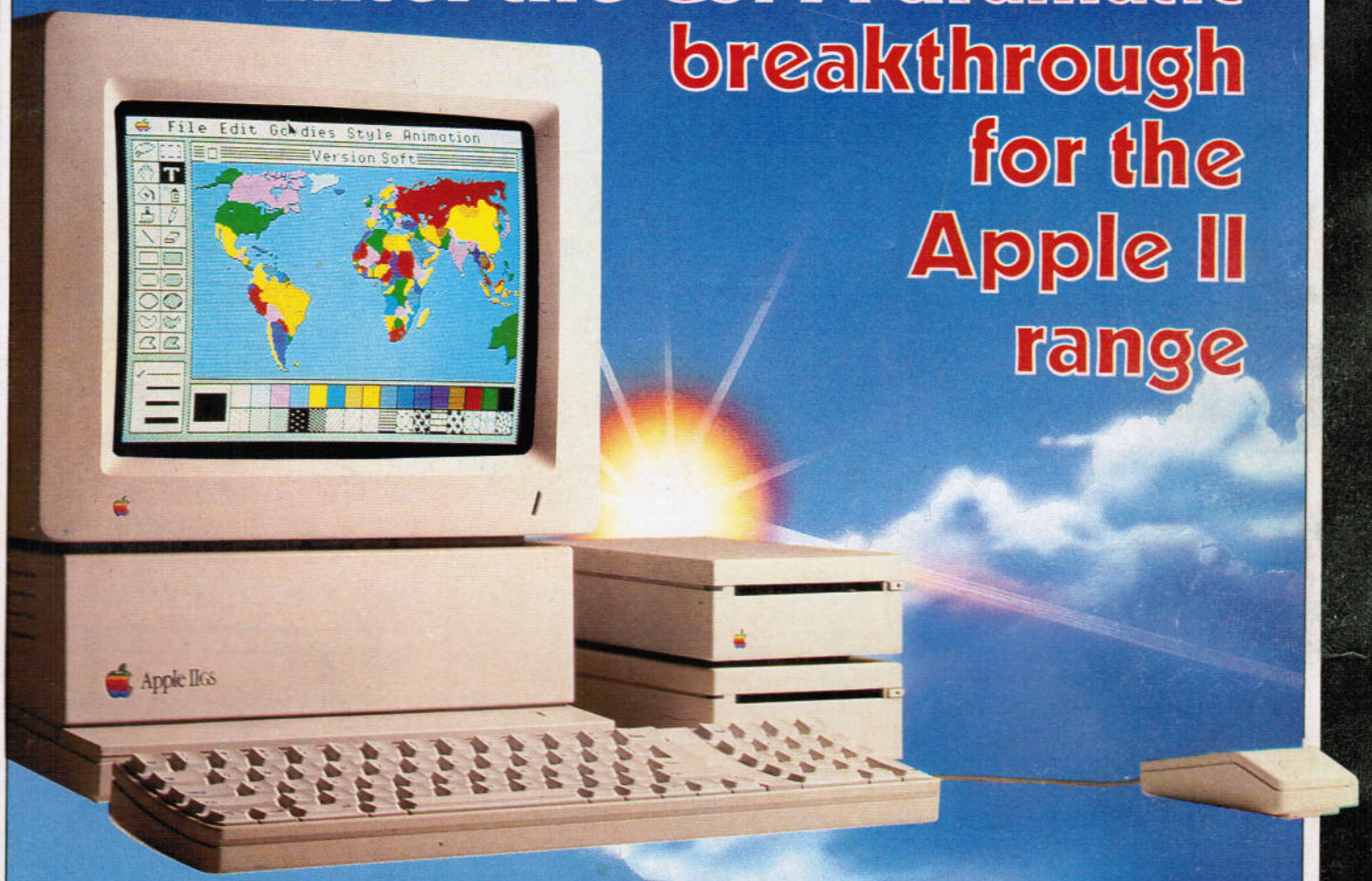
A Database Publication

apple user

Vol. 6 No. 10 October 1986 £1.25

Enter the GS: A dramatic breakthrough for the Apple II range



How to go mousekeeping with Pascal

Apple IIe: Enhancement plus compatability

Simple date-stamping for DOS 3.3 files

Using ProDOS to print out error messages

Cash flow budget analysis made easy

REVIEWS: Keystroke memory with MacroWorks ● Digital circuits with LogiMac

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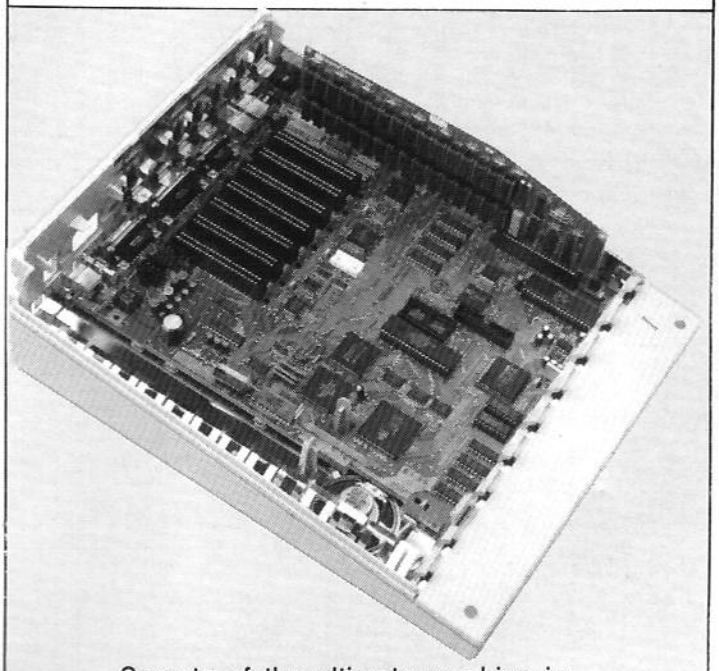
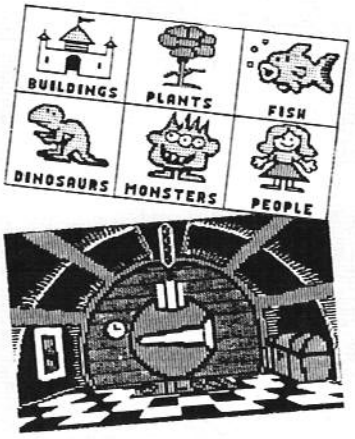
MicroLink

Debut



Fun & Games



Hardware

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ABC 11,780 January-June 1986

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To use today's and tomorrow's high-power software you need more than just a simple Ramcard. The *Flipper* System boosts the performance of today's programs and is equipped to take on tomorrow's. The combination of unrivalled compatibility and the versatility of the **RamDesk** Manager makes this system the most powerful productivity tool available for your Apple.

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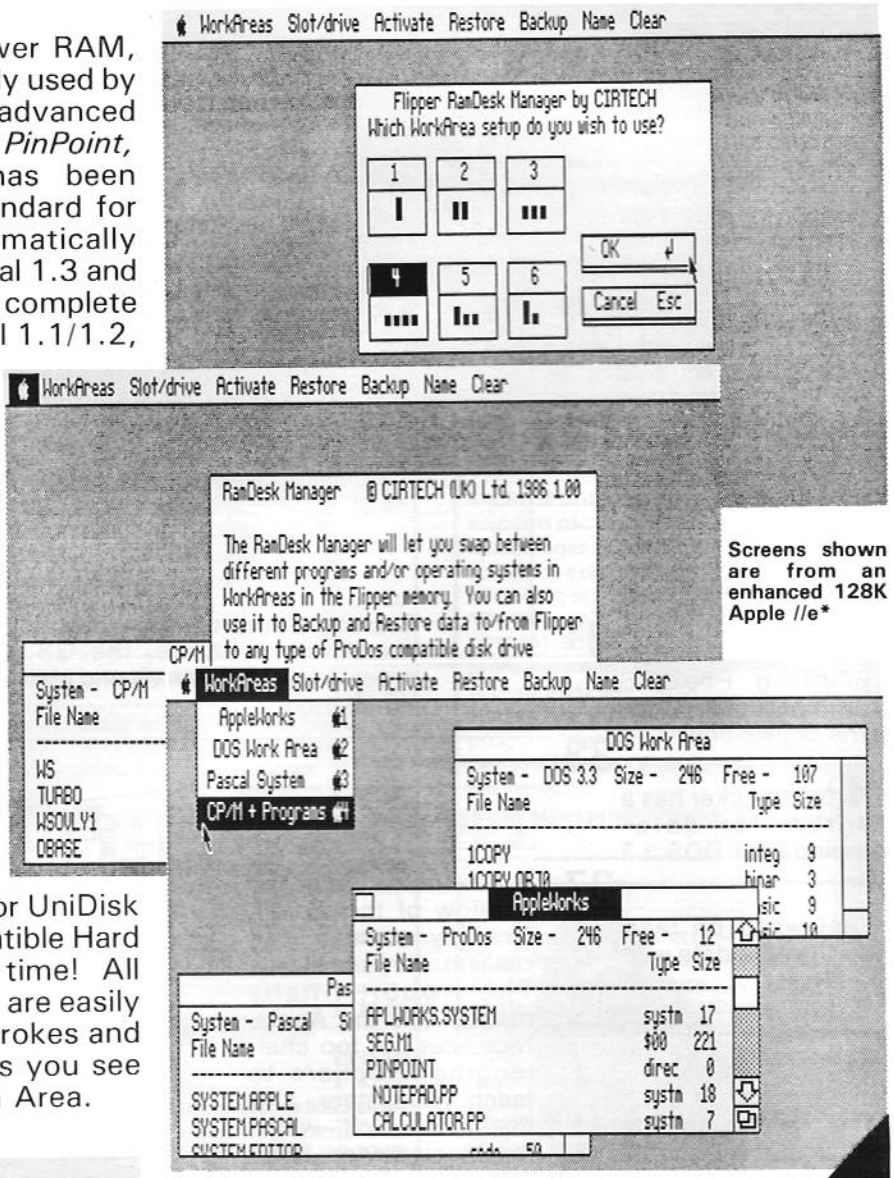

Screens shown are from an enhanced 128K Apple //e*

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*A text version of **RamDesk** with the same features is supplied for use on other Apple models.

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P.S. – If you have an earlier Flipper you can get **Ramdesk** by returning your ORIGINAL Program Manager disk (with £5 to cover handling) direct to CIRTECH.

The GS is a giant step forward for Apple II

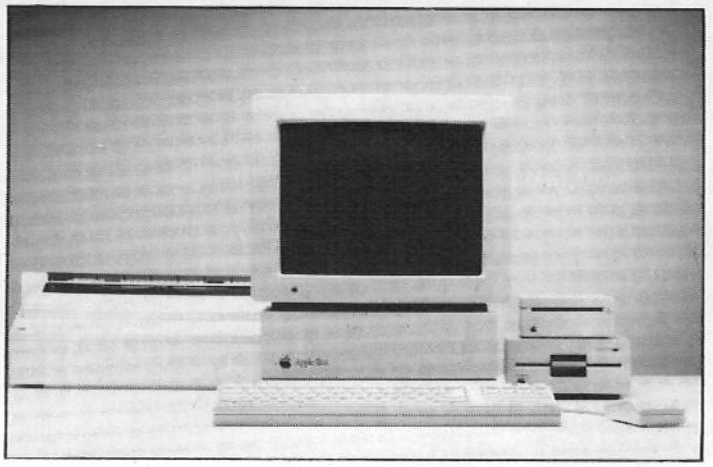
APPLE has launched the ultimate machine in its bestselling II range with sophisticated graphics and built-in sound – the IIGS.

Running on a new 16 bit processor, the computer which goes on sale in the UK in December is being aimed at small and medium sized businesses.

In particular, the company sees a potentially vast market among the current three million existing Apple II users world wide.

The Apple development team has kept many of the features that has won the II range a legion of fans but has added numerous others.

"There are a lot of people out there who prefer the Apple II to the Macintosh," pointed out an Apple spokeswoman.



"So much so they might well opt for an enhanced machine from another company rather than a Macintosh. We are certain the IIGS is going to appeal to them."

The new Apple II is based on the 65C816 microprocessor with 256K ram, expandable by 1 megabyte, and 128K rom. It has one dedicated ram/rom memory slot and seven additional input-output slots and comes complete with an Apple Desktop Bus mouse as standard.

In line with Apple's move towards generic peripherals for both the Apple II range and the Macintosh, the IIGS is the first Apple II to incorporate the AppleTalk network.

Running AppleTalk, the IIGS can link up to Apple's LaserWriter which can be shared by up to 31 micros. It can also be used with the Apple ImageWriter II dot matrix printer.

The IIGS is being launched along with the Apple Hard Disc 20SC, a 20Mb hard disc with SCSI interface, the SCSI allowing IIGS users to access files up to six times faster than on a floppy disc drive.

A range of new peripherals for the IIGS includes a high resolution RGB colour monitor and a monochrome monitor, a 3.5in disc drive and a 5.25in disc drive.

The company claims that the IIGS will run "the majority of existing Apple II software packages". And that they will run "approximately three times faster" on the new machine.

New applications are currently under development specifically for the IIGS and the first of these are expected to be ready in January, 1987.

David Hancock, Apple UK's managing director, says: "The launch of the Apple IIGS is a very important step in the evolution of the Apple II.

"What we have done is put the Apple II on a chip to combine the best features of the original design with significant enhancements and new features".

THE Apple IIGS is to be offered in three bundled packages starting at less than £1,000.

A monochrome system provides basic entry which includes the CPU, monochrome monitor and 3.5 in disc drive for £995.

Bundle two offers a colour monitor, 3.5 in disc drive and 256k ram expansion card for £1,395.

Top of the range is the 20Mb hard disc system with SCSI interface, monochrome monitor, 3.5 in disc drive and ram expansion card for £2,195.

"The bundles are not just introductory – they are part of the overall IIGS concept",. says a company spokeswoman.

Apple will also be offering both the machine and peripherals for sale as separate items. The price list is: CPU, £795; monochrome monitor, £110; RGB colour monitor, £410; 3.5in disc drive, £295; RAM expansion card, £95; 20Mb hard disc, £1,250; and 5.25in disc drive, £195.

R&D budget up 50 per cent

APPLE has boosted its research and development budget by 50 per cent in the States this year.

It has done this in order to ensure that the next 12 months witnesses the introduction of more new products than during the whole of the previous history of the company.

"Right now the pipeline is full," Apple supremo John Sculley admitted.

Although the company is playing things close to its chest for the time being, *Apple User* has learned that the boffins are working on:

- A way in which the Apple II and the Macintosh can understand each other's files.
- MS-DOS as a co-processor option for a future product.
- A role for Unix in workstations – but not as a replacement for Macintosh.
- More commercial applications for both the Apple II range and the Macintosh.
- Special software products of its own in order to stimulate new markets.

What Apple won't be doing is providing an architecture – as arch rival IBM has done – which allows for low-cost clones from the Far East to flood the market.

Instead it will stick to throwing its weight behind its research and development to provide the key for its continuing success.

"I firmly believe that Apple's future will ride on the innovative things we do in fully commercialising Macintosh and giving a long term commitment to the Apple II with technology enhancements as this becomes feasible," commented John Sculley.

new... new... new...

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The MacSerious Programmers' Tool Shop

TML Pascal at £90.00 is too cheap. We could be selling it for 2 or 3 times the price. This amazing system will compile BOTH Lisa & Macintosh Pascal, permitting the creation of stand-alone, double-clickable applications, and DA's. Complete access to the Toolbox is pro-vided, including QuickDraw, MacInTalk speech, printing, serial drivers, AppleTalk LAN, and the SANE floating point types are supported. MDS and C routines can be linked. This is a complete development system incorporating multi-window editing, Linker/Librarian, Resource Compiler , and executive batch processing as well as the Pascal Compiler with 11 application & D.A. examples. Works with Mac XL, 512K Mac, MacPlus, HFS, HD20, and extended memory systems. *Can you afford NOT to own this program?*

And to go with it there's TML Systems' Development Tools....

TML Source Code Library for only £70.00. A collection of 18 example Pascal applications representing over 1 megabyte of source code demonstrating how to program such things as:

- Printing
- Serial Drivers
- MacinTalk Speech
- Standard File Dialogue
- Split-scrollable Windows
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as well as example Function Key and Desk Accessories.

MacLanguage Database Toolkit for £85.00 - a complete library of Pascal procedures that allow you to quickly sort, search, and manage your data so you can build powerful applications.

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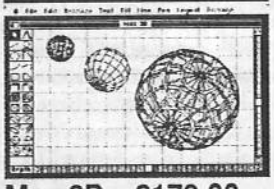

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Irish Republic: Apollo Buildings, Dundrum Road, Dublin 4 Phone 01-987-001
Switzerland: Wehntalerstraße 414, 8046 Zürich Phone 01-59-11-77

It just Wozn't true...

Steve Wozniak has not resigned from Apple and remains the corporation's longest serving employee.

Apple itself has stated this publicly in the wake of reports that he quit last year.

Although the company's co-founder now spends most of his time working on Cloud 9 – his start up company – he still remains close to the centre of things at Apple.

He continues to attend all the major company meetings and frequently makes himself heard at these.

"Woz is our genuine folk hero and we love him," said a US spokesman.

IIc stays – Sculley

APPLE president John Sculley has denied there is any truth in the rumour that the IIc is about to be dropped.

Speaking in the States recently, he issued what he described as "an emphatic no" to the story that has been circulating for some time.

"The IIc really meets the needs of a vast number of users with its very attractive entry price and real ease of set up and support," he said.

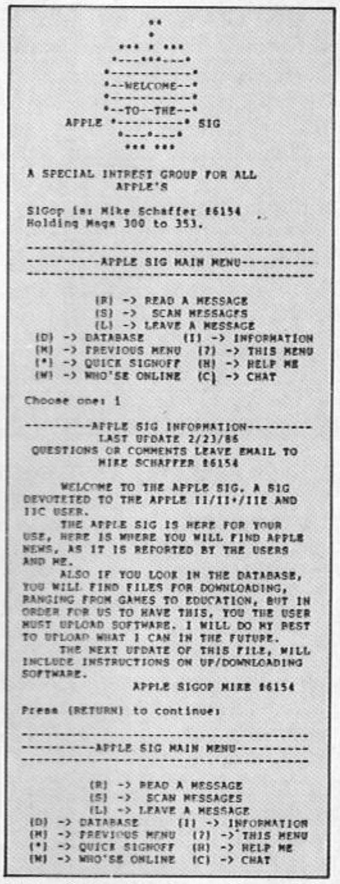
PC Stakes

APPLE has climbed above IBM in the US personal computer market according to figures from California-based research company Infocorp.

Infocorp's latest market survey shows Apple micros accounted for 28 per cent of total unit sales against 24 per cent for the IBM PC.

But Apple remains in second place in terms of the total dollar value of machines sold, with a 21 per cent share of the pot compared to 33 per cent for the IBM range.

New link to US database



```
              **
              *
          *** * ***
         *---***---*
        *-----------*
        *--WELCOME--*
        *-----------*
        *--TO--THE--*
   APPLE *---------* SIG
         *---*---*
          *** ***

A SPECIAL INTREST GROUP FOR ALL
          APPLE'S

SIGop is: Mike Schaffer #6154
Holding Msgs 300 to 353.

---------------------------------------
-----------APPLE SIG MAIN MENU----------
---------------------------------------

         (R) -> READ A MESSAGE
         (S) ->  SCAN MESSAGES
         (L) -> LEAVE A MESSAGE
 (D) -> DATABASE      (I) -> INFORMATION
 (M) -> PREVIOUS MENU  (?) -> THIS MENU
 (*) -> QUICK SIGNOFF  (H) -> HELP ME
 (W) -> WHO'SE ONLINE  (C) -> CHAT

Choose one: 1

----------APPLE SIG INFORMATION---------
         LAST UPDATE 2/23/86
 QUESTIONS OR COMMENTS LEAVE EMAIL TO
         MIKE SCHAFFER #6154

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DEVOTETED TO THE APPLE II/II+/IIE AND
IIC USER.
     THE APPLE SIG IS HERE FOR YOUR
USE, HERE IS WHERE YOU WILL FIND APPLE
NEWS, AS IT IS REPORTED BY THE USERS
AND ME.
     ALSO IF YOU LOOK IN THE DATABASE,
YOU WILL FIND FILES FOR DOWNLOADING,
RANGING FROM GAMES TO EDUCATION, BUT IN
ORDER FOR US TO HAVE THIS, YOU THE USER
MUST UPLOAD SOFTWARE. I WILL DO MY BEST
TO UPLOAD WHAT I CAN IN THE FUTURE.
     THE NEXT UPDATE OF THIS FILE, WILL
INCLUDE INSTRUCTIONS ON UP/DOWNLOADING
SOFTWARE.
                  APPLE SIGOP MIKE #6154

Press (RETURN) to continue:

---------------------------------------
-----------APPLE SIG MAIN MENU----------
---------------------------------------

         (R) -> READ A MESSAGE
         (S) ->  SCAN MESSAGES
         (L) -> LEAVE A MESSAGE
 (D) -> DATABASE      (I) -> INFORMATION
 (M) -> PREVIOUS MENU  (?) -> THIS MENU
 (*) -> QUICK SIGNOFF  (H) -> HELP ME
 (W) -> WHO'SE ONLINE  (C) -> CHAT
```

Part of the Apple section of the Mnematics database

MICROLINK has achieved a world first with a new electronic link across the Atlantic.

It allows subscribers to have instant access to a giant American database – including areas dedicated to both the Apple II range and the Macintosh.

And the cost will be approximately half that of a conventional transatlantic call.

The breakthrough has come about as a result of a deal struck between MicroLink and Mnematics based in New York.

With the help of its US partner, MicroLink has set up a complex electronic gateway which enables the exchange of messages between micros in the US and the UK.

The computer link opens up a host of new services to subscribers to the MicroLink electronic mail service.

Included among some 40 special interest groups are the ones for Apple II and Macintosh users which provide all the latest information on what's available for the machines States side.

Apple II owners can also download free programs ranging from a method of altering DOS commands to their choice through to a musical rendition of "What shall we do with the drunken sailor?"

The special interest groups are not confined to computers. Doctors, dentists, estate agents, lawyers and writers are among the people catered for in services that also offer a micro-conferencing facility.

Logging on to Mnematics means being able to choose from playing real time games to catching up with the global news round the clock from the Associated Press.

As a bonus for businessmen, the American database provides instant information from Dow Jones, the New York Stock Exchange monitor.

"We are just delighted that we are able to offer this first," says Derek Meakin, head of MicroLink. "It's going to transform the way we communicate with our cousins over in the States".

Now the men from Mnematics are working on a reverse link to allow micro users in the USA to share all the facilities of MicroLink.

The million dollar job

JOHN Sculley's achievement in leading Apple out of its financial crisis is being acknowledged in his pay-packet.

The chief executive comes out top of the league of Silicon Valley earners according to a new survey.

Sculley, who has repaired much of the financial damage suffered by Apple in the last months of the Jobs-Wozniak era, received $1,054,000 for his last year's efforts.

The schools fiddler owns up

THE man accused of diverting 2,500 discounted Apple computers from church schools to his shop in San Francisco has owned up.

Electronics retailer Steven Mathew David has entered a plea of no contest to charges that he helped cheat Apple Computer out of $500,000.

The micros were intended for schools in the Roman Catholic archdiocese of San Francisco but ended up in David's store.

Apple had supplied the machines at a large discount believing they would go into schools within the archdiocese. David even billed Apple for their installation – but then re-sold them.

His original plea of not guilty to grand theft was changed after John Lynch, an employee of the archdiocese, admitted being an accomplice in the deception.

David, who is reported to have already paid nearly $1 million restitution to Apple, now faces at least a court fine and probation in return for his plea of no contest.

New PC project

TWO former Apple employees have set up a business which observers say will have a great influence on micro development in the United States.

Wendall Sanders and Dave Larsen founded the Engineering Company in California to develop products for some of the US computer industry's largest manufacturers.

They are working on projects for Apple, IBM and Hewlett-Packard, and other major companies are said to be planning to utilise their technology.

Sanders and Larsen are entering the final stages of developing a product called Little Blue which turns Apple II computers into IBM PCs.

Little Blue reportedly allows the Apple II to run all existing PC software and fuller details of how it does this are expected to be announced in November.

Pursuit on way

TRIVIAL Pursuit, currently the world's most successful board game, is to be released for Apple users early next year.

With 70 million copies having been sold worldwide – three million in the UK – there was fierce competition among software companies to obtain the rights to produce a home computer version of the game.

After clinching the contract, Domark's joint managing director, Mark Strachan, was obviously pleased by the deal.

He told Apple User: "You can tell Apple users the game will definitely be available early next year.

"We're delighted that the Trivia people chose us as there was a lot of competition".

The game will be very similar to the board version with the Apple displaying the board and running the game.

A minimum of 3,000 questions will be included with the program, some with text only, but nearly half with sound and graphics.

The game is expected to sell for about £14.95.

Desktop boom means more jobs

THE booming desktop publishing market has caused Apple UK to take on extra staff.

Demand for the company's Desktop Publishing system has provided a welcome boost for Apple computer sales in recent months.

Only six months ago the Desktop Publishing division at Apple was staffed by manager David Jones and one assistant.

The latest wave of recruits will bring the department's strength up to double figures.

"Sales volumes are running at more than 300 per cent up on last year" says Jones.

"Apple predicts continuing growth in its Desktop Publishing sales through the end of this year and beyond, boosted by the introduction of increasingly sophisticated hardware and software. The feedback we are getting from dealers and other sources is that the graphics and design elements of Desktop Publishing are opening up personal computing to a whole new type of user.

"Desktop Publishing is expanding the personal computer market as a whole and sparking a revolution in business communications".

Since introducing Desktop Publishing to the UK last autumn, Apple has signed up a number of top flight outlets for the product including Gestetner, Linotype and Letraset, and many major dealers and distributors.

Desktop Publishing is also stimulating UK software development at firms like QED, which has produced a complete system for running a small newspaper, and Digital Publishing which has devised a system allowing display advertising make-up.

Hardware developers have also joined in, with Monotype using the Macintosh as a front end terminal on its Blazer typesetting system.

● The November issue of *Apple User* will contain a special in-depth report on desktop publishing.

Eastern challenge

A NEW strategy challenge based on the ancient oriental game of Mah Jong has been released for the Apple II and Macintosh by Activision.

Shanghai consists of 144 randomised picture tiles of seven different suits, stacked in the shape of a dragon. Players have to snap off matching pairs of tiles until they run out of either tiles or moves. Tiles can only be matched from opposite ends of the dragon – so participants have to know not only where the tiles are, but also how to play their way to them.

Shanghai has four different game options – for single players, opposing pairs, teams, and for opponents playing against each other, the dragon and the clock.

Price £24.99.

Label launched

INTERNATIONAL software house Activision has launched a new label under which it will publish the pick of the world's entertainment software for Apple II owners in the USA.

And the first three titles under the Electric Dreams label all come from Britain.

They are best-sellers The Rocky Horror Show, Spindizzy and Zoids, described by Activision president James Levy as having "the broadest appeal and proven performance.

Apart from the UK, Activision is also searching for the best offerings from the rest of Europe, Japan, Australia, Canada and South America which it will offer to American Apple II users for about $35.

Interactive fiction

A TOTAL of 22 interactive fiction titles are now available to Apple II and Macintosh owners from Infocom.

Including new releases Trinity, Leather Goddesses of Phobos and Moonmist, they span four genres – fantasy, tales of adventure, mystery and science fiction.

The games have four levels of play – introductory, standard, advanced and expert – and will sell here on disc for £34.99.

Turbo Pascal for Mac

BUDGET software house Borland International has released a version of its Turbo Pascal programming language for the Macintosh.

The American publisher says the product is the first truly low-cost software development system for the machine at $99.

It hopes to persuade software developers who have Pascal application programs for the short-lived Lisa micro to rewrite them in Turbo Pascal for the Macintosh.

Borland International president Philippe Kahn says his product will make it easier to write software applications on the Macintosh.

Turbo Pascal should be available in November and Borland intends to introduce a number of other Macintosh-based software products.

This represents a 180-degree turn by Kahn who, at the Apple World exhibition held earlier this year in San Francisco, claimed, "Nobody can make money selling Macintosh software" and compared the machine to a toy.

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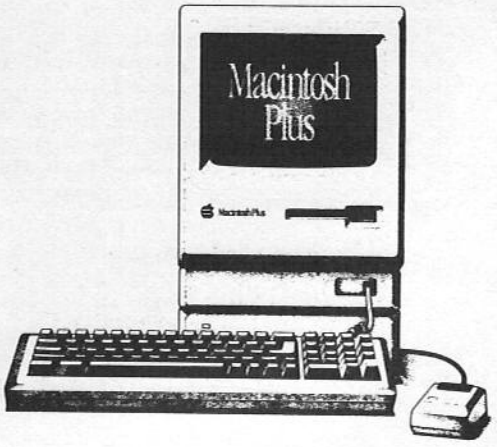

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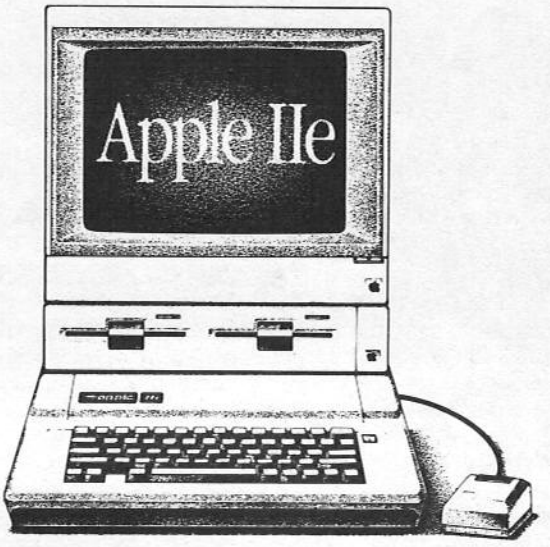

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MacroWorks for AppleWorks

GEOFF WOOD reviews a program that provides keystroke memory and many more functions. Experienced AppleWorks users should not be without it, he says.

EXPERIENCED users of AppleWorks will know that although it is a superb program it has its limitations. This is not surprising, because it was designed to run on an Apple IIe or IIc with only 128k of RAM, so it cannot have all the features of programs like Symphony and Jazz. But its simplicity is one of its virtues; it is easy to learn and almost foolproof in operation.

Advanced VisiCalc introduced keystroke memory, a way of recording a sequence of keystrokes that can be repeated at the press of a single Control-key. Lotus adapted keystroke memory for 1-2-3, using the name macro. The same idea is found in other programs such as Microsoft's Excel.

Now AppleWorks users can enjoy similar facilities thanks to a program called MacroWorks from Beagle Brothers. It is the best AppleWorks utility I have tested so far.

The normal AppleWorks list of Open-Apple commands is adequate, but MacroWorks adds more functions in the form of Solid-Apple commands. It also enables you to code your own sequences of commands into Solid-Apple commands. You can then customise the AppleWorks Help screens. You could even use it to set up spreadsheet functions such as Modulo, Pi, Sin, Cos, Tan, Future Value and so on.

What is more, MacroWorks allows you to print out an AppleWorks word processor file in two or three columns. It can also analyse a file and give a list of the words used, the number of occurrences of each word, the total number of words and the average word length. Last but not least, it can print a sorted list of all the files – or just the AppleWorks files – on disc.

MacroWorks is suppled with a 40 page manual in Beagle Brothers style with Victorian illustrations, a few jokes and a few minor errors. The program is supplied on a single floppy disc, unprotected so you can make a back-up copy.

It modifies the AppleWorks startup disc by adding another file called Macro.System and renaming the Aplworks.System file to Aplworks.Sys. MacroWorks is not compatible with the AppleWorks accessory programs Jeeves and Pinpoint, but the manual says it is compatible with the desktop expanders for RamWorks and MultiRam.

Installation is simple. Boot your copy of the MacroWorks disc and follow the instructions telling you when to insert the AppleWorks startup disc. The program can also upgrade AppleWorks on a 3.5in Unidisc or on a hard disc.

All the normal Open-Apple commands remain unchanged except that they operate only with Open-Apple, not with Solid-Apple. This causes few problems unless you have become accustomed to holding down the Solid-Apple key with the index finger of the right hand and using another finger on an arrow key to move the cursor over one word or one screenful. However you can easily re-program MacroWorks to revert to the normal effect of Solid-Apple arrow keys.

MacroWorks offers a ready-made set of 27 Solid-Apple commands, most of which can be changed if you wish. The macros are described in Tables I and II.

All but one of the macros in Table I are command sequences. The exception is SA-N which prints the following three lines on the screen:

MacroWorks
Copyright © 1986, Randy Brandt
Beagle Bros, Inc.

You could adapt this, or any other macro, to print your own name and address or any other text on the screen.

Two of the macros, SA-Left and SA-Tab, invoke themselves as many times as necessary. Any macro can include itself or another previously defined macro.

Any or all of the Table I macros permanently can be redefined permanently in to give your preferred sequence of commands. However the five macros in Table II cannot be permanently redefined.

There seems to be an error in the keystroke sequence given for SA-D. The macro works no matter where the cursor is located in the word, but the keystroke sequence works only if the cursor is on the first character in the word. Can any reader offer the correct sequence of keystrokes?

The last two macros can be redefined temporarily, but not permanently.

I used this feature to carry out a mini mail merge operation. I defined Solid-Apple-Period to enter a database file, then start an Open-Apple-R command to search one field for a record containing characters which I could type in at the keyboard.

Having typed the entry, I pressed Solid-Apple-Comma which I had temporarily defined as a macro to print the record as a label on to the clipboard, then copy the name and address into a word processor file already on the desktop and finally print out this file. Thus two macros saved me nearly 30 keystrokes. You could define similar macros on a permanent basis.

Although you are limited to 20 keystrokes for temporary macros, some could be other macros already defined with MacroWorks.

All the standard macros are designed for use with the word processor. A few also work with the spreadsheet and the database, but most either have no effect – apart from a few beeps or perhaps some unwanted characters on the screen. However you can create your own macros, temporary or permanent, for any of the three AppleWorks programs.

This is a two stage process. The first step uses the AppleWorks word processor to write and test a custom macro file. The second uses a special program on the MacroWorks disc to compile this macro file. In effect the new file replaces the standard macro file, so you should always use a copy of the MacroWorks disc to hold the new file.

The process is made easier if you load in the standard macro file and then modify any commands which you feel superfluous to your needs.

A macro file is limited to a total of 216 bytes. The standard file uses 209, so you need to delete or change some of the standard macros. A macro needs an overhead of two bytes plus one byte for each keystroke in the macro. Comments can be included alongside each macro describing what it does. If you create a macro file that is too big it will not compile properly and you will have to edit it.

Solid-Apple key	Keystroke sequence	Effect
Left-arrow	OA-Tab OA-Tab SA-Left	Jump to beginning of line.
Right-arrow	SA-Left Down Left	Jump to end of line.
Down-arrow	OA-F ONP Rtn Esc	Find next forced page break (NP).
Return	OA-O NP Rtn Esc	Insert page break.
Tab	Tab Tab SA-Tab	Jump to far right margin.
Space	OA-E Spc OA-E Left	Insert space (in overstrike mode).
A	Esc Rtn Rtn	Add files to desktop.
C	OA-O CN Rtn Esc	Centre text.
F	OA-F T OA-Y	Find text, clear previous word.
G	OA-F M1 Rtn	Go to marker (set with SA-M).
I	OA-O IN Rtn 3 Rtn Esc	Indent three characters.
J	OA-O JU Rtn Esc	Justify both sides.
K	OA-K Rtn OA-F P	Calculate page breaks, find a page.
L	OA-O UJ Rtn Esc	Left justify (cancels SA-C or SA-J).
M	OA-O SM Rtn 1 Rtn Esc	Set marker 1 (find with SA-G).
N	(see text below)	Type MacroWorks copyright notice.
O	OA-O IN Rtn 0 Rtn Esc	Indent zero (cancel SA-I).
P	OA-P Rtn Rtn Rtn	Print current file.
Q	OA-Q Down Rtn	Switch to next file on desktop.
S	OA-S Esc 4 Rtn OA-Q Rtn	Save file and remove from desktop.
Y	SA-Left OA-M T Down Left Rtn	Delete current line.
Z	OA-M T OA-9 Rtn Left	Delete to end of file.

Table I

You can define Solid-Apple macros for almost any key including control-keys. The one exception is Control-underline which, in combination with Solid-Apple, has the effect of deleting the character at the cursor. Some keys are the equivalent of a Control-key combination, for example Control-M is Return, Control-I is Tab, so you must not use equivalents in the same macro file. There is no distinction between upper and lower case letters, but keys with two characters can be used to create two different macros.

The macro file must start with the word START and end with the END. In the standard macro file after the word END there are the five macros which you cannot change permanently and also a list of alternative macros which you can copy or move into the main section.

The alternative macros are Solid-Apple-H to take the cursor home to the top left corner of the screen, Solid-Apple-W to swap the words on each side of the cursor, Solid-Apple-+ to insert supercript codes and Solid-Apple-+ to insert subscript codes.

Alternative macros for the spreadsheet are Solid-Apple-Control-A to perform an alphabetical column sort, Solid-Apple-Control-N for a numerical column sort, Solid-Apple-H to take the cursor home to cell A1 and Solid-Apple-Control L to change the spreadsheet entry layout.

Ideas for general purpose macros are Solid-Apple-^ to save all the files on the desktop, Solid-Apple-$ to print and save all the desktop files, and Solid-Apple-X to make an extra copy of the current file and name it X.

Another macro idea is given in the manual, Solid-Apple-W to change the left and right margins to zero so that the full width of the screen is used. You could modify this to include changing the characters per inch to 12 so that the file prints out on normal 8 inch wide paper with margins.

MacroWorks give you the the opportunity to create macros to overcome some of the limitations of AppleWorks. For instance, a very common typing error is the transposition of adjacent characters, recieve instead of receive. One reason why I still use AppleWriter in preference to AppleWorks is that this fault is so easy to correct by using Open-Apple-Left-arrow, Left-arrow, Open-Apple-Right-arrow (this operation is faster than it sounds).

To perform this operation in AppleWorks involves placing the cursor on the second of the offending characters, issuing an Open-Apple-M command, pressing Return twice, pressing the left arrow, then Return. This sequence may be slower than using the delete key on one character then moving the cursor and retyping the character. With MacroWorks, you could create a simple macro to perform the character transposition with lightning speed.

Experienced AppleWorks users don't need the help screens so MacroWorks allows you to replace them with information of your own choice or with a ready made list of the standard MacroWorks Solid-Apple commands.

If MacroWorks offered only the facility to introduce new commands into AppleWorks it would be well worth the money. But it does much more. It includes a program called Galley which can print a normal AppleWorks word processor file in two or three columns.

You must first set appropriate margins in the file. MacroWorks suggests a left margin of 1 inch and a right margin of 3.5 for two columns or 4.8 for three columns. You must also insert forced page breaks, easily done with the Solid-Apple-Return command.

There is an option to preview the text in multi column layout on the screen before you print it. This utility means that AppleWorks can now be used for laying out newsletters and the like.

The MacroWorks disc also has a program called Analyst which loads in an AppleWorks word processor file (up to 15k) and then analyses the words. It counts all the words in the file and gives a printout or screen view of all the words, either in alphabetical order or in the order in which they occur in the file. At the end of the list it shows the total number of words, the number of unique words – different from any other – the total number of characters and the average number of characters per word.

Solid-Apple key	Keystroke sequence	Effect
Delete	Right Del	Delete character under cursor.
D	OA-M T OA-Right Left Rtn	Delete word under cursor.
U	OA-C F	Undo last MacroWorks command.
Period	Spc Spc Spc Spc Down Left Left Left	Insert four spaces, move cursor down a line.
Comma	Right Right Right Right Del Del Del Del Down	Delete four spaces, move cursor down a line.

Table II

You can use Analyst to check your writing style and to see whether you have overused certain words. It can also help to detect spelling errors. Analyst ignores uppper and lower case differences but there is an option to exclude words that start with a number.

Another program on the MacroWorks disc is Alpha.Cat, which creates a two column printout of any ProDOS disc catalog in a format which fits nicely into a floppy disc sleeve. The list of files can be printed in alphabetical order or in the order in which the files have been saved on the disc. An option allows you to select AppleWorks files only.

A minor bonus is an option on the main menu that allows you to change the AppleWorks buzz into a more friendly beep.

Finally, the manual gives a few tips such as copying the AppleWorks program disc on to the back of your copy of the startup disc so that you only need to flip the disc over when booting up.

I can thoroughly recommend MacroWorks. In comparison with other AppleWorks utility programs and devices it represents excellent value for money at only £29.99.

To use the hackneyed phrase, macros are limited only by your imagination. Newcomers to AppleWorks should gain experience before contemplating MacroWorks, but no experienced regular user of AppleWorks should be without it.

Program: MacroWorks
Publisher: Beagle Brothers, available from MGA Microsystems, 140 High Street, Tenterden, Kent TN30 6HT
Price: £29.99
Requirements: Apple IIe/IIc

appletip

HERE'S a method of changing the catalog header on FastDOS. Existing DOS 3.3 utilities to do this won't work with FastDOS as the catalog header is stored in a different set of memory locations ($B478-$B46D) compared with $B3AF-$B3BA on normal DOS 3.3.

The program POKEs the new header into the DOS image in memory. To save it permanently you should initialise a disc with it soon after running the program.

A word of warning! It's a good idea to practise using this program on a spare disc, before putting it to use.

```
10 HOME : HTAB 4: INVERSE :
   PRINT "CATALOG HEADER
   CHANGE FOR FASTDOS": HTAB
   8: PRINT "BY DARRIN
   GORDON : NORMAL
15 HTAB 8: VTAB 8: INPUT
   "TITLE (MAX 11 CHARS)
   ";A$
20 IF LEN (A$) > 11 THEN 10
30 FOR T = 1 TO LEN (A$) :B$
   = MID$(A$,T,1) : POKE -
   19335 - T, ASC (B$) +
   128: NEXT : FOR X = -
   19335 - T TO - 19346 STEP
   - 1: POKE X,160: NEXT
40 PRINT CHR$ (4);"CATALOG"
50 PRINT "USE PROGRAM AGAIN?
   ";: GET R$
60 IF R$ = "Y" THEN RUN
70 END
```


AT LAST! SCIENTIFIC WORD PROCESSING FOR APPLES

$$y = \int_0^{\infty} \frac{N_1^{(\alpha-\beta)} + N_2^{(\alpha+\beta)^2}}{\sqrt{2\pi + x}}\,\partial x \qquad \text{if } \sum_{1944}^{1952} \eta \leq 180 \text{ then } \Omega \neq -1$$

This was printed on an NEC Spinwriter ELF printer using Format-80 Scientific. Other supported printers include Apple's Imagewriter and Epson FX, RX and MX series and compatibles. For more details contact Elite Software Company.

This extends Elite's FORMAT-80 range. Please contact us for full details.

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LaserJet for Mac

Using the latest advances in laser technology the LaserJet offers a vast choice of printing possibilities, however complexed or demanding, more over it's compact and cost effective.
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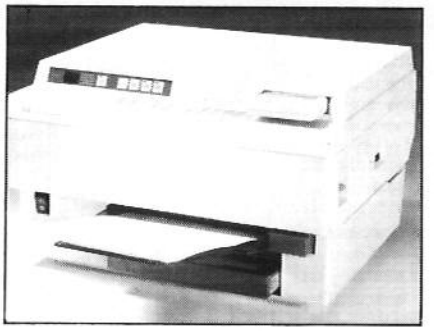
The unit is supplied with "Laserstart" a software driver that you install on your application disks system file and a cable to allow communication between your Mac and the LaserJet itself. With this system you can turn out crisp graphic and text documents without gaining a headache and the wasted time that you normally get with a dot matrix printer. Even Mac's draft quality print is better than most daisy wheel printers that cost around £1,000,000. What's more with the LaserJets manual feed you can print on to card, coloured paper and even OHP film. All this makes the LaserJet and The Mac the most flexible computer system on the market.

The complete system is available from MCT for £2,299.00 + VAT. This includes Hewlett Packard 24 hour repair service and one year warranty.



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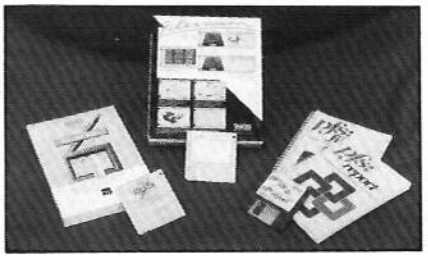

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Inside the Apple IIGS

APPLE has unveiled the next stage in the evolution of its world-beating II range – the IIGS.

The development team has effectively placed the Apple II on a chip, allowing the best features of the original design to be combined with such significant enhancements as almost complete compatibility with the IIe and the IIc.

THE HARDWARE

The four layer motherboard has the same physical dimensions as those of the IIe but fits in a smaller, redesigned case and is, of course, a completely new design. The socketed microprocessor is a 65SC816 which is a full 16 bit machine that on power up emulates the 65C02 of the IIc and later IIes. The other onboard chips are mainly surface-soldered custom designed together with eight D41464s giving two lots of 256k of ram.

The motherboard has seven of the traditional slots along the back and one other shorter slot in the front right-hand corner. The board sits in a platinum-grey plastic box 28cm wide, 30cm deep and 12cm high which has a small extension of 4cm at the front.

These dimensions are such that the computer, keyboard, mouse and two slim-line disc drives easily fit in a shoulder bag.

The power supply is supported above the left-hand side of the board. The top of the box is released by pressing two plastic buttons at the rear and can then be swung up and pulled clear of retaining hooks along the front lip of the main box.

These hooks form part of a metallic interference shield which also overlaps with the metal box of the power supply which can similarly be unhooked, swung away from its supports and completely removed.

The platinum-grey keyboard which measures 38cm x 12cm x 3cm is connected to the rear of the main box by a coiled cable. The connection is via a 4-pin sub-miniature DIN plug at one rear corner of the board.

A similiar connector at the other corner may be used for the mouse which now comes in a re-designed case, and which is easier to handle because of it.

The connections are made via the new Apple desktop bus which is a versatile, simple, serial system having a data line, a return line and a 5V power line. There is one reserved line. Peripheral devices other than the keyboard and mouse can be connected in any order to the desktop bus. Interestingly the motherboard had an old style keyboard socket and space for a keypad socket.

I did not try these out; it looks as if the board could be designed to fit into an existing IIe case using the old power supply and keyboard as an upgrade path. Whether this is true or not, and, if it is, whether new firmware is needed, I do not know.

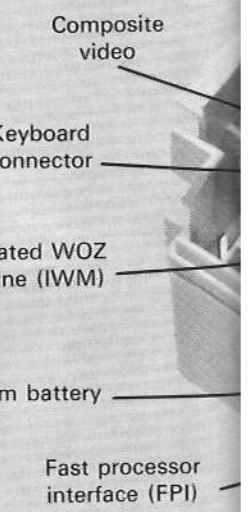
The keyboard has all the keys of the IIe including Open-and Closed-Apple although these have both translated to the left of the spacebar and are known as Open-Apple/Command key (with the propeller symbol familiar to Mac users) and Option key respectively. The spacebar is shorter, in common with most modern keyboards.

To the right of the main keys

USA
UK
French
Danish
Spanish
Italian
German
Swedish
Dvorak
French Canadian

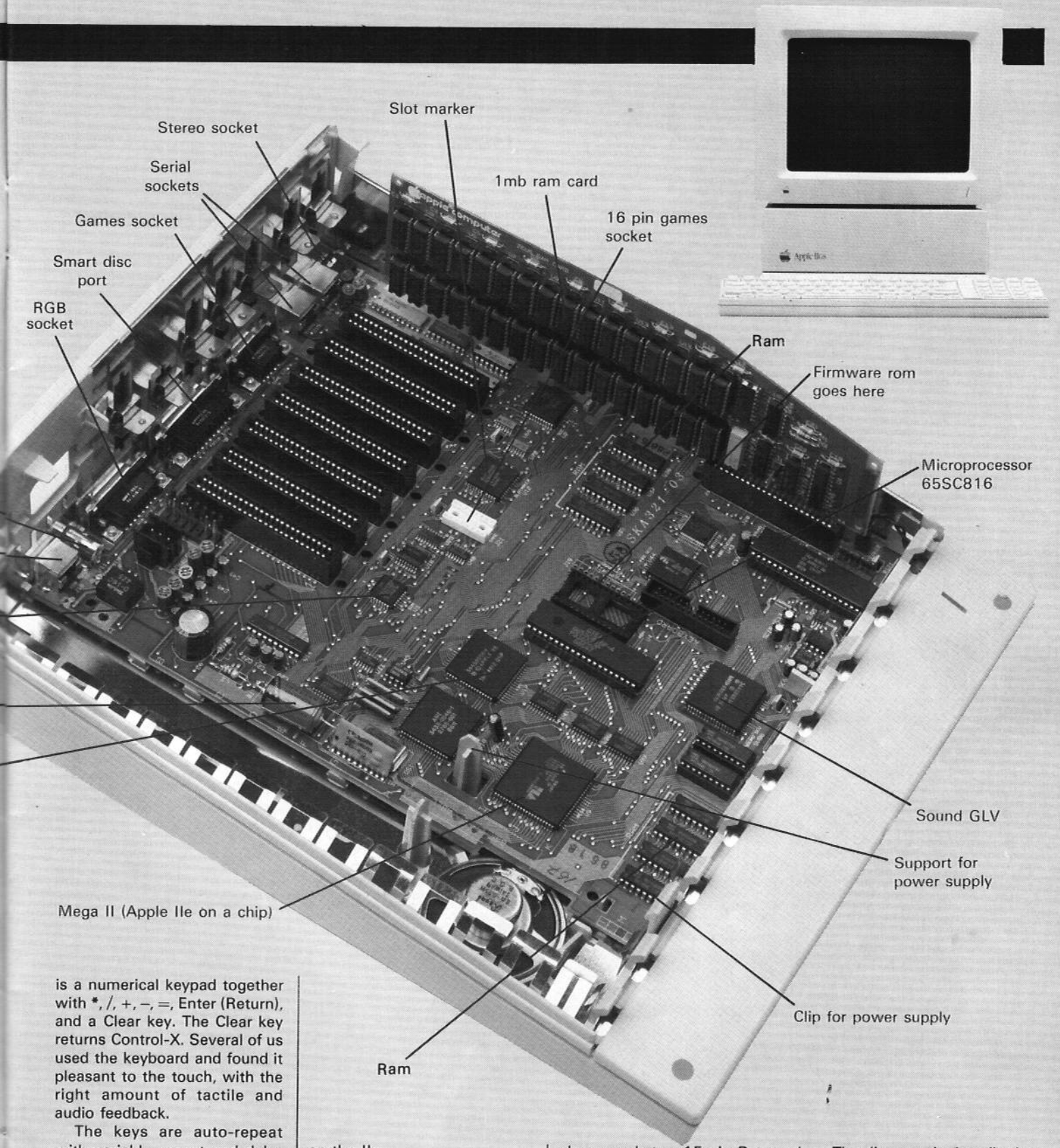
Figure I: Keyboard options

MAX PARROTT and MALCOLM WHAPSHOTT have been testing the new 16 bit Apple IIGS. Here is their report.



The main features at a glance:

Almost complete compatibility with IIe and IIc.
Can run IIe software at 2.8 times the speed.
7 slots, plus one other.
Two built-in serial ports.
Built-in 80 column display.
Built-in mouse port.
Built-in AppleTalk.
Redesigned case and motherboard using custom chips and the 65SC816 microprocessor, separate keyboard, and redesigned mouse.
Minimum 256k of ram, expandable up to 4mb.
128k of rom with Basic, new monitor program, a Mac-like finder and a machine control panel program.
Composite video and analogue RGB output.
A possible palette of 4096 colours.
Two new graphics modes:
– 320 by 200 with 16 colours.
– 640 by 200 using 4 colours.
New sound capabilities using a dedicated chip with its own 64k of ram.



is a numerical keypad together with *, /, +, –, =, Enter (Return), and a Clear key. The Clear key returns Control-X. Several of us used the keyboard and found it pleasant to the touch, with the right amount of tactile and audio feedback.

The keys are auto-repeat with variable repeat and delay times. The keyboard layout is adjustable, to conform to nine different country standards or the Dvorak system (Figure 1); the key tops however, were English/USA on our machine and not easily, if at all changeable. Possibly key overlays will be used.

An onboard control panel program which we will describe later allows the keyboard input to be buffered or not buffered as on the IIe.

The back of the main box has casing slots corresponding to the motherboard's slots, somewhat similar to those of the IIe, but these have plastic covers held in place by an internal key with a twist action for easy removal and replacement.

Under the slots are the Apple desktop bus connector (subminiature DIN) for the keyboard or direct mouse connection if wanted, a composite video phono socket, a 15-pin D type connector for analogue RGB, a 19-pin D type disc port, a 9-pin D type connector for games paddles – does anyone still use them? – or joystick (as on the IIe the full 16-pin DIL socket is also on the motherboard), two 8-pin sub-miniature DIN serial connectors and a stereo headphone jack.

The power plug and on/off switch are on the left of the rear above the keyboard connector.

The disc port is described as a smart port. In fact it's a very smart port, being able to daisychain up to two 3.5in drives and two 5.25in drives. The 3.5in drives appear to be in slot 5 as drives 1 and 2 and the 5.25s appear to be in slot 6. The review machine was sent with one of each size and these, when daisychained together, both appeared as drive 1 on slots 5 and 6.

The 3.5in Sony drive was

double-sided and gave under ProDOS a total storage space of 800k. The 5.25in was a half-height, external IIc drive which gave the traditional 143k of storage. In 8 bit IIe emulation mode, that is when powered up under the standard conditions, the machine acts as if an extended 80 column card were in slot 3. This appears to ProDOS as /RAM with the expected 127 blocks.

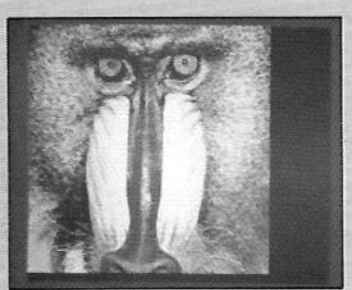
The review machine was also sent with a memory extension board which fitted in the shorter 44 line slot at the front of the motherboard. This had on board a further 1mb of ram as 32 D41256s arranged as two banks of 16. A jumper controlled whether one or both banks was mapped in.

In 16 bit native mode this memory is seen as contiguous 64k banks of memory. As the larger capacity memory chips become available in cheaper quantities these will probably be replaced to give an expected 4mb.

In 8 bit mode under standard conditions this memory is not seen by the system. However, the control panel program is able to set some or all of this memory, in steps of 32k, as a ram disc from 0k up to the maximum on board (Figure II). At least, I assume it is up to the capacity of the expansion board, as the control panel program told me the most I could have was 512k until I fitted the jumper on the board.

In 8 bit mode this memory appeared to ProDOS as /RAM5 with 1024 blocks and is obviously "mapped-in" to slot 5 – the smart port. While working in IIe mode with ProDOS 1.1.1 I happened to invoke the control panel program and was told that I had differing amounts of free ram available depending on how much of /RAM5 I was using.

Clearly the system has some form of dynamic ram allocation which does not essentially affect the 8 bit mode but may be important in 16 bit mode (although in 16 bit mode this memory is not seen as a solid disc but as main board memory).



Minimum ram disc size: (0-max in steps of 32k)
Maximum ram disc size: (0-max in steps of 32k)
Largest selectable: (Max of memory card)
Ram status:
Ram disc size:
Total ram in use:
Total free ram:

Figure II: Ram disc control panel

Incidentally, the control program can map out the ports and thus map in the corresponding internal slots in their place. When this happens with the smart port the use of /RAM5 and the 3.5in drive is lost but the 5.25in drive daisychained to the 3.5in still appears as if in slot 6.

We were told that the motherboard's slots, while being compatible with standard Apple II slots, are also compatible with the 16 bit mode. This is transparent to current 8 bit cards, but new cards will require more chips to demultiplex the address from the data lines.

As on the IIe, slots each have 256 bytes of space for prom allotted in the $C100 to $C700 area with expansion rom space for all from $C800 to $CFFF. Also each slot has its I/O locations in the space from $C090 to $C0FF and the holes in the screen memory area. Memory is shadowed, a term new to many Apple users – we'll return to this later.

The microprocessor on the GS is a 65SC816 which is a 16 bit CMOS version of the 65C02 from Western Digital with many extra commands and addressing modes to take advantage of more memory. It in fact starts up in 65C02 emulation mode and has to be switched to its 16 bit mode.

Its internal address bus is 24 bits wide and so it can address 16mb of memory; the GS however, has ram memory mapped from $0 to $3F in banks of 64k which is 4mb in total. The first two banks (0 and 1) correspond to the 128k of a IIe and these and the banks 2 to 63 (2 to $3F) can all run at the microprocessor clock speed of 2.8MHz. Rom is mapped in to banks $FE and $FF and is also read at 2.8MHz.

The addressing and memory refreshing for all these locations is handled by a custom built chip known as the FPI (Fast Processor Interface). Some more ram maps in to banks $E0 and $E1 and runs at 1MHz so that the I/O slots and video displays act as on the IIe. This ram shadows the zero bank ram so that the whole looks like a traditional Apple II, writing takes place in banks 0 and $E0 and for the I/O areas writing and reading are both slowed down.

The control panel has an option of running applications (games?) at the old 1MHz speed for compatibility. With this option the program still actually operates in the fast ram area but the FPI works at the slow speed.

The accumulator and index (X and Y) registers are 16 bits wide but can operate as 8 bit registers in 65C02 emulation. The data bus is 8 bits wide, much as with the 8088 of the IBM PC.

There are also 8 bit data and 8 bit program address bank registers, new addressing modes and fast block move instructions together with relocatable zero page and stack.

The processor is said to be a fast one; Steve Wozniak says that it is about twice as fast as the 68000 at the same clock speed.

The custom designed chips have some interesting names; the smart disc port is controlled by the IWM (Integrated Woz Machine), basic Apple II stuff by the Mega II (that is an Apple IIe in a chip), the slots by the Slotmaker and sound by the sound GLU (General Logic Unit) which works with DOC (Digital Oscillator Chip).

Other VLS ICs on board besides the FPI are the Video Graphics Controller (VGC), the Keyboard General Logic Unit (KeyGLU) and the keyboard microprocessor (a 50740A).

All the illustrations on these pages were photographed from an Apple IIGS monitor screen.

DISPLAY

On boot-up with DOS 3.3 or ProDOS 1.1.1 the demonstration machine, which was connected to an analogue RGB monitor, gave white text on a mid-blue background which looked pleasing but is alterable from the control panel program. The options are shown in Figure III.

The review machine was connected to a green-screen, monochrome, video monitor which caused the standard boot up display to appear as light green on a dark green background. We also connected it to a Microvitec low resolution monitor converted to accept analogue input rather than TTL. The startup display may be in 40 or 80 columns but generally software soon takes over and selects which.

The composite video display output switches to monochrome for text-only displays to enable the best resolution. The text and graphics modes act exactly as expected from Basic on a IIe.

The built-in 80 column display also acts exactly like an Apple extended 80 column card for the IIe. For example in 40 column mode pressing Esc 8 selects 80 columns and Esc 4 reverts to 40 columns. Issuing a PR 3 (or pr 3) also switches to 80 columns.

HGR and HGR2 (or hgr and hgr2, for all Basic commands may now be given in lowercase) creates a black screen surrounded by a colour border which is selectable via the control panel. With hgr on monochrome the text area at the bottom appeared as fine, alternate green and black lines with bright green text on it if the colour display is chosen as standard

but as a dark green background if monochrome is chosen. Low resolution graphics behaved as on a IIe.

The two new graphics modes have screen resolutions of 320 by 200 pixels with 16 colours per line (256 on the screen) and 640 by 200 with 4 colours per line. Basic does not have plot and draw commands to use these screens but they are accessible from it.

The 320 by 200 mode is true colour resolution, that is any colour dot (out of the 16) can be next to any other colour. This takes 4 bits per pixel or 32k per screen. Moreover, the memory mapping is linear and contiguous and entire bytes from $4000 to $BFFF of bank $E1

map on to the screen.

This memory is not normally shadowed and is not normally used from Basic. However it can be shadowed if desired by bank 01 (the auxiliary memory bank of the IIe).

The colours may be chosen from a palette of 4096 different colours and shades, but a good quality, high resolution, analogue RGB monitor is required to get the best results, especially for text.

The 640 by 200 mode is more complicated where colour control is concerned, although memory mapping still seems straightforward. Apparently the effect is that any one pixel may only take one of four colours selected from the palette but elsewhere on the line other colours are possible with a maximum of 16 for the line.

We have not seen any examples but this scheme apparently allows 80 column text to be shown on the same screen as the graphics by a technique known as dithering.

We had been sent some digitised colour pictures and a drawing program which gave remarkably good results on our colour monitor. On monochrome the super hi-res pictures appeared in shades of green but were still most impressive.

The full technical details of how colours are manipulated from Basic are not presently available, but a quick scan of some of the programs suggests that different values poked into the $C000 area of memory are involved as might be expected.

These new graphics modes are similar to but surpass those of the Atari ST, which has a two colour selected from 512 colours mode, and of the IBM colour adapter card which has the same dot but not the colour resolution.

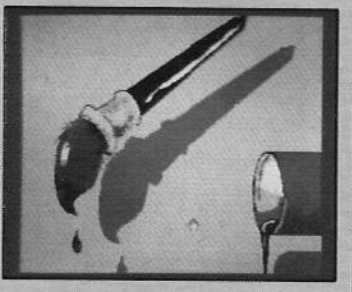
The Mac's screen has a pixel resolution of 512 by 342 and the pixels are square but without colour; the technical information says that the 320 by 200 mode of the GS has pixels with an aspect ratio of 5:6 and the other mode's pixels have a ratio of 5:12.

Type:	(colour/monochrome)
Columns:	(40/80)
Screen Colours:	
Text:	(white/black/deep-red/dark-blue/purple /dark-green/dark-grey/medium-blue/ light-blue/brown/orange/pink/light-green/ yellow/aquamarine)
Background:	(medium-blue/light-blue/brown/orange/light-grey/pink/light-green/yellow/aquamarine/ black/deep-red/dark-blue/purple/dark green/dark-grey)
Border:	(medium-blue/light-blue/brown/orange/ light-grey/pink/light-green/yellow/ aquamarine/white/black/deep-red/dark-blue/ purple/dark-green/dark-grey)
Standards:	
Hertz:	(50/60)

Figure III: Display control panel

SOUND

The old sound capabilities of the IIe are still there. To prove them we ran a commercial music games suite of programs and Applevision under integer



Basic. Each behaved correctly.

However, the machine is also fitted with a 32 channel sound chip from Ensoniq known as the DOC (Digital Oscillator Chip) which can reproduce digitised sound with 15 voices. Two channels are used for each voice and one channel is dedicated as a clock for the DOC and one is reserved.

The sound quality, which is fantastic, owes itself to the output section of the DOC which is a DAC (Digital to Analogue Converter) and which can control the volume and the waveform of the sound. The system is fitted with its own 64k of ram which is enough for 15 seconds using all channels. Less channels gives longer time.

One piece of 16 bit software, a simulation of a tape deck/editor, gave 35 seconds of playback from 800k of disc space with fantastic clarity and quality although the sound plays through a speaker no bigger or better than that of the IIe. Digitised music and singing was very clear – no hint of computer tinniness. A stereo jack at the rear of the machine can improve output.

The DOC is interfaced to the system by the sound GLU which in turn is controlled by a sound manager which is part of the on-board toolbox (see later). This gives low level control and a higher level note synthesiser enabling polyphonic synthesis. Apparently digitised music may also be input via the ADC which forms part of the DOC.

The strident ring of the old bell warning you of the latest syntax error has been replaced by a softer sound, adjustable from the control panel in pitch and volume from the almost inaudible to the strident.

CLOCK

There is an on-board clock set via the control panel which tells the time and date. On the control panel the time format can be set for 24hr or AM/PM and the date format can be set in the English (DD/MM/YY) or American (MM/DD/YY) form and also in the form YY/MM/DD (Figure IV). The clock does not use the same formats and commands as the Thunderclock and thus applications have to determine their environment.

Old ProDOS (that is v.1.1.1) cannot use this clock but the new ProDOS 8 and ProDOS 16 can and do, using both date and time to stamp files.

The clock and the preferences of the control panel are maintained by a lithium battery soldered to the motherboard. This should have a lifetime of 5 to 10 years, which seems long enough but should it need replacing an expert at soldering will be required. As it is possible to get user-replaceable lithium batteries it will be interesting to see if such are substituted in future.

I/O

The two built-in serial ports work in parallel with slots 1 and 2 although not at the same time. They are designated as the

Month:	(1-12)
Day:	(depends on month selected)
Year:	(0-99)
Format:	(MM/DD/YY, DD/MM/YY, YY/MM/DD)
Hour:	(1-12 AM/PM or 1-24)
Minute:	(0-59)
Second:	(0-59)
Format:	(AM-PM or 24 hour)

Figure IV: Clock control panel

printer and modem ports respectively but are actually identical and can be configured in many ways (Figures V and VI).

The ports are provided by a two channel serial communications chip (SCC 8530 from Zilog) and RS422 driver ICs. The firmware support for the ports emulates the Apple Super Serial Card, presumably in the same way as the IIc's port does. This means that any IIe communications software and any software which supports a particular printer interface using the IIe card hardware directly is unlikely to work correctly on the GS. Presumably as a corollary, if such software works on the IIc it will work on the GS.

The AppleTalk interface is built into the GS but cannot operate with both serial ports active – one has to be relinquished when AppleTalk is selected at the control panel.

One temporary problem is that the serial ports emerge via 8 pin miniature DIN plugs which are not yet easily obtainable in

this country, although Apple dealers do have them. Other machines such as the portable Epson also use them.

The built-in drive port has its own firmware known as the SmartPort which includes some of the IIc software and which can be called by applications to perform various functions expected of block devices.

Two 3.5in, two 5.25in and a ram emulated drive are supported by SmartPort. However, under DOS, Pascal 1.2, and Pascal 1.3 I was not able to format discs in the 5.25in drive. Under Pascal they were formatted but the volume name could not be written and I got the write protected disc error.

Under DOS they were formatted but I got an I/O error. The drive was perfectly able to write to the same discs if I formatted them elsewhere! I hope this is a small problem easily cleared up. It should be

```
Device connected: (printer/modem)
Line length: (unlimited/40/72/80/132)
Delete first LF after CR: (No/Yes)
Add LF after CR: (Yes/No)
Echo: (No/Yes)
Buffering: (No/Yes)
Baud: (9600/19200/50/75/110/134.5/150/300/600/
       1200/1800/2400/3600/4800/7200)
Data/Stop Bits: (8/1,8/2,5/1,5/2,6/16/2,7/1,7/2)
Parity: (none/odd/even)
DCD Handshake: (Yes/No)
DSR/DTR Handshake: (Yes/No)
XON/XOFF Handshake: (No/Yes)
```

Figure V: Printer port control panel

remembered that the review machine was a prototype and not a production model.

Another new I/O capability is the Apple desktop bus which is interrupt driven and can support not only the keyboard and mouse but also other devices such as hand controls and graphics tablets. The order of connection is immaterial as the bus knows which device is requesting a service.

The list of interrupt events used on the GS include interrupts from peripheral cards, video vertical blanking (used for mouse events, although a passive mode is also available) and video scan line, the mouse, AppleTalk network and timer, the keyboard, the two serial ports, the sound chip, the clock, disc interrupts and power up and reset.

In place of the ports provided on the rear of the machine the user can opt via the control panel program to use the seven, more traditional slots (Figure VII). These appear to work well with most IIe cards.

A common problem with the II+/IIe is one of timing mismatches with Z-80 cards but a Cirtech Z-80 card which worked well in the IIe under CP/M v.2 also worked well in the GS (set to normal, slow speed), suggesting that there is a high degree of compatability. Similarly, a Digital Research Gold card running CP/M Plus worked fine.

I also tried a Blackboard parallel printer card and found no problems. Similarly an old disc II card in slot 5 or 6 worked faultlessly. Interestingly, when slot 5 was selected in order to support a drive II there, the Smart Port could still boot from the 5.25in drive connected to it via the 3.5in drive although the 3.5in drive was inoperative.

Booting can be from any chosen slot, or ram or rom disc, or the slots (and SmartPort) can be scanned from 7 downwards as on the IIe.

Running the GS at normal (slow) speed under ProDOS with a Cirtech 1mb RAM card – The Flipper – in slot 7 was apparently okay, but when any form of access to the Flipper occurred the directory appeared to be lost.

I tried the Flipper in other slots and switched off the Apple ram disc but try as I could the Flipper would not work. Nor would it be recognised by CP/M. Apple says that its memory card will work in the GS's slots but I have not been able to check this. (It seems somewhat unnecessary to have two mb of virtual disc space).

```
Device connected: (modem/printer)
Line length: (unlimited/40/72/80/132)
Delete first LF after CR: (No/Yes)
Add LF after CR: (No/Yes)
Echo: (No/Yes)
Buffering: (No/Yes)
Baud: (1200/1800/2400/3600/4800/7200/9600/19200/
       50/75/110/134.5/150/300/600)
Data/Stop Bits: (8/1,8/2,5/1,5/2,6/16/2,7/1,7/2)
Parity: (none/odd/even)
DCD Handshake: (Yes/No)
DSR/DTR Handshake: (Yes/No)
XON/XOFF Handshake: (No/Yes)
```

Figure VI: Modem port control panel

The games port appears on the rear of the machine as a 9 pin D-type connector as on the IIe. It also appears as a 16 pin DIL socket in the middle of the board. I connected my joystick there and played many games without problems as long as the system speed was set slow.

It will be interesting to see how long before interrupt driven games controllers and other devices appear which use the desktop bus rather than the games controller.

FIRMWARE

Firmware should appear on the GS in 128k of rom mapped into banks $FE and $FF but more can appear at $F0 to $FD. In fact our rom appeared in eprom on an extender board and was clearly a prototype since it signed on at boot up with Apple IIBF.

The rom contains the Applesoft Basic interpreter, the monitor, the I/O routines (including a memory manager) and resident desk accessories within a toolbox.

Basic appears to be the same as in the enhanced roms of the IIe/IIc. The most noticeable difference between this and the old Basic is the use of lower case commands and variable names is allowed. However, lower case is converted to upper case internally and so more variety with variable names is not gained.

The monitor is changed to reflect the new microprocessor, although major entry points appear at the same addresses as in the old. The old commands of the II+/IIe still work, but the display is new (Figures VIII and IX).

Although we did not have full instructions for the monitor it bore enough similarities to the original so that we could work it but we probably missed some important points on the way.

Memory is accessed in chunks of 64k unless the bank and a slash precedes the address. For example, from Basic a call –151 enters the monitor and the command 800I or 800L (upper and lower case are acceptable) will list from $800 in bank 0. The command FF/800L now lists from $800 in

```
Slot 1: (Printer port/your card)
Slot 2: (Modem port/your card)
Slot 3: (Built-in text display/your card)
Slot 4: (Mouse port/your card)
Slot 5: (Smart port/your card)
Slot 6: (Disc port/your card)
Slot 7: (Your card/built-in AppleTalk)
Startup slot: (Scan/1/2/3/4/5/6/7/ram disc/rom disc)
```

Figure VII: Slots control panel

the rom area.

A range of memory is still given in the form start.end and is followed by the command (such as V or M or just Return). Registers are examined by Control+E and I/O is still redirectable by Control+K and Control+P (as before DOS commands should normally be used).

Hexadecimal arithmetic is performed for 32 bit numbers with a 32 bit result for addition and subtraction and a 64 bit result for multiplication. There does not appear to be division. A hex number followed by an equals sign gives the decimal equivalent.

An exclamation mark enters a mini-assembler which understands the full 16 bit commands

(some are 4 bytes long) and 24 bit addresses of the microprocessor. Pressing Return in the address field exits back to the monitor. While in the monitor, besides Control+C and Control+B, Q will exit to Basic. The commands S and T bring up Step and Trace respectively although I could not perform such. I am not sure if they are supposed to, or if they are there to give compatibility with the old non-autostart rom.

The monitor is sufficiently similar to the old that I could easily discover and convert the table of command characters, and in doing so discovered other recognised commands such as P, backslash, quotation marks, Z, U, the underline character and Control+R and T. However, I could not discover their proper effects which presumably affect registers and flags of the microprocessor.

From remarks in our introductory manual the quotes are probably for searching memory for a sequence of bytes. U seems tied up with the toolbox in some way.

The toolbox is an idea more familiar to Mac than Apple II users. It serves two purposes, first to support the desktop user interface and second to make programming easier. Unfortunately we had no manuals for the toolbox and were therefore unable to use it directly.

However, the software we have seen, which presumably results in part from use of the toolbox, is quite impressive. The introductory manual describes the toolbox as having five main features. These are:

- The tool locator which handles the interface between the tools and the user. Tools are not only those provided but can be user written and reside in ram as well as rom.
- The memory manager.
- Quickdraw, which provides the primitive routines for drawing on the new graphics screens. It supports lines, rectangles (with square and rounded corners), ovals, polygons, arcs, pixel images together with text characters and strings. Calculations relative to images are also made.
- The Event Manager which is used to look after event driven applications which in turn may be using the mouse or windows or other interrupting events.
- Miscellany, which hosts a number of smaller tools to look after the clock, access peripherals, change vectors, take care of interrupt enabling and disabling and so on.

In addition there are tools to handle the desktop – windows, menus, icons and their needs, text via a line editor, and dialogue boxes – and desktop co-resident applications such as the classic control panel which can run in nearly all applications and others – described as non-classic – which run only in the new desktop environment, that is new 16 bit software applications.

Sound has its own manager which handles low level stuff such as sending data to the DOC and high level stuff to generate sound envelopes, to modulate pitch and volume and vibrato and to allow looped playback and so on.

There are mathematical tools which include single, double and extended resolution floating point arithemetic – 32, 64 and 80 bit computations – also 64 bit fixed point arithmetic. There is also integer arithmetic and interconversion between types.

There are two resident desktop accessories in the GS, the main one of which is the control panel. This is accessible at switch on time or while running many applications. (By the way at switch on the system may be set for 50 or 60 Hz display).

The control panel uses only the four arrow keys and Return to make all selections and is

```
1=m   1=x   1=LCbank (0/1)

FF/206A: A9 00        LDA #00
FF/206C: 80 20        BRA 208E (+20)
FF/206E: 5C 2C C2 30  JMP 30C22C
FF/2072: A0 80        LDY #80
FF/2074: 00 A9        BRK A9
FF/2076: 28           PLP
FF/2077: 00 20        BRK 20
FF/2079: 5C 1D 6B AA  JMP AA6B1D
FF/207D: BF 05 2A FF  LDA FF2A05,X
FF/2081: A0 21        LDY #21
FF/2083: 37 80        AND [80],Y
FF/2085: F0 E0        BEQ 2067 (-20)
FF/2087: C2 30        REP #30
FF/2089: 8A           TXA
FF/208A: 0A           ASL
FF/208B: 0A           ASL
FF/208C: 48           PHA
FF/208D: 0A           ASL
FF/208E: 63 01        ADC 01,S
FF/2090: FA           PLX
```

Figure VIII: Note the memory addressed at 206E, 2079 and 207D and some of the new op-codes

intelligent. For example, when selecting serial ports and AppleTalk you are warned that only two of the three are allowed, or when setting the date it is soon evident that the panel knows how many days there are in a month and about leap years.

SOFTWARE

Software is probably the most important factor in the success of a machine. The IIGS has old Apple II software to fall back on (although this was no guarantee for the Apple III) and hopefully will have new, 16 bit software to look forward to.

First the old. Last year, in a very forward looking editorial, Tom Weishaar of Open-Apple said, when talking of compatibility between any new machine and the old, that "compatibility means a microprocessor based on the 6502, Applesoft in rom, Apple II compatible memory mapping, Apple compatible slots, and 5.25in disc drives as standard equipment". He also said that unless the new could run Applevision it was not an Apple.

On these criteria the new IIGS is certainly compatible, but is that enough to test it fully? The most likely problem areas will be in display, accessing discs and using in-built routines, so I set about testing these.

First I played a number of games from the past, each based on a DOS formatted disc. All which booted played correctly except Microsoft's Decathlon which filled the text area under the graphics displays with 2s instead of clearing the area, but it went on to play correctly.

Some of the newer protected games would not boot on the 5.25in drive daisychained to the SmartPort.

I next tried utitilies such as Penguin's Graphics to test the display – all was well – and Disc

```
00/0800:00 19 00 0A 00 B2 20 20 20 20 20 44 4F 53 20 33-.....2  -- DOS 3
00/0810:2E 33 20 48 45 4C 4C 4F 00 20 00 14 00 B2 20 00-.3 HELLO. ...2 .
00/0820:28 00 1E 00 89 3A BA 00 2E 00 28 00 97 00 54 00-(....:...(...T.
00/0830:32 00 BA 22 53 4C 41 56 45 20 44 49 53 43 2C 20-2.:"SLAVE DISC,
00/0840:49 4E 49 54 49 41 4C 49 53 45 44 20 38 2D 37 2D-INITIALISED 8-7-
00/0850:38 31 22 00 76 00 3C 00 BA 3A BA 22 41 50 50 4C-81".v.<.:::"APPL
00/0860:45 20 49 49 20 50 4C 55 53 20 4F 52 20 52 4F 4D-E II PLUS OR ROM
00/0870:43 41 52 44 22 00 7D 00 46 00 B2 20 00 9F 00 50-CARD".}.F.2 ...P
00/0880:00 B2 20 2D 2D 50 4F 4B 45 20 4C 41 4E 47 55 41-.2 --POKE LANGUA
00/0890:47 45 20 43 41 52 44 20 46 49 4E 44 45 52 00 F0-GE CARD FINDER.p
00/08A0:00 5A 00 B9 37 36 38 2C 30 3A B9 37 36 39 2C 31-.Z.9768,0:9769,1
```

Figure IX: Monitor memory dump

Arranger to test displays and disc accesses. Again all was well. Pressing ahead on disc accesses I tried Locksmith v.5.0 which worked and the Speed-Loader from Basug. This would not load without crashing into the monitor.

I suspect that this is due to a timing problem or just maybe the use of an illegal 6502 call because Speedloader will not work on a II+ fitted with a 65C02, However, a disc of programs created by Speed-loader on an Apple II+ loaded perfectly on the GS.

To test the use of machine routines I first tried Microsoft's Tasc compiler on the sample program and Penguin's Shortcuts with the "samplers". All was well.

I tried AppleWriter II/DOS and it failed completely, hanging the machine. This was intriguing, so I tried AppleWriter IIe/DOS. This at first seems to work, except for mouse characters appearing in the display bar at the top of the screen, but characters typed at the keyboard do not appear on the screen.

The use of the backspace at this point hung the computer, but Control+Q instead, followed by asking to quit and then changing my mind, seemed to allow the program to work correctly. Again very intriguing. So I tried AppleWriter IIe/

ProDOS, and this worked.

As a further test I tried Nikrom's Apple IIe diagnostic disc and found what I expected, namely the machine behaved as a IIe with extended 80 column card present. Of course, rom did not match up to the test, but just about everything else did.

I booted AppleWorks (which now comes on 3.5in discs and 5.25s) and used it extensively without any problems, although I was mildly surprised to find I had only a 55k desktop. Partly to overcome this I ran it at the fast processor speed from the 1mb ram disc – which is very impressive.

To test further I used CP/M v2.2 with a Cirtech Z-80 card which behaved faultlessly and CP/M Plus on a Digital Research Gold Card which also worked but the display was sometimes jittery. (Readers who have not seen this card should know that it handles video output.)

UCSD Pascal v.1.2 and v1.3 also worked faultlessly except for the formatting problem referred to above. Version 1.3 recognises the extra memory as a virtual disc called RAM5: and can start up from the 3.5in drive but not from RAM5:, at least not without patching.

Using old software is all very well to tide us over until the new arrives, but with the capabilities of this machine we can expect a lot more. Appleworks is very good on it, but think how nice AppleWorks with desktop accessories, graphics and communications built-in would be.

We got a taste for the future from the experimental software which came with the machine on 3.5in discs, and boy does it look good!

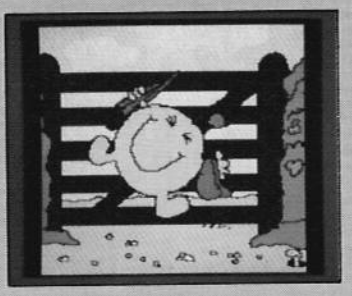
First was a new version of Mousedesk. Actually this was the least exciting of the samples, partly because it did not know about colour screens. Strange colour fringing effects, reminiscent of text on the hi-res screens in early games, made it almost illegible with a colour display selected, although it was perfectly clear on monochrome. Presumably this will be overcome in the final version.

Sound was remarkably well demonstrated by the mouse-operated tape deck and vision by a colour slide program. The resolution and colour of the pictures are superb.

Perhaps the most visually exciting piece was a "mouse paint" program analogous to MacPaint on the Macintosh but in full colour with other goodies thrown in such as the ability to animate a sequence of pictures and to save drawings as screens as well as mouse paint pictures.

The colour palette may be edited and selections made from 4096 colours and shades. A particular colour may be searched for in two ways. Running the mouse over the picture highlights the corresponding colour box at the bottom of the screen and running the mouse over the colour boxes highlights the corresponding colour on the screen. All of this is so fast it's almost unbelievable.

Finally there was a disc



which booted to give a programmer's workshop environment. This was called the CPW – the C stands for Cortland which harks back to an early code name for the machine.

In this environment, which operates under ProDOS although the user does not see it directly, several languages – among them a 16 bit macro assembly, C, and hopefully other compilers for other languages, come together to use common tools.

There is a standard file format which allows for relocatable program segments, possible from other languages, which may be dynamically loaded and library units available to each language.

How much of this exists for which languages I do not know – there is certainly a full 16 bit macro assembler and a C compiler together with an editor, a linker and a debugger.

There are also utilities to handle disc functions and, of course, the toolbox is there to be used.

All of this software came on experimental 8 bit and 16 bit ProDOS. ProDOS 1.1.1 ran perfectly on the machine, but apparently a new 8 bit version known as ProDOS 8 – which will run on other Apple IIs – has the ability to take advantage of some of the IGS's new features.

Also there is a ProDOS 16 which supports all the features of the GS but which runs only on the GS. Each of the ProDOS versions, old and new, use the same disc formats so files are interchangeable between discs but will not necessarily operate correctly on all machines.

The system loader automatically loads the appropriate version of ProDOS, depending on what it finds on disc.

THE FUTURE

The Apple II succeeded because of its graphics (advanced at the time), its approachability for software and hardware engineers and the different operating systems available such as DOS, the p-system and CP/M. It also got a boost from Visicalc.

The new machine has the advanced graphics and sound, the approachability, the old operating systems to fall back on and AppleWorks in place of VisiCalc. It has good quality software to tide it over until even better new stuff appears.

I'm sure that an even better AppleWorks will appear, and an MSDOS capability is promised from at least one third party. This will be interesting because it could be offered on the 3.5 or the 5.25in disc format or both.

IBM and most software seems to support 5.25s but the IBM portable has 3.5in. Old disc II drives would not be able to support MSDOS and so new drives will have to be bought by anyone wanting to upgrade.

In the long run 3.5in drives must be the favourite. The IIGS will take SCSI cards so that an external hard drive can be connected. I wonder if anyone will attempt to make an internal hard drive. It could be done given the space above the motherboard.

Under ProDOS, with Appletalk capability, I'm sure that word processors and other software will soon know how to talk to the Laserwriter and the possibility of such printers in general use will help their price to drop.

The price structure, which ranges from approximately £900 for the basic machine up to £2300 for everything including 20mb hard disc is similar to other business machines but roughly twice that of the new Amstrad with MSDOS. However, if you follow that path you are buying old technology.

You only have to see the GEM desktop system after viewing what the Apple IIGS has to offer in order to see that.

Finally, this is a machine which Apple II users will love and I suspect new business users will soon come over to.

MOUSEKEEPING WITH PASCAL

Tempt your Apple mouse out of its hidey hole with this program by Martin Keesen

USING a mouse for data entry and controlling programs has become very popular over the last few years. Fortunately Apple offers a mouse to live in one of the holes of the Apple II computer and you get a beautiful example of its use in the drawing package MousePaint.

In the accompanying manual examples are given of how to use the mouse in both Basic and machine language programs. Unfortunately there is no example for Pascal users, so after searching through a lot of magazines to find out if the wheel was already invented I started programming it for myself.

Now, under Apple Pascal it is possible to link machine language routines but one restriction is that these routines must be relocatable.

I started with the machine language example given in the mouse manual – not with very much success.

Every time I linked the routines with a test program the computer did what mice normally do – beep, beep, beep.

The origin of this behaviour is located in the interrupts produced on mouse movements, button press and screen refresh. Pascal doesn't like these interrupts and crashes most of the time.

However the interrupts are not necessary for simple programs. If you need them you'll have to do a couple of things described in the Apple II Pascal Device Support Tool manual. But be warned, the manual is for experts only!

The listing contains all relevant subroutines needed to operate the mouse without interrupts – CATCHMOUSE, CLAMPMOUSE, CLEARMOUSE, FREEMOUSE, HOMEMOUSE, POSMOUSE and MOUSE.

Let's look at their functions and the way to call them from within a Pascal program.

CATCHMOUSE (VAR CHEESE: BOOLEAN)

This must be called before any of the other mouse routines are used. It checks whether there's a mouse about and determines which slot it is using.

The result of variable CHEESE is FALSE if a mouse is present. This is merely the result of the mouse eating the cheese. The mouse's internal registers are reset and the mouse is synchronised with the Apple screen. As the mouse is in passive mode no interrupts will be generated.

CLAMPMOUSE (HIGH, LOW: INTEGER; VERTICAL: BOOLEAN)

Establishes new value boundaries for the mouse position data which in turn allows control of the resolution of the data sent to the Apple by the mouse.

The default values for both X and Y boundaries are $0 and $3FF. If the value of variable VERTICAL is TRUE the vertical (Y) boundaries are changed to the values given by HIGH and LOW. If VERTICAL is FALSE the X boundaries are changed.

CLEARMOUSE

Routine to set the mouse's X and Y position values to zero.

FREEMOUSE

The mouse is switched off by this routine. This is necessary upon exiting a Pascal program and if you don't do it the Pascal system will hang.

HOMEMOUSE

Sets the internal position registers of the mouse to the lower boundaries. These boundaries may be changed by the CLAMPMOUSE routine.

POSMOUSE (X,Y: INTEGER)

Sets the internal position registers of the mouse to the values of the variables X and Y.

MOUSE (VAR MOUSEX, MOUSEY: INTEGER; PRESSED, MOVED: BOOLEAN)

Transfers the mouse data to the Pascal program. MOUSEX and MOUSEY return values according to the position of the mouse.

PRESSED is TRUE if the button on the mouse is pressed down. MOVED is TRUE if the mouse is on the move.

When you have typed in the listing save it as MOUSE.TEXT and assemble it with the Pascal assembler. This results in the file MOUSE.CODE.

Your Pascal program must define the procedures mentioned above as EXTERNAL and the program must be linked to the file MOUSE.CODE by use of the Pascal Linker.

Success with your mousekeeping!

```
RETURN    .EQU 00          ;PASCAL RETURN-ADDRESS
XPOS      .EQU 02          ;VALUE OF X SET BY POSMOUSE
YPOS      .EQU 04          ;VALUE OF Y SET BY POSMOUSE
MODE      .EQU 02          ;VERTICAL/HORIZONTAL FLAG FOR CLAMPMOUSE
HIGHLIM   .EQU 04          ;UPPER LIMIT FOR CLAMPMOUSE
LOWLIM    .EQU 06          ;LOWER LIMIT FOR CLAMPMOUSE
;-------------------------------------------------------------------
          .MACRO PULL
          PLA
          STA %1
          PLA
          STA %1+1
          .ENDM

          .MACRO PUSH
          LDA %1+1
          PHA
          LDA %1
          PHA
          .ENDM
;-------------------------------------------------------------------
          .PROC CATCHMOUSE,1
          .PUBLIC CHEESE
          .DEF CALLCARD,TOCARD,CN

          PULL RETURN      ;PRESERVE PASCAL RETURN-ADDRESS
          JMP BEGIN

TMP       .EQU 02
CN        .BYTE 00
NO        .BYTE 00
TOCARD    JMP 0000         ;CODE CHANGED BY PROGRAM

BEGIN     JSR CHECK1       ;FIND MOUSE
          STA CHEESE
          CMP #01
          BEQ QUIT
          LDY #19          ;INITMOUSE-ROUTINE
          JSR CALLCARD
          LDY #12          ;SETMOUSE-ROUTINE
          LDA #01          ;PASSIVE MODE
          JSR CALLCARD

QUIT      PUSH RETURN      ;BACK TO PASCAL
          RTS

CALLCARD  SEI              ;DISABLE INTERRUPTS
          PHA
          LDA CN
          STA TMP+1
          LDA #0
          STA TMP
          LDA @TMP,Y       ;GET OFFSET
```

```
            STA TOCARD+1
            LDX CN              ;X-REGISTER MUST CONTAIN CN
            STX TOCARD+2
            LDY NO              ;Y-REGISTER MUST CONTAIN NO
            PLA
            JSR TOCARD          ;JUMP INDIRECT TO CARD
            CLI                 ;ALLOW INTERRUPTS
            RTS

CHECK1      LDX #07             ;CHECK 7 SLOTS
            LDA #00
            STA TMP
            LDA #0C8
            STA TMP+1
CHECK2      DEC TMP+1           ;DECREMENT CN
            DEX                 ;DECREMENT SLOTNUMBER
            BMI CHECK3          ;NO MOUSE IN SLOTS
            LDY #0C             ;LOCATION FIRST SIGNATURE BYTE
            LDA @TMP,Y
            CMP #20             ;FIRST SIGNATURE BYTE OF MOUSE
            BNE CHECK2
            LDY #0FB            ;LOCATION SECOND SIGNATURE BYTE
            LDA @TMP,Y
            CMP #0D6            ;SECOND SIGNATURE BYTE OF MOUSE
            BNE CHECK2          ;NEXT SLOT
            LDA TMP+1
            STA CN
            ASL A               ;MAKE NO FROM CN
            ASL A
            ASL A
            ASL A
            STA NO
            RTS
CHECK3      LDA #01             ;MOUSE NOT FOUND
            RTS
;-------------------------------------------------------------------------
            .PROC MOUSE,4
            .PUBLIC MOUSEX,MOUSEY,PRESSED,MOVED
            .REF CALLCARD,TOCARD,CN

            PULL RETURN         ;PRESERVE PASCAL RETURN-ADDRESS

            LDY #14             ;READMOUSE-ROUTINE
            JSR CALLCARD
            LDX CN              ;CN IN X-REGISTER
            LDA 0388,X
            STA MOUSEX          ;LSB OF X-POSITION
            LDA 0488,X
            STA MOUSEX+1        ;MSB OF X-POSITION
            LDA 0438,X
            STA MOUSEY          ;LSB OF Y-POSITION
            LDA 0538,X
            STA MOUSEY+1        ;MSB OF Y-POSITION
            LDA 0688,X          ;STATUS-BYTE
            ASL A               ;SHIFT BIT 7
            ROL A               ;TO BIT 0
            STA PRESSED
            ASL A               ;SHIFT BIT 5
            ROL A               ;TO BIT 0
            STA MOVED

            PUSH RETURN         ;BACK TO PASCAL
            RTS
;-------------------------------------------------------------------------
            .PROC FREEMOUSE
            .REF CALLCARD

            PULL RETURN         ;PRESERVE PASCAL RETURN-ADDRESS

            LDY #12             ;SETMOUSE-ROUTINE
            LDA #0              ;TURN MOUSE OFF
            JSR CALLCARD

            PUSH RETURN         ;BACK TO PASCAL
            RTS
;-------------------------------------------------------------------------
            .PROC CLEARMOUSE
            .REF CALLCARD

            PULL RETURN         ;PRESERVE PASCAL RETURN-ADDRESS

            LDY #15             ;CLEARMOUSE-ROUTINE
            JSR CALLCARD

            PUSH RETURN         ;BACK TO PASCAL
            RTS
;-------------------------------------------------------------------------
            .PROC HOMEMOUSE
            .REF CALLCARD

            PULL RETURN         ;PRESERVE PASCAL RETURN-ADDRESS

            LDY #18             ;HOMEMOUSE-ROUTINE
            JSR CALLCARD

            PUSH RETURN         ;BACK TO PASCAL
            RTS
;-------------------------------------------------------------------------
            .PROC POSMOUSE,2
            .REF CALLCARD,CN

            PULL RETURN         ;PRESERVE PASCAL RETURN-ADDRESS
            PULL YPOS           ;GET Y POSITION FROM PASCAL
            PULL XPOS           ;GET X POSITION FROM PASCAL

            LDX CN
            LDA XPOS            ;LSB OF X POSITION
            STA 0388,X
            LDA XPOS+1          ;MSB OF X POSITION
            STA 0488,X
            LDA YPOS            ;LSB OF Y POSITION
            STA 0438,X
            LDA YPOS+1          ;MSB OF Y POSITION
            STA 0538,X
            LDY #16             ;POSMOUSE-ROUTINE
            JSR CALLCARD

            PUSH RETURN         ;BACK TO PASCAL
            RTS
;-------------------------------------------------------------------------
            .PROC CLAMPMOUSE,3
            .REF CALLCARD

            PULL RETURN         ;PRESERVE PASCAL RETURN-ADDRESS
            PULL MODE           ;GET MODE FROM PASCAL
            PULL LOWLIM         ;GET LOWER LIMIT FROM PASCAL
            PULL HIGHLIM        ;GET UPPER LIMIT FROM PASCAL

            LDA LOWLIM          ;LSB OF LOWER LIMIT
            STA 0478
            LDA LOWLIM+1        ;MSB OF LOWER LIMIT
            STA 0578
            LDA HIGHLIM         ;LSB OF UPPER LIMIT
            STA 04F8
            LDA HIGHLIM+1       ;MSB OF UPPER LIMIT
            STA 05F8
            LDA MODE            ;MODE INTO ACCUMULATOR
            LDY #17             ;CLAMPMOUSE-ROUTINE
            JSR CALLCARD

            PUSH RETURN         ;BACK TO PASCAL
            RTS

            .END                ;MOUSE IS AUS
```

appletip

IF . . . THEN . . . ELSE in Applesoft

I showed in a previous Appletip how one can make use of a logical statement to manipulate the loop variable in a FOR . . . NEXT loop in order to simulate a REPEAT . . . UNTIL loop.

It is also possible to extend an IF . . . THEN statement to an IF . . . THEN . . . ELSE statement, using a similar technique.

Let us suppose a requirement in a program is that IF a variable N has a value between 10 and 20 THEN its value is printed ELSE the statement "OUT OF RANGE" appears. This may be done as follows:

```
20 RANGE = (N > = 10 AND N <
   = 20) + 1
30  ON RANGE GOSUB 1000,1010
    :
    :
    :
1000  PRINT "Out of Range":
   RETURN
1010  PRINT N: RETURN
```

The logical condition to be tested is the expression within the brackets in line 20. If it is true, Applesoft assigns it the value 1, if false, the value 0.

This program arrangement is of particular value when both the alternative actions require multiple statements which do not all fit on one line.

P.H.P. Harris

After using the Print Shop with the Blackboard card – which is not mentioned in the Printer Shop supported cards – I was trying other card drivers and found that the "VIDEX – Uniprint" driver is OK for the Blackboard too.

Surprisingly, the printer setup recommended in Apple User for Blackboard as an "EPSON" card does not work with my Blackboard card version 2.3.

Jaromir Smejc

MicroLink
in association with
TELECOM GOLD

No. 14 October 1986

NEWSLETTER

Helping relieve famine

MICROLINK was used to keep track of progress in a nationwide computer game marathon which raised more than £5,000 for Ethiopian famine relief.

The event involved micro owners all over the country playing the cult role-playing adventure Dungeons and Dragons.

Two teams of nine took part in a stamina-sapping Draganothon at the Trafalgar Square Community Centre in London and wrote themselves into the Guinness Book of Records after 84 continuous hours.

Other major Dragon Aid events were held simultaneously at Aberdeen and Basingstoke, and hundreds of mini marathons took place in family living rooms throughout Britain.

Organiser Adrian Mars said the on-line adventurers raised at least half of the £5,000 which will go to Bob Geldorf's Band Aid Trust.

RADIO FANS ARE TUNING IN TO MICROLINK

WHILE its 38,000 members communicate with one another across the ether, the Radio Society of Great Britain has been conducting its business closer to the ground via telephone, snail mail and traditional telex.

But all that is changing thanks to the society's group of mailboxes on MicroLink.

Chief excecutive David Evans says: "We are using MicroLink as a means of exchanging information between myself and a large number of members in the field who serve on our 16 committees, and other individuals both nationally and internationally.

"Being a commercial organisation, by law we cannot use the airwaves to conduct our business as the national organisation for radio amateurs in the UK.

"We represent the licensed amateur at government level and also publish books, magazines and technical material under 25 different titles.

"A remarkable two-thirds of our members are micro owners and we hope MicroLink will eventually be used for much of our committee work and the transmission of material for our publications, taking the place of ordinary telex and, to a certain extent, the telephone".

Sunny solution

OUT on the sunny Costa Blanca, David Corcoran is spreading the word about MicroLink to Spanish-based business people and fellow expatriates.

Corcoran, whose background is in insurance, believes there's a real need for fast reliable communications among a community that has strong ties with other countries, particularly the UK. He has been living in Alicante for 18 months, setting up a company providing computers, modems, acoustic couplers and comms software to Spanish residents with links abroad.

He has made MicroLink his choice as the recommended communications system for his clients, setting a target of 500 new mailboxes in the first year.

Sales link

WHEN MicroLink subscriber John Heritage heard that friends of his were having difficulty selling their house he came up with a bright idea.

Why not advertise the £84,950 det. des. res. in Fleet, Hampshire, on MicroLink's bulletin board? He duly did and within a few hours recorded more than 20 responses from other subscribers intrigued by the special offer of "at least three per cent discount" for MicroLink members.

But before the offers started rolling in the property was sold through normal channels.

Said the owner: "Even though it hasn't actually been sold through MicroLink, advertising it on the system seems to have proved a lucky talisman – there are two buyers fighting over who will get it at the moment".

Speeding health data

THE largest independent forecasting group in Europe has joined MicroLink in order to speed compilation of data for a major investigation of the health of the nation.

Henley Centre for Forecasting is looking into the whole issue of health, health care and lifestyles in the UK.

The task will take at least 18 months and has been commissioned by a number of leading companies in the pharmaceutical manufacturing and retailing sectors.

Henley Centre has made its worldwide reputation on the strength of its economic research and consultancy work, analysing markets and sales factors for its clients, particularly in the retail trade, marketing and advertising.

It also publishes a number of periodicals of general economic interest with special emphasis on the economies of the UK, EEC and East Asian countries.

MicroLink will enable the centre to receive data via electronic mail from the consultants it employs to research particular issues and markets for its publications and confidential strategic reports.

YOUR chance to join MicroLink – Page 45

The lowdown on high finance

Or how to cut the cost of borrowing by using the Access-Visa shuffle and other clever ploys. Chris Burridge has read a book that reveals all.

IT'S a rare treat to come across a book which no one can deny is "interesting". In fact Tom Weishaar's Your Best Interest is all about understanding and using interest rates – but with a difference. Geared specifically for computer users, the aim is to exploit just about any spreadsheet program to do the number crunching.

The text provides all the necessary lowdown on how financial transactions work, fully in context and in a simple and entertaining way. You can even join in without a spreadsheet program – as experienced Basic programmers can also use the algorithms provided.

The author is well known in the States for his down-to-earth style as editor and publisher of the informative Open Apple magazine dedicated to the Apple II fraternity. He also wrote the Prontos DOS and Frame-UP software, and is obviously a man who knows his Apples.

Upon opening the 172 page 9in by 6in paperback the American pedigree is unmistakable – the printing, $ signs, jargon and all. But don't be put off, for there's a wealth of good stuff which equally applies to really understanding loans and investments this side of the Atlantic. Apart from a practical tutorial, there is heavy promise of unmasking professional financial tricks.

Early emphasis is placed on the time value of money, which Weishaar claims we all missed out on at school – because the mental sums were error prone and took too long.

Spreadsheets have changed all that, and we can now wise up to deceptions plagued upon us by the financial institutions and enjoy learning about the true cost of borrowing or the true reward from investing.

When applying for a loan most people think in terms of monthly repayments without a thought to any interest rate rip-off. After all, how many of you, hand-on-heart, understand the (nearly double) difference between flat and true interest rates?

It turns out that our Consumer Credit Act under which APR's (annual percentage rates) have to be quoted in an attempt at clarification, is a copy of the longstanding American "Truth in Lending" laws.

Books are already available in the UK loosely based on giving complex compound interest formulae, but none like this one is geared to comparing alternative investment/loan stategies and answering 'Why?' by way of a practical spreadsheet tutorial.

To give a flavour of the true "learn while your doing it" approach, the first chapter gets you acquainted with setting up your spreadsheet into Question and Answer windows with built-in error checking procedures. Although an elementary knowledge of how to use a spreadsheet is essential, the hand-holding should enable anyone to cope. Even iteration is covered.

Early chapters deal with simple and compound interest, and practical examples show how calculations are affected by frequency of compounding and timing of repayments/income. All the programming algorithms are given and enable the construction of complete templates which solve set problems – all with instant "What If?" power. These range from comparing investment returns to seeing if borrowing from the bank for a particular scheme is viable.

The often overlooked concepts of present and future value are examined in depth – the idea is that £1,000 in the hand today is worth more because of inflation than it will be in, say, a year's time. It's only having completed this part of the tutorial the hard way and hopefully taken on board the principles, that the standard @NPV spreadsheet function is apologetically introduced. I winced, though, at the author's simplistic definition of inflation as "the term commonly used to describe a general increase in the price of everything!"

Needless to say interest rate priorities change depending whether you are a borrower or investor and Weishaar goes out of his way to explain the ins and outs from both viewpoints. This leads on, naturally, to look at wealth creation – income and expenses, assets and liabilities and the long term effect of taxes and inflation on your income and expenses.

Even death, taxes and inflation are covered in Chapter 5, although the figures given don't relate to UK citizens. The following chapter deals with the true cost of borrowing. No matter if it's on loan, mortgage, credit card or HP – "Borrower beware" is the theme. Some colourful jargon warns of "origination fees" (arrangement fees here), "buy-downs", "points" and teaser rates.

There are also "Caps", "Arms", "Escrow accounts" and "Assumptions" we Brits don't get inflicted with, but nasty "adjustable-rate mortgages" that we do.

Still, the book makes you think about the real (APR) rates you are paying – with a little research you'll be able to get up to the City ruse of the Access, Visa shuffle. This involves rotationally borrowing and paying back from each card at very low true interest rates taking advantage of necessary timing and

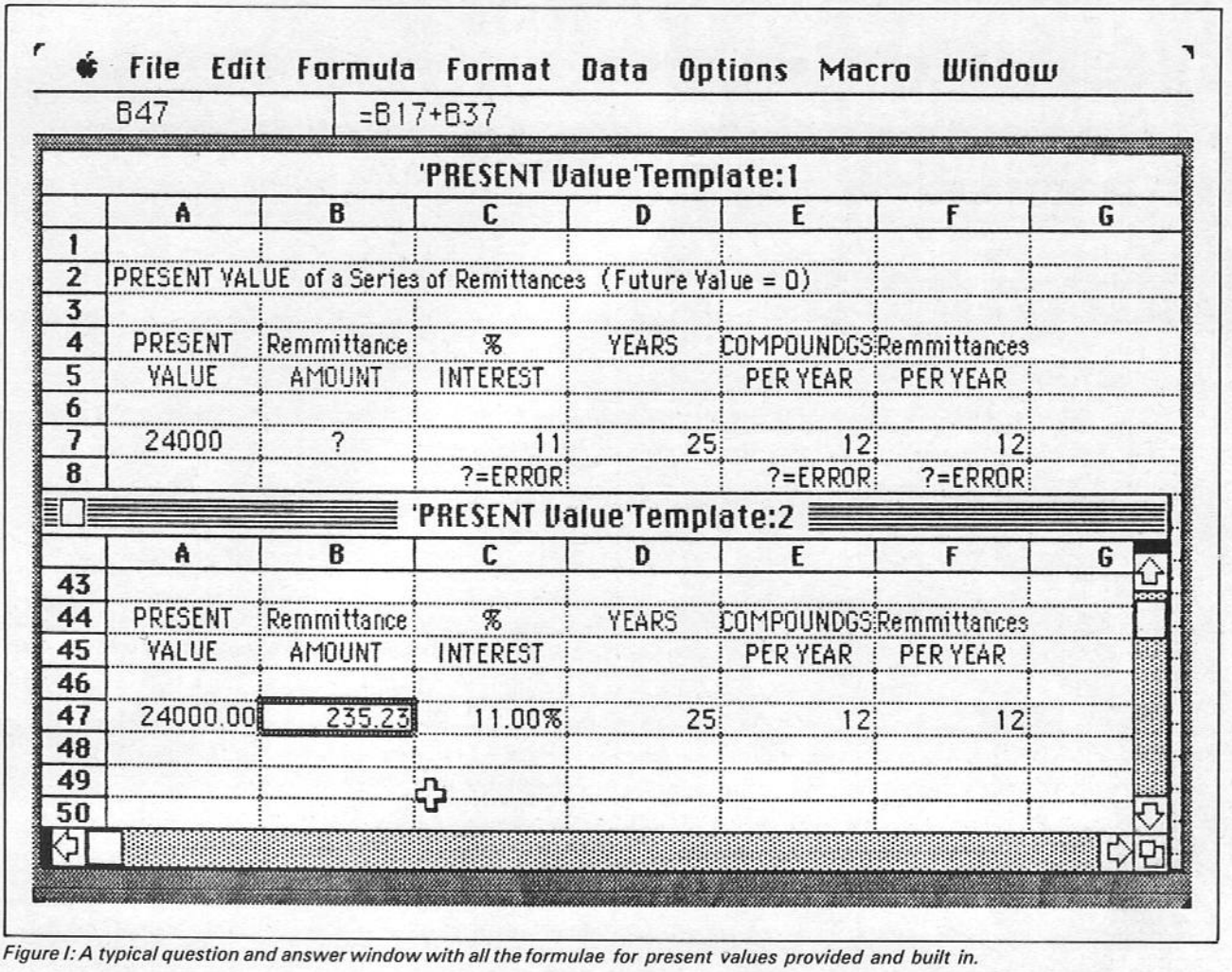


Figure I: A typical question and answer window with all the formulae for present values provided and built in.

interest calculation differences.

Tip: Borrow first from Visa – repay from Access cash advance within 55 days – after a week or so repay Access by further Visa drawing – and so on!

After you've worked the chapter on borrowing you should be able to choose between a Belgravia, Knightsbridge or Kensington. Confused? These are the names given to a range of new executive mortgage products being marketed in the UK by a certain aggressive American bank.

The packages encompass many oddball but complicated interest rate choices – some with fixed time/rate guarantees. The point is that you could easily adapt templates from the book to provide meaningful comparisons tailored to our personal circumstances.

Another ideal and normally daunting task would be deciding whether switching mortgages is worthwhile – either to an endowment basis or to an alternative lender advertising lower current rates.

The Figure I screen shows a typical template with split window created from the easy-to-follow instructions. Note the simplicity of the set-up, which in this case calculates the gross monthly cost of a £24,000 mortgage over 25 years at a 11 per cent mortgage rate.

You could just as easily work out, say, your current mortgage balance or see how long it would take to repay a loan. Just type in the known variables and hey presto – eyes down to the answer window. Beware that institutions vary in the methods they apply interest so you may not always be comparing like with like or be absolutely exact.

Mortgages, particularly, may have front or average interest loading and indeed it's somewhat of a trade secret that mortgage APRs aren't directly comparable for this reason.

The book algorithms are accurate enough as good general guidelines – you'll need to write to the institutions concerned if you're finicky and customise formulae accordingly. For example, Nat West is quoting £237.48 gross for a real mortgage based on Figure I – some £2.25 a month less than the template.

The final chapter deals with specialised investments such as bonds and certificates of deposit – likely to be a little over most peoples heads. But the information on calculating true yields is worth a read.

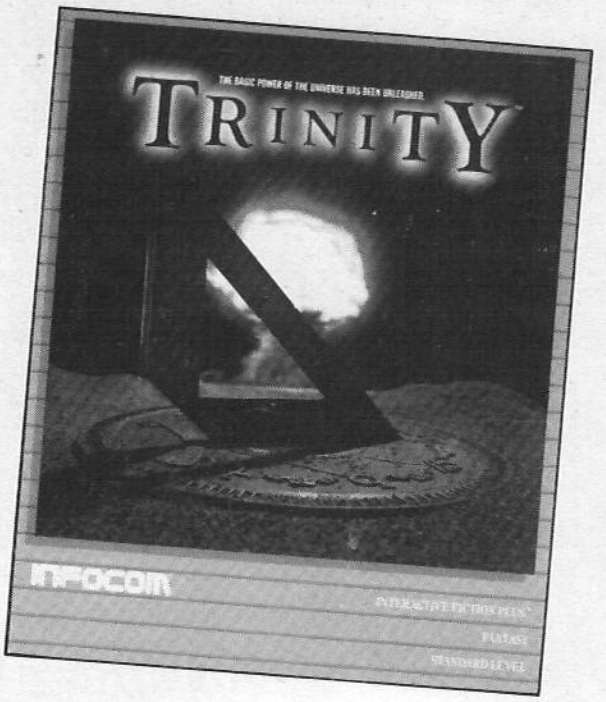
Two appendices follow and the first thoughtfully summarises the interest formulae. Unfortunately the second tabulates historical USA inflation/interest rates. The book is rounded off by a list of further reading (acknowledging that this publication is only an introduction to the subject), a useful glossary and standard index.

By now you should have a fair idea of what this book is all about. The step-by-step background explanations are certainly thought-provoking and complement the practical work. Almost without noticing you gradually build knowledge of how interest is handled – importantly from both present and future value standpoints.

The main limitation is the disappointing detail of actual formulae employed by the major UK credit cards and building societies. Still, you can do your own research.

Not everyone will be driven to wild enthusiasm about interest rates. But the book *is* different as a money book of the computer age. Given a fair conversion of the US$9.95 cover price it will be good value. You won't be bored, and it's probably easy to get hooked.

Adventure under the shadow of the Bomb



WORLD War III has begun and London is about to be on the receiving end of a nuclear strike. And as you begin to whimper, your holiday – and the world – comes to an end.

So begins Trinity, the latest Infocom text adventure. It was written by Brian Moriarty, author of the superb Wishbringer, and maintains the high standards of excellence set by Infocom, standards that remain unmatched by anyone else in this field.

Your immediate task is to survive the direct nuclear strike on London. Your subsequent aim, and this is what the adventure is all about, is to change the course of history.

If you manage to get out of Kensington Gardens alive you'll find yourself in a weird and wonderful land. Huge toadstools fill a strange country over which a giant triangular shadow is sweeping.

The toadstools are portals to sites where atomic tests have taken place in the past.

You must go through each of these portals back into the past to learn what role each of the situations, objects and events has in the scheme of history, and to discover just what you can do to alter it.

The culmination of your efforts should lead you to an area in the New Mexico desert – to Trinity, codename for the first explosion of a nuclear device.

The nuclear theme of this adventure means that the quest and consequences are rather more grave, and realistic, than is usual for an Infocom game.

Indeed it involves more than a few chilling experiences, not the least of which is an encounter with a child in a Nagasaki dugout just before the atom bomb was dropped.

However, the game never descends to sensationalism or poor taste and handles its subject seriously and sensitively. This nuclear topic may seem grim, but that would be a false impression of this adventure.

To intrigue and tantalise you without giving too much away, here's a taste of the many incidents in store: a roadrunner perching on a German shepherd dog's head, an umbrella stuck up an unclimbable, unchoppable tree, a marvellous, 4ft thick book which when open is so wide that it's impossible to touch both edges even with your arms outstretched, stampeding lemmings, a non-stop talking magpie, a timid skink, a surprising windmill, and a huge wand wielded by a 40ft high character.

In addition, there is a sprinkling of groan-inducing puns to lighten the atmosphere.

One puzzle features a vicious and horrific barrow wight, one of whose eyes is dangling from a pink, moist nerve.

Being a soft-hearted old adventurer (not to mention wise in the ways and depths of Infocom games), I attempted to KISS WIGHT.

The response?: "Your gesture brings a tender tear to the barrow wight's eye as it recalls the tender moments of its former human existence. Then it breaks your neck with a practised swipe of its claw". That's Infocom for you.

Elsewhere a boat, empty but for a sinister, dark-hooded oarsman, moved slowly out of the mist to the shore where it was boarded by ghostly figures of dust and vapour, shades "stooped and emaciated, sunken eyes dark with inscrutable emotions".

When I tried to board, almost tipping a spectre out in the process, the oarsman stared at my vacation shorts with barely concealed outrage and with a well-placed kick, removed me from the boat.

Finally, when I mischievously ventured to drink from the round pond in Kensington Gardens. I was told that "the sight of a child relieving itself in the pond changes your mind".

Well there's no changing my mind about Trinity, this is a marvellous adventure and of the very highest calibre. Without a triangular shadow of a doubt, this is another winner.

Bob Chappell

Program: Trinity
Price: £34.99
Supplier: Infocom, c/o Activision, 23 Pond Street, London NW3 2PN. Tel: 01-431 1101
Requirements: Apple II with 128k or Macintosh.

Hobbit will appeal

THE Hobbit is a faithful, if overdue, conversion of Melbourne House's classic adventure based on J.R.R. Tolkien's famous fantasy novel.

You play the part of Bilbo Baggins, a hobbit, who must seek out the evil dragon, take back the hoard of stolen treasure and put it in your chest at home for safe keeping. It sounds rather like one thief stealing from another!

To help you on your quest are your friends Thorin the Dwarf and Gandalf the Wizard. They come in particularly useful since hobbits are rather weak creatures and can't carry much or lift anything heavy.

To make things even more difficult, hobbits have almost no magical ability at all, so you need to rely on others to help you along your way.

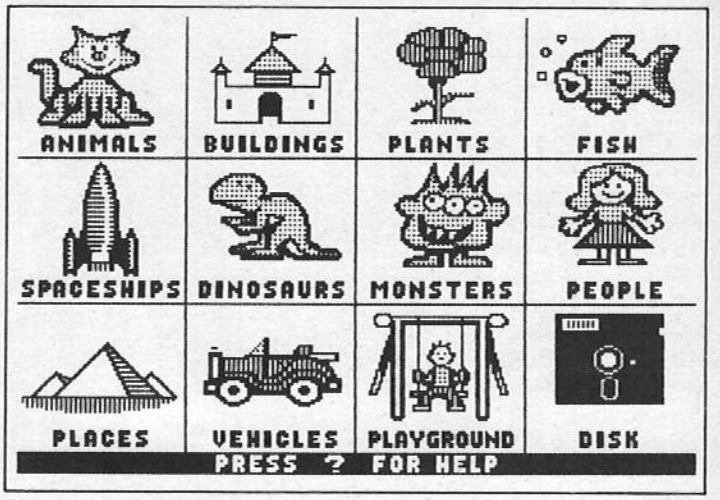
The game follows the book quite closely, bringing in many familiar characters, events and places found within its pages. You would be well advised to keep a copy of the book at hand while you play the game.

After booting the disc, the title page appears sporting a fearsome dragon. If you have lower case the descriptions are that bit easier to read, but everything you type will still be in upper case.

You can choose to play without the graphics, and this can be a welcome option after you've played a few times, since the pictures take a little time to draw up – about 10 seconds on average.

However, if you do select the pictures option you are only shown the picture for a particular location during your first

Happy children learn faster...



STICKERS is a game for children of 4 to 12 years of age and is designed to encourage creativity while at the same time help them to improve problem solving skills.

The picture style menu consists of 10 categories of pictures ranging from animals to vehicles, a playground option, and a disc option.

You move the joystick or use keys to highlight the picture category required, then press the joystick button or spacebar to select.

On choosing pictures the first of 10 from that category is displayed in the main area of the screen.

It has been created using a selection of sticker shapes which are displayed along the bottom of the screen. These 14 shapes range from squares to triangles to circles.

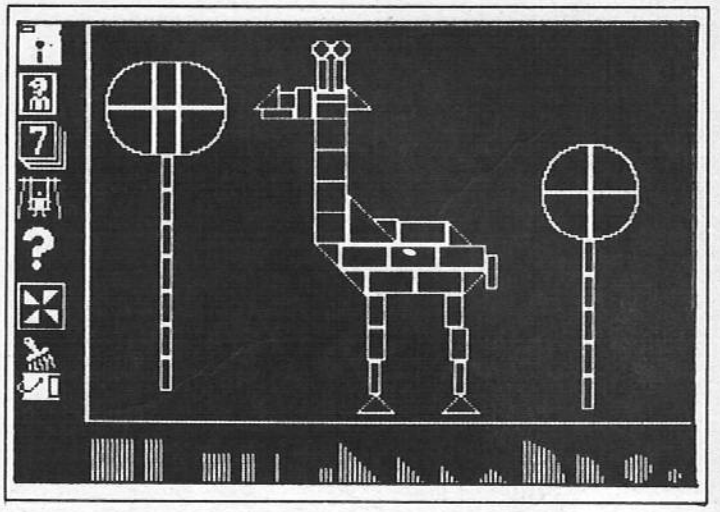
Down the left hand side of the screen there are seven icons. Using the disc icon you can load and save sticker pictures, and the picture icon takes you back to the picture menu.

The book icon lets you page through the 10 sticker pictures, each more complicated than the last of the selected category, the playground icon takes you to the playground and the question mark icon provides instructions for the current area of the program.

The rotation icon turns any shape by 90 degrees, and the paint can icon allows you to colour any shape using one of the five colours available.

Although the icons are easy to use and understand, if you select the playground or picture icons you will spoil any work done if it has not been saved on disc.

I would have preferred some form of warning message appear when either of these is



to beginners

visit there or whenever you type Look. The graphics themselves are quite good, but nothing amazing.

The accompanying manual is quite entertaining in itself. It goes to great lengths to sell you on the idea of what they call Inglish. Apparently the authors are quite proud of their parser and seem to think that it is something revolutionary.

Compared to Infocom standards it's not anywhere near as sophisticated as the manual would have you to believe. Given the fact that the Hobbit is quite an old game, it probably was amazing when it came out for the old Spectrum, but by today's standards it is pretty average.

Things like multiple sentence commands and the use of words like All and Except are standard practice these days. Another throwback from the old Spectrum days is when the manual refers to saving your progress to tape!

Other special features include the ability to communicate with certain characters using the Say command.

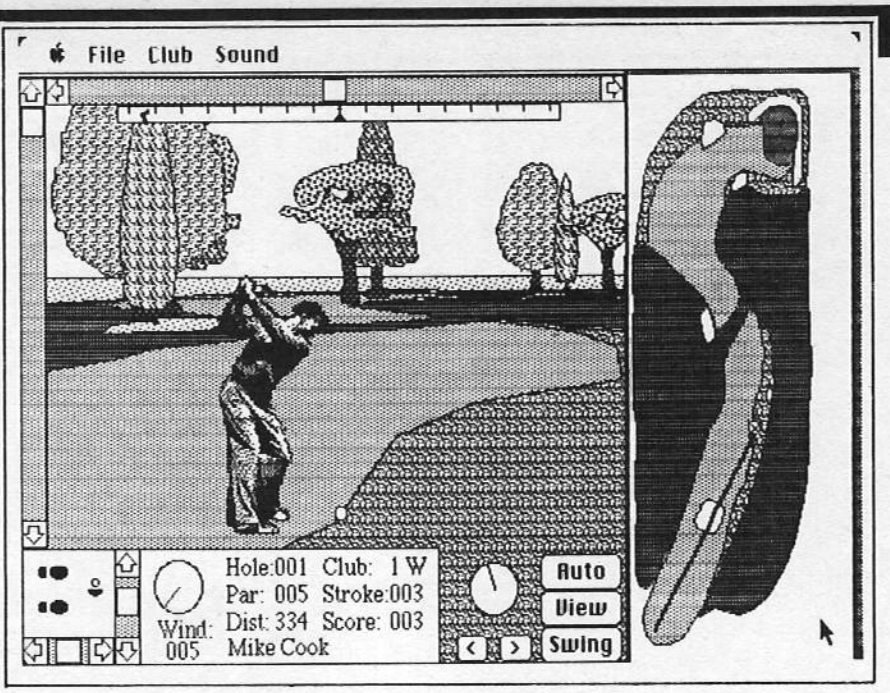
Animaction is the name given to the ability of other characters and creatures within the game to move about and do as they please while you are doing your own thing.

So if you sit around for a while other creatures will arrive and depart, or even sit down and sing a song. Their actions are supposedly in keeping with their character, and the way they react to you changes slightly each time you play.

The Hobbit is a good adventure for beginners. Experienced adventurers may prefer something a little more complex, sophisticated and challenging. But as far as British produced Apple games go it is very welcome indeed, despite the fact that the original Spectrum game came out over two years ago.

Leon Seltsikas

Program: The Hobbit
Price: £29.95
Publisher: Melbourne House, 60 High Street, Hampton Wick, Kingston-Upon-Thames, Surrey KT1 4DB.
Requirements: Any Apple II with a minimum of 64k



MacGolf really does hole in one

WHEN you have been around computers for as long as I have (16 years) you tend to get a bit blasé about software, but occasionally a new title appears and bowls you over. In a software market which is currently reaching new heights MacGolf must surely be one of the peaks of achievement.

When you boot the disc a golfer cries "Fore" in the time honoured tradition and you are invited to select your course. On the right hand side of the screen you get a plan view of the hole you are playing and the left hand side is blank except for an invitation to select your direction of view.

The view indicator automatically points directly at the hole, but as there is usually an obstacle in the way your first shot will need to be in another direction.

Having selected your viewing angle the scene in front of you is drawn starting from the point furthest away. In this way you can see the hole, flag and trees that may later be obscured by closer objects.

When the view is complete you select a club from your caddy, make a few fine adjustments to the direction of shot and swing using the scroll bars, adjust how you address the ball and finally take the shot.

There is also an indication of wind direction to enable you to compensate for its effects.

I must admit to a slight gasp of appreciation as I saw my first shot being taken. The golfer is a digitised image placed in front of the scene. As he makes the backswing several different shots are flashed on the screen. Then for the shot they are rapidly replayed along with some of the follow through.

Although the animation isn't smooth it is still quite something to watch. To add to this visual feast there is also a "woosh and thwack" noise.

The ball is tracked on both the overhead plan and the ground level view. On the latter you can see the ball bounce in the distance as it comes to rest.

What happens next depends on where the ball has landed. If it landed in the water you hear a splash which honestly sounds more like a ball falling in to a tiled bath than a lake.

If the ball went outside the course you will hear the golfer say "whoops" and if you are in the bunker you will hear a grating thud. This process repeats until you reach the green, where the image of your golfer will change to one wielding a putter.

The wind indicator now indicates the slope of the green and you must compensate for this in your shot. Highlight of the putting green is the sound effects.

If you put a short shot you will hear the ball rattling down the hole, if it is a long shot the crowd will cheer and clap, and if you miss a put by a small amount the crowd will groan in disappointment.

There are 18 holes to play on each of two courses, although I am told that more courses will be available separately on disc later. You have the choice of selecting one of three different levels of play: beginner, intermediate and expert.

As you move up in difficulty the game becomes more realistic. The wind blows stronger and it becomes increasingly difficult to get out of bunkers.

I must say I liked the sound and the animation, but what made the game most enjoyable was the constant change of view as I hit the ball all over the place, gradually homing in on the hole.

I had seen screen shots of the game in adverts and I must say that they do not do it justice. This piece of software will set the standard by which future games will be judged on the Macintosh. You must see it and having done so you will find it hard to resist.

Mike Cook

Product: MacGolf
Price: £49.95
Distributor: MacSerious Software, 36 Queen Street, Helensburgh G84 9PU. Tel: 0436 78131
Requirements: Apple Macintosh with 512k

FROM PAGE 27

selected.

The idea of the game is to match the stickers along the bottom of the screen with their outlines in the picture on the work area. You select a shape using a cursor, then move it into place on the work area.

If the piece matches, that part of the picture is coloured in. If the sticker shape does not match the outline it is over, it will not drop into the picture.

Quite often the sticker shape needs to be rotated to fit into its place on the picture and this is done by selecting the rotate icon on the left of the screen before choosing the sticker.

The playground option lets you drop sticker shapes anywhere on the screen and create a picture of your own.

Using the scissors icon you can redesign any or all of the 14 sticker shapes for use in the playground area. This is done by turning pixels on and off in an enlarged grid image of the sticker. The new designs can be saved on disc.

The playground is designed to stimulate the child's creativity and the ability to translate an idea into a picture, and once again I think it does this very well.

Stickers is a colourful game which comes in a smart, sturdy video-style box which contains the disc itself, an instruction booklet and a warranty card.

This is a worthwhile software package which will provide many hours of entertainment for young children while providing them with essential educational skills.

Philip Seltsikas

Program: Stickers
Price: £29.99 plus VAT
Publisher: Springboard, c/o MGA Microsystems, 140 High Street, Tenterden, Kent TN30 6HT. Tel: 05806 4278.

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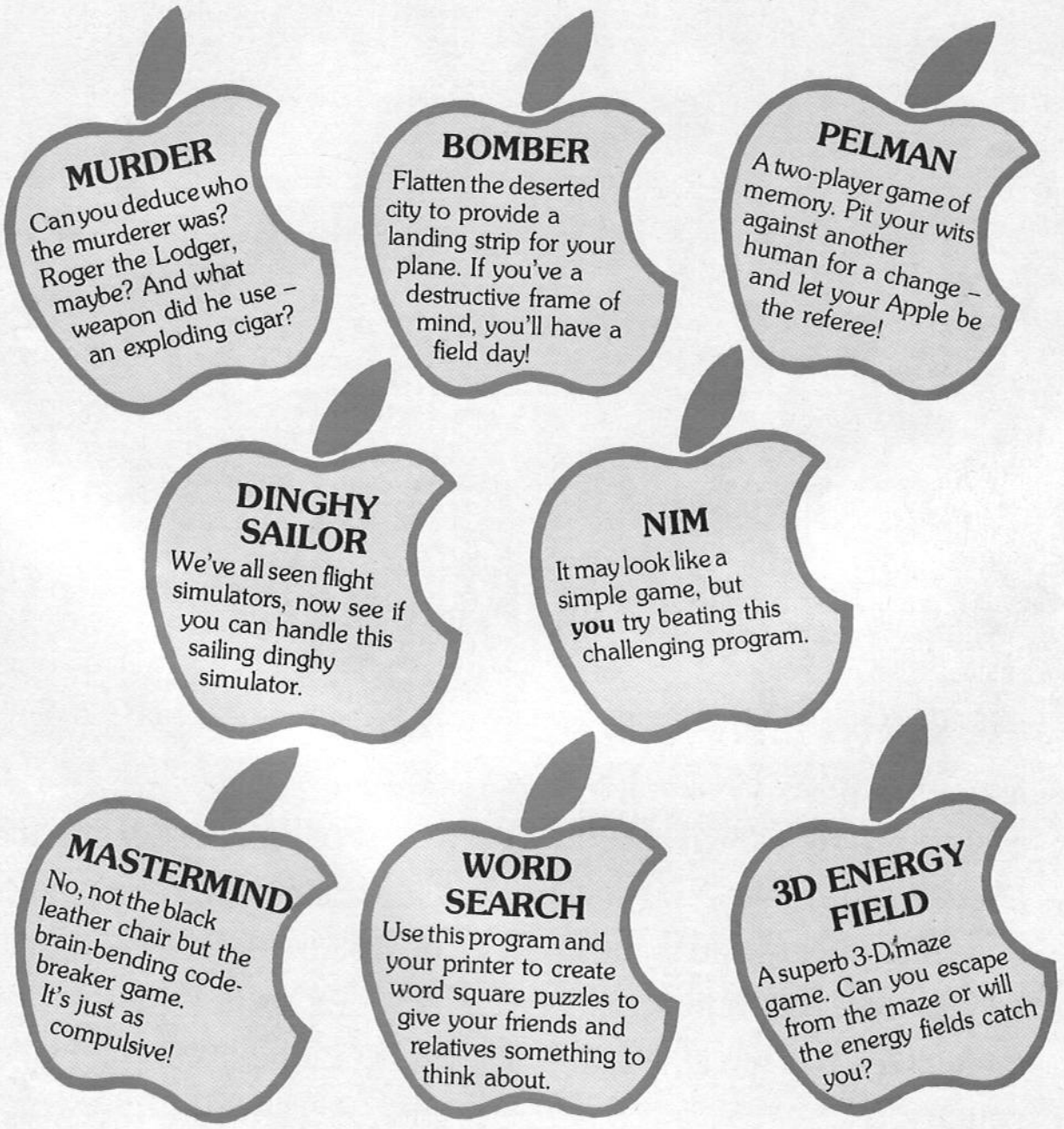

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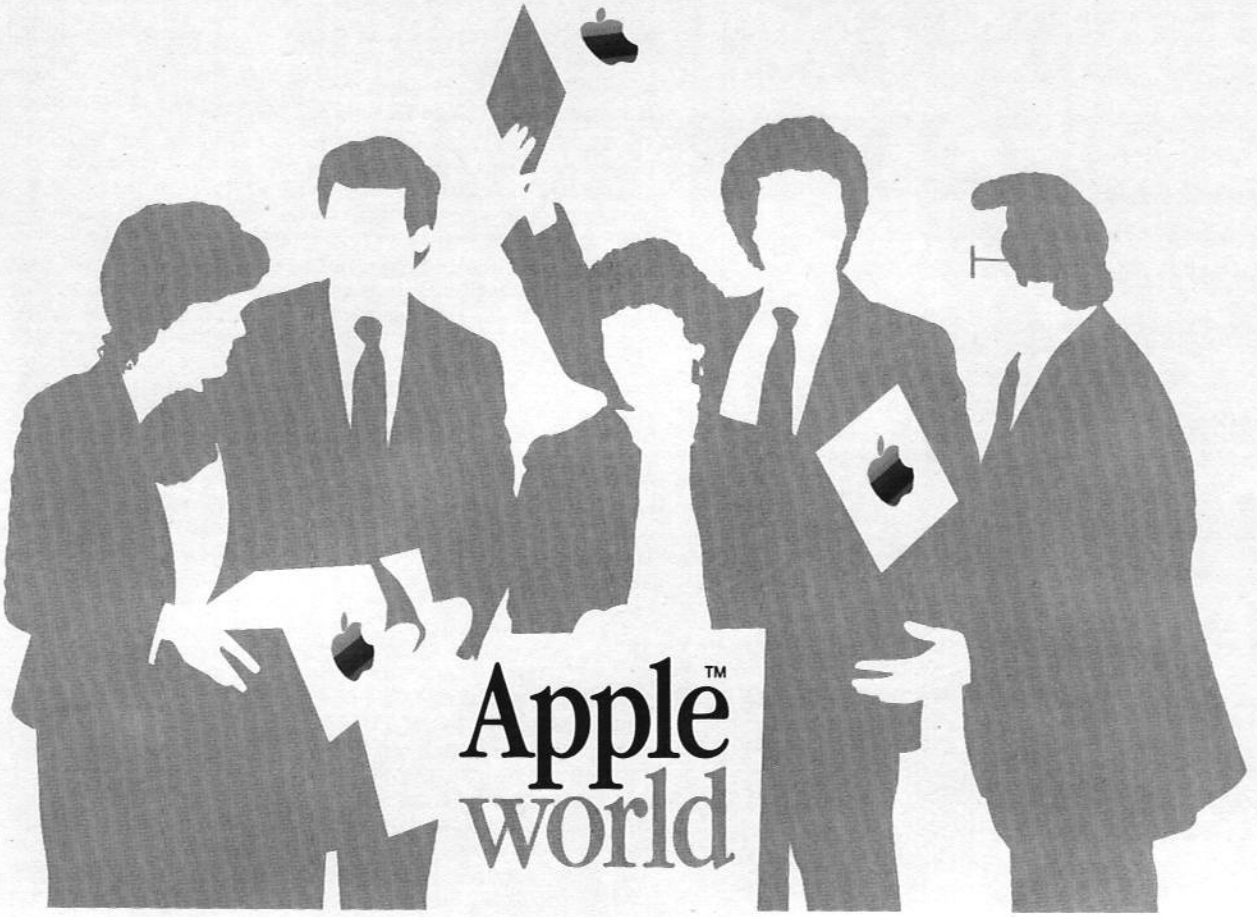

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PRINTING ProDOS ERROR MESSAGES

An easy method by Chris Payne

WHEN writing machine code programs it is sometimes necessary to give the user a prod with an error message. Having these messages in memory all the time, and having to have an output routine for them is wasteful, so what about using ProDOS's own error message routines to output them for you?

If you need to tell the user "RECTORY FULL" or "GRAM TOO LARGE" then this is how to do it.

ProDOS uses a philosophy of JSRing with registers set to activate certain routines. These locations will be the same no matter what changes are done to the rest of ProDOS, and in fact the location of some routines has already changed between ProDOS 1.0 and 1.1.1.

It is quite legitimate to use these routines yourself as long as you don't disturb any of ProDOS. One such routine is PRINTERR at $BE0C. This should be called with a number between $00 and $FF in the accumulator and the corresponding error message will be output to the current output device, be it screen, printer or whatever.

As well as providing all the ProDOS error messages, it outputs bits of messages as well. However, if you need to output the word "COMMAND" which may conceivably be necessary in a program, you only need to call PRINTERR with $18 in the accumulator, and the word will be output.

Fine, but how do we find out what words of wisdom ProDOS has for us? Figure I is a listing of a not very sophisticated program that prints out all that PRINTERR has available.

Turn your printer on with PR # 1 or whatever and then CALL 768. Each error message will be printed, with the corresponding hex number needed to produce it on the line below.

The printout finishes off with ?SYNTAX ERROR, which you should ignore as it is only produced because we have output a lot of garbage as far as Applesoft is concerned.

Although it is quite a trivial program, a few words of clarification are in order. PRHEX is a part of the Apple's Monitor software that prints the bottom four bits of the accumulator as a number on the screen or current output device.

When the hex number for the error code is printed we want to output the most significant character first, so the top four bits of the code in the accumulator are shifted to the bottom, and PRHEX is called.

PRHEX is called again with the original code in the accumulator, and so both characters are produced. PRHEX masks the top four bits of what is in the accumulator with $B0 to produce the standard Ascii character, so we don't need to do anything else to the code.

PRTERR outputs the error message without a Return on the end, so calling CROUT at $FD8E sorts that out.

To use the routine in a program, just do the following:

LDA#$1E	Load acc with error number.
JSR PRINTERR	Go to PRINTERR to output message.
JSR CROUT	Go to CROUT to output RETURN (optional).

The example above prints ERROR. Several of the error codes print COPYRIGHT APPLE COMPUTER. Are they trying to tell us something?

```
SOURCE    FILE #01 =>PERR
0000:                1 ************************************
0000:                2 *                                  *
0000:                3 *      ROUTINE TO PRINT ProDOS     *
0000:                4 *                                  *
0000:                5 *        ERRORS WITH NUMBER        *
0000:                6 *                                  *
0000:                7 *          by Chris Payne          *
0000:                8 *                                  *
0000:                9 *            19-SEP-85             *
0000:               10 *                                  *
0000:               11 ************************************

----- NEXT OBJECT FILE NAME IS PERR.O
0300:         0300   13             ORG    $300

0300:         BE0C   15 PRTERR       EQU    $BE0C
0300:         FDE3   16 PRHEX        EQU    $FDE3
0300:         FD8E   17 CROUT        EQU    $FD8E

0300:A9 00           19             LDA    #$00
0302:48              20 DOIT        PHA
0303:20 8E FD        21             JSR    CROUT
0306:68              22             PLA
0307:48              23             PHA
0308:20 0C BE        24             JSR    PRTERR
030B:68              25             PLA
030C:48              26             PHA
030D:6A              27             ROR
030E:6A              28             ROR
030F:6A              29             ROR
0310:6A              30             ROR
0311:20 E3 FD        31             JSR    PRHEX
0314:68              32             PLA
0315:48              33             PHA
0316:20 E3 FD        34             JSR    PRHEX
0319:68              35             PLA
031A:18              36             CLC
031B:69 01           37             ADC    #$01
031D:D0 E3    0302   38             BNE    DOIT
031F:60              39             RTS

** SUCCESSFUL ASSEMBLY := NO ERRORS
** ASSEMBLER CREATED ON 15-JAN-84 21:28
** TOTAL LINES ASSEMBLED     41
** FREE SPACE PAGE COUNT    89
```

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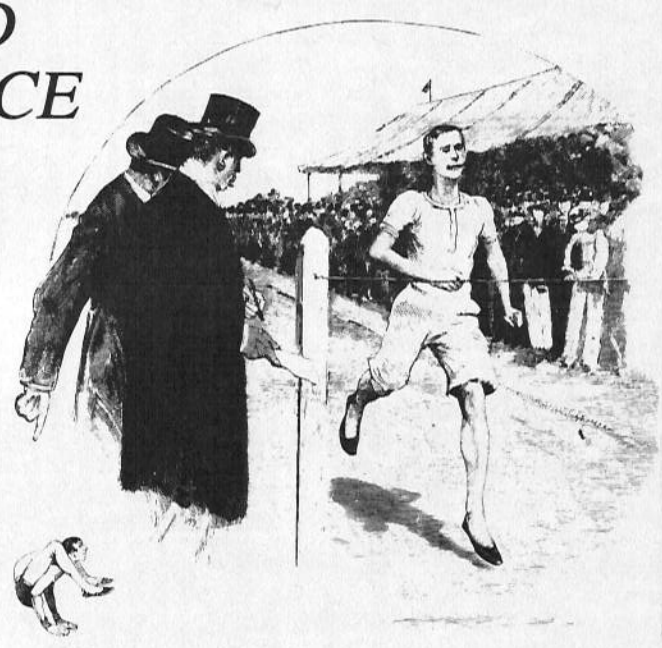

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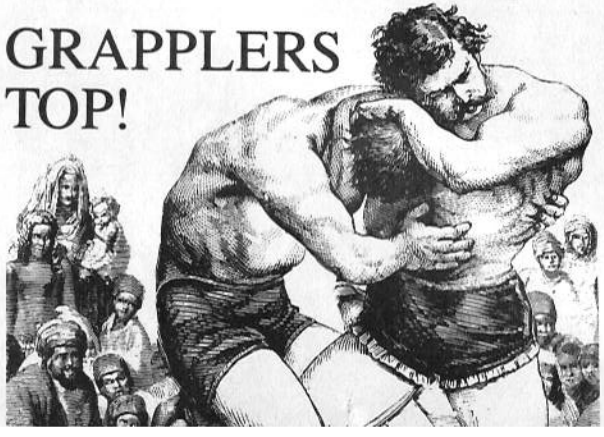

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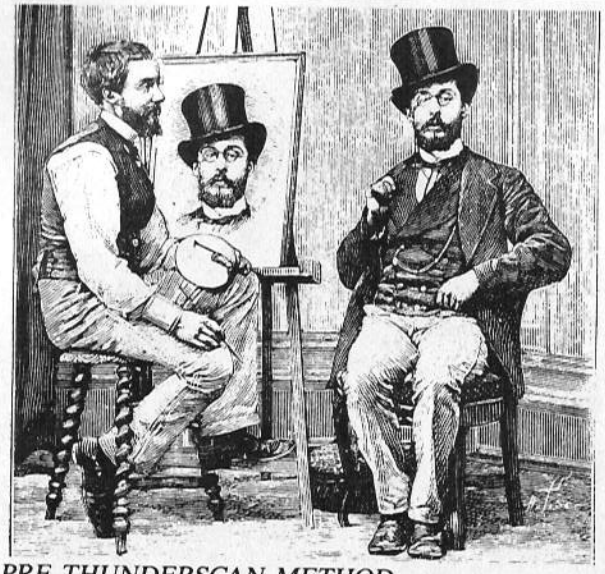

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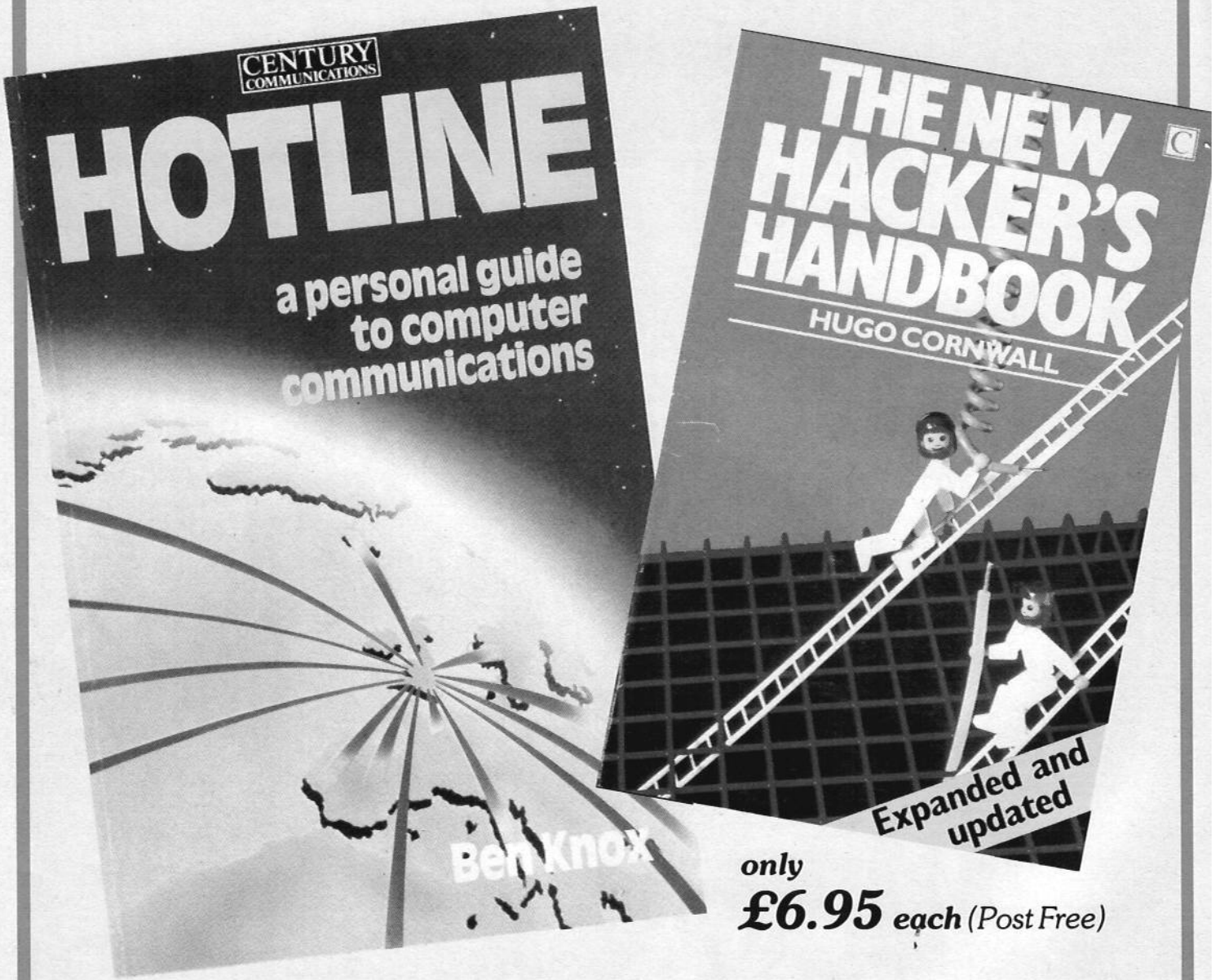

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PLEASE USE THE ORDER FORM ON PAGE 61

Date-stamp your DOS 3.3 files

Martin Kleucker shows how

BACK in February 1983 *Windfall* printed a program to append the date to a file name when saved under DOS 3.3. Here is another 6502 machine code program which will also date-stamp Basic program files but which does not permanently alter DOS.

The program, Listings I and II, once entered and saved to disc, is best BLOADed and executed with a CALL 836 from within a Basic Hello program such as that in Listing III.

It will ask for the date in the format DD.MM.YY. Take care to enter it carefully as no protection is given against false entries. However, an Hello program such as Mike Street's could be used to advantage.

The program will give you the chance to re-enter it because you are asked "OK". If you answer this with a Y the date is put into memory at $300-307 in reverse order. The files will not yet be date-stamped however, because to effect such stamping you have to enter an & followed by a Return if at the keyboard. You will see the message "(C) M Kleucker." From now on files will be date-stamped until you enter another &.

Note that after BLOADing DATER there is no room in page 3 of memory for other programs. However after entering the date the locations $322-368 and $39D-3CF are freed up.

Listing I

```
SOURCE FILE: DATER-SOURCE
0000:            1 *DIESE.PGM.ENTSTAND.NACH
0000:            2 *EINEM.VORSCHLAG.AUS
0000:            3 *all.about.dos.seite.250
0000:            4 *
0000:            5 *DOS_WIRD_BEI_$A397_MIT
0000:            6 *$20_$08_$03_GEPATCHT
0000:            7 *DAS_DATUM STEHT IN_0300-0307
----- NEXT OBJECT FILE NAME IS DATER-SOURCE.OBJ0
0300:            8         ORG  $300
0300:00 00 AE    9         DFB  $00,$00,$AE,$00,$00,$AE,$00,$00
0303:00 00 AE
0306:00 00
0308:8A         10         TXA             ;SAVE X
0309:48         11         PHA
030A:98         12         TYA             ;SAVE Y
030B:48         13         PHA
030C:A0 00      14         LDY  #$00
030E:A2 08      15         LDX  #$08
0310:BD FF 02   16 LOOP    LDA  $2FF,X     ;STORE
0313:99 88 AA   17         STA  $AA88,Y    ;FILENAME
0316:C8         18         INY
0317:CA         19         DEX
0318:D0 F6      20         BNE  LOOP
031A:68         21         PLA             ;Y-REG
031B:A8         22         TAY
031C:68         23         PLA             ;X-REG
031D:AA         24         TAX
031E:AD B6 AA   25         LDA  $AAB6
0321:60         26         RTS             ;TO DOS
0322:           27 *DIESES_PGM_FRAGT_NACH_DEM
0322:           28 *DATUM.
0322:           29 *UND_LEGT_ES_VON
0322:           30 *300-307 AB
0322:           31 *NACH_BOOTEN_AUFRUF_MIT
0322:           32 ****CALL 836
0322:           33 *DANACH_MIT_&_EIN/AUSSCHALTEN
0322:C4 C1 D4   34 TEXT    ASC  'DATE:--,--,--'
0325:C5 BA AD
0328:AD AE AD
032B:AD AE AD
032E:AD
032F:00         35         DFB  00
0330:0F 0B 20   36         DFB  $0F,$0B,$20,$3F
0333:3F
0334:00         37         DFB  00
0335:A8 E3 A9   38         ASC  '(c)       M Kleucker'
0338:A0 CD A0
033B:CB EC E5
033E:F5 E3 EB
0341:E5 F2
0343:00         39         DFB  00
FDED:           40 PRINT   EQU  $FDED
FD0C:           41 GET     EQU  $FD0C
FC58:           42 HOME    EQU  $FC58
0024:           43 CH      EQU  $24        ;CUR.HOR
0300:           44 STORE   EQU  $0300
0344:20 58 FC   45 START   JSR  HOME
0347:20 B5 03   46         JSR  PRNT       ;DATE...
034A:A2 07      47         LDX  #$07       ;7-0
034C:A9 05      48         LDA  #5         ;HTAB5
034E:85 24      49         STA  CH
0350:20 9D 03   50         JSR  GETKEY     ;DAY
0353:20 9D 03   51         JSR  GETKEY     ;MONTH
0356:20 9D 03   52         JSR  GETKEY     ;YEAR
0359:A2 0E      53         LDX  #14        ;OK ?
035B:20 B7 03   54         JSR  PRNT2
035E:20 0C FD   55 QUESTION JSR GET        ;Y/N
```

```
0361:C9 CE      56          CMP  #$CE      ;IS IT N
0363:F0 DF      57          BEQ  START     ;YES
0365:C9 D9      58          CMP  #$D9      ;IS IT Y
0367:D0 F5      59          BNE  QUESTION  ;NO
0369:           60 DATEOFF  EQU  *
0369:A9 83      61          LDA  #>DATEON  ;DATEON
036B:8D F6 03   62          STA  $3F6
036E:A9 03      63          LDA  #<DATEON
0370:8D F7 03   64          STA  $3F7
0373:A9 AD      65          LDA  #$AD
0375:8D 97 A3   66          STA  $A397
0378:A9 B6      67          LDA  #$B6
037A:8D 98 A3   68          STA  $A398
037D:A9 AA      69          LDA  #$AA
037F:8D 99 A3   70          STA  $A399
0382:60         71 PGM.ENDE RTS
0383:A9 20      72 DATEON   LDA  #$20      ;DOSPATCH
0385:8D 97 A3   73          STA  $A397     ;JSR
0388:A9 08      74          LDA  #$08
038A:8D 98 A3   75          STA  $A398     ;
038D:A9 03      76          LDA  #$03
038F:8D 99 A3   77          STA  $A399     ;$308
0392:A9 69      78          LDA  #>DATEOFF
0394:8D F6 03   79          STA  $3F6
0397:A2 13      80          LDX  #19       ;MK-SOFT
0399:20 B7 03   81          JSR  PRNT2
039C:60         82          RTS            ;FINISH
039D:           83 *UNTERPROGRAMME
039D:20 C4 03   84 GETKEY   JSR  GETKEY2   ;ALLOWED
03A0:9D 00 03   85          STA  STORE,X   ;SAVE IT
03A3:20 ED FD   86          JSR  PRINT     ;PRINT IT
03A6:CA         87          DEX
03A7:20 C4 03   88          JSR  GETKEY2   ;GET
03AA:20 ED FD   89          JSR  PRINT     ;PRINT IT
03AD:9D 00 03   90          STA  STORE,X   ;SAVE IT
03B0:E6 24      91          INC  CH
03B2:CA         92          DEX
03B3:CA         93          DEX
03B4:60         94          RTS
03B5:A2 00      95 PRNT     LDX  #00
03B7:BD 22 03   96 PRNT2    LDA  TEXT,X
03BA:           97 *    TXT END?
03BA:F0 07      98          BEQ  PRNTEND   ;YES
03BC:20 ED FD   99          JSR  PRINT     ;NO
03BF:E8        100          INX
03C0:4C B7 03  101          JMP  PRNT2
03C3:60        102 PRNTEND  RTS
03C4:20 0C FD  103 GETKEY2  JSR  GET
03C7:C9 B0     104          CMP  #$B0      ;>= 0 ?
03C9:90 F9     105          BCC  GETKEY2   ;NO
03CB:C9 BA     106          CMP  #$BA      ;<= 9 ?
03CD:B0 F5     107          BCS  GETKEY2   ;NO
03CF:60        108          RTS

*** SUCCESSFUL ASSEMBLY: NO ERRORS
```

Listing II

```
0300- B5 B8 AE B2 B0 AE B0 B2   0368- F5 A9 83 8D F6 03 A9 03
0308- 8A 48 98 48 A0 00 A2 08   0370- 8D F7 03 A9 AD 8D 97 A3
0310- BD FF 02 99 88 AA C8 CA   0378- A9 B6 8D 98 A3 A9 AA 8D
0318- D0 F6 68 A8 68 AA AD B6   0380- 99 A3 60 A9 20 8D 97 A3
0320- AA 60 C4 C1 D4 C5 BA AD   0388- A9 08 8D 98 A3 A9 03 8D
0328- AD AE AD AD AE AD AD 00   0390- 99 A3 A9 69 8D F6 03 A2
0330- 0F 0B 20 3F 00 A8 E3 A9   0398- 13 20 B7 03 60 20 C4 03
0338- A0 CD A0 CB EC E5 F5 E3   03A0- 9D 00 03 20 ED FD CA 20
0340- EB E5 F2 00 20 58 FC 20   03A8- C4 03 20 ED FD 9D 00 03
0348- B5 03 A2 07 A9 05 85 24   03B0- E6 24 CA CA 60 A2 00 BD
0350- 20 9D 03 20 9D 03 20 9D   03B8- 22 03 F0 07 20 ED FD E8
0358- 03 A2 0E 20 B7 03 20 0C   03C0- 4C B7 03 60 20 0C FD C9
0360- FD C9 CE F0 DF C9 D9 D0   03C8- B0 90 F9 C9 BA B0 F5 60
```

Listing III

```
10  PRINT  CHR$ (4)"BLOAD
    DATER"
20  TEXT : HOME
30  POKE 34,16: POKE 32,8:
    POKE 33,40 - PEEK (32):
    CALL 836: TEXT : VTAB 20:
    HTAB 11: & : POKE 37,255:
    NEW
```

appletip

Play a card trick on ROM

WOULDN'T it be great if we could change the routines in ROM? But, alas, as any programmer knows, ROM is unchangeable.

However we can change all this with the help of the language card.

An example is changing the cursor display to inverse instead of flashing.

This sounds like fun, but before jumping with joy, note that this method will not work on language cards that have an autostart monitor mounted on them. At least I don't think it will – try it anyway. Use this method:

CALL -151 (To enter the monitor)
C081:00 (Write enable the card)
D000 <D0000.FFFFM (Copy the monitor and basic into the language card)
Change whatever bytes you want to change. **(FD14:00** will make the cursor inverse)

At this stage the monitor is not affected, so nothing will have happened.

C082:00 (Write protect the card)
C083 and CR (Enter ROM mode)
At this stage all changes made will be noticeable. Remember however that the above method is not permanent.

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CHIT CHAT

Our recent visit to America proved to be very fruitful, with much knowledge to be gained in respect of their computer market, and also about Apple related products. One particular item which caught our eye was a much sought after publication, The Power of Appleworks. This book describes in great detail, and with the use of a demonstration disk, the many uses for this powerful and popular program. At only £29.95 including VAT, it is a must for anyone who is not yet getting the best from Appleworks.

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INSTALL ENHANCED AND STANDARD ROMS IN AN APPLE IIe

By J.R. PARKES

THE Apple IIe enhancement kit consists of two mask ROMs and a 2764 eprom and makes some useful additions to the Apple, but not all software will work correctly with the new ROM set. To date I know of three programs, Applewriter IIe (DOS 3.3 version), CIA kit and Doublestuff which do not work.

As the Apple IIe (PAL video version) stands the Applesoft Basic, monitor ROM and the character generator come in ROMs which are pin-for-pin compatible with 2764 eproms. I decided to fit both sets of ROMs into my Apple without causing any permanent damage to the motherboard.

To do this I used three 27128 eproms in place of the ROMs which form the Basic, monitor and character generator.

27128 eproms are pin-for-pin compatible with 2764 eproms with the exception of pin 26, which is not used on the 2764 eprom, but on the Apple IIe motherboard it is connected to +5v. It is used for address bit 13 on the 27128 eprom.

To fit the 27128 eproms to the motherboard you will need three 28 pin i.c. headers, three 28 pin i.c. sockets, three 7k quarter watt resistors, two changeover switches (RS type 317-263), one four way 0.1 inch plug and socket and some thin wire.

The first thing to do is program the 27128 eproms with both the old and new code. I suggest putting the old code in the bottom 8k and the new code into the top 8k of the 27128 eproms.

While working with the descriptions below, refer to Figures I, II and III.

Fit a 1K resistor between pin 28 and pin 26 on each i.c. header. Don't solder pin 26 end at this stage. Cut off the leg of pin 26 so that it won't make contact with pin 26 on the motherboard socket.

Stand a 28 pin i.c. socket on top of the header, making sure that the pin indents point the same way, then solder all the pins to the header except for pin 26. Solder a foot-long piece of thin wire to pin 26 of the header/socket combination.

Repeat the previous two stages for the remaining two header sockets.

At this point remove the Apple's case and take out the motherboard. Very carefully remove the following ROMs from the Apple motherboard and store in some antistatic foam:

- ROM CD
- ROM EF
- Character generator ROM

Fit the four way connector to a suitable position on the front of the motherboard (I fitted mine on the front edge so that

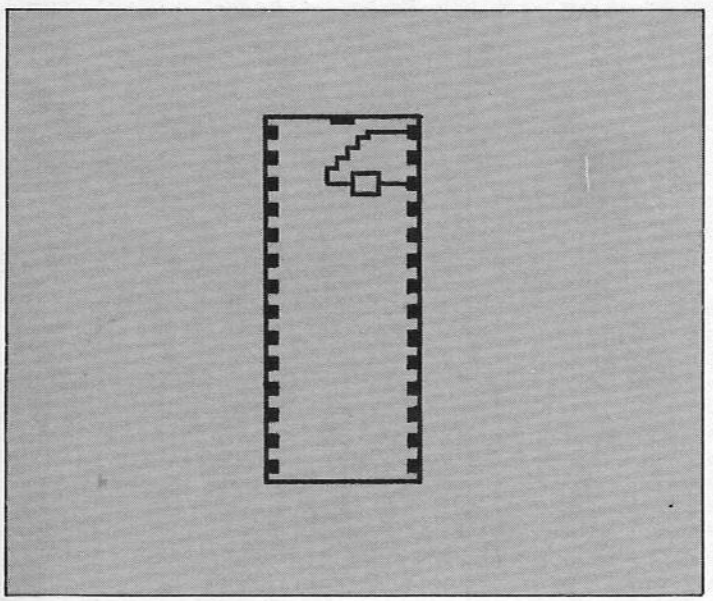

Figure I: Fitting the 1k resistor

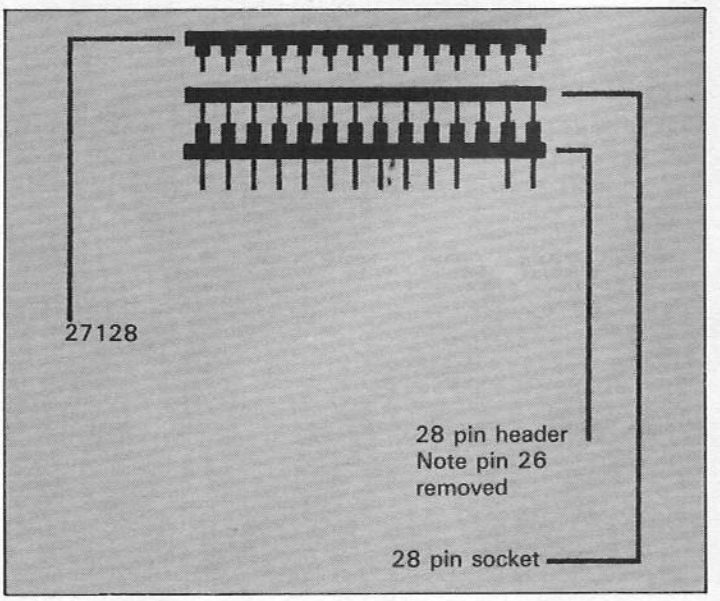

Figure II: Combining eprom, header and socket

when the motherboard is fitted into the case it is close to the font changeover switch, with a piece of double sided tape). On three of the connector pins solder the loose ends from the header/sockets that is one wire per pin. Join the fourth pin to the 0 volt rail on the motherboard.

Fit the two changeover switches in a convenient position. I cut the sloping front panel and fitted the two extra switches next to the font changeover switch. The two switches have the following functions:

- Select either enhanced or standard ROM set.
- Select mouse text or standard character sets.

Using the four way 0.1 inch connector, link the wiper of one switch to the loose wire from pin 26 of the character generator header/socket. Connect one of the other contacts of the switch to 0 volts.

Connect the wiper of the second switch to both of the loose wires from pin 26 of ROM CD and EF. Connect one of the other contacts of the switch to 0 volts.

Fit the header/socket units into the corresponding sockets on the motherboards, making sure that the resistor end is at pin 28 end of the socket on the motherboard. Fit the 27128 eproms into the header/sockets, again making sure they are fitted the right way around.

With everything in place switch on. All should work as normal.

When using the combined ROM Apple don't try changing the Applesoft/monitor switch while the machine is running any program, including any monitor routines, as it will probably bomb out. Always set the switch to the correct ROM set before booting any program.

Changing character sets mid-program is no problem. To test use AppleWriter IIe (DOS 3.3 version) and look at the data line at the top of the screen.

While the Apple is in bits why not fit an extra switch on the sloping front panel so that you can switch off the speaker? Great for late night working!

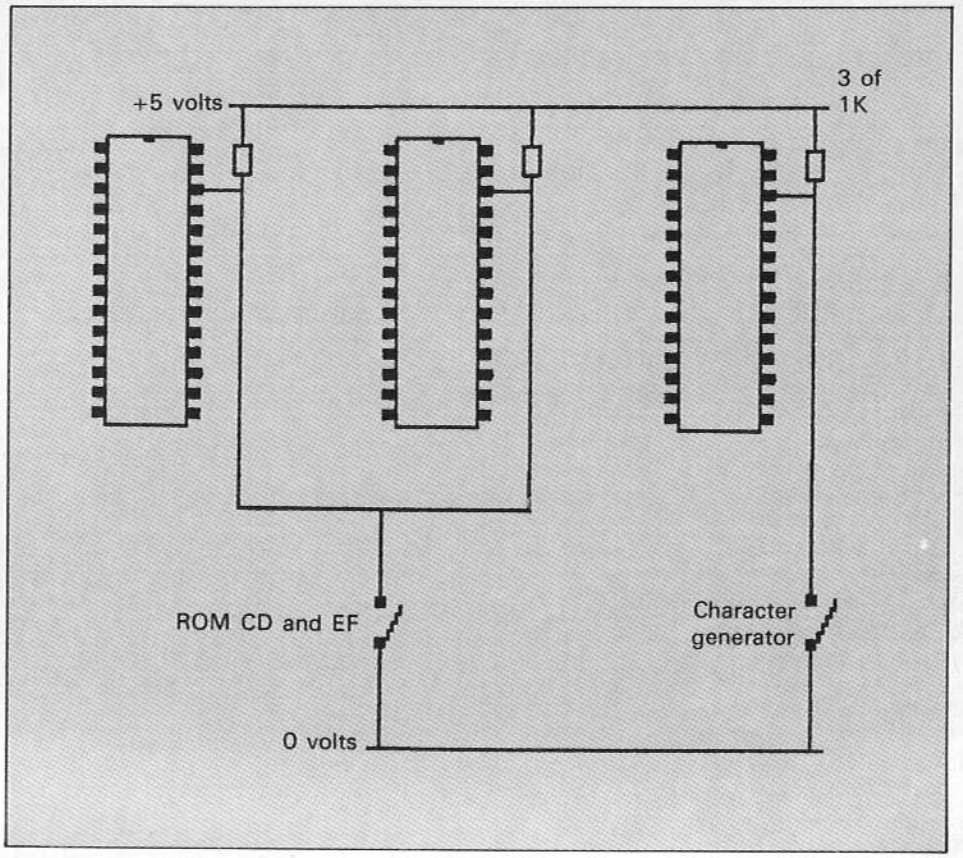

Figure III: The switching arrangements

Modifying the Peanut eprom writer to take 27128 eproms

THE Peanut eprom blower this article refers to is the one with four, 16 pin IC sockets down the left hand edge into which one plugs a dual in-line switch unit which has eight switches. This switch unit is used to select the type of eprom to be worked on.

To carry out this modification requires very careful work and is not recommended for the faint of heart. The following tools must be at hand to perform the modification:

- Small soldering iron.
- Solder sucker.
- Small gauge solder.
- Tube of instant glue.

Remove the eprom writer card from the Apple – switching the power off first – and prepare a suitable working area.

Then carefully remove the zero insertion force socket from the board using the solder sucker.

Locate pin 26 on the card and check that it is joined to pin 28. Using a sharp knife disconnect pin 26 from +5 volts (pin 28) making sure that pin 28 stays connected to +5 volts (check against pin 14 of any TTL chip on the board).

Replace the zero insertion force socket back into the board, and solder all pins except pin 26.

Using super glue stick a small slide changeover switch to the front edge of the zero insertion force socket.

Connect the wiper of the switch to pin 26 of the zero insertion force socket, then connect one side of the switch to +5 volts and the other to 0 volts. Mark the switch so that when the wiper is joined to +5 volts it reads 2764 and the top 8k of 27128 eproms, and when the wiper is joined to 0 volts it reads the bottom 8k of the 27128 eproms.

This completes the modification to the eprom blower.

Use of the dual in-line selection switch is not affected.

When using the eprom writer with 2764 eproms make sure that the new switch is set so that the wiper is joined to +5 volts.

When programming 27128 eproms, select the 2764 option and program once with the switch set to the top 8k and once with the switch set to the bottom 8k – a total of 15 minutes per chip.

Top 8k = new switch wiper joined to +5 volts.

Bottom 8k = new switch wiper joined to 0 volts.

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APPLE IIe with single disc drive. Expanded 80 column card, parallel printer card, Z80 card plus manuals etc. £325. Tel: 049481 3218.

FRANKLIN ACE 1000 computer 64k ram, Apple IIp compatible as new, £100. 16k ram card, £20. Tel: 066689-307 (Glos).

APPLE II EUROPLUS, Apple twin disc drives, Apple monitor, Epson MX80FT printer, accelerator, parallel printer cards, all v.g.c., £690 ono plus software. Apple DMP printer with demo disk, £90. Nigel. 0203 503042.

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APPLE Graphics Tablet, £380. Apple IIp, £399. ICE 20mb 16-user disc, £1690. HAL 4-user 10mb capricorn, £990. Videx Enhancer II, £79. SweetP colour plotter, £149. Aristocard parallel interface, £29. Zappler serial/parallel interface, £39. CCS synchronous serial card, £49. Oki 82A tractor, £19 (pVAT). Tel: Windsor 855073.

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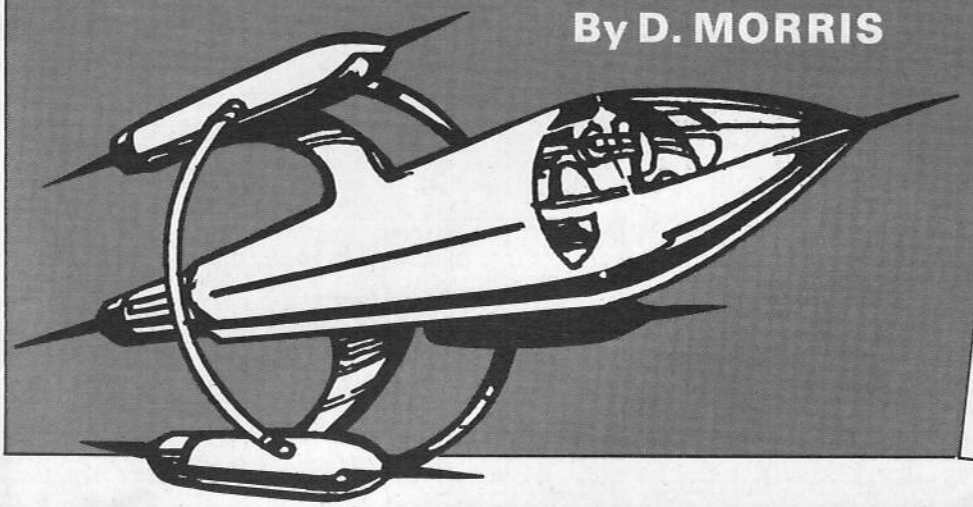
SPACE CARGO

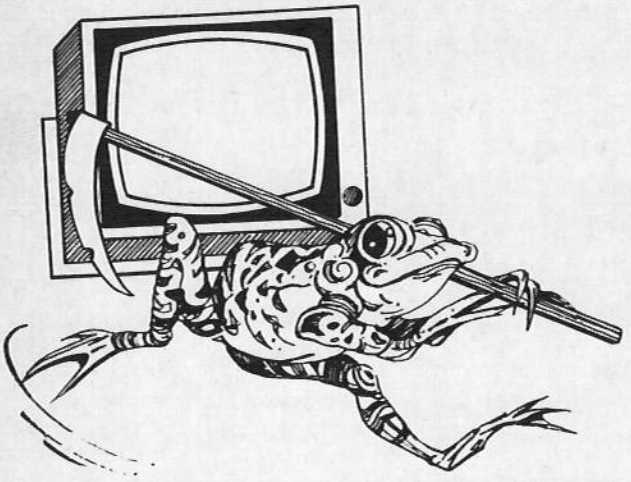
By D. MORRIS



SHORT, simple, using the low resolution screen, this game is worth typing in to your machine. It uses colour but is possible to play on a monochrome screen if you familiarise yourselves with the pattern obtained from different colours.

On our green screen monitor the cargo which you have to pick up appears as the more solid blocks of light.

```
100  TEXT : HOME
110  PRINT  TAB( 12)"SPACE
   PILOT TEST"
120  PRINT  TAB( 18)"III"
130  PRINT : PRINT : PRINT
   "PICKUP CARGO AND AVOID
   HIGH POWER FORCE"
140  PRINT
   "========================
   =============="
150  PRINT  TAB( 17)"FIELDS"
160  PRINT  TAB( 17)"======"
170  PRINT : PRINT " COLOUR
   KEY          *     MOVE
   KEY"
180  PRINT : PRINT " Blue
   Force Field *      I
   Up"
190  PRINT : PRINT " Purple
   Wall         *     M
   Down"
200  PRINT : PRINT " Gray
   Cargo        *     K
   Right"
210  PRINT : PRINT " Orange
   You          *     J
   Left"
220  PRINT : PRINT : PRINT :
   PRINT " Hard(1) -
   Medium(2) - Easy(3) ?";
   GET HM$:HME =  VAL (HM$)
230  IF HME = 3 THEN 270
240  IF HME = 2 THEN 280
250  IF HME = 1 THEN 290
260  GOTO 220
270 EL = 200:M = 20: GOTO
   300
280 EL = 100:M = 40: GOTO
   300
290 EL = 0:M = 50
300  GOSUB 540
310 C = 4:B = 3
320 W = 0:Q = 0:K = 3
330 COL = 7
340  COLOR= COL
350  IF  PEEK ( - 16384) >
   127 THEN  GET AA$
360  IF AA$ <  > "" THEN A =
   ASC (AA$):A = A - 32 * (A
   > 90)
370 D = B:E = C
380  IF A = 73 THEN C = C -
   1
390  IF A = 77 THEN C = C +
   1
400  IF A = 75 THEN B = B +
   1
410  IF A = 74 THEN B = B -
   1
420  IF C < 1 THEN C = C + 1
430  IF C > 38 THEN C = C -
   1
440  IF B < 1 THEN B = B + 1
450  IF B > 38 THEN B = B -
   1
460  GOSUB 730
470  PLOT B,C
480  COLOR= 0
490  FOR CEV = 1 TO EL
500  NEXT CEV
510  PLOT D,E
520  COLOR= COL
530  GOTO 340
540  GR : COLOR= 2
550  HOME
560  FOR P = 1 TO M
570 X =  INT ( RND (1) * 39)
580 Y =  INT ( RND (1) * 40)
590  PLOT X,Y
600  NEXT P
610  FOR T = 1 TO 5
620  COLOR= 5
630 Y =  INT ( RND (1) * 26)
   + 2
640 X =  INT ( RND (1) * 37)
   + 1
650  PLOT X,Y
660  NEXT T
670  COLOR= 3
680  HLIN 0,39 AT 0
690  HLIN 0,39 AT 39
700  VLIN 39,0 AT 0
710  VLIN 39,0 AT 39
720  RETURN
730 Q = Q + 1: IF  SCRN(
   B,C) <  > 5 THEN 760
740  PRINT  CHR$ (7);
750 W = W + 1: IF W = 5 THEN
   790
760  IF  SCRN( B,C) <  > 2
   THEN  RETURN
770 K = K - 1: IF K = 0 THEN
   850
780  PRINT  CHR$ (7);:
   RETURN
790  TEXT : HOME
800  PRINT : PRINT : PRINT :
   PRINT : PRINT "Well done.
   You have completed your"
810  PRINT
   "Space-Pilot-Test.  You
   have scored a"
820  PRINT "mark of ";:
   FLASH : PRINT 600 - Q:
   NORMAL
830  FOR I = 1 TO 1500: NEXT
   I
840  PRINT : PRINT "
   The End": GOTO 890
850  TEXT : HOME : PRINT :
   PRINT : PRINT : PRINT :
   PRINT "I am sorry to say
   that this test craft"
860  PRINT "can't take this
   much battering.  After"
870  PRINT "destroying 3
   high power force fields"
880  PRINT "it has blown up
   with you in it!!!"
890  PRINT : PRINT : PRINT
   "Do you want to play
   again?  Y/N?"
900  GET GAM$: IF GAM$ <  >
   "" THEN G =  ASC (GAM$):G
   = G - 32 * (G > 90)
910  IF G = 89 THEN  GOTO
   100
920  HOME : END
```



Lowdown on leap years

Keep a date with MIKE STREET

I HAVE been concerned to see a number of incorrect references to dates and leap years in *Apple User*. One such error was to suggest that the year 2000 is not a leap year.

A year is a leap year if its last two numbers are exactly divisible by four, unless it is a "century year" when the entire year number must be exactly divisible by 400.

Thus the years 1700, 1800, 1900 and 2100 are not leap years, whereas the year 2000 is a leap year. (An interesting side point is that the first year of the 21st century is 2001 and not the year 2000.)

I have been programming ICL mainframes for the last 13 years and think that the old 1900 series had a very neat solution to dates and date handling problems.

On these machines the standard method of holding dates on files was as a number of days since 31/12/1899, that is 01/01/1900 was day 1. Thus given a date in the format DD/MM/YYYY it is easy to convert it to a number of days and calculate the day of the week on which it falls (01/01/1900 was a Monday) or the number of days between two dates.

This program illustrates the idea and is valid for any date from 01/01/1900 to 31/12/2099.

Program listing

```
10  PRINT "THIS PROGRAM WILL
    CONVERT A DATE OF"
20  PRINT "THE FORM
    DD/MM/YYYY TO 'NUMBER OF
    DAYS"
30  PRINT "SINCE 31/12/1899'
    (I.E. 01/01/1900 = 1)"
40  PRINT "OR RETURN THE
    DATE REPRESENTED BY A"
50  PRINT "NUMBER FROM 1 TO
    73049 - I.E."
60  PRINT "FROM 01/01/1900
    TO 31/12/2099"
70  PRINT "IT WILL ALSO
    RETURN THE DAY OF THE"
80  PRINT "WEEK FOR THE
    REQUIRED DATE"
85  PRINT : PRINT "NOTE THAT
    01/01/1900 WAS A MONDAY,"
90  PRINT "AND THAT 1900 WAS
    NOT A LEAP-YEAR"
95  PRINT : INPUT "PRESS
    'RETURN' TO CONTINUE";C$
110  DIM SD(13),DW$(8)
115  REM  SD(N) = NO. OF
    DAYS IN YEAR BEFORE
    01/N/1900
117  REM  DW$(N) = DAY OF
    WEEK
120 SD(1) = 0:SD(2) =
    31:SD(3) = 59:SD(4) =
    90:SD(5) = 120:SD(6) =
    151:SD(7) = 181
130 SD(8) = 212:SD(9) =
    243:SD(10) = 273:SD(11) =
    304:SD(12) = 334:SD(13) =
    365
140 DW$(0) = "SUNDAY":DW$(1)
    = "MONDAY":DW$(2) =
    "TUESDAY"
150 DW$(3) =
    "WEDNESDAY":DW$(4) =
    "THURSDAY":DW$(5) =
    "FRIDAY":DW$(6) =
    "SATURDAY"
160  TEXT : HOME : PRINT
    "DATE CONVERSION PROGRAM
    - CONVERT TO"
170  PRINT " "
180  PRINT "NUMBER OF DAYS
    SINCE 31/12/1899  - N"
190  PRINT "DAYS TO DATE IN
    CHARACTERS        - C"
200  PRINT "QUIT THIS
    PROGRAM                -
    Q"
210  PRINT " "
220  INPUT "ENTER YOUR
    CHOICE - ";C$
230  IF  LEFT$ (C$,1) = "C"
    THEN  GOSUB 1020: GOTO
    120
```

This is one of hundreds of programs now available FREE for downloading on MicroLink

```
240  IF  LEFT$ (C$,1) = "N"
    THEN  GOSUB 2020: GOTO
    120
250  IF  LEFT$ (C$,1) = "Q"
    THEN  END
260  PRINT "INVALID - ENTER
    C OR N"
270  GOTO 220
1000  REM  CONVERT 'DAYS
    SINCE 31/12/1899' TO
1010  REM  CHARACTER DATE
1020  PRINT "DATE TO BE
    CONVERTED"
1030  INPUT " - NNNNN ";ND$
1040 ND =  VAL (ND$)
1045  REM  ALLOW 01/01/1900
    TO 31/12/2099 ONLY
1050  IF ND < 0 OR ND >
    73049 THEN 1230
1060 YR% = 0
1065  REM  1461 DAYS EVERY 4
    YEARS
1067  REM  CATER FOR 1900
    NOT A LEAP-YEAR
1069  REM  FIND YEAR
    REQUIRED
1070  IF ND > 365 THEN YR% =
    INT ((ND * 100 - 36525) /
    36525 + 1)
1080  IF ND < 366 THEN ND =
    ND - 1
1085  REM  FIND DAY IN YEAR
1090 ND = ND - ( INT ((YR% -
    1) * 365.25) + 365)
1100 DA% = 0
1110  IF YR% = 4 *  INT (YR%
    / 4) THEN DA% = 1
1115  REM  IF LEAP-YEAR ADD
    1 TO START DAYS FOR MARCH
    TO DECEMBER
1120  IF DA% = 1 AND YR% > 1
    THEN  FOR X = 3 TO
    13:SD(X) = SD(X) + 1:
    NEXT
1130  FOR X = 1 TO 13
1135  REM  FIND MONTH
    REQUIRED
1140  IF SD(X) > ND - 1 THEN
    GOTO 1180
1150  NEXT
1160  PRINT "SUB ERROR"
1170  GOTO 1230
1175  REM  FIND DAY OF MONTH
1180 ND = ND - SD(X - 1)
1190 DA$ =  RIGHT$ ("00" +
    STR$ (ND),2) + "/" +
    RIGHT$ ("00" +  STR$ (X -
    1),2) + "/" +  STR$ (YR%
    + 1900)
1200  PRINT "CHAR. DATE -
    ";DA$
1210  GOSUB 1520
```

What it offers the Apple user . . .

Electronic mail is much cheaper than the post

Sending mailbox messages to other subscribers, whose numbers are rapidly growing, is the cheapest form of communication possible. You can send a message of any length to another mailbox for less than the cost of a first-class stamp. And it doesn't cost a penny more to send the same message to 500 different mailboxes! Even a message sent to a mailbox on the other side of the world only costs 30p.

The biggest bulletin board of them all

The number of bulletin boards is growing rapidly. The only snag is that the vast majority are single-user boards – which means lots of other people are also trying to make contact and all too often all you get is the engaged tone. But with the MicroLink bulletin board there is no limit to the number of people using it at the same time. And no limit to the number of categories that can be displayed on the board.

Give your micro mainframe power

With MicroLink your micro becomes a terminal linked directly to the Telecom Gold mainframe computer, and able to tap its tremendous power and versatility. Right away you'll be able to use giant number-crunching programs that can only run on a mainframe.

The mailbox that is always open

MicroLink is in operation 24 hours a day, every day. That means you can access your mailbox whenever you want, and from wherever you are . . . home, office, airport – even a hotel bedroom or golf club! No-one needs to know where you are when you send your message.

We're only a local phone call away

The majority of MicroLink subscribers can connect to our mainframe computer in London by making a local phone call. This is possible because they use British Telecom's PSS system, which has access points all over Britain. A local phone call is all you need, too, for direct access via MicroLink to all the other countries belonging to the international Dialcom system.

Telemessages – at a third off

The modern equivalent of the telegram is the telemessage. Send it before 10pm and delivery is guaranteed by first post the following day (except Sunday). The service was intended for people phoning their message to the operator, which costs £3.50 for 50 words. But you can now use it via MicroLink, for only £1.25 for up to 350 words! For an extra 65p your message can be delivered in an attractive greetings card.

Go teleshopping on your micro

With MicroLink you can study the British Rail timetable – and then buy your ticket in advance. You can book theatre tickets. And even order a bouquet of flowers. It's all part of the tele-shopping revolution!

Send and receive telex messages

With MicroLink you can turn your micro into a telex machine, and can send and receive telex messages of any length. You will be able to communicate directly to 96,000 telex subscribers in the UK, 1½ million worldwide – and even with ships at sea via the telex satellite network. Business people can now send and receive telexes after office hours, from home or when travelling.

What does it all cost?

Considering all the services you have on tap, MicroLink is remarkably inexpensive. You pay a once-only registration fee of £5, and then a standing charge of just £3 a month. On-line costs are 3.5p a minute (between 7pm and 8am) or 11p a minute during office hours. There is an additional 2.5p a minute PSS charge if you are calling from outside the 01- London call area. Charges for telex, telemessages and storage of files are given on the next page.

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Initial registration fee: £5.

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Cheap rate is from 7pm to 8am, Monday to Friday, all day Saturday and Sunday and public holidays; Standard rate is from 8am to 7pm, Monday to Friday, excluding public holidays.

Filing charge: 20p per unit of 2,048 characters per month.
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Telex registration: £10.

Outgoing telex: 5.5p per 100 characters (UK); 11p per 100 (Europe); 18p per 100 (N. America); £1.25 per 400 (Rest of world); £2.75 per 400 (Ships at sea).
Deferred messages sent on the night service are subject to a 10 per cent discount.

Incoming telex: No charge.

It is not possible to deliver a telex without a mailbox reference. If a telex is received without a mailbox reference the sender will be advised of non-delivery and asked to provide a mailbox address.
Each user validated for telex and using the facility will incur a charge of 6 storage units a month. Further storage charges could be incurred depending on the amount of telex storage and the use made of short code and message file facilities.

MicroLink PSS service: 2.5p per minute or part (300 baud); 3p per minute or part (1200/75 baud).
Only applies to users outside the 01-London call area.

Telemessages: £1.45 for up to 350 words.
Telemessages can be sent with an illustrated greetings card for 75p extra.

Radiopaging: No charge.
If you have a BT Radiopager you can be paged automatically whenever a message is waiting in your mailbox.

International Mail: For the first 2,048 characters – 20p to Germany and Denmark; 30p to USA, Australia, Canada, Singapore, Hong Kong and Israel. For additional 1,024 characters – 10p; 15p.

These charges relate to the transmission of information by the Dialcom service to other Dialcom services outside the UK and the Isle of Man. Multiple copies to addresses on the same system host incur only one transmission charge.

Billing and Payment: All charges quoted are exclusive of VAT. Currently all bills are rendered monthly.

Software over the telephone

MicroLink is setting up a central store of software programs which you'll be able to download directly into your micro. The range will include games, utilities, educational and business programs, and will cover all the most popular makes of micros.

Talk to the world – by satellite

MicroLink is part of the international Dialcom network. In the USA, Australia and a growing number of other countries there are many thousands of users with electronic mailboxes just like yours. You can contact them just as easily as you do users in Britain – the only difference is that the messages from your keyboard go speeding around the world via satellite.

What you need to access MicroLink

You must have three things in order to use MicroLink: a computer (it can be any make of micro, hand-held device or even an electronic typewriter provided it has communications facilities), a modem (it can be a simple Prestel type using 1200/75 baud, or a more sophisticated one operating at 300/300 or 1200/1200 baud), and appropriate communications software.

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✓ I confirm that I accept the terms and conditions for the time being in force, a copy of which are available on request.

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Account Number

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* *Overseas subscribers only*

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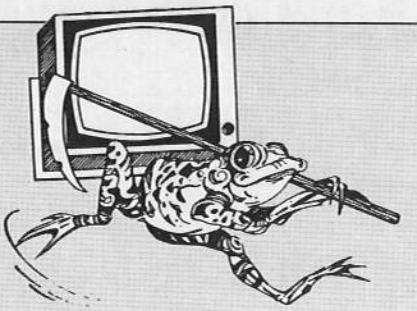
(✓) □ **C. Please invoice the company/authority.**
If you select this option, which is ONLY AVAILABLE to government establishments and Public Limited Companies, we will require an OFFICIAL ORDER to accept unspecified amounts.

```
1220  GOTO 1240
1230  PRINT "DATE ERROR -
   ";ND$
1240  INPUT "PRESS 'RETURN'
   TO CONTINUE";C$
1250  RETURN
1500  REM  CALCULATE DAY OF
   THE WEEK
1510  REM   01/01/1900 WAS A
   MONDAY
1520 J =  VAL (ND$)
1530 K = J - ( INT (J / 7) *
   7)
1540  PRINT "DAY OF WEEK -
   ";DW$(K)
1550  RETURN
2000  REM  CONVERT CHARACTER
   DATE TO
2010  REM  'DAYS SINCE
   31/12/1899'
2020  INPUT "DATE TO BE
   CONVERTED - DD/MM/YYYY
   ";DA$
2030 D% =  VAL ( MID$
   (DA$,1,2))
2040 M% =  VAL ( MID$
   (DA$,4,2))
2050 YR% =  VAL ( MID$
   (DA$,7,4))
2060  IF M% < 1 OR M% > 12
   THEN 2190
2070  IF D% < 1 THEN 2190
2075  REM  IS MONTH FEBRUARY
   ?
2080  IF M% = 2 AND D% = 29
   THEN 2100
2085  REM  IS DAY > MAX.
   DAYS IN MONTH ?
2090  IF D% > (SD(M% + 1) -
   SD(M%)) THEN 2190
2100  IF YR% < 1900 OR YR% >
   2099 THEN 2190
2105  REM  IS THIS A
   LEAP-YEAR ?
2110 L% =  INT ((YR% - 1900)
   / 4) * 4 + 1900
2115  REM  FIND DAYS TO
   START OF YEAR
2120 DS =  INT ((YR% - 1901)
   * 365.25 + 365)
2125  REM  1900 WILL GIVE
   NEGATIVE
2130  IF DS < 0 THEN DS = DS
   + 1
2135  REM  FIND DAYS TO
   START OF MONTH AND ADD
   DAY OF MONTH
2140 DS = DS + SD(M%) + D%
2145  REM  ADD 1 IF
   LEAP-YEAR AND MARCH TO
   DECEMBER
2150  IF L% = YR% AND YR% >
   1900 AND M% > 2 THEN DS =
   DS + 1
2155  REM  CO-ERCE DATE TO 5
   CHARACTERS
2160 BD$ =  RIGHT$ ("00000"
   +  STR$ (DS),5)
2170  PRINT "BINARY DATE -
   ";BD$
2180  GOTO 2200
2190  PRINT "DATE ERROR -
   ";DA$
2200  INPUT "PRESS 'RETURN'
   TO CONTINUE";C$
2210  RETURN
```



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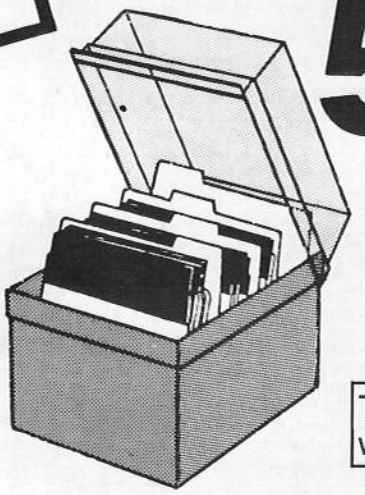

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PINPOINT

ACCESSORIES, COMMUNICATIONS AND MUCH MORE

Stand-alone or integral with AppleWorks.

PinPoint provides desk-top accessories and communications which become an integral part of AppleWorks. A single key press gives you access to:
Communications
Calculator
Appointment diary/calendar
Notepad
Typewriter
QuickLabel
Graphics/Text Merging

PLUS: SPELLING CHECKER

PINPOINT provides communications with electronic mail/telex services such as One-to-One, Telecom Gold and EasyLink from within AppleWorks and is as easy to use as AppleWorks itself. It will directly transmit an AppleWorks Word Processor file. There is no text-file creation necessary, simply use the arrow keys to point to the file to transmit. Messages received are automatically saved as AppleWorks WP files. And all without quitting AppleWorks.

PINPOINT POP-UP SPELLING CHECKER

You can now Spell check within AppleWorks without leaving your document. There is no need to save, print or create a text file. One keypress selects PinPoint. A further single keypress selects the Spelling checker. You can check an entire document, just a paragraph or just a word, with a single keypress. You can even check the spelling of a word in a Spreadsheet cell or a DataBase field.

When a spelling is faulty the pop-up speller will suggest up to 10 alternatives for automatic correction or you can easily add the word to the dictionary. Or you can edit the word yourself.

The Spelling checker is an optional add-on to Pinpoint and is dedicated for AppleWorks.

Both PinPoint and the Spelling checker are particularly suited for use with extended memory peripherals such as RamWorks, Z-RAM and RamFactor . . .

MEMORY MANAGEMENT with Pinpoint RAM Enhancement Kit:

This is a utility program which gives much more flexibility and ease of use when using Ramdisks.

The RamFactor card can be automatically partitioned via its own on-board firmware. RamWorks and Z-RAM are usually used as a total memory area for expanded AppleWorks (or other single program such as Supercalc 3a) or a single RamDisk.

Using the PinPoint RAM Enhancement Kit enables RamWorks and Z-RAM to be easily partitioned into two areas: typically one area for expanded AppleWorks and the second area as a Ram-Disk containing often-used files. The RAM Enhancement Kit enables a startup disk to be created which will automatically load the required files into RAM on boot-up. A typical configuration would be for a 1 Meg RamWorks to have 700K available to Expanded AppleWorks and 320K designated as a Ram Disk. The Ram Disk has been set to auto-load the PinPoint accessories (including the spelling checker and its 50,000 word dictionary) plus two standard letter formats, and two spreadsheet templates. On boot-up, all these are automatically loaded into RAM, saving later disk access and giving fast loading into the AppleWorks desktop directly from the Ram disk. (AppleWorks recognises the Ramdisk directly).
PINPOINT requires a IIc or Enhanced IIe with at least 128k of RAM.

Prices: (excluding VAT)
PinPoint £69.00
PinPoint Pop-up Spelling Checker £69.00
PinPoint Ram Enhancement Kit £29.00
(included free with PinPoint to Z-RAM/RamWorks owners)
IIe Enhancement Kit (4 chips) £59.00

MULTISCRIBE

MultiScribe gives you MacWrite on the Apple IIe or IIc.

MultiScribe uses the double hi-res screen to provide multiple fonts, and sizes, proportional spacing and shadow and outline printing – just like MacWrite!

Plain Text
Bold
Italics
Underline
Shadow
Outline
Subscript

With MultiScribe you don't have to use a mouse. All functions and pull-down menus are easily accessed via the keyboard. Plus, as well as 10 fonts provided, there's even a font editor so you can create your own. All this on a full feature word processor.

MultiScribe works with a IIc or 128k IIe and most dot matrix printers and interface cards. You can even use MultiScribe to customise files created on other word processors such as AppleWorks or AppleWriter – in fact any word processor that can save text as a text file. Give your old files new life with the attractive, attention-getting fonts and print-styling available only with MultiScribe.
(MultiScribe can also save text as text files for transfer to other programs.)

For all its sophisticated features, MultiScribe is remarkably easy to learn and use. There are no complicated control codes to learn.
Macintosh-style pull-down menus provide you with all the word processor commands you'll ever need – without leaving your document. And MultiScribe feature advanced visually-oriented text editing commands, like cut & paste and ruler-based text formatting.

IF YOU'RE AFRAID OF MICE, DON'T WORRY

With MultiScribe you have the option of using a standard keyboard or a mouse. You can use your mouse to pick and click commands from the pull-down menus, or use the keyboard to simulate mouse action. And for advanced users, MultiScribe offers keyboard equivalents for most commands, allowing you to by-pass the pull-down menus.

With MultiScribe you can change type styles easily, on the screen and on your printouts. With a few simple keystrokes or mouse clicks, you can change that humdrum print into fancy fonts – like Old English, business quality print, foreign language characters or maths and engineering symbols. Ten fonts are included but if you don't like any of them, then you can create your own (or edit an existing font), with MultiScribe's FontEditor. For education the FontEditor can be used to create maths, physics, chemistry and biology fonts while for business use, the FontEditor can be used to create logos and letterheads.

MultiScribe can even be "Ram-Driven" with RamWorks, Z-RAM or RamFactor, and accelerated with TransWarp.

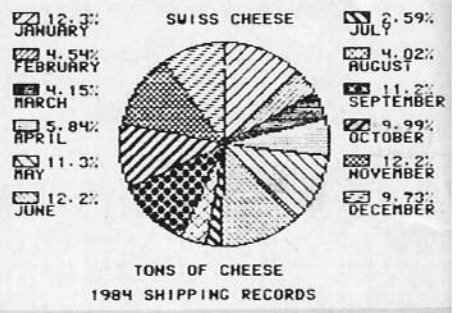
And all this for just £59.00.

No wonder Nibble magazine gave MultiScribe 5 apples – its highest rating.

Price: (excluding VAT)
MultiScribe £59.00

GRAPHWORKS

GraphWorks is the graphics program for AppleWorks.



GraphWorks has been developed to offer business graphics capabilities for AppleWorks Users.
GraphWorks is a stand-alone program which directly accesses AppleWorks spreadsheet files and plots them as four graph types: bar, stacked-bar, line and pie charts.

Price: (excluding VAT)
GraphWorks £79.00

ProFILER 2.1

ProDos DataBase for Apple II computers

ProFiler 2.1 is a data manager/report generator which is intermediate in terms of power and ease of use between simple file systems such as Quickfile/AppleWorks and complex, truly powerful databases such as dBaseII and Omnis.

The structure of ProFiler is a flat-file system with the ability to merge two files. It also provides a mail-merge facility with AppleWriter II, and will accept database files from AppleWorks.

ProFiler 2.1 has been designed for ease of use, is menu driven with help screens available at key points. It is programmed on a single floppy disk with hard disk transfer capabilities for increased storage and speed.

Key features are:
Maximum records per file: 64,000. (Subject to available space on your disk (floppy or hard disk)).

Maximum pages per record: 8 (16 in 40 column mode).

Maximum fields per record: 250.

Index fields per record: 3.

Search: Maximum of 10 search criteria per record. (Browse and/or report).

Report: Free-Form or columnar. Calculated fields on columnar report plus averages, counts and totals.

Mail-Merge: With AppleWriter II Version 2.0 (ProDos). (Use the Convert utility for Dos 3.3 version).

Import Data: Accepts AppleWorks' DataBase files directly. Will also accept text file input. (And can output as text file).

Price: (excluding VAT)
ProFiler 2.1 ..... £99.00

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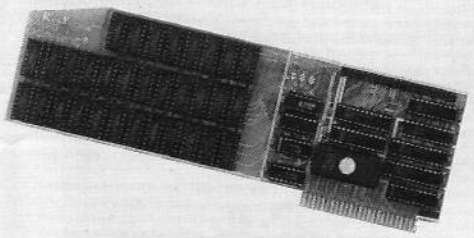
RAMFACTOR

Compatible with IIe and II+



RAMFACTOR FOR APPLEWORKS ON THE II+

While RamWorks is the clear winner for the auxiliary slot of a IIe, Ramfactor sets the standard for IIe main slots and the II+.

Like RamWorks and Z-RAM, RamFactor follows the Apple software standard. Ramfactor also follows the Apple II Memory Expansion standard for Ram cards.
This permits the organisation of the memory into multiple work areas containing different programs and operating systems. It also permits limited expansion of AppleWorks 1.3 or later.

With RamFactor, you'll be able to instantly add another 256k, 512k or 1 Meg onto the main board of your IIe or II+.
And as it's socketed you can upgrade your RamFactor at any time.

Virtually all modern software is already automatically compatible with RamFactor: software such as AppleWorks, PinPoint, SuperCalc 3a, ProFiler, Catalyst 3.0 and more.

PROGRAM FLIPPING

RamFactor can be organised into a maximum of nine partitions. Each partition functions as a separate RamDisk which may be configured for either ProDos, Dos 3.3 or Pascal 1.3. This enables you to switch between programs and operating systems at electronic speeds.

APPLEWORKS POWER

RamFactor now includes software which enables AppleWorks to run on the II+.

So, with RamFactor you don't need any further software to run AppleWorks on your II+. And RamFactor expands AppleWorks as well:

RamFactor gives AppleWorks a larger desktop, increases AppleWorks' internal memory limits so that the Word Processor can have 5,300 lines, and the database 5,300 records. Plus it also automatically loads AppleWorks into RAM and so accelerates AppleWorks by eliminating program disk access. It will also auto-segment large files across 2 or more floppy disks. It even provides the time and date on the screen with virtually any ProDos compatible clock.

Unlike RamWorks, however, the AppleWorks must be version 1.3 or greater. And you still require an 80 column card (for the II+ we recommend ViewMaster). You also require a 16k language card in Slot 0 (or the TransWarp accelerator in slot 0).

Prices: (excluding VAT)

256k RamFactor	£239.00
512k RamFactor	£289.00
1 Meg RamFactor	£369.00

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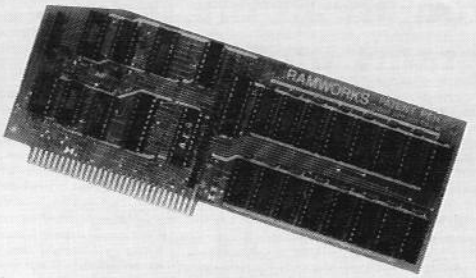
RAMWORKS

Compatible with IIe



RAMWORKS GOES UP TO 3 MEG

RAMWORKS is the sensational best selling memory card for the Apple IIe. Not only does RamWorks enhance and expand a vast array of other programs, it gives enhancements and expansion to AppleWorks that no other card can match or even come close.

No wonder people say: RamWorks for AppleWorks!

RamWorks plugs into the Apple IIe auxiliary slot and functions EXACTLY like Apple's extended 80 column card. But with RamWorks you get more memory, 80 column text, AppleWorks enhancements for ALL versions of AppleWorks, plus room to grow without using more slots. A design so advanced there's a patent on it.

Key features include:
(send for a more complete list of features, or see July or August issues of *Apple User*)

- Accelerates AppleWorks by eliminating disk access
- Increases AppleWorks Database to over 15,000 records
- Increases AppleWorks Word Processor to over 15,000 lines
- Increases AppleWorks Clipboard to 2000 lines or records
- Built-in AppleWorks printer buffer (for Super Serial Cards)
- Auto-segments large files so that files greater than disk capacity can be spread over two or more disks
- Expands ALL versions of AppleWorks – V1.0, V1.1, V1.2, V1.3 (and greater)
- Displays time and date on AppleWorks screen with any ProDos compatible clock
- Compatible with ALL IIe hardware (except Slot 3) including hard disks, Unidisk, Transwarp, Pro-App, modems etc, etc.

PLUS EVEN MORE MEMORY:

RamWorks is now RamWorks III. And that means all the above features plus increased memory above 1 Meg. 1.5 Meg RamWorks and 3 Meg RamWorks are now available:

Prices: (excluding VAT)

256k RamWorks	£219.00
512k RamWorks	£269.00
1 Meg RamWorks	£369.00
1.5 Meg RamWorks	£539.00
3 Meg RamWorks	£1299.00

HARD DISK FITS MACINTOSH PLUS APPLE IIE AND APPLE IIC

Finding a reliable and affordable hard disk for your Apple computer is now a whole lot easier with the arrival of the Pro-App 10 and 20 Megabyte hard-disk systems.

The new Pro-App hard disk is fully compatible with Apple IIe, Apple IIc and Macintosh Plus. (Macintosh 128 and 512 compatibility coming soon).

The Pro-App uses the latest hard-disk technology to improve the compatibility between Apples and Macs. Further, it uses Apple's own Unidisk controller to eliminate memory conflicts on the IIc and so provide a reliable hard-disc.

Interfaces and operating systems:

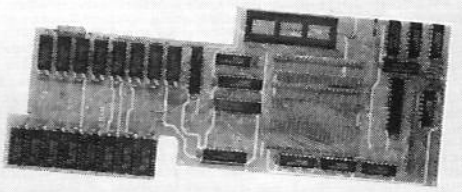
Macintosh Plus: High-speed SCSI interface.
Apple IIc: Connects to the external disk drive port on IIc. IIc MUST be Unidisk compatible. Operating systems: ProDos, Pascal 1.3 & Dos 3.3
Apple IIe: Connects to a Unidisk controller card. Operating systems: ProDos, Pascal 1.3 & Dos 3.3

The Pro-App follows the current Apple styling and is supplied with cables, manuals and software. (You may need a controller card for the IIe.)

Prices: (excluding VAT)
(Specify cable kit required/computer)

10Mb Hard Disc System	£795.00
20Mb Hard Disk System	£995.00
IIe UniDisk Controller Card	£49.00
IIc UniDisk Control Upgrade Chip	£19.00

THE 1 MEGABYTE IIC IS HERE WITH NEW Z-RAM II



Z-RAM is the supreme champion when it comes to expanding the IIc and making it more powerful. But now Z-RAM II is here, and that adds a whole EXTRA MEGABYTE to your IIc.

AppleWorks is expanded to a desktop size of 800k (that's nearly 16 times bigger than a standard IIc), PLUS you can run CP/M programs like dBase II and Wordstar.

Or you could have a half-Meg AppleWorks desktop, with a quarter-Meg RamDisk set aside to store accessories and communications such as PinPoint and its pop-up Speller, plus a 50,000 word dictionary plus a few files. And all this running at electronic speed on a IIc with no need for an external disk drive. (And there's a 64k (max) print buffer included for AppleWorks).
Z-RAM is fully compatible with Pro-App Hard Disks.

You don't know how good a IIc is, until you've seen it with Z-RAM.

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

For AppleWorks expansion – see details under RamWorks (or see July or August issues of *Apple User*).

Prices: (excluding VAT)

256k Z-RAM II (with CP/M)	£359.00
512k Z-RAM II (with CP/M)	£419.00
768k Z-RAM II (with CP/M)	£459.00
1 Meg Z-RAM II (with CP/M)	£599.00
640k IIc (IIc with 512k Z-RAM fitted)	£899.00
1152k IIc (IIc with 1 Meg Z-RAM fitted)	£1059.00

If you are in the habit of drawing schematic diagrams up to 38 feet square you could do worse than follow Bill Allen's example and take a look at . . .

LogiMac, a digital logic design aid

IN common with many electronic engineers, I frequently have to produce schematics of digital circuits. Of course, it is possible to do this using MacPaint or, better still, Mac Draw.

However, when I heard of the LogiMac package from Capilano Computing, this promised to be not only useful for drawing schematics, but could simulate their operation as well. Chris Dewhurst kindly sent me LogiMac for review, and I've been looking at it in some depth over the past months.

LogiMac is intended as a drawing aid, providing predefined symbols for common logic gates and devices, and a design aid, by allowing realistic simulations of circuit operation. This seemed to be pretty ambitious for a package costing only $59.95, so I set about exploring its capabilities with some degree of scepticism.

LogiMac is intended to be used on either a 128k or 512k Mac, and I was able to check this, since I upgraded my Mac halfway through the review. It even works quite comfortably with the 2mb memory that I now have.

The main problem I had during the first couple of weeks was with losing all my signal names. In the end this turned out to be due to the fact that I hadn't correctly entered a Return after each name. This was easily remedied by running LogiMac through the Localizer.

One thing that particularly intrigued me was that LogiMac was written in Modula-2, and so the package includes a file called LogiMac!, which is the Modula-2 interpreter (courtesy of Modula Corporation) which excutes the code in the LogiMac file.

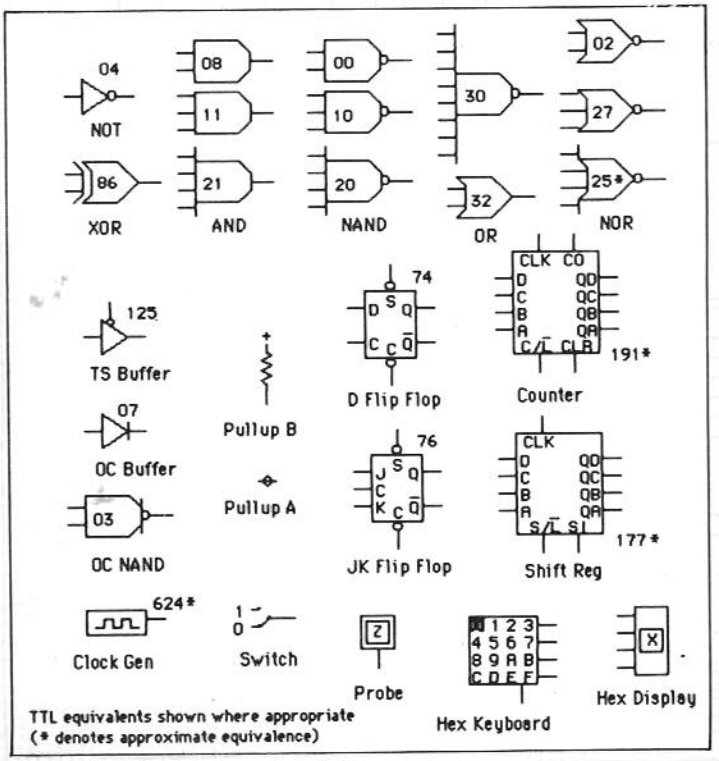


Figure I: LogiMac's gates and devices

Effectively, LogiMac provides us with a drawing area which isn't restricted by the size of the Mac's screen, but may be up to 38 feet by 38 feet. What is important is not the overall size of the drawing, but the complexity of it, and this is where the larger memory Mac has the advantage. Also the processing time increases quite dramatically for complex circuits.

On to this huge drawing board we can place any of the gates and other devices that LogiMac provides and a grid is used to aid with accurate positioning.

Figure I shows these circuit elements and, where a TTL equivalent exists, its number is also indicated. I had only two minor criticisms of this set of "building bricks".

The first was the rather unconventional nature of the Pullup A, which is intended to be used in those situations where the usual Pullup B would cause too much crowding on the schematic (the two pullups behave in exactly the same way).

In those cases where a signal requires tying directly to a logic 1 or logic 0, we simply label the inputs with the special reserved names 1 and 0.

The other criticism was that the use of the abbreviation C instead of, say, CLK or CK for the clock inputs of the flip flops could lead to confusion for beginners, since the Clear input is also labelled C.

However in the text the clear inputs are referred to as R for Reset. Labelling the Set/Reset inputs on the flip flops as S/R respectively should eliminate any confusion.

When all the required elements have been placed on the drawing area – using the mouse, of course – they are interconnected by the usual dragging operation, using the pointer icon.

If any signal lines or elements need to be removed we simply edit after changing from the pointer to the zap icon. At all times the circuit is "live", so signal changes can be observed while modifying connections.

There are two basic ways in which the circuit's operation can be monitored. One is to attach logic probes at various points around the circuit, and the other – much more useful – way is to generate logic analyser-style timing diagrams. In which case it is necessary to designate titles to each of the appropriate signal lines using the name (that is pencil) icon.

This is really quite straightforward, but I must admit to having a little difficulty because I kept forgetting to press the Return key after first pointing to a line then entering the signal name from the keyboard. I would enter maybe 20 or 30 signal names then lose the lot when I came to run the simulation.

It may be worth highlighting this particular part of the LogiMac manual. On the other

hand, the problem could be avoided by detecting any movement of the mouse (or click on its button) and, if Return hadn't already been pressed at the end of a name, a brief warning message could be given.

As each signal name is entered on the circuit diagram it appears on the timing diagram as well. Finally we run the simulation and the timing diagrams are generated automatically. Figure II shows a screen dump of the circuit and timing diagrams for a simple three bit counter, which is one of the demonstration files that is provided with LogiMac.

The generation of the timing diagrams and the propagation delay of the various gates in the circuit are central issues in the effectiveness of the simulation. Therefore it is worth looking at these in more detail.

The timing diagrams obviously show high, low (that is logic 1, 0), but also a further three different signal states – high impedance, don't know, and conflict. The LogiMac manual gives a concise explanation of situations in which states can occur. It should be pointed out at this stage that the manual is really quite a good tutorial on digital electronics.

The resolution of the timing display can be selected from two screen dots per unit time interval to 10 dots. Also the optional screen reference graticules can be placed at various fixed time intervals, or at positions where a selected signal rises or falls.

These graticules are very useful for comparing the relative timing of various signals on the timing diagram. Under default conditions all devices with inputs and outputs have propagation delay of one time interval, which can readily be changed (to a maximum of 127) using the Delay option in the Modify menu.

This delay will apply whenever andy change of input signal causes a corresponding change in the output. There is no provision for different delay values between different combinations of pins, or for different values between low-to-high and high-to-low transitions.

However to provide such a feature would make the whole package much more complex to use, and I think it was wise to limit the facilities in this area.

Obviously, most users aren't going to be satisfied with just looking at the timing diagram as it is generated on the Mac's screen, so it is worth mentioning the way in which hard copies of the circuit and the timing diagram can be produced.

The circuit itself is Saved by LogiMac as a file – most conveniently, on the external drive – and this can be edited easily. When you want to dump the circuit to the printer a separate picture file has to be created, which then has to be dumped via MacPaint.

In practice, this procedure needn't be too much of a chore – if you're using a 512k Mac, the Switcher can make the changeover between LogiMac and MacPaint quite straightforward.

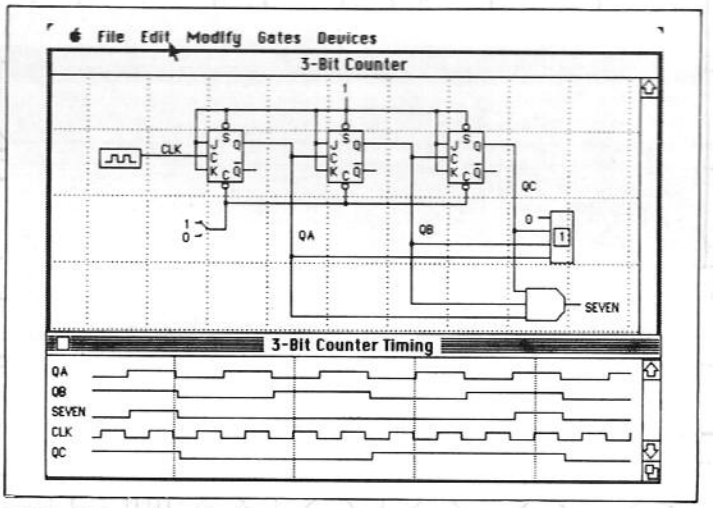


Figure II: Sample output

Also, of course, if there is enough spare memory, the Mac.Memory.Disk program from Assimilation Inc. can be used to great advantage.

I encountered another problem at this stage. When working with a circuit diagram much larger than the Mac's screen it is likely that the whole diagram cannot be accommodated by a single MacPaint page (8in by 10in), so it is necessary to define which area of the schematic will be dumped. The manual explains how this can be done by using the Set Page command before Save Circuit

This sets the page boundary so that the top left corner of the page coincides with that of the current circuit window display. The boundary is then displayed in the circuit window as a grey outline, and all circuit items within this boundary will appear within the circuit file.

In practice there isn't a Set Page option, but a Show Page one instead. These are obviously ment to be the same, but more detailed explanation should be given to the user.

The main difficulty is that the grey outline is so faint that it is very difficult to see. Also the outline can only be seen by scrolling the screen. It would have been far better to have the whole area inside the page boundary shaded a light grey – then it would have been easier to see (without the need for scrolling).

This was one real difficulty I experienced with LogiMac, and could be easily remedied by accessing the appropriate routine from the Mac's toolbox ROM.

Another feature of LogiMac which can cause problems is that any line which becomes joined to another, intentionally or accidently, effectively becomes part of that line. This means that if an error is made and the erroneous line is zapped all lines connected to it disappear as well.

It would have been far better to allow the zap to erase a section of line only as far as the nerest devices or junctions.

The only other awkward feature was that the usual cut-and-paste features have not yet been implemented.

This means that instead of being able to create a moderately complex circuit – such as a 3-to-8 line decoder – only once, then copy-and-paste to repeat it as many times as required, it was necessary to go through the whole circuit again.

This would make a tremendous difference to the ease with which LogiMac could be applied to very large, especially repetitive circuits.

One last feature that should be considered is the provision of macros. Imagine being able to replace a large block of circuitry, for example the decoder mentioned above, by a "black box" with the equivalent inputs and outputs.

I realise that this would be quite difficult to implement, and that it might not be feasible if Capilano are wanting to keep the cost of LogiMac at its present, very competitive, level. I could learn to live without macros, but only if the cut-and-paste facilities were fully implemented!

So much for how LogiMac is used, and one or two criticisms. Just how useful is it? First of all I looked at the package from the viewpoint of someone teaching logic circuitry. Obviously there can never be a subsitute for wiring together real logic gates and tracing round the circuit with an oscilloscope.

On the other hand only the best equipped laboratories have logic analysers with which to obtain a permanent record of the timing at various points around the circuit. Also the ability of LogiMac to vary the propagation delay of the gates over a wide range allows such problems as race hazards to be illustrated very conveniently.

In this connection it is worth pointing out that Capilano provides several very good demonstration files with the package. So, without reservation, I would say that LogiMac has a great future as an educational package for teaching logic design.

The next viewpoint I took was that of someone who wanted to have a detailed look at a logic circuit which had been

developed empirically, but which sometimes gave problems, such as the appearance of an unexpected glitch.

What I was looking at was a circuit which was part of an eprom emulator board I designed for my Apple II+. I have used this a lot in various hardware projects, and it does work very well. However this glitch occasionally shows up, and I did want to know why it occurred.

Of course a more experienced logic designer would probably have spotted the problem right away, but I resorted to LogiMac to do a simulation of the offending bit of circuit, and was able to play around with the propagation delay of the various gates in the circuit and figure out exactly what was causing the problem.

In cases like this it is often simply a question of changing a gate for a faster one – for example, LS gate by one from the ALS or F series.

The last viewpoint is that of someone requiring to carry out the design and simulation of a moderately complex circuit containing, say, more than 100 gates. What was attempted here was the simulation of a rather complicated interface circuit that one of my students is trying to construct. When completed it will form part of an "under the hood" 68000 attached processor board for the Apple II+ or IIe.

Who knows how successful the whole project will be, because many problems are yet to be overcome. But the particular circuit we looked at is vital, and so we spent quite a lot of time on this simulation.

Because of the complexity of the circuit the macro facility mentioned earlier, or even a fully implemented cut-and-paste, would have made the job an awful lot easier. Nevertheless, we persevered, and carried out a complete simulation of the circuit – that is, we generated a full set of timing diagrams at various points around the circuit.

Mind you, the processing time became very long. Whether this is a result of having used Modula-2 I'm not sure – maybe some of the code can be tweaked or rewritten in machine code to make it faster.

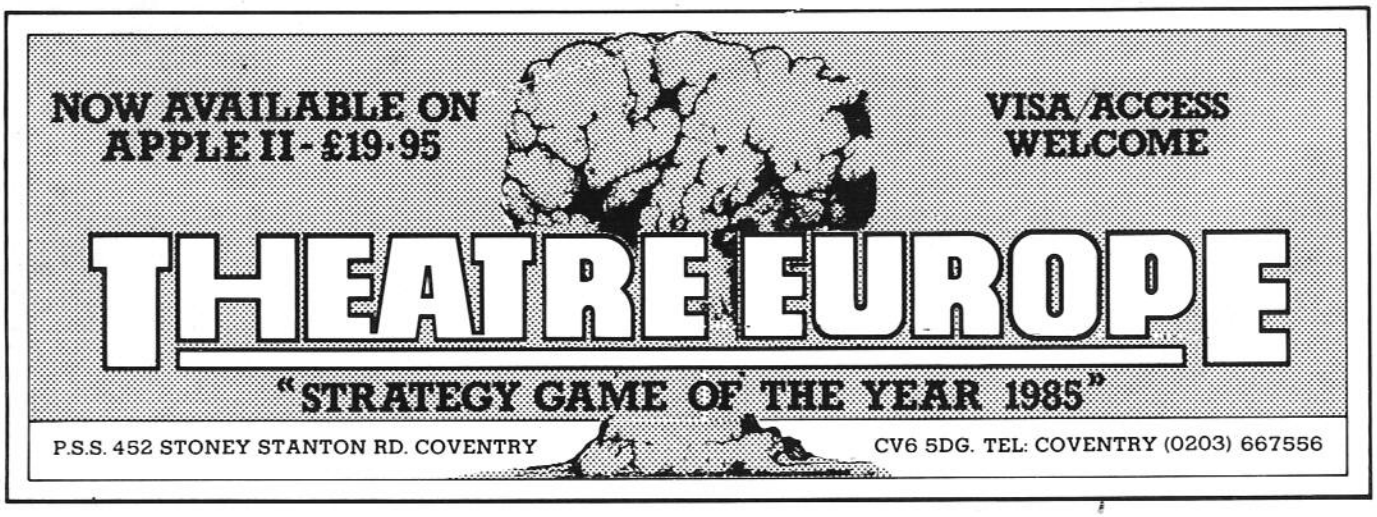
Having satisfied ourselves that the circuit should work, we went ahead and constructed it – and, miraculously, it really did work!

At this point the case for using LogiMac could have rested, but we went a stage further and used a logic analyser on the circuit to generate the same timing diagrams we had already simulated. It was very encouraging to see that the two corresponded, and this seems to confirm that LogiMac can be used for realistic logic design, albeit with a few reservations about its ease of use.

Overall then, it would be fair to say that LogiMac is not a fully developed professional package that full-time logic designers would be happy to use. However for "the rest of us" it is a very useful package for teachers of logic design and for the hobbyist or anyone else who wants to design and simulate digital logic circuitry on an occasional basis. In view of its very competitive pricing, it surely must be a great success in the education market.

I'd like to thank Chris Dewhurst for giving me the opportunity to review LogiMac, and to Richard McLoughlin for his patient work on the project.

Product: LogiMac
Price: $59.95 ($200 for educational licence)
Supplier: Capilano Computing Systems Ltd., PO Box 86971, North Vancouver, B.C., Canada V7L 4P6. Tel: 0101 604 669 6343.



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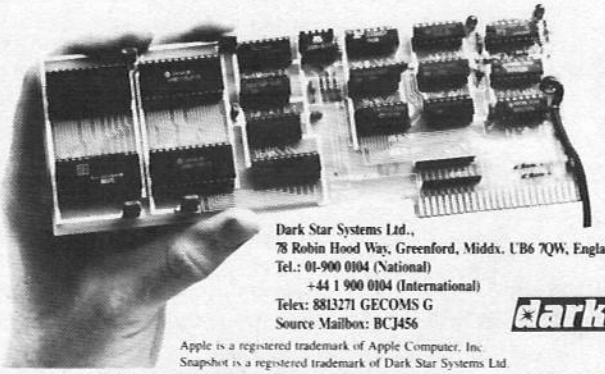

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How to prepare a cash flow budget

MOST businesses can benefit from preparing and using a cash flow budget. Big companies use them as a matter of routine in order to plan and control their income and expenditure.

Small businesses may feel that they can manage without a budget, but if they ask for an overdraft the bank may want to see their cash flow budget and, if necessary, will help them to prepare it.

The trouble with most cash flow budgets found in books on accounting or on the use of spreadsheets is that they start with the amounts expected to be paid and received in each month, rather than with the invoices. And very few of them account properly for the impact of VAT on cash flow.

The budget shown in the adjoining table is based on an actual business but the figures have been simplified. The arithmetic is easy; the difficulties lie in getting the pattern right.

Using a spreadsheet to set out the figures helps to establish the pattern and to correct errors at an early stage. More important, by amending a few basic figures the impact on cash flow can be seen in a matter of seconds.

The figures in column B are based on the company's annual budget for sales and costs. In the example the figures are rounded off to the nearest £1,000, but in practice more detailed figures could be used. The budget is compiled by converting these annual figures into cash flow.

The first step is to set out the pattern of sales on row 3. It is inaccurate to divide the total sales by 12 and put the same amount in each month. Instead the sales in previous years should be analysed to establish the percentage of total sales invoiced in each month.

In the example the monthly figures have been rounded off the nearest 1 per cent. In practice at least two significant figures are advisable. Note that August is a short month, owing to the annual holiday. Column O is used to check that the total of columns C to N add up to 100 per cent. The formula in O3 is SUM(C3:N3) but IF(SUM(C3:N3)=B3, "Correct", "Wrong") could be used instead to display confirmation or an error message.

The invoiced sales on row 5 are based on the pattern in row 3. The formula in cell C5 is B5*C3. This formula is copied across to column N leaving B5 unchanged in each formula. Again column O checks the total of C to N.

The next step is to establish the pattern of payments from customers. This can be done by examining the sales ledgers to find out what proportion of the customers pay promptly in the month following the date of the invoice and how many take two months and three months. These proportions are entered in cells B7 to B9.

If some customers take more than three months another row could be allowed, or better still, credit control should be tightened.

Thus the sum invoiced out in January in cell C5 gives rise to cash flow in February, March and April. The relevant cells are outlined in the table to show the link. The formula in D7 is C5*B7, the formula in E8 is C5*B8 and the formula in F9 is C5*B9. These formula are copied across columns D to N leaving cells B7, B8 and B9 unchanged on each row.

In order to enter correct figures in cells C7, C8, C9, D8, D9 and E9, the invoiced sales figures for October, November and December of the previous year are needed. The example assumes that the figures in those three months were the same as the projected sales for the last three months of this year. The figures are shown in italics as a reminder that this is not strictly correct.

In practice adding across columns C to N of rows 7 to 9 might give answers that do not balance exactly with the budgeted sales for the year.

Row 11 show the sum of the cash flows entered in rows 7 to 9. Row 12 adds 15 per cent to the figures in row 11 to show the total including VAT. These figures have been rounded off for display purposes, so the total in column O does not exactly match the total of the displayed numbers. However, it is near enough for practical purposes.

If preferred, the Integer or Round function could be used to round off the figures on row 12. The total would then be correct, but the rounding could give minor errors in subsequent rows.

For a business that deals wholly or partially with exempt or zero-rated goods and services, the VAT calculations should be adjusted accordingly. For a mixed business it would be necessary to have two separate totals for the taxed and untaxed items.

The next stage is to deal with the variable costs, the ones which vary in proportion to the level of sales. In a manufacturing business the main variable is the cost of materials, but there may be others such as fuel and carriage. In a wholesale or retail business the main variable cost is that of the goods bought for resale.

In the example the variable costs are set at 50 per cent of sales, a common figure for many manufacturing businesses. The formula in B17 is B5*0.5, so if the total sales in B5 is altered the variable costs in B17 will change.

The pattern of invoices received for variable costs is based on the pattern of invoiced sales, but staggered back three months. In other words the materials bought in January will be manufactured into products invoiced out in April. The stagger interval can be altered to suit different businesses.

Rows 19 to 21 display the cash flow of payments for the variable costs. The figures are calculated in a similar manner to those for income from sales, although the pattern in cells B19 to B21 is different from the pattern in cells B7 to B9. Again, the italicised figures in cells C19, C20, C21, D20, D21 and E21 should be based on purchases in the last three months of the previous year. Row 23 shows the sum of the cash flows in rows 19 to 21.

The next step is to deal with the fixed costs which do not vary in proportion to the level of sales. In the example the totals for which invoices are expected to be received in each month are entered on row 25. In practice the items could be put on separate rows headed advertising, bank charges, interest, insurance, gas, electricity, rent, rates, postage, telephone, and so on.

Row 27 shows the amounts expected to be paid in each month for the fixed costs. For simplicity, the example assumes that all the items are paid in the month following receipt of the invoice, but more rows could be used for items which are paid in

By Geoff Wood

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Month	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2	SALES														
3	Pattern %	100%	10%	7%	9%	8%	10%	7%	8%	6%	8%	10%	9%	8%	100%
4															
5	Invoices	2000	200	140	180	160	200	140	160	120	160	200	180	160	2000
6	Cash In:-														
7	1 Month	50%	*80*	100	70	90	80	100	70	80	60	80	100	90	1000
8	2 Months	30%	*54*	*48*	60	42	54	48	60	42	48	36	48	60	600
9	3 Months	20%	*40*	*36*	*32*	40	28	36	32	40	28	32	24	32	400
10															
11	Sub-total	2000	174	184	162	172	162	184	162	162	136	148	172	182	2000
12	plus VAT	2300	200	212	186	198	186	212	186	186	156	170	198	209	2300
13															
14	VARIABLE COSTS														
15	Pattern %	100%	8%	10%	7%	8%	6%	8%	10%	9%	8%	10%	7%	9%	100%
16															
17	Invoices	1000	80	100	70	80	60	80	100	90	80	100	70	90	1000
18	Cash Out:-														
19	1 Month	50%	*45*	40	50	35	40	30	40	50	45	40	50	35	500
20	2 Months	25%	*18*	*23*	20	25	18	20	15	20	25	23	20	25	250
21	3 Months	25%	*25*	*18*	*23*	20	25	18	20	15	20	25	23	20	250
22															
23	Sub-total	1000	88	80	93	80	83	68	75	85	90	88	93	80	1000
24	FIXED COSTS														
25	Invoices	260	20	20	30	20	40	20	20	10	20	20	30	10	260
26	Cash Out:-														
27	1 Month	260	*10*	20	20	30	20	40	20	20	10	20	20	30	260
28															
29	Grand total	1260	98	100	113	110	103	108	95	105	100	108	113	110	1260
30	plus VAT	1449	112	115	129	127	118	124	109	121	115	124	129	127	1449
31															
32	Pay Days	50	5	4	4	5	4	4	5	2	4	5	4	4	50
33															
34	Wages	250	25	20	20	25	20	20	25	10	20	25	20	20	250
35	Salaries	120	10	10	10	10	10	10	10	10	10	10	10	10	120
36	Holiday pay	20				2		1		15				2	20
37															
38	Total pay	390	35	30	30	37	30	31	35	35	30	35	30	32	390
39															
40	Total O'flow	1839	147	145	159	164	148	155	144	156	145	159	159	159	1839
41															
42	VAT in	300	30	21	27	24	30	21	24	18	24	30	27	24	300
43	VAT out	189	15	18	15	15	15	15	18	15	15	18	15	15	189
44															
45	VAT in-out	111	15	3	12	9	15	6	6	3	9	12	12	9	111
46	To customs	111			27			36			15			33	111
47															
48	Total O'flow	1950	147	145	186	164	148	191	144	156	160	159	159	192	1950
49															
50	Balance	350	53	67	0	34	38	21	42	31	-4	12	38	18	350
51	Cumul.Bal.		53	120	120	154	192	213	255	286	282	294	332	350	
52															

Cash flow budget

the second or third month after receipt of the invoice.

Rows 23 and 27 are then added to give a grand total for variable and fixed costs in row 29. Row 30 adds 15 per cent to these figures to show the amount including VAT. Again, these figures have been rounded off for display purposes, so the total does not exactly balance with the number displayed in cell 030. However the discrepancy is negligible.

Strictly speaking some of the purchases may be zero rated or exempt from VAT. If such purchases are a significant amount of the total they should be entered in a separate section so that no VAT is added to the cost.

Row 32 shows the number of pay days in each month. Note that there are only two pay days in August because of the annual holiday.

Total wages for the year are shown in cell B34. The annual total is then apportioned across columns C to N using row 32 as the basis, so the formula in cell C34 is B34/B32*C32. This is copied across columns D to N leaving B34/B32 unchanged in each formula but changing C32 on a relative basis for each column.

Total salaries for the year are shown in cell B35. Since they are paid monthly the total is divided by 12 to obtain the monthly amount. The formula in cells C35 to N35 is B35/12.

Holiday pay is entered into the appropriate columns of row 36. The total of the wages, salaries and holiday pay is then shown in row 38.

The total pay is added to the total of the fixed and variable costs to show the total outflow in row 40. The formula in B40 is B30+B38. This is copied across columns C to N on a relative basis.

Next comes the tricky problem of calculating the VAT payable once a quarter. Many people make the mistake of basing these sums on the cash flow shown in rows 11 and 29, but VAT payments are based, not on cash flow, but on invoices. The fact that the VAT invoiced to customers has not been collected or that the VAT invoiced from suppliers has not been paid is of no concern to HM Customs and Excise.

Columns C to N of row 42 show the VAT receivable from the invoiced sales. The formula in B42 is B5*0.15. This is copied across columns C to N on a relative basis.

Columns C to N of row 43 show the VAT payable on the invoiced purchases. The formula in B43 is (B17+B25)*0.15, which is copied across columns C to N on a relative basis.

Row 45 is the difference between row 42 and row 43. The formula in B45 is B42-B43, which is also copied across columns C to N on a relative basis.

Row 46 shows the quarterly amount of VAT payable. Note that the amount in each quarter is the total of the three previous months, thus the formula in H46 is E45+F45+G45. This is copied into K46 and N46 on a relative basis. The amount shown in E46 must take account of the VAT calculation for December of the previous year.

Row 48 shows the grand total outflow. The formula in B48 is B40+B46. This is copied across columns C to N on a relative basis.

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Row 50 shows the difference between the total inflow and the grand total outflow. The formula in B50 is B12-B48, again copied across columns C to N on a relative basis.

Finally, row 51 shows the cumulative total balance. The formula in C51 is C50+B51, copied across columns D to N on a relative basis.

It can be seen that even though the business is not seasonal, the cash flow is better in some months than in others. By changing the figure in B5 it is easy to see the impact on cash flow of a rise or fall in total sales. Similarly, changes can be made to the pattern of sales on row 3 or to the pattern of cash flow in cells B7 to B9 and/or B19 to B21.

Preparing a cash flow budget forces managers to think about the business. It shows where the peaks and troughs of cash flow are likely to occur and helps in planning capital expenditure, dividend payments and arranging loans.

But that is not all. The cash flow budget provides a plan against which actual cash flow can be compared on a month-by-month and cumulative basis.

Most spreadsheet programs make it easy to transfer the budget figures for each month into a separate worksheet so that an adjacent column can be used to enter the actual data. A third column can then show the difference between budget and actual. Major variances may highlight the need for appropriate action to correct a problem.

A cash flow budget does not of itself prevent cash flow problems, but it does give advance warning so that action can be taken in good time.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Month	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Check
2	SALES														
3	Pattern %	100%	10%	7%	9%	8%	10%	7%	8%	6%	8%	10%	9%	8%	
4															
5	Invoices	2000	200	140	180	160	200	140	160	120	160	200	180	160	Wrong
6	Cash In:-														
7	1 Month	50%	*80*	100	70	90	80	100	70	80	60	80	100	90	Right
8	2 Months	30%	*54*	*48*	60	42	54	48	60	42	48	36	48	60	Right
9	3 Months	20%	*40*	*36*	*32*	40	28	36	32	40	28	32	24	32	Right
10															
11	Sub-total	2000	174	184	162	172	162	184	162	162	136	148	172	182	Right
12	plus VAT	2300	200	212	186	198	186	212	186	186	156	170	198	209	Right
13															
14	VARIABLE COSTS														
15	Pattern %	100%	8%	10%	7%	8%	6%	8%	10%	9%	8%	10%	7%	9%	
16															
17	Invoices	1000	80	100	70	80	60	80	100	90	80	100	70	90	Wrong
18	Cash Out:-														
19	1 Month	50%	*45*	40	50	35	40	30	40	50	45	40	50	35	Right
20	2 Months	25%	*18*	*23*	20	25	18	20	15	20	25	23	20	25	Right
21	3 Months	25%	*25*	*18*	*23*	20	25	18	20	15	20	25	23	20	Right
22															
23	Sub-total	1000	88	80	93	80	83	68	75	85	90	88	93	80	Right
24	FIXED COSTS														
25	Invoices	260	20	20	30	20	40	20	20	10	20	20	30	10	Right
26	Cash Out:-														
27	1 Month	260	*10*	20	20	30	20	40	20	20	10	20	20	30	Right
28															
29	Grand total	1260	98	100	113	110	103	108	95	105	100	108	113	110	Right
30	plus VAT	1449	112	115	129	127	118	124	109	121	115	124	129	127	Right
31															
32	Pay Days	50	5	4	4	5	4	4	5	2	4	5	4	4	Right
33															
34	Wages	250	25	20	20	25	20	20	25	10	20	25	20	20	Right
35	Salaries	120	10	10	10	10	10	10	10	10	10	10	10	10	Right
36	Holiday pay	20				2		1		15				2	Right
37															
38	Total pay	390	35	30	30	37	30	31	35	35	30	35	30	32	Right
39															
40	Total O'flow	1839	147	145	159	164	148	155	144	156	145	159	159	159	Right
41															
42	VAT in	300	30	21	27	24	30	21	24	18	24	30	27	24	Right
43	VAT out	189	15	18	15	15	15	15	18	15	15	18	15	15	Right
44															
45	VAT in-out	111	15	3	12	9	15	6	6	3	9	12	12	9	Right
46	To customs	111			27			36			15			33	Right
47															
48	Total O'flow	1950	147	145	186	164	148	191	144	156	160	159	159	192	Right
49															
50	Balance	350	53	67	0	34	38	21	42	31	-4	12	38	18	Wrong
51	Cumul.Bal.		53	120	120	154	192	213	255	286	282	294	332	350	350
52															

Excel Cash Flow. The formula in O3 is IF(SUM(C3:N3)=B3, "Right", "Wrong"). Similar formulae are entered in most of the other cells in column O.

EXCEL owners who try out the cash flow budget will find that the suggested formula IF(SUM(C3:N3)=B3, "Correct", "Wrong") displays the answer Correct on all the rows in column O except rows 3, 15 and 50. This will not happen with Multiplan, nor with spreadsheet programs for the Apple II.

To illustrate this problem in Excel, create a worksheet as follows. Enter the number 1 in rows 1 to 10 of column A. In A12, enter SUM(A1:A10) which will display the answer 12. Type this number in A13. In A15, enter the formula IF(A12=A13, "Correct", "Wrong"), displaying the answer Correct. In A17, enter the formula A12-A13, displaying the answer 0.

Try changing the numbers in A1 to A10 from 1 to 0.1 and change A13 to 1 (the number displayed in A12). Now A15 will display the answer Wrong and A17 will display the very small number -1E-16. Try changing the numbers again from 0.1 to 0.5 and change A13 to 5. This time the answer is Correct. Change from 5 to 4.9 and the answer will be Wrong. Try again with 0.4900001 (Correct) and 0.49000001 (Wrong).

I wrote to Microsoft about this problem and was told that Excel calculates to 20 significant figures, whereas other spreadsheets are less accurate. I am not convinced that this is a satisfactory explanation. Does any reader have a better explanation and – more important – a way of overcoming the problem?

Incidentally, Excel also has the same problem as AppleWorks with the INT function (see Apple User, *June 1986, page 12).*

AppleWorks glitches tracked down to a £

TWO letters in your April 1986 issue concerning AppleWorks reminded me of problems I have had with my own system.

With reference to Adam Gilinsky's letter, I too have had strange but consistent gliches with the AppleWorks word processor, but only after I modified the spreadsheet to print a pound sign in place of the dollar sign (Appletip, March 1985).

I used a DOS 3.3 utility to do this and I presume this caused the problems. I eventually got round to making the same patch, but this time using a proper ProDOS utility (ZAP, by Graham Keeler, Apple User, May 1986) and since then I have had no further trouble.

Ben Marselis's problem is more easily solved. He has brought A4 paper which is usually advertised as being 11⅔ inches long when sold for computer applications. This works out as exactly 70 printed lines when printing at six lines per inch.

To get the ImageWriter to conform to a page length other than 66 or 72 lines, as set by the DIP switches, it is necessary to tell AppleWorks that the printer does not accept top-of-page commands, then set the page length from the print options to 11.7 inches or whatever.

AppleWorks will then send out blank lines to pad out each page and not form-feed. I have set up an "alternative" ImageWriter without top-of-page as one of my AppleWorks printers and I use it for any non-standard stationery.

To be fair to the ImageWriter, it has the ability to cope with different vertical tab lengths, but it is asking a little too much of any general purpose package like AppleWorks to expect it to cope with sophisticated printer programming. I often wonder what proportion of "smart" printer capabilities are ever actually used.

At least AppleWorks can cope with justified proportional text on the ImageWriter, which was one of my main reasons for buying it. It has turned out to be a superb package and I have yet to find anyone who has not been impressed when they have seen it in action.

However, I despair when it comes to Apple's lack of support for their 8 bit range. Apple had the best small system in the world (sorry Acorn, I don't believe your adverts) thanks to the software base, but by letting things stagnate during the Mac regime this lead has been all but lost to the likes of the Atari ST (when the software arrives, as it will), and even the Amstrad range.

Things had better move fast if Apple wants to maintain its end-user loyalty, let along win new customers. – **D.B. Jones, Sleaford, Lincs.**

Drawing the line

i OWN a Macintosh Plus and an ImageWriter printer. When I try to print with either Microsoft Excel or MacDraw, the computer thinks my Imagewriter (10in) is an ImageWriter 15in. Can you help? – **Matt Mick, Insch, Scotland.**

● Well, to be honest, No! You have to draw on the left of the screen only.

Paper problem

REGARDING Ben Marselis' paper problem Apple User *April, 1986. As you can see I have some of this "strange" 11.7 inch paper from another source. I use it a great deal with AppleWriter IIe.*

The reason for the apparently odd 11.7 inch page length is that it is the same length as A4 paper. If the paper width is 235mm this is almost exactly A4 paper size.

Setting the page length is easy under AppleWriter. Using the print options the page length can be set to 70 lines if the line interval on the printer is 1/6th inch.

In order to set the page length permanently he will have to send a control character sequence to the printer, although I do not know if this will solve all his problems with other programs.

If these use default paper lengths of 11 or 12 inches he may be stuck. However many programs that I use control the page position by sending form-feed control characters (usually Ctrl-L) and with such programs the length of the page is unimportant as long as the printer knows the page length and the position for the top of the page.

I have an Epson RX80 printer and the control codes for setting the page length to 70 lines with 1/6th inch spacing are ESC 2 ESC CF.

If he issues these or the equivalent commands to his Imagewriter this will correct the form length for the time the printer is left switched on.

I assume that the ImageWriter has a similar facility for changing the form length by a software approach. Many utilities such as Microsoft Multiplan and the Tool Kit Editor Assembler have facilities for issuing a priming sequence to the printer before each listing is made.

In AppleWriter the same effect could be obtained by inserting the control codes into the text being printed by using a glossary command or inserting the codes into the .TL phrase in the printer options.

It is worth pointing out that my printer uses only traction feed paper. With the A4 size paper the sprocket holes do not remain in sequence with the pages as they are 1/2 inch apart. To overcome this I set the printer characteristics, turn the printer off line and then issue a form feed from the control panel.

Having loaded the paper I reset the top-of-form position of the paper by hand and then the pages are always synchronised with form feeds whatever the sprocket hole positions.

I notice that some people have been writing about Pascal input routines and other problems and that you are gong to extend the Pascal Tutorial series along these lines.

I learnt my basic Pascal from a book called Advanced Pascal Programming Techniques by Paul A. Sand. It is an American book which I discovered quite by accident in an Edinburgh bookshop.

It was published in 1984 and is therefore up to date and has the additional advantage that the author uses demonstration programs written under Apple Pascal 1.1.

It aims to build up a series of routines from basic Pascal building blocks and I should think that anyone with even a miniscule knowledge of Pascal will find it useful, as I did. It is published by Osborne/McGraw-Hill, IBSN 0-88134-105-3. For further information outside the USA the publishers give the following address: Osborne/McGraw-Hill, 2600 Tenth Street, Berkley, California 94710, USA.

Does anyone know any publications which give an in depth dissection of Apple Pascal along the same lines of Beneath Apple DOS and the ProDOS Technical Reference Manual especially with respect to the BIOS tables and writing SYSTEM.ATTACH files?

For your own information regarding a point raised by Stephen Lowe in the February 1986 Apple User *I have a Blackboard printer interface card and this also changes the Ctrl-I code for a Ctrl-Y code under Pascal.*

I was very interested by the comments raised in the December 1985 issue regarding the exit command from EDASM under ProDOS. I have noticed the same fault mixing BASIC.SYSTEM 1.1 with EDASM.SYSTEM 1.0.

This intrigues me because Apple quite clearly defines the necessary structure for systems programs under ProDOS in the Technical Reference Manual.

All systems program should

be of the same fundamental structure and should all have the facility of starting up another systems file on terminating.

If EDASM and BASIC .SYSTEM are doing this properly they should be able to start any system file whatever the version and this hitch suggests that even Apple has got it wrong.

After all, EDASM can start up any of the other system files including the updated FILER program without any problems.

The END and BYE commands in EDASM and Basic do work correctly so this comment isn't strictly true. But then again why bother with EXIT if it is so version-dependant?

As a matter of interest I have dropped the .SYSTEM extension to the file names from many of my system programs. Thus Basic is restarted simply by a -Basic command. I can hop to the FILER, EDASM and AppleWriter etc with -FILER, -EDASM and -WRITER and so on.

In doing this I have noticed that ProDOS does not recognise these file names on booting despite the fact that the manuals suggest it will.

They say that ProDOS searches the volume directory for the first file with a .SYSTEM extension, and if it does not find one it uses the first SYS type file instead. In my experience it does not do this.

Incidentally, has anyone noticed that EDASM can't tell the time either? It gets the minutes wrong if the time is on the hour, so if the time is 11:00 EDASM prints it as 11:56.

Also, I have noticed that loading a print options file in AppleWriter using WPL (I believe in all versions) clobbers the values of the (X), (Y) and (Z) variables.

I get round this problem by transferring them to $A, $B and $C before using a QC directive, but this is a severe restriction when there are only seven variables to start with.

Has anyone else noticed this and is there a solution?

Finally, I have a question or two of my own. I am lucky enough to own one of those flash new Panasonic TVs with the flat screen and three video inputs.

As an experiment I tried plugging my trusty Apple IIe into the external video input and I got a picture. However the colour was all distorted until I changed the position of the small switch on the motherboard marked OS1.

A friend had noticed this switch and the fact that it had moved from its position in front of slot 6 to the right hand side of the board in some later revisions.

No reference is made to this switch or what it does in the reference manuals.

Now I can use all my games programs in beautiful 22 inch technicolour but only by fiddling with something I knew nothing about.

Does anyone know what this switch is and what it does? Does it have any similarity to altering the jumpers in the video area of the Europlus motherboard?

Also, are the large potentiometers on the IIe motherboard in any way related to the colour trim and signal level controls on the Europlus?

If other IIe users have external video inputs on their televisions or video recorders I suggest they try the same experiment – it's a lot cheaper than a colour monitor, RGB card or RF modulator and the picture is excellent, especially if your television is adapted for use with teletext.

You may need to buy an RCA phono to video plug converter but these seem to be easily available from Boots and the like.

I would recommend that when using your television with a video game of any sort that the contrast and brightness are turned down to avoid burning out certain areas of the picture tube.

I am having a small problem with my Profile. I have managed to buy a Profile and control card which work perfectly with my Apple IIe. However despite queries sent to Apple I have found that booting straight from the Profile with a PR#5 command is unreliable.

It works perfectly for the first 10 to 15 seconds that the computer is switched on but fails thereafter unless the computer is switched off again.

Apple's explanation was that certain Profile-interface combinations are influenced by the connector cables used and recommend a change of cable. At £25 plus for a trial replacement cable I would have thought that there must be a cheaper solution.

I have already tried twisted-pair ribbon cable to no avail. Any suggestions? – **William Bird, Nottingham.**

Double hi-res

DAVE Russell's review of the Resolution 64 card (June 1986 Apple User) refers to a revision A main board for the Apple IIe, which does not support double hi-res.

He gave a method of checking, which is to look at the number below the words Apple Computer Inc on the board between the expansion slots and the back of the case, a number ending in A indicating a revision A board.

Having found that both my own IIe and one I use at work had numbers of this type, I rang Apple to find out about the possibility of upgrading the boards. They told me that no IIe bought in the UK had a revision A board and that on UK versions the A ending to the number does not refer to the revision type, it only applies to machines sold in the US and Europe.

Every IIe originally bought in the UK should have double hi-res capability. – **Derek Washington, Wallington, Surrey.**

WP packages

I WOULD like to commend you on a great magazine; I feel you have the information I seek.

I am looking for a good word processor (Apple II+ or IIc). However, I do not want to have to spend months learning how to use it even though I am computer literate.

I am currently using Sierra On-Line's Screenwriter II, but I feel I need something better and stronger.

I think I am looking for a "generic" word processor, one which allows me to use in full the special features of my Epson-MX80. In my manual for the MX, one such program was specified as Lazy Writer.

Now my questions: If there are any such programs on the market, could I obtain them? How much would it cost?

On the other hand, if such programs are not obtainable, which popular word processor would you recommend I buy, Wordstar, AppleWorks, Format-80, Homeword, Incredible Jack, Word Juggler, Fulltext 55/80, or any others?

I am aware of the requirements and of the diversity of some of the integrated packages. Would it be possible for you to help me by giving me some information on the ones you feel are the best on the market, and have viability. – **J.A. Corpuz, London W9.**

● We doubt if you'll find a word processor which prints only to the Epson – but many newer ones offer lists of printers from which you select yours – so it's not difficult.

Really, we cannot recommend a word processor as so much depends on what you want to write, how much you want to write and how much you want to spend!

As you already have one and want a more powerful package we would try looking at Wordstar (needs a Z80/CP/M system hence more money), Format-80 and Appleworks. Fulltext was reviewed in the August *Apple User*.

Silent type

IN the Apple User *April 1986, T.L. Knight asks if the Silentype's interface card is a standard RS232 and if it is compatible with other printers.*

You may wish to know that in Apple's publication Apple in Depth – a reference guide to Apple products, published in 1983, page 79 shows that the Silentype's interface is a "custom synchronous serial" one, powered from the Apple's own power supply via a 9-conductor cable.

I'm afraid I can't answer Mr Knight's question about modification. – **Den James, Gloucester.**

BACK ISSUES

Catch up on articles you may have missed. Back issues from January 1985 are still available at £1.25.

January 1985

John Sculley's View of 1985 – Games (Gelfling Adventure, Story Maker, Stellar 7) – Application: Apples down on the Farm – Cloze Technique (Plus review of Clozemaster) – World of the 6809 Part II: Flex Operating System – Apple II v ITT 2020 – Reviews (Ormbeta Compact Accounting System, CGL Half-Height Drive) – Apple IIe and IIc compatibility – Handling Interrupts and large arrays in Pascal – Reporter's view of Macintosh – PLUS News, New Products, Appletips and Letters.

February 1985

Steve Wozniak talks about Apple II developments – Quicksort algorithm in Forth and Basic – Games (Deadline, Witness, Planetfall, Enchanter, Scorcerer, Expedition Amazon) – Graphics DIY part XI – Targeting with a spreadsheet – Apple to Apple file transfer – Miners' strike resolved by computer? – Chemical formulae on Lisa – two Macintosh books reviewed – World of the 6809 Part III – Software reviews (Sales Edge and Management Edge) – Application: book publishing – Split screen techniques – PLUS News, new products and letters.

March 1985

Circle drawing algorithms – Super Pilot System Log – Summarising data with VisiCalc – Competitive estimating with Multiplan – Graphics DIY part XII – Ampersand editing – Macintosh (MacTerminal, Mouse Stampede, optical mouse, plus Mac book) – Reviews (Merl modem, Intec hard drive, Vision 128/256 card, the Editor, plus three educational packages) – Fun and Games (Xyphus, Fighter Command, Picture Writer) – PLUS News, New products, letters and Appletips.

April 1985

Apples in the dental surgery – Adding graphics commands to Applesoft – Using the VBLANK signal – Getting to grips with software – Reviews (Spee-Demon card, PFS File/Report for Macintosh, W-P-LAB) – Weather forecasting with Mac – Pascal Filer's D command – Fun and Games (La Triviata, Design Your Own Home: Architecture, Interiors, Landscape) – Books (Appleworks, VisiCalc, Machine level programming) – Index to Windfall Vols. 1 and 2. PLUS News, New products, Letters and Appletips.

May 1985

Sports Day runs smoothly with Apples – Graphics DIY Part XIII (pie charts) – Reviews (The Workbench, Macputer IIc, Copytext, Omnis 2 on Macintosh, seven Logo books) – The RWTS explained and demonstrated with a disc verify routine – protecting programs from Copya – Pascal (directory access from within programs) – Binsearch in Forth and Basic – Reaction Timer – Apples in Hungary – Fun & Games (Smart Shopper, Plantin' Pal, Micro Cookbook) – PLUS News, New products, Letters and Appletips.

June 1985

Apples keep track of music companies and Macintosh designs record sleeves – Fun and Games (Music Construction Set, Song Writer, Music Readiness) – Pascal Tutorial: start of a new series looks at records – Reviews (Tick-Tack translation package for Apple II+/IIe, Musicworks for Macintosh) – Graphics (three books reviewed) – Mugraph: light dependent resistors making sounds – Ampersound: routines for making music and sounds from Basic – PLUS all the latest News, New Products and Readers' Letters.

August 1985

Spreadsheet secrets shared – Apple IIIs provide power behind computer bureau – Graphics DIY Part XV – Wordstar scrolling problems solved – Descartes data processing program generator – Fun & Games (Winnie the Pooh, Mickey's Space Adventure, Print Shop, Hitchhiker's Guide to the Galaxy) – Mac at the centre of a publishing revolution – Pascal Tutorial: random access files – Review of Micro Planner for Macintosh – Restore to any Data line – PLUS News, New Products, Letters and Appletips.

July 1985

Apples at the heart of Papworth Hospital – Fun & Games (Secret of Arendarvon Castle, Antagonists, Fahrenheit 451, Rendezvous with Rama, Amazon, Shadowkeep, Adventure Writer) – Pascal Tutorial: using files of records – Binary file load utility – Using extended 80 column card memory – Macintosh (Flowcharting, Preview of Guide) – Book reviews (Business Basic, Epson printers) – Reviews (FingerPrint and Printerrupt) – Graphics DIY Part XIV – DOS patches – PLUS News, New Products, Letters and Appletips.

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letters and Appletips.

October 1985

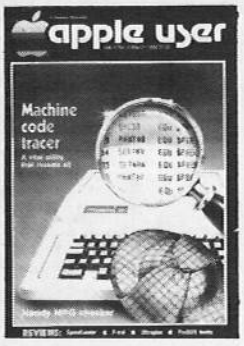
&DOSFile: start of a new series – spreadsheet for home budgets – Apples in a Hertfordshire college – using Page 3 routines with a language card – Graphics DIY Part XVI – Reviews (Ramworks extended 80-column card, Computereyes and Magic digitisers) – add a factorial function to Basic – Pascal tutorial: assembly language programming – lower case Pascal – Fun & Games (Mix and Match, Spotlight, Instant Zoo, Ernie's Quiz) – free sectors on disk – PLUS News, New Products, Letters and Appletips.

November 1985

Graphics Library final part plus disc offer – MEMDOS operating system – calculating duty rosters with a spreadsheet – Macintosh: reviews of Microsoft's Excel and P&P's fat Mac upgrade – ProDOS gives Applesoft new lease of life – Review of Cirtech CP/M Plus system for IIc – Apple word processors compared with MS-DOS counterparts – &DOSFILE: two more routines added – Pascal tutorial: parameter passing – extra tracks on discs – Fun & Games (Suspect, Karateka, Dazzle Draw) – PLUS News, New Products and Letters.

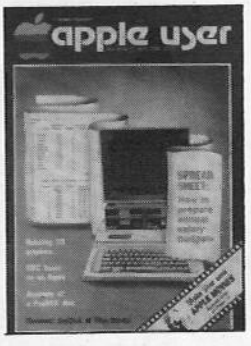
December 1985

Hardware project to improv
video output – Pascal Tutoria
bomb-proofing programs
&DOSFile: data compressio
techniques – date calculatio
with Multiplan – Applicatio
Apples in an academ
household – Review of DD
debug card – Macintos
reviews of MacType and Mac t
Knife Fonts – Fun & Gam
(Sword of Kadash, Cutthroats)
Sliding block puzzle
Metacraft's Forth – Apple Us
Games Disc offer – PLUS New
New Products and three pag
of readers' letters.



March 1986

Pascal tutorial: dynamic memory usage Part 2 – Fun & Games (Transylvania, Ring Quest, Crimson Crown) – CP/M: PIP patch to enable repeated commands – &DOSFile: RAMdisk function – ProDOS: four books reviewed – Spreadsheet: useful miles-per-gallon calculator – Comms: budget equipment interfaced to Apple Part 1 – Reviews (Speed-Loader, P-tral) – Macintosh (review of Ultraplan) – Machine code step-by-step tracer utility – Applesoft lower case input routine PLUS News, New Products and Letters.



April 1986

Pascal tutorial: Tips and books – Fun & Games (Mac Wizardry, Brataccas, Enchanted Scepters and Airborne) – Comms: budget equipment interfaced Part 2, software to simulate a simple teletype terminal – Spreadsheet: annual salary budgets – Graphics: machine code routine to rotate 3D wire frame images – Apples applied to slide production – Reviews (Apple's 3.5in Unidisk, Plus-Works, and BBC Basic running under CP/M) – Organisation of a ProDOS disc Part I – PLUS all the Apple news, new products and your letters.

May 1986

Making of a monster Macintosh – Fun & Games (Ultima IV, Spellbreaker, Captain Goodnight) – Scrolling hi-res pages – Making the most of Wordstar – Spreadsheet; presenting balance sheets in visual form – ProDOS Part 2 – Reviews (Supercharged Apple II with Snapshot Shuttle and Cirtech Flipper, Jeeves for desktop facilities) – DOS amendment to display free sectors – Application! Apples in use in a technical college – PLUS all the latest Apple news and your letters.

June 1986

Hi-res Picture Editor Part 1 – Fun & Games (Carmen Sandiego, Newsroom, Scamper) – Spreadsheet: Check your electricity bills – Reviews (Graphworks, Resolution 64, Flipper) – Renumber long programs using Exec – An easy way to edit Programs with a Word Processor – Hangman with BIG letters: Ideal for the disabled and poor sighted – Word Squares Generator – ProDos manuals revisited – Application: Apples in newsagents' shops – PLUS all the latest Apple News, New products and your letters.

July 1986

Word Square: Answer to
month's puzzle – Spreadshe
Chris Burridge creates a mo
based on Stock Market sec
ties – Fifth birthday review –
& Games (Alter Ego, Déjà
The Adept) – CP/M: Beat
hidden areas – Thin Mac
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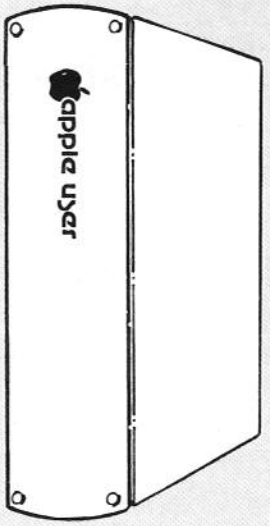

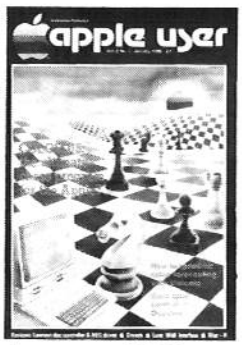

January 1986

Spreadsheet model for sales forecasting – Pascal tutorial : speed-up techniques – Fun & Games (Colossus Chess 4.0, One Man Band) – Application: how a shopkeeper uses an Apple IIc – Reviews (Lawtant disk controller card, Lemi Midi interface) – Heapsort in Forth and Basic – Macintosh reviews (Crunch, Mac +II) – Duodisk write protect switch hardware project – &DOSFile: expansion and compression – Index to Volume 5 – PLUS News, New Products, Appletips and Letters.

February 1986

Hi-res overlay utility – Pascal tutorial: first look at dynamic memory usage – Hardware: build an interface for Snap EV1 video RAM camera – Application: Apples at home in 14th century house – &DOSFile: database and form generator – Reviews (Cirtech and Tymac printer cards) – Macintosh (reviews of Microsoft File and Ensemble) – Fun & Games (Seven Cities of Gold, Adventure Construction Set, The Pay-Off) – Using Text Page 2 – PLUS News, New Products, Letters and Appletips.

August 1986

Reviews (Expand the IIe's capacity with MultiRam, Full-text, New Zealand-derived word processor) – MicroLink update – Part 3 of Paul Sinnett's hi-res picture editor program – Fun and Games (Elite, Chess, Balance of Power, Bond's Tale) – Spreadsheet: How to get wealthy on the Stock Market, Part II – Pascal: D. Jones' dump for Imagewriter, J.P. Lewis grapples with Boolean logic – Using UltraTerm more fully – CP/M: Automate Wordstar – PLUS all the latest Apple news and lots of your letters.

September 1986

Graphics: Print Shop expanded – Game: Brick Shoot Out – Utilities (Simplify graph production, date stamp IIc files, print formulae with Practical II) – Fun and Games (Ballyhoo, Ootopos, Clip Art for Newsroom, and Ultima II) – MicroLink update – Spectagram: Colour for the Apple II+ – Perfect pitch with Guitar Tuner – Reviews (Comprehensive Interface System and Acqsoft for laboratory data, Pinpoint, Cirtech's Z80 board and CP/M Plus) – PLUS all the latest Apple news, New products and your letters.

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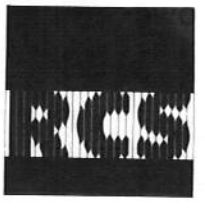

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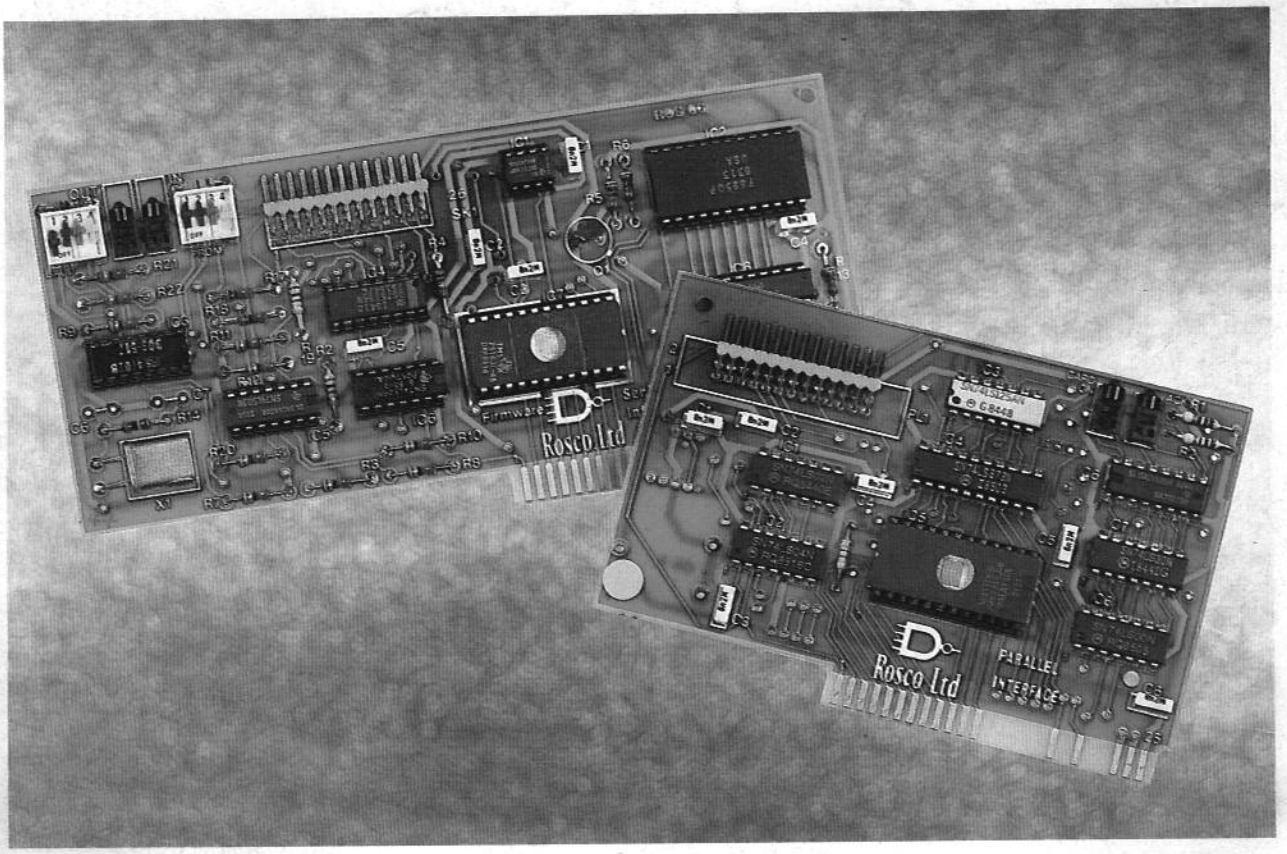

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