



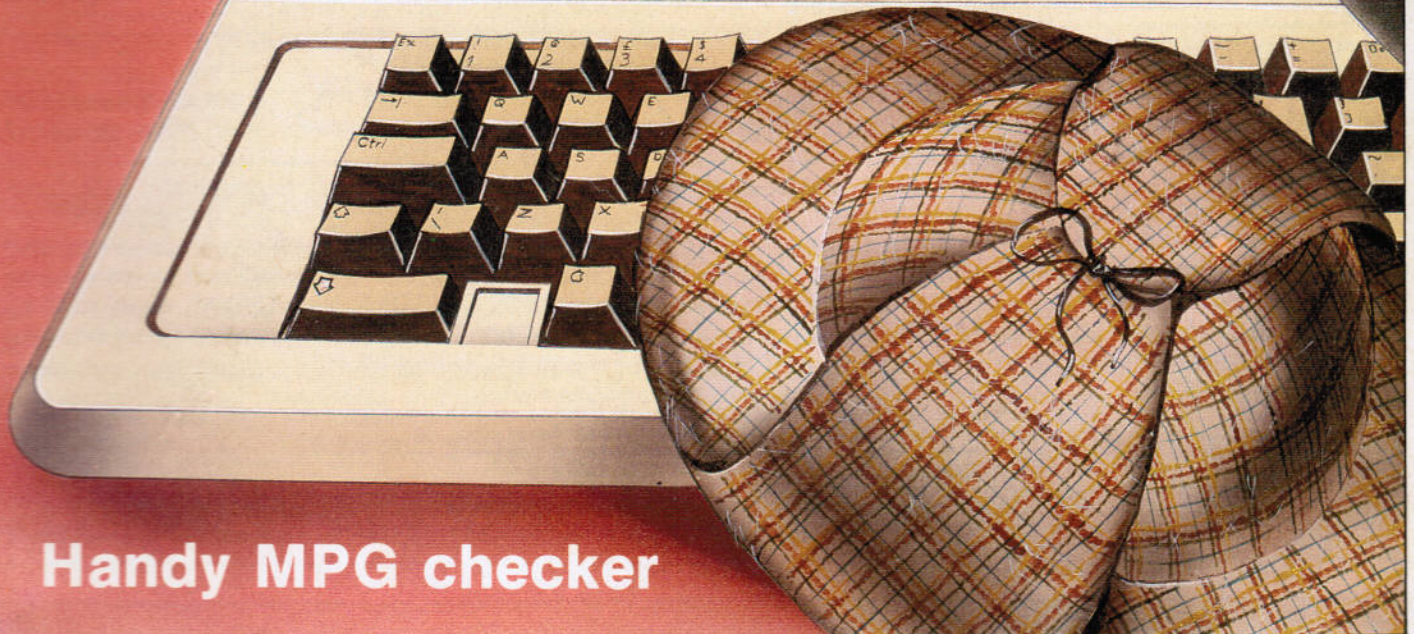
A Database Publication

apple user

Vol. 6 No. 3 March 1986 £1.25

Machine code tracer

A vital utility that reveals all



Handy MPG checker

REVIEWS: SpeedLoader 🍏 P-tral 🍏 Ultraplan 🍏 ProDOS books



Some facts about RAMCARDS...

They're not all the same -

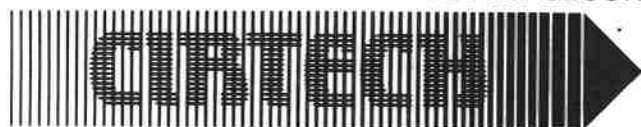
FEATURE	flipper	APPLE	RAMWORKS	MULTIRAM
Designed to Apple standard	YES	YES	NO	NO
Runs on Apple //e and II+	YES	YES	NO	NO
Fits in any standard slot	YES	YES	NO	NO
Maximum memory without add-ons	1024K	256K	512K	768K
Total memory possible	6MB	6MB	3MB	1.5MB
Automatically recognised by ProDOS, CP/M+ and PASCAL 1.3	YES	YES	NO	NO
100% compatible with all standard Apple II software	YES	YES	NO	NO
Patch necessary for ProDOS (inc. APPLEWORKS), DOS 3.3 and PASCAL 1.3	NO	NO	YES	YES
ProDOS, DOS 3.3, PASCAL 1.3 and CP/M bootable direct from the RAMcard	YES	NO	NO	NO
Free support for CP/M 2.20B/2.23 and PASCAL 1.1/1.2	YES	NO	NO	NO
Program/operating system switching software included	YES	NO	NO	NO
Includes fast backup and restore software	YES	NO	NO	NO

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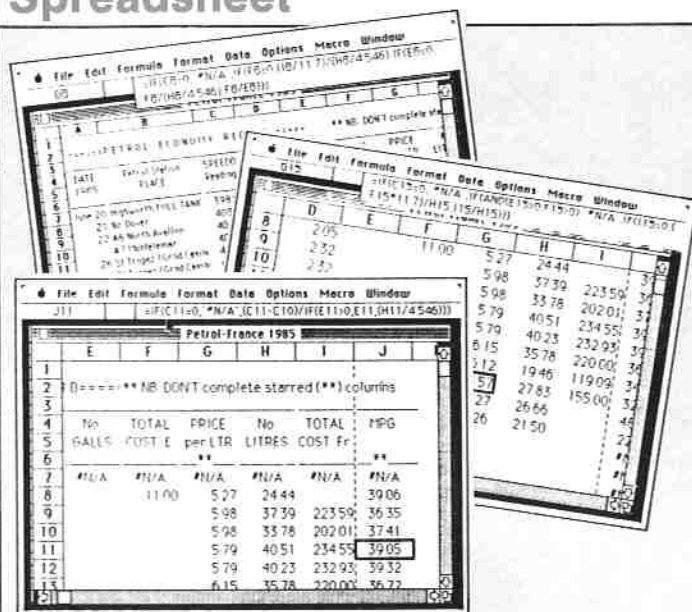
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DATA HIGHWAY for Pigeon **£69.00**

Jobs feud over

THE feud between Apple co-founder Steve Jobs and the corporation's present board has ended in an out-of-court settlement.

Apple instituted a \$5 million lawsuit when Jobs broke away to set up his new company, Next Inc, and took several key personnel with him.

While Apple president John Sculley is said to be delighted with the deal, Jobs is believed to be chafing over the restrictions it imposes on his new venture.

In particular Jobs is said to be unhappy at having to agree to aim his products at a different sector of the university market than Apple.

Both organisations are working on machines with the 3M specification - 1mbyte of RAM, a million pixels, and one million instructions per second capacity.

Apple has been given rights to market the Next Inc micro, if it so chooses, to the market sections Jobs has agreed to stay out of.

HI-TECH GAMES

VERSIONS of two of Activision's most popular titles, *Hacker* and *Mindshadow*, are being produced for the Macintosh and should make their appearance this spring.

"These new versions have been tailored to take advantage of the sophisticated technology available in the latest computer systems", says managing director Hugh Rees-Parnall.

"Our design team has made use of the Macintosh high resolution graphics and pull-down menu screens which broaden the potential for creative development even further".

★ ★ ★

SOFTWARE developed on the Apple IIe will form the basis of a seminar for marketing decision makers organised by Engineering Market Research at Stockport College of Technology on March 25.

New deal for the Apple II owners

A NEW era of responsive communication between Apple UK and its loyal army of Apple II owners is about to begin.

And *Apple User* has been chosen as the vehicle to spearhead the promising new relationship between the company and its massive user base - estimated at nearly 150,000 in Britain.

The impetus is Apple's answer to growing criticism that it has been steadily losing touch with end users, and doubts - compounded by the firm's internal problems of last year - that the Apple II had a limited future.

As long ago as last August, *Apple User* reported Apple UK chief executive David Hancock's admission: "We haven't spent enough time appreciating the people who buy our products... we haven't been as sympathetic as we could have been to their needs".

But now Apple is about to make amends to its Apple II

users. Announcing the new policy, Apple II product manager Chris Calvert said: "We are looking to strengthen our relationship with end users.

"We intend to start communicating more readily with them, through the pages of *Apple User* and by establishing stronger links with user groups.

"This is in preparation for a number of exciting moves we shall be making in the Apple II product line in the months to come.

"The Apple II is a product that we see as remaining viable throughout the 1980s and we intend to build it up rather than going the alternative route of bringing out a new machine to replace it.

"Users can be assured that we will always protect the Apple II installed base.

"Our commitment is already illustrated by the recent launch of the 3½in disc drive and expanded memory capacity.

"Now we are looking to improve the speed, graphics and

sound capabilities of these machines in an ongoing attempt to add value to the product line.

"You can take it from me that a significant part of the research and development effort at Apple Computer is dedicated to improving the Apple II".

Apple's initiative will be welcomed by dealers and distributors who when contacted by *Apple User* revealed their dissatisfaction with the way the company was marketing the Apple II.

The survey showed that in almost all cases the dealers considered that Apple UK was playing up the Macintosh to the disadvantage of the Apple II.

"Mac crazy"

"The trouble with Apple UK is that they simply follow the lead of Big Brother in the States where everybody is Mac crazy", a prominent dealer told *Apple User*.

"Over here people are a little more discerning and realise that the Apple II - the old workhorse - is still excellent value for money.

"If Apple UK would only pull its finger out and spend a bit on promoting the Apple II I'm sure sales could be boosted significantly".

A man who helped launch Apple products in this country is also convinced that there is still a lot more mileage in the Apple II.

Stephen Brewer, formerly Apple UK's first sales and marketing manager, insists that the machines are still a force to be reckoned with.

"They were and still are excellent value for money", he says. "As a machine to get you from A to B, the Apple II is more or less all you want.

"That's why the big customers come back for it time and again. And they'll continue to do so even without the benefit of the Macintosh type hype".

Mac Plus snag

THE high hopes of Apple that its new Macintosh Plus will make dramatic inroads into corporate and higher education markets are being hamstrung by problems of software compatibility.

Fifteen per cent of the programs produced for the original Macintosh will not run on the new machine and Apple technicians here and in the USA are rushing to complete compatibility tests on both third party and Apple-designed software.

On the list of incompatible software is Apple's own Pascal which cannot be run from a hard disc because of its copy protection. As a result of this,

Apple is having to produce a new version for the Macintosh Plus.

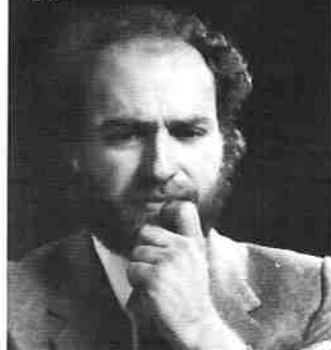
"The results of tests so far, though still not complete, show that 85 per cent of current Macintosh software will run without requiring upgrading", said product manager Richard Bradley.

Tests have so far been conducted on 150 packages in the UK and about 500 in the USA.

"The reason why some software doesn't run is because developers have broken the guidelines by, for instance, not using the Mac ROM routines or the file IO properly", claimed Bradley.

If only there were an alternative to integrated software!

Where can I find an integrated package that combines the features and power of the programs I already own?



What will I do with the programs I use today if I buy integrated software tomorrow?



What if I can't use my old files with the new software?



Will I have to spend yet more time and money learning something completely different?



You've probably considered the benefits of buying a program that does several different jobs from one disk. After all, most computer users need to switch from one task to another several times a day. And repeatedly closing down your current program, booting a different disk and then trying to find where you left off wastes valuable time and disrupts your flow of work.

Integrated software would be the obvious solution if it weren't for the fact that one Apple II[®] user is likely to have very different needs from another.

The remarkable Snapshot Shuttle[™] is an inexpensive device that gives you a simple alternative to worrying about the drawbacks of integration. It lets you keep up to four different programs in

memory at any one time.

You want to combine the best word-processor with the fastest spreadsheet, a versatile comms package and Hitch Hikers Guide to the Galaxy? Fine. With the Shuttle you're free to choose.

You can switch rapidly between your programs with just the flip of a switch, and each one resumes running exactly where it was interrupted. No fuss, no waiting. The Shuttle even works happily with integrated software!

You already know everything you need to know to use the Shuttle. There are no new commands for you to memorize and no piles of impenetrable documentation to wade through. And because it uses the interrupt-and-resume power of the Snapshot card, the Shuttle gives you access

to a whole new world of great, easy-to-use utilities that will enhance your Apple at home and in the office.

Ask your local Apple dealer to demonstrate the power of the Shuttle for you, or write or call us for more information.

PRICES (ex VAT)

Shuttle software for Snapshot //e card	£20.00
Printinterrupt software for Snapshot //e card	£20.00
Copykit software for Snapshot //e card	£20.00
Shell software for Snapshot //e card	£20.00
Shuttle, Printinterrupt, Copykit and Shell combination pack	£55.00
Snapshot //e card for Apple II+ and //e (requires software)	£95.00

SYSTEM REQUIREMENTS

Apple II+ or //e with minimum 128K RAM and 1 disk drive.

MEMORY EXPANSION CARDS

The Shuttle will let you load 2 x 64K programs into a 128K Apple. Naturally, the more memory you have, the more programs you will be able to load. The Shuttle works with all the popular RAM cards including Apple's new Memory Expansion Card.

Cirtech 64K extended //e 80-column card	£ 55.00
RAMrod 128K (includes DOS 3.3 RAMdisk software)	£160.00
Glanmire 512K extended //e 80-column card	£399.00

(includes Appleworks expansion software).

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Dealer and distributor terms are available on application.

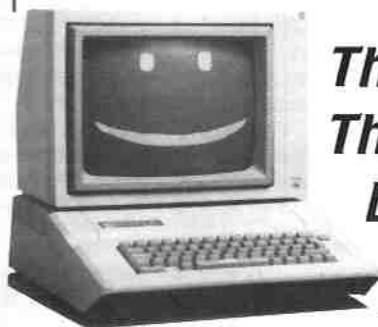
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Apple II seminars

The Manchester Region Productivity Association has organised a series of one-day seminars in the North West where Apple II micros will be used to demonstrate how businesses and other organisations can benefit from computers.

Seminar topics cover the range from an introduction to microcomputing to advanced uses of spreadsheet programs.

Fees, including luncheon, are £74.75 for members, and £86.25 for non-members of the Association, which may be contacted on 061-236 6079.

More US software on way

A NEW division of publishers Software Express has been created to boost the number of programs available to Apple users.

Already it has reached a number of licensing agreements that entitle it to import a range of products from the US and to get British software distributed in America.

A key element in the new venture is Program Exchange, an invitation to professional software houses and hobbyist programmers to join in the venture.

"We see our role as being like that of a record company, publishing software from many sources under one label", says Jon Dean, who is in charge of the project.

"We would welcome the opportunity of evaluating software from professional and amateur authors.

"Quite often home programmers have the best new ideas and approaches to software, but their programming skills are weak.

"If we feel a title will fit into our range we'll work with the author to make that program a quality title".

So what price that Macintosh?

A SUBTLE alteration in Apple's promotional literature has revealed an intriguing bit of company history.

Until recently the name Macintosh was described in the firm's advertising as "a trade mark licensed to Apple Computer".

Now the wording has been changed to "Macintosh is a trade mark of McIntosh Laboratory Inc. and is being used with its express permission".

This acknowledgement is the latest development in a saga dating back almost three years to when the Macintosh computer was about to be launched.

New York-based McIntosh Laboratory is, a company source told *Apple User*, "producer of high quality stereo equipment".

To protect itself against cheap copies and lookalikes it also registered the various alternative spellings of McIntosh - including Macintosh, the

name Apple co-founder Steve Jobs picked for his new upmarket machine.

This meant Apple could not use the name Macintosh without the permission of McIntosh Laboratory.

And, according to an *Apple User* source in the USA, this permission was to prove extremely costly.

Realising that the stubborn Jobs was determined to have the name he had chosen for his new machine "at any price" - and that Apple was making money hand over fist - McIntosh stalled negotiations, threatening the launch of the Macintosh computer.

In the end, according to legend, McIntosh asked for - and got - \$1 million as a one-off licence fee.

The latest change in the wording of the acknowledgement involves no further payment, *Apple User* understands,

but is to "clarify and make more explicit the ownership of the trade mark".

Third parties such as dealers and software developers involved with Macintosh must also attribute the trade mark in the new manner, and Apple says it intends to publish a set of guidelines in the near future.

One question that remains unanswered in the affair is: Did Steve Jobs make a million dollar boob in his choice of a name for his new machine?

The Concise Oxford Dictionary defines macintosh as an alternative spelling of mackintosh - "waterproof material of rubber and cloth for garments".

Standard reference works insist that the correct spelling of the variety of apple Steve Jobs had in mind is either McIntosh or McIntoch.

In which case, did Jobs pay \$1 million to name his computer after a raincoat?

Apple's earnings hit new peak

APPLE has reported record earnings per share in the first quarter of the current financial year.

Sales were at the second highest level ever achieved by the company.

Although net sales for the quarter were down from £488 million a year ago to £373 million, net earnings rose from £32 million to £39 million.

Cash has increased by £172 million to a record £308 million while inventories have been reduced by £106 million to £76 million.

"The keys to our success were gross margin

improvement and higher inventory turns", Apple's top executive, John Sculley explained.

"Sales were as we expected, profitability was at record levels, and our balance sheet continued to strengthen. The reorganisation is behind us now".

Apple User

WE regret that the price of *Apple User* goes up this week to £1.25. The annual subscription is also increased, to £15.

This is the first price rise since the publication started as *Windfall* nearly five years ago.

Mac 'hotline'

A JOINT development program involving Microsoft, General Computer, Aldus and Blyth Software has been launched with the aim of ensuring close compatibility of software and peripherals for the Macintosh.

The arrangement promises close coordination among the participating companies in such areas as product development, compatibility testing and marketing efforts.

"Now that Apple has introduced the Macintosh Plus, true compatibility among software and peripherals has become even more important", says General Computer marketing manager Malcolm Hobbs.

"Our domination of the Macintosh internal hard disc drive market makes it essential for us to work closely with major software developers".



640K IIc (plus CP/M)



with Z-RAM

Your IIc can be fatter than a Fat Mac and ready for business.

AppleWorks is expanded to a desktop size of 413K (that's about 8 times bigger than a standard IIc). PLUS you can run CP/M programs like dBASE II, Wordstar, Turbo PASCAL, Microsoft BASIC and over 3,000 other CP/M programs. And there's more – but only with **Z-RAM**.

Z-RAM is available with either 256K or 512K of additional memory PLUS a powerful Z-80B microprocessor for running CP/M software. Added to the IIc standard 128K of memory, that gives 384K or 640K of Ram, which gives an AppleWorks desktop size of 229K or 413K.

Z-RAM with AppleWorks will knock your socks off.

As well as expanding the actual desktop size, **Z-RAM** will also simultaneously load the AppleWorks program into memory thus eliminating the need for a second disk drive. This "Ram-disking" also means that AppleWorks will now run about 10 times faster.

And don't worry about the desktop files being larger than floppy disk capacity – if the file is bigger than the remaining space on a disk **Z-RAM** will automatically segment the file and prompt you when to insert subsequent disks.

Z-RAM will expand the AppleWorks DataBase to 5100 records per file, and doubles the Word Processor size to 5100 lines per document.

Z-RAM even gives you a printer buffer (print spooler). So you're back into AppleWorks without waiting for the printer to finish.

Z-RAM is also a high speed solid state disk drive or Ram-Disk and is compatible with Applesoft, PRO-DOS, DOS 3.3, PASCAL and CP/M.

Z-RAM is totally compatible with all IIc software and hardware, and installs easily and securely inside the IIc in less than half an hour. Installation is easy, clear instructions show you how and all you need is a screwdriver. (Absolutely no soldering).

Z-RAM is easily handled by the IIc power supply by using a patent-pending power saving design.

Z-RAM comes complete with manual, Ram-Disk software (CP/M, ProDos and Dos 3.3), Z-80 operating system, CP/M manual and AppleWorks Expansion software.

SOFTWARE FOR APPLEWORKS

JEEVES - Personal Assistant

Desktop Accessory for AppleWorks and IIc. Co-resident with AppleWorks and provides Appointment Calendar, Calculator, Note Pad, Alarm Clock and PhoneDialer – all just one keystroke away.

Graphworks

Provides business graphics for AppleWorks. Graphs directly from AppleWorks Spreadsheet Graph Types: Pie, Bar, Stacked-Bar and Line.

2.5 MEG IIe with RAMWORKS

RAMWORKS is the memory card for the Apple IIe that gives the Appleworks user previously unheard of memory capacity. And more.

RAMWORKS simply plugs into the Apple IIe auxiliary slot (Slot 3) and completely replaces an 80 (or extended 80) column card. In use it functions and behaves EXACTLY like Apple's extended 80 column card, but with much more memory. It is TOTALLY compatible with ALL Apple 80 column software.

RAMWORKS has the same features as **Z-RAM** except that it does not have an in-built Z-80 co-processor (it provides 80-column display) and the print spooler works with Apple's Super Serial Card (or compatible).

RAMWORKS can be expanded to a greater size (2.5 Megabytes). Additionally, there is an RGB option which will provide double-hi-res colour graphics without using a further slot.

Ramworks	Appleworks Desktop
128K	101K
256K	183K
512K	367K
1 MEG	736K
2.5 MEG	1837K

As well as AppleWorks, other programs supported by **RAMWORKS** and **Z-RAM** include: Magicalc, Flashcalc, Supercalc 3A, Diversi-DOS and others. Also, **RAMWORKS** supports Dark Star's Shuttle Multi-Tasking System.

CLOCKS for IIe & IIc

TIMEMASTER H.O. – IIe SYSTEM CLOCK – IIc

Both these clocks offer full Pro-Dos compatibility and automatic time and date stamping of files – including AppleWorks files. When used in conjunction with **RAMWORKS** or **Z-RAM**, these clocks will continuously display the date and time on the Appleworks screen, and give automatic access from AppleWorks database (just use a time or date field).

Timemaster for IIe plugs into any slot, features a 20 year auto-recharging battery and will emulate other clocks.

System Clock for IIc features a pass through serial port – the IIc system clock plugs into either IIc serial port, then the modem or printer plugs into the clock. Batteries are replaceable (1-2 years).

ORDERING INFORMATION

256K Z-RAM	£359.00
512K Z-RAM	£419.00
128K Ramworks	£199.00
256K Ramworks	£219.00
512K Ramworks	£269.00
1 Meg Ramworks	£469.00
2.5 Meg Ramworks	£1,499.00
640K Floppy Disk Drive (IIe)	£269.00
Timemaster H.O. (IIe/II+)	£129.00
System Clock IIc	£79.00
Ram-disk software for Ramworks	£29.00
CP/M Ram-disk software for Ramworks	£29.00
Visicalc IIe Expander software	£29.00
RGB Option for Ramworks	£129.00
Z-80+ (CP/M card/software) (IIe/II+)	£139.00
Z-80c (CP/M card/software for IIc)	£159.00
Viewmaster 80 (II+) (80 cols on II+)	£139.00
Graphworks	£79.00
Jeeves (IIc)	£49.00

Add £1.00 P & P per order. Add VAT at 15%

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Renaissance in Silicon Valley

IN Sunnyvale, California, you'll find Fry's Electronics — the world's only one-stop shopping centre for hackers.

At first you think you've entered just another supermarket, with rows of shelving full of all the usual goodies like soap powder, breakfast cereals, soda pop, and hair conditioners.

But as you move further into this large store, you discover that you're walking between isles of microchips, shelves of expansion cards, and displays of breadboard kits for hardware hobbyists.

Of course, complete computer systems are also on sale — Apple II, Macintosh, IBM — even Atari STs and Amigas.

The software sits on the shelves in a profusion not easy to find this side of the water, and there's a collection of computer books and magazines that I've only once seen bettered — at a bookstore called Computer Literacy, and that's also in Sunnyvale.

The morning after my visit to Fry's I set off on a 30 mile trip along the busy freeway from the heart of Silicon Valley to the San Francisco Civic Centre where the January 1986 Mac World Expo was happening.

When I registered and was handed my program guide I received my first surprise. The full title of the show I'd come 6,000 miles to see was Macworld Expo & Apple II World Expo. The Apple II was climbing on the bandwagon.

Well, that was fine by me. It's the way it should be — for too long Apple computer users have been split into two, almost enemy, camps. Perhaps this was a sign of a long overdue reconciliation.

Into the show. Unlike the Boston show last August which had fitted itself into one hall, this time the Expo filled two. But that is misleading, because the Boston hall was as big as the two in San Francisco combined, and although it's difficult to be sure, I had the feeling that overall there were no more, and perhaps slightly fewer, exhibitors at this show, even when the Apple II contingent was included.

The Apple II section turned out to occupy about one fifth of the total floor space, and had around two dozen or so

exhibitors apart from Apple themselves.

Not a vast presence I'm afraid, but enough to demonstrate very clearly that even though the Apple II may be eight years old, it's still going strong in a business where designs can become out of date before they are released for sale and computer companies rocket up the popularity stakes and down again in what seems like the blink of any eye.

Since it first appeared it's been a tempting target for everybody who wanted to make himself rich by building a faster, flashier, more powerful machine.

One or two have survived and

— were like a house divided. We lost sight of the fact that both machines belonged to the same stable and complement each other.

Many Apple II users felt jealous of the new upstart's fast and crisp picture, pull-down menus, multiple windows, and clever little rodent. Unfortunately, Apple themselves did very little to discourage the belief that the earlier machine was inferior in the earlier days of the Mac.

The Apple II was to be left to wither away, or milked dry as the company's cash cow, depending on your point of view.

But the darn'd thing wouldn't

about enhancing the Apple II (yet again).

Now in San Francisco in January 1986 we saw the first fruits of that renewed commitment. Over the past few months Apple have announced a number of new Apple II products, and there they all were. The Unidisk 3.5 was there, silencing criticism about lack of disc space. In fact, I know several Mac users, myself included, who felt pangs of jealousy because Apple II users were now able to store 800k on one 3.5in disc — twice as much as Mac users could until now.

The Apple II Memory Expansion Card from Apple was there with 256k, and Apple said they would be supplying expansion kits to boost that to 1 mbyte in the near future.

This card has the ability to greatly enhance the power of the Apple II computer, and a number of programs from third party developers were on show that take advantage of the extra storage and RAM now available for word processing, spreadsheets, and databases.

Probably the most impressive is Catalyst 3.0 from Quark, which manages to create an uncannily exact emulation of the Mac desktop environment on the Apple II. To operate this remarkable piece of software you will need at least 256k of RAM, the 3.5in drives, and an ImageWriter if you want to be able to print your output without severe headaches.

But it really does turn the II into a very close (closer than Atari ST, Amiga, or Gem or windows on IBM) Macintosh lookalike. And with colour, too. No more need to feel jealous of these people with Macs. Well, almost.

By the way, if 1 mbyte is still not enough, Applied Engineering of Texas was demonstrating its RAMWorks II memory card which comes in various memory configurations up to three



**JIM MANGLES reports
from the Mac World Expo
that the Apple II is
back on the bandwagon**

even prospered. Many dozen more failed. But even among the big and successful personal computers not even the IBM-PC can generate the sort of user loyalty and grass roots enthusiasm you find with Apple II users.

The most severe test has been over the last two years, since Apple launched the Macintosh on the world. Suddenly Apple users — and, it would seem, Apple themselves

go away. People kept on buying it, preferring the IIe over the supposedly superior IIc, what's more! While the Mac has gone on to establish itself as a major contender in the personal computer marketplace, sales of the Apple IIe actually began to pick up, and are currently at a record pace.

Eventually Apple seemed to realise that they had a success on their hands (yet again) and in 1985 started to do something

mbyte with an expander piggyback card, and allows you to have automatic AppleWorks expansion up to a 2277k desktop – all for \$1699.

And if you want to hot up your IIc, there is the MultiRAM CX card from Checkmate Technology. For \$429.95 you can follow the instructions provided and personally install this card inside the supposedly unexpandable IIc – if you're not the nervous type. Otherwise get your dealer to do the dirty deed.

But when it's done your computer has a 512k memory expansion or RAM card – and a 65C816 CPU to give it true 16 bit power, all ready for the new software that's coming along soon to use this new chip that will think it's an old-fashioned 65C02 until you tell it different.

But I think that the most innovative, most brilliant – or most silly – product there was the SwiftCard from Information Appliance. It's a small board that slots into the IIc's slot number 3 (the one that we're told not to use because of the 80 column card) which gives instant word processing, database, calculator and communication facilities upon power-up without ever loading a floppy disc. All for \$89.95 – that's the brilliant bit.

All this software is stored in ROM chips on the card, and as a result it's very difficult to do anything else with your Apple if it's there. That's the silly bit.

The extra silly bit for the UK only is that because our auxiliary slot is in line with slot three (in American IIcs it's off to the left side of the motherboard) we won't be able to install the Swiftcard anyway.

Undoubtedly the show's centre of gravity remained heavily with the Macintosh. After all, here Apple officially unveiled the LaserWriter Plus and the MacPlus. The new Mac must have been about the most leaked new computer from a major manufacturer for a long time.

The MacPlus is the Rocky I described in January, so I won't waste much time on it except to ask please, Apple UK, how soon can I upgrade my Fat Mac and how much will it cost? I've no doubt that this is one upgrade well worth doing, a megabyte of RAM together with double

capacity disc drives will go a long way to curing the "head-bumping" problems I'm always having with my present machine.

But it's still not enough. A machine like the Mac cries out for more and yet more RAM, more disc storage space, bigger and if possible even more detailed screen, and faster and faster operating speeds. I'm quite sure Apple is working on this. My spies tell me that they've seen the prototypes of Jonathan on the bench in

one there and then.

General Computer, the Hyperdrive people, announced a Hyperdrive for the MacPlus, and the Hyperdrive 2000 which combines a 20mbyte internal drive with a 12MHz 68000 CPU, 1.5mbytes of RAM, and the MC68881 co-processor. The price was not available at showtime.

GCC said that in May they'd be releasing a file server program called HyperNet that'll allow up to 32 AppleTalk users to share hard disc storage as



'Undoubtedly the show's centre of gravity remained heavily with the Macintosh'

Apple's development laboratories at Cupertino, and it'll address all these needs directly. The only thing that bothers me a little is that I'm told it looks remarkably like an IBM AT.

Meantime, if you can't wait, and are prepared for some drastic and expensive surgery on your present machine, Levco Company of San Diego will transform it into a MacSuper 20, which has a MC68020 processor running at 16MHz, a MC68881 floating point arithmetic co-processor, an internal 20 mbyte hard disc, and four megabytes of internal RAM.

The memory upgrade uses the new 1mbit chips costing about \$100 each and have a lot to do with the upgrade costing about \$8,500. If you're a bit short of the ready there's a 2mbyte version that can be yours for a mere \$4,000. But when all this is done, you have a machine that goes like greased lightning.

And just in case you think it's too pricey for anyone to take seriously, let me assure you that the biggest problem Levco were having at the show was fighting off all the people who wanted

well as files and programs for \$295.

There seemed a lot of new hard discs there. Apart from the ones already mentioned, I counted another eight, and I'm sure I missed some others. At least three other companies were offering internal drives à la Hyperdrive but at significantly lower prices, and another three offered SCSI-connected drives that were significantly cheaper than the others, which is what I'd expect.

I look forward to the price of hard drives for the Mac falling significantly over the next six months as the competition hots up now this new port makes engineering much easier. Meanwhile, the cheapest I could find was the 10mbyte MacNifty Personal at \$895 and I'd imagine it'll be discounted before long.

In the software department there was encouraging evidence of new products coming forward to serve the undoubted demand from serious CAD users who would love to use the Mac but have been discouraged in the past by the lack of serious applications

in this field.

Among the best is Bridgeport Machines' \$2,500 EZ-Draft that seems to do everything that you could possibly want in the area of mechanical design and Mac3D from Challenger Software for two and three dimensional architectural models, engineering diagrams, mechanical drawings, illustrations, and general artwork.

Easy 3D from Enabling Technologies is a glorious tool for quick creation of solid, precisely shaded graphics for work or pleasure and ParaGenesis, from Advanced Engineering Solutions, is a full scale electronic design system for professionals.

Among other products that caught my attention were MacSpin, from D2 Software, which is a graphical data analysis system using three-dimensional scatter plots rotating in real time under user control. If that doesn't mean a lot to you, don't worry. It's just beautiful to watch, and useful too.

Fontographer, from Altsys, is a laser font editor that creates downloadable Postscript code and an absolute must for anyone who wants to get the best out of their LaserWriter.

Tempo, from Affinity, is described as the "ultimate macro", and after watching it perform its tricks, I believe it.

Finally, a couple of items that appealed to my sense of humour, if not my wallet. Systems Research will upgrade you to the Amber Mac. For \$99 plus labour for installation, they will replace that nasty black and white tube in your Mac with a nice new amber one (contains the patented orange Drop display).

And for a mere \$22,000, not including cost of the 512k Mac, you're ready to go with Embroidery Plus from Macpherson Inc. Now the rest of us can master quality embroidery design. You can take an image from a digitizer (not included), freehand drawing or technical sketch and in one step transform it into an elaborate embroidered piece on your Barudan electronic embroidery machine (included). If you want the software alone, that will only set you back \$6,000.

* Jim Mangles is head of Ewart Microsystems, Helensburgh, Scotland.

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NEWSLETTER

WORD WINGS DOWN FROM WICK

CAITHNESS Glass, the company that made the Mastermind presentation bowl and many other famous engraved glass trophies, is using MicroLink for a pilot project which may eventually lead to a network linking it with its UK sales reps, agents and concession shops.

Famous all over the world for its collectors' paperweights and glass-and-silver jewellery, the firm has a greater need than most for reliable, high speed communications.

Situated in Wick, just about as far north as you can get in mainland Scotland, the company has factories in Perth and Oban, its sales office in Stoke-on-Trent, and reps, agents and retail outlets all over the UK.

"Considering the shortcomings of the postal system it would be ideal for everyone to have their own mailbox on a closed MicroLink network to facilitate ordering, financial accounting and stock control", said accounts and systems manager Homer Lindsay.

"It might even be possible to open up a section for micro owners among the 11,000 people around the world who are registered collectors of our paperweights so they can go on-line for the latest news about our products".

The password is...

WHEN someone joins MicroLink they are issued with their personal mailbox number and a unique password.

This is usually a six letter word - six is the minimum number of letters the system will accept - and the subscriber is, of course, free to change the password as often as required.

Human nature being what it is, do subscribers often lose or forget their passwords?

Says system manager Colin Rogerson: "Not very often now that MicroLink is well established. But in the early days we averaged one such

case a week.

"However the problem is easily overcome. After taking the most stringent steps to establish the subscriber's credentials we refer them to the original password they were allocated, which is kept on permanent file at MicroLink's head office, and reissue it to their mailbox.

"But it does point up the fact that subscribers should always be careful to keep a record of whatever password they are using at the moment - although not in too obvious a place - just in case they suffer a lapse of memory".

Log on to the Flying Pig

LONDON subscriber Adrian Mars is using MicroLink to operate what he claims is the world's cheapest, completely independent, professional computer consultancy service ever.

He's even calling his organisation Flying Pig Services as an indication that he believes just about anything is possible with the help of MicroLink.

Flying Pig will help both home and business micro users choose their hardware, peripherals and software and also solve technical problems.

For £5.40 clients receive via MicroLink one or more versions of a comprehensive questionnaire relating to their specific area of interest.

The completed form will be assessed by Flying Pig consultants who, says Mars, will promptly offer "an unbiased reply that could well save lots of money". The client is also entitled to 15 minutes consultancy over the phone.

Hold that train...

THE train now standing at Platform 4 can be caught courtesy of MicroLink, making subscribers rail journeys simple to organise from home or office.

If they hold a Visa, Access, American Express or Travel Key credit card they can book British Rail tickets, seat and sleeper reservations using MicroLink's new telebooking service.

Seats can be reserved at an extra cost of £1 - or £2 on Pullman services - and the charge for sleeper accommodation is £15 a berth.

MicroLink even helps subscribers choose their trains by carrying constantly updated British Rail timetables, together with fares between London and 20 major cities throughout England, Scotland and Wales.

LINK OVERCOMES HANDICAPS

MICROLINK has been chosen as the electronic medium for an innovative scheme to introduce disabled people to the world of telecomputing.

Over the next few months the Central Remedial Clinic in Dublin will operate a pilot project involving half a dozen or so people of normal intelligence but who have physical handicaps ranging from slight motor impairment to the inability to move or speak coherently.

The project is thought to be unique in that, as well as using MicroLink's electronic mail facility, it will also embrace speech synthesis and speech recognition technology in helping the disabled to communicate with the outside world.

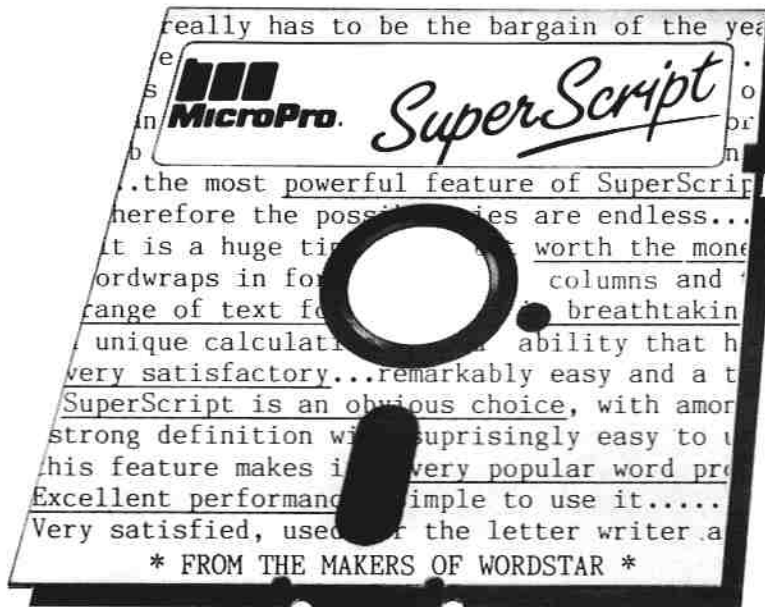
Microelectronic resources manager Bob Allen said: "We hope that their increased ability to communicate will lead to fuller lives. I won't guarantee them a job, but at least it will give them a fighting chance in the marketplace".

Interestingly, the disabled people involved in the project aren't thrilled at the prospect of telecomputing from home.

"At first we took the traditional view that this would mean independence for them", said Allen. "but they told us it would remove the social dimension from their lives and tend to isolate them.

"So we have compromised and will arrange for them to attend centres where there is a human element combined with the working environment".

WORDAHOLIC



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MegaRam Plus: Expandable memory and disk caching. Plug this versatile RAM Expansion Card into your IIe auxiliary slot for up to 1.0 Megabyte (MB) of expansion memory on the mainboard and all the features of an extended 80-column card. Not to mention, exclusive disk caching software, MegaRamCache.

MegaRamCache copies data from main memory to its own cache memory. This caching memory significantly reduces disk access time, provides the fastest possible data retrieval

and speeds generation of larger documents.

Then there's RAM disk software that emulates hard and floppy disk drives.

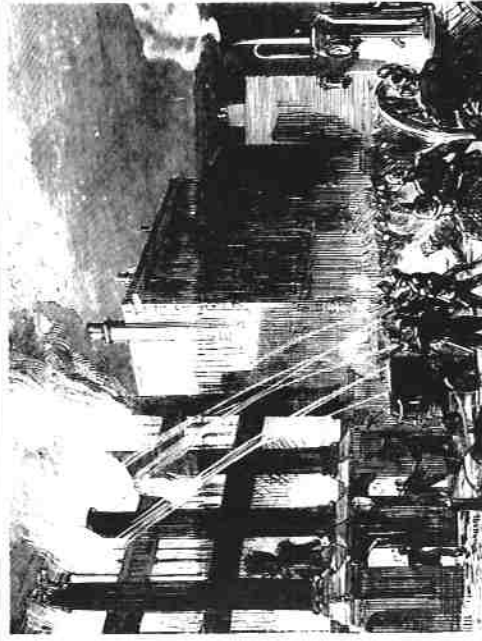
Multi I/O: The versatile, upgradeable clock/calendar and input/output card. AST's Multi I/O lets you add a clock/calendar, a serial printer port and a serial communications port — all in a single slot.

Complete compatibility with ProDOS, Appleworks and most other Apple IIe applications programs means Multi I/O is right for your environment. The serial printer port lets you connect popular letter quality and dot matrix printers. The serial communications port allows you to communicate via telephone modem with other personal computers and on-line services — Hayes compatibility included.

SIMPLE SIMON SUCCESSFUL

Simon Aristocard — a name that has been familiar to Apple Users for seemingly ages. Yet these simply installed interface cards have been amongst the most consistently successful products for Apple ever handled by P&P. Reliability and value for money is the key.

The Serial interface will communicate with any RS232 device which includes: Printers, Terminals Modems, Paper Punch Readers, and Computers, etc.

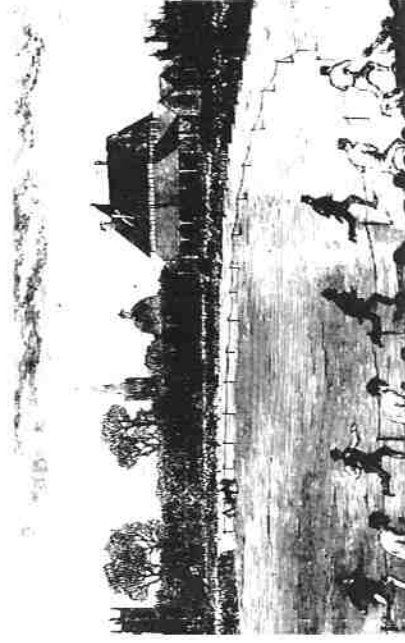


BRIGHT ORANGE SETS APPLE WORLD ALIGHT!

Once again Orange Micro's GRAPPLER+ has topped the monthly P&P Apple Hardware top 20 chart. In fact the Grappler has not been out of the chart since the product was first introduced to this country over 3 years ago! An amazing fact for any product in this fast moving business.

The original GRAPPLER was revolutionary. It was the first interface card providing easy graphic screen dumping for the Apple II/II+ /IIe/III computers. With the introduction of the GRAPPLER+, Apple users were given the freedom of on-board printer selection. BUFFERED GRAPPLER+ adds 16K of printer buffering to the most advanced interface available, and is easily expandable to 32K or 64K. Get to grips with a Grappler now!

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The Parallel interface is a general purpose printer card which works with virtually all parallel printers.

SERIAL ARISTOCARD	SIM 002	£75 + VAT
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EXTRA RAM

Whilst our illustration might be more suited to "Farming Weekly", the extra RAM we refer to gives your Apple more memory and better software — TITAN RAM.

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And you have a choice of Two cards — 64K, and 128K — to match your price/performance needs. Exceptional software is included with each board to deliver exceptional advantages too!

Call your dealer for more details

TITAN RAM 64K	SAT 002	£189 + VAT
TITAN RAM 128K	SAT 003	£239 + VAT



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To speed up virtually all your computer work, Titan have included a feature to put Applesoft, Integer, or PASCAL on the faster Accelerator IIe instead of the regular language card or ROM. This now takes place automatically when you boot up. As a result, practically every program will run about 3 1/2 times faster.

Accelerator IIe is compatible with just about anything you may have in your computer. It's transparent to your software and compatible with most standard peripherals. And it works perfectly with memory boards. In fact, you can now triple or even quadruple your memory without sacrificing speed.

(See "Extra Ram" in column 1. Ed)

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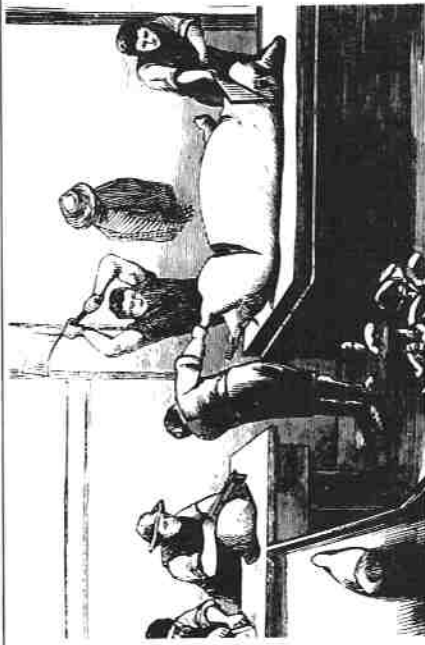
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Cirtech of Galashiels in Scotland have achieved a "first" on our monthly chart of best selling hardware add-ons for Apple. The company has no less than six of its products in the Top 20! How has it been achieved? Once again it's that tried and tested combination that we all look for — reliability and excellent value for money.

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The Skyfox is a machine you've got to fly to believe! A fighting machine endowed with incredible speed and response. Its many features include powerful, deadly weapons and the most advanced radar warning and guidance systems.

This 3D flight and combat simulation for the Apple has been given rave reviews in the computer press. *Apple User* wrote: "With so much going for it I feel that Skyfox will surely be a success".

We've now obtained copies of the Skyfox package for our readers at the exceptionally low price of £15.95. Don't miss this chance to get your hands on a program that will tax your Apple to its very limit!

Order form on Page 61

	A	B	C	D	E	F	G	H	I	J	K
1											
2	=====PETROL ECONOMY RECORD=====					** NB. DON'T complete starred (**) columns.					
3											
4	DATE	Petrol Station	SPEEDO	PRICE	No.	TOTAL	PRICE	No.	TOTAL	MPG.	
5	1985	PLACE	Reading	per GAL	GALLS	COST £	per LTR	LITRES	COST Fr		
6				**			**			**	
7	June 20	Highworth FULL TANK	39816	2.05	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	
8	21	Nr Dover	40026	2.05		11.00	5.27	24.44		39.06	
9	22	A6 North Avallon	40325	2.32			5.98	37.39	223.59	36.35	
10		A7 Montelemer	40603	2.32			5.98	33.78	202.01	37.41	
11	26	St Tropez (Grnd Casin)	40951	2.25			5.79	40.51	234.55	39.05	
12	July 3	St Tropez (Grnd Casin)	41299	2.25			5.79	40.23	232.93	39.32	
13		6 A7 North Montelemer	41588	2.39			6.15	35.78	220.00	36.72	
14		A6 near Tornous	41735	2.38			6.12	19.46	119.09	34.34	
15		A6 Vray	41936	2.16			5.57	27.83	155.00	32.83	
16		7 A1 near Dover	42220	2.05		12.00	5.27	26.66		48.43	
17		8 Highworth	42328	2.04		9.67	5.26	21.50		22.84	
18				#N/A			#N/A			#N/A	
19				#N/A			#N/A			#N/A	
20				#N/A			#N/A			#N/A	
21				#N/A			#N/A			#N/A	
22		FILL-UP AGAIN !!	**	#N/A			#N/A			#N/A	
23											
24	TOTALS:	Over distance >	2512	#N/A	0	32.67	#N/A	307.58	1387.17	37.13	
25		Averages >	#N/A	2.21	0	10.89	5.71725	30.76	198.17	36.64	
26											
27											
28											
29											
30											
31	YEAR >	1985									
32	TOTAL	MILEAGE =	2512	At an AVERAGE of		37.13	mpg.				
33											
34	TOTAL	COST £	151.23			(In France 118.56	@ 11.7 F.Fr per £)				
35											
36	TOTAL	FUEL =	67.66	Gallons	or	= 307.58	Litres				
37	AVERAGE	Cost per LITRE =	F.1	5.75	or	£0.49	(Over ALL miles)				
38	AVERAGE	Cost per GALL =	(F. 26.1517		or	£2.24	(Over ALL miles)				
39											
40											

Figure 1: An example of the model in action – a 2,512 mile trip to the South of France at 37.13 mpg

ASK anyone how many miles their car does to the gallon and you'll get an optimistic answer based "on a run". The fact is people are sensitive over their prized purchase, and don't like to admit it's a guzzler. Somehow the three official government figures aren't usually realistic, either.

The odds are that you haven't a clue what your car *really* consumes on average over a long mileage – say minimum 2,500 miles. The maths involved are even more daunting when faced with a continental journey – there's the added complication of litres and foreign currency to contend with.

Here's a simple model – Figure 1 – which automatically computes the exact answer, copes with all the conversions and provides a useful long term record.

Although produced on Macintosh Multiplan, the under-

lying principles apply equally to other spreadsheet programs – it'll be just at home with Visicalc or Magicalc and will also run on the new Excel.

In fact the screen dumps were all produced on Excel, and using one of its clever little features all of the formulae have been converted to the more familiar Visicalc A1 style of cell referencing.

The model is designed to print neatly on a single standard

8.5in by 11in page utilising the sideways (wide) option. It's easy to print off a few copies of the "nude" model for future data entry use.

I place mine on a clipboard and my navigator wife Pam does the boring writing business en route while I'm filling up. Apart from date and place, you'll notice that only two variables, quantity and total cost, need be recorded.

The third variable, the price

per gallon/litre, the mpg between stops and the overall figures are all calculated by the template once you've eagerly keyed the data upon your return home.

Of course it's vital to start and finish with a full tank – best to do this yourself, as most attendants stop at the first cut-out and you can invariably squeeze in more.

So to the actual construction where the keyword is KISS – Keep It Simple Son. The general layout is self-explanatory and most formulae are straightforward. The only complex bit is the heart of the model, namely the formula in the price per

What mpg does your car really return?

This spreadsheet model from CHRIS BURRIDGE gives an accurate answer

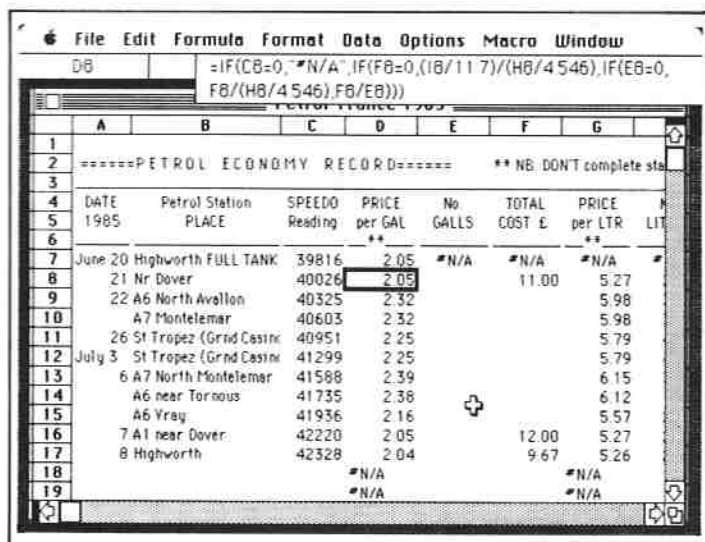


Figure II: The price per gallon calculation forms the heart of the model

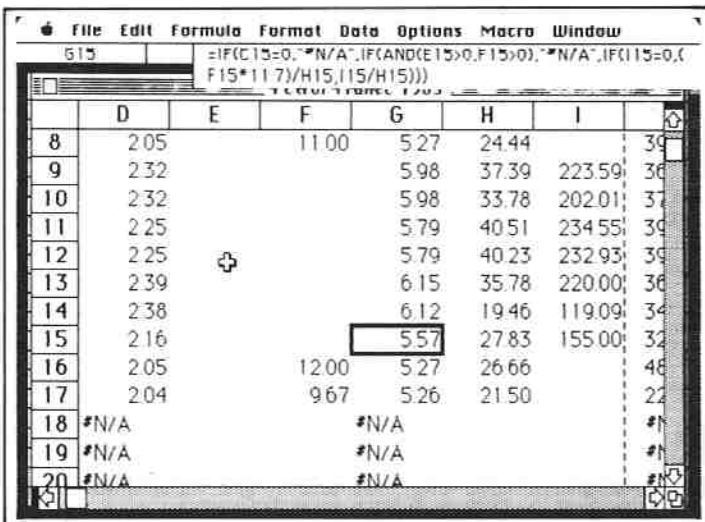


Figure III: An exchange rate of 11.7 francs per £ has been used to compute price per litre

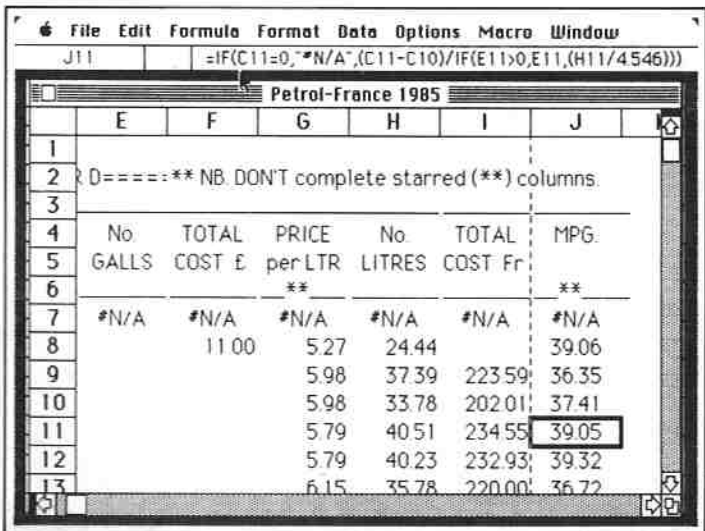


Figure IV: The simple formula to produce the eagerly-awaited mpg results

gallon column (see Figure II). Please don't be put off by the several layers of nestings – just build up the logic gradually in self-contained modules.

For the benefit of those few readers who only understand Multiplan, here is the same thing in Multiplan format:

```
=IF(RC[-1]=0,"#N/A",
IF(RC[+2]=0,(RC[
+5]/11.7)/(RC[+4]/
4.546),IF(RC[+1]=0
,RC[+2]/(RC[+4]/4.
546),RC[+2]/RC[+1]))
```

The important logic in both cases is:

- If no speedo reading display N/A – presumed no entry recorded, or:
- If no sterling total cost, then calculate in Francs at say 11.7 to £, or:
- If nothing entered in gallons column then calculate in litres, otherwise divide sterling cost by number of gallons.

Figure III shows the similar but less complicated calculation coded into the price per litre column. Again the maths are done in the appropriate currency by default. As with all other formulae, notice the steps taken to avoid dividing by zero.

The more interesting mpg column formula can be seen in Figure IV. The model gives the result after each fill-up of fuel. You'll see that the calculation simply deducts the current speedo reading from the last one, then divides by the number of gallons or litres.

Averages and totals are

shown for the data. Note particularly that the two averages at the bottom of the mpg column differ. This is because the bottom one is an average of the various "stage" results while the top figure is a true average over the entire mileage – and, encouragingly, slightly higher too.

Hopefully most readers should have no trouble in setting up their own model if the illustrations are studied and the logic understood. But in case of difficulty, drop me a line at the *Apple User* offices.

The table summary provided usefully pulls all the figures into an easily assimilated quick read form.

Figure V shows the main formula involved. This facilitates comparison with other periods monitored and determines the all-important trend.

When you are planning next year's foreign drive just estimate the total mileage, make amendments to the formulae for latest petrol cost/exchange rate (in any currency) – then calculate to see the estimated petrol cost. An enhancement would be to incorporate motorway road tolls.

You can also monitor the ongoing efficiency of your car engine. It's simple to test whether that last service was done properly or if economy figures are living up to manufacturers claims. Or could it be that the dreaded de-coke can't be put off any longer?

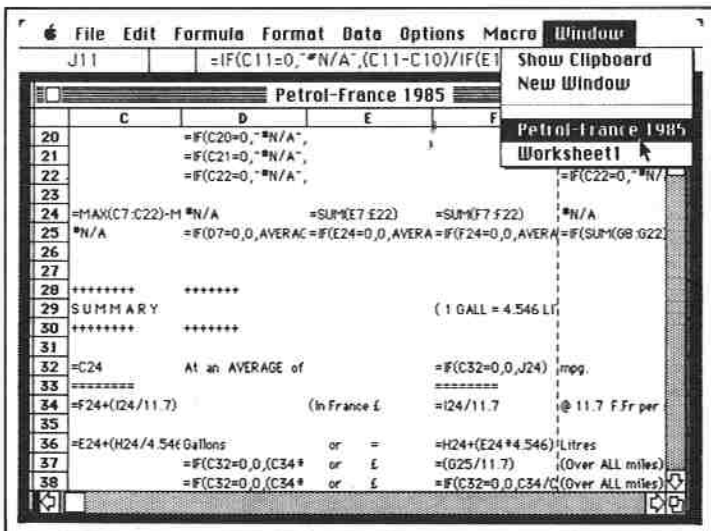


Figure V: A screen dump of the table summary showing the main formulae

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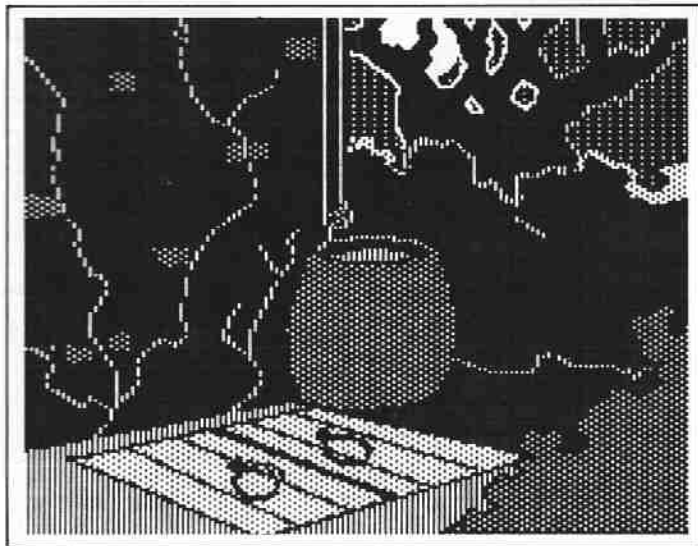
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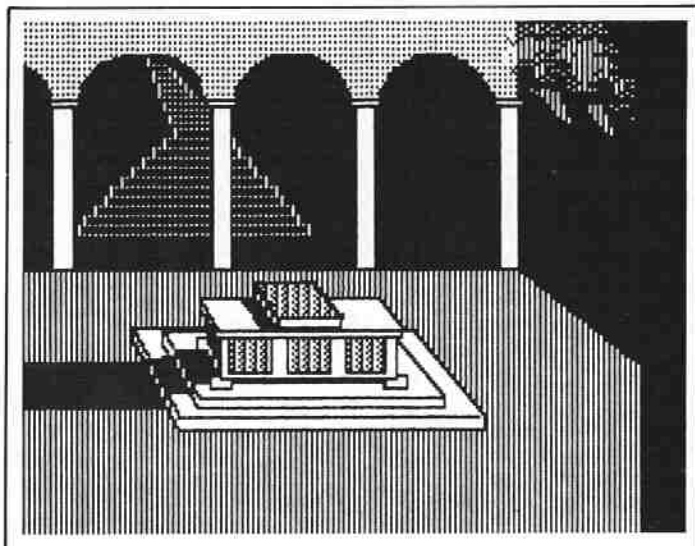
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One of the new locations...



...and one of the old in Transylvania

IF you had a quick look at the latest batch of releases from Penguin Software you might be forgiven for thinking that the friendly folk from Illinois were running short of ideas.

For example Ring Quest is a follow-on from their Quest adventure game and Crimson Crown is a follow-on from Transylvania. They've even released another version of Transylvania.

Of course quick glances can give a wrong impression. Penguin has also recently released two completely new programs—Home Connections, a comms package, and Home Data Manager, a database.

The Home packages will get a separate review in a later issue. For now we'll concentrate on the games, all graphic adventures.

Transylvania revisited

Let's start with the new version of Transylvania. If you read the review of the original in the *Apple User* you may remember that we quite liked it.

The new version is released under Penguin's Polarware imprint and now requires a 64k machine. It's been extended with some more locations and puzzles and also features Comprehend, Penguin's sophisticated new input analyser.

If you never saw the original

then we would recommend this version.

However if you solved the original then you probably wouldn't find enough new in this version to justify a repeat purchase unless you're a real addict.

There's also an extended version available in Macintosh format for adventurous mouse-users.

Title: Transylvania
Author: Antonio Antiochia
Publisher: Penguin/Polarware
Requirements: 64k

There's a Ring to it

Ring Quest follows on from The Quest, but it's not necessary to have completed The Quest beforehand.

Once again you're teamed up with Gorn, the King's Champion, and the bikini-clad sorceress Lisa also features. Even so, the adventure is completely self-contained and is certainly

up to Penguin's usual high standard.

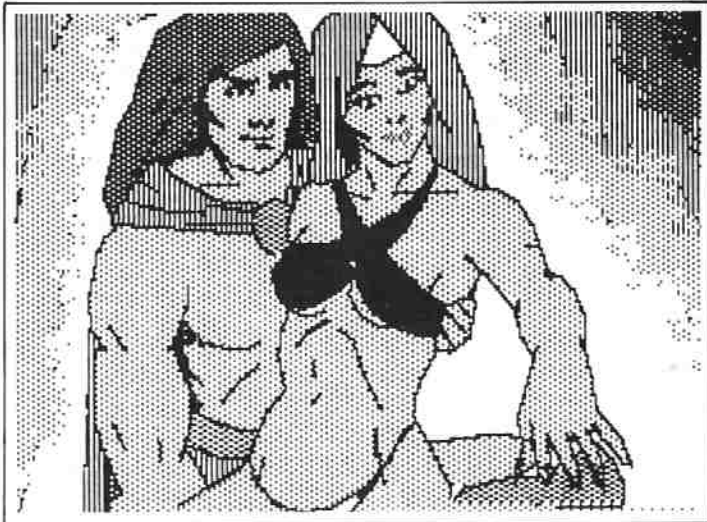
It's a little harder than The Quest, but shares the feature that it can be solved in a variety of ways.

There are also two arcade sections between you and your goal. Adventure purists and committed arcade-haters can

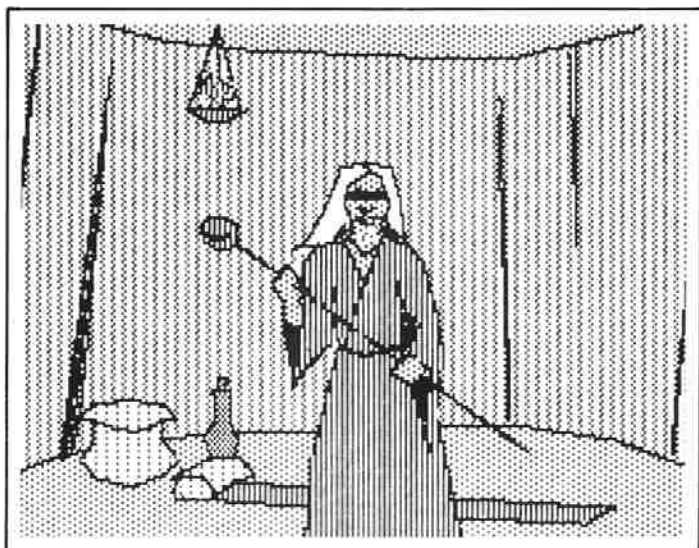
escape these bits by typing "Arcade Off", but from our point of view they form an interesting diversion.

Penguin seem to have abandoned the 48k market because Ring Quest, unlike its predecessor, requires 64k.

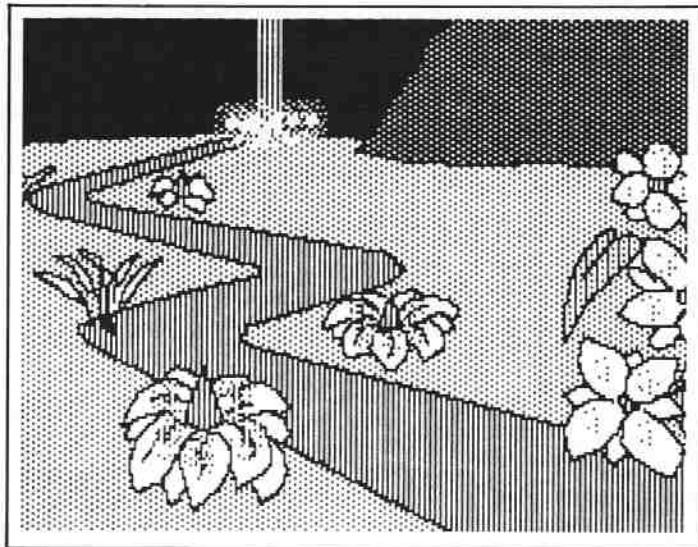
This is a natural way to go because it's a few years since



Gorn and Lisa together at last in Ring Quest



Who is that masked stranger in Ring Quest?



Crimson Crown – the river winds through the magic garden

Apple made a 48k machine and the number of memory expansion cards sold suggests that most users have more than 48k.

Title: Ring Quest
Author: Dallas Snell, Joel Ellis Rea, Joe Toler & Ron Goebel
Publisher: Penguin
Requirements: 64k

Riddled with riddles

The Crimson Crown, another Polarware package, is sub-titled "Further Adventures in Transylvania".

This time instead of having to rescue Princess Sabrina she accompanies you on your journey, along with Crown Prince Erik. Despite being royals, they're remarkably amenable to taking orders.

You don't need to have completed Transylvania before playing The Crimson Crown and even if you have, it doesn't help.

Saved games are written to the actual game disc and you can only save a maximum of three games. In practice, though, this wasn't a problem even for cautious players like us.

It's not too difficult but is a bit trickier than Transylvania. It's also riddled with riddles.

Instead of a werewolf constantly appearing, this time a sage crops up all over the place. He gives rather a lot of hints if

you bother to talk to him, but then sages tend to be like that, don't they?

Polarware packaging is a bit more up market than the old-style Penguin variety. The games now come in stout cardboard boxes fitted with foam cushioning.

Inside you'll now find goodies like posters, maps, wizard's calling cards and the like. These may not actually help in the game, but they provide a

certain atmosphere.

The style owes a little to Infocom, but who cares? What real Penguin fans might care about is that the move into Polarware seems to mean that we are no longer given unique insights into penguin lore and tradition.

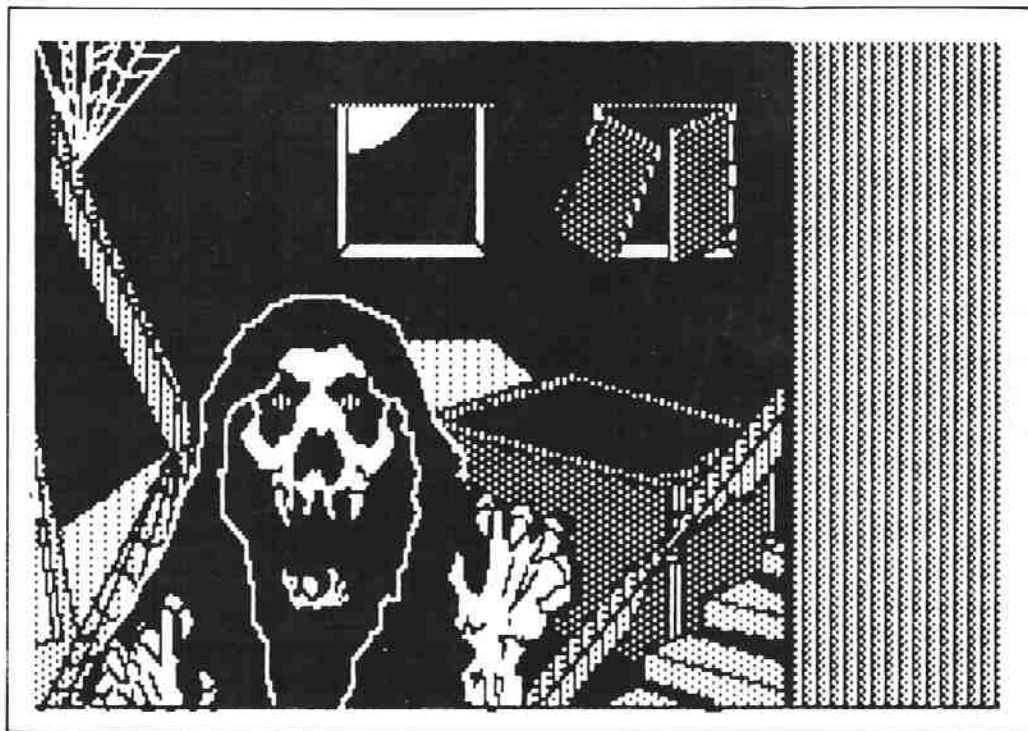
Whereas Ring Quest imparts the snippet that penguins carry three-ring binders, both Transylvania and Crimson Crown have the same piece of

information – penguins like novel ideas.

After all the revisions, sequels and so forth, will the next release show that while penguins like novel ideas, Penguin can produce them?

Title: The Crimson Crown
Author: Antonio Antiochia
Publisher: Penguin/Polarware
Requirements: 64k

Cliff & Denise McKnight



A gruesome discovery in Crimson Crown... these double glazing salesmen get everywhere!

But in Pascal you CAN see the wood for the trees ...

LAST month we started to examine dynamic memory allocation and the way in which Pascal permits memory space to be allocated during program execution, rather than during compilation.

The example given was trivial, so simple in fact that it would have been simpler to use an array to reverse the list of numbers typed in.

Now we will examine a major application in which dynamic memory allocation provides the most efficient solution to a problem.

Consider a program which must input a list of names and keep them in alphabetical order. We could use a simple array of strings, but as each name is input it would have to be inserted into the appropriate position in the list.

To find an item, we then find which half the item is in, then which quarter, eighth, and so on. If the items are not kept in such order, scanning a list from the top is a laborious process. In either case, we would not know how large to make the array.

An alternative approach might use a linear list similar to the one used last week to store numbers. The pointers could be rearranged to maintain alphabetical order. This does permit dynamic memory allocation, but the re-arrangement of pointers is a messy process and scanning is again rather

slow.

A better choice is a "tree". This is a data structure in which each value stored has associated with it pointers to other items, or nodes, of the tree. Think of the family trees that we see in history books which describe the generations of families.

In computing, a tree is much like that. Each node is like the husband of a marriage - we ignore the wives! For convenience the nodes of our trees never have more than two branches, "children". Such trees are termed binary trees.

There are trees with nodes with more than two branches, but these are very rare, and very messy to program.

The first item encountered is always put at the top of the tree, after that new items are added in order, low values to one side, high values to the other, doing this test at every node. An

example of a tree is seen in Figure 1.

To find an item in the tree, the following algorithm is used:

While we're not at end of tree,

□ *if current node is required one then quit, else ...*

□ *if current node is less than the required one, then follow right hand branch, else ...*

□ *if current node is greater than the required one, then follow left hand branch.*

□ *(If we've reached the end of the tree, then the required item is not in the tree.)*

Try "walking through" the tree in Figure 1 to find the value 43, and note the path that is taken. What happens when you try to find the value 66?

To add a new item to the tree we follow the above technique to find where the item should be, and if it is not there add it at that point. Where would 54 be added to the tree?

One great advantage of a tree is that an item is found very quickly because only a limited number of items have to be examined - the number is equal to the depth of the tree. In an un-balanced tree, such as this, the depth is highly variable.

The simplest approach to programming the search algorithm is a recursive one, that is one which uses a procedure which calls itself. The reason for this is that the tree itself can be described recursively, that is in terms of itself.

To see what I mean by this, consider how a node might be described. A node consists of a value, together with two pointers to other nodes further down the tree. Either pointer may be nil if we have reached the end of a tree. For example, in Figure 1 the node with value 98 has pointers to 96 and 99.

A more rigorous description says a tree is either empty (no values) or consists of a node with pointer(s) to other trees. These secondary trees are said to be subtrees of the main tree.

Consider the tree in Figure 1. Clearly the tree is not empty, it consists of a node with a value 33, and two pointers to two other subtrees.

Consider the right-hand subtree. It consists of a node, 36, with pointers to two more subtrees. This process can be continued until the end of the tree is reached.

Now when we want to search the tree this definition can be used to arrive at a simple technique. We define a procedure search which

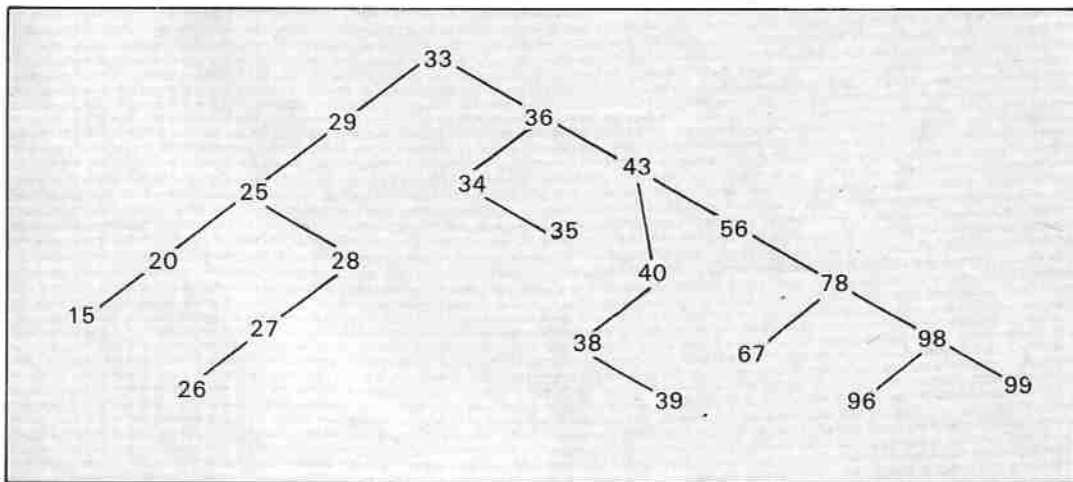


Figure 1: Example of a tree data structure

searches a tree like this:

□ If the current tree is the node required then stop.

□ If the current tree is empty, that is has no pointers, value is not in tree.

□ If current tree is less than required, perform this search on the right-hand subtree of this tree.

□ If current tree is greater than required perform this search on the left-hand subtree of this tree.

As we follow this algorithm deeper and deeper, the subtrees get smaller and smaller until we are looking at individual nodes. Note that we have changed the terminology of "follow right hand pointer" above to "search right hand subtree", but the effect is the same.

When it comes to printing out the contents of the tree, a similar recursive approach can be used. Consider any node. Its left-hand subtree should be printed out first in correct order, then it itself should be printed, followed by its right subtree, in order again. The rule for each subtree is the same.

The algorithm is therefore defined thus:

□ If the current tree is an empty node, then do nothing.

□ Repeat this algorithm for the left subtree (if any).

□ Print out the current node's value.

□ Repeat this algorithm for the right subtree (if any).

Consider again the tree in Figure 1. Starting at the top node, termed the root, it is not empty so the program calls print to examine the left subtree. Again this is not empty, so print is called repeatedly until we arrive at the far left hand element — that is the smallest as required. The one above it is then printed, after which the routine is called to print out the right subtree.

The process then works back up the tree until the root node is reached, after which the right-hand subtree is printed out in a similar manner.

It is an understatement to say that this is not a trivial process. Examine Figure 1 again and try

following the above algorithm to print out the numbers in order. How would you change the algorithm to print out the numbers in reverse order?

The above algorithms are shown coded in the Pascal program of Listing 1. Names are input until a name with zero length is typed, then they are listed in alphabetical order.

Note that, unlike almost any other storage and sorting/searching technique, no data is moved once it has been entered and only a small fraction of elements are examined in order to find the correct position of the name.

Dynamic memory is not an easy concept to grasp, particularly for those of us who started programming in Fortran or Basic (indeed, I'm grateful to a friend, Richard Stearn, for checking through these articles on dynamic memory). However it can provide a very efficient way of managing complex data structures.

I do recommend that you try running the program in Listing 1. How would you amend it to keep a count of the number of times each name was entered, printing the repeat count out in the final list? (Hint — add an integer to the record declaration.)

In these two articles it has only been possible to introduce the uses that can be made of dynamic memory allocation. A full discussion could fill a whole book.

Also, you might like to note that the Apple Pascal system incorporates a tree search function which does a fast search of a particular tree structure similar to the method shown here.

Next month, in the last article in this current series, I'll discuss further books on Pascal and programming which interested readers may wish to look at. They are all books which I've felt it worthwhile buying.

I'll also throw in a number of hints about use of the Apple Pascal system, and address myself to any points raised by *Apple User* readers since the series started.

```

program tree search;

type namestr = string[20];
    ref = ^word;
    word = record
        key : namestr;
        left,
        right : ref;
    end;

var    root : ref;
        name : namestr;

procedure printtree(subtree:ref);

begin
    if subtree < nil then
    begin
        printtree(subtree^.left);      (* print the left sub-tree *)
        writeln(subtree^.key);         (* print out this node *)
        printtree(subtree^.right);    (* print out right sub-tree *)
    end
end;

procedure search(name:namestr; var node:ref);
begin
    if node = nil then                (* have reached end of tree *)
    begin                              (* so add it in *)
        new(node);                    (* create new variable *)
        node^.key:=name;              (* insert name into node *)
        node^.left:=nil;              (* at end of tree - so left *)
        node^.right:=nil;            (* and right pointers = nil *)
    end
    else                               (* not at end of tree *)
    if name<node^.key
    then search(name,node^.left)      (* search left sub-tree *)
    else
    if name>node^.key
    then search(name,node^.right)     (* search right sub-tree *)
    else                               (* name = node.key!!! *)
        writeln('WARNING- name duplication!');
    end;
end;

begin (*MAIN PROGRAM*)
    writeln('Enter names: hit <RTN> to finish ');
    writeln;
    root:=nil;                        (* zero root pointers *)
    write('NAME: ');
    readln(name);
    while name <> '' do
    begin
        search(name,root);
        write('NAME: ');
        readln(name);
    end;
    printtree(root);
end.

```

Listing 1

HAVE you ever wanted to copy several files/programs to several different discs or even from several discs to one, and keep on having to warm boot CP/M and re-run PIP to accomplish it?

Have you ever wanted to reset all disc to R/W (Read/Write) while in PIP, only to have to exit PIP, change discs, do your warm boot, and then re-run PIP? Annoying, isn't it?

Well I was annoyed and decided to do something about it. The listing is a fully documented assembly language patch to PIP which changes PIP to let you Reset all Discs to R/W without having to exit PIP and also conveniently repeats the last one line command you gave to PIP with one key.

I took advantage of the fact that CP/M is lazy in not removing the last command from the console input buffer, but just overwrites it with your new command.

First carefully type in the coding exactly as shown, either with or without the comments after the semi-colons, using

Play it again PIP - without all that hassle

A repeating PIP patch from PETER WILSON

your favourite word processor, and calling your file PIPATCH.ASM.

If possible use a non-document mode (if you use Wordstar select the N option from the main menu) as some word processors, especially Wordstar, add extra control codes when you save a file, which make a mess of it when using the CP/M

Assembler.

Having checked your work, save your file and exit your word processor - if you made an error in copying the listing you will need it later. Now copy on to a spare disc PIPATCH.ASM, ASM.COM, DDT.COM, and PIP.COM, put it in drive A: and press Ctrl-C.

We now want to assemble

your work into a format that can be read into PIP to overlay part of it. Type in ASM PIPATCH.AAZ, Return which will assemble the mnemonics into a usable hex file. You do not have to give ASM.COM an extension as ASM is assumed.

The AAZ following our PIPATCH is to tell ASM that the source code is on A: drive, you want the output to go to A: drive, and that you do not want a PRN file.

The PRN file includes the original source program as well as the generated machine code, sometimes called op codes and any error notations, useful for debugging a new program.

If you get any errors, check your work at that point with your word processor and attempt to reassemble.

You should now have an additional file on your disc called PIPATCH.HEX which we shall now use.

Type DDT PIP.COM to load PIP as well as DDT into your memory and you will see DDT's sign-on message of NEXT PC



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1E00 0100 which is saying that PIP has been loaded starting at 0100 and ending at 1E00 (we will need this information in a moment).

Now at the prompt (-) type IPIPATCH.HEX which is saying to DDT set up the default file control block to be the file name PIPATCH.HEX, that is, the next file to be read using the R command to overlay the current file is PIPATCH.HEX.

Follow this with an R to read, and DDT will read in and overlay PIP with PIPATCH.HEX. Having completed that, exit DDT by a Ctrl-C.

We will now use the hex numbers DDT gave us at sign-on. 1E00 minus 0100 hex or 7680 - 256 decimal gives us 7427 bytes. The CP/M SAVE command requires us to enter the number of Pages to Save of 256 bytes, so 7424 divided by

256 is 29 pages.

We can now enter SAVE 29 A:RPIP.COM Return and a new file will appear on your disc called RPIP.COM; our repeating, resetting PIP.

Try it out, shall we? OK, enter RPIP and let RPIP be read into memory, remove your disc and put in another. Enter S (upper or lower case) and RPIP will reset all your discs in both drives. Enter at the prompt -

B:=A:*.COM (or reverse it if you like) and RPIP will copy just like PIP from one disc to another.

Now change the disc in drive B: for another and press R (again upper or lower case) and RPIP will first reset all discs to R/W and then repeat your last command copying all files with an extension of COM to drive B:

You now have a repeating PIP.

"Play it again, PIP".

```

;PIPATCH
bdos equ 0005 ;CP/M start point.
fcb equ 05Ch ;Default File Control Block.
crlf equ 082Eh ;PIP's own (CR)-Line Feed Routine.
buff equ 1ECBh ;PIP's own input buffer.
;
org 100h ;Address of start of program
jmp signon ;
org 110h ;Start address of Input/Output custom area
;
signon: lda fcb+1 ;Check to see if a command was given at
;the Command line.
cpi ' ' ;
jnz 04CEh ;If a command was issued then don't
;display the new sign-on message else
lxi d,mess1 ;do display the new sign-on message.
mvi c,9 ;
call bdos ;get CP/M to write it to console.
;
jmp 04CEh ;
;
mess1: db 0dh,0ah ;New sign-on message.
db 'Repeating PIP (S=Reset, R=Repeat)',0dh,0Ah,'$'
;
consol: lxi h,buff ;
mvi m,80h ;detail the maximum length of reply.
xchg ;
;
mvi c,10 ;Read the console buffer.
call bdos ;Get CP/M to do it for you.
;
lda buff+1 ;Load length of reply.
cpi 1 ;Was just one character entered?
jnz return ;If more than one character (i.e. it was
;not 'S' or 'R') then let PIP process it
;as normal.
;
lda buff+2 ;Yes it was just one character.
ani 5Fh ;Convert to upper case.
cpi 'R' ;Was it the 'R' for repeat?
jnz getfch ;No then jump.
;
;The repeat command involves restoring
;the first four characters and echoing
;the old command.
;
lhld store ;Restore the length
shld buff+1 ;and the character typed.
;
lxi d,mess3 ;
mvi c,9 ;Display the disk reset message.
call bdos ;Get CP/M to write it to screen.
;
;
;
lxi d,mess2 ;
mvi c,9 ;Display the repeating message.
call bdos ;Get CP/M to write it to screen.
;
;
lxi h,buff+1 ;Get length of command
mov c,m ;and move it into BC register.
mvi b,0 ;
;
inx h ;
dad b ;Point to the first free position in
;the buffer.
mvi m,'$' ;Flag the end of the line with a '$'.
lxi d,buff+2 ;
mvi c,9 ;Echo the line.
call bdos ;Get CP/M to do the work.
;
mvi c,13 ;BDOS command to reset.
call bdos ;Get CP/M to do the work.
ret ;Let PIP process the previous command again.
;
;
mess2: db 0dh,0ah ;
db 'Repeating: $'
;
getfch: ani 5Fh ;Convert to upper case.
cpi 'S' ;Is it the Reset Command?
jnz return ;If not let PIP process it.
;
;The Reset Command.
;
;
lxi d,mess3 ;Disk reset message.
mvi c,9 ;
call bdos ;Get CP/M to do the work.
;
mvi c,13 ;BDOS command to reset.
call bdos ;Get CP/M to do the work.
call crlf ;
;
;
pop h ;Remove a word from the stack.
jmp 53Ch ;Rejoin PIP command line.
;
;
mess3: db 0dh,0Ah ;
db 'All Disks Made R/W.$'
;
;
return: lhld buff+1 ;Save first character typed.
shld store ;Let PIP process it
ret ;and return.
;
;
store: dw 0 ;No initial command.
;
;
org 96Fh ;Patch PIP to the vector at this routine.
jmp consol ;
;End.

```

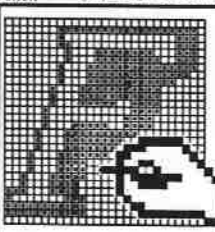


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Fluent Fonts & Fluent Laser Fonts from Casady Company are something else we're now distributing, so we think that together with FONTastic, Fontographer, and the latest Art's font collections we've got the lot area pretty well covered!

It's rather difficult to explain MacSpin from D'S Software in words. In fact, it's the most graphic interactive, immediate way we've ever seen in present date, and it'll be here soon. In a similar vein, we think that Cricket Graph is the clear leader among the graph programs now available, and we'll have that one here for you any day now.

File... Edit... Goodies! T M

titled

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IN this series we have hitherto been considering how to pack as much data as possible on to discs. To conclude the series we turn our attention to the most efficient use of the computer's own random access memory.

The computer can process data stored in RAM much more quickly than it can process the same data stored on a disc, a feature which is particularly evident when one wishes to sort records.

If a lot of sorting has to be done, for example, it is more convenient to transfer the file to RAM, do the sorting, and return the sorted file to the disc.

This can be done in Basic by DIMensioning an array large enough to hold all the fields to be sorted, but one can run into memory problems, particularly with large string arrays.

The &DOSFILE alternative is to take the compressed data from the disc and store it in the space between the top of the area containing array pointers and the bottom of the area containing strings (see Apple memory map on page 140 of the Applesoft Tutorial).

To keep matters simple, provision has been made only for the storage of one file at a time, so don't expect a full function RAMdisc program allowing the storage of multiple files in what is after all a fairly small area of RAM.

The available space when last month's database program is working on a file with 17 fields per record is about 18k.

The syntax of the new & commands is a bit complicated. The file must first be opened with the &O command as before, and address RECLN (decimal 942) must be poked with the length of the record in bytes. The command:

&MR(<Filename>),N1,N2

(where <Filename> is, as before, a string variable, a numeric variable, or a string literal in quotes, N1 is the first record to be read in and N2 is the last record to be read in) reads records N1 to N2 from the named file into RAM.

Similarly, the command:

&MW(<Filename>),N1,N2

writes the same records back to disc. (Think of these commands

RAM in the data to get things moving

as Memory Read and Memory Write).

Once in RAM, the records may be selected by the &N command as before. Reading from RAM is accomplished by the command:

&QR

which transfers the RAM record to the RDBUF area for further comparison or expansion. Similarly, the command:

&QW

transfers the contents of WRBUF to the designated area of RAM. (These commands can

top of the previously free memory.

Before using the &MR command it is therefore necessary to make some estimate of the free space available. One approach is simply to calculate the sum of the maximum allowable lengths of all strings in memory.

This can be done in the context of last month's &DOS-FILE program quite easily - the array element FD%(4,FF) holds the maximum allowable length of the string element OUT\$(FF) in both the database and form generator modules. There are

be in use plus a safety factor of, say, 100.

Dividing the result by the length of a record will give the number of records which can be safely held in RAM at one time. While records are held in RAM, it is wise to make frequent use of the statement:

X=FRE(0)

which is an essential part of the input routine, to ensure that old strings are discarded, and the space occupied by strings in current use is kept to a minimum. The same garbage-collecting routine is also called as part of the &K code.

It is very important to remember that RAM is not a permanent store like a floppy disc. If you want to keep the results of sorting records you must write the RAM records back to disc before leaving the program. (Don't switch off the computer!)

The hi-res graphics pages are not usable. If you want to use the graphics pages, two lines of this month's assembly listing must be altered.

Line 1089 should be changed from LDX STREND to LDX 0, Line 1091 should be altered from LDY STREND+1 to LDY #\$40 if only the first hi-res page is to be used, or to LDY #\$60 if the second page is to be used as well.

The number of bytes available will then be found from the function X=FN SPACE(X), where FN SPACE has been differently defined:

Page 1 only:

```
DEF FN SPACE(X)
  =PEEK(111)
  +256*PEEK(112)
  -16384
```

Both pages:

```
DEF FN SPACE(X)
  =PEEK(111)
  +256*PEEK(112)
  -24576
```

always RN elements in the array.

Reference must then be made to Basic's pointers to find the top of the array table and the bottom of the string storage area. The top of the array table is marked by the pointer STREND (addresses decimal 109,110) and the lower end of string storage by the pointer FRETOP (addresses decimal 111,112). The statement:

```
DEF FN SPACE(X)
  =PEEK(111)
  +256*PEEK(112)
  -PEEK(109)
  -256*PEEK(110)
```

will set up a function which can be called later. Before filling the RAMdisc, the statement:

X=FN SPACE(X)

will return a value in X corresponding to the number of bytes available at the time. From this must be subtracted a value corresponding to the lengths of all the strings likely to

be thought of as Quick Read and Quick Write).

A few points must be borne in mind when using the RAM-disc facilities.

The records in RAM are not protected from Basic. The start of the records placed in RAM by the &MR command is just above the area where numeric arrays and pointers to string arrays are kept.

This area is enlarged if any further variables or arrays of any kind are used, which would corrupt the first few records.

It is vital to declare all variables in the initialisation phase of a program, or at least to make sure that no new variables are created while records are held in RAM. 256 bytes of space have been left free against such eventualities, but do not push your luck!

There is a similar problem with the last few records. Each time a string variable is assigned a new value the characters of the new value are stored at the

PETER HARRIS concludes his database series

The correspondence of records in RAM and on disc may cause some confusion. In each case, the first record is record 0. Thus after transferring records with &MR(FI\$),N1,N2 the sequence &N(0):&QR will select the same record from memory as could be selected directly from the disc with &N(N1):&R.

Likewise, the &MW(FI\$),N1,N2 command takes the record held at position 0 in memory and puts it at position N1 in the file, with further records following on up to position N2.

If one wishes to transfer another range from memory, say 10 records starting at N3 in memory to a range starting at

N1 in the disc file, one must go through a more elaborate routine:

```
FOR N=0 TO 9
&N(N3+N):&QR:&P
&N(N1+N):&W(FI$):NEXT
***
```

I have discovered 3 bugs in the course of putting the &DOSFILE code to work. The first, and most annoying, is the inability of the &K code, as published, to cope with null strings. The cure involves the following modifications to the assembly listing in the January 1986 issue.

Line 819 should get a label:

```
819 C05 LDA STRLEN
Lines 796 to 799 should be
deleted and replaced by the
```

following:

```
796 LDY STRLEN
797 BEQ C05
798 C07 DEY
799 LDA (STREND),Y
800 BEQ C07
801 STY STRLEN
```

Following these corrections, lines 562 and 572 of last month's Basic program may be deleted.

The second is the habit of all the &DOSFILE filing commands, including &V, of creating a new file if one did not exist before. As verifying a file is a good method under DOS 3.3 of finding out whether a file exists or not, this can be annoying.

The fault is in the LDX #0 instruction in line 316 of the listing in the October 1985

issue, which permits the file manager to create a new file if one does not already exist.

This is really appropriate only to the &O command, and the instruction should load the X register with a non-zero value for all other commands. Unfortunately it occurs late in the code common to all the commands. A fix can be achieved by the following steps:

Alter line 317 to read:
317 FB3 JSR FLMNGR
Delete line 316.
Add three new instructions between lines 270 and 271:
270 STY BUFP (old line 270)
271 LDA (PTR),Y
272 TAX
273 DEX
274 SKP 1 (old line 271)

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After this fix, the &D(FI\$) statement in line 9330 of last month's Basic program is no longer necessary and may be removed.

The last deficiency is in the & syntax checking, which does not catch all typing errors, for example if one types &(W) instead of &W. This is less of a nuisance than the other bugs, but can be cured by some extra instructions near the start. Delete line 105, and replace it with:

```

105      SBC#65
106      BCS ND2
107      ND3  JMP SNERR
108      ND2  JMP#26
109      BCS ND3
    
```

Because of the modular nature of the Basic program, it

should be very easy to modify to one's own requirements. I have not included a sorting routine, as some interesting sorts were featured in Peter Gorry's article on Page 26 of the September 1984 issue of *Apple User*.

Nick Levy (July 1984 issue, Page 33) has some thoughts on the organisation of databases.

It is certainly worth considering splitting a database into several files, particularly if one or more are sorted into some kind of order for use as index files. This can dramatically speed up access to a particular record.

If one knows that there is more than enough space on the disc for the expected number of records, hashing techniques

may be useful.

These work in the following way. Let us suppose that we wish to access a customer record by name, sex, and geographical location (North, South, East, West). There are 2500 spaces in the file.

An elementary hash code would be achieved by taking the decimal Ascii code of the initial letter of the name, subtracting 65 and multiplying by 80, to give an answer between 0 and 2000. To this is added 40 if the customer is female, 10 if the location is South, 20 if the location is East, and 30 if the location is West.

Records are entered, not into the first available space as in the &DOSFILE program, but into

the position determined by the hash code.

Retrieval is very fast until the file fills up, when the hash code for a new record is equal to an existing one.

At this point a collision is said to have occurred, and the new record has to be entered into the next free space - possibly determined by a secondary hash code - whereupon the retrieval process is slowed.

The snag about hash coding is that it is efficient only if one regularly accesses the database in the same way, and if the file is not filled to bursting. This is why commercial databases specify a key field for rapid searching, and why search rates differ between empty and full database files.

```

SOURCE FILE: &DOSFILE
9689:
1048      LST  GN
1049      *****
9689:      1050 *
9689:      1051 * RANDISC
9689:      1052 *
9689:      1053 * ZNR(FI$),N1,N2 TRANSFERS RECORDS N1 TO N2
9689:      1054 * FROM DISC FILE FI$ TO RAM
9689:      1055 *
9689:      1056 * ZMW(FI$),N1,N2 TRANSFERS RECORDS FROM RAM
9689:      1057 * TO POSITIONS N1 TO N2 IN DISC FILE
9689:      1058 *
9689:      1059 *****

00041     1061 TOTREC EQU 4
00081     1062 CURREC EQU 8 PTR,BUFF,NBZ NEEDED

9689:     1064 NSB OFF
9689:A0 03 1065 MEMFILE LDY E3 READ CODE
9689:C9 52 1066 CMP E'R
9689:F0 08 1067 BEQ MF3
9689:CB 1068 INY WRITE CODE
9689:10 57 1069 CMP E'W
9689:1F 03 1070 BEQ MF3
9689:4C 09 0E 1071 JMP SNERR
9689:7C E4 96 1072 MF3 STY MEMPAR
9689:78 01 00 1073 JSR CHRGET
9689:D0 5C 90 1074 JSR FILENAME+2 (NAME PARAMETER)
9689:20 71 93 1075 JSR PARGMT (N1)
9689:3C E7 96 1076 STY FIRSTPOINT+1
9689:60 E6 96 1077 STA FIRSTPOINT
9689:20 71 93 1078 JSR PARGMT (N2)
9689:38 1079 SEC
9689:ED E6 96 1080 SBC FIRSTPOINT CALCULATE
9689:AA 1081 TAX FILE MANAGER
9689:45 51 1082 LDA L1NNUM+1 RANGE PARAMETER
9689:3D E7 96 1083 SBC FIRSTPOINT+1
9689:AB 1084 TAY AS
9689:7B 1085 INX
9689:08 01 1086 BNE MF2 (N2-N1+1)*RECLN
9689:1C 1087 INY
9689:20 56 96 1088 MF2 JSR MULT PRODUCT HOLDS REQUIRED RANGE LENGTH
9689:A6 40 1089 LDY STREND
9689:BE EC 96 1090 STX FILESTART
9689:A4 4E 1091 LDY STREND+1
9689:CB 1092 INY ALLOW SPACE FOR NEW VARIABLES
9689:8C ED 96 1093 STY FILESTART+1
9689:A8 89 1094 LDY E9
9689:89 E4 96 1095 MF1 LDA MEMPAR,Y
9689:91 00 1096 STA (PTR),Y
9689:88 1097 DEY
9689:18 FB 1098 BPL MF1
9689:4C 2A 91 1099 JMP FEUF

9689:06 04 1101 MULT STY TOTREC
9689:B4 05 1102 STY TOTREC+1
9689:A9 00 1103 LDA E0
9689:BD EA 96 1104 STA PRODUCT
9689:F0 EB 96 1105 STA PRODUCT+1
9689:AD AE 03 1106 LDA RECLN
9689:85 98 1107 STA CURREC
9689:7A 07 1108 LDY E7
9689:06 08 1109 MULT1 ASL CURREC
9689:76 11 1110 BCC MULT2
9689:18 1111 CLC
9689:45 04 1112 LDA TOTREC
9689:60 EA 96 1113 ADC PRODUCT
9689:BD EA 96 1114 STA PRODUCT
9689:45 05 1115 LDA TOTREC+1

9689:6D EB 96 1116 ADC PRODUCT+1
9689:BD EB 96 1117 STA PRODUCT+1
9689:0E EA 96 1118 MULT2 ASL PRODUCT
9689:12 EB 96 1119 ROL PRODUCT+1
9689:8B 1120 DEY
9689:10 E2 1121 BPL MULT1
9689:6E EB 96 1122 ROR PRODUCT+1
9689:6E EA 96 1123 ROR PRODUCT
9689:60 1124 RTS

1126 *****
1127 *
968E: 1128 * RGR SIMILAR TO ER, TRANSFERRING CURRENT RECORD
968E: 1129 * SELECTED BY AN() FROM FILE IN MEMORY TO R0BUF
968E: 1130 * RGR SIMILAR TO EN, TRANSFERRING CURRENT RECORD
968E: 1131 * FROM R0BUF TO RECORD IN MEMORY SELECTED BY AN()
968E: 1132 *
968E: 1133 *****

968E:48 1135 QUICKREAD PHA
968F:20 01 00 1136 JSR CHRGET
9692:68 1137 FLA
9693:09 52 1138 CMP E'R
9695:F0 18 1139 OR BEQ OR
9697:C9 57 1140 CMP E'W
9699:F0 03 1141 BEQ QW
969B:4C 09 0E 1142 JMP SNERR
969E:20 97 93 1143 QW JSR SETADR2+3
96A1:20 C7 96 1144 JSR RECPOS
96A4:01 02 1145 QW1 LDA (BLOCKADR),Y
96A6:91 08 1146 STA (CURREC),Y
96A8:CB 1147 INY
96A9:CC AE 03 1148 CPY RECLN
96AC:98 F6 1149 BCC QW1
96AE:68 1150 RTS

96AF:AD 03 1152 OR LDA RDX
96B2:05 02 1153 STA BLOCKADR
96B4:AD 03 1154 LDA RDX+1
96B7:05 03 1155 STA BLOCKADR+1
96B9:20 C7 96 1156 JSR RECPOS
96BC:01 08 1157 OR1 LDA (CURREC),Y
96BE:91 02 1158 STA (BLOCKADR),Y
96C0:CB 1159 INY
96C1:CC AE 03 1160 CPY RECLN
96C4:90 F6 1161 BCC OR1
96C5:60 1162 RTS

96C7:AE 03 03 1164 RECPOS LDY RNUM
96CA:AC 04 03 1165 LDA RNUM+1
96CD:20 56 96 1166 JSR MULT
96D0:18 1167 CLC
96D1:AD EA 96 1168 LDA PRODUCT
96D4:6D EC 96 1169 ADC FILESTART
96D7:85 06 1170 STA CURREC
96D9:AD EB 96 1171 LDA PRODUCT+1
96DB:6D ED 96 1172 ADC FILESTART+1
96DF:85 09 1173 STA CURREC+1
96E1:AD 00 1174 LDY E0
96E3:60 1175 RTS

96E4:03 04 1177 MEMPAR DFE 3,4
96E6: 1178 FIRSTPOINT DS 2
96E9:00 00 1179 DFB 0,0
96EA: 1180 PRODUCT DS 2
96EC: 1181 FILESTART DS 2

*** SUCCESSFUL ASSEMBLY: NO ERRORS
    
```


APPLE'S new disc operating system for the Apple II series of computers has got off to a relatively slow start, unlike DOS 3.3 which it replaces. But many users do like it and books on the subject are beginning to appear.

Inside Apple's ProDOS, by John Campbell, Reston Publishing Inc., Prentice-Hall, 1984, ISBN 0-8359-3078-5. £18.40.

Inside Apple's ProDOS shows all the signs of having been hastily put together in order to fill the notorious gap left by Apple not having enough ProDOS manuals to go around.

This is evidenced by the first chapter which offers an overview of the new system but which unfortunately was written without access to the final version of the discs sold to the public.

The effect is that the present files are not the same as those described by Campbell, but he admits this early on and, in fact, from the point of view of the assumed reader (a user accustomed to Applesoft Basic and DOS 3.3) it does not make much difference.

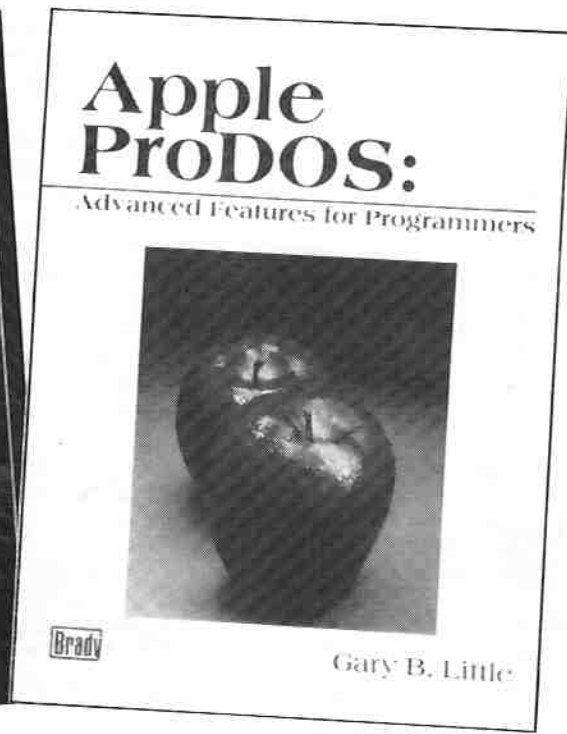
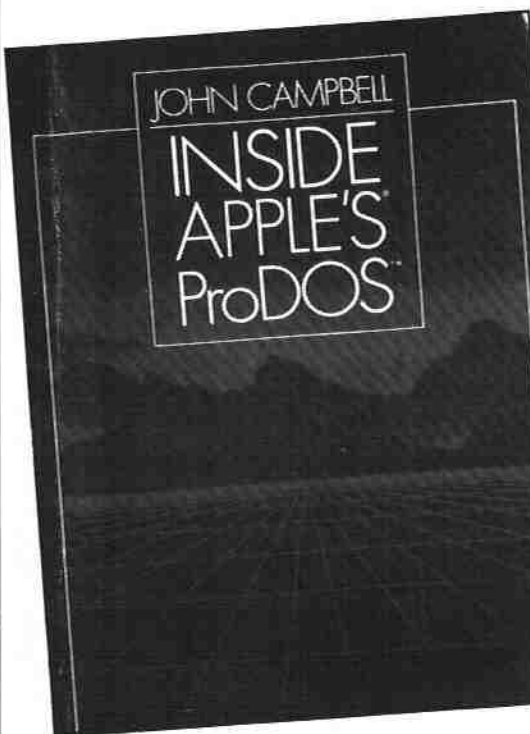
Another sign of haste is the transposition of some of the many pictures of screens which adorn the book. Again, although this may puzzle a new user, the old hand will not worry overmuch.

Fortunately the book is written with a certain sense of dry humour and not with that overbearing jollity characteristic of many American publications of this kind.

Each chapter begins with a quotation and although some are a little strained I rather liked the opening quote: "Nothing is more expensive than a start". (Nietzsche, 1888).

The book begins with "How to bring ProDOS up from cold" and then covers the commands available, contrasting them with the corresponding DOS version. On the way Campbell covers PRODOS, BASIC.SYSTEM and STARTUP, volumes and files, and pathways and directories, giving a program to access directories.

In chapter 4 sequential files are discussed, random access files being covered in the



ensuing chapter. Both give a good guide to the construction of such files on the disc and leave the reader in no doubt as to exactly where a character will appear and what delimits strings.

The book continues with a short discourse on binary files followed by an even shorter one on EXECing TEXT files and a description of the FILER and CONVERT programs, ProDOS utilities which come with the system disc.

In the closing chapters Campbell moves on to the machine language interface (MLI), first discussing memory usage and memory maps and giving some useful information on various locations used by ProDOS, although not to the depth which will be required by someone who wants to write system programs.

The use of the MLI is then described, mainly through the

EXERCISER, but finishing with a short description of the MLI error codes and how to write a system program.

In chapter 10 Campbell changes tack completely and describes a Basic program aimed at putting together a small and simple "management information system" — actually a Christmas card mailing list — which unites the subroutines and command usages described earlier in the book.

This is quite long, taking 16 pages for the listing which mercifully appears to be taken directly from a good computer output and not typeset, consequently I did not test it.

There are nine appendices which compare the DOS and ProDOS commands, and ProDOS and SOS (the Apple III's operating system), describe the APA program, the various error messages likely to be encountered under ProDOS and

miscellaneous topics such as clock cards, the Profile and the use of /RAM.

Apple ProDOS Disk/File Handling, by Graham Keeler, Prentice-Hall International, 1985, ISBN 0-13-038829-7. £13.95

The second book, Keeler's Apple ProDOS Disk/File Handling, starts with the traditional comments on floppy discs and disc drives, mentions the ProFile, and gives a tip on using the reverse side of floppies.

Chapter two is "Getting started with ProDOS" and the next few roughly follow the same lines as the first few of Campbell's book (one chapter is devoted to the IIc and its systems utilities), but reference is not generally made to the corresponding DOS commands, making Keeler's a better book for the newcomer to disc

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GRAHAM KEELER



operating systems. It also gains from actually relating more to the distributed discs than does Campbell's.

An interesting facet of Keeler's book is that programming tips are scattered throughout. For example, Campbell merely mentions the EXEC command and gives its syntax.

Keeler does this, of course, but also goes on to show how to "capture" a Basic listing into a TEXT file for subsequent editing and EXECing.

He also illustrates how to gain keyboard input while a file is being EXECed and some uses of this ability and refers to other EXECing uses. Keeler finishes the first part of his book with a database program, again too long to test.

His description of sequential and random files which leads up to this is just as good as Campbell's and is in fact more extensive, with details on trans-

ferring random access files from DOS 3.3 to ProDOS and, somewhat tantalizingly, with reference to other disc filing methods but without much programming detail.

The second part of the book, Chapter 11 onwards, is more technically orientated but is not quite as detailed as Campbell's on the MLI.

Keeler describes memory use and gives some information on ProDOS locations and BASIC.SYSTEM and shows how the Basic programmer can extract information about the system and the ProDOS directory. He gives a mainly Basic disc editing program which uses MLI calls and describes its use to recover deleted and overwritten files and goes on to deal with bad blocks.

He next shows how to make a dual ProDOS-DOS 3.3 disc (readers can buy directly from the author such a disc which

contains most of the programming pieces from the book) and finishes with appendices describing in some detail the utility programs of the book.

Besides the database and Zap program already mentioned there are Mail.list and Copy.blocks.

Further appendices describe the differences between DOS and ProDOS, and something unusual, but nonetheless welcome in a ProDOS book, DOS utilities showing control characters, creating extra space on disc, multiple column catalogues, removing the pause in catalogues and determining the free space on disc.

The book has been prepared directly from word processed manuscripts but looks more "print-like" than most. The listings were EXECed directly into the text and hopefully are therefore without typographical error.

Apple ProDOS: Advanced Features for Programmers, by Gary B. Little, Brady Communications Co. Inc., Prentice-Hall, 1985, ISBN 0-89303-441-X. £16.35.

Little's Apple ProDOS: Advanced Features for Programmers carries on where the previous two books leave off.

It starts in much the same way as the other two with an introduction to ProDOS, a short comparison with DOS 3.3, and a potted history of DOS, followed by "Files and File Management" and "Loading and Installing ProDOS".

However these chapters are more technically biased than Campbell's and Keeler's - there is even an annotated source listing of the ProDOS system global page.

In chapter four there is a detailed description of the MLI commands with 6502 assembly programs as examples of each. Error codes and how to handle them are also described.

The rest of the book covers system programs (and BASIC.SYSTEM), interrupt handling, clock drivers and disc drivers. The last two have assembly language guides to writing your own.

The book's appendices are very short, describing the

correspondence between some ProDOS assemblers (the book uses Merlin Pro), the existing ProDOS versions, the correspondence between ProDOS blocks and DOS 3.3 sectors, a bibliography, and a disc of programs which may be bought from the author.

These are the examples from the book as text files, suitable as source listings for Merlin Pro, together with Basic and machine code programs.

There are also three bonus programs. The first draws a low resolution ProDOS disc map and shows the free space. The second adds to the BASIC.SYSTEM the command TIME, which prints the time or allows a Basic program to pick it up. The third adds the TYPE command to BASIC.SYSTEM.

Which book would I recommend? Well the first two would probably replace the ProDOS manuals to most people's satisfaction.

As Keeler's is more up to date and has more programming tips I suspect his is the more useful book and the better buy, although in the more advanced sections each book complements rather than replaces the other because the information printed is different.

However an advanced programmer will want more and will turn to Little's book. This, together with Keeler's makes a very useful, informative duo, though if a deep level of technical information is required, the ProDOS Technical Reference Manual from Apple is a must.

Getting Started with ProDOS, by B.M. Peake and D. Rorke, Peak Press, P.O. Box 6252, Dunedin, New Zealand. £2.95.

● An alternative for the user who wants a short guide to ProDOS is a mail order only booklet entitled Getting Started With ProDOS by B.M. Peake and D. Rorke.

Having only 68 pages, it obviously can't be as comprehensive as the other three. However at the price it makes a useful quick guide and might save you some time if you get impatient with the manuals.

CHAT ON THE CHEAP

STUART BELL shows how to access the country's bulletin boards at a modest cost in this two-part project which covers both hardware and software

HOW would you like a modem that's 15 inches square and feels as if it weighs a ton? Put like that, my latest project doesn't seem very appealing.

However, if it's described as providing access to the bulletin boards of the country for a total cost, including interface and software, of less than £80, then those of you who, like me, can't afford the latest in data communications technology may like to read on.

Wishing to access the private electronic mail system of USUS(UK), the UCSD p-System Users' Society, I had two alternatives.

I could either buy a modern modem, a decent up-to-date serial card and terminal-emulation software, or else try a low cost approach. Financial constraints meant that, as is true of the rest of my Apple II+ system, "trailing edge of technology" won.

The final result is a combination of modem, serial card and software that costs well under £80.

At the heart of the system is the Modem 2B, an ex-GPO piece of equipment that a used-equipment dealer(*) is now selling for the princely sum of £29.95 plus carriage. This is an incredibly robust piece of equipment that provides 300 baud communications in either receive or answer mode.

To drive it, an Apple II or IIe user needs a serial card of some sort. I used an ex-demo Apple Communications card at a cost

of £30, but any serial card should do as the Modem 2B needs only one handshaking signal, and the comms card doesn't even provide that.

While this article describes the use of one particular modem with a specific interface card, I hope that the hardware and software techniques discussed here will be applicable to other configurations.

As it acts as the link between the telephone line and the computer, any modem has two interfaces. The one between the modem and the telephone line is the simpler one, only two wires are essential. These connect the modem to the two lines used to carry voice signals.

In theory a direct connection is possible. However BT is quite rightly unhappy about the subscriber making direct connections to its network, and this

approach is neither recommended nor legal.

Since an increasing number of installations use the new BT sockets, I decided to employ them to connect the modem. A flying lead with spade terminals at one end and a standard BT plug at the other is used to connect the modem to the telephone line.

A socket is mounted on the rear of the modem and the telephone handset plugged into that new socket. The wiring diagram is shown in Figure 1.

While the Modem 2B is not specifically BT-approved, it would be rather hypocritical of BT to object to a piece of equipment that it has used for many years. The 2B is built to far higher standards than most modern modems.

The interface between modem and Apple employs the

RS-232 "standard". I use inverted commas because the RS-232 standard is rather a misnomer due to the totally inconsistent way in which manufacturers use the various signals defined by the various internationally-agreed protocols.

A minimal interface is provided by three wires - earth, transmit data and receive data. The 2B can be run with this, and that is all that the Apple communications card provides (it simply loops the handshaking signals back to the device to which it is connected).

However use of the modem is simpler if we can provide it with a Data Terminal Ready signal on pin 20 of the interface. This signal is used to select whether the telephone handset or computer is connected to the line to the exchange.

The host computer is dialled using the handset. When the carrier tone is heard the DTR signal is set to connect the computer. At the end of the session the DTR signal is dropped to re-connect the telephone handset.

Since I could not use the interface card to generate this signal, I turned to the games I/O connector on the Apple II motherboard. Here we find four annunciator outputs which can be set to 1 or 0 under program control.

By connecting pin 15 (annunciator 0) of a DIL header (much like an IC socket, but with pins on to which wires can be soldered) to pin 20 of the 25

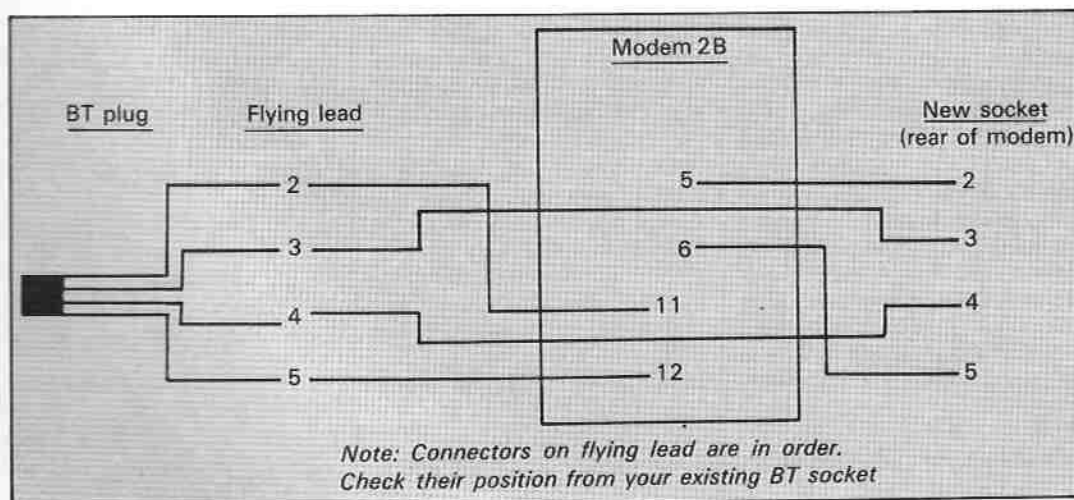


Figure 1: Telephone connections

way socket by a single wire, the required DTR signal can be provided.

The wiring of the Apple to the modem is shown in Figure II. Users of Apple IIs should note that the annunciator outputs do not appear on the socket on the rear of their computer. I am not familiar with the serial ports of IIs. In any case, it makes little sense to use such a large

```

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      British Rail Service
      Tickets / Fares / Timetable
*****
1 : Ticket Bookings
2 : Seat Reservations
3 : Sleeper Reservations
4 : Timetable and Fares

1-4 HI-H4 H(help
R(e-display or Q(uit : 4

*****
      British Rail - Timetable and Fares
      To and from LONDON
*****
1 : Aberdeen
2 : Birmingham
3 : Brighton
    
```

modem with a portable computer.

If you are using another serial card, then the DTR signal may be provided correctly. It is more likely that it is permanently set, or else is an echo of a signal going into the card.

Unless the documentation is particularly good, I would recommend use of the games I/O controller as outlined above - it can save many hours of fruitless experimentation.

It is possible to test the DTR signal by toggling it using the poke instructions detailed in the panel adjoining while listening to the handset plugged into the back of the modem.

You should hear the handset being alternately connected and disconnected from the telephone line, and hence the dialling tone coming and going.

You may need to depress the buttons in the cradle which holds the handset to achieve a re-connection. Do make sure that the modem is plugged into the mains supply!

Once we have some simple software working, we can check

it out without incurring telephone costs by disconnecting the modem from the interface card and looping together the transmit data and receive data lines. I used a bent paper-clip in the 25 way socket.

That completes the hardware part of this project. Next month we shall consider the requirements of simple terminal emulation software, under both DOS and Pascal.

* Display Electronics, 32 Biggin Way, Upper Norwood, London SE19 3XF. Tel: 01-679 4414.

```

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ACC - Access
AMX - Amer. Exp

Card type :
    
```

These screens show the kind of services that can be accessed using the Apple II+ and Modem 2B. They are both sections of the MicroLink database.

- Type the line POKE 49241,0 but do not type Return.
- Dial the required number and when the carrier is detected, hit Return to assert DTR by means of the annunciator 0 signal, and hence connect the computer to the phone line.
- Type IN 2 Return Ctrl-A Ctrl-F to invoke the terminal software.
- At the end of the session type Ctrl-A Ctrl-X to exit.
- Type POKE 49240,0 Return to disconnect the computer, and use the handset to check that the dialling tone is audible. This is essential if phone bills are not to be excessive.

Use of the communications interface under DOS

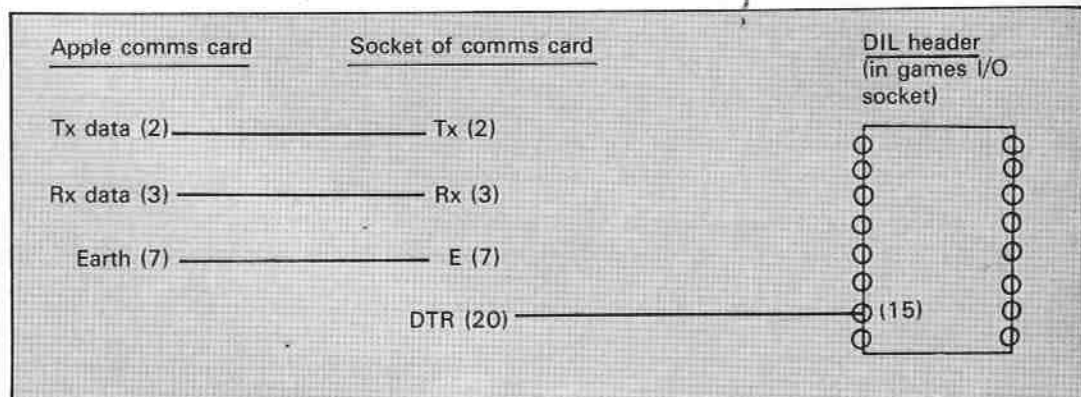
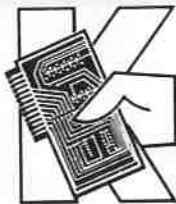


Figure II: RS-232 connections

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IT is often said that the best utilities are available from user groups because the members know what is really needed. Well, I do not know if Cornelis Bongers and William Schouten are members of Basug (the British Apple Systems User Group) but their product, SpeedLoader, is certainly a very useful and well thought out piece of software.

The first paragraph of the manual says: "Our main motivation for developing the SpeedLoader was frustration. Each time we wanted to start an assembler, run a utility package or play a game, we had to reboot the system. This took usually between 10-40 seconds and we decided that this was simply too long when you need some serious work done".

They set about remedying this common frustration and came up with SpeedLoader. It is not another fast DOS, in fact it cannot load text files (more on this later). It is a relocatable machine code program which loads Applesoft, Integer and binary files with amazing rapidity. Moreover, it will also, if required, act as a menu program.

When I first received the copy of SpeedLoader and looked at the very impressive demonstration disc which came with it I could immediately think of two DOS 3.3 discs of mine which needed more speedy loading.

The first was a suite of programs used for general purpose graphing, curve fitting and data storage. Each program is in Applesoft, most need DOS to load and save data, some BLOAD further machine code routines and one is split up in memory by such a routine. Most run at the normal Basic start point of \$801 but a couple are loaded above the hi-res pages.

The Hello program on the disc acts as a gateway to the others, setting up parameters as needed. This disc seemed a good candidate for testing SpeedLoader, so I went to work.

First it was necessary to print the manual. This came on the back of the disc in the form of six DOS 3.3 Ascii text files plus a Basic program to print them to

screen or printer. I followed the recommendation and used Applewriter instead.

The manual is 44 pages long and a printer is essential because the information provided is detailed and concisely written, although in one or two places contradictory—for example the disc is described as copy protected but it advises you to copy it immediately (it is copy protected).

Presumably, any word-processing program which uses standard DOS 3.3 text files will be suitable to print it. If you do not have a printer I recommend that you find a friend and get it printed when you buy the package.

After a quick read of the first few pages, noting that "those who work in Applesoft have immediate access to all the capabilities of the SpeedLoader" I decided not to read any more but to get going.

I booted the SpeedLoader disc which surprisingly isn't that fast, and was confronted with the main program. This is menu driven offering the options of initialising a fast boot disc, copying files to a fast boot disc, renaming fast boot files, cataloguing a fast boot disc, deleting fast boot files, invoking special

options, cataloguing the DOS 3.3 disc (which is the source), deleting DOS 3.3 files, changing drives and quitting the program.

I initialised an old disc and was pleased to see that SpeedLoader knew that data was present and asked if I wanted to continue. I did so and then took the option to copy files. First, I copied an image of DOS which was provided on the master disc as a DOS 3.3 file.

Fortunately, I had read enough of the manual to know that I would have to speedload DOS because my programs needed it and that I should give it a fast file name such as >DOS.

Unfortunately I had not read enough of the manual to know that had I chosen special options SpeedLoader would have offered me the choice of installing DOS. (When I discovered this later I resolved to read manuals more thoroughly in future.)

The special name >DOS tells SpeedLoader to speedload this file (because its name starts with >) and execute it before setting up any others. The symbol £ in front of a name tells SpeedLoader to load this file first, a. tells it not to display the name in the automatic menu

program and * tells it to bypass the automatic menu and execute this file instead, that is, your own Hello program.

Next I copied all the straightforward Basic programs and quit the program to test them out. Choosing this option means booting the disc in drive 1. I put the fast disc in and continued and was literally straight into the menu.

I chose one of the options — you press the highlighted letter next to the name of the program — and there it was. Like lightning! Most impressive.

Or re-booting the SpeedLoader disc to copy the rest of the programs and files a difficulty arose. I needed 16 files on the disc and SpeedLoader only allows 15. I resolved the problem by putting one of the secondary machine code routines on the disc under normal DOS and let its main program BLOAD it as usual.

Any SpeedLoaded files can be co-resident on a disc with normal DOS files. The SpeedLoader program takes care of this for you, carefully adjusting the VTOC as it goes.

It also allows a Basic program — SpeedLoaded of course — to load or run other files at different addresses and automatically adjust the necessary pointers. Consequently it was easier to set the disc up under SpeedLoader than it was under DOS. The disc ran well and is now in daily use by several people and no problems have emerged.

The second disc to convert was a games one in, dare I admit it, more or less daily use. This appeared initially to be slightly more difficult, since the files were mainly machine code BLOADed at different addresses using a mixture of Applesoft, Integer and Exec files to overcome overwriting problems.

This time I read the manual thoroughly and discovered that the SpeedLoader program can be loaded anywhere in memory from \$200 upwards. Also, as games are usually played just once, I did not need DOS on the disc nor in memory.

Now it actually became much easier to set the disc up

Frustrated by loading times? Then go for SpeedLoader

MAX PARROTT finds it is well worth while

under SpeedLoader than it was under DOS. I did not need to use Integer Basic nor Exec files, indeed for most of the games I didn't need an Applesoft loader – the menu was sufficient.

What are the difficulties with SpeedLoader? Well, none really. It will not speed load text files, but the disc has a utility on it to capture DOSs other than DOS 3.3, so you have a good chance to put on a fast DOS if you need it.

Once a program is put on to a menu-driven SpeedLoad disc you cannot load and examine it as usual, but you can set up a disc with a DOS and a short Applesoft program which will catalogue a SpeedLoad disc and load whatever you want.

This can then be saved as normal and put back on to the SpeedLoad system if you want under a different form.

Your disc may invoke 80 column cards or language cards from within an Hello program,

but the SpeedLoad program can do this for you – the option is given at Init time.

The displayed menu is not very attractive and is actually slightly confusing since the file-type appears on the left of the screen, followed by the letter to press, followed by the name of the program (only eight letters allowed), but with a slight loss of speed this can all be overcome by using your own startup program.

I make two recommendations. First, if you have ever been frustrated by loading times of non-copy protected programs then buy this utility. It is well worth the money.

Secondly, when you initialise a disc under SpeedLoader use a new one. I had one problem which emerged later. Being short of discs I decided to sacrifice an old CP/M data disc to become a SpeedLoad disc.

Initialisation and copying all went well, but it would not boot.

Guessing that SpeedLoader did not actually reformat if it found data, I re-initialised the disc under DOS 3.3 and again invoked SpeedLoader. All went well and it booted properly.

Later I demonstrated it to someone on a IIe and it would not work. I booted DOS on the machine then used Cntrl-OPEN-APPLE-RESET to boot the SpeedLoad disc. It worked properly.

I tried this out a few times and discovered that from cold the disc would never work, from warm it would always work. I tried the same experiments on a IIe. From warm it would always work, from cold it would work but extremely slowly as if SPEED were set at 1.

Guessing again that some extra data was being brought in from the disc I started afresh with a new object disc and made another SpeedLoad one as before. Everything was perfect.

Obviously the remedy is easy – just use new discs, or at least avoid CP/M formatted discs, and maybe Pascal as well.

I have not described all that the SpeedLoader program can do. One of the special options is to optimally align the disc tracks to decrease loading times.

Further decreases in time can be gained by skipping sectors. Another special option feature is to display these skipped sectors and by trial and error adjust them for maximum speed.

I found that the boot process was so quick that it did not seem worthwhile to tamper with these last two options. However if many files are to be loaded in succession it could be worth the effort.

SpeedLoader by Cornelis Bongers and William Schouten. Distributed by Basug, P.O. Box 177, St. Albans, AL2 2EG. Price: £16.

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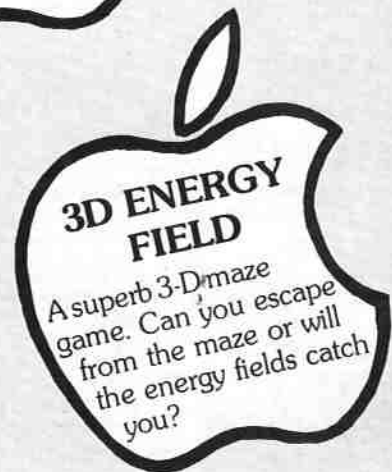
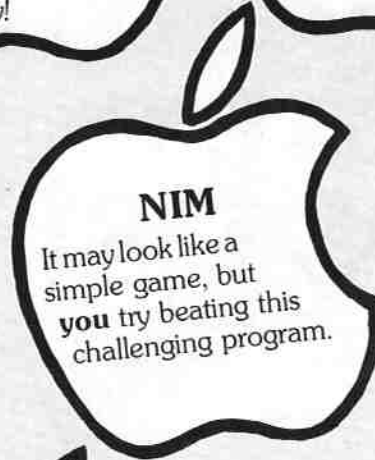
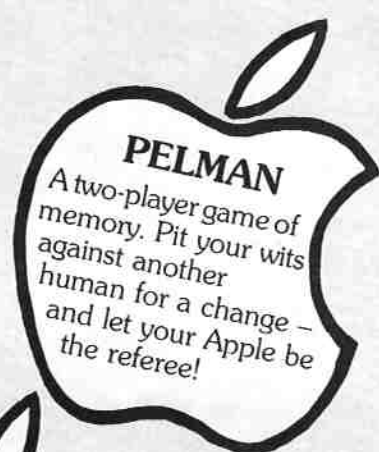
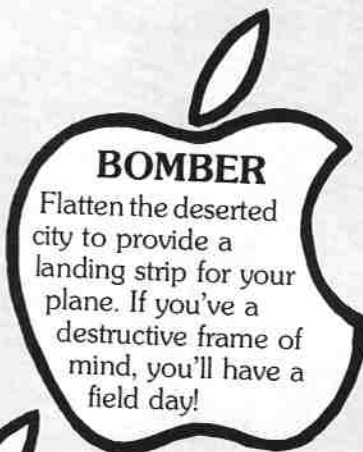
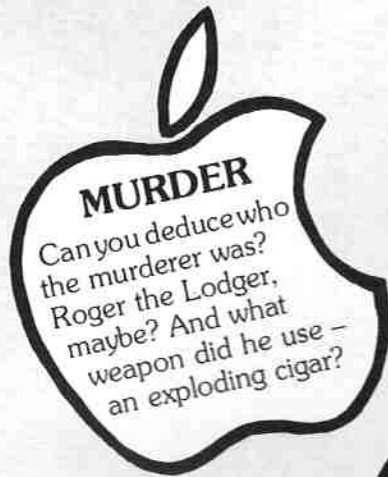
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0	Accounts settled £	0	0	0	0

Figure I: Part of the Trade Creditors schedule

BREAKEVEN.AID						
TBS BREAKEVEN POINT						
SALES REDUCTION		£	7000			
GROSS PROFIT			20.00	%		
SEMI VARIABLE OVERHEADS		£	5.00	%	reduction factor	
SALES	COST OF SALES	GROSS PROFIT	SEMI VARIABLE OVERHEADS	FIXED OVERHEADS	PROFIT BEFORE TAX	PBT % of SALES
£	£	£	£	£	£	
90000	72000	18000	4000	5000	9000	10.00
83000	66400	16600	3650	5000	7950	9.58
76000	60800	15200	3300	5000	6900	9.08
69000	55200	13800	2950	5000	5850	8.48
62000	49600	12400	2600	5000	4800	7.74
55000	44000	11000	2250	5000	3750	6.82
48000	38400	9600	1900	5000	2700	5.63
41000	32800	8200	1550	5000	1650	4.02
34000	27200	6800	1200	5000	600	1.76
27000	21600	5400	850	5000	-450	-1.67
20000	16000	4000	500	5000	-1500	-7.50

Figure II: Aid to estimate the Breakeven Point

Off-the-peg financial planning that fits perfectly

OWNING a spreadsheet program and using it productively are poles apart. Creating a simple cashflow budget is one thing – linking a whole series of complex models to cope with the financial planning of a small business is another.

Even if book-keeping's a breeze and you're mathematically capable you probably haven't the time. Unfortunately experienced spreadsheet composers are hard to come by, and professional experts or financial consultants don't come cheap.

Buying an even costlier off-the-shelf accountancy package with all the bells and whistles may be your only way of computerising your business finances – until now...

Trinity Business Systems, of Norwich, has thoughtfully launched a unique new product, Ultraplan, a comprehensive suite of off-the-peg business models designed for use with the popular Multiplan spreadsheet program on the

Macintosh. Versions are also available for other "alien" computers.

The modular construction enables easy switching of formats to cope with sole trader, partnership or limited company. The blurb is at pains to point out that no prior accounting knowledge is required to gain full benefit.

Trinity recognises that many businessmen find dealing with budgetary figures daunting, they usually aren't adept at strict financial control and profitability suffers as a consequence. Ultraplan, although sophisticated, seeks to overcome these fears by avoiding jargon and providing brief, easily understood instructions.

The package comes with two unprotected discs and ring-style manual. The first disc consists of 23 powerful budgeting schedules covering all aspects of financial planning from projections right the way to full profit and loss and balance sheet production. Management Aids is the name

given to the further 24 models on the second disc aimed at helping out with complex daily financial decisions.

Although Ultraplan doesn't claim to be an accountancy package, it will certainly do this job for a small business by way of added bonus to the intended bread and butter budgetary diet. The program caters for a wide cross-section of users, currently ranging

from large corporates such as Cammel Laird Shipping and British Alcan Foil down to self-employed individuals.

In between come many firms of accountants, solicitors and investment brokers – Trinity's product has little competition within Europe and exports have been made to Portugal, Israel, Jordan and Australia.

In America the marketing of

OPECYC.AID				
Purchases-raw materials	12000	13000	13500	15000
Stocks-raw materials	2500	3000	3750	5000
Stocks-work in progress	1000	2000	2750	4000
Stocks-finished goods	3600	4000	4750	5000
Trade debtors	12750	13000	14500	17000
Trade creditors	8000	9500	11500	14000
Sales	26850	28000	30000	35000
Cost of goods sold	12350	14750	15250	16000

Days in period	DAYS	DAYS	DAYS	DAYS
	91	91	91	91
Raw materials turnover	20	23	28	31
Less Suppliers credit	64	72	81	85
Production period	10	14	20	24
Finished goods turnover	26	27	28	29
Credit to customers	43	44	45	44

TOTAL OPERATING CYCLE	Days	35	36	39
				44

Figure III: The Operating Cycle trend

spreadsheet templates is big business, and it's more than surprising that the idea hasn't taken off this side of the pond.

A technical package such as this one demands a high standard of user support, and this is available by free quarterly newsletters and on the usual hot line.

Astonishingly, this service is disregarded by most buyers. According to Trinity's John Webster, queries are minimal and it's a welcome change for someone to even bother to return their registration card.

Certainly this speaks well for the excellence of the descriptive material – the manual is brief but clear and completely self-contained. Examples of each model are allocated a separate page, with simple explanations nicely printed in note form for easy assimilation.

It's refreshing to have only a couple of pages introduction and general guidance before you're ready to select any template from the index. On occasions some of the notes concerning "result interpretations" are over crisp for my liking, but this is nit-picking considering the many excellent books available in the financial spectrum.

Sensibly the discs come with all files in Multiplan protected mode. A password must be obtained from Trinity if schedules or formulae need customising. It's easy to enter your key data in the ready prepared templates on both discs – simply type in the unprotected spaces provided, press the command key/'=' to recalculate and your budgets or queries are instantly on screen.

All the built-in formulae do their job in a trice. All that's left is to print out a hard copy for reference and permanent retention.

One minor gripe is that the large budget models didn't always fit on to a single page, despite the page set-up being organised to print sideways in International fanfold form.

The most vital result produced from Ultraplans primary budget model of any

1	2	3	4	5	6	7	8
TBS	PRICE LIST		INC. ON PRICE	DISC. ON PRICE	DISC. ON PRICE	DISC. ON PRICE	DISC. ON PRICE
	DESCRIPTION	BASE PRICE	SELLING PRICE	SELLING PRICE	SELLING PRICE	SELLING PRICE	SELLING PRICE
		£	£	£	£	£	£
10	8.64 Watch Childs	12.31	11.70	11.08	10.47	9.85	
11	10.67 Watch Teenagers	15.21	14.44	13.69	12.92	12.16	
12	11.29 Watch Gents	16.09	15.28	14.48	13.69	12.87	
13	12.50 Watch Ladies	17.81	16.92	16.03	15.14	14.25	
14	13.95 Watch Underwater	19.88	18.88	17.89	16.90	15.90	
15	14.56 Stopwatch	20.75	19.71	18.67	17.64	16.60	
16	14.75 Clock mini	21.02	19.97	18.92	17.87	16.82	
17	16.03 Clock alarm	22.84	21.70	20.56	19.42	18.27	
18	17.92 Clock 12" Wall	25.54	24.26	22.98	21.71	20.43	
19	18.10 Clock 15" Wall	25.79	24.50	23.21	21.92	20.63	
20	22.11 Gold Watch	31.51	29.93	28.36	26.78	25.21	

Figure IV: The Price List aid

business is the computation of likely cash requirements over the next 12 periods. Changes made to data or budgeting criteria are automatically reflected on screen.

Assessing the consequences of proposed courses of action on both profitability and liquidity is straightforward. Updated projections are at your finger tips, ensuring tight financial control.

A feature of the schedules is that they have been designed in a format to please your bank manager, enabling rapid

It's simple to find out the often surprising true cost of slow payers

preparation of professional borrowing presentations.

Nine budget schedules comprehensively cover specific elements of assets and liabilities such as creditors (Figure I). These then interlink with others dealing with overheads, depreciation and so on to create detailed balance sheet/profit and loss account.

Because of the linking it is vital to run schedules in order. Some require to be run, that is opened and saved so that information is correctly passed

on to dependent ones. This proved tedious on occasions, but all is well explained.

Having properly sorted out your working capital requirements the second management aids disc seeks to improve profitability and liquidity.

This is done by getting to grips with decisions and problem areas which might normally be considered complex and daunting. In many ways this is the most powerful and interesting part of the package.

The breakeven point, for example (see Figure II) cleverly calculates profit at any level of sales – just enter maximum anticipated sales/gross profit per cent and details of overheads to see the magic figure.

Help is also on hand to give a rough idea of the inevitable but critical time lag between cash outlay and cash inflow from sales – see the operating cycle aid shown in Figure III.

Other models allow comparison of different debtor and creditor policies – it's simple to find out the often surprising true cost of slow payers!

Advice is available on the ideal stock re-order levels and simple stand-alone sales/purchase/nominal ledgers are supported.

Automatic production of

invoices/price lists (Figure IV) is speedy – all price increases, trade discounts, salesmen's commissions and their performances are taken care of by Ultraplans.

Many more schedules diversely range over working capital requirement, vehicle running costs, investment appraisals, compound interest calculations and examination of direct labour costs.

CONCLUSIONS:

The switched on businessman knows that the high cost of borrowing and mounting pressures on profit margins make constantly available and updated budgetary information an essential management tool.

Future prosperity, and indeed the very survival of his business, probably depend on it.

Ultraplans meets these needs, providing accurate meaningful information on tap in modules easily assimilated even by novices.

The results should also satisfy the most discriminating trader/corporate planning needs, including the Inspector of Taxes and bank manager when required.

Unfortunately my screen dumps don't really do justice to the larger budget schedules which each span a whole year.

Well presented, this British package has no direct competitor, fills a serious market gap at modest cost and deserves to be a winner.

If you're not wanting a full feature accountancy package but would like to harness Multiplan's power to plan financially, Ultraplans at £99 is a recommended tailor-made investment that won't break the bank.

Chris Burrige

HARNESS THE POWER

UltraPlan consists of a comprehensive but easy to use budget together with a range of management aids designed for use with Multiplan, Supercalc and Lotus 123.

No accounting or high level proficiency with spreadsheets is required for you to gain the benefits that are normally only associated with sophisticated planning methods. Simply follow the fully illustrated and easily understood instructions, enter your business's key figures in the spaces provided and UltraPlan does the rest.

UltraPlan's budget consists of 44 schedules covering all aspects of financial planning from sales and gross profit projections to computation of working capital, cash and overdraft requirements. UltraPlan will produce to your requirements full profit and loss accounts and balance sheets for twelve periods together with corresponding figures for the previous year.

UltraPlan's modular construction enables you to implement whichever option you may require: limited company, partnership or sole trader.

UltraPlan's 24 management aids are designed to help you with the complex decisions you have to make every day. Each aid is easy to use and include:- breakeven point - vehicle cost analysis - economic order quantity - re-order level calculation - working capital requirements - stock/profit optimisation.

UltraPlan is available for the following configurations:

	LOTUS 123	MULTIPLAN	SUPERCALC
IBM PC & Compatibles	X	X	X
APRICOT	X	X	X
MACINTOSH		X	
SIRIUS		X	X

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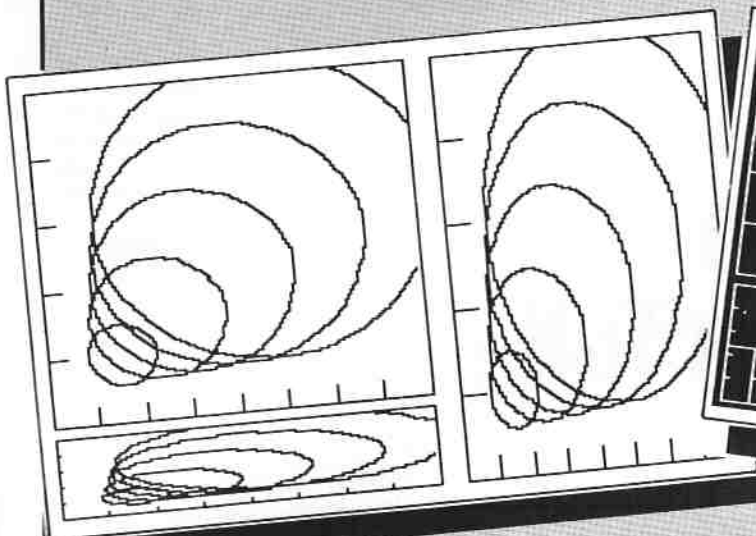
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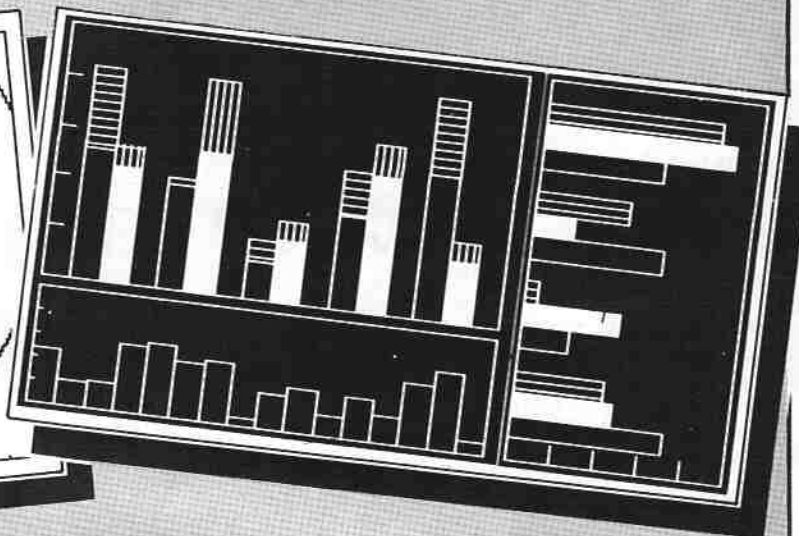
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apple user Graphics Library



Three plots from the example program



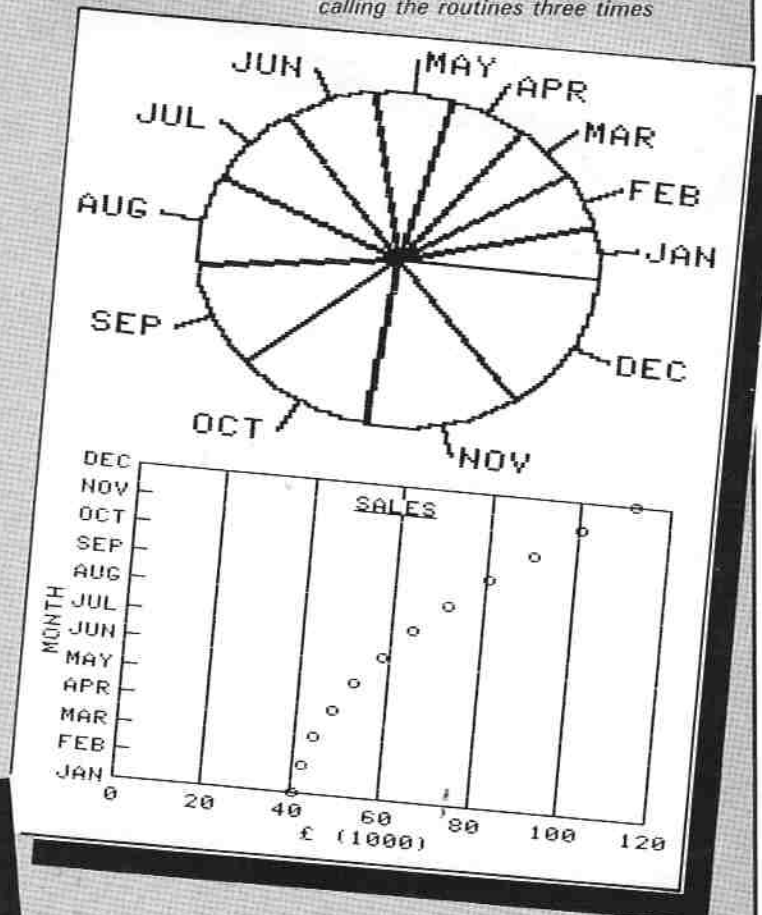
Example of the flexibility created by calling the routines three times

The November issue of *Apple User* saw the last in the Graphics Library series. For the benefit of those readers who missed some of the articles the complete list of issues that featured the Apple User Graphics Library are given in the panel below. Back numbers are still available, and these are listed on Page 60.

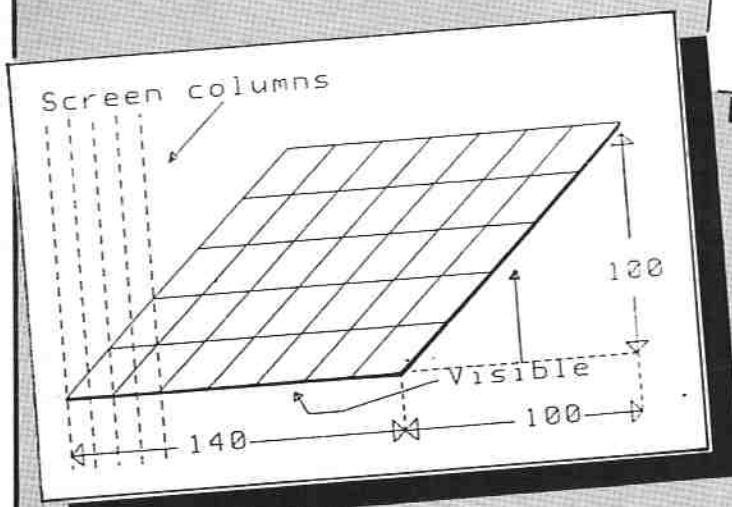
A disc has now been prepared containing all the routines presented in the series and this is available for £5.95.

The cost of the disc plus the photocopied articles is £9.95.

To order, use the form on Page 61.



Produced by the example program



Part 1	February 1984	Part 10	December 1984
Part 2	March 1984	Part 11	February 1985
Part 3	April 1984	Part 12	March 1985
Part 4	May 1984	Part 13	May 1985
Part 5	June 1984	Part 14	July 1985
Part 6	August 1984	Part 15	August 1985
Part 7	September 1984	Part 16	October 1985
Part 8	October 1984	Part 17	November 1985
Part 9	November 1984		

THE initial impression of the world of machine code and the monitor is at best a frustrating one, if not utterly depressing.

I for one struggled to enter the op-codes and the relative branches using the monitor and then had to stare blankly at the weird and unpredictable results of my ambitious little routine.

Having an Apple II+ meant that I didn't have any of the monitor ROM routines to trace my programs — as in the Apple II — and nothing very satisfactory in the way of an assembler.

Two years hence, having bought the S-C Macro Assembler, which I have found very enjoyable to use, I have sought to rectify the situation by writing a utility which I hope many machine code programmers will find invaluable.

It is a full-grown tracer, with proper register displays and disassembled instructions, plus a breakpoint, a graphics toggle, a location dumper and a fast and slow mode.

The routine requires three and a bit pages of memory, and I like to stick it at \$B00, along with any other utilities I need so that I can trace any other programs which are longer and are stored above \$6000.

This means that with its stack at \$F00-\$FFF the whole lot really occupies \$B00-\$FFF (five pages) and this does limit the size of any Basic program in memory.

I suggest that you enter the assembly version, not just the code (if you have an assembler) so that you can assemble it anywhere that is convenient — which also allows you to change the program's zero-page usage, \$0C-\$1F, with ease if it clashes with that of the program to be traced. The program runs at two levels, the first being the Editor and the second the Tracer. From

Editor's note: The assembled listing shown here was printed via Lisa V2.5 because we do not have the S-C Macro Assembler.

Labels such as ^1 are local labels, an instruction such as BNE <1 means "go back to nearest 1" and BNE>1 means "go forward to nearest 1".

The EPZs are references to zero page locations, use EQU on other assemblers.

Banish machine code's mystery with this full-grown tracer

Machine code programmers should find MICHAEL AGERBAK's utility invaluable

the Editor you can do the following:

Q: Quits the program with an RTS, which should return you to Basic if you called the routine or the monitor if you entered with \$BOOG.

G: Begins tracing of the program starting at the hex address specified after the G.

A,X,Y,P: Allow the contents of the specified register to be altered by entering a hex byte.

D: Dumps the contents of the specified hex location. This is very useful for monitoring indexes and so on while tracing.

H: Flips to HGR screen.

F: Sets tracing mode to auto-repeat. Slow mode is returned to by pressing space during tracing.

T: Flips back to text.

B: Sets breakpoint address to a two byte hex address. When the Tracer reaches this address it immediately returns to the Editor without executing the instruction there.

From the Tracer mode, all of the above commands can also be used except for G. The Q option returns to the Editor.

If a BRK instruction is encountered, it will also return to the Editor, the latter mode being identified by the inverse text. Pressing the spacebar

steps on to the next instruction in slow mode or stops tracing in fast mode.

If a JSR to a ROM routine is encountered the program asks if the user wants to execute it. If not, it simply ignores the instruction, but if the user does, the next step will execute the whole routine at once — perhaps with strange effects — and you are not allowed to trace each instruction.

A final note. If you examine the code you will see that what it does is check the op-code to see if it is unusual — a branch or a jump or a stack operation and so on which would upset normal tracing.

If it is, the program simulates the instruction and continues, but if not the instruction is executed. This requires that an RTS is stored at the end of the instruction to return to the Tracer.

Once the instruction is executed the original value of the location is stored back over the RTS and this means if you interrupt the program with RESET during a cycle there may be corruption of the program you are tracing.

You may wish to modify the program in the following ways:

To change the toggle to

HGR2 change location \$E15 from \$53 to \$55.

To add another command stick the extra code at the end of the program in the EDKEY routine between the last two RTS instructions remembering to include a BNE to the last RTS if the input wasn't your command (see other commands).

The home-made stack is located at \$F00, but it is quite likely that you will want to change this. Changing the defined value at the beginning and reassembling will achieve this.

The pointer always starts at \$FF and works downwards, and the maximum number of nested subroutines is about 127, depending on how you use the stack, until the pointer goes right round the clock, which is unlikely if your program is working properly.

Disassembling is done in the LINE subroutine at \$D8B. This must disassemble at least one line to work out the location of the next instruction.

The number loaded into A at \$D9E is how many additional lines you wish to disassemble (zero being 255, so the minimum total is two lines). The routine uses the same ROM routine as the monitor L command.

Note that the tracer does not accommodate RTI or SEI, mainly because I don't know how to use either of them.

I included a small program to be assembled at \$6000 which helps demonstrate the use of the Tracer. It would normally print the two's complements of numbers 0-\$20, but when traced you can see the separate changes to the registers and flags during program operation.

Also note the effect of the JSR \$FDDA, print hex byte in Accumulator — you don't get a disassembly of the ROM routine.

The references to DOSTACK and DOSTORE in lines 47, 55, 56, 68, 69 and 83 are not needed if the program is to be used under ProDOS and can be deleted.

Also note that the program will work on the II, II+ and IIe but only on the IIc if no 65C02-only commands are encountered.

0800	1	ORG #800			
0800	2	-----	084F 4C 11 08	B2	JMP EDITOR
0800	3	STEP BY STEP	0852	B3	DOSTORE DFS 1
0800	4	BY MICHAEL AGERBAK	0853	B4	-----
0800	5	MACHINE CODE	0853 20 58 FC	B5	BEGIN JSR HOME
0800	6	TRACER.	0856 A5 15	B6	LDM NITPCL
0800	7	COPYRIGHT 1985	0858 B5 1E	B7	STA PCL
0800	8	-----	085A C5 0F	B8	CMP BREAKL
0019	9	P EP2 #19	085C D0 09	B9	BNE >1
001A	10	S EP2 #1A	085E A5 16	90	LDA NITPCH
001B	11	A EP2 #1B	0860 C5 10	91	CMP BREAKH
001C	12	X EP2 #1C	0862 D0 05	92	BNE >2
001D	13	Y EP2 #1D	0864 4C 11 08	93	JMP EDITOR
0000	14	D EP2 #0D	0867 A5 16	94	LDA NITPCH
000E	15	DH EP2 #0E	0869 B5 1F	95	STA PCH
000C	16	SPEED EP2 #0C	086B 24 12	96	BIT ROM
000F	17	BREAKL EP2 #0F	086D 50 03	97	BVC >3
0010	18	BREAKN EP2 #10	086F 4C CF 0C	98	JMP D0.IT
0011	19	TEMP1 EP2 #11	0872 20 98 00	99	JSR LIME
FC58	20	HOME EQU #FC58	0875 18	100	CLC
0033	21	PROMPT EP2 #33	0876 A5 1E	101	ADC PCL
FFA7	22	GETHX EQU #FFA7	0878 B5 15	102	STA NITPCL
003E	23	AL1 EP2 #3E	087A A5 1F	103	LDA PCH
003F	24	AL2 EP2 #3F	087C 69 00	104	ADC #000
FB67	25	GETLN EQU #FB67	087E B5 16	105	STA NITPCH
001E	26	PCL EP2 #1E	0880 A4 17	106	LDB LENGTH
001F	27	PCH EP2 #1F	0882 B1 1E	107	LDA (PCL),Y
0012	28	ROM EP2 #12	0884 B5 18	108	STA TEMP
0F00	29	STACK EQU #F00	0886 A9 60	109	LDA #060
FBED	30	PRINT EQU #FBED	0888 91 1E	110	STA (PCL),Y
FD35	31	GETCHR EQU #FD35	088A A0 00	111	LDB #000
F948	32	SPCS3 EQU #F948	088C B1 1E	112	LDA (PCL),Y
FDE3	33	PRINTB EQU #FDE3	088E	113	-----
FE80	34	SETINV EQU #FE80	088E C9 00	114	BRK CMP #000
FE84	35	SETNRN EQU #FE84	0890 D0 09	115	BNE JSR
FDDA	36	PRINTB EQU #FDDA	0892 A4 17	116	RTN LDB LENGTH
FDBE	37	CR EQU #FDBE	0894 A5 18	117	LDA TEMP
0018	38	TEMP EP2 #18	0896 91 1E	118	STA (PCL),Y
FE63	39	LIST EQU #FE63	0898 4C 11 08	119	JMP EDITOR
002F	40	LEN EP2 #2F	089B	120	-----
0017	41	LENGTH EP2 #17	089B C9 20	121	JSR CMP #020
003A	42	APL EP2 #3A	089D D0 49	122	BNE RTS
003B	43	APH EP2 #3B	089F C8	123	INY
0015	44	NITPCL EP2 #15	08A0 C8	124	INY
0016	45	NITPCH EP2 #16	08A1 B1 1E	125	LDA (PCL),Y
0013	46	GET EP2 #13	08A3 48	126	PHA
AA59	47	DOSTACK EQU #AA59	08A4 C9 CF	127	CMP #0CF
0800	48	-----	08A6 90 24	128	BCC >2
0800 A2 00	49	START LDX #000	08A8 A2 00	129	LDB #000
0802 86 19	50	STX P	08AA B0 44 0E	130	LDA QUERY,X
0804 86 0C	51	STX SPEED	08AD 20 ED FD	131	JSR PRNT
0806 86 12	52	STX ROM	08B0 E8	132	INX
0808 CA	53	DEX	08B1 C9 BF	133	CMP #?
0809 86 1A	54	STX S	08B3 D0 F5	134	BNE <0
080B AD 59 AA	55	LDA DOSTACK	08B5 20 35 FD	135	JSR GETCHR
080E BD 52 08	56	STA DOSTORE	08B8 C9 CE	136	CMP #N
0811 20 58 FC	57	EDITOR JSR HOME	08BA F0 09	137	BEQ >1
0814 20 80 FE	58	JSR SETINV	08BC 20 BE FD	138	JSR CR
0817 A9 BA	59	LDA #;	08BF A9 FF	139	LDA #0FF
0819 85 33	60	STA PROMPT	08C1 B5 12	140	STA ROM
081B 20 98 0D	61	JSR LIME	08C3 30 07	141	BMI >2
081E 20 2C 0D	62	JSR DISPLY	08C5 20 BE FD	142	JSR CR
0821 20 84 FE	63	JSR SETNRN	08C8 68	143	PLA
0824 20 35 FD	64	JSR GETCHR	08C9 4C E4 0C	144	JMP RESULT
0827 20 ED FD	65	JSR PRNT	08CC A5 15	145	LDA NITPCL
082A C9 D1	66	CMP #0	08CE A6 1A	146	LDB S
082C D0 07	67	BNE >1	08D0 9D 00 0F	147	STA STACK,X
082E AD 52 08	68	LDA DOSTORE	08D3 CA	148	DEX
0831 BD 59 AA	69	STA DOSTACK	08D4 A5 16	149	LDA NITPCH
0834 60	70	RTS	08D6 9D 00 0F	150	STA STACK,X
0835 C9 C7	71	CMP #6	08D9 CA	151	DEX
0837 D0 13	72	BNE >2	08DA 86 1A	152	STX S
0839 20 67 FD	73	JSR GETLN	08DC 68	153	PLA
083C A0 00	74	LDB #000	08DD B5 16	154	STA NITPCH
083E 20 A7 FF	75	JSR GETHX	08DF A0 01	155	LDB #001
0841 A5 3E	76	LDA AL1	08E1 B1 1E	156	LDA (PCL),Y
0843 B5 15	77	STA NITPCL	08E3 85 15	157	STA NITPCL
0845 A5 3F	78	LDA AL2	08E5 4C ED 0C	158	JMP R1
0847 85 16	79	STA NITPCH	08E8	159	-----
0849 4C 53 08	80	JMP BEGIN	08E8 C9 60	160	RTS CMP #060
084C 20 B5 00	81	JSR EDKEY1	08EA D0 1A	161	BNE JMP1
			08EC A6 1A	162	RTS1 LDB S

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0BEE E0 FF	163	CP1 #0FF	!ISN'T AT BEGINNING	0C7C C9 4B	244	*1	CMP #04B	!PHA
0BF0 D0 03	164	BNE >1		0C7E D0 0C	245		BNE >2	
0BF2 4C 92 0B	165	JMP RTN	!IF IT IS THEN JUMP EDITOR	0C80 A6 1A	246		LDX S	
0BF5 EB	166	INX	!IF NOT	0C82 A5 1B	247		LDA A	
0BF6 B0 00 0F	167	LDA STACK,X		0C84 9D 00 0F	248		STA STACK,X	
0BF9 B5 16	168	STA NITPCH		0C87 C6 1A	249		DEC S	
0BF8 EB	169	INX		0C89 4C E4 0C	250		JMP RESULT	
0BF8 BD 00 0F	170	LDA STACK,X		0C8C C9 68	251	*2	CMP #068	!FLA
0BF8 B5 15	171	STA NITPCL		0CBE D0 0C	252		BNE >3	
0C01 B6 1A	172	STX S		0C90 E6 1A	253		INC S	
0C03 4C E4 0C	173	JMP RESULT	!AND JUMP TO RESULT.	0C92 A6 1A	254		LDX S	
0C06	174			0C94 B0 00 0F	255		LDA STACK,X	
0C06 C9 4C	175	JMP1	CMP #04C	0C97 B5 1B	256		STA A	
0C08 D0 0B	176		BNE JMP2	0C99 4C E4 0C	257		JMP RESULT	
0C0A C8	177		INX	0C9C C9 0B	258	*3	CMP #00B	!PHP
0C0B B1 1E	178		LDA (PCL),Y	0C9E D0 0C	259		BNE >4	
0C0D B5 15	179		STA NITPCL	0CA0 A6 1A	260		LDX S	
0C0F CB	180		INX	0CA2 A5 19	261		LDA P	
0C10 B1 1E	181		LDA (PCL),Y	0CA4 9D 00 0F	262		STA STACK,X	
0C12 B5 16	182		STA NITPCH	0CA7 C6 1A	263		DEC S	
0C14 4C E4 0C	183		JMP RESULT	0CA9 4C E4 0C	264		JMP RESULT	
0C17	184			0CAC C9 2B	265	*4	CMP #02B	!PLP
0C17 C9 6C	185	JMP2	CMP #06C	0CAE D0 0C	266		BNE >5	
0C19 D0 1B	186		BNE BRNCH	0CB0 E6 1A	267		INC S	
0C1B CB	187		INX	0CB2 A6 1A	268		LDX S	
0C1C B1 1E	188		LDA (PCL),Y	0CB4 B0 00 0F	269		LDA STACK,X	
0C1E B5 13	189		STA GET	0CB7 B5 19	270		STA P	
0C20 CB	190		INX	0CB9 4C E4 0C	271		JMP RESULT	
0C21 B1 1E	191		LDA (PCL),Y	0CBC C9 9A	272	*5	CMP #09A	!TSI
0C23 B5 14	192		STA GET+1	0CBE D0 0F	273		BNE D0.IT	
0C25 A0 00	193		LDY #00	0CC0 A5 19	274		LDA P	
0C27 B1 13	194		LDA (GET),Y	0CC2 4B	275		PHA	
0C29 B5 15	195		STA NITPCL	0CC3 2B	276		PLP	
0C2B CB	196		INX	0CC4 A5 1A	277		LDA S	
0C2C B1 13	197		LDA (GET),Y	0CC6 B5 1C	278		STA X	
0C2E B5 16	198		STA NITPCH	0CC8 0B	279		PHP	
0C30 4C E4 0C	199		JMP RESULT	0CC9 6B	280		PLA	
0C33	200			0CCA B5 19	281		STA P	
0C33 4B	201	BRNCH	PHA	0CCC 4C E4 0C	282		JMP RESULT	
0C34 29 0F	202		AND #00F	0CCF	283			
0C36 D0 3B	203		BNE STCK	0CCF 0B	284	D0.IT	PHP	!SAVE P
0C38 6B	204		PLA	0CD0 6B	285		PLA	
0C39 4B	205		PHA	0CD1 B5 11	286		STA TEMP1	
0C3A 4A	206		LSR	0CD3 20 1F 0D	287		JSR B0	!THEN EXECUTE INSTRUCTION.
0C3B 4A	207		LSR	0CD6 0B	288		PHP	!SAVE ALL REGISTERS
0C3C 4A	208		LSR	0CD8 0B	289		STA A	
0C3D 4A	209		LSR	0CD7 B5 1B	289		STA A	
0C3E 4A	210		LSR	0CD9 6B	290		PLA	!IN ORDER SO NOT
0C3F 90 2F	211		BCC STCK	0CDA B5 19	291		STA P	
0C41 6B	212		PLA	0CDB B6 1C	292		STX X	!DISTURBED.
0C42 B0 4A 0C	213		STA D0BRN	0CDE B4 1D	293		STY Y	
0C45 A5 19	214		LDA P	0CE0 A5 11	294		LDA TEMP1	
0C47 4B	215		PHA	0CE2 4B	295		PHA	
0C48 2B	216		PLP	0CE3 2B	296		PLP	
0C49 2B	217		CLD	0CE4	297			
0C4A F0 03	218	D0BRN	BEQ >1	0CE4 24 12	298	RESULT	BIT ROM	
0C4C 4C E4 0C	219		JMP RESULT	0CE6 50 05	299		BVC R1	!CHECK IF JUST EXECUTED
0C4F CB	220	*1	INX	0CE8 E6 12	300		INC ROM	!IF SO THEN CLEAR FLAG
0C50 B1 1E	221		LDA (PCL),Y	0CEA 4C EC 0B	301		JMP RTS1	!AND PULL BACK PC.
0C52 30 0E	222		BRI SUB	0CED A4 17	302	R1	LDY LENGTH	!OTHERWISE RESTORE
0C54 1B	223		CLC	0CF5 A5 1B	303		LDA TEMP	!INSTRUCTION.
0C55 65 15	224		ADC NITPCL	0CF1 91 1E	304		STA (PCL),Y	
0C57 B5 15	225		STA NITPCL	0CF3	305	DUMMY:		
0C59 A5 16	226		LDA NITPCH	0CF3 20 2C 0B	306	*1	JSR DISPLY	!DISPLAY REGISTERS
0C5B 69 00	227		ADC #00	0CF6 24 0C	307		BIT SPEED	!TEST TRACE SPEED.
0C5D B5 16	228		STA NITPCH	0CF8 50 0B	308		BVC >5	!IF FAST THEN JUMP ON
0C5F 4C E4 0C	229		JMP RESULT	0CFA AD 00 C0	309		LDA #C000	!READ LAST KEY PRESSED.
0C62 1B	230	SUB	CLC	0CFD C9 A0	310		CMP #0A0	!IF SPACE THEN
0C63 65 15	231		ADC NITPCL	0CF7 D0 15	311		BNE >3	
0C65 B5 15	232		STA NITPCL	0D01 A9 00	312		LDA #000	!SLOW MODELAB
0C67 A5 16	233		LDA NITPCH	0D03 B5 0C	313		STA SPEED	
0C69 69 FF	234		ADC #0FF	0D05 20 35 F9	314	*5	JSR GETCHR	!AND GET A#
0C6B B5 16	235		STA NITPCH	0D08 20 ED FD	315		JSR PRNT	!PRINT A#
0C6D 4C E4 0C	236		JMP RESULT	0D0B C9 D1	316		CMP #0	!IF A#="0" THEN
0C70	237			0D0D D0 03	317		BNE >2	!JUMP
0C70 6B	238	STCK	PLA	0D0F 4C 11 0B	318		JMP EDITOR	!TO EDITOR
0C71 C9 9A	239		CMP #09A	0D12 C9 A0	319	*2	CMP #0A0	!IF A#=" " THEN
0C73 D0 07	240		BNE >1	0D14 D0 03	320		BNE >4	
0C75 A6 1C	241		LDX X	0D16 4C 53 0B	321	*3	JMP BEGIN	!JMP BACK TO BEGINNING.
0C77 B6 1A	242		STX S	0D19 20 B5 0D	322	*4	JSR EDKEY1	!IS A#-ANY OTHER?
0C79 4C E4 0C	243		JMP RESULT	0D1C 4C F3 0C	323		JMP DUMMY	!THEN GO BACK ABOVE
				0D1F	324			

PROGRAMMING

001F A4 10	325	80	LDY Y		
0021 A6 1C	326		LDX X		
0023 A5 19	327		LDA P		
0025 A8	328		PHA		
0026 A5 1B	329		LDA A		
0028 28	330		PLP		
0029 6C 1E 00	331		JMP (PCL)		
002C	332				
002C 20 BE FD	333	DISPLY	JSR CR		
002F A0 00	334		LDY #A00		
0031 89 5F 00	335	FLAGS	LDA DISPI,Y		
0034 20 ED FD	336		JSR PRNT		
0037 88	337		DEY		
0038 D0 F7	338		BNE FLAGS		
003A 20 6D 00	339	NEITR	JSR PRNTIT		
003D C8	340		INY		
003E C0 05	341		CPY #005		
0040 D0 F8	342		BNE NEITR		
0042 20 BE FD	343		JSR CR		
0045 A9 C4	344	DUMP	LDA *D		
0047 20 ED FD	345		JSR PRNT		
004A A9 BA	346		LDA *:		
004C 20 ED FD	347		JSR PRNT		
004F A2 00	348		LDX #A00		
0051 A1 00	349		LDA (D,X)		
0053 20 DA FD	350		JSR PRNTRT		
0056 20 BE FD	351		JSR CR		
0059 60	352		RTS		
005A D0 D3 C1	353	DISP	ASC *PSA1Y*		
005D 86 D9					
005F	354	DISPI	DFS 2,800		
0061 C3 DA C9	355		ASC *CZ1DB-VW		
0064 C4 C2 A0					
0067 D6 CE A0					
006A A0 A9 A0					
006D 89 5A 00	356	PRNTIT	LDA DISP,Y		
0070 20 ED FD	357		JSR PRNT		
0073 20 48 F9	358		JSR SPCS3		
0076 89 19 00	359		LDA P,Y		
0079 85 18	360		STA TEMP		
007B A2 08	361		LDX #A08		
007D 06 10	362	SHIFT	ASL TEMP		
007F A9 00	363		LDA #A00		
0081 69 00	364		ADC #A00		
0083 20 E3 FD	365		JSR PRNTNB		
0086 CA	366		DEI		
0087 D0 F4	367		BNE SHIFT		
0089 20 48 F9	368		JSR SPCS3		
008C 89 19 00	369		LDA P,Y		
008F 20 DA FD	370		JSR PRNTRT		
0092 20 BE FD	371		JSR CR		
0095 60	372		RTS		
0096 A5 15	373		LDA NITPCL		
0098	374				
0098 A5 1E	375	LINE	LDA PCL		
009A 85 3A	376		STA APL		
009C A5 1F	377		LDA PCH		
009E 85 3B	378		STA APH		
00A0 A9 01	379		LDA #A01		
00A2 20 63 FE	380		JSR LIST		
00A5 A4 2F	381		LDY LEN		
00A7 C8	382		INY		
00AB 84 17	383		STY LENGTH		
00AA A9 04	384		LDA #A04		
00AC 20 63 FE	385		JSR LIST		
00AF 20 BE FD	386		JSR CR		
00B2 A5 17	387		LDA LENGTH		
00B4 60	388		RTS		
00B5	389				
00B5 C9 C1	390	EDKEY1	CMP *A		
00B7 D0 00	391		BNE >2		
00B9 20 67 FD	392		JSR GETLN		
00BC A0 00	393		LDY #A00		
00BE 20 A7 FF	394		JSR GETHX		
00C1 A5 3E	395		LDA AL1		
00C3 85 1B	396		STA A		
00C5 60	397		RTS		
00C6 C9 88	398	>2	CMP *X		
00CB D0 00	399		BNE >3		
00CA 20 67 FD	400		JSR GETLN		
00CB A0 00	401		LDY #A00		
00CF 20 A7 FF	402		JSR GETHX		
00D2 A5 3E	403		LDA AL1		
00D4 85 1C	404		STA X		
00D6 60	405		RTS		
00D7 C9 D0	406	>3	CMP *P		
00D9 D0 00	407		BNE >4		
00DB 20 67 FD	408		JSR GETLN		
00DE A0 00	409		LDY #A00		
00E0 20 A7 FF	410		JSR GETHX		
00E3 A5 3E	411		LDA AL1		
00E5 85 19	412		STA P		
00E7 60	413		RTS		
00EB C9 D9	414	>4	CMP *Y		
00EA D0 00	415		BNE >5		
00EC 20 67 FD	416		JSR GETLN		
00EF A0 00	417		LDY #A00		
00F1 20 A7 FF	418		JSR GETHX		
00F4 A5 3E	419		LDA AL1		
00F6 85 10	420		STA Y		
00F8 60	421		RTS		
00F9 C9 C2	422	>5	CMP *B		
00FB D0 10	423		BNE >6		
00FD 20 67 FD	424		JSR GETLN		
00E0 A0 00	425		LDY #A00		
0E02 20 A7 FF	426		JSR GETHX		
0E05 A5 3E	427		LDA AL1		
0E07 85 0F	428		STA BREAKL		
0E09 A5 3F	429		LDA AL2		
0E0B 85 10	430		STA BREAKH		
0E0D C9 C8	431	>6	CMP *H		
0E0F D0 0A	432		BNE >7		
0E11 A0 50 C0	433		LDA #C050		
0E14 A0 53 C0	434		LDA #C053		
0E17 A0 57 C0	435		LDA #C057		
0E1A 60	436		RTS		
0E1B C9 B4	437	>7	CMP *T		
0E1D D0 07	438		BNE >8		
0E1F A0 51 C0	439		LDA #C051		
0E22 A0 54 C0	440		LDA #C054		
0E25 60	441		RTS		
0E26 C9 C4	442	>8	CMP *D		
0E28 D0 11	443		BNE >9		
0E2A 20 67 FD	444		JSR GETLN		
0E2D A0 00	445		LDY #A00		
0E2F 20 A7 FF	446		JSR GETHX		
0E32 A5 3E	447		LDA AL1		
0E34 85 00	448		STA D		
0E36 A5 3F	449		LDA AL2		
0E38 85 0E	450		STA DH		
0E3A 60	451		RTS		
0E3B C9 C6	452	>9	CMP *F		
0E3D D0 04	453		BNE LAB10		
0E3F A0 FF	454		LDY #A0FF		
0E41 B4 0C	455		STY SPEED		
0E43 60	456	LAB10	RTS		
0E44	457				
0E44	458	QUERY	DFS 1,480		
0E45 C5 D8 C5	459		ASC *EXECUTE?*		
0E4B C3 D5 D4					
0E4B C5 DF					
0E4D	460		END		
6000	1		ORG #6000		
6000	2		OBJ #800		
6000 A2 00	3	LITTLE	LDX #A00		
6002 EB	4	>1	INX		
6003 BA	5		TXA		
6004 49 FF	6		EOR #A0FF		
6006 7B	7		CLC		
6007 69 01	8		ADC #A01		
6009 20 DA FD	9		JSR #F0DA		
600C E0 20	10		CPX #E020		
600E D0 F2	11		BNE (1		
6010 60	12		RTS		
6011	13		END		

WHEN I first saw the advertisement for P-tral in *Apple User* I was sceptical. In fact, I was very sceptical. It claimed that P-tral is a package which converts AppleSoft programs into Apple Pascal, that it does this for "any business, scientific, graphics and game software from source", and that "translation results approach 100%".

Why was I so wary? The most obvious reason, that DOS and Pascal use different disc formats, is in fact no problem. Various people sell format conversion programs, and some are available in user group libraries.

The first stage in using the P-tral package is to run a program that reads in the Basic program from a DOS disc and writes it to an Apple Pascal textfile.

I was dubious primarily because of the efforts of myself and a friend to convert Basic programs into Pascal. We had found it very difficult to determine the logical structure of a program written by someone else.

Where did subroutines start and finish, what were variables used for, what did that piece of complex code do, what is that CALL for?

All these questions had made the process of converting a 1500 line Basic program a very laborious process. Could a computer program perform a task that had taxed the efforts of two pretty experienced programmers?

Finally, I was sceptical because I find reading and understanding unstructured Basic programs so difficult — that's partly why I'm such an avid user of Apple Pascal.

The P-tral package comes as a 108 page loose leaf manual with three discs. The volume of documentation is not as daunting as it seems. It is very well laid out, being in the main double-spaced output from an NLQ dot matrix printer.

Indeed the manual is very good indeed. It separates a tutorial from the main reference section, with useful appendices at the back. What's more, despite originating on the far side of the Atlantic, it doesn't suffer from that dreadful "gee whiz, ain't this fun" approach of not a few American manuals. In fact the manual is highly

P-tral, a competent way of converting your Basic programs into Apple Pascal

readable and informative.

The three discs contain firstly the P-tral package for 64k Apples (II, II+, IIe, IIc), secondly the package for 128k machines (IIe or IIc), and thirdly a DOS-format disc containing the program used in the tutorial demonstration.

Only having a II+, I was unable to test the extra capabilities, mainly associated with size limits, boasted by the 128k versions. As we shall see later, disc space is more critical than RAM space.

After a quick skip through the manual, I decided to test the

List was clearly a non-starter. It uses that technique so beloved by Sinclair Spectrum owners of using a large number of REM statements into which can be POKEd a machine code program or, as in this case, program data.

This illustrates the point that while P-tral can convert Basic programs it would be unreasonable to expect it to understand and translate such tricky (not to say obscure, undecipherable and downright reprehensible) techniques.

Brian's Theme was more amenable to the conversion

**But don't, says
STUART BELL,
expect automatic
production of
perfect Pascal**

package on a couple of small Basic programs. So that readers could have an idea of the test data, I turned to those Applesoft programs supplied on the DOS 3.3 master disc.

After the first phase — converting the Basic program to Apple Pascal textfile format — the main P-tral program is run.

This is in three parts, the package automatically chaining from one stage to the next.

At the end of the process we arrive at the final Pascal program. During this process, various workfiles are produced. The user can specify the disc drive holding the source file, that to hold the Pascal program, and that to be used to hold the workfiles.

So what happened with the DOS master programs? Phone

process. However I did notice a POKE to location 216 with the comment "TURN OFF ONERR". As the Pascal system uses a totally different memory map, this has no chance of working, even though P-tral will happily convert the POKE into Pascal.

I would have been happier if it had flagged all POKES for investigation by the user.

A similar problem exists with POKES to the locations which control the screen window.

This program also contains a CALL to a ROM routine. To do such operations, P-tral supplies a library of machine code routines which are then linked into the compiled Pascal program. I was impressed that the supplied routine switches in the Applesoft and monitor ROMs before calling the routine, and

then turns the language card back on when it returns.

What is more questionable is the possible interference between the Apple Pascal system and ROM routines which think that Applesoft is running.

The user might well be advised to delete all CALLs until he or she is certain what they do.

Another program that I tested POKEd a short machine code program into memory, and then called it. Such CALLs are bound to fail, as the POKING of the program will almost certainly crash the system.

Once more, we encounter problems when Basic programs are not "proper" Basic. Once the CALLs and POKES had been sorted out, Brian's Theme ran very nicely. P-tral supplies a whole set of high-resolution graphics routines to mimic each Applesoft HGR command.

But what about Little Brick Out? After all, it uses lo-res graphics, and Apple Pascal doesn't support them. The writers of P-tral have thought of that one, and supply the code for a unit called LORESSTUFF, which can be bound into the SYSTEM.LIBRARY, and then used just like hi-res graphics. Very clever, and typical of the thorough nature in which the whole package has been implemented.

Enough of silly little 100 line programs — let's really test P-tral! I selected as my ultimate test data the program that my friend had laboriously converted from Applesoft to Pascal. A game called Startraders, it runs to some 1500 lines of Basic and 110 sectors on disc.

Apart from hassles with "dirty" Basic, I encountered four specific problems in the conversion of Startraders.

The first is one of disc space. Even in the initial transfer process this is a problem, as one drive is used to hold the DOS format disc. I found that a tokenised Basic program converted to a Basic program in Pascal textfile format of twice the size, in this case 107 blocks.

However problems really start when the package generates its workfiles. The manual refers to the need for space of two to three times the size of the Basic program. Add to this the size of the resulting Pascal program (in my case 180

blocks), the P-tral program files (about 200 blocks), and you can see that 800 blocks soon disappear.

I must stress that the manual emphasises that either 8in floppies or a hard disc are recommended for serious program conversion. I used a single density 8in floppy (616 blocks), plus two Disk IIs, and still found space very tight.

One of the 1280 block (640k) Apple-compatible disc drives would appear ideal for those of us whose pockets do not stretch to a Winchester. Those with only two Disk IIs should not consider this package.

An 80 column display is also needed. With the wide use of the IIe this will not be a problem for many users.

The manual also recommends the use of a speed-up card. I did use an Accelerator, and found that the whole process for Startraders took about two hours per cycle, that is for each repetition of the correct-convert-compile process.

Obviously, the package will still run at 1MHz. Since so much time is spent accessing the disc, the slow-down might be no more than 50 per cent.

While on the subject of hardware, I found that P-tral is a very clean user of the Apple Pascal system, that is it does not presume the type of hardware (such as discs and 80 column cards) that is being used, but accesses it properly through Apple Pascal.

Hence, unlike some other software written under Apple Pascal, it should run on any system. Users must, of course, own either Apple Pascal 1.1 or 1.2. I do not know if there are any problems with the latest version, 1.3.

The second problem is the sheer size of the Apple Pascal program produced. The editor can edit files up to about 40 blocks in length, but P-tral could produce a Basic program in textfile format of over 100 blocks.

How is the user supposed to edit this, or the final Pascal program for that matter? While various "crumble" programs are available to break down large files into manageable proportions, or can be written by experienced programmers, the package really ought to have

provided such a facility, with P-tral then being able to handle programs spread over several files.

As it happens, I have the Advanced System Editor on my Apple Pascal. The ASE allows the editing of files of unlimited length, so I had no problem. However, P-tral should allow for the majority who do not use ASE.

The third problem arose when it analysed the Basic program before converting it to Pascal. Consider the following piece of Basic code:

```
3300 A$ = "CONSTANTINOPE"
3310 IF B$ = "MARMALADE" THEN RETURN
3320 B$ = "ORTHOGONALITY"
3330 RETURN
```

P-tral cannot be certain whether the Return at 3310 marks the end of a subroutine, with 3320 being the start of the next one, or whether they are all part of the same routine. P-tral prompts the user for advice. Rather than go through this process each time that I ran the package, I tidied up the Basic to read in this case:

```
3310 IF B$ = "MARMALADE" THEN 3330.
```

This also produces clearer code. The need for user intervention is not a fault of P-tral, rather it is the only way of dealing with ambiguous Basic code.

My fourth problem was rather more worrying. I encountered an error message which was not mentioned in the manual: "PROCEDURE NESTING EXCEEDS 3".

This means, I think, that P-tral will not handle the case of a procedure being inside a procedure inside a procedure.

This seems a rather limiting restriction. As it is not mentioned in the manual it may be that later versions will not have this constraint. Such a nesting does not seem very deep.

I got round it by replacing the offending GOSUBs with the actual code for the subroutine. This increases program size because of the duplication of identical code which it causes.

In the event I ran out of disc space and had to reduce the size of the program slightly. By a strange coincidence, I had had

to do exactly the same thing when squeezing Startraders to let it run when compiled under Tasc (the Applesoft compiler), even with DOS moved on to the language card. However I would emphasise that the problem here was one of disc space, not memory size.

Before concluding, I must refer to the Pascal which P-tral produces. The manual warns: "I must caution you that if the code was cumbersome and difficult in Basic, in all possibility it will remain that way in Pascal".

This is an understatement! Unless the Basic is very clearly structured, the Pascal that is produced will be closer to "Baspal" or "Pasic" than true Pascal. In other words, it is clearly a Basic program coded in Pascal.

For example, all variables are declared globally. This is automatic in Basic, but very bad

programming practice in Pascal. Furthermore, the unstructured nature of most Basic programs means that the Pascal equivalent is full of GOTOS.

In ten years of Pascal programming I have never needed to use the dreaded GOTO, although on one or two occasions it might have been clearer if I had.

However, P-tral produces Pascal which is full of GOTOS. While a human converter could appreciate the overall algorithm of a procedure, and hence re-code it in a structured manner, it would be too much to expect a package like P-tral to do this.

Hence I must have severe reservations about the use of P-tral to, as the manual suggests, "reduce the Pascal learning curve".

Using the output from P-tral to learn Pascal must be classed as being as ill-advised as using the primitive computerised spoken language translators of the early 1970s to learn Russian. In short, in places the code is diabolical, but don't blame P-tral, blame Basic.

As you may have realised by now, I was very impressed by P-tral. It is a very well-written package that deals as competently as I could possibly expect with the problems of converting programs from Basic to Apple Pascal.

I hope that later versions will allow the deeper nesting of procedures - apart from that I found no other bug in the system.

Would-be purchasers should be aware of P-tral's need of large amounts of disc space. As it stands, they will also need to be able to crumble large files (the UCSD p-System User's Society has such a program).

It would have helped if the workfiles could be distributed across a number of smaller disc drives.

I am not convinced that the market for such a package will be very large, but if you need to convert an Applesoft program into Pascal, P-tral could save you tens of even hundreds of laborious hours.

As long as you do not expect the automatic production of perfect Pascal, and are willing and able to assist P-tral in its task and tidy-up the resultant code, then you will find it a most worthwhile purchase.

Title: P-tral.

Programmer: John Dyson.

Distributors: DMS Electronics, Bretton Court, Manor Road, Wales Village, Sheffield.

Price: £125 (Pioneer version).

System requirements:

Any Apple II, with 64k or 128k. Apple Pascal 1.1 or 1.2. 80 column card. Manual recommends 8in floppy or Winchester disc. About one block needed for each line of Basic program to be converted.

● As this issue of *Apple User* was going to press, P-tral version 1.0 arrived in the office. The new version "contains internal enhancements including improved memory handling". There is also a revised manual, so it's clear that Woodchuck is continually improving its product.

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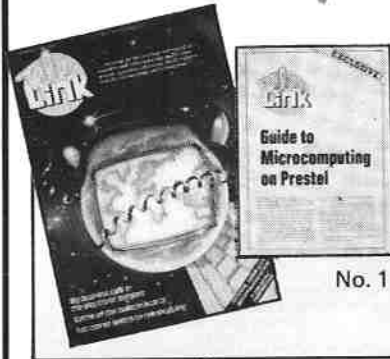
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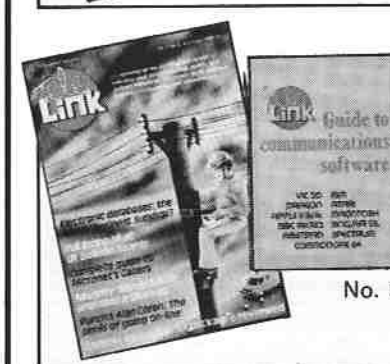
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Order form on Page 61

HAVE you ever tried programming in Applesoft using lower case letters? I think it would be more convenient if Applesoft Basic could accept lower case input, like Apple Pascal and CP/M. Then there would be no need to touch the Caps Lock key when mixing cases.

This is why I wrote this lower case input routine.

The Applesoft interpreter is in ROM. There is no way, at least no easy way, to make it really understand lower case input. It appears that the only method is to make the Basic interpreter think that lower case input is really upper case.

This is quite easy. A very simple machine code program which changes everything into upper case is the answer. However this would not work for the following statements:

```
PRINT "Hello World!"
INPUT "radius = ",R$
REM subroutine
DATA Jan, Feb, Mar
```

We need a program which leaves anything within quotation marks or anything after REM or DATA statements unchanged when we are typing at editing level.

Also it must have no effect in the Basic program execution mode.

The mode is determined by the values of two bytes at locations \$76 and \$33. If the location \$76 is set to \$FF (or if it is not \$FF, but the value of \$33 is \$DD) then we are at editing

GIVE THE CAPS LOCK A REST

This lower case input routine by
POLON TANG allows you to do
just that . . .

level. Otherwise we are in the Basic program execution mode.

The routine I have written can do all these things for you. It also supports multi-statements. Although the patch must normally shift any letters outside quotation marks there are two exceptional cases. Look at the following statements:

```
REM xyz" fgh"
REM lmn
DATA abc, def, "ghi"
```

Here, xyz and lmn are outside quotation marks but should not be affected. When the program finds the word REM there is no need for any following letters to be shifted.

Also, abc and def should be left unchanged. The byte STATUS (see the listing) is used to determine whether it is necessary to change case.

The first routine works under DOS 3.3 and the second in the ProDOS environment only.

If a Videx Videoterm is used

as an 80 column video output terminal, it must be in slot 3. The Apple IIe 80 and Cirtech 80 column cards are also supported.

Other 80 column cards such as the Vision-80 may not work and of course your keyboard has to generate lower case, so most II+s are not catered for.

To activate it under ProDOS key in the following:

BLOAD LCP [Return]
(or -LCP)

Change screen mode (40 or 80 columns) if necessary.
IN # A\$300 [Return]

To disconnect it, enter IN#0 for 40 column display or PR#3 for 80 column display.

The routine starts at location \$2FF, which is the last byte in the normal keyboard input buffer. This means the first byte of the routine may be overwritten later.

Nevertheless, crashes will

not be caused since that byte is the instruction RTS which is used to prevent the routine from BRUNning.

The routine actually starts at location \$300 so you can get it into the machine either by a BRUN or a BLOAD command. Under DOS 3.3 BRUN LCP after selecting 40 or 80 columns mode.

After installation the routine will be called directly from the operating system if any line input is required by or called through the system.

The routine will check whether it is in 80 column mode. If it is not, 40 column mode is assumed.

Then it passes control back to the original input routine according to the video output mode. When the input routine finishes the control is returned to the patch.

Now it is time to decide how to proceed. If the last character just being input is not a Return (Ascii \$8D), it returns immediately to the system. Otherwise it saves registers A, Y, X and SP.

If it is in Basic execution mode it quits with the registers recovered. If not, it looks for REM, DATA, colons and quotation marks and takes appropriate action.

Either REM is found or it goes beyond the length of the line causing it to finish. All the four registers mentioned above will be recovered and then the control is returned to the operating system.

0200	1	BUFFER	EDU #200	0322 BA	25	TSX	0352 68	49	PLA	037E	74	:
0038	2	KSM	EPZ #38	0323 BE 4E 03	26	STX FINISH+1	0353 AB	50	TAY	037E	75	:
AA55	3	DOSKSM	EDU #AA55	0326 A4 76	27	LDY #76	0354 68	51	PLA	037E C8	76	GET INY
03EA	4	DOSCON	EDU #03EA	0328 C8	28	INY	0355 60	52	EXIT	037F CC 51 03	77	CPY LEN+1
F018	5	KEYIN	EDU #F018	0329 F0 04	29	BEG GOOD	0356	53	:	0382 F0 C9	78	BEG FINISH
0800	6	:		032B A4 33	30	LDY #33	0356	54	:	0384 B9 00 02	79	LDX BUFFER,Y
0800	7	:		032D C0 00	31	CPY #00	035A E8	55	NOTREM	INX		
0300	8	ORG #300		032F 00 1C	32	BNE FINISH	0357 E0 04	56	CPX #4	0387 C9 A0	80	CMP #A0
0300 A2 02	9	LDX #2		0331 A0 FF	33	GOOD	0359 00 12	57	BNE NOTCOM	0389 F0 F3	81	BEG GET
0302 B0 54 AA	10	LOOP1	LDX DOSKSM-1,X	0333 20 7E 03	34	LOOPH	035B 88	58	DEY	038B 60	82	RTS
0305 90 15 03	11	STA START,X		0336 49 B0	35	EDR #B0	035C 20 8C 03	59	LOOPD	038C A0 A2 03	83	GETSH LDA STATUS
0308 B0 12 03	12	LDX ADR-1,X		0338 C9 0A	36	CMP #0A	035F 00 A5 03	60	CMP DATA-1,X	038F F0 ED	84	BEG GET
030B 95 37	13	STA KSM-1,X		033A 98 F7	37	BCC LOOPH	0362 00 09	61	BNE NOTCOM	0391 20 7E 03	85	JSR GET
030D CA	14	DEX		033C 88	38	DEY	0364 CA	62	DEX	0394 C9 E1	86	CMP #E1
030E 00 F2	15	BNE LOOP1		033E 88	39	COM	0365 00 F5	63	BNE LOOPD	0396 30 09	87	BMI RETO
0310 4C EA 03	16	JMP DOSCON		033D A2 03	39	COM	0367 BE A2 03	64	STX STATUS	0399 C9 FB	88	CMP #FB
0313 15 03	17	ADR START		033F BE A2 03	40	STX STATUS	036A 20 8C 03	65	NOTCOM1	039A 10 05	89	BPL RETO
0315 20 18 FD	18	START	JSR KEYIN	0342 20 8C 03	41	LOOPR	036D C9 BA	66	NOTCOM	039C 29 DF	90	AND #DF
0318 C9 80	19	CMP #80		0345 D0 A2 03	42	CMP REM-1,X	036F F0 CC	67	BEG COM	039E 99 00 02	91	STA BUFFER,Y
031A 00 39	20	BNE EXIT		0348 00 8C	43	BNE NOTREM	0371 C9 A2	68	CMP #A2	03A1 60	92	RETO
031C 48	21	PHA		034A CA	44	DEX	0373 D0 F5	69	BNE NOTCOM1	03A2	93	STATUS
031D 98	22	TYA		034B D0 F5	45	BNE LOOPR	0375 20 7E 03	70	QUOTE	03A3 C0 C5 02	94	REM ASC *MER*
031E 48	23	PHA		034D A2 00	46	FINISH	0378 C9 A2	71	CMP #A2	03A6 C1 04 C1	95	DATA ASC *ATAD*
031F BE 51 03	24	STX LEN+1		034F 9A	47	TSX	037A 00 #9	72	BNE QUOTE	03A9 C4		
				0350 42 00	48	LEN	037C F0 EC	73	BEG NOTCOM1	03AA	96	END


```

SOURCE FILE:FDI = :DISK/L,CASE.PATCH
0000: 1 *****
0000: 2 *
0000: 3 * LOWER CASE PATCH *
0000: 4 *
0000: 5 * CREATE ON: 31 SEP 85 *
0000: 6 *
0000: 7 *****
0000: 8 *
0000: 0200 9 BUFFER EGU $200 ;KEYBOARD BUFFER
0000: FD1B 10 IN40 EGU $FD1B ;45 COLUMN ENTRY
0000: C305 11 IN80 EGU $C305 ;80 COLUMN ENTRY
0000: 12 *
----- NEXT OBJECT FILE NAME IS /DISK/L,CASE.PATCH.0
02FF: 02FF 13 ORG $2FF
02FF:40 14 RTS ;PREVENT FROM BRUN
0300:08 15 KEYIN CLD
0301:48 16 PHA
0302:45 37 17 LDA $37 ;CHECK SCREEN
0304:C9 C3 18 CMP $C3
0306:F0 07 030F 19 BEQ COLB0
0308:68 20 PLA
0309:20 18 FD 21 JSR IN40 ;CALL MONITOR INPUT
030C:4C 13 03 22 JMP MAIN
030F:68 23 COLB0 PLA
0310:20 05 C3 24 JSR IN80 ;CALL 80 COLUMN CARD INPUT
0313:C9 80 25 MAIN CMP $80 ;COMPARE 'CR'
0315:00 39 0350 26 BNE EXIT
0317:48 27 PHA ;SAVE REGISTERS
0318:98 28 TYA
0319:48 29 PHA
031A:8E 4C 03 30 STX LEN+1 ;SAVE X REGISTER
0310:8A 31 TSX
031E:8E 49 03 32 STX FINISH+1 ;SAVE SP
0321:A4 76 33 LDY $76
0323:CB 34 INY
0324:F0 04 032C 35 BEQ GOON
0326:A4 33 36 LDY $33
0328:C0 00 37 CPY $FDD ;APPLESOFT PROMPT
032A:00 1C 0348 38 BNE FINISH
032C:A0 FF 39 GOON LDY $FFF
032E:28 79 03 40 LOOPH JSR GET ;BYPASS ANY
0331:49 80 41 EOR $80 ;PRECEDING LINE NO.
0333:C9 0A 42 CMP $0A
0335:90 F7 032E 43 BCC LOOPH
0337:88 44 DEY
0338:A2 03 45 CDM LDX $#03 ;COMMAND TEST
033A:8E 9D 03 46 STX STATUS
0330:20 87 03 47 LOOPR JSR GETSH ;TEST FOR 'REM'
0340:00 9D 03 48 CMP REM-1,X
0343:00 0C 0351 49 BNE NOTREM
0345:0A 50 DEX
0346:00 F5 0330 51 BNE LOOPR
0348:A2 00 52 FINISH LDX $#00 ;RESET SP
034A:9A 53 TXS
0348:A2 00 54 LEN LDX $#00 ;RECOVER X REGISTER
0340:68 55 PLA
034E:A8 56 TAY
034F:68 57 PLA
0350:60 58 EXIT RTS ;EXIT PATCH
0351: 59 *
0351: 60 *
0351:E8 61 NOTREM INX
0352:E0 04 62 CPX $#04
0354:00 12 0368 63 BNE NOTCOM ;NOT A SPECIAL COMMAND
0356:88 64 DEY
0357:20 97 03 65 LOOPD JSR GETSH ;RESET POINTER
035A:00 A8 03 66 CMP DATA-1,X ;TEST FOR 'DATA'
035D:00 09 0368 67 BNE NOTCOM ;NOT A SPECIAL COMMAND
035F:CA 68 DEX
0360:00 F5 0357 69 BNE LOOPD
0362:0E 9D 03 70 STX STATUS
0365:20 87 03 71 NOTCOM1 JSR GETSH
0368:C9 BA 72 NOTCOM2 CMP $BA ;'1'
036A:F8 CC 0338 73 BEQ CDM
036C:C9 A2 74 CMP $A2 ;''
036E:00 F3 0365 75 BNE NOTCOM1
0370:20 79 03 76 QUOTE JSR GET
0373:C9 A2 77 CMP $A2 ;''
0375:00 F9 0370 78 BNE QUOTE
0377:F0 EC 0365 79 BEQ NOTCOM1
0379: 80 *
0379: 81 *
0379:C8 82 GET INY ;FORWARD POINTER
037A:CC 4C 03 83 CPY LEN+1 ;INPUT LINE LENGTH?
0370:F0 C9 0348 84 BEQ FINISH
037E:B9 00 02 85 LDA BUFFER,Y ;GET NEXT CHARACTER
0382:C9 A0 86 CMP $A0 ;SPACE
0384:F0 F3 0379 87 BEQ GET
0386:60 88 RTS
0387:A0 90 03 89 GETSH LDA STATUS
038A:F0 E0 0379 90 BEQ GET
038C:20 79 03 91 JSR GET
038F:C9 E1 92 CMP $E1 ;'a'
0391:38 09 039C 93 BMI RETO
0393:C9 F8 94 CMP $F8 ;'z'+1
0395:18 05 039C 95 BPL RETO
0397:29 0F 96 AND $0F ;SHIFT TO UPPER CASE
0399:99 00 02 97 STA BUFFER,Y ;STORE BACK TO BUFFER
039C:60 98 RETO RTS
039D:00 99 STATUS DFB $00 ;SHIFT CONDITION STATUS
039E:CD C5 100 REM DFB $CD,$C5 ;'MER'
03A0:02 101 DFB $02
03A1:C1 04 102 DATA DFB $C1,$04 ;'ATAD'
03A3:C1 C4 103 DFB $C1,$C4
    
```

ProDOS version

APPLE - BEST IN THE NORTH WEST

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A powerful language that can be usefully applied in a short time

Conventional computer programs process data; however the computer system of the future will process knowledge. Logic Programming is a step in this direction and PROLOG - PROgramming in LOGic, is the first practical realisation of this approach. It is at present receiving special attention since it has been chosen as the basis of the Japanese Fifth Generation Computer System Project.

LPA micro-PROLOG, the famous implementation of PROLOG for the micro-computer, is now available for Apple IIe and IIc computers. Included with the software is an easy-to-use wire bound reference manual and a FREE introductory book entitled "Start Problem Solving with PROLOG" written by Tom Conlon and published by Addison-Wesley.



Logic Programming Associates Ltd, Department AU/1, Studio 4,
The Royal Victoria Patriotic Building, Trinity Road,
LONDON SW18 3SX. Tel: 01-871 2016

Message handler

TOP Mail, from Topexpress, operates as a desk top accessory which can be run from within any Macintosh application.

Users pass any Macintosh file to Top Mail and it allows the transfer of text, graphics, spreadsheets for consolidation, databases or even entire applications.

The service is not limited to one-to-one message handling. It can despatch any length of message to any number of AppleTalk network users at one time.

Priced at £250, Top Mail is compatible with other components of the network and all Macintosh hard disc systems.

● *Topexpress, 13-14 Roundchurch Street, Cambridge CB5 8AD. Tel: 0223 355427.*

Hard disc power pack

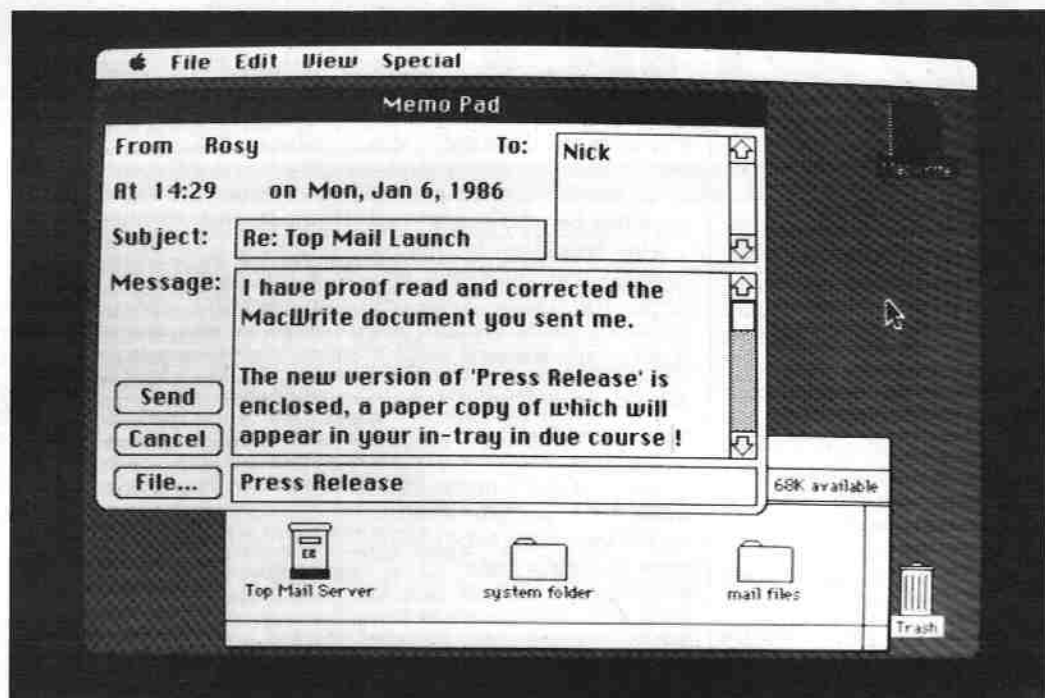
ADDITIONAL speed and power is available to the Apple II+ and IIc using Space Coast Systems' new internal 3.5in hard disc, which also replaces the machine's internal power supply.

The Challenger contains its own heavy duty power supply plus 10 or 20mbyte hard disc drive and streaming tape back-up.

● *Space Coast Systems, 301 South Washington Avenue, P.O. Drawer 2767, Titusville, FL, USA. Tel: 0101 305 268 0872.*

Bilingual database

AN English language database may have limitations for businessmen who spend much of their working life abroad. But software house Attar (Middle East) has come up with the answer – a bilingual database



The Top Mail electronic mail service for the Macintosh operates as part of the computer's desktop

for the Apple IIc and IIc.

Called Linguafle, it can be designed to operate in various combinations of Latin and Arabic based languages. Initial versions are in Arabic-English, French-Arabic and English-Russian.

All system prompts and fonts of chosen languages can be altered. The package, which requires no special hardware, costs £450.

Attar also provides a keycap engraving service for fully bilingual keyboards.

● *Attar (Middle East), Newlands Road, Leigh, Lancs WN7 4HN. Tel: 0942 608844.*

Grammar checker

A GRAMMAR-checking program which is claimed to go beyond conventional proofreading software is now available for the Apple IIc and IIc.

Sensible Grammar, from Sensible Software, is designed to check word processing files – with already corrected spelling – for common writing errors.

It uses a library of over 1,000 commonly misused English phrases to identify pompous, informal, cliché, vague, wordy, repetitive, sexist and other

faulty phrases.

Punctuation, capitalisation and typographical errors are also caught.

After showing errors in context, the program automatically suggests replacement wordings. Problem phrases can be corrected immediately.

Sensible Grammar is fully compatible with AppleMouse and features a Macintosh-style user interface with windows,

pull down menus, scroll bars and dialogue boxes. For mouseless users a set of keyboard commands is supplied.

A 128k Apple with 80 column display is needed to run the program, which works with most popular word processors. Price \$99.95.

● *Sensible Software, 210 S. Woodward, Suite 229, Birmingham Michigan 48011, USA. Tel: 0101 313 258 5566.*



Sensible Grammar spots faulty phrases

Data registration

THE Data Protection Act 1984 gave computer users, including Apple owners, until this March to register any "non-recreational" storage of information on living individuals.

Failure to register will render the user liable to prosecution.

A free registration pack is available from the Data Protection Registrar, Springfield House, Water Lane, Wilmslow, Cheshire SK9 5AX. Tel: 0625 535777. This includes the necessary registration forms and explanatory booklet.

But for small to medium-sized businesses wanting more comprehensive details ADM has produced a £65 kit.

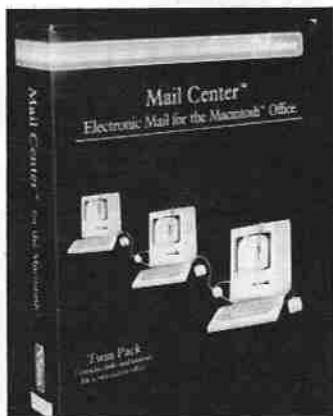
Again this includes registration forms but also a copy of the Act itself, a guide, and a set of forms designed to help decide whether there is a need to register. (Registering costs £22.)

● ADM, ADM House, 5 Headstone Road, Harrow, Middlesex, HA1 1PL. Tel: 01-863 0621.

E mail package

A NEW electronic mail package for the Macintosh from American company Videx, Mail Center, contains two separate programs, Application and Receiver.

Application may be used to



view mailboxes, contact other users on the AppleTalk network and to send information. Most non copyprotected programs, data files, documents and pictures can be transferred.

The Receiver is a small program that constantly monitors information sent over AppleTalk to its mailbox, then receives and stores it.

Its ability to integrate into virtually all discs ensures important messages are always delivered.

Mail Center, price £257, works in the background, allowing the Macintosh to be used for more important tasks.

● P&P Micro Distributors, Todd Hall Road, Carrs Industrial Estate, Haslingden, Rossendale, Lancs BB4 5HU. Tel: 0706 217744.

Digitiser for the IIc

THE Computereyes video digitiser from Stem Computers, originally only available to Apple II+ and IIc users, has been released for the IIc.

A video acquisition system, it enables the capture of high contrast and grey scale images from any standard source, such as camera or video recorder, and the ability to save and recall them from disc with a minimum of keystrokes.

Images can be dumped to a printer.

The applications for the video system include graphic arts, pattern recognition, security, quality control, spatial measurement, robotics and artificial intelligence, computer art and industrial controls.

Prices for the system start from £139. Optional Double Hi-Res software is £14.

● Stem Computing, 3 Blackness Avenue, Dundee DD2 1ER. Tel: 0382 65113.

20mbyte disc drive

EQUIPPING a Macintosh with its HyperDrive 2000 will enable the machine to handle applications that exceed the capacity

of most personal computers, claims makers General Computers, USA.

The HD2000 is a high performance co-processor board and 20mbyte internal hard disc drive which lends itself to such applications as artificial intelligence, CAD, engineering, scientific and statistical analysis, electronic publishing, animation and business modelling.

Other features are an additional 1.5mbyte of RAM, a 12MHz 68000 microprocessor that doubles the internal processing speed of the Macintosh, and a 68881 floating point co-processor for high speed numerical calculations.

GCC has also released a file server software package which it claims will allow as many as 32 Macintoshes to link together as part of an AppleTalk network.

It gives users shared access to hard disc storage capacity, files and programs.

Both products are compatible with the Macintosh Plus, come with a 90 day limited warranty and cost \$3,195 and \$295 respectively.

● General Computer Corp, 215 First Street, Cambridge, Mass. 02142, USA. Tel: 0101 617 492 5500.

Apple Dumpings

IN last month's New Products section we gave details of Apple Dumpings from D-Soft. Unfortunately, we managed to get

one digit of the phone number wrong.

Telephone exchanges being as picky as computers, not a lot of people got through.

D-Soft's correct phone number is 01-748 9202. Our apologies to them and all the people who called the wrong number.

Power in a pack

A LACK of mains sockets or a breakdown of power supply need not be an obstacle to the use of an Apple IIc.

Northumberland company GT Associates has produced an alternative form of power for the machine, its PowerWedge 2500 series of battery packs.

The packs provide for two hours continuous use, even when the disc drive is running for as much as 30 per cent of the time. An audio alarm gives 20 minutes warning of "shut-down".

PowerWedge is simply plugged into the Apple's power socket and recharging - through the computer's own mains unit - takes three hours.

In addition to making the IIc portable, the packs can be used as a no-break power supply. Any mains interruptions will not affect the operation of the computer, meaning no loss of data.

● GT Associates, High Hambleton House, Wooler, Northumberland, NE71 6SU. Tel: 0668 81623.



Video digitiser from Stem Computers

apple classifieds

C.C.S. COMMS card £25. Miracle Technology comms card £35. Tel: 0329 239983 evenings.

APPLE SOFTWARE, use your programs without the hassle of Apple DOS with friendly "options" using windows, joystick control (optional), speech output (optional). Disc, manual, only £9.95. Tel: 0494 39283 evenings.

APPLE IIe 1985 128k 80 column. Z80 and printer cards. Duodisc drives. £1000 o.n.o. including delivery to your table! Telephone Lancaster (0524) 39246.

APPLE II+ 64k disc drive, controller, Hitachi B/W monitor, joystick, lots of software. £400 o.n.o. Tel: Geoff 01-340 7103 evenings.

APPLE SOFTWARE, Art Master design package, 12,000 shape combinations, mix U/L text with graphics, joystick controlled, design pictures, charts, the easy way, disc, manual, only £9.95. Tel: 0494 39283 evenings.

BEAGLE graphics plus Bill Budge graphics plus Higher graphics II, £35. Apple Mechanic plus Doublestuff, £25. T.G. paddles and joystick £30. 22 Apple books £30. Bag of Tricks and Beneath Apple DOS £18. G.P.L.E. £15. Merlin Assembler £28. Apple Logo plus five books £80. Metacrafts Forth and Graforth £27. Pinball construction set, Olympic Decathlon, Apple Panic, Hi-Res Soccer £25 or £170 the lot, if collected. Tel: (Blackburn) 0254 81 2916.

APPLE II+ 64k, twin disc drives, 80 column card, monitor, Basic, Pascal. Tel: 0892 22916. £350 o.n.o. Few games.

128K RAM card £95, speech synthesiser, Z80, 16k RAM card £35 each. Disc controller £30. 80 column £40. All brand new. Tel: 0707 335408.

APPLE III plus monitor, two 5mb profiles, and software or may swap for Macintosh 512k. Tel: 0795 664989 daytime.

DIGISOLVE UGP card 512 x 512 resolution with long persistence monitor £200. Tel: 0977 554105.

SYMBIOTIC Symplexor latest update plus two controller cards, Noxy 5.3, Noxy 4.9 twisted pair leads £450 complete. Tel: Canterbury 0227 731281.

MACINTOSH software, will swap, borrow, buy. Especially W-P, utilities. Tel: Chris (0602) 259183 days, (0602) 254475 evenings.

DISC drive, Apple IIe as new £100. Tel: 01-904 6760 evenings.

APPLE Macintosh plus Imagewriter printer plus software. As new, will accept £1000 o.n.o. Tel: 0532 865244 evenings.

TIME II card. No documentation £20? Tel: (0954) 210511 evenings.

APPLE II+ 2 disc drives, controller, monitor, Centronics printer, card + cables, colour, SSC, 80 column, 16k cards, TABS Accounts, sales, purchase, nominal ledgers, CC A DMS, Visifile, Visicalc, Applewriter, Go-between, Sargon, Pascal, Copy Z plus Flight-simulator full documentation. Joystick corp program generators. Ideal for business use. Little used. Tel: 0506 411567 after 6pm.

APPLE II Stuff, Soft, Hardware also wanted. Tel: 0344 484736.

UNWANTED prize (see Apple User, August 1985). Ape Escape, Caves of Olympus, Regatta £20 each, £55 all three. Decathlon £15. U-Talk speech card £20. Tel: Lee (0734) 693262 between 5-8pm.

APPLE Dot matrix printer, hardly used. Interface instructions and demo disc £150. Tel: Dave 061-434 4371 evenings.

DISC drive with controller £90. Locksmith ver. 5.50 £40; Microsoft Multiplan for II+ £40. Tel: 0923 775250.

FANCY joining a new Apple II users club for beginners in programming? Write to Philip Dixon, Lambshield, Hexham, Northumberland. Also hardly used Applewriter IIe £55.

II+ Koalpad plus software £75. Silentype including I/Ford £70. Light pen plus software £25. Paul Tel: Chesterfield 826302.

DIGISOLVE UGP graphics card with ICL long persistence monitor £200. Tel: 0977 554105.

II+ Koalpad and software £75 Silentype including I/F card £70. Lightpen and software £25. Paul, Chesterfield 826302.

MODEM WS2000 ideal for Prestel, Micronet and Telecom Gold £100. Apple Access II for use with Telecom Gold £40. Ultima III adventure games £30, Flight simulator II £40. Tel: Peter Coles 0908 564497.

EX computer club software II+, IIe, IIC 150 plus titles, cheap. Send SAE for list, Peter Singer Flat 2, The Old School House, Merthyr Vale, Glamorgan, Wales.

APPLE IIe 80 column and 80 column 64k extended cards for sale £40 and £55 respectively o.n.o. Tel: 01-553 3553 after 6pm. Will exchange for IIe clock or other card. Plus Toshiba MSX 64k (new) £100 o.n.o.

APPLE IIe with extended 80 column card, r.f. modulator, monitor II, disc drive, controller card, joystick, all complete with manuals. Sublogic simulator II. £700 o.n.o. the lot. Tel: 0638 667711.

APPLE IIC system complete £700. Tel: 01-310 7162 for details.

MAC FORTH level II as new £155. Digisolve Hi-Res 512 x 512 pixel graphics for Apple II etc £290.00, with S/W and H/B. Penman plotter and S/W for Mac £290. Tel: 0904 765677 (York).

APPLE II with 2 Apple drives, Paper Tiger printer and interface, monitor, Wizard-80 column card, Easywriter, Pascal £390. Tel: 01-253 3411 ext. 480.

APPLE IIe 2 disc drives, joystick, paddles, manuals, 6 Apple books, 100 games, lockable storage box. Games include The Hitchhikers Guide to the Galaxy, Cutthroats, Skyfox etc. Bargain at £1200. Tel: 047384 309 (Suffolk).

APPLE Europlus II, 80 column card, two disc drives, Philips monitor, manuals, Applewriter II, Apple dealer maintained, used by author who has since bought a IIC £600 o.n.o. Tel: 0539 821562.

APPLE II+, IIe unwanted software, Cobol, Pascal, Wordstar, MBasic. First reasonable offer. Tel: Mark 051-260 9392.

MUST clear 10mb Winchester, 128k cards, Z80, CP/M, Videx 80 column, RGB, complete TABS. Tel: 0924 443913.

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ALTHOUGH I am using Applewriter II under the older DOS 3.3 on an Apple II+ with a Canon PW-1080A dot matrix printer, the solution that I have devised to the problem that Mr Bebbington describes in the November issue of Apple User should work for the ProDOS version of Applewriter and any printer.

Permanently altering the Applewriter II code so as to send the appropriate control code for the selection of 12 pitch Elite is possible, but leaves you with no alternatives, and would override any other setting you desired. It would therefore not be possible, for example, to select another font.

A better solution is to use the Ctrl-V Esc E Ctrl-V facility to insert the desired printer control sequence at the beginning of the text.

If you have problems remembering the control codes make a glossary file of the more commonly used code combinations, giving them easily remembered command letter like E for Elite, S for Standard, N for NLQ etc.

If every new text file is started with this sequence the printer will be set up correctly each time you print it. If you don't want the extra line at the start of the page just start the text to be printed directly after the control code sequence on the first line. The printer will start printing at the left hand margin because control codes are not treated as spaces unless they occur away from this left margin between text.

Alternatively if you want a more permanent solution the control codes may be inserted in the print/program set up as a top line entry. This is a little more complicated, but does insert the set up code every time.

Access the print/program set up page with Ctrl-P, ? and insert the code directly:

TL / ESC E / / /

This will send an Escape E to the printer at the top of every page. Unfortunately it will also send a line feed which will insert a blank line at the start of every page.

To remove this blank line insert after the Elite set up code a reverse line feed (on my Canon this is Esc j CHR\$(36) to feed

one reverse 1/6 inch line feed. The complete entry would be: **TL/ESC E ESC j \$ / / /** (Note: CHR\$(36) = "\$")

If text is required on the top line also just insert it after the control code sequence as usual.

Several print format set up value files can be saved to disc and loaded as required.

If a similar set up is inserted in the bottom line then the printer can be returned to a standard setting after each printing. — **John Avery, Thatcham, Berks.**

Appleworks snags

RE Appleworks for the II+ (Apple User, November 1985) I have found a few problems.

If there are any readers who are contemplating purchasing this package read on.

Check your printer card. Is it an Epson 8132? If so you'll need an Image-maker EPC1 chip from Dark Star (£25).

This chip replaces the 2716 eeprom on the interface card and is compatible with Pascal, CP/M and Appleworks, but not PFS software.

Users who do not possess full Ascii keyboard may have problems obtaining a @ and ^, even if the instructions are followed exactly. Solution: Buy an Enhancer II (£132)?

So the total cost for Appleworks for the II+ would be £206.95. Is it worth it? — **K.J. Ashton, Leeds.**

Modifying an Apple II

I HAVE an Apple II+ and have been offered a Apple II which I would like to modify to a II+.

I believe that all I have to do is change the ROMs to Applesoft. Is this correct?

Also should the machine be

capable of using the standard Apple II+ PAL card?

The idea is that my son would leave my Apple alone if he gets his own.

A friend of mine who changed his Apple II+ for a IIe is having difficulty running his Visicalc on 80 columns.

The version he has gives him the option of 40 or 80 and on the II+ he just said yes to the 80 column question and up comes 80 columns.

Running the same program on the IIe the disc just reboots.

Is there a fundamental reason for it doing this, as we thought that the II+ and IIe were compatible, although we know that there is a difference in the 80 column card? — **E Nunn, Gosport.**

● You will also need the autostart monitor ROM to make the II into a II+, although it won't be exactly the same.

You may have difficulty obtaining the ROMs. Have you considered finding an old Applesoft card or using a language card and copying into it an image of your II+'s ROMs?

The Visicalc needs changing although you could put an old 80 column card in the IIe and it would probably work, but be a step back.

Max Parrott

DOS relocation

YOUR issue of March 1985 mentions, in an Appletip by P.A. Gorry on page 44 the Computer Data Service's Memory Management System II (MMS) software for relocating DOS to a language card. I have tried to obtain this from dealers without success. Any suggestions? — **A.K. Snell, Poole.**

● We've been unable to trace anyone who still stocks the package.

If your main priority is to move DOS to the language

card, you might consider something like Beagle Bros' Pronto-Dos, although getting this package might not be too easy — try P&P or MGA.

Also Basug have various utilities in their software library which may give you what you need.

Finally, it might be worth mentioning that the Apple User graphics Library disc contains a routine for moving DOS to the language card.

Peter Gorry included it because it is necessary for some of his graphics routines. However the routine is not documented, so using it independently may not be all that easy.

Dumping hi-res screens

I HAVE been trying to put together Max Parrott's machine code program to dump the page 1, 2 and 3 hi-res screens to a printer as described in the September issue of Apple User.

I have been assembling the program by typing it in through the monitor as a hex dump. It appears to be all right as far as address \$95E3, where it becomes, for some reason I don't understand, unstuck.

I enclose a printout of the relevant portion. Could you tell me where I am in error?

In a recent letter you mention that it is possible, but not easy, to use another 16k of RAM in the IIe. Can you tell me where information on this might be available? — **W.J. Davis, Dublin.**

● The portion of your monitor input code which you sent me is correct.

You have to remember that an assembler uses labels for any addresses to which you want to refer. GPRINT is an example of such a label, as are PRINT and DOUBLE above it.

The code which is to be put

into memory at this address is contained within the quotes following the pseudo op-code ASC. The program wants the Ascii code corresponding to the text 0820G and this is 30,38,32,30,47 in hexadecimal.

Please remember that the routine is aimed at an Image-writer connected to the Apple via an Apple Super Serial Card. If you have another card the subroutine PRINT at \$95D0 will have to be changed.

If you have another printer the routine just might work if the printer graphics commands at GPRINT, DPRINT, ON and OFF are adjusted accordingly.

Use of the 16k of RAM corresponding to the language card is controlled by a series of "soft switches" in the \$C080 area of memory. The details are in the technical manuals.

It would be worth your while looking at programs which use the language card to see what they do. Some examples are:

- Help screens, by J.P. Lewis, p23 of August 1983 *Windfall*.
- Page 3 routines, by D. Haynes, p23 of October 1985 *Apple User*.
- Basic Commands, by P. Gorry, p18 of April 1985 *Apple User*.

Max Parrott

Tripped by leap year

THERE are two points in Duncan Langford's excellent *Appletip* from the October 1985 issue of *Apple User* which I must comment on.

Top of column 4. Sorry, but 1984 was a leap year, so it was Sunday January 1 1984, not Monday as printed.

In the program listing lines 420 and 430 are fine for dates in 1986 up to Sunday January 5 1986. For January 6 1986 line 420 fails to give the right answer because what is needed is our old friend Modulo 7.

Using Modulo 7 suggests a remainder in the range 0-6 which appears to be too large, as Duncan Langford has only three entries in his table because 1988 is a leap year.

Perform the calculation without any regard to the fact that

1988 is a leap year and January 1 1988 works out to be a Friday for dates up to and including February 29 and appears to be a Saturday where the extra day has been ignored for dates after February 29.

So the full table to be used with the result of Modulo 7 calculation becomes:

Su	M	Tu	W
1989	1990	1985	1986
Th	F	S	
1987	1988	1988	

The table can be coded as data and read into an array in the normal way. To change Base Year all that is needed is alternative data or an additional dimension to the array, for example:

```
240 FOR I=0 TO 6
250 READ Y(I)
260 NEXT I
```

In simple steps the calculation replacing lines 400-470 of the original demo program becomes:

```
400 Q=M(MD-1)+DT; REM Total
      days
410 Y=Q-(INT(Q/7)*7); REM
      Less than a week
420 W=DW+8-Y; REM Extra 1
      for dayname of Jan 1st
430 V=W-(INT(W/7)*7); REM
      Reduce to range 0-6
470 VTAB 16; PRINT"The year
      is ";Y(V)
```

Dayname of	Array subscript (V)	Choose which range for DATA line		
		80/84	85/90	90/95
Su	0	84	89	95
M	1	84*	90	90
Tu	2	80	85	91
W	3	80*	86	92
Th	4	81	87	92*
F	5	82	88	93
Sa	6	83	88*	94

Note: Items marked * show the "apparent" dayname for Jan 1 - resulting from the calculation which at the time could not tell that an allowance for leap year was needed. Vic Nash, Sutton Coldfield.

Baulky printer

I HAVE been trying to set up a word processing system with my Apple II+ computer, Smith Corona TP-1 printer with an RS232C interface and the Apple Super Serial Card without much success.

Despite numerous attempts I cannot get the printer to work with dBase II, Wordstar or Visicalc and for that matter any other programs.

I should be most grateful if you would kindly provide me with the necessary technical information to set up a working system using the above hardware. For your information, the following are the details of the RS232C interface on the TP-1 printer:

Signal	Pin No.
TXD	2
RXD	3
RTS	4
CTS	5
SGND	7
DTR	20

Printer data rate - 1200 baud. Data format - 8 bit word length. Interface protocol - DTE selected.

Parity - even.

- Dr. D.D. Ho, Hull.

● First make sure that the cable is connected correctly and that there is continuity from a pin on one connector to the pin on the other.

Second test the hardware at the simplest software level. That is, switch on the Apple without a

disc in the drive and then press Reset. Type PR#1 to engage the serial card which has to be in slot 1 for some of the software you mention.

Now to the nitty-gritty (with the Apple off). On the card make sure that the jumper block points to the word Terminal.

Make sure that SW1 (1-4) is set off, on, on, on for 1200 baud.

First try SW2-1 on for one stop bit unless your printer asks for two stop bits. If your printer can be set for a lower baud rate do so (adjust card switches to match) because your printer buffer may not be large enough to cope with long documents.

In the same vein if you can switch off the printer's parity checking do so, otherwise set the card (page 15, 16 of manual).

Max Parrott

Pascal possibilities

AS a fan of Pascal, and in particular Apple Pascal, I have read with great interest the series you have been running in *Apple User*. I would, however, like to make a suggestion for an article.

I have used Ormbeta software, written in Apple Pascal among other languages, and it appears to have a good set of input routines for bomb proof input of data.

I have duplicated these to a certain extent for my own use but consider that a more experienced programmer might develop a standard set of editing commands and a suitable Pascal or assembly language library routine.

If a standard library routine was developed, and possibly offered on disc, future programs submitted to you for publication could easily be implemented. Another benefit would be common operation among programs. - Barry Keal, via MicroLink.

● We're glad that you like *Apple User* so much, especially our coverage of Apple Pascal. Later this year Stuart Bell will be starting a new series called 'Pascal Building Blocks' in which he will develop a whole package of library routines to aid program development under Apple Pascal.

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September 1981

Consumers' guide to Apple music, Part I - Games review (Starmines, Creature Venture, Hi-res Soccer) - Ski-run game (listing) - Speed restrictions with variables - Non-linear curve fitting - Machine code techniques, Part II (text insertion) - Crash course in Basic, Part I - Dot matrix printer review - Apples in networks (modems, Prestel) - CAL explosion coming - Computer games for physically handicapped - Apple user profile: SEGAS. PLUS three pages of Compucopia and five Appletips.

June 1982

New ways of linking Apples to the outside world - Introduction to Forth, Part I - Games review (The Prisoner, Pinball) - Apples in Medicine - Tasc Compiler review - Micros in process control - Building pictures with machine code - High-speed Apple links to mainframes - Wildport cards review - The Last One and CORP program generators reviewed - Book review (Apple II User's Guide) - Teacher's Toolkit and suite of primary school programs reviewed. Plus four pages of Compucopia and six Appletips.

April 1983

Games reviews (Type Attack, Microwave, Tubeway) - Word Processing (Supertex, Executive Secretary, Wordstar, Word Handler) - economics of using electronic worksheets - Fishing (game listing) - Apples in the pet foods and film slides industries - Anatomy of the Ile - Beginner's programming - Reviews (Omnis, Strobe 100 Plotter, Hilderbay Bookkeeper, Turnkey CP/M) - Programming for the classroom - Fickle Finger Proofing Part II. PLUS four pages of Compucopia and six Appletips.

November 1983

Think Tank (Pascal Blockwrite/read, fast data-logging, input validity checking, date verifying) - Games reviews (The Alien, New World, Crime Wave) - Neat Pascal listings - Interactive Video at American Express - Reviews (CP/M Card, Disc-o-doc, The Graphics Magician) - In-circuit Emulation Part 2 (Rovino ICE II card) - Graphics (Super resolution, hi-res text strings) - Graphs from Visicalc - Lisa's Cullinet mainframe link - Logo Part 1 - schools' software library. PLUS Compucopia, News, Letters and Appletips.

June 1984

The Steve Jobs interview - Pascal Tutorial Part VI - Arbitrary byte patterns in memory - Graphics package Part V - Spreadsheet: Visicalc's @LOOKUP function - Compile and solve crosswords with Appletips' WPL - British games reviewed (Derby, Soccer Manager, Election, Necromancer, Mekbula) - Modems, micros and bulletin boards - Program for marking schoolwork - Reviews (Pixy plotter, TG Track Ball, CWP colour modulator) - Logo round-up. PLUS News, New Products and Letters.

October 1981

Micro Planner review - Games review (Computer Bismark, Battle of Waterloo, Raster Blaster) - Letter square puzzle - Machine code techniques, Part III (dumping screens and printers) - Bulletin boards and personal computer database systems - Teletype terminal program - Crash course in Basic, Part II - Consumer's guide to Apple Music, Part II - Apple user profile: SEGAS, Part II - Apples in South African schools - Programs for primary schools. PLUS two pages of Compucopia and four Appletips.

August 1982

Games review (Bandits, Suicide, Swashbuckler, Fly Wars) - Instruction file editor - Teach yourself Morse, Part I - VisiCalc section - Pastext II review - Asynchronous data transfer, Part II - Omnis review - A melody from your micro - Summary of 10 utilities - Make your own user port, Part II - Mah Jong - Number sorting - Elements of the Apple, Part V - Guidelines for buying a school Apple - Educational programs reviewed - PLUS four pages of Compucopia and two Appletips.

May 1983

Think Tank (Visicalc Magic, Appledarts sound, hi-res routines) - Games reviews (Spy's Demise, Teleport, Bear Run, Prism, Bug Attack) - Moans about manuals - To copy or not to copy - The outdoor Apple - Reviews (Wildword, Apple Circuit, Personal Data Analysis) - Date conversion - Understand the Epson Part I - Visicalc Review of Vergecort 128k RAMcard and Cdex Visicalc training course - Graphics (generating bar indicators with listing) - Standing Wave Plotter. PLUS five pages of Compucopia and seven Apple tips.

December 1983

Think Tank (memory dump in Forth; shape filling) - Games Reviews (Dark Crystal; Dawn Patrol; Minit Man; Flip Out; Snooper Troops 1 and 2; Dragon's Keep; Troll's Tale) - Reviews (Word Juggler; Koala Pad Touch Tablet; Wildcard Plus) - How to choose software for your business - Talking to dolphins - Write your own adventure games - Estate Agency with a network of Apples - Lander Game Listing - Visicalc cash flow projections - Drawing with Logo. PLUS News, Letters and Appletips, Compucopia.

July 1984

Capitol CAD package - Automating CP/M with Pseudo disc drive - Wordstar on Epson printer - Relational Databases - Games (Lode Runner, Coveted Mirror, Crypt of Medea, Queen of Hearts, Quiz Listing) - Screensplicer - Ile super-res graphics - Pascal tutorial part VII (defining procedures) - Volume control for Apple II - Appletips review - Lisa helping visually handicapped - Calculating mortgage repayments with Visicalc - PLUS News (including report on Apple '84), New Products and Letters.

November 1981

First review of the new Apple III - Games review (Temple of Apsah, Hellfire Warrior, Apple Panic) - Hayden Compiler review - BCPL, a fast language for the Apple - Psychological assessment by the Apple - Beneath Apple DOS book review - New software from the USA - Crash course in Basic, Part III - The role of speech synthesizers in schools - Historical review of computer literacy - Apple user profile: clothing manufacturing. PLUS three pages of Compucopia and six Appletips.

October 1982

Games reviews Knight of Diamonds (the second wizardry scenario) and Pig Pen - Think Tank (with listings) - Med-res graphics, Part II (filling in shapes) - Lisa assembler language review - Magic of VisiCalc - VisiCalc Business Forecasting Model review - Cross reference listing program - Apple-vox speech synthesiser review - Morse Code, Part III - Computerised flash card for schools - French Verb program review. PLUS four pages of Compucopia and seven Appletips.

June 1983

Games reviews (Pie Man, Asteroid Field, Star Thief, Cyclotron, Star Blaster, Warp Destroyer) - Security with Data Encryption - Product reviews (Routine Machine, List Handler, Apple III CP/M Softcard, Savvy, Apple Project Manager and Micronet) - Apple '83 preview - Screen editing for beginners - Understanding the Epson Part II - Book review (Create Word Puzzles with Your Micro) - More Apple Pilot facilities. PLUS five pages of Compucopia and eight Apple tips.

January 1984

Hi-res text generator - Game listing (Patience) - Games reviews (Apple Cider Spider; Theesus and the Minotaur; Thunderbombs; Buzzard Bait) - Lisa Workshop - Logo in the US - Pascal Tutorial Part I - Pascal PEEKING and POKEING - Reviews (Bit Stik version 2; CIA utility; Nano 6502 Assembler; Aviette FDD 820 disc drive; KGP-40 printer; AK-GC joysticks; Praxis 35 typewriter/printer; Visicalc Advanced) - Appletips word counting. PLUS News, New Products, Letters and Appletips.

August 1984

Communications - Apple in a haulage company - Book Review (Apple Basic Data File Programming) - Reviews (Scribe 3D CAD package, Sage CP/M Database, Codewriter Ile, Ramdrive Ile, ShortCuts) - Games (Plasmania, Bouncing Kamungas, Pinball Construction Set) - Graphics package part VI (text handling by machine code) - Lisa organising meetings - Pascal Assembler - Speech input via Voice Input Module - Multiple helps with cricket scores. PLUS News, New Products, Letters and Appletips.

December 1981

Regain Step/Trace in Autostart Apples - Games listings (Apple Casino, Avoid, Calendar) - Games review (German Whist, Wizardry, Galactic Attack, Pool 1.5) - Sinta Shape Manager review - Machine code techniques, Part IV (sorting arrays) - A/D converter review - Colour systems - Financial Controller review - Wordstar review - Crash course in Basic, Part IV - Debugging the Fortran Compiler - Care of discs - Electronic atlas - Pascal explored. PLUS four pages of Compucopia and seven Appletips.

November 1982

A beginner's guide to PEEKs and POKEs, Part I - Games review (Galactic Wars, Night Mission Pinball, Raster Blaster, David's Midnight Magic and three Quick Spins) - Think Tank (with listings) - Three 80 column cards evaluated - Visicalc: Brush up your algebra - Bit Stik graphic system reviewed - Pitfalls in producing educational software - Treasure Islands educational game reviewed - Med-res graphics, Part III (Ampsand routine). PLUS four pages of Compucopia and six Appletips.

July 1983

Apple '83 review - Think Tank - Games reviews (Zork I, II and III, Hitch-hiker's Guide to the Galaxy, Wavy Navy, Shuffleboard) - Using a printer with DOS - Reviews (Micro Planner and The Spreadsheet) - Visicalc potpourri - Beginners' PEEKs, POKEs and CALLs - Creating a turnkey system - Atomic research Apples - File organisation methods - Insurance broking with an Apple - Pilot Animation - Tip for using both sides of a disc. PLUS five pages of Compucopia and seven Appletips.

February 1984

Macintosh Revealed - Apple in the clothing industry - Book Review - Reviews (ProDOS, Apple's new operating system; Bank Street Writer; Keystar for Wordstar; Word Weaver III) - Logo: manipulating human language - Lisa Workshop Part II - Build your own graphics package - Games (The Quest, Story Machine, Repton, Sammy Lightfoot) - Date Manipulation - Voice Darts - Pascal Tutorial Part II - Pascal Animation - Visicalc cashflow models. PLUS News, New Products, Letters and Appletips.

September 1984

How an Apple helps police hero - Updating Apple graphics and arcade design - Serial data transfer - Games (Early Games Music, Learning with Leeper, Fuzzywump, Hollowen) - and DIY Graphics Part VII (including review of Doublestuff) - Macintosh (journalist's view of MacWrite, Software Development, Transylvania, Linking Lisa to ICL mainframe) - Pascal Tutorial - Pilot Interpreter - Spreadsheet (including bug in VAV) - Reviews of Graphpak and Format-80 Enhanced - News, New Products and Letters.

March 1982

Games review (Crush, Crum and Chomp) - Apple Medi Forum - Data Factory review - Apple Graphics, Part III (displaying histograms) - Printing annotated DOS disc directory - Crash course in Basic, Part 7 - Start training for the Apple Olympics - Elements of 1 Apple, Part II - Payroll pack for the Apple III - 5 educational programs review - DOS 3.3 to 3.2 software switch - Workshop/Words tuition course reviewed. PLUS three pages of Compucopia and four Appletips.

January 1983

Think Tank - Book review (Apple Graphics and Arca Game Design) - Games review (Wizard and Princes Transylvania) - Six-page gui to memory storage (guide, disc drives, new bubb memory, 128k RAM cards, di back-up, mini-Winchest drives, new Apple drives) - W Disney's TRON - Graphmag review - Installing Wordstar Business cash flow with Visicalc - Pilot review - Interacti editor-assembler, Part II. PLUS four pages of Compucopia and eight Appletips.

August 1983

Think Tank - Reviews (TT Accelerator Board - tripling the speed of an Apple II; Micro planner Part II; The Ramview 6 and Vision 80 80 column card for the Ile; SuperPilot - does set a CAL standard?) - Gam reviews (Kabul Spy, Sup Taxman 2, Succesion, Ja breaker, Spectre) - Ile or Ile? ti Apple III's place in the market - Use indices for What I analysis with Visicalc - Bas editing for beginners - Pasc Disc Directory - PLUS five pages of Compucopia and six Appletips.

March 1984

Games listings (Noughts and Crosses; Twenty Questions) - Pop music Apple - Review (Studentdata, Sideview) - Gam reviews (Facemaker, Polit Artist, Microbe, Adventures, Flesh, Dungeon!) - Pasc Tutorial Part III - Lisa (Launch Lisa 2 series; SunAccount ledger system) - Graphics pages memory, plus two histogra routines - Indexing Forth discs - Critical Path Analyses w/ Visicalc. PLUS News (More aft Macintosh; multiplying mic Lisa wins Rita), New Product Letters and Appletips.

October 1984

Appletips (drive-cleaning, DO! REMs and Lists) - Apples in clothing factory - Book review (games programming, Pilot Apple IIC) - Games (Gruds Space, Cherryspin, Aquatron) - Graphics Part VIII (including review of Spectrogram color card) - Mac software review (MacForth, Click Art and Mac If Knife) - Simulation of radioactive decay and Einstein solids - Pascal tutorial - Flashcalc - Reviews of Blackboard print card and CWP drive - PLU Letters, News and New Products.

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AU3

April 1982

Apple speeds the news - Games review (Castle Wolfenstein, Threshold, President Elect) - DOS Toolkit problems - Linking Apples to IBM - Home-grown boards boom - Micro-Finesse review - Basketball match analysis - Elements of the Apple, Part III - FMS accounting system review - DOS disc directory, Part II - Apple graphics, Part IV (3D animation graphics) - Apple '82 Education Forum - A structured approach to teaching. PLUS four pages of Compucopia and five Appletips.

February 1983

Think Tank - Interactive editor-assembler, Part III - Development of Scrabble on the Apple - Visicalc's storage command DIF - Games reviews (Escape from Rungistan, County Fair, Snake Byte, Snack Attack) - Software reviews (Structured Basic, GraForth, Visischeduler and Lisa and the file - Pascal Pointers - Network analysis - Handling interrupts - Makeweight grading system - Date-stamping DOS - Educational game (listing) - Formatted Applesoft. PLUS four pages of Compucopia and seven Appletips.

September 1983

Games reviews (Evolution, Wayout, Aztec, Crisis Mountain) - First impressions of Lisa - Think Tank - Reviews (Apple Interactive Data Analysis, FileFax, Storyboard) - Replicating with Visicalc - Printers Daisywheel v. dot matrix, maintenance contracts, stationery, Pipeline printer buffer and Fingerprint reviewed, new products, printer jargon, A-Z guide to printers, plotters and intelligent interfaces) - Apples and youth training - PLUS three and a half pages of Compucopia and 11 Appletips.

April 1984

Reviews (TK1 Solver, Rapid Reader, Homeward, Pen-Pal, Cache 16/64 printer cards) - Macintosh software flashes - Build your own graphics package part III (Shape Tables) - Developing ProDOS programs - Pascal Tutorial Part IV - 16-page guide to Apple extras - from typist to Apple User - Games reviews (Wizardry III, The War of the Samurai, The Spy Strikes Back) - Encoding routine - Book reviews (Visicalc for the Apple II Plus, The Elementary Apple) - PLUS News, New Products, and Letters.

November 1984

Apple in a primary school - Games (Flight Simulator II, Drol, BC's Quest for Tires) - Graphics Part IX (including review of Cat Graphics) - Pascal Tutorial: Introduction to Pascal Operating System - Macintosh languages: MacForth, MacBasic, MBasic & Instant Pascal - Two Macintosh books reviewed - Communications, Part III: Software - Loading DOS Toolkit assembler onto language card - Software reviews (Digisolve's Pixel Paint, Hilderbay's Payroll) PLUS Letters, News and New Products.

May 1982

A case for Applebus as a new international standard - Games review - Flight Simulator - Hires Planet Plotting - Microspeed review - Mathemagic review - Update on Printers (special 16-page printer section) - The Stationery Revolution - Understanding Microcomputers (Part IV) - Simulations Enhance Classroom Work - Computers in Business Education Studies - Speedy Way to Handle Histograms. PLUS four pages of Compucopia and four Appletips.

March 1983

Darts game listing - Think Tank - Beginner's look at System Master - Games reviews (Blade of Blackpool, Banner Magic, Free Fall, Computer Scrabble) - Lower case displays in Basic - Buying a financial spreadsheet - Reviews of Multiplan; Applewriter III; Geometry and Measurement, Drill and Practice; CLIP - News about Lisa and the file - Applesoft error handling - Interactive editor-assembler, Part IV - Apple on a pig farm - Fickle Finger proofing, Part I. PLUS four pages of Compucopia and four Appletips.

October 1983

Games reviews (Ultima II, Pot O'Gold Plus, Sherwood Forest, Juggler) - Think Tank - In-Circuit Emulation Part One - Lisa (emergency planning with the N.W. Health Authority, developing Busifile) - reviews (Basicode 2, Metacraft's Forth) - Graphics (Digisolve Vector Graphics board and Apple Business Graphics) - Visicalc v. Beebcalc - Training (DIY course selection, what is training, computer-based training) - Package Deal game listing - improving life for the disabled. PLUS Compucopia and Appletips.

May 1984

Special report on the Apple IIc micro - Preview of Applesworks - Lisa mapping - Using DOS within Basic - Who should buy Multiplan? - Grandad gets his Apple - Graphics Package Part IV - Games reviews (The Missing Ring, Color Me, Black Death) - Game Listing: Apple Raid - Pascal Tutorial Part V - Macintosh: the Sand Project - Semi-standard letters with Applewriter's WPL - Reviews (PaperGraphics, Transitions, Mem/DOS, Ultraterm). PLUS News, New Products, Letters and Appletips.

December 1984

Games (Spare Change and Gumball) - Desert Island Discs with Pam Fisher - Pascal Tutorial (final look at the Operating System) - Spreadsheet (VisiCalc command table) - Lisa 7/7 Software - Macintosh games (Pensate and Frogger) - How Macintosh helps an actress - The world of the 6809 Pt. I: the Rehaflex board - Escher game listing - Graphics DIY Part X (including review of Sweet-P. plotter) - Hilderbay SSP software review - Communications - PLUS News, New products and letters.

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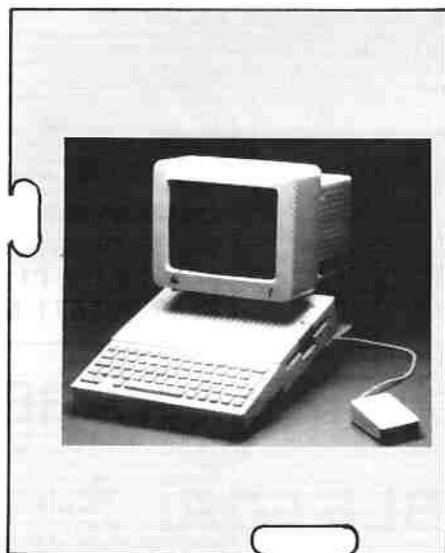
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