .

This month I'll cover disks 61 to 73 in the Fred Fish collection of Public Domain software. (My drives are still recovering from the strain and as soon as they have fully recuperated, more reviews will be forthcoming.) If you're interested in these disks, contact your local Amiga dealer — the disks are shareware and many dealers are letting users copy them during off-peak shopping times. But — many of the disks are shareware, so do the right thing if you find they are useful. (Any dealers who are offering this copying service are invited to drop me a line so I can give you a mention for the benefit of those who are having trouble finding the disks.)

Now — Disk 61 has Atpatch, which is only of use to those with a Transformer. Filldisk ensures that your disks contain no secrets and Lpatch helps to get old Workbench 1.0 programs going under 1.2. MicroEmacs is for the advanced user only. Pearlfont is a pretty character font which can be carried over to your favourite paint package. Terrain generates some fancy map-like images which could be useful as backgrounds for paint projects. Vsprites is a clever example of use of Vsprites with source code supplied.

Disk 62 contains an elaborate game called Hack, which I've never really got into but could be interesting for games freaks. Disk 63 contains a port-over of a popular UNIX game called Larn which didn't turn me on at all, but then I'm hard to please.

Disk 64 has some interesting images and image-presentation utilities put together by the Commodore/Amiga people — very useful stuff.

Disk 65 has Bawk, which is a search-and-replace type text utility that is more bug-ridden than a Darlinghurst flophouse. MWB and Closewb are a pair of utilities to allow you to open and close an extra Workbench window. Cookie is a fortune cookie note producing program — velly funny! Jtime gives detailed instructions and diagrams for the manufacture of your own battery backed real-time clock for mouse port 2. Menubuilder is a menu building utility for C language programmers. Newpackets is an important tutor package for 1.2 written by Carolyn Scheppner. Pascaltoc is a language translator which doesn't work. Prep is a Fortran preprocessor which may or may not work (and I really don't care). Runback allows a program to be started independent of the CLI window and is very useful. Sunmouse makes your mouse behave like a Sun Workstation mouse — squeak, squeak!

Disk 67 starts with AMCAT, a very useful disk cataloging program. (This is shareware, so please: send money to the au-

thor.) Amigaspell is, as you might guess, a (Americanised) spelling checker. Bouncer is a graphics demo of a ball bouncing around a 3D room — very pretty. Comm is yet another terminal program. Dux5 is a descendant of DirUtil and is more powerful than, but not as friendly as, DirUtil3 which is the best thing since miniskirts.

Hexcalc is a beaut calculator which can replace the useless thing in Workbench/Utilities. Icons is a collection of interesting icons (what did you expect?). Mandala is an unusually good graphics *cum* audio demo. Persmit is a demo teaser for a commercial (but pleasantly cheap) personal file manager. Rslclock has nothing to do with Bruce Ruxton, but is a handy little clock utility. Rtcubes gives a brilliant demo of fast graphics — show this to your local Mac Mouth. Wheel is a 'Wheel of Fortune' type game written in AmigaBasic which beginners can use as a demo as well as for fun.

Disk 68 contains the latest version of MicroEmacs, which is a small but powerful text editor that runs on many different computer systems.

Disk 69 begins with ASM68K, a full-featured macro assembler with excellent documentation. Blitlab lets you play around with the blitter in safety. Conman is an alternative console manager with advantages over the standard item. Console is another console handler. DK is a really neat little demo which is ideally slipped into the startup sequence of a friend's Workbench disk — very cute. Frags reports on the amount of memory available in blocks above a defined size. Icontype allows you to change the type of an icon after manufacture. Make is a new version of the old command. Monproc moniters a process for packet activity which is then reported. Mouseclock turns your boring mouse pointer into a digital clock with pointer — cute. SB lets you browse through structures in the system. Spew is a charming little number which generates Daily Mirror, Melbourne Truth type headlines — amusing. Spool is a set of programs to manage and perform spooling of printer output and is very useful. WC is a word count program to count words in a text file.

Disk 70 contains Amigamoniter which is a very nice utility to let you see what is going on inside the machine. ARC is an archiver/compresser which is important for anyone using bulletin board shareware. Blackbook is a computerised gentleman's emergency kit — real black books are easier and cheaper. Dotil is a directory displaying package which is very useful.

A couple of utilities which all Amiga owners should have handy are Marauder II and the Mirror Hacker Pack. Marauder II is my preferred tool for backing up my precious original disks of commercial software.

Gravitywars is a very, very nice game which is strongly recommended for students and everyone else. Probably one of the best things I've found on Fish disks. Jobs is an alternative user interface to CLI and seems useful. Lens is a magnifying glass utility for examining your navel. Life 3D is a version of the classic computer simulation; nicely done and fun to play with. Logo is, I am informed by a cognizenti, a very nice implementation of the Logo language, complete with some dazzling demo routines. Setkey is another teaser demo for a commercial keymap editor package. VPG is a video pattern generator — useful for adjusting your television or monitor.

Disk 71 has Airfoil, which is a very clever graphics display of the behaviour of airfoil sections under different conditions. Amibas is a collection of AmigaBasic programs to add to the collection, examine and learn from. Blocks does a lightning fast wandering snake imitation with square sections and 4096 colors — a very pretty demo. Comm is yet another terminal program. Diskx lets you poke around in the guts of an AmigaDOS file system. FPIC is a fantastically good image processing program which is designed for the processing of IFF pictures. Stunningly powerful stuff and very easy to use. IconMK builds icons for files which were created without icons — useful. Icons is another collection of assorted icons. Newfonts provides two more fonts for the collection, one is electronics symbols and the other a PC-like font. Etcli allows editing in CLI command lines. Pwdemo demonstrates a commercial package PowerWindows which is a window maker for C language programmers. ROT generates and displays 3D objects. Timeset lets you set the time from Workbench without going into Preferences.

Disk 72 is chock full of images which range from good to great. There's something here for everyone. Some of the digitised images which are beginning to appear around the traps are stunningly good.

Disk 73 begins with ADD, a utility which lets you create keyboard shortcuts for selection of menu items and some other things. Autoiconopen is code which fools Workbench into thinking it is receiving mouse inputs which open and close icons — it must be useful for something. DIO is a module for C programs facilitating use of exec devices — handy for C programmers. Dissolve is a pretty graphics presentation tool which causes the image to gradually coalesce onto the screen in myriad random pixels, very effective. Dterm is yet another terminal management package with a lot of special functions. Expose is a program which causes all window controls, even those hidden under other windows, to become visible and usable.

LIT is a utility which displays all characters being handled, including those which are usually unprintable. LMV is a shareware program which allows you to make animated sequences from series of IFF images. Sample images are included and the program is very effective — worth every penny. Mouseoff is a 'time out' type program which removes your mouse pointer after ten seconds of non-use and replaces it when a key or mouse is touched. Parout uses parallel port resources to access the parallel port directly — shades of robot control!! Penpalfont, search me, sounds like yet another fancy font. Runbackground, like it says, this one lets you run a job in the background while doing other processing. Snapshot is a screen dump utility which works OK with enlarged memory. Type and Tell speaks aloud each key you press. XPLOR is a system examination utility in assembler.

Some of the packages are shareware. This means that they are not free. If you are going to make use of any of the shareware packages, you are asked to send some money to the author to encourage him/her to produce more good stuff for us all. A bank draft drawn on an American bank (the Commonwealth bank is good at sorting this out for you) is the ideal method of payment. Shareware is invariably good value, compared to commercial software, so support the authors and encourage the concept.

Next month I'll be looking at the upgraded Digi-View and (at last!) Digi-Paint, see you then. □

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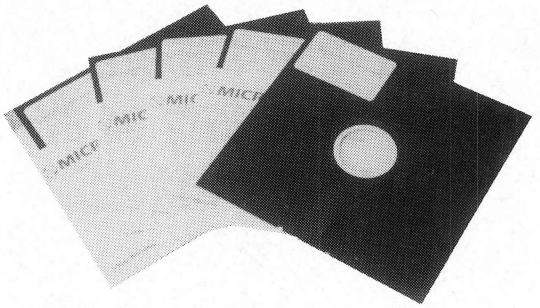

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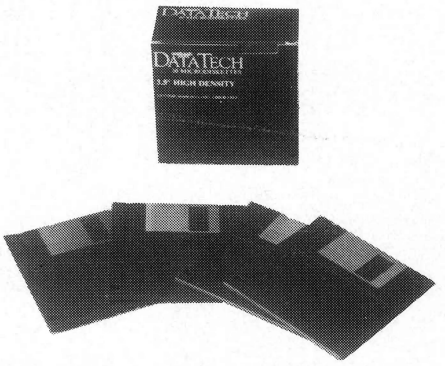

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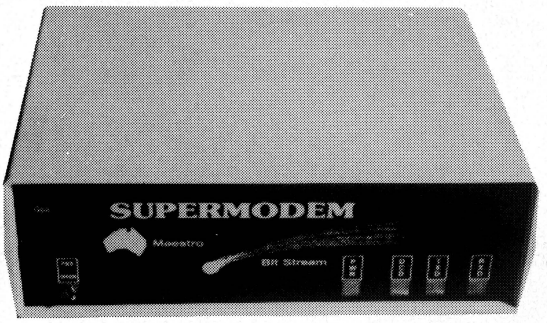

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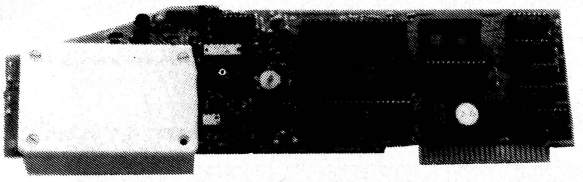

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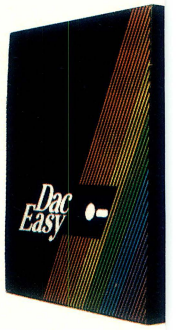

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PAUL FISHER

YOUR ATARI

A couple of months ago, I promised to write about some art programs for the Atari ST series. The Atari 520-ST and 1040-ST are graphics machines *par excellence*.

At the time of their release, they offered graphics resolutions and colour palettes not previously available in home computers and surpassing many professional computers, including Big Blue. Although IBM have now caught up with Atari, the ST remains an excellent machine for computer assisted artwork.

When Atari first announced the ST back in 1985, it proposed to bundle Digital Research's GEM-Paint, along with a couple of other programs from the GEM collection. Ultimately, only the GEM desktop was released on the ST and Atari was faced with obtaining paint, write and further programs from other sources.

The paint program was called Neochrome. This was originally released as Version 0.5, which was pretty limited, but the later version, 1.0, is a very good program indeed. A number of third party developers have also released paint programs, the best known being Degas, the Design & Entertainment Graphic Arts System, written by Tom Hudson and distributed by Batteries Included.

When a program has to compete with bundled software, it must offer considerable advantages over the 'freebie' in order to make the grade. Hudson has been quoted as saying that he was so stunned by the quality of an early pre-release version of Neochrome that he decided to see if he could match it.

The result was Degas, which actually reached the market in the US before Neochrome. Degas offers a number of facilities not found in Neochrome but it also lacks one or two. In general, I think Degas will appeal more to people producing serious art, while Neochrome is suited to the doodler. An enhanced version called Degas Elite is also available.

The opening screen of Degas is a menu offering a palette of 16 colours in low resolution (4 colours in medium and mono in hi-res), a swag of brush shapes and access to all facilities of the program.

Drawing can be with brushes or pencils of various shapes, ray projection for perspectives, 'K-lines', circles, frames, airbrush and so on. A magnify feature allows you to work pixel by pixel for fine touching up while a slow-draw facility gives much finer control over the mouse. (A large movement of the mouse is translated into a very small movement of the brush or pointer.) This is important as the mouse is a fairly coarse instrument for drafting.



A mirror option is provided; so is a shadow facility which provides a shadow outline for each line as it is drawn. The obligatory area fill facility is also there — unlike Neochrome, this provides a range of over 60 fill patterns in addition to solid colour. Additional fill patterns can be loaded from disk, or you can design your own. The same goes for text fonts and brush shapes.

The provision of the ray-drawing tool and a multitude of fill patterns makes Degas ideal for architectural sketching, especially in the medium or high resolution modes.

Degas is a well-constructed program. Its use is so intuitive that the small but comprehensive manual is almost redundant. There are no unpleasant surprises, only pleasant ones.

CAD-3D

A program of quite a different type, also by Tom Hudson, is CAD-3D. This is quite different from anything else I have seen and will be reviewed in full in another column.

Pro-copy

Another quite different program is Pro-copy. This is not by Tom Hudson and is not an art package. It is a simple, no frills but very powerful disk copying program. Pro-copy is distributed in Australia by Tech Soft.

The documentation (which comes as a text file on the distribution disk) states that Pro-copy is to be used for making archival copies of your own legally purchased programs, for your own use. Personally, I think this is a bit of wishful thinking. As was remarked in something I read recently, software piracy will be eliminated shortly after sex before marriage!

Anyhow, Pro-copy is a menu-driven program which simply reads in the contents of the source disk and writes them out to a target disk. It can handle most copy protection schemes and can also format the target disk as it goes. A useful feature is the ability to make multiple copies without the need to read in the target disk every time. The program can also handle an ordinary disk copy operation with much less disk shuffling than using the GEM desktop to copy disks.

With a large percentage of Atari soft-

ware being copy protected, and given the ability to copy non-protected software more conveniently than the GEM tools, I rate Pro-copy as a worthwhile addition to your software library.

Copying Files

The folk lore for copying files between folders on a floppy seems to be that it is necessary to copy the file onto a second disk, close the first folder, open the second, then copy back onto the original disk.

This is not necessary with the later versions of TOS and GEM. Say you have a file called 'my.prg' in a folder called 'progs' on disk A. To copy this to a second folder or the root directory, simply double click on the Disk A icon to get a second window for that disk. On the new window open the appropriate folder or root directory. Then click on your original window and drag my.prg to the new window. The copy will then be placed where you want it with no need to shuffle disks.

One word of warning — you cannot copy a file into its own folder (that is, you can't copy a: progs my.prg into the a: progs directory). To attempt this will corrupt the file beyond repair. Try it on an unwanted text file to see the effect.

One word of warning — you cannot copy a file into its own folder . . .

Consumer Electronics Show

The Perth Consumer Electronics Show (CES) is billed as the largest in Australia. It covers all manner of electronics as well as computers. Unfortunately, it seems that the change-over from Mobex to Atari Australia came too late for a display to be organised.

To make amends, local dealer, Computer Oasis, has been running an Atari Expo in a regional shopping centre. The Expo showed off some of the latest hardware and software — but no Mega STs yet.

Among the new hardware were the first 'official' showing of the 520 ST-FM, the 65XE games computer, Tech Soft hard disk, Fujitsu colour printer and Oki laser printer. This was quite an impressive show and Computer Oasis are to be congratulated on their initiative.

Public Domain

Finally, a further word on user groups. One of the very worthwhile activities of many user groups is the maintenance of software libraries. The programs in the libraries are either public domain, software demonstration disks, shareware or programs licensed for distribution through the clubs.

I have recently received the Public Domain list from Norman Pearce of the Adelaide Atari Computer Club. Norman currently has 124 disks listed and hopes to have 145 in the near future. Most of these are available for $10.00 plus $1.00 postage and handling.

For further information contact him, care of the Atari ST Public Domain Software Library, PO Box 333, Norwood SA 5067, or your nearest Atari computer club.

Well, that's it for this month — keep the feedback feeding. □

FTL MODULA-2 Compilers $90-$125

You've probably heard of Modula-2, Niklaus Wirth's newest language: It's now available for a range of machines from JED Microprocessors.
This implementation was written in Australia, and is being sold worldwide. It's available for small-memory MS-DOS and CP/M Z-80 at $90 and large memory MS-DOS and 68000 (Atari) at $125.
It contains an integrated full-screen editor with fast compilation and linking from libraries, which makes it more powerful than Turbo-P., and much easier to use on large programs. You get 1 meg of soft-ware on three full disks, with full sources of the editor and many other modules and utilities. It produces fast, PROM-able code which closely follows Wirth's third edition, with 8087 and LONG support.

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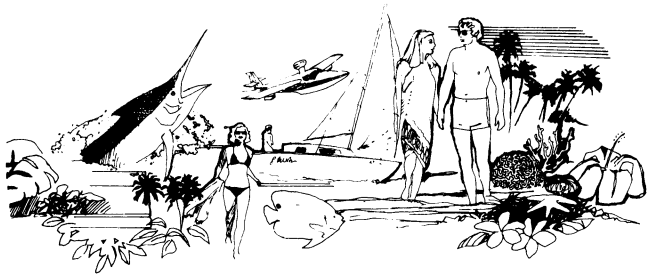

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IAN ALLEN

YOUR C64

The Amazing Asterisk . . . "*"

EVERYBODY WITH a disk drive is familiar with the way you can use the filename "&" to load up a listing of the disk directory. It's probably the most commonly used feature of CBM DOS, because there are a million and one occasions when you want to know the contents of a disk.

But there is another feature of the DOS which I suspect is widely under-utilised, simply because people are not aware of it's versatility: the "" filename.*

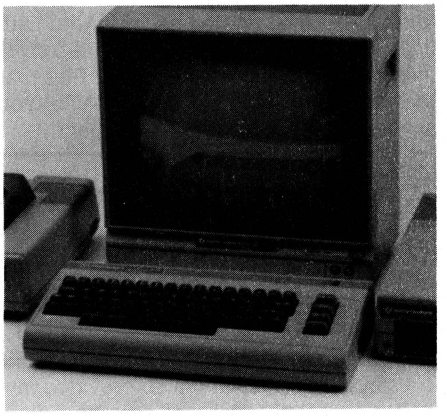
But there is another feature of the DOS which I suspect is widely under-utilised, simply because people are not aware of it's versatility: the "*" filename. Most people use it when they've first powered up and want to load the very first program on their disk. They simply type:

```
LOAD "*",8
     or
LOAD "*",8,1
 (for an M.L. program.)
```

(For the purposes of this article I will stick to Basic V.2 commands, but the same DOS features work equally well from the C-128's Basic 7.0, and apply to the 1570/71 drives.)

Load "*" is a useful trick, because you can safely assume that all commercial software will boot via the first program in the directory and this way you don't have to bother remembering the names peculiar to each program. However, when it's used in this form, the "*" filename only works reliably when you're loading the first program since power-up, or since the drive was last initialised. That's because the "*" filename normally calls up the *most recently* accessed file and only boots the first file, if no other has been called before.

You can use this fact to advantage, because (provided you've not loaded a new program in between), "*" will let you load



the last program SAVEd, even if it's been previously scratched. That may seem a little hard to believe, but try it for yourself (on a test basis). Load up any old Basic program, then proceed as in Listing 1.

```
SAVE "TEST",8
(to save it under a new name), then:
OPEN15,8,15:PRINT#15,"S0:TEST":CLOSE15
(to scratch it), or alternatively:
>S0:TEST
(if you're using the DOS WEDGE), then:
NEW
(to wipe it from computer memory), then:
LIST
(to make sure it's gone), then:
LOAD "*",8
(this is the test part), then:
LIST (it should be there again!)
```

***Listing 1.** The "*" filename normally calls up the most recently accessed file and only boots the first file if no other has been called before — try it using the above listing after loading up an old Basic program.*

That trick also works even if you've done a directory scan via the DOS WEDGE in the meantime, but it doesn't work if you've loaded the directory with Basic's LOAD "$",8 command. That disturbs the pointer and it's another reason why you should get into the habit of always loading the DOS WEDGE before you start a programming session. (You've no excuses, its supplied free on the disk that comes with your drive!) The trick also doesn't work if you change disks or power off. It's got to be the world fastest *un*-scratch method (but only if you do it on the spot).

Because "*" points to the last file accessed, you can also use it as a fast way to issue the VERIFY command. VERIFY "*",8 will automatically refer to the file you just SAVEd.

It's got to be the world's fastest un-scratch method (but only if you do it on the spot).

Resetting

Sometimes you will have loaded one program, and then want to switch to another on another disk, but one which is the first on its directory. LOAD "*",8 won't work here; you'll get a disk ID mismatch error. What you need to do is to somehow reset the drives' "*" pointer to the default state. If you've got an SX-64 or a 128D it's easy; just press the drive reset button. If you're using the standard 64/1541 combination you will need to either have fitted a reset switch to the 64 (which also resets the 1541) or you will have to switch off the drive and then turn it on again.

Personally, I don't like turning my equipment on and off any more often than I have to. The microseconds after you first power on are the time of maximum stress for electronic components (just like light bulbs) so you'll be pleased to know that DOS provides two other ways which avoid the need to switch off. The first is to issue the initialise command "I". You do this by typing:

```
OPEN 15,8,15 : PRINT#15,"I" : CLOSE15

or

>I from the DOS WEDGE
 (see how much easier it makes things!)
```

But the easiest way to reset the "*" pointer is to simply issue the Load command with a colon before the "*", as shown here –

```
LOAD :"*",8
     or
LOAD :"*",8,1
 (for M.L. autostart programs)
```

This trick also works if you want to reboot a program that loads in parts. It may have booted off the first program on the directory but then the Boot program subsequently loaded other programs off the disk. This means that the "*" will point to the last part of the program that was load-

ed, not the boot that you initially loaded. The above code will reset the drive as if you had just powered it up. (It doesn't similarly affect the 64, so if you have occasional problems look to it).

Load and Run

Normally, a LOAD command will only put your Basic program into memory. It'll then wait for you to type RUN to get it going. You can issue a LOAD and RUN command by typing:

```
LOAD "*",8:
 (note the colon AFTER the 8)
```

Then hold down the Shift key and tap the Run/Stop key. You will see the word LOAD appear after the colon, which doesn't seem to make a lot of sense, but your program will Run as soon as it is loaded. This tip will work on any Basic program, even if you spell out its name entirely. It's something I've often found very handy.

The "*" filename is actually a wild-card and can be used with characters before it, in which case it will search for the first file on the directory that begins with those letters. For example, LOAD "U*",8 will load the program "Ultraterm" if it is the earliest program beginning with "U" in the directory. You can also use this wild card feature when you want to do a directory list, but are only interested in the files that beginning with say, the prefix "SND." You would issue the following command:

```
LOAD "$0:SND.*",8
```

This is helpful when you have a lot of files on a disk, and want to be able to pick out only certain ones. In Ultraterm I used the prefix "SND." to indicate that a file contains music data. By doing so I provided a way for the program to differentiate music files from text files and also provided myself with an easy way of scanning disks when I am looking for a particular tune. The screen is less likely to scroll because the files I'm not interested in aren't displayed, and this also makes it less confusing to scan.

You can use almost all the DOS features from within programs but surprisingly few people do. I think there is often a misconception that DOS commands only work in 'direct' mode — not when a program is running. It helps to remember that it's not the 64 that interprets the DOS commands; it only passes them on. It's the 'brain' inside the drive that does the real work and *it* only interprets orders; it doesn't care about which mode the computer was in when they were sent.

One last trick. You can also use the "*" character to search for files of a particular type, such as PRoGram, SEQuential, RELative or USeR. Just use "*=P" or S or R or U (the first letter of the file type you are after. For example —

```
LOAD "$0:*=S",8
```

will load for listing only Sequential files on the directory. You can use this command in combination with other tricks. This command —

```
LOAD "$0:S*=P",8
```

will load for listing only Program files beginning with "S". □



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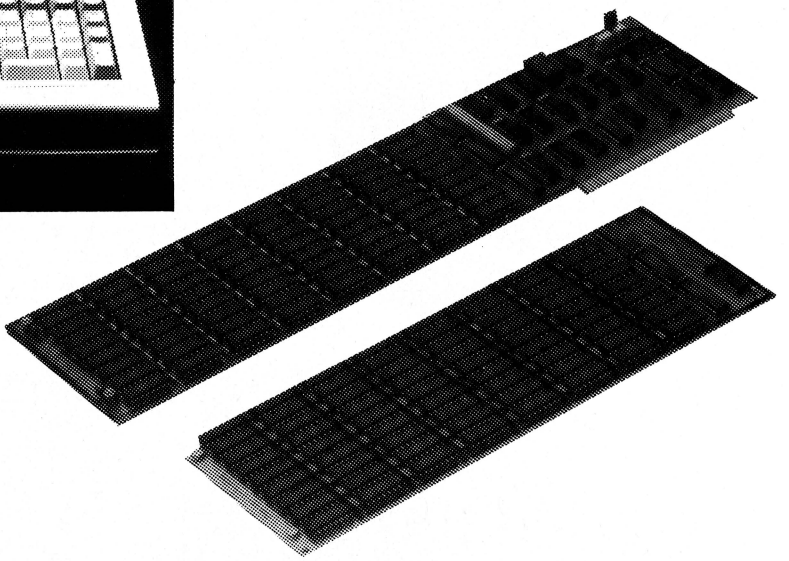

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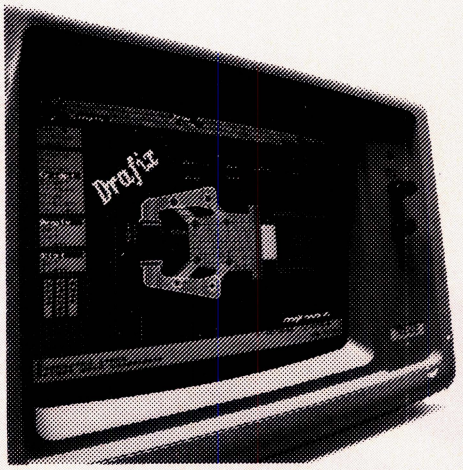

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YOUR MAC

IF YOU'VE BEEN keeping an eye on the IBM camp over the last six months, you'll have seen much excitement over the advent of Intel's 386 chip and the more recent announcements of Microsoft's Operating System/2 (OS/2) and IBM's Personal System/2 (PS/2) computer line. These changes are said to be revolutionising the IBM world by extending memory capability and through the introduction of multitasking and multi-user systems.

Central to all these happenings is Intel's 80386 processing chip which is supposedly a super version of the Intel 80286. Both the 286 and the 386 exceed the capabilities of the software presently available — which seems to be the way things are going at present.

It could well be another year before Microsoft are able to de-bug their new OS/2 operating system for the 286 and, although OS/2 will work on the 80386-based computers, it doesn't extend their capabilities past that of the 286. IBM users will have to wait even longer for Microsoft to write and debug their OS/3 operating system to get access to the full capabilities of the 386.

MultiFinder

Of course the Mac world hasn't been idle. Motorola hasn't sat back and watched the development of the 80386 without having done something about it, which is why rumours abound about the new Mac II. This machine is going to use Motorola's 68030 processor running at 20 MHz, with a 68882 floating-point processor — so they say.

If you believe the hoopla, PCs are moving towards the introduction of multitasking and multi-user operations. We already have a form of multitasking (albeit primitive) on our Macs and IBM PCs in the form of desktop accessories and memory-resident programs, although true multitasking computers don't suspend the operations of a program in the background mode.

The whole idea of multitasking is that you can continue to write your business plan on a word-processor, while your 10,000 row by 10,000 column spreadsheet re-calculates and your mailing list database re-sorts — all simultaneously. These computers are for those users who believe their every second is precious and who deal in massive mathematical forecasting programs to ten decimal points.

Apple are working flat out to get their multitasking operating system (code-named Juggler) to market before Microsoft breaks out its OS/2. And whereas Microsoft will undoubtedly charge through the nose for OS/2, Juggler — now renamed MultiFinder — will be packaged free with all new Macs.

MultiFinder is an extension to Finder 6.0 and System 4.1 that provides a form of multitasking with the added function of 'enhanced data-sharing capabilities'.

Andy Hertzfeld, the man who devised Switcher, wrote the basic form of Juggler/MultiFinder. It uses many of the Switcher algorithms plus the interface from Servant, a multitasking front-end for Finder that Hertzfeld has released over Compuserve.

Apple originally claimed that the bulk of Mac applications would run on MultiFinder without modification, whereas all IBM DOS applications will have to be re-written for OS/2. Even when re-written, many old IBM applications will not take advantage of multitasking and they'll run very slowly.

Like most company public relations, this comparison is both partly true and partly false. Most IBM applications would have to be rewritten for OS/2 — but they won't be, simply because 286- and 386-based computers both have a 'Virtual 86' mode that allows them to run MS-DOS applications without modification.

It also appears that Mac applications will need to be rewritten to take advantage of the multitasking functions of MultiFinder. Without modification they will just sit stationary in the background like the old Desk Accessories.

What you will get in the new system-software package is the ability to select either Finder direct (for old applications that won't work with the new extension) or MultiFinder. You can also set up your own standard operating environment and save these parameters onto the disk, so that everything automatically falls into place when you start up each morning.

You set the memory partition size of each application through a pull-down window. With MultiFinder, the number and size of applications that can be open at any one time depend only on the RAM available — although Apple say the limit is 30. The Mac II with 8 megabytes on the logic board and more in the slots can obviously run a large number of programs at the same time . . . but 30?

The operating system extension can work on all current versions of the Mac from the Mac Plus to the Mac II; the 'Fat Mac' is too small to gain advantage. You need at least 1 Mbyte for multitasking nowadays, as the applications are beginning to consume more and more space.

If you've got an SE or Mac II with a MS-DOS co-processor board, you will also be able to run most MS-DOS applications (unmodified), simultaneously with Mac programs. You can have Lotus 1-2-3 running under MS-DOS in one window and cut-and-paste directly into a Macintosh application.

Problems . . .

MultiFinder is said to have trouble with resource arbitration. Rumour has it that it isn't effective in handling problems of 'ownership' of various system resources like serial ports and this could pose a threat to the compatibility of communications software — key applications in multitasking systems.

MultiFinder is categorised as a 'non pre-emptive' multitasking system. In the pure form of (pre-emptive) multitasking, the operating system assigns priorities to tasks and ensures that each has the resources to run effectively.

No application should be able to impinge on another, but MultiFinder can't guarantee this, especially in the communication area. Still, Apple say that if your software has all been written to their software-development guidelines, everything will be OK. There are a lot of 'ifs' in here!

What Apple means by MultiFinder's 'enhanced data-sharing capabilities' is that you can exchange text and illustrations through cut-and-paste functions while applications are sharing the same screen. I saw this in operation during a recent demonstration of a beta copy. It is fast, easy and quick, and to my mind this will prove to be the most valuable function of MultiFinder to the average user. Not too many people have thirty programs and only a few of those will want to run them all simultaneously!

The cut-and-paste enhancement is great. You can virtually shift anything to anywhere, instantaneously. And like the latest version of Microsoft's Windows, MultiFinder uses overlapping, rather than tiled, windows.

The Mac's ability to exchange data between different applications is now

dramatically improved, although they still haven't managed to incorporate the Jazz 'Hotview' function that allows changes in one version of the data to automatically be transferred to the other — but I guess you can't have everything.

Later versions of MultiFinder are expected to have a virtual memory capability which allows hard-disk space to serve as extended RAM. This is something that OS/2 is said to be offering the IBM world, so it is an important addition to the Mac operating system.

Apple in the States have also hinted that a true pre-emptive multitasking version of MultiFinder will be available at a later date for the Macintosh II. It will need the 68020 processor plus another member of the same chip family, the 68851, which supports paged memory management. Only this way can applications be provided with separate and protected memory partitions that ensure that they can't interfere with each other. □

I was in Los Angeles for the launch of the new Macintosh SE and II back in March and I marvelled at many of the goodies that third-party vendors had on display for the new machines — see *The Max Macs*, YC Apr. '87.

We saw the new high-definition SuperMac colour monitor, and AST took us over their plant and showed us prototypes of the Mac 86 and 286 MS-DOS plug-in boards for the two machines. Everyone, it seemed, was designing plug-ins and plug-ons for the new machines, but at the time all this was vapourware.

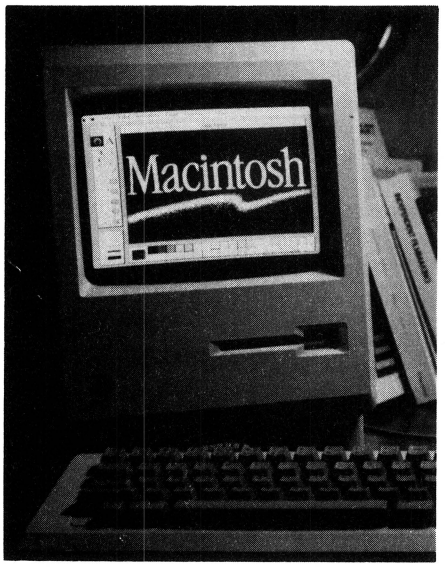
There's a big difference between seeing a prototype and seeing products on the shelves in computer stores, but now it is all starting to happen. AST and many other third-party manufacturers are beginning to ship a whole raft of add-ons for the SE — and also for the II, although Apple won't be into full production of the Mac II for some time yet. By the time you see this in print many of these products will be on sale in Australia.

Expansion Chassis

AST are in the fortunate position of being very closely associated with Apple — they have a co-marketing agreement. So it's not surprising to find that they are the first cab off the rank with the AST Pak, a dual board expansion chassis, which lets you add speed and maths-power to the SE. You can use AST Pak to soup up the SE almost to Mac II proportions by adding a Motorola 68020 (plus logic), a 68881 maths co-processor and up to 2 Mbytes of memory.

The board also has an AST bus which, according to AST, in essence, creates another slot. The board isn't in Australia yet, so I don't quite know what 'in essence' actually means — but apparently there is a cable feed out of the back of the Mac and two extra slots into which you can plug any off-the-shelf SE card. It sounds good, but it's not unique.

AST's Mac 86 and Mac 286 co-processor cards for MS-DOS are quite different in operation. The Mac 86 uses an 8086 processor and locks up the Mac SE's memory, while the Mac 286 is a 80286-based CPU board that has its own memory and runs concurrently with the Mac II processor.



Both can read and write DOS-formatted data and run DOS programs if you've got an IBM floppy drive — but they won't handle colour, even if you've got a colour monitor on on your Mac II.

There are a lot of memory expansion and co-processor cards being made for these machines. SuperMac is making a SuperRAM Plus which lets you bump up the memory of the SE or the Mac Plus to 4 Megabytes, and the Mac II to 8 Mbytes. AST also have a RAM-expansion product, the RM4 with between 1 and 4 Mbytes of memory.

Levco are selling Prodigy SE which takes the SE as high as 32 Mbyte, adds a 68020 and floating point co-processor, and provides two SCSI ports — one of which can be used for their internal Overdrive 40 hard disk. To handle this amount of memory they've had to add a memory-management chip which is horrendously expensive, so this is probably only a toy for millionaires, or for SE owners who have to run Unix. It might be cheaper to invest in a Mac II.

Peak System's Orion Accelerator Board might be a slightly cheaper way to go if you need the 68020 CPU and the 68881 co-processor and want to run Unix. It can also go to 32 Mbytes and uses a 68851 memory management chip.

On the hard disk front, General Computer Co. are making a range of HyperDrives. There is an FI/40 internal unit for the SE, and FX/20, and FX/40 external SCSI units for either machine. They also have a streaming tape backup unit. Imagineering have most of these products already in stock.

General Computer have announced their own accelerator board with the now standard 68020 and 68881 chips, up to 4 Mbytes of RAM, and an additional slot. They also have the HyperNet 2.0 network filer server which will run on all Macs and sell for only a few hundred dollars. You use software to set up a single file server, and this can then be accessed by an unlimited number of Macs.

Two more hard disk units are Plus-20 and Sierra from Peak Systems. Both are combination hard disk/tape backup units. The Sierra is a 40 Mbyte unit, while the Plus-20 is a 20 Mbyte SCSI unit which is one of a range that will extend to 30, 45, 65, and 80 Mbytes drives.

Unix and The Mac

The potential of Unix on the Mac II seems to be growing every day. AST in association with Apple have designed an Intelligent Communications Processor which is used on AST's new ICP card. It comes with its own 68000 processor control and four ports for both synchronous and asynchronous communications.

It was designed specifically to increase the functionality of software-based operating systems like Unix, but it can also be used to bridge X.25 and SNA, or as a four-terminal connector.

Avatar's 3270 emulation board is already in production, although we won't see it in Australia for some time. This is the first in a series of IBM-emulation products to link the Mac into the mainframe environment. The card hooks into the SE's bus and provides a transfer rate of 2.35 Megabits/sec through coaxial links. There is file transfer software coming with the board.

So if you want mainframe power on your disk, it looks like as if it is all happening. Now we've all got to start saving! □

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Contributions by Telephone: Contributors who have modems and suitable software (in the MODEM7/YAM mould — see our stories on Christensen Protocols in the May and June 1983 issues) can arrange direct transfer to our computers 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. □

AD INDEX

ABE 62
Advanced Peripherals 107
Ann Court Comp. Serv. 100
Arista Electronics 51
Attache 86
Babani Books 129
Barsons 52
Blue Chip 11
Blue Sky Industries 28
Centre Industries 62
Commodore 50
Computer Factory 117
Computer Office Supplies 101
Computer Print & Paper 140
Computer Trader ... 138, 139, 140
CTC 75
Custom-Made Software 76
Cypher 152
Dataplex 26, 27
Dick Smith Electronics 73, 120
Discware 118, 119, 154, 155
Earth Computer Systems 153
Electronic Solutions 96, 97
EME ..... IBC
Epson 102
Federal Binders 156
Federal Marketing 82, 83,
Halcolm Holdings 36
Hales & Rogers 131
Hanimex 67
Hi Tech Software 90
Hitachi 6
Hypec 81, 92
Imagineering 10, 69
Impact Network 12
Info World 101
InfoMagic ..... IFC
Interface Publications 159
JED 152
Kaypro 89
KCM 38
MACE 148
Maclagan Wright 136
MDS 100
Micro Education 146, 147
Micro General 91
Microland 14, 15
Micromart P/L 48
Micromart (Melb) 111
Microsoft 3
Microway 94
Mike Boorne Elect. 88, 132
Mitsui ..... OBC
NEC 80
Netcomm 110
Newmenon 72
Nice Computer Company 25
Olympia 106
PC Extras 53
Perfect Interface 20, 137, 145
President 121, 122, 123, 124, 125
Programs Plus 49
Queensland Expo '87 32
Ritronics 103
Select Software 58, 59
Software Express 74
Software on the Cheap 159
Texas Instruments 43
Typequick 136
Uni Systems 136
Unisys 70
Utilico 128
Vapourware 33
WD & HO Wills 161



"I can see 4 milds."

"What a Sterling idea."

STERLING 25s

Australia's First Family of Milds

P742

WARNING-SMOKING IS A HEALTH HAZARD

APB 4372-C

MICHAEL BURLACE

CURSORY GLANCE

At a computer crime conference in Britain, attendees were told to watch out for hackers — the conference word for criminals. To me, that's about as sensible as saying watch out for walkers when you are concerned about trespassing but no-one has come up with a better word for a headline.

A headline needs something emotionally-charged, short and clear to the reader. Maybe the 'Computer Mafia' could come up with a suitable term and get the security firms off the honest hackers' backs!

Criminal hackers are easy to spot, apparently. They are the ones who arrive to work 30 minutes early, don't take a lunch break and stay late. They are also the ones who play with computers at home. It could be that they are the hard-working ones, but never mind, the security guys will keep a close eye on them.

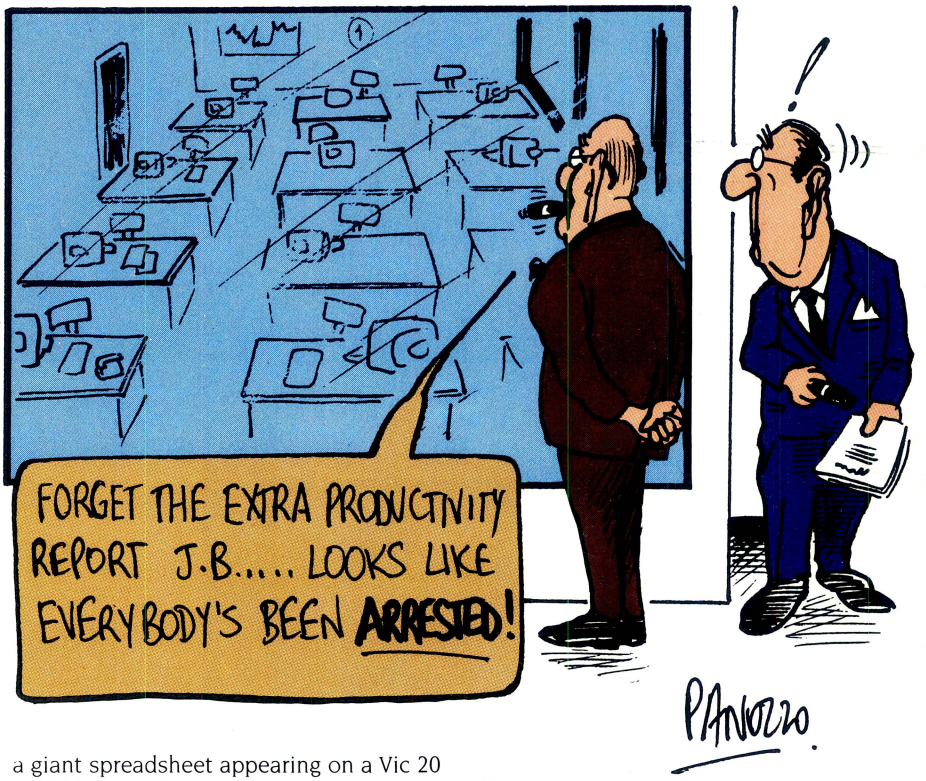
■ I commented in the June issue that women were rare who went 'EEK' at the first sign of a mouse. I have had to eat my words. A friend came out of her mouse-hole to say that she went bananas at the mention of a mouse, let alone the sight of the furry things.

I'm waiting to see what the electronic rodent does. She's WordStar semi-literate at this stage, so I wait patiently for her first contact with a mouse from the computer culture.

■ In my early years of using a microcomputer I always seemed to work in a place where there was great demand on the computer and so I learned to grab it when I could. After a while I realised I was pacing myself to the computer instead of vice versa. I was being used by the computer rather than being a computer user.

Now that we can buy or rent videos of burning log fires to play on our televisions, we need something similar that can be used on our computers. Perhaps a screen of images to soothe the mind and calm the nerves after a hard day pounding the keys. Maybe a spreadsheet which brings up a view of the Bahamas after we have done the latest financial forecast. The spreadsheet could even show how to get there by transferring the relevant funds to a Bahaman bank account!

People in the word processing pool could have a view of a window . . . any window. And, people with home computers could have images of programs too large to fit on their computers — Lotus running a giant spreadsheet appearing on a Vic 20 could be the ultimate in one-upping your mates.



■ Robots are being used to perform brain surgery on humans. The robot is under the control of the surgeon and gets greater accuracy in positioning instruments than the surgeon could. The position is determined by using brain scans.

So far the robots are used only to take samples of tumours but they will eventually be used to eradicate tumours and perhaps do larger jobs.

The patient is immobilised but conscious during the operation. It sort of reduces the risk of having a guy with the DTs open up the wrong part but then again it could lead to him pressing the delete key instead of the sampling key.

'Whoops nurse, I think I just erased the patient's memory.'

One computer freak once described the brain as 'wetware' and it has no doubt been called 'greyware'. Life is slowly imitating art again as the brain becomes a peripheral.

■ I love the way recruitment ads read MIS Manager when they want a Management Information Systems Manager. I wonder how many get what they ask for.

Bootstrap

The invention gadget for the weak of mind, or lapsed of memory, is a development of those keyfinders. You have probably seen (or heard) one — a plastic box about the size of a matchbox with a keyring on one end. When you can't find your keys you whistle. The box hears your cry for mercy and whistles back.

Filefind attaches a software whistle to the files you are most likely to lose and keeps track. In this way you can name a file anything and Filefind will be able to find it at any time in the future. It is memory resident, like Sidekick, and pops up at the touch of two rarely-used keys. Then you type in DATA, DOC or whatever and up pops the name of your file with its attached description. Works on any missing files.

It is for MS-DOS computers only and preferably pretty close to a three-letter standard. I'm not sure how you get to remember the two-letter code for the program, but that's your problem, remember?

□ *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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