A Database Publication

AppleUser

Vol. 8 No. 2 February 1987 £1.25

$ 4.60
66

Instant DOS – and a big memory bonus

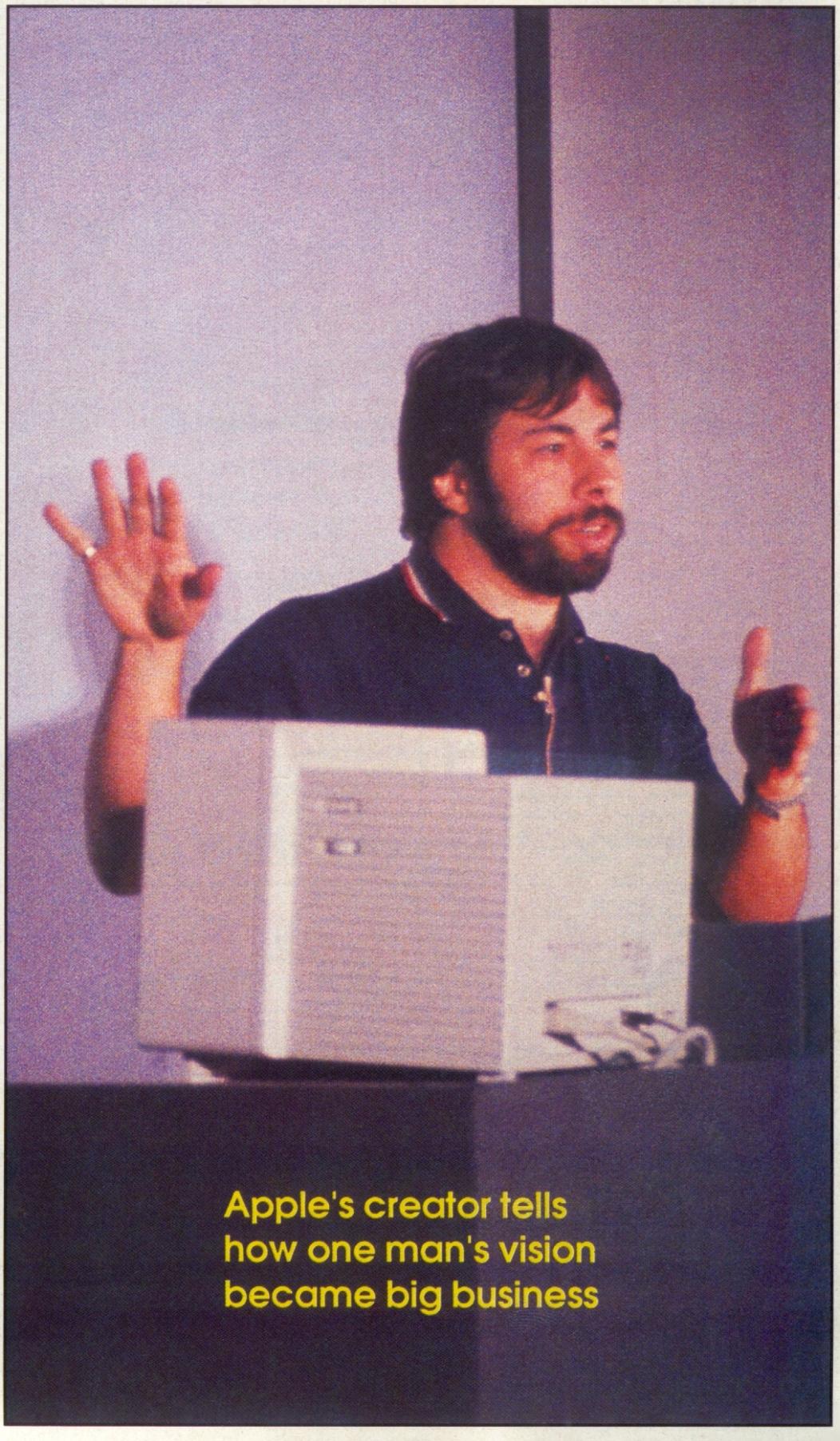
Saving and merging in Applesoft

Auto line numbering simplified

Desktop Publishing in action

REVIEWS:

DOTS-Perfect
TransWarp
Multi-Scribe
AppleWriter 2.0
MacBottom
Hyperdrive FX/20



Apple's creator tells how one man's vision became big business

Apple II board to accept IBM software

REPORTS from America say that a Texas manufacturer is about to bring out a peripheral board that will allow Apple II micros to run IBM software.

Applied Engineering of Dallas is said to be nearing completion of a board for MS-Dos on the II+, IIe and IIGS.

The firm's president, Dan Pote, has revealed that the board will be "completely integrated" in the Apple.

This will allow the operation of peripherals like clocks and printer interfaces while in MS-Dos mode.

Pote added that the hardware, developed by former Apple engineers, has already been successfully tested on IBM-based software like Lotus 123, Symphony, Sidekick and Flight Simulator.

The board will be powered by an 8086 chip running at 7.14Mhz – compared to 4.66Mhz on the IBM PC and XT.

It will also have more than 640k of memory and a disc controller, and will recognise standard Apple peripheral cards.

Meanwhile, a San Francisco Examiner article claims Apple is to drop the 512k Macintosh in favour of the Macintosh Plus as an entry machine.

A new Macintosh, codenamed Aladdin, is said to be under development. This will reportedly be based on the 68020 processor and have two 1.6Mb 3.25in floppy disc drives plus a pair of expansion slots.

The newspaper goes on to say that Apple will release three versions of the rumoured open architecture Macintosh, called the Paris, this year.

There will be a basic model with two 3.25in 1.6Mb floppy drives and eight expansion slots, a workstation with 40Mb hard disc, and a colour version with 17 in screen according to the report.

● Last month *Apple User* reported that Orange Micro of Anaheim, California, was producing a system to enable the IIGs to run IBM programs.

Financially, Apple is doing fine

LEADING American financial journal Business Week has run the slide rule over Apple Computer and pronounced it in fine shape.

The publication's latest issue says when John Sculley wrested control of Apple from its co-founder Steve Jobs less than two years ago the company was reeling from the first quarterly loss in its history and laying off one-fifth of its employees.

Worse still, sales of the Macintosh, on which Apple had bet its future, were barely 10,000 a month.

"Although the Mac was easy to use, business customers called it an underpowered, overpriced curiosity – a toy", says the article.

But Sculley said: "The Mac was one of the major reasons I came to Apple in the first place. To save it I had to fall back on what I knew best".

To the former president of Pepsi-Cola that meant marketing, says Business Week.

In the weeks before the launch of an improved Macintosh a year ago he personally touted the machine around major buyers like Dupont, General Electric and Eastman Kodak and listened to their criticisms.

That effort is paying off. While Apple won't disclose figures, according to one analyst quoted in the article shipments of Macintoshes doubled in 1986.

In addition, desktop publishing took off faster than anyone expected – 50,000 Macintosh-based systems being sold last year along with $150 million worth of Apple laser printers.

Business Week says that although the Macintosh still has only about seven per cent of sales to businesses the machine's user-friendly style is at last winning converts.

A data processing consultant who set up a large Macintosh installation for a major oil company is quoted as saying: "I sense a pro-Mac feeling spreading".

The effect on Apple's financial performance has been startling, says Business Week.

While IBM's 1986 earnings sagged, Apple surged 151 per cent to $154 million in the fiscal year ended last September – and it has $576 million in cash and no debt.

Apple shares, which had plunged to $14 in mid-1985, now trade at over $40 – the highest for three years.

CLASSIC ADVENTURE

CLASSIC text adventure trilogy Zork has been brought together in one package by Infocom for the Apple II and Macintosh. The pioneer interactive fiction programs Zork I, II and III have sold nearly a million copies between them in the past five years and won many awards. The new package, Zork Trilogy, costs $69.95.

Shares deal riddle

MYSTERY surrounds the sale by chief executive John Sculley of $40 million worth of Apple shares late last year.

A company spokesman said Sculley disposed of the stock "for personal financial reasons".

But Sculley can hardly be short of a dollar or two. In October, a month before he sold 107,000 shares for $39.81 each, Apple User reported a survey that placed him top of the Silicon Valley salary league.

At that time Sculley was said to be earning $1,054,000 a year.

The share sale, revealed by the Securities and Exchange Commission in New York, is the second Sculley has made since joining Apple.

Nine months ago he received $32.25 each for 16,000 shares.

Five other Apple Computer officers were also involved in the latest share dealings, but a spokesman said "this does not reflect any company doubts".

Apple shares are currently trading at around $41.

A new line for lasers

NEW for the Macintosh with LaserWriter, compatible laser printers or typesetters are GhostFonts from MacSoft.

They are standard format fonts which download automatically for immediate use with any program supporting LaserWriter.

GhostFonts allow the user to print normal LaserWriter and LaserWriter Plus fonts as a background or as shaded text without outline.

The packages work with programs such as MacWrite, Word, Ready Set Go, and MacPublisher. Background printing can be achieved with programs like PageMaker, MacDraw, Super Paint and MacDraft which allow the mixing of text and graphics.

GhostFont for the LaserWriter cost £45.50, for LaserWriter Plus £89.50.

Prolog for the Mac

A FULL implementation of artificial intelligence language Prolog is being launched for the Macintosh.

Written by UK Prolog specialist Logic Programming Associates, LPA MacProlog is said to exploit all the features of the Macintosh and Macintosh Plus.

Expert systems can be developed using pull-down menus, windows and dialogues, and these same features can be incorporated in the finished application.

MacProlog is supplied with an incremental compiler rather than a batch compiler, making it interactive and fast.

It contains more than 200 built-in routines for the experienced programmer.

Completed applications can be passed through an optional optimising compiler which makes the code more compact and efficient.

A choice of three programming environments allows users to pick the style of Prolog syntax which best suits their level of experience. Price £295.

Database systems

TWO computer enthusiasts at Oregon State University in the US have developed new database systems for Macintosh programmers.

Ted Lewis and Abdullah Al-Dhelaan created user support systems MacMan and DAMacMan to retrieve information from an 800-page technical programming book Inside the Macintosh.

The two systems operate as a desktop application or desk accessory. Information is retrieved by procedure, function or toolbox manager category.

MacMan will also support multiple, sizeable windows.

Franchise scheme for desktop publishing

DESKTOP publishing company Dialogue UK is offering Macintosh home users an opportunity to go into business for themselves.

The unusual franchise deal involves an intensive weekend training seminar in applied desktop publishing.

Also included are a range of courses including basic journalistic, print and design skills, public relations and general promotions, plus a primer course on running a small business.

This will be followed up with administrative, promotional and resource back-up for each individual business in the interlinked franchise group.

There is also a basic user course for potential Macintosh owners who are interested in taking up a franchise.

The aim, says managing director Nathan Goldberg, is to set up a nationwide network of home-based desktop publishers under the Dialogue UK banner.

"Although we cannot guarantee to find work for franchisees, I'm sure there will be no shortage of it in a fast-growing market place", he added.

"The cost of franchises will vary according to each individual's needs, starting at £500 for the applied training and initial back-up support".

Movie games

AS a tribute to outrageous B movies, Activision has brought out Hollywood Hijinx for the Apple II and Macintosh.

It involves the search for 10 unusual studio props in the flamboyant house and grounds of an eccentric, recently deceased movie mogul.

If you can find the lot in one night you get to inherit the estate, which includes an enormous maze created by program author Dave Anderson with the help of 700 paperclips. Price £29.99.

Speedy system

A PROGRAM that operates like a standard Macintosh disc drive, only much faster, has been released by US developer Micro-Sparc.

Called the SpeedDisk System, it can be used with application programs like MacWrite and Excel to increase execution speed up to 1,000 per cent.

It lets the user supercharge application programs like MacWrite and Excel. In only four steps, application programs can be configured on a SpeedDisk and saved. Price $29.95.

War in the Pacific

LATEST release for Apple II wargamers from Strategic Simulations is War in the South Pacific, a semi-realtime program set in WWII.

There are three scenarios to choose from – Battle of the Coral Sea, May 1942, Invasion of Guadalcanal, August 1942, and Japanese Counter-attack on Guadalcanal, October 1942. Each scenario plays to the beginning of March 1943.

The program includes weapons and firepower of more than 400 ships, 17 types of aircraft and numerous infantry units and a choice of one, four or eight hour battle modes.

Each hourly turn allows for every ship, plane and infantry company to be accounted for, including damage reports which are sometimes falsely supplied by the computer.

Designed to be played by two players, or by one player against the computer, War in the South Pacific costs $59.95.

Chips fault

APPLE has sold an estimated 25,000 IIGS micros in the US with flawed graphics chips.

A Calfornia technology newsletter report says Apple could face expenditure of $5 million to replace the faulty motherboards containing the surface mounted chips.

An Apple source said the fault appears only as "a flickering effect on the screen when an unusual selection of colours appear" and that most users would probably not even be aware of it.

"There is no damage to data or files or the operating system", he added. "It is a problem of implementation rather than design. We'll soon have it fixed".

Cray twins

APPLE is proudly using a $14.5 million Cray supercomputer to develop its next generation of micros. According to the Wall Street Journal, when Cray's boss John Rollwagen told Seymour Cray this over the phone "there was a pause at the other end of the line. And Seymour said, 'That's interesting, because I'm designing the next Cray with an Apple' ". – **Computer Guardian.**

Owing to pressure of space J.H. Brown's decoding program has been held over until next month.

Apple v US Army

APPLE wants the US Army to beat a retreat for the first time since Vietnam.

The current campaign is over the Pentagon's commitment to IBM/Unix/MS-DOS operating systems.

Apple seeks a share of a $16,000 million information technology budget for its IIGS.

And the company has opened a Washington office from which to launch its assault on the military decision-makers.

But observers say Apple faces an uphill battle because the US Army's pro-PC buying policy is not only well entrenched but difficult to argue against in terms of computer compatibility.

Rather than change its collective mind, the US Army is thought more likely to suggest that Apple brings out an MS-dos machine itself if it wants a share of the military market.

Printer control made easier

Part 4 of Stuart Bell's tutorial series covering the unitary approach to program development

IN the first three parts of this series we considered the design of a Screen Control Unit. This was a UCSD Pascal Unit which simplifies the writing of terminal-independent and reasonably powerful screen-handling routines by providing a standard set of procedures.

We now move on to our second building block, a Printer Control Unit. While many printers are described as being Epson or IBM Proprinter compatible, anyone who has tried modifying a program written to drive one printer so that it will work correctly with another will be all too aware of the potential problems.

The issue is not simply that of control codes for specific functions; difficulties also arise with the presence or absence of particular facilities, and even the physical width of the paper permitted by the printer.

Add to this the different facilities offered by dot matrix and daisy wheel printers and the magnitude of the problem becomes apparent.

Independent routines

What this building block seeks to do is provide Apple Pascal programmers with a means of writing printer-independent driver routines.

Such routines will obviate the need to rewrite your software if you have several printers or ever upgrade your current model – and who doesn't have a fantasy about connecting up a laser printer to his Apple?

The fundamental problem, then, is the printer-independence of our Printer Control Unit. How are we to make it handle both a simple daisy wheel printer and a 24-pin multi-mode dot matrix printer?

One solution would be to write a different implementation part of our Unit for each model, with the same interface for use by our user programs. (For a reminder of the distinction between interface and implementation parts of a Unit, see the article in the second Apple User Pascal Tutorial series, or the appropriate Apple Pascal Manual.)

However, this approach would get unwieldy when handling several printers and would be very difficult to de-bug consistently and effectively. But a moment's thought about the approach used by the designers of the p-System should give us the obvious solution.

How do they handle different terminals or screen displays? By using the SYSTEM.MISCINFO file to store machine specific data. Clearly, a similar approach should work for printers.

If we use PRINT.MISCINFO as the standard file we can keep other files for other printers, for example FX100.MISCINFO, DPL24.MISCINFO and simply use the C(hange option in the Filer to rename as PRINT.MISCINFO the file for the printer currently in use.

While the structure of SYSTEM.MISCINFO has been defined for us – its contents are listed on pages 208-9 of the Apple Pascal 1.1 OpSys Manual – no such standards exist for PRINT.MISCINFO.

Clearly, choosing the information to be stored is crucial to the success of our Unit. We need to balance a reasonable size and simplicity with the ability to drive quite complex printers.

To this end I made a number of design decisions. If they are too limiting for your particular configuration, then the file includes an unused area which you may employ to the Unit as required. Note that this will limit the portability of programs using your customised Unit.

The first decision was that we shall not handle colour printers, as very few printers handle colour and no standard system exists.

Secondly, graphics are not catered for, largely because this would really need a whole Unit to itself. Further, fantasies not withstanding, this Unit will not drive laser printers – except when they are emulating a more traditional printer.

Finally, we shall not attempt to handle down-loadable character sets, nor typefaces on daisy wheel printers which require the spacing and hammer-weight information to be sent with each character.

Some of the latest dot-matrix printers offer a bewildering range of typefaces, with such names as compressed double-width elite enhanced. Often many are very similar and I suspect that few owners use more than a subset of them.

Thus, the Apple User Printer Control Unit is limited to 16 different typefaces. If you need more, enlargement should be simple, resulting in a larger PRINT.MISCINFO.

The information contained within PRINT.MISCINFO is of two types. It contains one record of type printmisc_rec, as shown in Listing 1. As always, the underscore character is entirely optional; it may be omitted – but not replaced by a hyphen.

Typefaces

The first group describes the printer itself; the second deals with each typeface. The former is contained in the record *p_info*. *P_width* contains the width of the printer – for example an 80 column printer is 80 tenths wide and in this case 80 would be stored here.

Tfaces stores the number of typefaces usable (to a maximum of 16). *Stoptochange* indicates whether a program needs to stop for a change of typeface – as with a daisy wheel printer.

The type *comm_seq* will hold up to four characters, stored as Ascii codes. A *comm_seq* is stored for most operations and four should be adequate for the vast majority of printers.

Most will require only one or two, in which case we simply fill out the command sequence with the character code stored in *p_null;* a character with no effect for that particular printer.

While a full range of non-Ascii characters is not supported, a pound sign is so useful that it is worthwhile making it accessible.

Some printers allow access to it by means of character codes greater than 127, while others require to be switched into a UK character set, the printing of hash (#), and finally a return to the standard Ascii character set.

Since this may take more than four characters, two *comm_seqs* are allowed. □

◁ Microspacing is very useful to achieve neat right-justification, giving a far better look than whole spaces. *Can_ms* indicates if the printer can achieve it, *ms_per_inch* stores the number of micro-spaces per inch performed by the printer, and *ms* makes the printer move the print-head one micro-space. Multiple micro-spacing with one command is not supported.

The remainder of the information in *printmisc_rec* is laregly self-explanatory and simply indicates the availability and implementation of such facilities as underlining and superscripts.

This is followed by 16 records of type *tface_rec*, one for each typeface. For each is stored the name, whether it is a proportionally spaced typeface, the pitch and the command sequence required to select that typeface.

Next, *ps_widths* stores the width of each character in the proportionally spaced typefaces. For example, if *ps_units* contained 60, and *ps_widths[73]* contained 4, then this would indicate that the character with code 73 is 4/60" wide when proportional spacing is in use.

The possibility of proportionally spaced typefaces of different sizes has not been allowed for; additional *ps_width* arrays could be added if required.

Finally, the record is extended by an expansion area of 8 booleans, 8 names, and 8 command sequences to permit you to add extra facilities without having to change the size of PRINT.MISCINFO.

You may rename any or all of these variables to implement extra facilities. It will not matter that the file was created using the names in Listing I.

Care needed

However, note that when the Pascal compiler allocates storage for records, it uses reverse allocation, storing the last-declared elements first. Thus, only change the declaration with care.

Now that we have defined the form of PRINT.MISCINFO we need to discuss its use. As is the case with SYSTEM.MISCINFO, two types of program are needed. The first – the analogue of SETUP.CODE – is used to create and edit the information stored within PRINT.MISCINFO.

Once this is done, the second program – our Apple User Printer Control Unit – can access the file.

The program PR_SETUP is shown in Listing II. It is largely self-explanatory, being simple if a little lengthy. Certainly, it does not have a very elegant user-interface.

I could have made it look prettier but this would have required a much longer program. Alternatively, use of the Screen Control Unit would improve things, but make this Unit unusable for those of you who have yet to get the Screen Control Unit working.

Unlike SETUP.CODE, hexadecimal input is not supported – I find decimal quite adequate. The most important procedure, *editfile* is rather long, and will be listed in full next month.

You should now be able to create your own PRINT.MISCINFO by typing in the PR_SETUP program, compiling and running it, selecting first W(ritefile and then Q(uit. Q(uit.

The created file is rubbish of course; without Editfile, that will have to wait.

● *Next month we shall create a sensible file, and then turn to the use of PRINT.MSCINFO in our Unit.*

```
type     byte = 0..255;
         name = string[12];
       tenths = integer;          (* measurements in
                                     tenths of an inch *)
       nibble = 0..15;
     comm_seq = packed array [0..3] of byte;
                                  (* command sequence *)

     tface_rec = packed record    (* one for each typeface *)
            title : name;
            is_ps : boolean;      (* is proportionally spaced *)
            pitch : real;         (* irrelevant if ps *)
         sel_tface : comm_seq;    (* to select this typeface *)
              end;

     p_inforec = record
           p_width : tenths;      (* carriage width *)
            tfaces : integer;     (* no of typefaces *)
      stoptochange : boolean;     (* user intervention to change
                                     typefaces - eg daisy ? *)
            p_init : comm_seq;    (* to initialise printer *)
            p_null : byte;        (* char ignored by printer:
                                     used to fill comm_seq *)

        has_pound : boolean;      (* can give sterling sign *)
       pound_char : array[0..1] of comm_seq;

           can_ff : boolean;      (* can form feed: some can't! *)

           can_ms : boolean;      (* can micro space *)
      ms_per_inch : integer;      (* mspaces per inch *)
               ms : comm_seq;     (* for one microspace *)

        can_uline : boolean;
         uline_on,
        uline_off : comm_seq;

      can_fwd_feed : boolean;
     fwd_feed_frac : integer;     (* fraction of inch *)
         fwd_feed : comm_seq;

      can_rev_feed : boolean;
     rev_feed_frac : integer;     (* fraction of inch *)
         rev_feed : comm_seq;

    can_sup_script : boolean;
       sup_script : comm_seq;

    can_sub_script : boolean;
       sub_script : comm_seq;

     non_sub_sup : comm_seq;      (* cancel sub/superscript *)

       end; (* of p_info *)

printmisc_rec = packed record

         p_info : p_inforec;

  p_typefaces : packed array [nibble] of tface_rec;

       ps_units : integer; (* fractions of an inch indicated
                              by contents of ps_widths *)

     ps_widths : packed array [byte] of nibble;

     user_bool : packed array[0..7] of boolean;
     user_name : packed array[0..7] of name;
     user_cseq : packed array[0..7] of comm_seq;

end; (* of printmisc_rec *)
```

Listing I

```
program pr_setup;

type    (* type section as in listing 1 *)

var    p_misc : printmisc_rec;
       fname : string[15];
        doit,
exitconfirmed,
    donearead,
   doneanedit,
    doneawrite:boolean;
           ch:char;

procedure editfile;

(* full text of editfile next month!!! *)
begin (* Editfile *)
end; (* of editfile *)


procedure writefile;
var f:file of printmisc_rec;
   io:integer;

begin
  repeat
    writeln;
    write('Name of file to be written: ');
    readln(fname);
    if length(fname)>6 then fname:=copy(fname,0,6);
    if pos('.',fname) = 0 then fname:=concat(fname,'.miscinfo');
    {$I- }
    f^:=p_misc;
    rewrite(f,fname);
    io:=ioresult;
    {$I+ }
  until io=0;
  put(f);
  close(f,lock);
  doneawrite:=true
end;


procedure readfile;
var f:file of printmisc_rec;
   io:integer;

begin
  repeat
    writeln;
    write('Name of file to be read: ');
    readln(fname);
    if length(fname)>6 then fname:=copy(fname,0,6);
    if pos('.',fname) = 0 then fname:=concat(fname,'.miscinfo');
    {$I- }
    reset(f,fname);
    io:=ioresult;
    {$I+ }
  until io=0;
  donearead:=true;
  p_misc:=f^;
  close(f,lock)
end;

procedure checkexit;
begin
  writeln; write('Quit selected: confirm y/n ');
  repeat
    read(keyboard,ch)
  until ch in ['y','n'];
  exitconfirmed:= (ch='y')
end;

begin (* main program *)
  donearead:=false;
  doneawrite:=false;
  doneanedit:=false;
  exitconfirmed:=false;
  writeln('Apple User Printer Control Unit: PR-SETUP');
  repeat
    writeln;  writeln;
    write('Select: R(ead a file, W(rite a file, E(dit a file, Q(uit: ');
    repeat
      read(keyboard,ch)
    until ch in ['r','w','e','q'];
    writeln(ch);  writeln;
    case ch of
    'r': readfile;
    'w': writefile;
    'e': editfile;
    'q': if doneawrite then exitconfirmed:=true
                       else checkexit;
    end
  until exitconfirmed;
  writeln('y  -  That''s all, folks! ')
end.
```

Listing II

Apple*tip*

Applesoft stores its string variables dynamically. However when it runs out of free memory it must clean up the unused strings, a process which can take several minutes. There is no way to stop this process but you can give your program's user some warning.

The following line should be put in the main flow of your program.

```
1000 IF PEEK(112)-PEEK(110)=4 THEN
PRINT"STANDBY":
```

An alternative method is to execute a FRE(0) inside the major loop of your program. This would still in total take up the same time but at least this fractional delay would be less noticeable.

There are two ways to use DOS 3.3 from machine language, Read Write Track Sector and the normal commands. The other way is to send the normal DOS commands, one character at a time in the 6502 accumulator, to $FDED. Remember to precede the commands with a RETURN and CTRL-D and follow it with another RETURN. Here is a short-cut if you have ROM Applesoft.

```
300:LDA $20
302:LDY $03
304:JSR $DB3A ;Applesofts string
printing routine
307:RTS
320:0D 04 43 41 54 41 4C 4F 47 0D 00
    C A T A L O G
```

If you use the indirect only commands you must also convince DOS that Basic is running. From Applesoft $76 must not contain $FF and $33 must not contain $DD. From Integer $D9 must be greater than $7F.

Colin Foster and Robert Neale look at STAT and PIP, the almost-friendly software transfer and information programs

The ins and outs of logical devices

SO that CP/M can carry out all its input and output on different hardware it employs the idea of performing I/O between different logical devices. These are:

CON: The console (screen and keyboard)
LST: The listing device (the printer)
PUN: The punch device (perhaps a serial comms card)
RDR: The reader device (perhaps the comms card)
A:, B:, . . . The disc drives

The PUN: and RDR: device names are a hangover from the days when high speed punched paper tape was used for loading and saving data.

Nowadays most systems use these names to refer to the RS232 serial card which you may have installed to talk to other computers or modems, or maybe a second printer or plotter.

PUN: is used for output and RDR: for input. LST: can only be used for output but CON: deals both with input from the keyboard and output to the screen.

Each of the logical devices (other than the disc drives) has associated with it four possible physical devices. Exactly what they are will depend on the facilities provided on your system.

Some of these devices may necessitate the installation of software drivers which will come with them when you buy but generally there is no problem.

Microsoft's CP/M 2.2 uses the CONFIGIO program to install user provided drivers. We mentioned previously that the system has a lookup table of vectors to translate between software and hardware keyboard and screen codes.

In the same way there are vectors to areas of memory assigned to each of the Apple slots. The new I/O drivers are installed by CONFIGIO in areas of memory set aside for each slot and the appropriate vectors are changed.

Under CP/M 2 you can see the possible assignments of physical devices to logical devices by typing STAT VAL: (of course STAT must be on the logged drive or you must give the drive specification, and note that the colon following VAL is important).

The list you will obtain is shown in Figure I. You may see the current selection of physical devices (obviously only one physical device may be assigned to each logical device at any one time) by the command STAT DEV:.

You can also change the destination or source of data by STAT. For example it can be useful to temporarily point all output destined for the printer to the screen for the purposes of checking program output without wasting paper.

The command to do this is STAT LST:=CRT: and the general form of the command is STAT <LOGICAL DEVICE>=<PHYSICAL DEVICE>. Note that the device names do include the colon which must not be omitted.

Be careful with reassignments of physical to logical devices. STAT CON:=TTY: is apparently fatal – the machine appears to die.

The reason is that this assignment tells CP/M to take all input from a source other than the keyboard, probably the RS232 interface card, and to send output there. Thus the console is "locked out".

This type of assignment is used when you want to control your Apple from another computer via a network or modem or direct connection – admittedly not an everyday operation for most of us. The only way out of this is a reset or a switch off.

CONSOLE (CON:)
TTY: 'Slow' serial device (usually slot 2)
CRT: Keyboard and screen (slot 0 on an Apple II+ or 40 column machine or slot 3 if 80 column output)
BAT: Batch processing, input from RDR: and output to LST:
UC1: User defined console
READER (RDR:)
TTY: Special I/O device 0
PTR: Paper tape reader (slot 2 input on an Apple)
UR1: User defined reader
UR2: User defined reader
PUNCH (PUN:)
TTY: 'Slow' serial device
PTP: Paper tape punch (slot 2 output on an Apple)
UP1: User defined punch
UP2: User defined punch
LIST (LST:)
TTY: 'Slow' serial device
CRT: Screen (slot 0 on an Apple with 40 columns, slot 3 output if 80 columns)
LPT: Line printer (slot 1 on an Apple)
UL1: User defined list device

Figure I: Possible physical assignments to logical devices

CP/M

Part 4

Option	Function
A	Version 3.1 only, Archives. Only those files which have changed since the last copy will be copied.
B	Version 2.2 only. Block mode transfer –input from fast device is buffered until XOFF (i.e ^S) character received, then written to disc.
C	Version 3.1 only. Prompts the user for confirmation before copying proceeds.
Dn	Delete characters after column n during transfer, for example truncate lines over 80 columns long sent to the printer.
E	Echo all transfers on console.
F	Strip all form feed characters from file during transfer.
Gn	Get file from another user area (user n).
H	Assumes hexadecimal values only are valid and reports errors on the console.
I	Ignores any '.00' characters in the source file and also checks for hexadecimal values as above.
L	Convert upper case to lower case.
N	Add line numbers to each line transferred.
N2	As N, but leading zeros are printed and a tab is inserted after each line number.
O	Object file transfer – normal CP/M end of file character is ignored. Should be used when copying any non-text file which does not have a COM extension. Also use with the [V] option as there is a bug in PIP.
Pn	Insert form feed characters every n lines. The command P causes the default of every 60 lines.
Qs^Z	Quit copying from the source as soon as the string s (any sequence of printable characters terminated by ^Z) is encountered.
R	Read system files, that is files with $SYS status.
Ss^Z	Start copying files when the string s (any sequence of printable characters terminated by ^Z) is encountered.
Tn	Expand Ascii tab characters (^I) to every nth column.
U	Convert lower case to upper case.
V	Verify that the file has been correctly copied.
W	Write over $R/O (read-only) files. Normally, copying to a filename which already exists and which has status $R/W effectively overwrites the old version by writing a new file in another part of the disc with the filename extension .$$$. Then the original version is deleted and the new version has its extension changed from .$$$ to whatever the user specified. The same process occurs with $R/O files with the [W] option. The new file will have the status $R/W.
Z	Zero the parity bit on input for each Ascii character.

Figure II: PIP parameter options.

Once we have selected physical devices using STAT we can transfer data between any logical devices using the transient utility PIP.COM, CP/M's Peripheral Interchange Program.

PIP accepts commands in the form PIP <DESTINATION> = <SOURCE>[Parameters] or if you want to do several things one after the other, PIP can also be used interactively by just typing PIP.

PIP will then prompt you for commands with a *. To exit back to the system at this prompt just press Return.

Primitive purposes

Often you will not want to add parameters. For example, to turn your Apple into a primitive typewriter get PIP up and running and then type at the prompt:

```
LST:=CON:
```

Whatever you type on the keyboard is sent to the printer as well as to the screen. This can be useful for bashing out quick memos, shopping lists and so on.

Note that the Return key now only returns the cursor to the start of the line press Control+J to feed a new line.

To finish we must type Ctrl+Z – CP/M's end of file character – to tell PIP that we have reached the end of our input.

Now try:

```
A:RUBBISH.TXT=CON:
```

at the PIP prompt. This will let you type into the computer exactly as before but this time whatever you type will be sent to the disc file RUBBISH.TXT on drive A: rather than to the printer.

This can be useful if you do not have an editor to hand and you want to create a small text file for some reason. Note, if you haven't already, that absolutely everything which you type in is sent out again – including delete characters.

PIP is not an editor, there is no way to correct mistakes in your input before it is actually sent to its destination – just do not make any! Type in a fair bit of rubbish and finish by pressing Ctrl+Z as before to tell PIP that you have finished.

If you now type:

```
CON:=A:RUBBISH.TXT
```

at the * prompt the process will be reversed – PIP will send the entire contents of A:RUBBISH.TXT to the screen in the same way as the TYPE command.

PIP.COM is an extremely powerful and useful program which most people underuse. It can of course copy files between drives but it can split them, search for certain characters or strings and concatenate files.

You can for example, add to the end of an existing file by typing on the keyboard, add input from the RS232 interface, then stick another file on the end, and so on.

Many of these functions are controlled by option parameters which we can give PIP along with the commands in the form:

```
*<DESTINATION>=<SOURCE>,<SOURCE1>,
SOURCE2>....<SOURCEn>[PARAMETER]
```

For example the command:

```
PIP LST:=A:DUMP.ASM[T8FP64]
```

tells PIP to send the disc file DUMP.ASM to the printer, expanding tabs to every eight columns, removing any existing form-feed characters and inserting new ones every 64 lines.

Figure II lists the options PIP can be given and briefly describes what each one does.

The obvious use of PIP to copy one file from a disc to another disc may be augmented by the [V] parameter. Thus:

```
PIP ANOTHER.ONE=FIRST[V]
```

will copy the file FIRST on the logged drive to the new file ANOTHER.ONE on the logged drive and will verify the copy after it is made. We recommend that you always verify files in this way although it does take a little longer.

To combine two files, we use a command of the form:

```
*BOTH.BAS=EX1.BAS,EX2.BAS
```

This creates a new file called BOTH.BAS which has a copy of EX2.BAS added to the end of EX1.BAS. The original files are not changed.

Driving from A to B

To copy from one drive to another it is generally best to copy from the A: drive to the B: drive and invoke PIP from the A: drive because generally PIP and the file you want to copy are not on the same disc. CP/M 2 remembers which discs are in which drive and expects to be told of disc changes by the user pressing ^C. It is possible then that PIP (via CP/M) will refuse to write to a particular disc (which you know is okay) because it thinks that it is protected in some way. The only way out of this with PIP version 2 is to press Ctrl+C and start again. However, *Apple User* published a patch for PIP in March 1986 which allows PIP to reset discs and as a bonus to repeat the last command. Note that single drive file copying is impossible with PIP and most manufacturers of CP/M systems include a utility to do it. □

Entertaining entry into the dungeons

Product: Standing Stones
Price: £19.95
Supplier: Ariolasoft, 68 Long Acre, Covent Garden, London WC2E 9JH
Tel: 01-836 3411
Requirements: Any Apple II

LEGEND has it that many time cycles ago Merlin, the great but gullible wizard, threw a big party. After several hours his guests had eaten and drunk so much that they slept the sleep of the overfed – except for the wicked Kormath.

He was so obsessed by greed that while the others slept, he grabbed as much silver and gold as he could carry, including the Holy Grail. Then off he flew to his private stash deep beneath the great rocks of Stonehenge.

You have been chosen to venture into the vast labyrinth beneath Stonehenge in the quest for riches, glory and the Holy Grail.

At first sight, this game looked like another Wizardry clone. However closer inspection revealed quite a few features which set it apart. The most obvious difference is that your ultimate goal is clearly set out from the start.

This takes a lot of the mystery and intrigue out of things which I felt was a bit of a shame. You are actually told in the instructions that the Grail lies at the bottom of the fifteen level dungeon and that to win the game you have to retrieve it.

The basic structure is as follows: First you construct a character, then you materialise in the dungeon. Slash, kill, collect gold, make maps, cast spells, heal your character (Note: you can only take one character at a time into the dungeon), and so on.

When you have gained enough experience, equipment and hit points, you will be able to venture deep enough into the dungeon to retrieve the Grail.

The main playing screen is split vertically down the middle. Occupying the left half is Wizardry-like pseudo-3D perspective view of the dungeon, made up of rather dull white vectors. The right contains your character attributes.

Graphically the game's not much to look at, but the pace is a little quicker than Wizardry since it is not disc dependent. It also has a few amusing sound effects and comments thrown in for good measure.

The game's humorous atmosphere gives me the impression that it is a bit of a satire on fantasy role playing games. For instance, one of the spells you have to throw around is called the Kitchen Sink – guess what that does?

You can choose to greet any monster you encounter, which the manual describes as simply stopping to wave and say hello. Sometimes you will get a friendly response and perhaps even a small gift.

If this doesn't work, however, you can try and bribe the monster with spells, potions, scroll or gold, and sometimes you can get away with giving it a cursed item or a poison potion. This can be a good way to get such things off your hands but it won't always work.

If you come across a particularly nasty creature, you can offer it all sorts of riches and it will gladly accept them and kill you anyway. I think the author has a strange sense of humour.

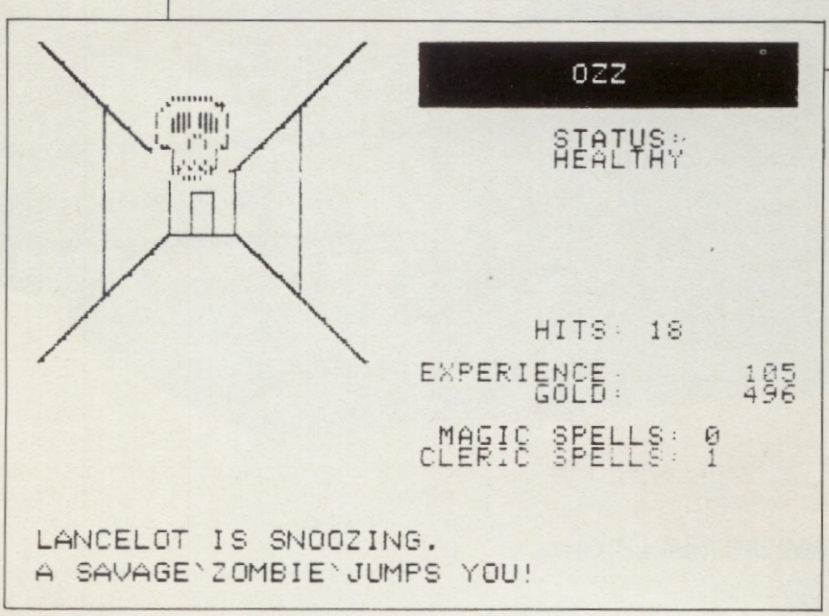
If you find all this proves to be a bit much for you, and you feel like speeding things up a bit, then a Snapshot card or similar will enable you to break into the game, exit to Basic, catalog the disc, and manually move each of the files to a Dos disc.

Since the whole game is written in Applesoft Basic, it is relatively easy to adjust your character's attributes, thereby making it easier to win the game. You can also modify parts of the game so you have infinite spells and so on. Although it's a bit naughty, it can be as much fun as the actual game itself.

If you are an accomplished Wizardry veteran then you can get bored with Standing Stones, as the level of challenge and sophistication is that much lower. For first-time dungeon delvers, it's a fairly competent game.

Leon Seltsikas





Not close enough for comfort

Product: Mind Pursuit
Price: £19.99
Supplier: US Gold
Tel: 021-356 3388
Requirements: Any Apple II

GIVEN the runaway success of Trivial Pursuit, it was perhaps inevitable that a host of lookalikes would be spawned. Equally inevitably, some are better than others.

The creators of Mind Pursuit make modest enough claims about their product, blurbing it as "The Ultimate Test Of Information & Knowledge" – their capitals, not mine.

Test it certainly is – and the questions set will tax your general knowledge – but ultimate it isn't. Still, you'll have an entertaining time amassing the points required for victory.

Game design is robust enough to be all but foolproof, as at its most complex it only involves progressing across a snakes and ladders board, and life is made a little easier by the fact that there aren't any snakes.

And setting up for play couldn't be simpler. Clearcut menus allow you the choice of playing against yourself or up to three other players, with a further choice of three different game objectives and four different time limits.

This does allow for some variety in approach, although the questions themselves remain the same regardless of the set-up you choose.

Still, it's useful to have the option of answering either within 30 seconds or whenever you feel like it – especially as typing time is deducted from your overall allowance.

The manual, though short (at four sides it couldn't be much shorter) is helpful, and using Escape will call up a screen to refresh your memory if necessary.

Careful though; hitting Escape at the wrong time will reset the game, which is a little annoying if you're just short of victory – rather like knocking over the scrabble board.

At this stage you'll also realise that you are not dealing with the leading edge of game design. Graphics are generally skeletal, sound abrupt and response times slow.

Presumably something had to give to accommodate the sheer volume of questions, but there could have been a happier compromise.

And – admittedly this is a pet hate – it's necessary to press Return after selecting an option or answer, which I've always regarded as an insult to my decision-making abilities. However, this is offered as a "feature" so perhaps I shouldn't complain too much.

The game offers questions in six categories – Science & Nature, History & Geography, TV & film, Sports & Games, Culture and Grab Bag.

Some of the categories are perhaps a little hazy, but that's scarcely a problem as the category is chosen for you by an on-screen dice (or die, if you're feeling pedantic).

Presumably you can control the fall of the dice – if you've got better reflexes than I have.

Questions in each category are presented in three formats; fill in the blank (that is, you type in the whole answer), multiple choice and true or false, worth respectively 100, 50 and 25 points.

If you're feeling confident, go for the first – fifteen straight answers can win you the game at the lower levels.

Be warned though: unless you watch an awful lot of American television, especially sport, you're doomed to failure. In fact the whole game has a very strong transatlantic flavour.

And answers need to be worded carefully – Hitler invaded Russia, not the USSR and Uncle Ronald is the President of the USA, not the States, America or Disneyland.

As mentioned earlier, screen display is slow, but the program does score in that the correct answer is provided in the case of error, though the accompanying tune grates on the ear after a while.

A little more irritating is its habit of correcting "slightly" wrong answers while giving credit anyway. Apparently the answer to "Hickory and hazel are types of . . ." is nuts – nut is only "close enough".

And the wild card character which allows for a spelling mistake can lead to some bizarre but acceptable responses – I'll never look at Burp Lancaster in the same light again.

In similar vein, I felt the program could have been a little more lenient with some spellings – I know necessity is the mother of invention, but I thought neccesity acceptable enough.

On the credit side, there are literally thousands of questions on the disc, and additional discs are available at a price.

Avoid short, consecutive games though, as questions tend to reappear. In three brief games I got the same sports question as many times – the random factor doesn't work too well. To my chagrin I got it wrong three times as well.

The game is enlivened by the occasional picture or musical clue, though nothing too startling. The only really imaginative section is the gameboard mode where you assume a 3D character and physically head towards the finish in your persona of Gramps, Annabelle, Prince or Gortz.

Gortz seems to owe his origins to robotics, but Prince falls part way between animal and machine. Still, the cover shows a dog wuffling about, so we'll assume my monitor is at fault.

With the huge selection of similar games available, standards have got to be a lot higher than this. It's a game to keep the family entertained on a sleepy Sunday afternoon and then be consigned to the great toy box in the sky.

W.F. Wilberforce

Real challenge for adventurers

Product: Uninvited
Price: £26.95
Supplier: Mirrorsoft, Maxwell House, 74 Worship Street, London EC2A 2EN.
Tel: 01-377 4600
Requirements: Macintosh

SEVERAL months ago I reviewed Deja vu for the Macintosh and concluded that it was an exceptional product – intriguing, innovative and, most of all, a real challenge.

Now from the same stable comes another product, Uninvited, which uses all the same principles but follows a new storyline and gives you another adventure to try and complete. This product has improved upon the original design, with the inclusion of animation and exceptional digitised sound.

Uninvited puts you in the shoes of a man who has just crashed his car into a tree outside a large old house in the country. You wake dazed, realising that your brother who was in the passenger seat next to you has gone missing. This is where the fun begins, as you go off to explore the old house and attempt to find your unfortunate brother.

Uninvited is basically an adventure. You wander around an imaginative and vivid world, attempting to solve puzzles and pick up clues, but where this game leaves all others behind is how the player interacts with this world.

The screen contains various windows, the largest being the player's view into the grounds and rooms within the house.

Within this window are the various objects you will have to examine and work with to solve the adventure. Another window contains the objects you are carrying, the conventional inventory.

However, unlike most adventure games, ▷

◁ you don't have to type 'get lamp' or 'drop gun'. Instead you point at the object in the main window, click on it and then drag it into your inventory window. You are now carrying that object.

Examining objects is simpler still – you just double click on any object, in either your inventory or main window.

To walk around the world you use the Exits window on the screen. This contains one or more small squares which indicate the exits from this room. By double clicking on one of them, you will be moved into that room.

Another window contains the textual descriptions of the rooms, objects, events and people which you come across during play, and the final window allows you to open, close, hit, consume, speak and operate.

To use these functions, select the object which you wish to act on, then the function. For example to hit the ghost, you point and click on the ghost then press the hit button on the screen. This is not a recommendation!

No longer do you have to hunch over a computer keyboard, struggling with the vocabulary and not even getting around to solving the true puzzles or problems. Here is a product which has had the Mac philosophy applied throughout and lets you get on with the fun of playing the game.

As for the plot: The house has about 40 rooms, but the game extends into the surrounding grounds, including a haunted maze built upon a graveyard, a greenhouse and something called a Magisterium.

You will have to solve many clever problems to get past the first hallway, but you will probably find yourself, like me, engrossed until you do. If anyone knows how to get into the 'Magisterium', then please let me know!

In the house you will constantly be harrassed by a strange small goblin carrying a key, who runs in front of you when you least expect it. No matter how hard I try though I cannot capture him and get that key.

A wonderful example of the sound in the game is an ancient gramophone record, which actually plays an excerpt of music before the main spring goes twang! and it will play no more. It's worth reloading the game just to hear this a few times.

The game comes on two discs, one of which may be placed on to a hard disc to make game play faster. I played it on a single drive Mac+ though and never found it to be slow or unresponsive to my actions. You also get a well-written 11 page manual.

However, as with any other good Mac product, the manual will not even have to be touched if you are willing to play and explore the functions on the screen.

The package is strong and attractive – it feels like £27 worth of product, unlike some items on the market. And the weeks or months of pleasure it will give are worth every penny. **Hugh Green**

Masks for the minors

Product: Mask Parade
Price: £19.95
Supplier: Springboard, c/o MGA Microsystems, 140 High Street, Tenterden, Kent TN30 6HT
Tel: 05806 4278
Requirements: Apple IIe, IIc, II+

MASK Parade is another creative game by Springboard, designed for children aged 4-12 years who like to dress up. The added bonus here is that they design what they wear.

On booting you are presented with a choice of printer setup or going directly to the Mask Parade picture menu. The printer setup is self explanatory with 32 different printers and 37 interfaces to choose from. I was pleased to see the Apple Silentype on the list because few publishers bother to support it nowadays.

The picture menu helps make things easy for children to control the program. Moving the joystick or using I, J, K or M (I would have preferred the arrow keys), causes the different categories to flash. The six available include hats, masks and even feet.

If the mask is selected from the picture menu the program enters the Mask work area: The outline of a mask appears, accompanied by a series of icons.

By placing the cursor next to the book icon and pressing the joystick button or spacebar the program pages through various mask outlines. There are almost 20 different ones – even a pumpkin for halloween.

Once the desired outline is on-screen it can be customised with the crayon icon which allows you to draw and erase lines. If you want to design your own mask from scratch the garbage can icon will clear the screen.

Now eyes, nose, and mouth can be added. By placing the cursor next to the appropriate icon and pressing the joystick button, the program will scroll through the various designs.

Sometimes the features will not appear in quite the right position on the mask – in this case you can use the cursor to move them into place.

The mask can now be printed, cut out, coloured in, reinforced with card (where's that old box the Apple came in?), and some string or elastic attached.

If masks are not enough there is always the Hats and Hairpieces work area. Here again there is a range of outlines you can access, including a chef's hat, rabbit's ears, top hats and many more. These can be customised using the crayon icon as before.

Other areas, which work in similar fashion, are Jewellery and Ties, which has the option to add extra gems for use in the jewellery, Glasses, with a range of spectacles to choose from and Feet.

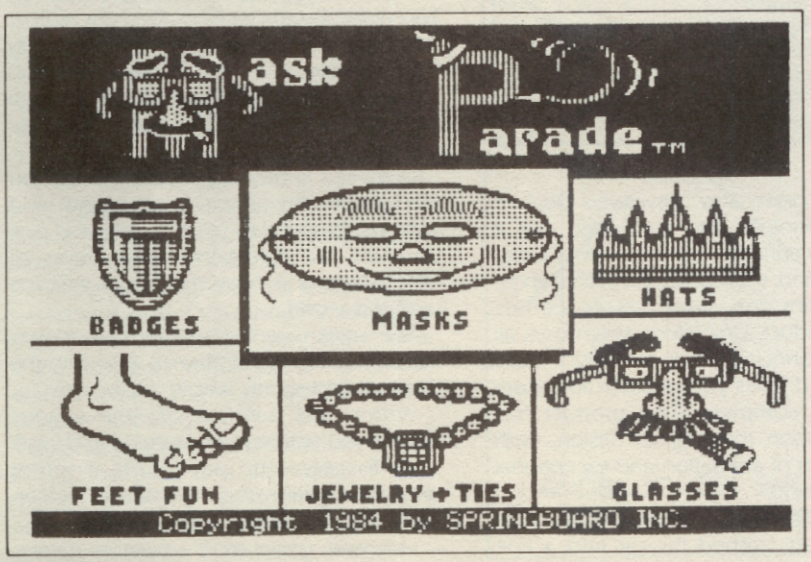
There is also a Badge work area but that's not as satisfactory as the others as many of the designs are unimaginative. However, there is an option to print text on the badge, with a choice of three ordinary fonts: fat, wee and big.

Mask Parade is an enjoyable package with a wide choice of designs to prompt experimentation and manipulation of ideas.

As with other Springboard packages it comes in a sturdy video cassette-style box, and includes one disc, an instruction booklet, a product catalog, and a limited warranty.

It would have been nice to see a set of coloured pens or pencils included, and perhaps some thin coloured card for putting through the printer. But even so, Mask Parade will keep children happy for many an hour.

Philip Seltsikas



Product: The Pawn
Price: £19.95 (Apple II) £24.95 (Macintosh)
Supplier: Rainbird, Wellington House, Upper St Martin's lane, London WC2H 9DL.
Tel: 01-240 8838
Requirements: Any Apple II or Macintosh

Adventuring with a near perfect parser

I HAVE to admit that, after all the attention this graphic adventure has received, I couldn't wait to load it and find out if it was as good as they said. It is!

The game is set in the land of Kerovnia at a time of great social unrest. For many years there has been dissatisfaction with the rule of King Erik. The Roobikyoub dwarves, under the leadership of Gringo Baconburger, are the main agitators for the abolition of the monarchy. The situation reached a head when Queen Jendah II was assassinated. In the heat of the moment the dwarves were blamed and subsequently banished from the land.

They retreated to a cave system under the mountains and continued to fight for a democratic government and an investigation to clear their reputation.

Their main argument for their innocence is their pronounced aversion to the sight of blood, especially their own. They maintain that the likely perpetrator of the evil deed is the court magician Kronos.

The fact that his sister Zita is known to have had an unwholesome influence over the recently vanished Princess Lacey is used to indicate the depth of Kronos' control over the kingdom.

Any group wishing to abolish the monarchy would therefore, be a target of his enmity. What better way to get rid of an opponent, they maintain, than by blaming them for the dastardly deed?

The populace also feels that some sort of investigation should be made and the longer the king ignores the situation, the more unpopular he becomes.

It is into this situation that you arrive. You awake on a path after being rendered unconscious by an unknown assailant. Your main task is to get out of the country before it explodes in to violence, but don't expect to do so without getting involved with the inhabitants.

You type in your commands from the keyboard, but unlike any other adventures, the parser seems able to handle virtually any input you give it, and the degree of interaction with the other characters is beyond belief.

For example, the parser understands "Take the guru's key from the hat and put it in the bottle in the plant pot".

At one point I typed "Ask the guru what is the meaning of life". He replied: "Life can be strange, wonderful, frightening, exhilarating and completely inexplicable. Life is much more exciting if spent contemplating life itself, yet death brings an end to that contemplation. Perhaps it's better not to think about it and just live it, for it is a gift and should not be wasted".

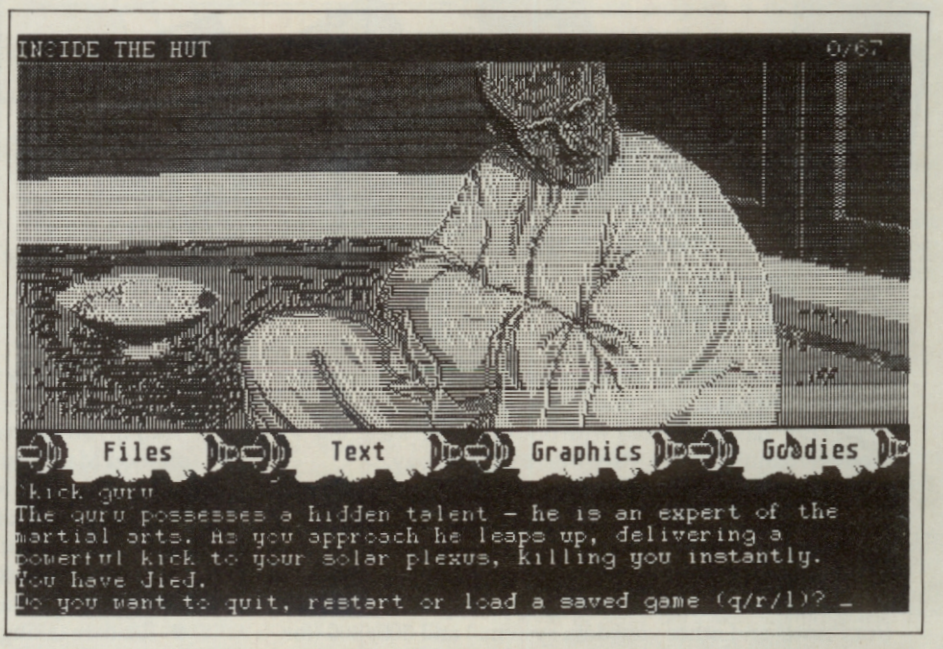
The graphics are also very impressive, with great attention being paid to detail, although the colourless Mac cannot do them full justice. Unfortunately the graphics are not available on the Apple II version.

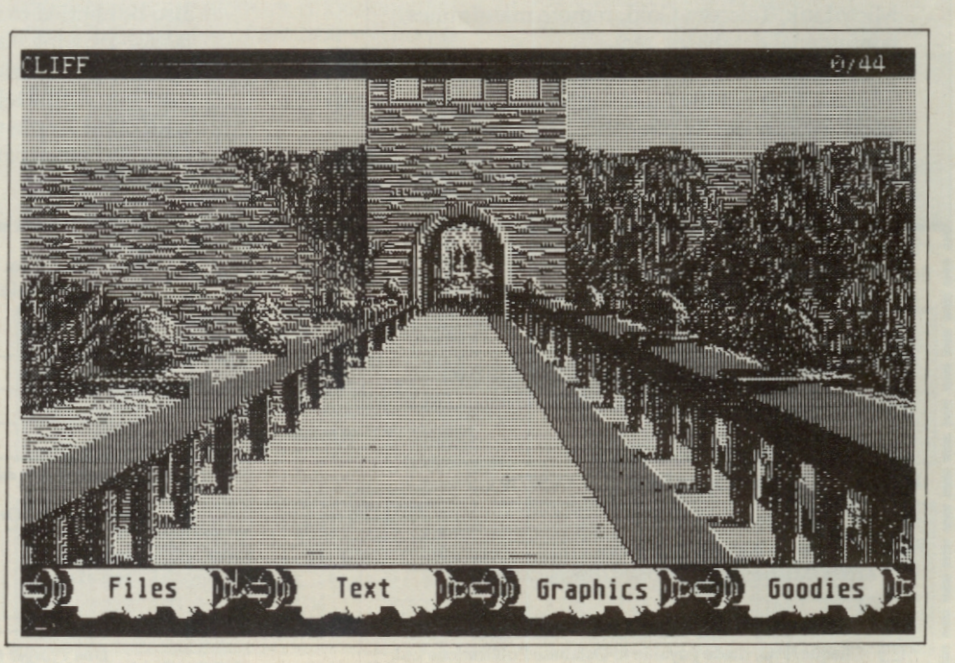
I still have a fair way to go in the adventure, but the problems I have solved have been logical, if only in retrospect!

The Pawn comes with a 44 page novella which sets the background and includes a very useful Help section. And a small booklet gives advice on tackling adventures in general and the Pawn in particular. Also included are a guide to loading and running the program and an A3 poster.

Overall the atmosphere is beautifully evocative and the gameplay excellent. What more can I say?

Paul Gardener





An auto line numbering program

Loading, relocation and setting up is done automatically in this utility by Graham Keeler

THE auto line numbering program described here is part of the complete editing package which makes up the Lostock Screen Editor. The only difference is that this comes as a single Applesoft program and incorporates a fairly complicated loading section.

Loading, relocation and setting up is done automatically, the program is relocatable and fully protected between Dos and its buffers, and is protected through a Reset. However, the program presented here can be loaded with a very short Applesoft loader program, and can be located wherever you wish to make it reasonably safe.

➔ Using the auto line numbering program

The principle and use of the program is very simple. Once it has been loaded, it can be initialised by typing Control+A. The computer responds with:

```
START: DEFAULT 10INC: DEFAULT 10
```

To both prompts you can either type in a number, or simply press Return to accept the default value. START is the starting line number that you want, and INC the increment or step between line numbers. The default of 10 will nearly always be acceptable.

Once initialised, pressing the spacebar at the start of a line will automatically produce the next line number in sequence. When typing in a program all you need to do is press the spacebar and type in the line without bothering with line numbers.

If you want to issue a direct command there is no need to switch off the auto line numbering. Anything but a space at the start of a line will suppress generation of the line number, while the computer still remembers where you got up to.

You can even run the program, then add more lines to it with auto line numbering continuing from where you left off, provided that you don't press Reset. This effectively destroys the auto line numbering and you will have to run the loader program again, or at least restore the intercept vectors.

If you are finished with auto line numbering, it can be switched off by typing Control+O (for Off) to prevent further line numbers appearing accidentally if you type a space at the start of a line, but it can be initialised again just by repeating the Control+A sequence.

However, you don't need to type Control+O before Control+A if you merely want to alter the value of the next line number.

Setting up the program

The program works by intercepting all keyboard input to see whether a line starts with Control+A or, when auto line numbering is initialised, a space or Control+O. This is done by POKEing certain locations which are different for Dos 3.3 and Prodos.

It may also be necessary to reset HIMEM. It is therefore necessary, or at any rate easiest, to use a separate small Applesoft program to do these POKEs and load the main, machine code program, and two versions of this loader program are listed.

The location of the machine code program must also be considered. There are various possibilities, but the machine code programmer's favourite at $300 is not possible because the program is too long. For Dos 3.3 the very top of available memory is probably best, unless you want to put another machine code program there.

For Prodos this is not quite such a good idea – ProDOS allocates buffers dynamically as needed and this can cause problems when it needs the space occupied by the auto line numbering program.

The other fairly safe place is at the bottom of memory, moving the start of Applesoft above the machine code. Two versions of the loader program are therefore given, one for Dos 3.3 and one for Prodos. If you want to load the program beneath Applesoft for Dos 3.3, use the Prodos version but replace lines 30 and 50 by:

```
30 POKE 56,0: POKE 57,950 CALL 1002
```

The main program is in machine code and is listed both in assembler and as a hexadecimal dump. If you have an assembler you can simply type in and assemble the program, using as ORiGin either $9400 for Dos 3.3, or $900 for Prodos.

If not, the easiest way is to enter the monitor and type in the numbers listed in the hexadecimal dump. To do this, type CALL –151, when the Applesoft] prompt will be replaced by a star. Next type either:

```
9400:
```

for the Dos 3.3 version, or:

```
900:
```

for the Prodos version, followed by the hexadecimal numbers exactly as listed, pressing Return at the end of each line.

The listing is correct for Dos 3.3, but for Prodos you must replace the underlined numbers, typing 09 in place of 94 and 0A in place of 95. Check very carefully that the numbers are exactly as listed.

When the entry is complete, type Control+C and Return to get back to Applesoft,then save the program by:

```
BSAVE AUTO.OBJ0, A$9400, L$1F7
```

(again replace $9400 by $900 for the Prodos version).

Users who do not feel comfortable about entering the program can purchase the Lostock Screen Editor from Lostock Soft- ▷

```
10  PRINT  CHR$ (4);"BLOAD AUTO.OBJ0"
20  POKE 8,0: POKE 26,0: REM  CLEAR AUTO AND GET FLAGS
30  POKE 56,0: POKE 57,148: REM  SET PROGRAM START ADDRESS ($9400)
40  HIMEM: 37888: REM  PROTECT PROGRAM
50  CALL 1002: REM  SET UP INTERCEPT
```

List loader program

```
10  PRINT  CHR$ (4);"BLOAD AUTO.OBJ0"
20  POKE 8,0: POKE 26,0: REM  CLEAR AUTO AND GET FLAGS
30  POKE 48690,0: POKE 48691,9: REM  SET PROGRAM START ADDRESS ($900)
40  POKE 103,1: POKE 104,11: POKE 2816,0: REM  ALTER BASIC START TO $B01
50  NEW
```

List loader for ProDOS

◁ ware at 13 Cranborne Close,Lostock, Bolton BL6 4JG. Price – specially reduced for Apple User readers – is £15.95).

The Editor has the advantages that it is preserved through a Reset, is completely protected from both Dos and Applesoft and handles loading and the appropriate location automatically.

It comes as a single Applesoft program, with both Dos 3.3 and Prodos versions on a single disc, along with several other useful programs. It also combines the auto line numbering and a much improved screen editor in a single, integrated package.

```
9400.95EF

9400- 20 1B FD E0 00 F0 01 60
9408- C9 81 D0 05 C5 08 D0 42
9410- 60 C9 A0 D0 07 C5 08 D0
9418- EE 4C 5E 95 C9 8F F0 1A
9420- 48 A9 8D C5 1A F0 02 68
9428- 60 A9 00 85 1A 20 9C FC
9430- 68 C9 8D D0 D2 68 68 68
9438- 68 60 A4 08 C0 A0 D0 C7
9440- A0 00 B9 D3 95 20 ED FD
9448- C8 C0 1D D0 F5 A9 88 85
9450- 08 60 A9 81 85 08 A5 33
9458- 85 2E A9 00 8D CA 03 8D
9460- CB 03 8D CC 03 8D CD 03
9468- 8D CE 03 8D CF 03 A9 A0
9470- 85 33 EE CC 03 A0 00 A2
9478- 06 B9 B7 95 20 ED FD C8
9480- CA D0 F6 A9 A0 85 33 A0
9488- 00 B9 C4 95 20 ED FD C8
9490- C0 0F D0 F5 A9 88 A0 0F
9498- 20 ED FD 88 D0 FA A9 8D
94A0- 85 1A 20 6A FD E0 00 D0
94A8- 12 A9 01 8D CE 03 A9 B1
94B0- 20 ED FD A9 B0 20 ED FD
94B8- 20 8E FD 86 1B A2 FF E8
94C0- E4 1B F0 44 BD 00 02 C9
94C8- A0 F0 F4 48 38 E9 B0 90
94D0- 7F C9 0A B0 7B AD CD 03
94D8- C9 10 B0 74 A0 00 B9 CD
94E0- 03 29 0F 0A 0A 0A 0A 99
94E8- CD 03 B9 CE 03 4A 4A 4A
94F0- 4A 18 79 CD 03 99 CD 03
94F8- C8 C0 02 D0 E1 68 0A 0A
9500- 0A 0A 8D CF 03 4C BF 94
9508- AD CC 03 29 0F F0 17 A0
9510- 02 B9 CD 03 99 CA 03 A9
9518- 00 99 CD 03 88 10 F2 A0
9520- 06 A2 07 4C 79 94 AD CF
9528- 03 D0 0A AD CE 03 D0 05
9530- AD CD 03 F0 1C AD CD 03
9538- C9 64 B0 15 AD CA 03 C9
9540- 64 B0 0E A9 A0 85 08 A5
9548- 2E 85 33 A2 00 A9 88 60
9550- 68 A9 9A 85 08 A2 00 9D
9558- 00 02 E8 A9 8D 60 A0 00
9560- B9 CA 03 29 F0 D0 08 E0
9568- 00 D0 04 C0 02 D0 0E 4A
9570- 4A 4A 4A 18 69 B0 9D 00
9578- 02 20 ED FD E8 C0 02 F0
9580- 18 B9 CA 03 29 0F D0 05
9588- E0 00 F0 0A 18 69 B0 9D
9590- 00 02 20 ED FD E8 C8 D0
9598- C7 F8 18 A0 02 B9 CA 03
95A0- 79 CD 03 99 CA 03 88 10
95A8- F4 B0 04 C9 64 90 04 A9
95B0- 00 85 08 D8 A9 A0 60 D3
95B8- D4 C1 D2 D4 BA A0 C9 CE
95C0- C3 BA A0 A0 A0 A0 A0 04
95C8- 05 06 01 15 0C 14 20 3D
95D0- 20 31 30 C1 D5 D4 CF A0
95D8- CC C9 CE C5 A0 CE D5 CD
95E0- C2 C5 D2 C9 CE C7 A0 C3
95E8- C1 CE C3 C5 CC CC C5 C4
*
```

Hexadecimal dump of the program under Dos 3.3. For the ProDOS version replace the underlined numbers with 09 in place of 94 and 0A in place of 95.

How the program works

It is quite unnecessary to understand how the program works in order to use it, but for those interested the principles are as follows.

All keyboard input is intercepted just before it reaches the monitor subroutine KEYIN at $FD1B. This means that the intercept comes after input has been examined by the disc operating system, which is why different versions are necessary for Dos 3.3 and Prodos: It is this interception that is cancelled when Reset is pressed.

The POKEs in the loader program cause execution to jump to the start of the auto program instead. If the key is not a Control+A, space or Control+O, or does not come at the start of a line, it is passed back to Applesoft, otherwise the appropriate section of the program is invoked.

The current line number and the increment are stored as three-byte, BCDnumbers, high byte first, in locations START1, START2, START3 and INC1, INC2, INC3. Five decimal digits are stored in five nibbles, the low nibble of the third byte not being used.

The flag AUTOFLG is used to record the status of the program, having three states – off, being initialised and fully operational. Cancelling auto line numbering simply involves clearing this flag.

On initialisation the digits making up the numbers are collected, converted to BCD nibbles and loaded into the bottom nibble, after higher nibbles have been shifted along. The numbers are checked that they do not exceed 63999, the increment is not zero and there are no non-digits. The assembly program is extensively commented so I hope that the details of this procedure are explained sufficiently clearly.

When the spacebar is pressed the current line number is issued, one digit at a time, to the screen and into the keyboard buffer. The line number is then updated by adding the increment, using the BCD arithmetic mode.

Incidentally, this is the one time when I have found it useful to do arithmetic in BCD, which is made very convenient on the 6502 by the Decimal mode of operation. □

```
SOURCE FILE: AUTO
0000:           1 ************************************************
0000:           2 *                                              *
0000:           3 *         AUTO LINE NUMBERING PROGRAM          *
0000:           4 *                                              *
0000:           5 *           GRAHAM KEELER  -  1985             *
0000:           6 *                                              *
0000:           7 ************************************************
----- NEXT OBJECT FILE NAME IS AUTO.OBJ0
9400:           8         ORG  $9400
0008:           9 AUTOFLG EQU  $08       ; AUTO FLAG AND GET FLAG MUST BE
001A:          10 GETFLG  EQU  $1A       ; CLEARED IN INITIALIZATION
001B:          11 LNLENG  EQU  $1B
002E:          12 SAVEPR  EQU  $2E
0033:          13 PROMPT  EQU  $33
03CA:          14 START1  EQU  $3CA
03CB:          15 START2  EQU  $3CB
03CC:          16 START3  EQU  $3CC
03CD:          17 INC1    EQU  $3CD
03CE:          18 INC2    EQU  $3CE
03CF:          19 INC3    EQU  $3CF
0200:          20 IN      EQU  $0200
FC9C:          21 CLREOL  EQU  $FC9C
FD1B:          22 KEYIN   EQU  $FD1B
FD6A:          23 GETLN   EQU  $FD6A
FDBE:          24 CROUT   EQU  $FDBE
FDED:          25 COUT    EQU  $FDED

9400:          26 ************************************************
9400:          27 *              INTERCEPT KEYS                  *
9400:          28 ************************************************
9400:20 1B FD  29         JSR  KEYIN     ; (NORMALLY JUMP HERE)
9403:          30 *                      ; A CONTAINS KEY, HI SET
9403:E0 00     31         CPX  #$00      ; IS THIS FIRST CHAR ON LINE?
9405:F0 01     32         BEQ  AUTO
9407:60        33 RETURN  RTS            ; RETURN TO APPLESOFT
9408:C9 81     34 AUTO    CMP  #$81      ; CTRL-A
940A:D0 05     35         BNE  ISITSPC
940C:C5 08     36         CMP  AUTOFLG   ; ALREADY HANDLING AUTO?
940E:D0 42     37         BNE  SETAUTO   ; NO, SO SET IT UP
9410:60        38         RTS            ; YES, SO JUST LEAVE IT
9411:C9 A0     39 ISITSPC CMP  #$A0      ; CHECK FOR SPACE CHARACTER
9413:D0 07     40         BNE  ISITCTO
9415:C5 08     41         CMP  AUTOFLG   ; IS AUTO INITIALIZED?
9417:D0 EE     42         BNE  RETURN    ; NO, SO BACK TO APPLESOFT
9419:4C 5E 95  43         JMP  AUTOSPC   ; GO PRINT NEXT LINE NUMBER
941C:C9 8F     44 ISITCTO CMP  #$8F      ; CTRL-O
941E:F0 1A     45         BEQ  CANCEL
9420:48        46         PHA            ; SAVE KEYPRESS
9421:A9 8D     47         LDA  #$8D      ; ARE WE ALREADY HANDLING INPUT
9423:C5 1A     48         CMP  GETFLG    ; FOR AUTO SETTING?
9425:F0 02     49         BEQ  ITISGET
9427:68        50         PLA            ; NO, RESTORE KEYPRESS
9428:60        51         RTS            ; AND BACK TO APPLESOFT
9429:A9 00     52 ITISGET LDA  #$00
```

AppleUser SPECIAL OFFERS!

Go wargaming on your Apple – with the ultimate conflict simulation!



Theatre Europe simulates the first 30 days of the war. In addition to being able to command either side, the player can choose the style of his opponent (the computer). The first level is a beginners level, where the computer opponent will not use the nuclear option. If he selects level two, the computer will play a "Rational" game following the accepted strategies of NATO or the Warsaw Pact. In level three it will play a highly unpredictable game.

In the game you command either NATO or Warsaw Pact forces. To help you there is a full colour poster map, together with a detailed instruction booklet.

While the producers of Theatre Europe have taken every care in researching this program to ensure the accuracy of details, we must stress that the events depicted in this conflict simulation are entirely fictitious. They must never be allowed to happen – the danger is that they might!

R.R.P.	Apple User price	Special subscription offer
£19.95	£14.95	£9.95 (+ subscription)

VOTED
Strategy Game of the Year 1985



This is the classic game no Apple user should miss . . . now it comes to you at an exceptionally low price!

Elite challenges you to undertake a fantastic voyage of discovery and adventure – making it a supreme test of your combat, navigational and entrepreneurial skills.

There are more than 2,000 different planets you can visit, bartering with their inhabitants, fighting off space pirates and bounty hunters.

The package includes a Space Trader's Flight Training Manual, a short novel to set the scene, a Quick Key Control guide, a Ship Identification guide – all designed to help you make the most of this superb game.

R.R.P.	Apple User price	Special subscription offer
£19.95	£14.95	£9.95 (+ subscription)

VOTED
America's No. 1 Apple game

TO ORDER, PLEASE USE THE FORM ON PAGE 61

```
942B:85 1A      53        STA  GETFLG    ; CLEAR GETFLG
942D:20 9C FC   54        JSR  CLREOL
9430:68         55        PLA            ; RESTORE CHAR
9431:C9 8D      56        CMP  #$8D      ; IS FIRST CHAR A RETURN?
9433:D0 D2      57        BNE  RETURN    ; NO SO LET GETLN HANDLE IT
9435:68         58        PLA            ; CLEAR RETURN ADDRESS
9436:68         59        PLA            ; OF GETLN
9437:68         60        PLA            ; AND RDCHAR
9438:68         61        PLA            ; FROM STACK
9439:60         62        RTS            ; GO BACK TO SETAUTO TO HANDLE
943A:           63 *                     ; DEFAULT
943A:           64 ************************************************
943A:           65 *          CANCEL AUTO LINE NUMBERING          *
943A:           66 ************************************************
943A:A4 08      67 CANCEL  LDY  AUTOFLG
943C:C0 A0      68        CPY  #$A0      ; AUTOFLG SET TO $A0 WHEN AUTO ON
943E:D0 C7      69        BNE  RETURN    ; NOT ON, SO IGNORE
9440:A0 00      70        LDY  #$00
9442:B9 D3 95   71 PRMESS4 LDA  MESS4,Y   ; PRINT MESSAGE
9445:20 ED FD   72        JSR  COUT
9448:C8         73        INY
9449:C0 1D      74        CPY  #$1D
944B:D0 F5      75        BNE  PRMESS4
944D:A9 88      76        LDA  #$88      ; BACKSPACE
944F:85 08      77        STA  AUTOFLG   ; CLEAR AUTO MODE
9451:60         78        RTS            ; AND RTS WITH BACKSPACE
9452:           79 ************************************************
9452:           80 ************************************************
9452:           81 *      START OF AUTO LINE NUMBERING PROPER     *
9452:           82 ************************************************
9452:           83 ************************************************
9452:A9 01      84 SETAUTO LDA  #$01      ; FLAG FOR INITIALIZING AUTO
9454:85 08      85        STA  AUTOFLG
9456:A5 33      86        LDA  PROMPT
9458:85 2E      87        STA  SAVEPR    ; SAVE OLD PROMPT SYMBOL
945A:A9 00      88        LDA  #$00
945C:8D CA 03   89        STA  START1    ; CLEAR START NUMBER
945F:8D CB 03   90        STA  START2
9462:8D CC 03   91        STA  START3
9465:8D CD 03   92        STA  INC1      ; AND INCREMENT
9468:8D CE 03   93        STA  INC2
946B:8D CF 03   94        STA  INC3
946E:A9 A0      95        LDA  #$A0
9470:85 33      96        STA  PROMPT    ; SPACE INTO PROMPT SIGNAL
9472:EE CC 03   97        INC  START3    ; USE NON-ZERO LOW BYTE OF START3 AS
9475:           98 *                     ; FLAG FOR FIRST OF TWO PASSES
9475:A0 00      99        LDY  #$00
9477:A2 06     100        LDX  #$06
9479:B9 B7 95  101 PRMESS1 LDA  MESS1,Y   ; PRINT 1ST OR 2ND MESSAGE
947C:20 ED FD  102        JSR  COUT
947F:C8        103        INY
9480:CA        104        DEX
9481:D0 F6     105        BNE  PRMESS1
9483:A9 A0     106        LDA  #$A0      ; SPACE
9485:85 33     107        STA  PROMPT    ; AS PROMPT SYMBOL
9487:A0 00     108        LDY  #$00
9489:B9 C4 95  109 PRMESS3 LDA  MESS3,Y
948C:20 ED FD  110        JSR  COUT
948F:C8        111        INY
9490:C0 0F     112        CPY  #$0F
9492:D0 F5     113        BNE  PRMESS3
9494:A9 88     114        LDA  #$88      ; BACKSPACE
9496:A0 0F     115        LDY  #$0F      ; 15 TO BE PRINTED
9498:20 ED FD  116 NEXTBS  JSR  COUT      ; BACKSPACE OVER DEFAULT MESSAGE
949B:88        117        DEY
949C:D0 FA     118        BNE  NEXTBS
949E:A9 8D     119        LDA  #$8D      ; CR
94A0:85 1A     120        STA  GETFLG    ; USE CR VALUE AS FLAG WHILE
94A2:          121 *                     ; GETTING START OR INC
94A2:20 6A FD  122        JSR  GETLN     ; GET VALUE FOR START OR INC
94A5:E0 00     123        CPX  #$00      ; ZERO IF DEFAULT SELECTED
94A7:D0 12     124        BNE  NODEF
94A9:A9 01     125        LDA  #$01
94AB:8D CE 03  126        STA  INC2      ; MAKES A 10
94AE:A9 B1     127        LDA  #$B1      ; 1
94B0:20 ED FD  128        JSR  COUT      ; PRINT A 10
94B3:A9 B0     129        LDA  #$B0      ; 0
94B5:20 ED FD  130        JSR  COUT
94B8:20 8E FD  131        JSR  CROUT
94BB:86 1B     132 NODEF  STX  LNLENG
94BD:A2 FF     133        LDX  #$FF
94BF:E8        134 NEXTA1 INX
94C0:E4 1B     135        CPX  LNLENG
94C2:F0 44     136        BEQ  DONE
94C4:BD 00 02  137        LDA  IN,X
94C7:C9 A0     138        CMP  #$A0
94C9:F0 F4     139        BEQ  NEXTA1    ; IGNORE SPACES
94CB:48        140        PHA            ; STORE NEW NUMBER ON STACK
94CC:38        141        SEC
94CD:E9 B0     142        SBC  #$B0      ; TURN INTO A PROPER NUMBER
94CF:90 7F     143        BCC  ERROR2    ; CAN'T BE A NUMBER KEY
94D1:C9 0A     144        CMP  #$0A
94D3:B0 7B     145        BCS  ERROR2    ; CAN'T BE A NUMBER KEY
94D5:AD CD 03  146        LDA  INC1
94D8:C9 10     147        CMP  #$10
94DA:B0 74     148        BCS  ERROR2    ; IF HIGH NIBBLE NOT ZERO,
94DC:          149 *                     ; TOO MANY DIGITS
94DC:A0 00     150        LDY  #$00
94DE:B9 CD 03  151 AGAIN   LDA  INC1,Y    ; SHIFT NUMBER ONE NIBBLE TO LEFT
94E1:          152 *                     ; (HIGH NIBBLE OF INC1 WILL BE ZERO)
94E1:29 0F     153        AND  #$0F      ; LOW NIBBLE
94E3:0A        154        ASL  A
94E4:0A        155        ASL  A
94E5:0A        156        ASL  A
94E6:0A        157        ASL  A
94E7:99 CD 03  158        STA  INC1,Y    ; TO HIGH NIBBLE
94EA:B9 CE 03  159        LDA  INC2,Y    ; HIGH NIBBLE
94ED:4A        160        LSR  A
94EE:4A        161        LSR  A
94EF:4A        162        LSR  A
94F0:4A        163        LSR  A
94F1:18        164        CLC
94F2:79 CD 03  165        ADC  INC1,Y
94F5:99 CD 03  166        STA  INC1,Y    ; TO LOW NIBBLE OF NEXT DOOR
94F8:C8        167        INY
94F9:C0 02     168        CPY  #$02
94FB:D0 E1     169        BNE  AGAIN     ; NOW DO INC3 TO INC2
94FD:68        170        PLA            ; RESTORE NEW NUMBER
94FE:0A        171        ASL  A
94FF:0A        172        ASL  A
9500:0A        173        ASL  A
9501:0A        174        ASL  A         ; SHIFT TO HIGH NIBBLE
9502:8D CF 03  175        STA  INC3      ; (DON'T USE LOW NIBBLE OF INC3)
9505:4C BF 94  176        JMP  NEXTA1    ; GET NEXT DIGIT OF INPUT
9508:AD CC 03  177 DONE    LDA  START3
950B:29 0F     178        AND  #$0F      ; ON 1ST PASS, CONTAINS A 1
950D:F0 17     179        BEQ  DONE2
950F:A0 02     180        LDY  #$02
9511:B9 CD 03  181 SWITCH  LDA  INC1,Y    ; SWITCH INC TO START
9514:99 CA 03  182        STA  START1,Y
9517:A9 00     183        LDA  #$00
9519:99 CD 03  184        STA  INC1,Y    ; CLEAR INC
951C:88        185        DEY
951D:10 F2     186        BPL  SWITCH
951F:A0 06     187        LDY  #$06      ; SECOND MESSAGE OFFSET BY 6
9521:A2 07     188        LDX  #$07      ; SECOND MESSAGE IS 7 CHARACTERS
9523:4C 79 94  189        JMP  PRMESS1
9526:AD CF 03  190 DONE2   LDA  INC3
9529:D0 0A     191        BNE  CHECK64
952B:AD CE 03  192        LDA  INC2
952E:D0 05     193        BNE  CHECK64
9530:AD CD 03  194        LDA  INC1
9533:F0 1C     195        BEQ  ERROR     ; CAN'T HAVE INCREMENT OF ZERO
9535:AD CD 03  196 CHECK64 LDA  INC1
9538:C9 64     197        CMP  #$64
953A:B0 15     198        BCS  ERROR     ; INC MUST BE < 64000
953C:AD CA 03  199        LDA  START1
953F:C9 64     200        CMP  #$64
9541:B0 0E     201        BCS  ERROR     ; LINE NO. MUST BE < 64000
9543:A9 A0     202        LDA  #$A0
9545:85 08     203        STA  AUTOFLG   ; NEW FLAG TO SHOW AUTO FULLY SET
9547:A5 2E     204        LDA  SAVEPR
9549:85 33     205        STA  PROMPT    ; RESTORE OLD PROMPT SYMBOL
954B:A2 00     206        LDX  #$00
954D:A9 88     207        LDA  #$88      ; RETURN TO APPLESOFT WITH BACKSPACE
954F:          208 *                     ; IN A, TO GENERATE NEWLINE
954F:60        209        RTS
9550:68        210 ERROR2 PLA
9551:A9 9A     211 ERROR  LDA  #$9A       ; CTRL-Z
9553:85 08     212        STA  AUTOFLG   ; CLEAR FLAG
9555:A2 00     213        LDX  #$00
9557:9D 00 02  214        STA  IN,X      ; CTRL-Z IN KEYBD BUFFER
```

```
955A:E8        215         INX
955B:A9 8D     216         LDA  #$8D      ; AND RETURN IN A
955D:60        217         RTS            ; CTRL-Z WILL CAUSE SYNTAX ERROR
955E:          218 *                      ; MESSAGE
955E:          219 ***********************************************
955E:          220 *          GENERATE A LINE NUMBER             *
955E:          221 ***********************************************
955E:A0 00     222 AUTOSPC LDY  #$00
9560:B9 CA 03  223 NEWNIBBLE LDA START1,Y
9563:29 F0     224         AND  #$F0      ; HIGH NIBBLE
9565:D0 08     225         BNE  OUT       ; OUTPUT IF NOT ZERO
9567:E0 00     226         CPX  #$00
9569:D0 04     227         BNE  OUT       ; OR IF WE HAVE OUTPUT BEFORE
956B:C0 02     228         CPY  #$02      ; IS THIS THE LAST DIGIT?
956D:D0 0E     229         BNE  LOWNIBBLE ; IF NOT, DONT OUTPUT
956F:4A        230 OUT     LSR  A
9570:4A        231         LSR  A
9571:4A        232         LSR  A
9572:4A        233         LSR  A         ; HIGH TO LOW NIBBLE
9573:18        234         CLC
9574:69 B0     235         ADC  #$B0      ; CONVERT TO ASCII
9576:9D 00 02  236         STA  IN,X      ; INTO KEYBOARD BUFFER
9579:20 ED FD  237         JSR  COUT      ; AND TO SCREEN
957C:E8        238         INX
957D:C0 02     239 LOWNIBBLE CPY #$02     ; NOW DO SAME FOR LOW NIBBLE
957F:F0 18     240         BEQ  DONE3     ; DON'T DO LOW NIBBLE OF 3RD BYTE
9581:B9 CA 03  241         LDA  START1,Y
9584:29 0F     242         AND  #$0F      ; LOW NIBBLE
9586:D0 05     243         BNE  OUT2
9588:E0 00     244         CPX  #$00
958A:F0 0A     245         BEQ  NEXTNIBBLE
958C:18        246         CLC
958D:69 B0     247 OUT2    ADC  #$B0
958F:9D 00 02  248         STA  IN,X
9592:20 ED FD  249         JSR  COUT
9595:E8        250         INX
9596:C8        251 NEXTNIBBLE INY
9597:D0 C7     252         BNE  NEWNIBBLE ; (ALWAYS)
9599:F8        253 DONE3   SED            ; PERFORM ADDITION IN BCD
959A:18        254         CLC
959B:A0 02     255         LDY  #$02
959D:B9 CA 03  256 NEXTADD LDA  START1,Y  ; INCREMENT LINE NO
95A0:79 CD 03  257         ADC  INC1,Y    ; BY INC
95A3:99 CA 03  258         STA  START1,Y
95A6:88        259         DEY
95A7:10 F4     260         BPL  NEXTADD
95A9:B0 04     261         BCS  OVERFLW
95AB:C9 64     262         CMP  #$64      ; HAVE WE RUN OFF THE END?
95AD:90 04     263         BCC  NOOVER
95AF:A9 00     264 OVERFLW LDA  #$00      ; NUMBERS OVERFLOWED
95B1:85 08     265         STA  AUTOFLG   ; CLEAR AUTO FLAG
95B3:D8        266 NOOVER  CLD
95B4:A9 A0     267         LDA  #$A0      ; FINAL SPACE
95B6:60        268         RTS            ; BACK TO KEY HANDLE ROUTINE
95B7:          269 ***********************************************
95B7:          270 *                MESSAGES                     *
95B7:          271 ***********************************************
95B7:D3 D4 C1  272 MESS1   ASC  'START:'
95BA:D2 D4 BA
95BD:A0 C9 CE  273 MESS2   ASC  '        INC:  '
95C0:C3 BA A0
95C3:A0
95C4:A0 A0 A0  274 MESS3   DFB  $A0,$A0,$A0,$04,$05,$06,$01,$15,$0C,$14,$20
95C7:04 05 06
95CA:01 15 0C
95CD:14 20
95CF:3D 20 31  275         DFB  $3D,$20,$31,$30 ; '  DEFAULT = 10' IN INVERSE
95D2:30
95D3:C1 D5 D4  276 MESS4   ASC  'AUTO    LINE NUMBERING CANCELLED'
95D6:CF A0 CC
95D9:C9 CE C5
95DC:A0 CE D5
95DF:CD C2 C5
95E2:D2 C9 CE
95E5:C7 A0 C3
95E8:C1 CE C3
95EB:C5 CC CC
95EE:C5 C4

*** SUCCESSFUL ASSEMBLY: NO ERRORS
```


MICRO COMPUTER CONSULTANTS LTD

Special New Year Bundle Offers on all the Apple Range including Macintosh, LaserWriter & Apple II GS

McCAD by Vamp

PCB Design Package
for Macintosh

Evaluation Disk &
5 minute manual
available

Call TODAY for further details

Authorised Apple and
LaserWriter Dealers
Level One Service Centre

MCC

Barclay House, 151 Elliott St
Tyldesley, Manchester
M29 8EL

Tel: 0942-892818

☆☆☆OVERSEAS ORDERS A SPECIALITY☆☆☆

THE MACWRITE ALTERNATIVE

Geoff Wood finds MultiScribe an acceptable answer to Apple IIc (and e) owners' aspirations

IMPECUNIOUS Apple IIe or IIc owners who are saving up to buy a Macintosh in order to use MacWrite can save themselves a great deal of money by simply buying MultiScribe for £59.

It uses the double high resolution graphics of the IIe or IIc to emulate most of the features of MacWrite on the Macintosh, including pull down menus, cut and paste operations, scroll bars, dialog boxes, multiple fonts in various sizes and styles, rulers, and so on.

Of course you must not expect an Apple II to give as clear a picture as the Macintosh screen. Nor can you expect the speed of operation of Apple II word processing programs like AppleWriter or AppleWorks.

But MultiScribe meets a need for those who want fancy fonts in various sizes and styles with Macintosh operations. What is more, it offers a built-in Font Editor with which you can edit existing fonts or create new ones. You don't get that with MacWrite.

Like MacWrite, MultiScribe uses a mouse to select commands from the menus, but you can use the Escape key and the four arrow keys if you wish. Alternatively, most commands can be operated by holding down the Open Apple key and pressing another key, say P for Print. These commands are similar to MacWrite, where you hold down the command key and press another key.

The program is ProDOS based and comes on two sides of a single floppy disc, not copy protected. The manual is over 250 pages with a 20 page addendum for updates including such features as support for UniDisk 3.5, hard discs and ram drives. The manual is similar in format to Macintosh manuals with tutorial sections and reference sections.

When you boot up, if you have an Apple memory expansion card or similar card, you will be offered the option to load all the program, including the fonts and the font editor, into the ram card. This feature saves disc access time later, especially if you use several fonts in one file.

The screen appearance is similar to MacWrite. It shows a blank white (or green) document window with a menu bar above displaying the words, File, Edit, Search, Format, Font, Size and Style, and a vertical scroll bar at the right hand side. There is also an Apple symbol in the top left hand corner offering various options. One of these is About MultiScribe, which tells you the version number and the available memory – 29k with an Apple IIc.

Another useful option on the Apple symbol menu is Invert Screen. With the green Apple II monitor, I found it easier on the eye to have green characters on a dark background rather than black characters on a bright green background. Similarly, on a black and white Hitachi monitor I preferred white characters on a dark background.

Formatting text

You can't have white on black with MacWrite but you don't need it because the Macintosh screen displays pure white whereas inverse on the Apple II screen has horizontal lines running across it.

As with MacWrite, the cursor changes from an I-beam in the document window to an arrow in the menu bar or scroll bar. When you click the mouse, a flashing vertical bar at the location of the I-beam marks the insertion point where text appears as you type.

If you are accustomed to other Apple II word processing programs, you must remember that with MultiScribe you can move the cursor without moving the insertion point. If you forget to click the I-beam, you may find yourself inserting text in the wrong place.

As in MacWrite, formatting the text in terms of the margins, line spacing and justification is done by inserting rulers in the text where you want to change the format from that determined by the first ruler. Rulers can be hidden or shown. They can be cut – except the first ruler – or copied and pasted.

The standard ruler has a scale marked in inches and eighths of an inch. The left and right margin markers are set to give six inches of text with ten tab markers spread across the page. The margin and tab markers can be moved with the mouse or by using the left or right arrow keys with an Apple key.

Also on the ruler, in the same position as the left margin marker, is an indentation marker which can be moved to indent the first word of every paragraph. The ruler displays boxes where you can point and click to choose 0, 1, 2 or 3 line spacing or to justify left, right, centre or full.

Unlike MacWrite, after you click one of these boxes nothing happens until you move the cursor out of the ruler. This enables you to make several format changes in the ruler without having to wait for one to take effect. As you might expect, the Apple II takes longer than the Macintosh to carry out some of the re-formatting operations, so this feature is useful.

When you change the margins or the indentation or tab settings, the text below the ruler is reformatted accordingly. However, when you change the justify settings the text is not reformatted on the screen, only on the printer. Thus MultiScribe is not strictly speaking a WYSIWYG word processor. What you get may not be exactly what you see.

Scrolling is performed either by using the mouse to move the elevator in the vertical scroll bar (or by clicking below or above the

elevator) or by using the up and down arrow keys to move the I-beam. As you scroll through several pages the elevator box shows the number of the page currently on the screen.

You can change the number of the first page of a document so that long documents can be split into shorter sections for ease of editing. Like the earlier versions of MacWrite, MultiScribe keeps the whole file in ram so you are limited to files of about 10 pages.

Page breaks are shown as dotted lines across the screen. They can be changed by using the Insert Page Break command from the Format menu.

With short documents the arrow keys scroll the cursor from start to finish quite quickly. For long ones it is faster to use the mouse to move from start to finish. Even so there is a delay of a few seconds, much longer than with MacWrite, which in turn is not as fast as AppleWorks or Apple Writer.

Another way of moving through the text is identical to the procedure used in AppleWorks. You hold down one of the Apple keys and press a number from 1 to 9. The higher the number you press, the nearer the cursor moves to the end of the document. Alternatively, if you hold down one of the Apple keys and press either < or > the cursor moves through one screenful of text at a time.

File transfer

Documents can be saved under any valid ProDOS filename. As with MacWrite, you can choose either Save or Save as . . . from the File menu. These commands save all the formatting details such as fonts, sizes, styles, rulers, print options, and so on. Alternatively, you can choose the Save as Text command which saves files as Ascii text files without the MultiScribe fonts, styles, sizes or special formatting. Thus MultiScribe files can be transferred to other word processing programs such as Apple Writer and AppleWorks.

The Open command enables you to load either files created with MultiScribe or Ascii text files created by other word processing programs.

As with MacWrite, you must select text before you can edit it. This is done either by dragging the I-beam with the mouse or by moving the I-beam while holding down one of the Apple keys. Unfortunately, the MacWrite technique of clicking the I-beam at the start of the text, then holding the shift key down and clicking at the end of the text you want to select, does not work with MultiScribe. Nor can you click on a word to select it, as in MacWrite.

Selected text can be deleted with the Cut command from the Edit menu or by pressing the Delete key. However cut text is transferred to the clipboard and can be pasted back in; deleted text is lost for ever. Alternatively, selected text can be copied on to the clipboard and pasted elsewhere.

The appearance of selected text can be changed by using the menus for Font, Size and Style. MultiScribe offers 10 different fonts, five sizes and eight styles. Samples of some of these printed on an Imagewriter II are shown in Figure I. All the fonts except Standard.80 are proportional spacing.

Some of the larger fonts are not available in all five sizes because the large versions would exceed the limit of 75 points maximum size per character.

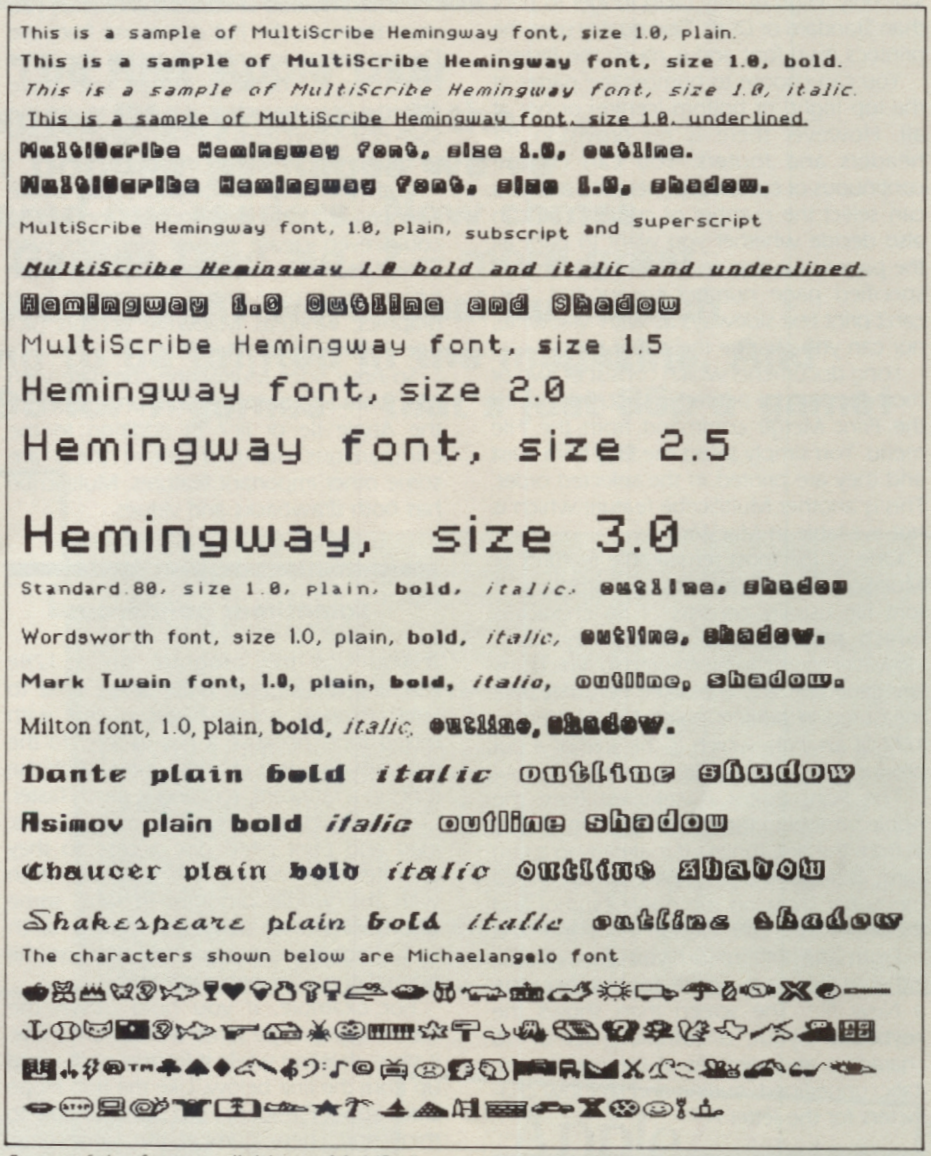
Selected text can be changed from upper to lower case or vice versa by using an option in the Style menu. You can't do that with MacWrite or AppleWorks.

You do not need to select text in order to use the Find or Replace commands from the Search menu. Simply locate the insertion point at the start of the text you wish to search, then initiate the command. Both commands can operate on whole or partial words, either recognising or ignoring case. A specified word can be replaced either one word at a time or all occurrences of the word.

MultiScribe supports 11 different printers, including the Apple Imagewriter, Scribe and DMP, the Epson FX, the MX and RX, the Okidata 92 (IBM), 92 (Std) and 192/193, the C.Itoh Prowriter and a Brother printer. It can operate from an Apple IIc port or from a Super Serial card in any slot of an Apple IIe.

It also supports 40 other printer cards. Once you have specified your options, your selections are saved on the disc so you don't have to repeat the specification each time you use the Print command.

The Print command offers options similar ▷



Some of the fonts available on MultiScribe

◁ to MacWrite. You can choose High, Standard, or Draft with mixed fonts and sizes, or Text quality which gives one font and one size only. High quality takes longer to print than Standard or Draft. Text quality uses the printer's own font and is much the fastest.

You can choose to number the pages at the top (right) or bottom (centre) or not at all. However there is no provision for headers and footers. You can choose continuous or cut sheet paper feed and you can select the number of copies. You can also decide whether you want to print all the pages of a document or only from one specified page number to another. You can't print text sideways as with MacWrite, nor can you change the paper size.

Long documents which consist of two or more files can be printed in succession with the Print Merge command from the File menu. You simply select the files from a list and they are printed in the selected order. This is another MultiScribe feature which is not available in MacWrite.

One of the most remarkable features of MultiScribe is the font editing program. A font file usually consists of 96 characters which match those on the keyboard. However fonts can be created in which any key generates any character. Font sizes are measured in printers points, a point being 1/72 of an inch, which is the size of a dot produced by a dot matrix printer.

The Font Editor is selected from the Apple symbol in the menu bar then loaded in from the disc (unless it is already in a ram card). It displays a plain grey screen with a menu bar showing the Apple symbol and the words File, Edit, Design, Font and Size.

From the File menu you can choose either to Open an existing font file or create a New file. The screen then shows the keyboard layout, a complete set of 96 characters and samples of the plain, bold, italic, underlined, outline and shadow characters for the letter A.

Pixels display

You can then edit the font for the letter A or choose another letter by using the Get command from the Design menu. The letter you wish to edit is displayed as pixels on a background of dots which form a rectangle covering the total width and height of the character.

To edit a character, you change the dots or pixels by using the mouse (click on a dot or pixel to change it) or by using the arrow keys to select a dot or pixel then pressing the Open Apple key (dot) or the Closed Apple key (pixel).

At any stage in creating or editing a character you can use commands from the Design menu to shift the whole character up or down a row, or one column to the left or right. You can also flip a character horizontally or vertically. These options make the task of editing much easier than if you had to change every dot or pixel. Commands in the Size menu enable you to change the height or width of the background rectangle.

Having created or edited a character, you must then use the Put command from the Design menu in order to retain the new character in memory. When you have edited a few characters, it is wise to use the Save command from the File menu in order to save the font file on the disc.

With the Font Editor you could create scientific or foreign language fonts. You could even create picture elements with which you could draw pictures. This is the nearest you could get to mixing text with graphics, whereas MacWrite accepts pictures created with MacPaint.

So how does MultiScribe compare with MacWrite and ordinary word processors for the Apple IIe or IIc? In addition to the comparisons outlined above there are some other important features. MultiScribe has both drawbacks and virtues.

Sometimes ponderous

If you use the program on a 128k machine it can take quite some time to scroll through a few pages of text with mixed fonts because it has to refer to the program disc as it changes fonts. With the fonts in a ram card, scrolling is much faster.

Other operations like find, search, save, load and print need disc access so they operate faster with a ram card. But even with the whole program in ram, some operations are slow compared with conventional word processors that use the normal character generator chip.

For example, if you hold down the Delete key to wipe some words from a line, it stops deleting while it fetches each word up from the line below. Like the Bob Hope crack about President Ford being unable to think and chew gum at the same time, MultiScribe cannot delete and perform word wrap at the same time. However when you compare the cost of an Apple II and MultiScribe with a Macintosh and MacWrite, you can't expect to buy a BMW at a Ford price.

There are other shortcomings. For example, there is no option to see the carriage returns, but that is true of MacWrite also. (Apple Writer and AppleWorks let you see the carriage returns so that you can delete surplus blank spaces.) Similarly, there is no way to search for text that includes carriage returns, whereas with Apple Writer you can do this easily.

There is no glossary facility, but you could use the Replace command to substitute long words or phrases for a single character such as an asterisk.

Another irritating weakness compared with Apple Writer and AppleWorks is that if you use the down arrow key to scroll to the last line the final press of the arrow key does not take the cursor to the end of the document, only to the last line. But then, MacWrite does not recognise the arrow keys of the Macintosh at all, so you are obliged to use the mouse.

MultiScribe has many of the same shortcomings as MacWrite. For example, you cannot catalog all the files on a disc, only the text files. You cannot delete files off a disc from within the program nor can you rename, lock or unlock files. More important, you cannot format a blank disc.

Like MacWrite, MultiScribe does not display line numbers or the number of characters. There is no easy way to count the number of words, but it can be done by saving the document as an Ascii text file then using the Apple Writer word count WPL program. Alternatively you can load the Ascii file into Apple Writer and divide the number of characters by six to give an approximate count of the number of words.

Like MacWrite and AppleWorks, the MultiScribe Find and Replace commands only search forward through the file, not backwards. (Apple Writer searches either backwards or forwards.) With MacWrite, if you start a search part way through a file, when it reaches the end of the file it goes to the start and continues searching until it reaches the cursor again. Like AppleWorks, MultiScribe stops at the end of the file and does not search from the start to the cursor.

Unlike Apple Writer, MultiScribe's search facility does not permit wild card or any length characters, but then neither do MacWrite and AppleWorks. Unlike MacWrite, the MultiScribe tab positions cannot be defined as decimal point positions, so if you have tables with decimal points you may need to insert or delete spaces.

Value for money

However, MultiScribe has its virtues. Like MacWrite and AppleWorks, when you choose the Open or Quit commands, it does not wipe a changed file out of the ram without asking you whether you wish to save it first. Apple Writer gives no such warning.

MultiScribe is excellent value for money for those who want the features it offers. Conventional word processors like Apple Writer or AppleWorks do all that most people need. But if you want fancy fonts and you can't afford a Macintosh and MacWrite, MultiScribe is nearly as good at much less cost.

MultiScribe is available from Bidmuthin Technologies, PO Box 264, Harrow, Middlesex, HA3 9AY.
Tel: 01-907 8516.
Price: £59.
A new version (2) of MultiScribe offering better printing quality and some other goodies is now also available for the IIc, IIe and IIGS.

□

Putting an Apple II into overdrive

ALTHOUGH the Apple II has many merits, one of its shortcomings is that some of its functions are slow compared with other micros. This is partly because the 6502 microprocessor executes its instructions at a rate of 1MHz (one megahertz is one million cycles per second) whereas its main 8 bit rival, the Z-80 operates at 4HMz.

More recent 16 bit microprocessors operate even faster. The 8088 used in the IBM PC operates at 4.77MHz and the 6800 used in the Macintosh operates at 7.83MHz.

Of course the operating speed of the processor is not the sole determinant of the apparent speed of a computer. Programs witten in some languages such as Pascal run faster than similar programs written in Basic, especially if the Pascal is compiled and the Basic is interpreted. However, well designed Basic programs can run faster than badly designed Pascal programs.

Nevertheless, many programs written for the Apple II can be speeded up with the aid of the TransWarp accelerator card, which uses a 65C02 microprocessor running at 3.6MHz clock speed.

The card also houses 256k of ultra fast ram chips and it is compatible with the Apple II, II Plus, IIe and enhanced IIe. It is made by Applied Engineering who also make the RamWorks and RamFactor expanded memory cards.

The TransWarp card is compatible with

The TransWarp accelerator card is designed to boost the Apple II's speed. Geoff Wood tries it out

all standard peripherals cards such as printer and modem interfaces, disc drive controllers, 80 column cards, mouse cards, clock cards and expanded memory cards. However, some of these cards do not operate properly at speeds higher than 1MHz, so the TransWarp card has two banks of switches which can be set to operate cards in each slot at the higher or lower speed.

In general most disc controller cards, serial cards, communications cards and clock cards need 1MHz, whereas parallel printer cards, hard disc controllers, 80 column cards and mouse cards will operate at 3.6MHz. Memory expansion cards such as the Apple card and RamFactor can operate at 3.6MHz, but older memory expansion cards that use the bank switching technique operate at 1MHz.

The card can be fitted into any vacant slot except the auxilliary slot of an Apple IIe. It can even be used instead of a language card in slot 0 of an Apple II Plus.

When you switch on the machine there is a high pitched beep instead of the normal sound. The word TransWarp appears on the screen followed by another beep and then the computer boots up the disc drive.

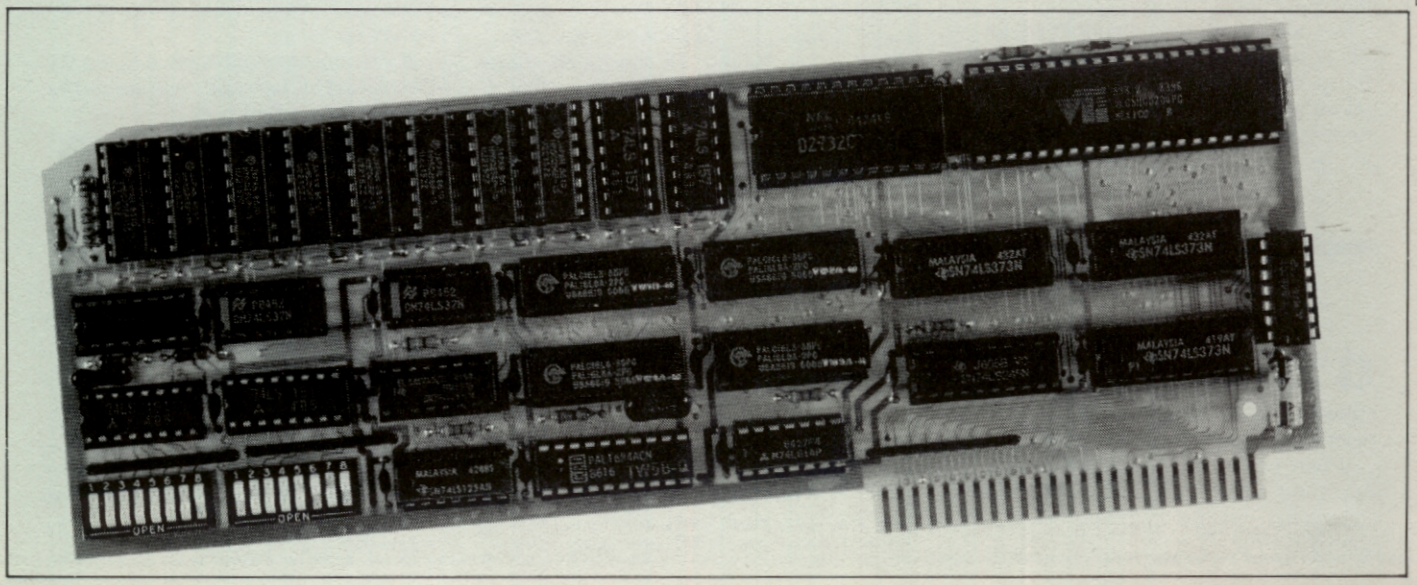
If you press the Escape key immediately after switching on the TransWarp card is disabled (even as a language card) and programs run at normal speed.

Thereafter you can switch between programs with Open-Apple-Control-Reset and the TransWarp card is unaffected. Then the only way to activate the TransWarp card is by cold booting (powering up) the computer.

The card can also be disabled or enabled through software control by poking 1 or 0 into location 49268. If you poke 3 into this location the card is disabled and can only be enabled again by a cold start.

On power up TransWarp loads the Apple's rom into the ram and uses the rest of its ram to emulate most of the Apple's main and auxiliary memory. The Apple's main memory is used only for video display of text and graphics which requires the 1MHz rate.

I tried out the TransWarp card in my Apple IIe with AppleWorks. The first thing you notice is the speed at which the cursor flashes. Opertions that require disc access ▷



◁ are carried out at normal speed, but most other operations are much faster.

In the spreadsheet I entered the number 1 in A1 and the formula 1+A1 in A2 and then copied the formula down to A250. This took four seconds as compared to eight seconds for normal AppleWorks. I then copied column A into columns B to H. This took only 40 seconds instead of 100.

Recalculation of the eight columns took 8 seconds compared to the normal 24. Inserting four blank columns between D and E took only four seconds instead of 12. Deleting the four columns A to D took only five seconds instead of 16. These times exclude the time taken to press the keys to issue the commands.

In the word processor I created a 20 page document with 1100 lines. Replacing a word that occurred 340 times in the text took 30 seconds compared to the normal 90 seconds. Changing the left margin from 1 inch to zero took only 6 seconds instead of 15. Changing the number of characters per inch from 10 to 12 took only 6 seconds instead of 10 seconds.

In the database I loaded a file with 500 records. It took between 2 and 5 seconds to rearrange the file on any of 7 columns compared to the normal time of between 4 and 14 seconds. To extract all the records matching three criteria took less than 2 seconds instead of 4.

Differences in time of a few seconds may not sound much to the novice, but anyone accustomed to using computers knows that if you have to wait more than two seconds, your attention wanders. Waiting 10 seconds is a nuisance and waiting for 30 seems like ages.

The files described above occupied most of the 55k desktop space in the 128k Apple IIe. I used a 1024k RamFactor memory expansion card to give a desktop size of 1012k and much larger files.

In the spreadsheet I entered the number 1 in A1 and the formula 1+A1 in A2 and then copied the formula down to A990. This took 8 seconds compared to 25 seconds for normal AppleWorks. I then copied column A into columns B to T. This took only 6 minutes instead of nearly 18. Recalculating the 20 columns (nearly 20,000 cells) took only 80 seconds instead of 340.

In the word processor I created a 92 page document with almost 5000 lines. Replacing a word that occurred 1564 times in the text took less than 6 minutes compared to the normal 20.

In the database I created a file with 5000 records. It took between 8 and 50 seconds to rearrange the file on any of seven columns compared to the normal time of between 30 and 150 seconds. To extract all the records matching three criteria took only 5 seconds instead of 14 seconds.

Thus the TransWarp card really pays off with an expanded memory card and large files. But even in a normal Apple II the savings are worthwhile.

I tried the TransWarp card with other programs. With Apple Writer 2.0, the Find/Replace/All command was much faster, but most other operations seemed about the same. One noticeable difference was in printing a document to the screen (for checking page breaks). The text scrolled much faster than usual.

Operations like replicating and recalculating were much faster with VisiCalc. But VisiCalc is notoriously slow at loading files, and this was unchanged. On the other hand, Multiplan loads files much faster than VisiCalc but is slower at recalculation. A worksheet that normally takes 50 seconds to recalculate was finished in 20 seconds. SuperCalc 3a, which is already the fastest Apple IIe spreadsheet, operates like greased lightning with the TransWarp card.

Quickfile in its day was way ahead of database programs like VisiFile but was relegated when AppleWorks arrived with its much faster operations. With the TransWarp card, Quickfile almost matches normal AppleWorks for speed in sorting and extracting records.

Some aspects of Business Graphics, a Pascal-based program, are speeded up by the TransWarp card, especially when drawing filled bar charts and pie charts.

Many games programs are speeded up by the card. If you are bored with Olympic Decathlon or Pac Man, try them with TransWarp fitted.

However if you use CP/M programs on your Apple, the TransWarp card will not help. Some Z-80 cards access the Apple's direct memory access bus, others don't But the TransWarp card must be de-activated with both types of card.

The TransWarp card is designed to be power efficient, but like all accelerator cards it draws a fair amount of power and generates heat. The manufacturers recommend the use of a cooling fan.

Before you buy any accelerator card you need to recognise that although its microprocessor runs at 3.6 times the speed of the normal Apple 6502, this does not mean that all your programs will run 3.6 times as fast. Many operations such as disc access will be unchanged.

Many calculation operations will be performed in half or a third of the normal time but few operations will appear to be done 3.6 times as fast. Nevertheless if you want to speed up your Apple II, the TransWarp card will work wonders with many programs.

The TransWarp accelerator card is available from Bidmuthin Technologies, PO Box 264, Harrow, Middlesex, HA3 9AY. Tel: 01-907 8516, price £279. □

Apple*tip*

While playing around on my Apple II+, I came across a useful tip for REM statements.

By ending and starting your REM statments with a few Ctrl-Js you can have many more blank lines above and below your words and therefore make them stand out much more than using an asterisk (*) or any other symbols.

When you use a word processor for editing Applesoft programs by converting the listing to a text file you have to take care over the following.

When executing the text file back to Applesoft Basic the DATA and REM statements will be followed by extra spaces.

You can anticipate this by removing all the spaces immediately after these statements in your text file.

When you use Applewriter you can do that by putting the cursor at the beginning by typing Ctrl B. Next type Ctrl F and answer the question with /REM /REM/ A or /DATA /DATA/A.

When you use the editor from the Toolkit you have to execute the command C/REM /REM/ or C/DATA /DATA/. All the extra spaces are then removed automatically.

Here's a tip for using Autostart ROM special locations. In location decimal 1010,$3F2, and decimal 1011,$3F3 you can put your own values in and control what the RESET key does. (For more details see Page 37 of the Apple II Reference Manual). Then when this is done you simply CALL-1169 to set the power-up value.

If you do not do this your Apple will believe that it has just been turned on and perform a cold start.

Here are the useful pokes:

```
10  POKE 1010,00
20  POKE 1011,03
30  CALL - 1169
```

This will now jump to $300 every time you press the RESET key. (You could have a program there to do something.)

```
40  POKE 1010,105
50  POKE 1011,255
60  CALL - 1169
```

Now every time RESET is pressed it will jump into the monitor. There are many more that can be tried.

In Part One, Steve Wozniak told Mike Cowley how his formative years shaped his thinking on computer design. This month he traces events from the dramatic arrival of the Apple I

The dream that turned into a revolution

STEVE Wozniak was never cut out to be the boss of a giant computer corporation. All he ever wanted to do was design machines for his own amusement and those of his friends at the home computer club.

However his long-time friend Steve Jobs had other ideas. "Steve was the hustler", insists The Woz. "He'd had a couple of sales jobs and so he knew in which direction he wanted us to go".

It was Jobs who persuaded his old school pal to stop giving away the schematics of his new machine to all and sundry and grasp the opportunity to "make a few bucks".

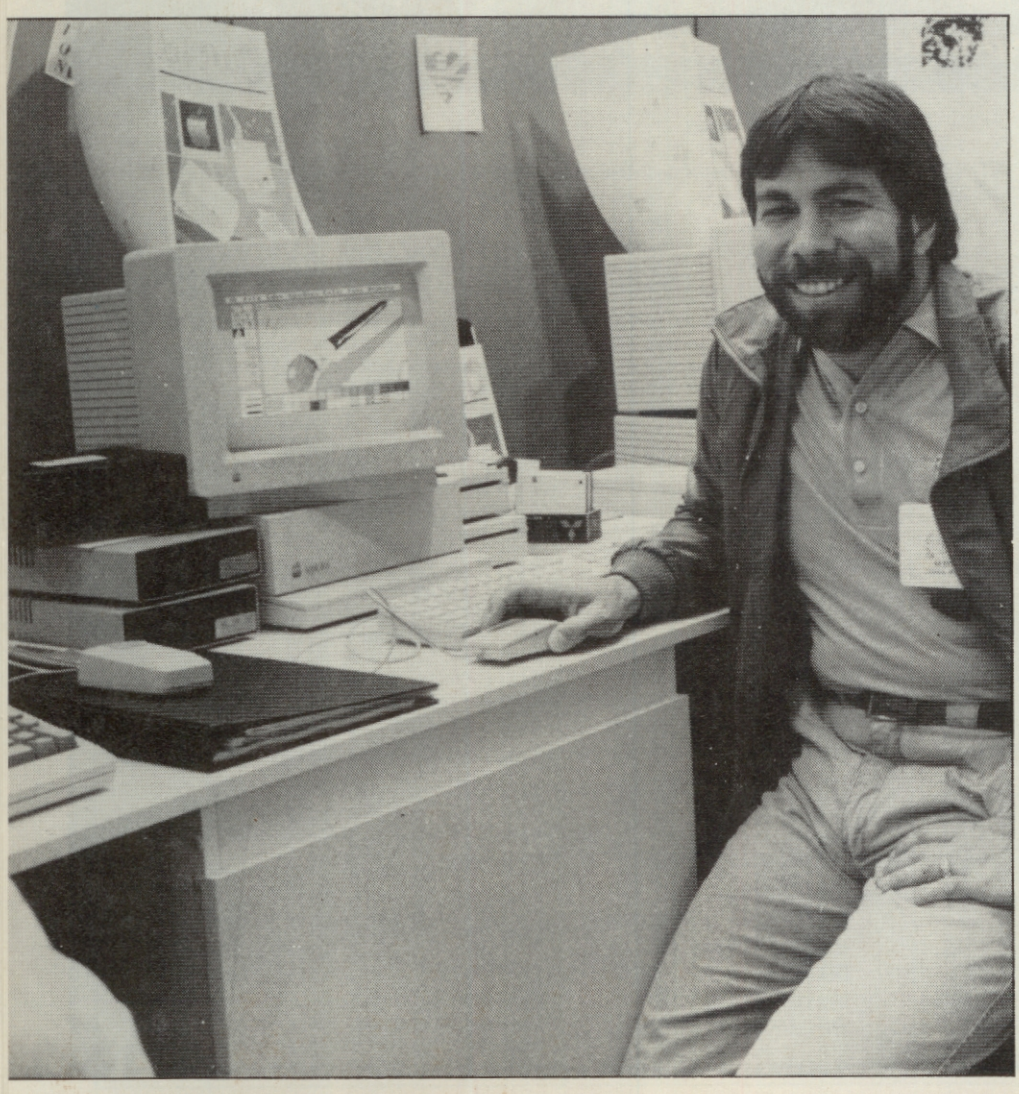
Not that he actually convinced him to stop telling the world about his new machine. For even while Jobs was out on the road peddling the revolutionary board, The Woz was only too delighted to talk about it to anyone who wanted to listen.

"I was just so proud of it", he says. "To me, it was just the most beautiful PC board of all time".

With just one notable exception, everyone else seemed to agree with him. The sole dissenter was the lab manager at Hewlett Packard where Steve Wozniak worked.

To him fell the distinction of making one of the biggest blunders of the century. He turned down the Apple I when Steve Wozniak offered it to the company.

It was a personal blow to Wozniak which – on the occasions he recollects it – makes him shudder to this day. "That was really bad", he says. "I found it difficult to accept as other engineers round the lab told me they thought it was the best product in the world".



However this setback was soon to be stored away in that corner of the mind reserved for unpleasant memories. For the news came through from Steve Jobs that their embryo part-time company had won a $50,000 order.

"That was the biggest economic shock recorded in the history of Apple", says Steve Wozniak, "and it was for 100 fully built computers at $500 each – not just PC boards".

Money, money . . . money?

Once their initial euphoria died down, the two Steves suddenly realised that they simply didn't have enough funds to deliver the goods.

While Wozniak sweated it out, Jobs went into action. First stop was the local parts distributors who succumbed to his entreaties to allow them 30 days credit.

Atari, the company for which Wozniak had already designed Breakout, was the next port of call. With no plans to produce a computer themselves at that time, officials readily agreed to let them have chips at cost price out of its corporate warehouse.

The final part fell into place when a friend's father agreed to loan them $5,000 to buy the parts they couldn't get on credit.

So the Apple production line was in business. It involved picking up the PC boards from the manufacturer and transporting

them to Steve Jobs' garage. There his sister was paid $1 a board for stuffing chips into the sockets.

As the full cycle took only 10 days – and as they had 30 days credit – Apple was transformed from an idea into a business.

Not that either of them could afford to take any money out of it at first. But as Wozniak was still working at Hewlett Packard and Jobs was "living at home", they didn't suffer any real hardships.

Meanwhile the Apple I was wowing the American computer buffs. "It had one key element which was sort of new", explains The Woz somewhat diffidently.

"The computers up to that time had a front panel where you could toggle these switches and put stuff into memory.

"With the Apple I, I took an approach more like with calculators with which I was naturally very familiar.

"When you took a Hewlett Packard model and turned it on, there was a little microprocessor in there and it had a little rom program that looked at a key. Whenever a key was pressed it figured out which one, made a decision, and put the right thing up in the display. The idea was that the rom to get you started was already built-in".

This Wozniak saw as the right approach to his computer, as by this time keyboards had become common. And as their price had dropped to between $50 and $60 even he with limited funds could afford that.

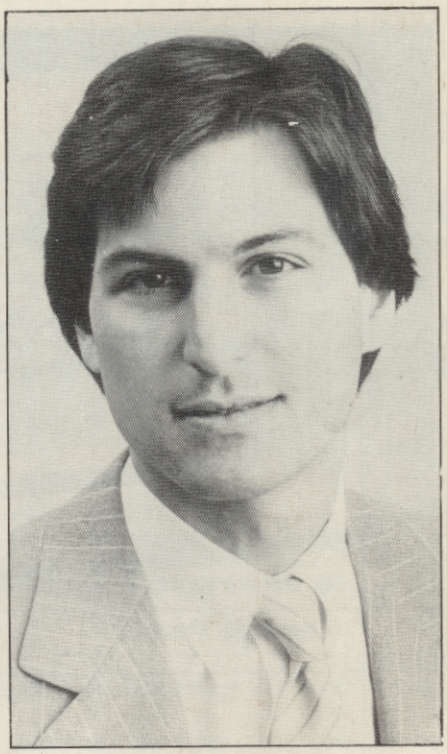
"So I saw the key was to have a little rom program – let's call it a monitor program as I didn't have a name for it – which would look at the keyboard when the user powered up.

"That meant you could type all of your input on the keyboard and skip the switches. As I had built the switch-and-light computer a few years before, I knew the first step".

With 256k eproms not available at this time back in 1976, Steve Wozniak opted for the 256 x 4s available in the HP lab where he worked – using two of these to give him 256 bytes.

Having already written the Basic, once the hardware was finished, within minutes The Woz had the code up and running.

Looking back now the designer is the first to admit that much of his inspiration for the machine came about because of cash shortages. "I had to go down certain routes because I couldn't afford the other way", he says.



Steve Jobs – persuaded his old school pal to grasp the opportunity to 'make a few bucks'

It was more or less the same story for the Apple II. For within a month of starting to sell the original model, The Woz had the Apple II "running cold".

To him the machine remains the high point of his life's work – "one of those great things that rarely happen to anyone design-wise".

"What I had produced in the Apple II were 10 things that had never been done before – and they all became standards for personal computers", he says.

Yet Steve Wozniak had never really set out to create the second computer. All he had really wanted to do was add colour to the Apple I.

"In trying to achieve this everything sort of started combining and got smaller and smaller", he recalls, "and what we ended up with was the Apple II which had half as many chips and easily twice the functionality".

A number of the features – including colour – came about as a result of The Woz having written the Atari game Breakout. "Colour was added in first so that games could be programmed", he remembers. "The real motivation being that I wanted to program a Basic version of Breakout to show it off at my computer club."

Having written the Basic himself, Steve sat down one night and burned some new roms with line drawing, colour changing and various Basic commands that would plot in colour.

"I got this ball bouncing around and suddenly I realised that it needed sound", he says. "So I added a speaker to the Apple II.

"It wasn't planned, it was accidental – like so many other things that fell into place just as though they were meant to".

When Steve Jobs saw the end result he immediately predicted that he could sell 1,000 a month. Mind you there was one snag. For to build that number of machines at $250 each would cost in the region of $250,000 up front.

And despite the fact the Apple I by now had its own cult following, they only had a few thousand dollars to show for it.

Chance of the decade

Commodore just happened to be doing its own computer at this time and the two Steves saw that company at first as a potential backer. But even though Commodore's technical genius Chuck Peddle popped into the Jobs' garage to see what was going on, Commodore eventually decided to carry on with its own prototype.

So the Apple co-founders started looking around for venture capital and a number of high powered money men did call in on them.

"They would ask questions like "What do you think the size of the market is?", says The Woz, "but I was so naive I wasn't able to provide the sort of answers they wanted".

Eventually along came Mike Markkula, an engineer who was already a millionaire ▷





The first machines

'I had to go down certain routes because I couldn't afford the other way'

◁ from his stock market expertise.

Originally he agreed to devise a business plan for Apple. But the more he looked into the operation, the more the entrepreneur saw the potential of the Apple II.

"He told us we were in a business situation that happens about once in every decade", says The Woz, "and he forecast that the company would have a $500 million turnover within a few years.

"Now here was a man who knew all about these kind of things. So he joined us as an equal partner".

The first action that Markkula took was to persuade Steve Wozniak that he must give up his job at Hewlett Packard and concentrate on Apple full time.

"I said no at first", he recalls. "All I wanted to do was design computers and I could do that just as easily at the club. Not only that, but I didn't want to be a businessman".

But finally because of pressure from Steve Jobs and other friends, The Woz relented.

The next few years saw Steve left to the thing he enjoyed best, designing computers in general and the II series in particular. In fact he would have been happy to continue with this role under the Apple umbrella if the "dark days" hadn't arrived.

This was the time the Apple II had to take a back seat to both the Macintosh and the Apple III.

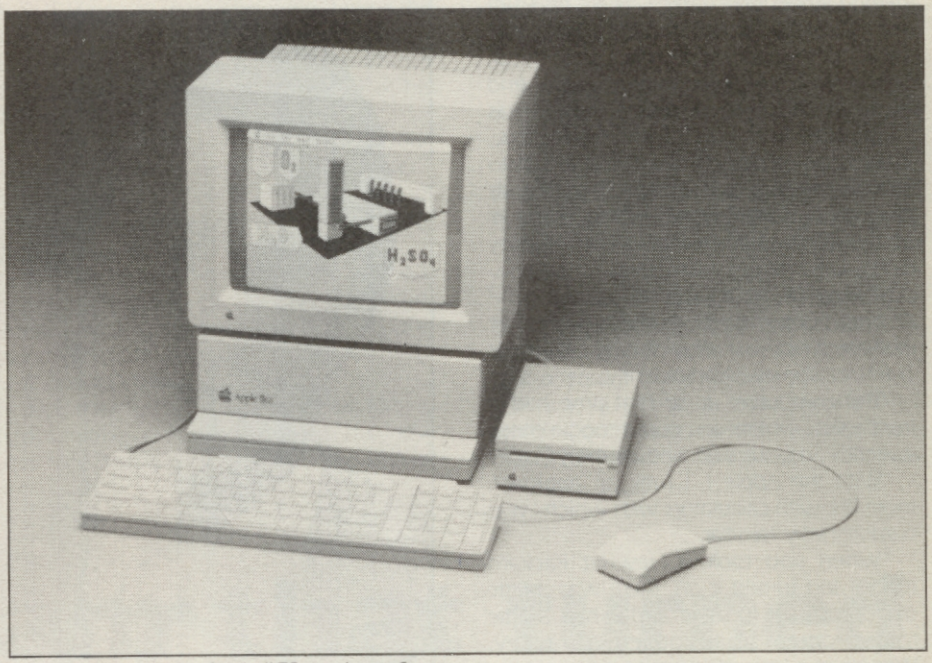
"We were not allowed to take it where we wanted to", he says. "Any good idea we came up with was rejected because it would infringe on the other machines.

"Projects like hard discs on the Apple II had to be cancelled because of this. It was a most frustrating time".

Now Steve Wozniak believes that Apple is once more back on course. And no one is more pleased to see the arrival of the latest in the II series – the Apple IIGS.

Today Steve Wozniak describes his relationship with Apple as "informal". But he's still around and there is little doubt that the technicians are more than pleased to receive the benefit of his expertise as a designer.

"So I'm still doing what I always wanted to do", he says. "And I never did have to become a businessman. For that would have poisoned me . . ." □



Back on course – the Apple IIGS continues Steve

Appletip

The auto-repeat function of the Apple IIe keyboard is a very useful one. However handicapped users have quite other ideas about this.

These people have trouble with touching the right keys. If they do so, they often press down the keys for too long with the result that the auto-repeat starts functioning.

For this reason it would be desirable to have the option to switch the auto-repeat function on and off, which implies a modification of the Apple hardware.

The auto-repeat works like this. If a key is depressed the keyboard encoder AY-3600 generates a logical high signal at pin number 5. This any key down signal remains logical high as long as a key is depressed.

It is used by the IOU chip to effectuate the repetition of the key which is depressed. The IOU chip contains a timing circuit which controls both the moment at which the repetition starts as well as the tempo in which the key is repeated.

It will be clear that no alterations can be made to this timer. The only remaining possibility is to switch off the auto-repeat function completely.

This can be done by disconnecting the any key down signal from the IOU chip. A very crude but effective way to do this is to bend pin number 5 of the AY-3600 so that it no longer fits into the socket.

A more sophisticated method is the use of a printed circuit board as indicated in the adjoining figure. On the board is a 40 pin IC header which fits into the socket of the AY-3600 on the main board of the Apple IIe. The AY-3600 itself is placed in the 40 pins socket on the board.

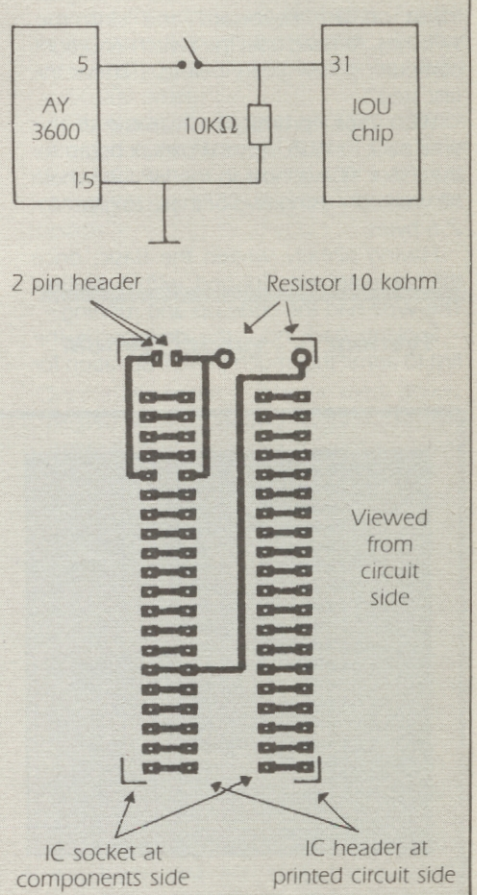
The switch under the keyboard can be used to switch the auto-repeat on and off. This switch is normally used to switch from English to European keyboard layout. Just connect the switch to the board by means of a two pin header.

If the switch is closed the any key down signal is transferred to the IOU chip.

If the switch is opened the resistor assures that the signal to the IOU chip remains logical low. This resistor must not be too low in value because that would damage the AY-3600.

According to the datasheet of the AY-3600 a resistor of 10 kohms is satisfactory.

If you don't want to use the switch you can select the auto-repeat function by placing a shunt instead of the switch.



Limitations go by the board

AppleWriter 2.0
An overview by
Geoff Wood

THE answer given to a recent letter (Feedback, *Apple User*, October 1986) quite rightly points out that it is difficult to recommend a particular word processing program because it depends what kind of word processing you want to do. However, I was disappointed to see no mention of Apple Writer 2.0 (the ProDos version) which I use in preference to AppleWorks, Format-80, Wordstar, Easywriter and other word processing programs I have tried.

One reason for the neglect of Apple Writer is that earlier versions for the Apple II Plus had some serious limitations, especially for cursor movement. The Dos 3.3 version for the Apple IIe was a big improvement, but the ProDos version for the Apple IIe or IIc is even better.

With a 128k machine you can have files up to 46845 bytes in length in ram and you can move the cursor from the beginning to the end of a file almost instantly.

You can set the line length on the screen so that what you print is almost what you see, subject to some minor points such as centred headings not being centred on the screen.

Similarly, underlining, bold print, superscript and subscript do not show as such on the screen but that is true of many other word processing programs.

The single data line, which can be suppressed, at the top of the screen shows the size of the current file in characters, the position of the cursor from the start of the file and from the start of the paragraph, the file name and other data. You can also display at the foot of the screen the position of the cursor in terms of the page number and line number.

Editing speed

The ease and speed of editing is remarkable. Apart from the normal facilities to delete or insert one or more characters, words and paragraphs, you can also move words or paragraphs simply by absorbing them into a buffer and moving the cursor to the new location.

You can also copy text from one location to another, thus duplicating without retyping or disc access. A useful feature is the ease of rectifying the common typing error of transposing two characters. You can also change case from upper to lower case or vice versa very easily.

Apple Writer 2.0 incorporates a glossary feature with which you can designate any of the keys, with or without shift, to insert predetermined words or paragraphs up to 2048 characters anywhere in the text. You can have up to 99 different entries in a glossary file which can be saved on disc.

You can split the display to view two different parts of a large file and edit one while you view the other. You can load and save part of a file as well as the whole file and you don't have to save a file before you print it.

You can merge two or more files by simply loading all or part of a file off a disc into a file already in ram. The file or part file is loaded in at the point where the cursor is located.

The find and replace facilities are case-sensitive but nevertheless good. The speed with which you can automatically change, say, 100 entries in a large file leaves other word processing programs at the starting gate.

Printing displays

When it comes to printing, Apple Writer does most things that other good word processors do, depending on the quality of your printer. You can vary the margins, indent or outdent the first word of a paragraph, embed commands to vary the margins within the text, justify left, right or centre or fill justify. However, it does not offer microjustification, just extra spaces between some of the words.

If your printer will accept Control or Escape codes you can change the character spacing and the line spacing, even to the extent of having four lines per inch, that is one and a half spacing. You can control the page length, the number of printed lines per page and the number of lines between the header or footer and the main text.

You can specify headings that appear on every page (except the first, if you wish), and print page numbers at the top or bottom of the page, left, right or centre.

Although Apple Writer does not automatically print the numbers alternately left and right – like a book – you can get it to do so by embedding print commands. You can also insert, at any point in the text, ▷

```
<   Z Mem:46392 Len:  453 Pos:    0 Tab:   0 File:formletter
(Address)

Dear (Name):

Congratulations on your purchase of an Apple computer.  You and your family
will spend many enjoyable and instructive hours with your new personal
computer.  In today's fast-paced high-technology world, (Name), you can't
afford to be without one.  And you can rest assured that when you use an Apple
computer, you're using the best there is.

Best wishes,


The Folks at Apple Computer

.inAddress number (X) (press return)
.FF
```

AppleWriter 2.0 in action

◁ footnotes that will be printed at the foot of the page.

For large documents you can print one file after another with automatic page numbering. If one file ends part way down a page, the next will start immediately below. You can also embed commands to prevent any paragraph from being split over two pages. This is especially useful for tables.

Most ProDos functions can be performed while editing. These include deleting, renaming, locking or unlocking a file, cataloguing the disc, creating sub-directories, setting the prefix and, most important, formatting a disc.

You can also save and load tab files and files for print commands. You can connect your keyboard direct to the printer and use it like a typewriter and set it into terminal mode to send or receive data via a modem.

As if this were not enough, Apple Writer incorporates its own word processing language (WPL) which enables more experienced users to do remarkable things. In effect, WPL causes Apple Writer automatically to perform operations for which you would otherwise have to type in the commands.

It can print selected names and addresses and do form letters, and can boilerplate standard paragraphs for contracts and similar documents.

It can count the number of words in a file, perform simple arithmetic operations, for example to number or renumber paragraphs and create menu programs so that less experienced operators simply have to choose a number to get it to perform operations.

A friend of mine got it to do horoscopes from birth dates. I have used it to solve crosswords by using the search commands, though it is slow compared to Sensible Speller which can be used with Apple Writer.

Apple Writer 2.0 is ideal for beginners because the two tutorial discs take you through all the main features. You hardly need to look at the manual, good though it is, and there are Help facilities on the master disc which need not be kept in either drive unless you want the Help files. You can use Apple Writer 2.0 quite easily with only one disc drive.

In conclusion

To sum up, Apple Writer 2.0 on ProDos is a much under-rated and under-publicised program which can more than hold its own in comparison to other word processing programs.

Requirements: Apple IIc or Apple IIe, preferably with extended 80 column card.
Price: £109.

□

Appletip

tMANY routines are available to obtain the memory location from the horizontal and vertical coordinates of the hi-res graphics screen. However this information can be obtained from within the Applesoft interpreter without using specially written machine code routines.

When using hi-res graphics Applesoft makes use of the following locations and routines to obtain the memory location and the bit position of the point just plotted (or proposed to be plotted):

Absolute memory location:

lsb = ($26 + $E5)

Absolute memory location:

msb = ($27 ORA $E6)

Bit mask:

= $30

In order to examine a point without plotting, use the HPOSN routine at $F411, place horizontal coordinate in Y, X registers and vertical coordinate in Accumulator, do a JSR $F411 then the byte of interest can be examined with LDA ($26), Y.

If this is EORd with $1C (colour mark) and ANDd with $30 (bit mark) the appropriate bits are isolated.

STRATEGIC PLUS SOFTWARE
PO BOX 8
HAMPTON
MIDDLESEX TW12 3XA

APPLE II SERIES

STRATEGIC PLUS SOFTWARE

ADVENTURE

Bard's Tale (Ariolasoft/Electronic Arts) 64k	£19.95
Elite (Firebird). 48k	£19.95
Autoduel (Origin Systems Inc.) 64k (joystick req)	£49.00
Moebius (Origin Systems Inc) 64k	£49.00
Black Cauldron (Sierra On-Line) 128k (IIe/IIc)	£35.00
Rings of Zilfin (SSI) 48k	£35.00
Roadwar 2000 (SSI) 48k	£35.00
Phantasie II (SSI) 48k	£35.00
Shard of Spring (SSI) 64k	£35.00
Wizards Crown (SSI) 48k	£35.00

STRATEGY

From Australia we are proud to present
STATEGIC STUDIES GROUP
and their range of superior strategy games

Reach for the Stars (SSG) 64k	£26.95
Carriers at War (SSG) 64k	£29.95
Europe Ablaze (SSG) 64k	£29.95
Battlefront (SSG) 64k	£23.95
Lords of Conquest (Electronic Arts) 64k	£31.00
Crusade in Europe (Microprose) 64k (joystick req)	£24.95
Decision in the Desert (Microprose) 64k (Joystick req)	£24.95
Conflict in Vietnam (Microprose) 64k (Joystick req)	£24.95
Chessmaster 2000 (Software Country) 48k	£38.00
Gettysburg – The Turning Point (SSI) 64k	£49.00
Warship (SSI) 48k	£49.00

SIMULATION

Micro League Baseball (MLSA) 48k	£35.00
F-15 Strike Eagle (Microprose) 64k (joystick req)	£21.95
Silent Service (Microprose) 64k (joystick req)	£24.95
American Challenge (Mindscape) 64k	£35.00
Computer Quarterback (SSI) 48k (paddles req)	£35.00
Computer Quarterback Team Discs (SSI) 1984, 1985	Each £15.00
Flight Simulator II (Sub-Logic) 48k	£43.00
Jet (Sub-Logic) 64k	£35.00

INFOCOM LATEST TITLES AVAILABLE

VISA

RING 01-979 2987
FOR CREDIT CARD ORDERS & CATALOGUE
All prices are inclusive of VAT & P&P

LATEST RELEASES FROM U.S.

RING BEFORE 3PM MON-FRI FOR SAME DAY DESPATCH BY 1ST CLASS MAIL!

Instant Dos gives a memory bonus

Robert O'Brien offers a program with a touch of magic – Dos without delay

TURN on your computer and in less time than you can say "Load Dos" the speaker beeps, a menu is placed on the screen, Dos 3.3 is installed and initialised – all in about half a second.

There is no whirring of discs, no clackity-clack while the drive's read/write head calibrates on track 0, no 4 to 5 second delay while Dos downloads from the floppy disc – if indeed the disc in the drive had a copy of Dos on it – and there is no need to have Dos on any of your unprotected discs.

No longer will you need to search for a disc with a valid Dos image on it. In future you will need only data discs, giving you an extra 32 sectors of storage space (8k) per disc as an added bonus.

That's not all. The program which gave you Instant Dos gives a lot more besides. For example if 6 is pressed followed by Reset the disc in drive 1 slot 6 will boot as if you had typed PR#6. Pressing 7+Reset will exit to the monitor while 8+Reset reinstalls your version of Dos 3.3 instantly, returning control to you.

Control+P+Reset will print out the normal 40 column text screen to a printer in slot 1, 9+Reset will dump the hi-res page 1 screen to the printer and)+Reset (shift+9 on the II+) will do likewise for hi-res page 2.

Important feature

These options will operate regardless of what program happened to be in control before you pressed Reset. For many this may be the most important feature – you will never again have to switch off your Apple to regain control, whether using protected programs or recovering from a hung program.

And you can examine the contents of ram at any time by using option 7+Reset.

If you press Reset without preceding it with an option key you just get a normal reset, and if the program (if any) in use at the time is designed to recover from a reset you will neither lose data nor exit the program.

By now you are probably wondering just how all this magic is achieved. All you need to avail yourself of these features (and more besides) is the Apple Firmware Card, also known as the Integer Romcard, and five or six eproms of the 2716 variety.

Eprom stands for Erasable Programmable Read-Only Memory integrated circuit and the 2716 eprom is a 2k chip which can be used instead of the 24 pin rom chips on the firmware card.

The firmware card is a 12k romcard designed to provide those with Applesoft in the motherboard rom access to the alternative language – Integer Basic or vice-versa. The card was intended to be used in slot 0 and in fact an unmodified Dos 3.3 only supports the card in that slot.

However, by trimming the switch at the back of the card you can use it in any free slot – I use slot 5. The switch on the back of the card is left in the up position for all future use of the firmware card.

Although Dos 3.3 occupies about 10.5k of ram in normal use it can actually be squeezed into a mere 8k of eprom space. This means that only four eproms are required to hold the complete Dos image. A fifth is required to hold the card control program – which occupies less than half the available space on the chip.

Table II shows the detailed eprom contents. Note that the area from $F033-FC35 is free space available in the eproms for user programs – over 3k. More on this later.

The control program as written is slot dependent, which means that if you want to use the firmware card in a slot other than slot 5, as in the current program, you will have to change seven bytes in the code.

Simple operation

These handle the switching on and off of the romcard slot and also the switching off of slots other than the card slot. Table I specifies the bytes involved and the reference lines in the table are the lines in the assembly listing where the bytes occur.

How does the program work? Quite simply, when Reset is pressed or the computer is turned on the microprocessor in all 6502 based computers takes the two bytes found at $FFFC-FFFD as the address of the first program to be run. In the normal Apple II+/IIe it finds the address $FA62 which is the reset routine in the Autostart rom on the motherboard.

However, if a firmware card is installed in any slot with its switch in the up position, its rom programs take precedence on power-up or reset. The microprocessor looks at the $F8-rom on the card first for a program to execute.

All we have to do is arrange for the Reset-vector bytes $FFFC-D in the card's rom to point to the start of our control program on the card – then at power-up or reset we are in command.

Main modules

The f8-rom code can be considered as 10 main modules for overview purposes:

I, lines 46-96, Reset handler which checks the power-up byte and keypresses if any.

II, lines 98-102, Boot routine (option 6) – equivalent to a PR#6.

III, lines 104-265, power-up and option 8 routine which downloads Dos from the romcard.

IV, lines 267-400, handler for options 0-5 – the user programs in the F0 and front end of the F8 eproms.

V, lines 422-428, screen dump (40 column) module. (Ctrl+P option) lines 522-619.

VI, lines 430-515, routine to print out hi-res 1 & 2 – options 9 &).

VII, lines 522-524, exit to monitor module (option 7). Lines 534-550, lines 163-176.

VIII, subroutines, lines 408-417, fast code mover, enter with number of pages (that is 256 byte blocks) to move in the X register and lines 625-639; code to turn off all slots except the romcard slot.

IX, Special location code:

a) Lines 530-532, romcard exit window. This location is critical as it allows for the

Ref.* Line	Byte	Card Slot Number 0	1	2	3	4	5	6	7	Function of byte
		Values required in byte								
164	FCFD	81	91	A1	B1	C1	D1	E1	F1	turn slot off
471	FEF4	81	91	A1	B1	C1	D1	E1	F1	ditto.
530	FF56	81	91	A1	B1	C1	D1	E1	F1	ditto.
563	FF78	81	91	A1	B1	C1	D1	E1	F1	ditto.
511	FF48	80	90	A0	B0	C0	D0	E0	F0	turn slot on
615	FFDE	80	90	A0	B0	C0	D0	E0	F0	ditto.
628	FFEC	0	1	2	3	4	5	6	7	ignore slot.

* refers to line number in source code listing of control program.

Table I. Slot dependent byte values

transition of the program from the romcard to the mainboard rom/ram. Line 532 is just a filler byte. The card switch-off code must be at $FF55.

b) Line 647, Reset vector. The address of the start of the romcard control program must be at location $FFFC-FFFD.

X, module I-IX sub-programs: There are five sub-programs used by the various modules which are moved into the input buffer (page 2 of ram) and then called by the control program in the romcard:

1: Lines 164-263, used by the Dos installer Module III. Produces the startup menu.

2: Lines 164-176 used by VII the exit to Monitor routine.

3: Lines 377-397 used by IV issues the "Invalid f0-rom option" message, waits a while and then does a normal Reset.

4: Lines 563-616 used by V to print the 40 column text screen. Note that if power-up byte is wrong it re-installs Dos from the Romcard. If page 3 Dos vector is wrong printout is not attempted.

5: lines 471-512 used by VI to print hi-res page 1 or 2. The program uses grappler hi-res dump codes – Ctrl+I;G;I for a graphics dump (inverse). The notes for Program 4 also apply here.

Room for Dos

To prepare for programming the eproms first clear an area of ram in which the squeezed-up version of your favourite Dos 3.3 is to be placed. Enter:

```
CALL-151 Return *4000:FF N 4001<4000.7000M Return
```

then move the Dos code down to lower ram in three blocks:

```
*4000<9D00.B3FFM Return
*5700<B600.BAFFM Return
*5C00<BC00.BFFFM Return
```

Now the essentials of Dos occupy ram from $4000-$5FFF (8k). Assuming for the moment that we are not ready to use the F0-rom for user programs we proceed to load the control program into ram with:

```
BLOAD INST.DOS.OBJ,A$6C36
```

We are now ready to program the five required eproms needed for Instant Dos or you can save the lot for later programming with:

```
BSAVE ROMCARD.OBJ,A$4000,L$3000
```

Programming eproms, assuming you have a suitable card, is usually very straightforward. Starting with the eprom for the D0-rom code it is only necessary to insert the eprom into the zero insertion force (ZIF) socket on the card. Then activate the card, select the write option and simply enter the starting address in ram of the code to be programmed into the eprom.

The Peanut eprom card, activated with a PR#n (n is card slot) is to be recommended. It is menu driven, having its driving program built into rom on the card. It uses a power on/off switch on the card so you can insert, program and remove eproms without switching off the computer.

To program the eproms use these starting addresses when prompted to by your eprom card:

1. D0-ROM : $4000
2. D8-ROM : $4800
3. E0-ROM : $5000
4. E8-ROM : $5800
5. F0-ROM : $6000 optional: Use only if option 0-5 programs needed.
6. F8-ROM : $6800 (user programs may occupy 6800-6C35 inclusive.)

Note that if at any time during use the romcard does not operate as described you may need to switch off power, remove the card and reseat the eproms in their sockets.

Menu driven

This type of problem will be evident on power-up and could also be indicative of interference by cards in lower slots. Careless handling of the pins of the eproms after they have been programmed may change some of the code on the eprom and cause incorrect operation. In such cases the eprom will have to be re-programmed but will not normally need to be erased again.

The switch on the card must be left in the up position for all future use as an Instant-Dos card. If the computer does not respond to 6 or 8+Reset when it is desired to exit a protected program it should normally respond to 7+Reset and when it exits to the Monitor you have control and can execute a 6 or 8+Reset option.

The three broken circle pads on the firmware card must all have a spot of solder placed on them to enable the F8 rom socket and allow the use of 2716-type eproms on the card (pads are on the component-side).

The first broken circle pad is marked F8 on the card and can be found in approximate position B4 between the 74LS09 and the 74LS138 chips.

The other two pads are approximately midway between positions A7 and A8, on the left of the bank of four resistors. The pads are labelled 2716 and are enclosed by a white rectangular shape.

Additional programs up to 3k may be placed on the firmware card using the available space in the F8-rom which has over 1k free and, of course, the F0-rom which we have not had to use so far.

Free space

Options 0-5 allow the selection and instant download and startup of user programs from this free space. There are some rules which must be obeyed in order to use these options:

1. The identification bytes 4C 55 FF must be placed in the first three bytes of the F0-rom ($F000-F002 inclusive) as the main control program in the F8-rom searches for this identifier to verify the presence of an F0-rom in the romcard.

If these bytes are not found by the program after selecting a 0 to 5 option then the error message "Invalid f0-rom option!" will be displayed and a normal motherboard reset will occur.

2. The 48 bytes from $F003-F032 are re- ▷

Eprom No	Designation	Address Range	Eprom Contents
1.	D0-ROM	D000-D7FF	9D00-A4FF of DOS 3.3
2.	D8-ROM	D800-DFFF	A500-ACFF of DOS 3.3
3.	E0-ROM	E000-E7FF	(AD00-B3FF)+(B600-B6FF) of DOS
4.	E8-ROM	E800-EFFF	(B700-BAFF)+(BC00-BFFF) of DOS
5.	F0-ROM	F000-F7FF	optional user program space.
6.	F8-ROM	a) F800-FC35	optional user program space.
		b) FC36-FFFF	Control-program for ROM-card (6 built-in options.)

Note: for Instant Dos, only eproms 1,2,3,4 and 6b need be programmed.

Table II. Eprom contents

Program option no.	Bytes 1,2 (dest.)	Bytes 3,4 (length)	Bytes 5,6 (entry pt) startup addr	Bytes 7,8 (source)
0.	$F003-4	$F005-6	$F007-8	$F009-A
1.	$F00B-C	$F00D-E	$F00F-10	$F011-2
2.	$F013-4	$F015-6	$F017-8	$F019-A
3.	$F01B-C	$F01D-E	$F01F-20	$F021-2
4.	$F023-4	$F025-6	$F027-8	$F029-A
5.	$F02B-C	$F02D-E	$F02F-30	$F031-2

Table III. User rom-program parameter bytes

◁ served for the specification of the six permitted programs (option 0-5 inclusive). The six optional programs are allotted eight bytes each as follows:

Bytes 1 & 2: Low & high order bytes of the destination address in ram to which the program is to be moved.

Bytes 3 & 4: Low & high bytes which specify the length of the program to be moved from rom.

Bytes 5 & 6: Low & high bytes of startup address of the program after the move is completed – this would normally be same as bytes 1 & 2 but might be $3D0 if it is only desired to do an instant BLOAD and return to Basic.

Bytes 7 & 8: Low & high bytes of the location (address) in the firmware card where the program to be moved can be found – the source pointer.

Routine selected

The specification bytes for each program are shown in Table III. For example, we want to program the F0-rom with a routine to be selected with the 0+Reset option which is to be loaded into ram starting at $300 with a length of $D0 bytes.

When it has been downloaded the startup address is to be $304 and we are going to store it in eprom at $F033, the first available byte for user programs.

In preparing to program for this option we would setup the identifier with:

```
*6000:4C 55 FF
```

followed by the program parameters:

```
*6003:00 03 D0 00 04 03 33 F0
```

We then:

```
BLOAD OPTION.0.PROGRAM,A$6033.
```

Similarly for up to five other option programs, entering the programs and their parameters in the available space.

We can then proceed to blow a 2716-type eprom with the contents of ram starting at $6000.

The total available space for one to six programs is $F033-$FC35 inclusive – 3038 bytes. Ideal user programs for this free space might be a DOSMOVER to put Dos into the language card in slot 0, or PLE/PGE the line editor, page 3 routines or short Dos commands such as 1+Reset to Catalog drive 1 and 2+Reset for drive 2.

The Instant Dos Card is used almost every day in the writer's Apple II+ and has been tested on an Apple IIe and found to work satisfactorily.

In testing the firmware card the only program which gave me trouble was the Applewriter II word processor. If I pressed Reset without using one of the option keys the computer hung. But placing the card switch in the down position enabled me to recover without losing text already keyed-in by pressing Reset again.

By contrast, a similar test with Format-80 returns one to the main menu! The problem lies in the Applewriter II protection scheme which does not permit it to respond correctly to Reset if intercepted by our special firmware card.

Watch the rom

Applewriter II also uses a non-standard Dos which you can examine with 7+Reset. Also note that if Applewriter II does not respond to 7 or 8+Reset should you want to exit to the monitor or Basic then in all likelihood the F8-Rom on the firmware card has become slightly loose – probably from heating/cooling effects between periods of use.

If you encounter this problem it will be necessary to switch off, push back the F8 rom into its socket and you are then ready to start again.

However, if you used a chip-insertion tool to install the eproms there will probably be enough spring in the pins of the eprom to maintain a good electrical connection with the contacts in the socket.

So when using Applewriter II avoid using the Reset key to return to the title page menu – you can always use "Ctrl+P do help80" or "help40" if you want to access the command summaries instead of ? from the title page. And when you are finished using the word processor exit to Basic using 8+Reset to re-install Dos 3.3 without rebooting a disc.

Satisfactory tests were done with Format-80, AppleWorks/PlusWorks, Copy II+ 6.0 (ProDos), Locksmith 6.0, CP/M, dBase II, Visicalc, Multiplan, Visidex, Sargon III, Zaxxon and Speedway to name a few. In other words 6, 7 or 8+reset will boot a disc, exit to monitor or re-install Dos 3.3 and exit to Basic as desired.

The tests referred to were carried out with an Apple II+ with a 16k ram card in slot 0, a printer buffercard in slot 1, 80 column card slot 3, Z-80 card slot 4, Apple Romcard slot 5 (Instant-Doscard) and a disc controller card in slot 6.

Slot 7 is used for a variety of cards such as eprom-programmer, colour-card, Peanut modem, Wildcard and so on. The Romcard was also tested in an Apple IIe with an extended 80 column card.

A final thought. With the firmware card installed in your computer you can have all the features previously mentioned and with a suitable modification to the control program you can prevent unauthorised use of your computer while the firmware card is installed.

All that is required is that the control program asks for a secret password whenever the computer is switched on. If the user is unable to supply it he cannot go any further.

The control program should be designed to prevent exit to the monitor or any other action until the appropriate password is entered. ▷

```
                        *--------------------------------
                        * Instant DOS 3.3 installer program
                        * for F8-ROM in Apple firmware card.
                        *
                        *   by Robert F. O'Brien
                        *
                        *   using S-C MACRO ASSEMBLER Ver. 2.0
                        *
                        *--------------------------------
                           .OR $FC36
                           .TF INSTANT.DOS.OBJ
                        *--------------------------------
                        *
                        *          Equates
                        *--------------------------------
3A-                     SRC.PTR       .EQ $3A,B
3C-                     DEST.PTR      .EQ $3C,D
06-                     LENGTH        .EQ $6,7
0200-                   BUFFER        .EQ $200
D000-                   SRC           .EQ $D000 - $EFFF (ROM)
9D00-                   DEST          .EQ $9D00 - $B3FF (RAM)
B600-                   DEST.2        .EQ $B600 - $BAFF (RAM)
BC00-                   DEST.3        .EQ $BC00 - $BFFF (RAM)
FA62-                   MB.ROM.RESET  .EQ $FA62  (RAM)
C000-                   KEYBOARD      .EQ $C000
C010-                   KBDSTRB       .EQ $C010
C0D0-                   CARD.ON       .EQ $C0D0
C0D1-                   CARD.OFF      .EQ $C0D1
C100-                   INIT.PRT      .EQ $C100
C102-                   PRT.CHAR      .EQ $C102
FC58-                   MON.HOME      .EQ $FC58
FF3A-                   MON.BELL      .EQ $FF3A
FCA8-                   MON.WAIT      .EQ $FCA8
FC24-                   MON.VTABZ     .EQ $FC24
FE84-                   MON.SETNORM   .EQ $FE84
FB2F-                   MON.INIT      .EQ $FB2F
FE93-                   MON.SETVID    .EQ $FE93
FE95-                   MON.OUTPORT   .EQ $FE95
FE89-                   MON.SETKBD    .EQ $FE89
FF65-                   MONITOR       .EQ $FF65
CFFF-                   CLR.ROM       .EQ $CFFF
28-                     BASL          .EQ $28
25-                     CV            .EQ $25
                        *--------------------------------
                        RESET.ENTRY.POINT
FC36- D8                   CLD
FC37- 2C 10 C0             BIT KBDSTRB    allow keypress.
                        *
                        CHECK.FOR.SPECIAL.KEYS
FC3A- A2 00                LDX #0
FC3C- AD 00 C0          .1 LDA KEYBOARD   get keypress if
FC3F- CA                   DEX            any - try 256
FC40- D0 FA                BNE .1         times.
FC42- 2C 10 C0             BIT KBDSTRB    clear keyboard.
FC45- 29 7F                AND #$7F       drop Bit 7.
FC47- C9 36                CMP #'6        boot drive 1?
FC49- F0 47                BEQ BOOT.SLOT.6    do it.
FC4B- C9 37                CMP #'7        exit to monitor?
FC4D- D0 03                BNE .2         no!
FC4F- 4C 4D FF             JMP MONITOR.EXIT  yes on 7.
FC52- C9 38             .2 CMP #'8        download ROM DOS?
FC54- F0 47                BEQ INIT.DOS   yes on 8.
FC56- C9 39                CMP #'9        print hires page1?
FC58- D0 03                BNE .3
FC5A- 4C C8 FE             JMP DUMP.HIRES.PG1
FC5D- C9 29             .3 CMP #')        page 2 print?
FC5F- D0 03                BNE .4
FC61- 4C CE FE             JMP DUMP.HIRES.PG2
FC64- C9 10             .4 CMP #$10       Ctrl-P:screen dump
FC66- D0 03                BNE CHECK.PWRUP.BYTE
FC68- 4C BA FE             JMP MOVE.SCREEN.DUMP
                        *
                        CHECK.PWRUP.BYTE
FC6B- AD F3 03             LDA $3F3       if powerup byte
FC6E- 49 A5                EOR #$A5       wrong then re-
FC70- CD F4 03             CMP $3F4       install ROM DOS.
FC73- D0 2B                BNE MOVE.DOS.IMAGE
                        *
                        * check for option 0-5 (F0-ROM)
                        *
FC75- AD 00 C0          .1 LDA KEYBOARD   get keypress if
FC78- CA                   DEX            any, try 256 times
FC79- D0 FA                BNE .1
FC7B- 2C 10 C0             BIT KBDSTRB    allow future keys.
FC7E- C9 30                CMP #'0        valid program
FC80- 90 07                BLT DO.NORMAL.RESET  options are
FC82- C9 36                CMP #'6        0-5 + RESET.
FC84- B0 03                BGE DO.NORMAL.RESET
FC86- 4C F0 FD             JMP DOWNLOAD.PROG.0.TO.5
                        *
                        DO.NORMAL.RESET
FC89- A9 FA                LDA /MB.ROM.RESET-1   put addr-1
FC8B- 48                   PHA                   on the
FC8C- A9 61                LDA #MB.ROM.RESET-1   stack and
FC8E- 48                   PHA                   go to it
FC8F- 4C 55 FF             JMP EXIT              with RTS.
                        *--------------------------------
                        BOOT.SLOT.6
FC92- AD F3 03             LDA $3F3          mess up Powerup
FC95- 49 A4                EOR #$A4          byte and do reset.
FC97- 8D F4 03             STA $3F4
FC9A- 4C 89 FC             JMP DO.NORMAL.RESET
                        *--------------------------------
                        INIT.DOS
FC9D- 20 E3 FF             JSR TURN.OFF.SLOTS.0123467
                        *
                        MOVE.DOS.IMAGE
FCA0- A9 00                LDA #0            set source and
FCA2- 85 3A                STA SRC.PTR       destination addr.
FCA4- 85 3C                STA DEST.PTR      pointers.
FCA6- A9 D0                LDA /SRC
FCA8- 85 3B                STA SRC.PTR+1
FCAA- A9 9D                LDA /DEST
FCAC- 85 3D                STA DEST.PTR+1
FCAE- A2 17                LDX #23           get $9D00-B3FF code
FCB0- 20 A9 FE             JSR MOVE.X.PAGES
FCB3- A9 B6                LDA /DEST.2
FCB5- 85 3D                STA DEST.PTR+1
FCB7- A2 05                LDX #5            get $B600-BAFF code
FCB9- 20 A9 FE             JSR MOVE.X.PAGES
FCBC- A9 BC                LDA /DEST.3
FCBE- 85 3D                STA DEST.PTR+1
FCC0- A2 04                LDX #4            get $BC00-BFFF code
FCC2- 20 A9 FE             JSR MOVE.X.PAGES  DOS now in posn!
                        *
FCC5- A2 00                LDX #0                 move control
FCC7- BD FC FC          .1 LDA CONTROL.PROG,X  program down
FCCA- 9D 00 02             STA BUFFER,X           to RAM.(prog.1)
FCCD- CA                   DEX
FCCE- D0 F7                BNE .1
                        *
FCD0- A9 60                LDA #96           set slot 6 and
FCD2- 8D E9 B7             STA $B7E9         drive 1 as the
FCD5- A9 01                LDA #1            current drive.
FCD7- 8D EA B7             STA $B7EA
FCDA- A9 1B                LDA #$1B          no pending DOS
FCDC- 8D 5F AA             STA $AA5F         command.
                        *
FCDF- A2 2F                LDX #$2F          install DOS page
FCE1- BD 51 9E          .2 LDA $9E51,X       3 vectors.
FCE4- 9D D0 03             STA $3D0,X
FCE7- CA                   DEX
FCE8- 10 F7                BPL .2
                        *
FCEA- A9 BF                LDA #$9DBF        set reset vector
FCEC- 8D F2 03             STA $3F2          and powerup byte.
FCEF- A9 9D                LDA /$9DBF
FCF1- 8D F3 03             STA $3F3
FCF4- 49 A5                EOR #$A5
FCF6- 8D F4 03             STA $3F4
                        *
FCF9- 4C 00 02             JMP BUFFER        exit to control
                        *                    program in RAM.
                        *--------------------------------
                        * prog.1 occupies ROM space from
                        * $FCFC to $FDEC inclusive, although
                        * it is assembled for $200 - the
                        * address to which it will be moved.
                        *--------------------------------
                        CONTROL.PROG
                           .PH BUFFER
                        PROG.1
```

```
                        PROG.2
0200- 8D D1 C0             STA CARD.OFF   turn slot 5 off.
                        *
                        INITIALIZE
0203- D8                   CLD            do part norm. reset
0204- 20 84 FE             JSR MON.SETNORM
0207- 20 2F FB             JSR MON.INIT
020A- 20 93 FE             JSR MON.SETVID
020D- 20 89 FE             JSR MON.SETKBD
0210- 20 58 FC             JSR MON.HOME     clear screen.
0213- AD 58 C0             LDA $C058      SET.AN0 =TTL HI
0216- AD 5A C0             LDA $C05A      SET.AN1 =TTL HI
0219- AD FF CF             LDA CLR.ROM    turn off extn. ROM
021C- 2C 10 C0             BIT KBDSTRB    clear keyboard.
021F-                   END.2  .EQ *
                        *
                        * print startup messages.
                        *
021F- A2 28                LDX #MSG.2-MSG.1
0221- BD 62 02          .1 LDA MSG.1-1,X
0224- 9D FF 05             STA $600-1,X       screen line 4.
0227- CA                   DEX
0228- D0 F7                BNE .1
022A- A2 11                LDX #MSG.3-MSG.2
022C- BD 8A 02          .2 LDA MSG.2-1,X
022F- 9D 27 04             STA $428-1,X       screen line 8.
0232- BD 9B 02             LDA MSG.3-1,X
0235- 9D 27 05             STA $528-1,X       screen line 10.
0238- BD AC 02             LDA MSG.4-1,X
023B- 9D 27 06             STA $628-1,X       screen line 12.
023E- BD BD 02             LDA MSG.5-1,X
0241- 9D 27 07             STA $728-1,X       screen line 14.
0244- BD CE 02             LDA MSG.6-1,X
0247- 9D 4F 04             STA $450-1,X       screen line 16.
024A- BD DF 02             LDA MSG.7-1,X
024D- 9D 4F 05             STA $550-1,X       screen line 18.
0250- CA                   DEX
0251- D0 D9                BNE .2
0253- 86 D8                STX $D8       turn off ONERR flag.
0255- 20 3A FF             JSR MON.BELL
                        *
                        * initialize DOS and enter BASIC.
                        *
0258- A9 03                LDA #3         set maxfiles 3,
025A- 8D 57 AA             STA $AA57      build buffers,
025D- 20 D4 A7             JSR $A7D4      init DOS, and
0260- 4C 3B B7             JMP $B73B      exit to basic.
                        *
                        *  Screen menu on powerup
                        *
0263- C4 CF D3
0266- A0 B3 AE
0269- B3 A0 D2
026C- C5 C1 C4
026F- D9 BB CF
0272- D0 D4 C9
0275- CF CE D3
0278- BA                MSG.1     .AS -/DOS 3.3 READY;OPTIONS:/
0279- B0 AD B9
027C- AC A9 AC
027F- C3 D4 CC
0282- AD D0 BB
0285- AB D2 C5
0288- D3 C5 D4                .AS -/0-9,),CTL-P;+RESET/
                        *
028B- A0 B6 A0
028E- BA C2 CF
0291- CF D4 A0
0294- A0 C4 B1
0297- AC D3 B6
029A- A0 A0             MSG.2  .AS -/ 6 :BOOT  D1,S6  /
029C- A0 B7 A0
029F- BA C5 CE
02A2- D4 C5 D2
02A5- A0 CD CF
02A8- CE C9 D4
02AB- CF D2             MSG.3  .AS -/ 7 :ENTER MONITOR/
02AD- A0 B8 A0
02B0- BA C2 CF
02B3- CF D4 A0
02B6- A0 D2 CF
02B9- CD AD C4
02BC- CF D3             MSG.4  .AS -/ 8 :BOOT  ROM-DOS/
02BE- B9 AF A9
02C1- BA D0 D2
02C4- D4 A0 C8
02C7- C9 D2 C5
02CA- D3 A0 B1
02CD- AF B2             MSG.5  .AS -"9/):PRT HIRES 1/2"
02CF- B0 AD B5
02D2- BA D3 C5
02D5- CC C5 C3
02D8- D4 A0 C6
02DB- B0 AD D2
02DE- CF CD             MSG.6  .AS -/0-5:SELECT F0-ROM/
02E0- C3 D4 D2
02E3- CC AD D0
02E6- BA D0 D2
02E9- D4 A0 D3
02EC- C3 D2 C5
02EF- C5 CE             MSG.7  .AS -/CTRL-P:PRT SCREEN/
02F1-                   END.1  .EQ *
                               .EP
                        *--------------------------------
                        * the following 3 bytes must be
                        * placed in F0-ROM at $F000-F002
                        * for valid ROM.
                        *
                        VALID.F0.ROM.ID.BYTES
FDED- 4C 55 FF             .HS 4C.55.FF
                        *--------------------------------
                        DOWNLOAD.PROG.0.TO.5
FDF0- 48                   PHA                save option no.
                        *
                        * check if F0-ROM valid
                        *
FDF1- A0 03                LDY #3
FDF3- B9 FF EF          .1 LDA $F000-1,Y
FDF6- D9 EC FD             CMP VALID.F0.ROM.ID.BYTES-1,Y
FDF9- D0 62                BNE INVALID.F0.ROM
FDFB- 88                   DEY
FDFC- D0 F5                BNE .1
                        *
                        * setup index to selected prog. data
                        *
FDFE- 68                   PLA            get option no.
FDFF- 29 07                AND #%.0111    calc. index to
FE01- 0A                   ASL            selected program
FE02- 0A                   ASL            data.
FE03- 0A                   ASL      index $0,8,10,18,20,28
FE04- 48                   PHA      save index for startup.
FE05- A8                   TAY
FE06- B9 03 F0             LDA $F003,Y    check for invalid
FE09- 85 3C                STA DEST.PTR   dest. address
FE0B- C9 FF                CMP #$FF       (i.e. FFFF)
FE0D- D0 07                BNE .2
FE0F- B9 04 F0             LDA $F004,Y
FE12- C9 FF                CMP #$FF
FE14- F0 47                BEQ INVALID.F0.ROM
FE16- B9 04 F0          .2 LDA $F004,Y
FE19- 85 3D                STA DEST.PTR+1      set program
FE1B- B9 05 F0             LDA $F005,Y         length.
FE1E- 85 06                STA LENGTH
FE20- B9 06 F0             LDA $F006,Y
FE23- 85 07                STA LENGTH+1
FE25- B9 09 F0             LDA $F009,Y    set startup addr
FE28- 85 3A                STA SRC.PTR    of program.
FE2A- B9 0A F0             LDA $F00A,Y
FE2D- 85 3B                STA SRC.PTR+1
                        *
                        * Move full pages (256-byte blocks)
                        *
FE2F- A6 07                LDX LENGTH+1      get total pages.
FE31- F0 03                BEQ DO.PART.PAGE  no full pages!
FE33- 20 A9 FE             JSR MOVE.X.PAGES
                        *
                        DO.PART.PAGE
FE36- A6 06                LDX LENGTH     get partial page
FE38- F0 0A                BEQ DO.EXIT    all done!
FE3A- A0 00                LDY #0         index to start.
FE3C- B1 3A             .1 LDA (SRC.PTR),Y    move program
FE3E- 91 3C                STA (DEST.PTR),Y   into RAM.
```

```
FE40- C8          INY              next byte.
FE41- CA          DEX              countdown bytes
FE42- D0 F8       BNE .1           more to move.
                  *
                  DO.EXIT
FE44- 68          PLA              get back calc.'d
FE45- A8          TAY                 index.
FE46- BE 08 F0    LDX $F008,Y      get RAM entry addr
FE49- B9 07 F0    LDA $F007,Y      A:high byte; X:low
FE4C- A8          TAY              page boundry?
FE4D- F0 05       BEQ .1           yes!
FE4F- 8A          TXA              no. so use hi as-is
FE50- 48          PHA              get ready for jump
FE51- 4C 57 FE    JMP .2
FE54- CA        .1 DEX             adjust high byte.
FE55- 8A          TXA
FE56- 48          PHA              get ready for jump
FE57- 88        .2 DEY             adjust low always.
FE58- 98          TYA
FE59- 48          PHA
FE5A- 4C 55 FF    JMP EXIT         run the program
                  *                via RTS in Monitor.
                  *-------------------------------
                  * Move program for "invalid rom ...
                  * to the input buffer and run it.
                  *-------------------------------
                  INVALID.FO.ROM
FE5D- 68          PLA              discard option num.
FE5E- A0 1F       LDY #END.2-PROG.2
FE60- A2 00       LDX #0
FE62- BD FC FC  .1 LDA CONTROL.PROG,X    get exit
FE65- 9D 00 02    STA BUFFER,X           program.
FE68- E8          INX                    (part 1)
FE69- 88          DEY
FE6A- D0 F6       BNE .1
FE6C- B9 7B FE  .2 LDA PROG.3,Y      get exit program
FE6F- 9D 00 02    STA BUFFER,X       (part 2)
FE72- E8          INX
FE73- C8          INY
FE74- C0 2F       CPY #END.3-PROG.3+1
FE76- 90 F4       BLT .2
FE78- 4C 00 02    JMP BUFFER         run "invalid rom
                  *                    message" program
                  *-------------------------------
                  * Program to issue invalid rom
                  *  message.
                  * prog.3 occupies ROM space from
                  * $FE7B-$FEA8 inclusive.
                  *-------------------------------
                  PROG.3
                     .PH BUFFER+END.2-PROG.2
                  PRG.3
021F- A2 16          LDX #END.8-MSG.8
0221- BD 36 02    .1 LDA MSG.8-1,X
0224- 9D 4F 07       STA $750-1,X       screen line 22
0227- CA             DEX
0228- D0 F7          BNE .1
022A- A0 14          LDY #20            short wait to
022C- A9 FF       .2 LDA #$FF           see message
022E- 20 A8 FC       JSR MON.WAIT       (just in case
0231- 88             DEY                 reset clears
0232- 10 F8          BPL .2                  screen.)
0234- 4C 62 FA       JMP MB.ROM.RESET
                  *
                  MSG.8
0237- C9 CE D6
023A- C1 CC C9
023D- C4 A0 C6
0240- B0 AD D2
0243- CF CD          .AS -/INVALID FO-ROM/
0245- A0 CF D0
0248- D4 C9 CF
024B- CE A1          .AS -/ OPTION!/
024D-             END.8  .EQ *
                     .EP
FEA9-             END.3  .EQ *
                  *-------------------------------
                  * Routine to move whole pages of
                  * bytes (i.e. 256 byte-blocks)
                  * Enter with number of pages to
                  * move in the X-register.
                  *-------------------------------
                  MOVE.X.PAGES
FEA9- A0 00          LDY #0
FEAB- B1 3A       .1 LDA (SRC.PTR),Y
FEAD- 91 3C          STA (DEST.PTR),Y
FEAF- C8             INY
FEB0- D0 F9          BNE .1
FEB2- E6 3B          INC SRC.PTR+1      next page source
FEB4- E6 3D          INC DEST.PTR+1     next page dest.
FEB6- CA             DEX                countdown pages.
FEB7- D0 F2          BNE .1             more to do.
FEB9- 60             RTS                exit to caller.
                  *-------------------------------
                  * Move screen printing program
                  * into input buffer and run it.
                  *-------------------------------
                  MOVE.SCREEN.DUMP
FEBA- A2 6C          LDX #END.4-PROG.4    bytes to move
FEBC- BD 76 FF    .1 LDA SCREEN.DUMP-1,X   get prog.
FEBF- 9D FF 01       STA BUFFER-1,X        move it.
FEC2- CA             DEX                   next byte
FEC3- D0 F7          BNE .1                still more.
FEC5- 4C 00 02       JMP BUFFER         do screen dump.
                  *-------------------------------
                  DUMP.HIRES.PG1
FEC8- 20 E7 FE       JSR MOVE.HIRES.MODULE move prog.
FECB- 4C 00 02       JMP BUFFER            and run it.
                  *-------------------------------
                  DUMP.HIRES.PG2
FECE- 20 E7 FE       JSR MOVE.HIRES.MODULE
FED1- A2 26          LDX #PG2.PATCH.LOCN   set index.
FED3- A0 04          LDY #4                move 5 bytes
FED5- B9 E2 FE    .1 LDA PATCH,Y           to select
FED8- 9D 04 02       STA BUFFER+4,X        hires page 2.
FEDB- CA             DEX
FEDC- 88             DEY
FEDD- 10 F6          BPL .1
FEDF- 4C 00 02       JMP BUFFER         dump hires pg2.
                  *
                  *  code for page 2 hires selection.
                  *
                  PATCH
FEE2- A9 B2          LDA #"2            page 2 req'd.
FEE4- 20 02 C1       JSR PRT.CHAR       output to printer
                  *-------------------------------
                  MOVE.HIRES.MODULE
FEE7- A2 5A          LDX #END.5-PROG.5     bytes to move
FEE9- BD F2 FE    .1 LDA HIRES.DUMPER-1,X  get program.
FEEC- 9D FF 01       STA BUFFER-1,X        install in
FEEF- CA             DEX                   main RAM.
FEF0- D0 F7          BNE .1
FEF2- 60             RTS              return to caller.
                  *-------------------------------
                  * Program to print Hires pages 1
                  * and 2 - uses Grappler dump
                  * commands e.g. Ctrl-I G!2 for
                  * inverse dump of page 2.
                  * prog.5 occupies ROM space from
                  * $FEF3 to $FF4C inclusive.
                  *-------------------------------
                  HIRES.DUMPER
                  *
                     .PH BUFFER
                  *
                  PROG.5
0200- 8D D1 C0       STA CARD.OFF       turn off slot 5
0203- AD EA 03       LDA $3EA           check for valid
0206- C9 4C          CMP #$4C           DOS in RAM.
0208- D0 2C          BNE EXIT.HIRES.PRINT  error!
                  *
020A- A9 01          LDA #1             slot 1.
020C- 20 95 FE       JSR MON.OUTPORT    printer on!
020F- 20 EA 03       JSR $3EA           re-connect dos
0212- A9 A0          LDA #$A0           space.
0214- 20 00 C1       JSR INIT.PRT
0217- A9 89          LDA #$89           Ctrl-I
0219- 20 02 C1       JSR PRT.CHAR       output it.
021C- A9 C7          LDA #"G"           G for graphics.
021E- 20 02 C1       JSR PRT.CHAR
0221- A9 C9          LDA #"I"           I for inverse.
0223- 20 02 C1       JSR PRT.CHAR
```

```
                        PG2.PATCH.LOCN
0226-                      .BS 5,$EA        5 NOP's (pg 2)
022B- A9 8D                LDA #$8D         issue <RETURN>
022D- 20 02 C1             JSR PRT.CHAR
0230- 20 93 FE             JSR MON.SETVID   printer off.
0233- 20 EA 03             JSR $3EA         re-connect DOS
                        EXIT.HIRES.PRINT
0236- AD F3 03             LDA $3F3         check powerup
0239- 49 A5                EOR #$A5         byte.
023B- CD F4 03             CMP $3F4         ok?
023E- D0 03                BNE .1           no, its wrong!
0240- 4C 62 FA             JMP MB.ROM.RESET normal reset.
                        *
0243- AD FF CF          .1 LDA CLR.ROM      extn. rom off.
0246- A0 07                LDY #7           start slot 7.
0248- 98                .2 TYA              calc. slot
0249- 0A                   ASL              index and
024A- 0A                   ASL              put in X-reg.
024B- 0A                   ASL
024C- 0A                   ASL
024D- AA                   TAX
024E- 9D 81 C0             STA $C081,X      turn off slot X.
0251- 88                   DEY              next slot.
0252- 10 F4                BPL .2           do 7 to 0 incl.
0254- 8D D0 C0             STA CARD.ON      leave slot 5 on.
0257- 4C A0 FC             JMP MOVE.DOS.IMAGE    download
                        *                        DOS from ROM
025A-                   END.5  .EQ *
                               .EP
                        *-------------------------------
                        * Turn off all slots except Rom-DOS
                        * card slot,move control prog. and
                        * exit to monitor prompt.
                        *-------------------------------
                        MONITOR.EXIT
FF4D- 20 E3 FF             JSR TURN.OFF.SLOTS.0123467
FF50- A0 1F                LDY #END.2-PROG.2  bytes to move.
FF52- 4C 59 FF             JMP MON.2          do part 2.
                        *-------------------------------
                        *   EXIT origin must be at $FF55
                        * to line up with RTS in motherboard.
                        *-------------------------------
                        EXIT
FF55- 8D D1 C0             STA CARD.OFF     slot 5 card off.
                        * and fall into RTS in monitor ROM.
FF58- EA                   NOP              fill byte
                        *-------------------------------
                        * Continuation of Monitor exit routine
                        *
                        MON.2
FF59- A2 00                LDX #0           set move index.
FF5B- BD FC FC          .1 LDA CONTROL.PROG,X
FF5E- 9D 00 02             STA BUFFER,X     install in RAM
FF61- E8                   INX
FF62- 88                   DEY              countdown bytes.
FF63- D0 F6                BNE .1
FF65- A9 4C                LDA #$4C         install Jump
FF67- 9D 00 02             STA BUFFER,X     vector to
FF6A- A9 65                LDA #MONITOR     low byte.
FF6C- 9D 01 02             STA BUFFER+1,X
FF6F- A9 FF                LDA /MONITOR     high byte.
FF71- 9D 02 02             STA BUFFER+2,X
FF74- 4C 00 02             JMP BUFFER       run program.
                        *
                        *-------------------------------
                        * Prog.4 occupies ROM space from
                        * $FF77 to $FFE2 inclusive.
                        *-------------------------------
                        SCREEN.DUMP
                        *
                           .PH BUFFER
                        *
                        PROG.4
                        *
                        *   print screen routine.
                        *
0200- 8D D1 C0             STA CARD.OFF  slot 5 card off.
0203- AD EA 03             LDA $3EA      check if valid dos
0206- C9 4C                CMP #$4C
0208- D0 3E                BNE EXIT.PRINT   invalid DOS
                        *
                        PRINT.SCREEN
020A- A9 01                LDA #1           slot 1.
020C- 20 95 FE             JSR MON.OUTPORT  turn printer on.
020F- 20 EA 03             JSR $3EA         reconnect DOS.
0212- A9 A0                LDA #$A0
0214- 20 00 C1             JSR INIT.PRT
0217- A9 8D                LDA #$8D         issue <RETURN>
0219- 20 02 C1             JSR PRT.CHAR     output to printercard.
021C- A2 00                LDX #0           cursor to top line
021E- 8A                .1 TXA              set for vtab
021F- 85 25                STA CV
0221- 20 24 FC             JSR MON.VTABZ    move cursor.
0224- A0 00                LDY #0           htab 0
0226- B1 28             .2 LDA (BASL),Y     get screen byte.
0228- C9 A0             .3 CMP #$A0         normal video?
022A- B0 04                BGE .4           yes
022C- 69 40                ADC #$40         no! so make normal.
022E- D0 F8                BNE .3
0230- 20 02 C1          .4 JSR PRT.CHAR     output char.
0233- C8                   INY              next htab.
0234- C0 28                CPY #40          end of screen line?
0236- 90 EE                BLT .2           no!
0238- A9 8D                LDA #$8D         issue linefeed.
023A- 20 02 C1             JSR PRT.CHAR     output it.
023D- E8                   INX              next line.
023E- E0 18                CPX #24          end of screen?
0240- 90 DC                BLT .1           no!
0242- 20 93 FE             JSR MON.SETVID   printer off.
0245- 20 EA 03             JSR $3EA         reconnect dos.
                        *
                        EXIT.PRINT
0248- AD F3 03             LDA $3F3         check powerup byte
024B- 49 A5                EOR #$A5
024D- CD F4 03             CMP $3F4
0250- D0 03                BNE .1           invalid!
0252- 4C 62 FA             JMP MB.ROM.RESET      normal reset
0255- AD FF CF          .1 LDA CLR.ROM      extn. rom off.
0258- A0 07                LDY #7           turn off all slots.
025A- 98                .2 TYA              calc. slot index
025B- 0A                   ASL              and move to x-Reg.
025C- 0A                   ASL
025D- 0A                   ASL
025E- 0A                   ASL
025F- AA                   TAX
0260- 9D 81 C0             STA $C081,X      turn off slot X.
0263- 88                   DEY
0264- 10 F4                BPL .2           do slots 7-0 incl.
0266- 8D D0 C0             STA CARD.ON      turn slot 5 on.
0269- 4C A0 FC             JMP MOVE.DOS.IMAGE    download
                        *                        ROM-DOS
026C-                   END.4  .EQ *
                               .EP
                        *-------------------------------
                        * turn off cards, if any, in all
                        * slots except ROM-DOS card.(slot 5)
                        *-------------------------------
                        TURN.OFF.SLOTS.0123467
FFE3- 2C 10 C0             BIT KBDSTRB      clear keyboard.
FFE6- AD FF CF             LDA CLR.ROM      extn. ROM off.
FFE9- A0 07                LDY #7           start slot 7.
FFEB- C0 05             .1 CPY #5           ignore slot 5.
FFED- F0 09                BEQ .2
FFEF- 98                   TYA
FFF0- 0A                   ASL              calc. slot index
FFF1- 0A                   ASL              and put in X-reg.
FFF2- 0A                   ASL
FFF3- 0A                   ASL
FFF4- AA                   TAX
FFF5- 9D 81 C0             STA $C081,X      turn slot X off.
FFF8- 88                .2 DEY
FFF9- 10 F0                BPL .1           do slots 7-0 incl.
FFFB- 60                   RTS              exit to caller.
                        *-------------------------------
                        * reset vector origin must be $FFFC
                        * for correct function of ROM-DOS
                        * card. Switch on the card must be
                        * in the UP position permanently.
                        *-------------------------------
                        RESET.VECTOR
FFFC- 36 FC                   .DA RESET.ENTRY.POINT
                        *-------------------------------
```

Telex net package

A NEW Apple II-compatible Autex telex management package has been produced by Chernikeeff Telecommunications, opening the way to wide area networking via the international telex system.

The microprocessor-controlled Autex telex message switch comes in four versions to control traffic on from one to 16 lines and provides a number of user options.

Its group broadcast facility enables the same message to be personalised and sent to a pre-programmed list of addresses, while urgent messages can be transmitted immediately using a five-level message priority system.

All dialling procedures are handled automatically by the Autex which interfaces with the Apple II via the RS232 serial port.

The system also features an automatic transmission facility allowing messages to be transmitted outside working hours.

Both incoming and outgoing messages can be stored in the Autex's memory, which can be accessed via the Apple II for local printing or displayed on-screen for editing and automatic onward transmission.

Eight interface ports are provided on the Autex 100, 200 and 400 and 16 ports on the Autex 1600. The system can also be expanded to meet multi-telex line requirements to form a multi-terminal, multi-line telex management system.

● *Chernikeeff Telecommunications, Church Wharf, Pumping Station Road, London W4 2SN. Tel: 01-995 7855.*

Mac software listed

WITH an estimated 2,000 Macintosh programs on the market, finding the right one for your needs can be a problem if you don't have the new guide from International Software Database.

The American company operates a worldwide software ordering and information service and has worked with Apple Computer to compile a comprehensive listing of Macintosh software.

Winter MacGuide, listing more than 2,000 software packages, is the official Macintosh product availability publication.

It includes product title, vendor name and address, suggested retail price and program description for each item.

● *International Software Database Corporation, 1520 South College Avenue, Fort Collins, Colorado 80524, USA. Tel: 303 482 5000.*



Autex telex management system

Hi-res monitor

A RANGE of colour and monochrome monitors has been launched in the UK by Thomson.

Among them is the Apple II compatible VM3102 VG/VA, high resolution composite green/amber monitor with dark tube, flat-face and 35MHz bandwidth.

● *Thomson Monitors, Ringway House, Bell Road, Daneshill, Basingstoke, Hampshire RG24 0QG. Tel: 0256 29155.*

Vertical market drive

A SCHEME has been devised by Blyth Software to encourage the development of vertical market software on the Macintosh using Omnis 3 Plus.

The aim of the Strategic Developers Programme is two-fold – to provide the resources and facilities developers need to create software, and to market the finished product.

Apple has given full support to the project, supplying the hardware at special developers rates, and Blyth offers the loan of Omnis 3 Plus and Runtimes for up to three months.

Products have already been developed using the scheme addressing a variety of vertical markets.

Delivery and Fleet Management is aimed at companies running their own fleets or employing haulage contractors or using a combination of the two. Price: £295.

Private Practice handles the day-to-day running of a private practice, including booking appointments, linked diagnosis and treatment filing and retrieval.

Architects Information Management System covers a range of applications related to architectural projects, contracts and buildings information management and scheduling. Price: £350.

Other programs in the pipeline are directed at farmers, the police, bakers, security companies, home improvement companies and garages.

Niroo Rad, Blyth's sales manager, says the scheme has already provided solutions for previously uncatered for markets: "We have satisfied numerous professionals who had begun to despair about ever finding software to suit their specific needs", he said.

Blyth Software, Mitford House, Benhall, Saxmundham, Suffolk IP17 1JS. Tel: 0728 3011.

Unix V link

A NEW suite of programs from Equinox Computer Systems allows Macintosh and IBM compatibles to communicate with Stride machines running under Unix V.

Called the Connectables, the programs offer all the benefits of local area networking with a Stride 400 Series Unix system at the hub.

The Connectables allows a Macintosh to emulate a standard terminal connected to the Stride computer and the machine can also utilise the larger storage capacity of the Stride as a simple disc/file server.

The Connectables consist of a suite of three programs – a copy of UniHost is required for each Stride machine connected, PC Works for each IBM and MacLine for each Macintosh.

● *Equinox Computer Systems, 114/116 Curtain Road, London EC2A 3AH. Tel: 01-739 3450.*

Hard disc back-up

AUTHORISED distributor Computers Unlimited is to launch the UK's first back-up unit for Macintosh hard discs.

It is also to distribute LoDown's external Macintosh hard discs, which range from 20 to 80mb.

The 20mb hard disc costs £1,395 and the 30mb is £1,695. LoDown says the relatively high UK price is due to an inclusive 12 month guarantee, as opposed to 90 days in the US.

● *Computers Unlimited, 246 Regents Park Road, London N3 3HP. Tel: 01-349 2395.*

Hi-res graphics

GRAPHICS software publisher Baudville has released 816/Paint for the Apple II series on 5.25 and 3.5in discs.

It is the first package to support all Apple high resolution modes including the 4096 colour super hi-res mode on the IIGS. Price $75.

● *Baudville Incorporated, 1001 Medical Park Drive S.E., Grand Rapids, Michigan MI 49506. Tel: 616-957 3036.*

□

A Database Publication

AppleUser

Vol. 7 No. 7 July 1987 £1.50

Spreadsheet aid to calculating biorhythms

The Apple LaserWriter under the microscope

Desktop publishing in South Africa

Producing a customised version of MacWrite

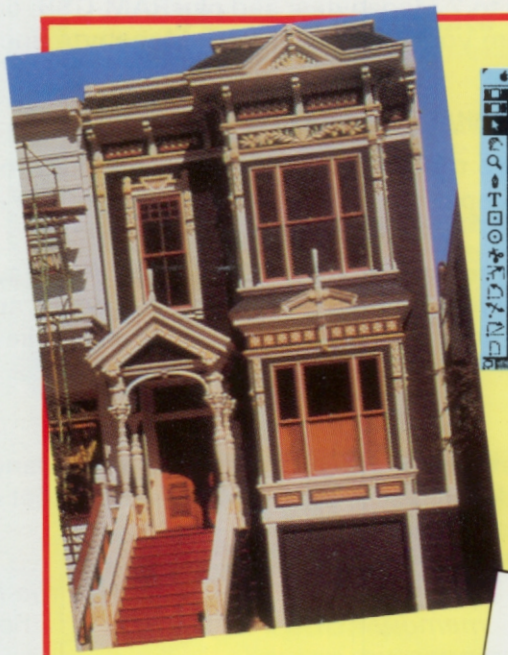
UK takes to Shareware: But where's the money?

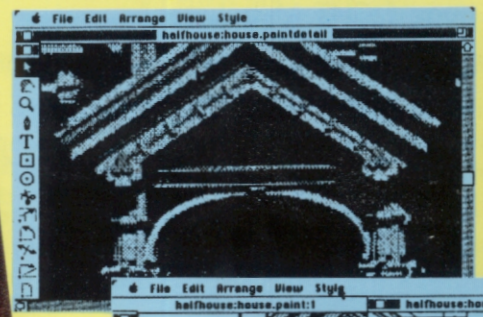
REVIEWS

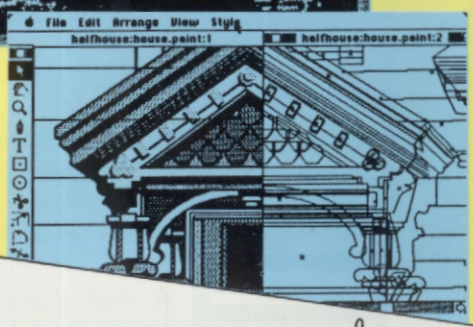
VIP Professional; Word 3.0; Prodos compiler + all the latest games for the Apple II and Mac

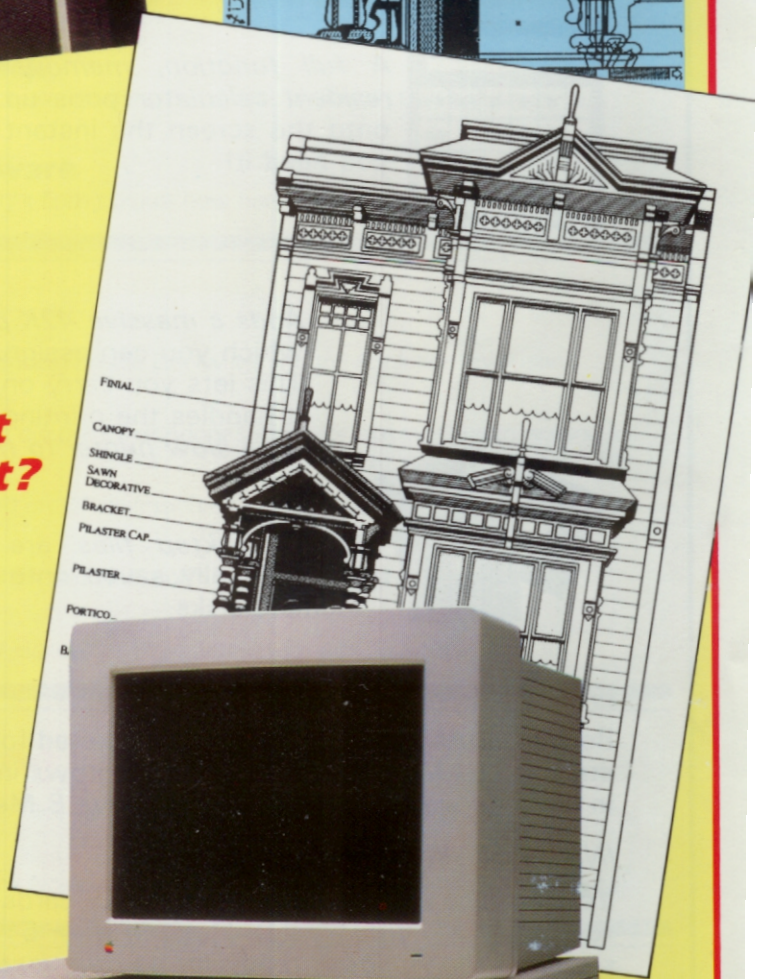
UTILITIES

A useful new command for Dos 3.3; powerful screen editor for Basic; make the most of shape tables







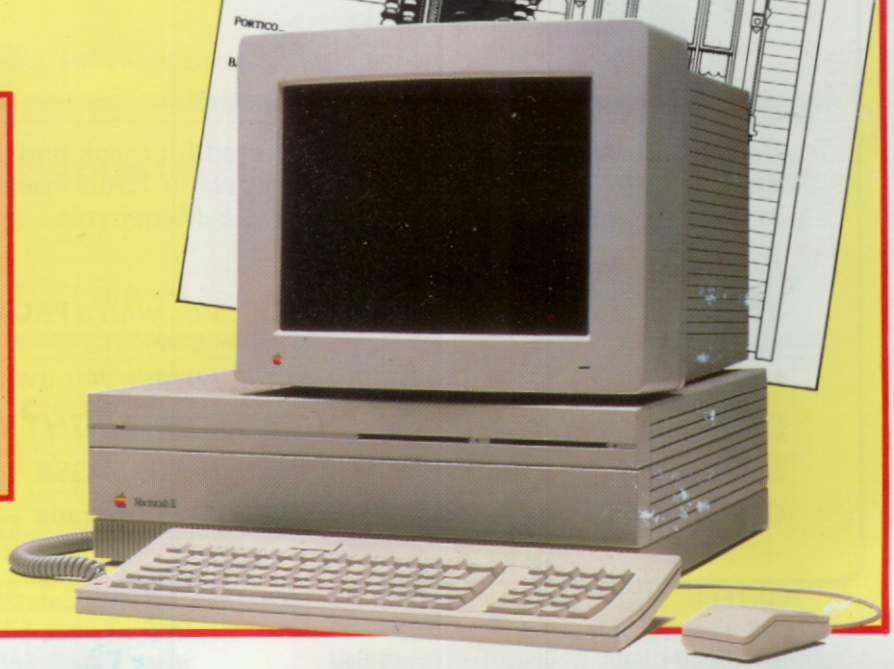


Adobe Illustrator unveiled:

The best art package yet?



How the Apple IIgs interfaces with the outside world



Easy as 1-2-3

Lotus power and Apple compatibility: Geoff Wood examines VIP Professional

VISICALC on the Apple II was the first spreadsheet program, but now Lotus 1-2-3 on the IBM PC dominates that market. Lotus has sold over two million copies of 1-2-3, but there is no version for the Apple II.

The popularity of 1-2-3 has prompted other software producers to write similar programs to run on IBM compatible micros. Now, VIP Technologies of Canada has produced a Prodos based program called Professional, modelled after 1-2-3 but designed to run on the Apple IIGS. The program has the same commands and features as 1-2-3 and it can read and write Lotus files and run Lotus macros.

To transfer worksheets or macros from an IBM PC to an Apple IIGS you must use communications programs in both machines. Not having an IBM machine I was unable to try this out. Most 1-2-3 macros run all right but some may need amendment for Prodos pathnames instead of MSdos disc drive references.

The program is supplied on an 800k microdisc and it is not copy protected. The disc has a good demonstration program and some utility programs, including one for converting AppleWorks spreadsheets to 1-2-3 type files.

VIP Professional needs at least 256k of extra ram which must be in the memory expansion slot of the IIGS. Ramcards in the main slots are not recognised by the program. I tested it with a 512k ramcard which left 391,327 bytes for the worksheet. On starting up, the entire program is loaded into ram in about 40 seconds. Thereafter it does not need to refer to the disc except for loading or saving worksheet files.

Gigantic spreadsheet

The 260 page manual is fairly comprehensive but not too formidable. The first 75 pages give eight lessons covering the main features. Novices might have some minor problems where the diagrams do not exactly match the screen, but those who have used another spreadsheet program should have no difficulty.

The next 165 pages are reference sections covering the commands and functions though not in great detail. There are only 16 pages on macros but one of the appendices gives a list of 10 books on 1-2-3, including some on macros.

Professional offers a gigantic spreadsheet of 8192 rows and 256 columns, like the latest version of 1-2-3 for the IBM PC. (Earlier versions of 1-2-3 offered only 2048 rows and 254 columns.) But it is not just a 1-2-3 clone. It also has some Macintosh features such as pull-down menus, dialog boxes and icons. You can use a mouse to operate the pull down menus and dialog boxes and to select cells for formatting and to set or remove windows. However, if you prefer, you can use the program without a mouse.

Touch of the Macs

Whereas 1-2-3 on the IBM PC has a screen appearance like VisiCalc, with the control panel above the matrix of cells, Professional looks more like a Macintosh spreadsheet with a menu line across the top and scroll bars down the side and across the bottom. The control panel is at the bottom of the screen.

Anyone who has used Lotus 1-2-3 will have few problems in using Professional. Most of the commands are identical in terms of key depressions. The 10 function keys of the IBM PC are simulated by holding down the Open Apple key and pressing one of the 10 keys numbered 1 to 9 and 0.

Another big difference is that the display shows only 14 rows and 9 columns whereas 1-2-3 on an IBM PC shows 20 rows and 8 columns, as do most other spreadsheet programs. Excel on a Macintosh allows you to select a smaller font to show more rows, but there is no similar facility with Professional.

A detailed description of the program would fill a whole issue of *Apple User*. Suffice it to say that it is the most powerful spreadsheet available for the Apple IIGS. It has far more features than AppleWorks, FlashCalc, Multiplan and VisiCalc. In some ways it is even better than Excel on the Macintosh, especially on macros.

Its nearest Apple II rival in terms of features is SuperCalc 3a which offers graphs and database and also macro facilities with the eXecute command. However, SuperCalc 3a limits the file size to 55k, even with extra memory.

Professional offers 51 functions whereas AppleWorks has only 16, VisiCalc has 31, FlashCalc has 37 and Multiplan has 47. These spreadsheets do not offer database or date functions nor can they display graphs. (AppleWorks has a separate database program but the spreadsheet is not intended to be used for database work.)

SuperCalc 3a has 48 functions, including date functions. It also offers seven types of graph – pie, bar, stacked bar, line, X-Y, area and Hi-Lo, whereas Professional and 1-2-3 offer only the first five of these. Nevertheless, the appearance of the graphs on both the screen and the printout are better with Professional than with SuperCalc 3a. Colour graphs on Professional are superb whereas the graphs of SuperCalc 3a are better in monochrome.

To test the capacity of Professional, I carried out some tests similar to those I have used when testing AppleWorks with expanded memory cards for the Apple IIe. I entered the number 12345 into cell A1 and copied it down to cell A1000. I then copied this column of figures into other columns until the memory ran out at cell BM1000, a total of 65,000 cells.

In the same Apple IIGS with 768k of ram, AppleWorks 2.0 offered a desktop size of 637k. I created a similar worksheet and the memory ran out at cell BC972, a total of 54,918 cells (AppleWorks has 999 rows). Thus Professional created a bigger file than AppleWorks despite offering less ram for the worksheet.

Speed tests

However, this test worksheet has no formulae, so I started Professional again with the number 1 in cell A1, entered 1+A1 in cell A2 and copied the formula down to cell A1000. Next I entered 1+A1 in cell B2 and copied this down to cell B1000. I then copied this column into subsequent columns until the memory ran out at cell J200, a total of 9,200 cells. A similar test with AppleWorks ran out at cell Y480, a total of 24,456 cells. It seems that with formulae, AppleWorks is more efficient than Professional in using the ram.

Professional took 57 seconds to recalculate this worksheet. AppleWorks took 150 seconds to recalculate the much larger one, but when I cut the worksheet down to 9,200 cells the recalculation took only 52 seconds.

In building up these worksheets, Professional was much faster than AppleWorks for the copying operations. Professional ▷

◁ also scores in the number of functions, the range of commands and, of course, the graphs. However, the database program in AppleWorks is easier to use than the database operations of Professional. And AppleWorks can hold up to 12 files in ram and switch almost instantly between them.

Those who have used 1-2-3 will know that it is not an easy program to learn or to use, mainly because there are so many options in the structure of commands. And macros are not easy for beginners. The same is true of Professional. Anyone who has never used a spreadsheet before might be better to start with AppleWorks which is easy to learn, easy to use and almost foolproof.

Fortunately, AppleWorks files can be converted to files for Professional by using the utility program provided. This operation is easy and fast, but there must be enough space on the disc to hold the new file. I converted several files and found that all values and formula converted correctly but all the labels were underlined. I could find no mention of underlining in the manual and no way of eliminating the underlining except by retyping each label.

VIP offers a version of Professional for the Apple IIc or enhanced IIe. The program is supplied on two sides of a floppy disc, not copy protected. There is also a second disc, one side with demonstration files, the other side with programs for customising graphs and for converting AppleWorks files. The program and files can be copied to a hard disc or to 3.5in microdisc.

This version of Professional needs at least 256k of extra ram which must be in the auxilliary slot of the Apple IIe (for example, RamWorks III or MultiRam), or the equivalent in an Apple IIc (for example, Z-Ram or UltraRam). A 512k RamWorks III card gives 298,382 bytes for the worksheet but a 1mb RamWorks gives 675,182 bytes for the worksheet, more than enough for most people.

Ram disc helps

The program does not work if the extra memory is in a normal slot, so cards such as the Apple Memory Expansion card, RamFactor and Cirtech cards are not suitable. However, these cards can be used as a ram disc to help to speed up the program which is slow when operated from floppy discs. Unlike the IIGS version, the IIe/IIc version is not loaded into ram on starting up. The program does not work with ram discs created by software such as RamDrive. Both RamWorks and RamFactor are needed to run Professional from a ram disc.

Professional operates much faster on the IIGS than on the IIe or IIc, thanks to the faster speed of the microprocessor. In an Apple IIe, operations such as scrolling and recalculation can be speeded up by using a Transwarp Accelerator card (reviewed in *Apple User*, February 1987.

Indeed, for serious business use you really need three cards – an accelerator, RamWorks III and RamFactor as a ram disc. The cost of these three cards would go a long way towards buying an Apple IIGS. But for those who already have one or more of these cards, Professional is a good buy if you want to be able to run a 1-2-3 type program on an Apple IIe or IIc.

Professional is better suited to the Apple IIGS than to the IIe or IIc. But the main virtue of both versions is that, at long last, you can run a program like 1-2-3 on an Apple II. There is now no excuse for buying IBM instead of Apple on the grounds that 1-2-3 won't run on an Apple. Professional offers keystroke compatibility with Lotus 1-2-3, interchange of files and some extra features. It could become the most popular spreadsheet for the Apple IIGS.

Product: VIP Professional
Price: £279 for IIGS, £219 for IIe/c.
Supplier: Bidmuthin Technologies, PO Box 264, Harrow, Middlesex, HA3 9AY.
Tel: 01-907 8516.
Requirements: Apple IIGS with at least 25k expansion memory and one 3.5in drive, or Apple IIe/IIc with auxilliary slot memory (at least 256k) fitted and one 5.25in drive.

BUFFERED SMART SWITCHES

• BOTH PRINTERS PRINTING DIFFERENT DOCUMENTS SIMULTANEOUSLY • • SOFTWARE CONTROL • OVERRIDE SWITCH • RESET & MULTIPLE COPY FUNCTION • EXPANDABLE • SIMULTANEOUS DATA INPUT • AUTO SELECT •
ACS - AUTO COMPUTER SELECT • SI = SIMULTENAOUS INPUT • C = COPY • SPS = SOFTWARE PRINTER SELECT

CENTRONICS

PB-DP (64K) £249 • 1 Centronics input and 2 output soft select with 64K buffer expandable to 256K • C/SPS
PB-4-2 (256K) £345 • 4 Centronics input and 2 output with 256K buffer. ACS/C/SPS
PB-6-2 (256K) £495 • 6 Centronics input and 2 output with 256K buffer. ACS/SI
PB-7-1 (256K) £445 • 7 Centronics input and 1 output with 256K buffer. ACS/SI

SERIAL

SB-4-2 (256K) £415 • 4 Serial input and 2 serial output with 16K buffer at each input & a total of 256K memory. ACS/SI/C/SPS
SB-7-1 (256K) £595 • 7 Serial input and 1 serial output with buffer at each input and a total of 256K memory expandable to 1MB. ACS/SI

UNIVERSAL BUFFER

• SERIAL & PARALLEL INPUT AND OUTPUT • X ON AND X OFF SOFT AND DTR HARD HANDSHAKE • CENTRONICS • 2 FRONT PANEL T SWITCH INPUT AND OUTPUT • COPY • RESET • EXPANDABLE TO 256K •
UB (64K) £220

SMART AUTOMATIC SWITCHES

• AUTO COMPUTER SELECT • SERVICE • REQUEST LED INDICATION • MANUAL OVERRIDE SWITCH • UNSERVICED COMPUTER RECEIVES BUSY •

CENTRONICS

MP-401 £150 • 4 Centronics input and 1 Centronics output
MP-801 £200 • 8 Centronics input and 1 Centronics output

SERIAL

MS-401 £180 • 4 Serial input and 1 serial output
MS-801 £230 • 8 Serial input and 1 serial output

INTELLIGENT PRINTER BUFFERS

• SELF-TEST FUNCTION • BUFFER/PRINTER READY INDICATOR • BUFFER RAM STATUS INDICATOR • RESET AND MULTIPLE COPY FUNCTION • BUFFER BYPASS SWITCH •

PB (64) £140 • 1 Centronics input and 1 Centronics output with 64K buffer
PB-2 (64) £185 • Above with 2 way manual switch to connect 2 micros to 1 printer or vice versa
PB (256) £190 • 1 Centronics input and 1 Centronics output
PB-2 (256) £235 • Above with 2 way manual switch to connect 2 micros to 1 printer or vice versa

ACCESSORIES

KSM 101 £65 • Serial RS232 to parallel converter with PSU
KSM 104 £70 • Parallel to serial RS232 converter with PSU
KSM 110 £24 • Multi-link serial RS232 switch selectable cable
CUSTOM CABLE-MAKING SERVICE AVAILABLE

CABLES (6ft long)

KPC 104R • Ribbon Cable 36pin–36pin £12.00
KPC 104 F6 • Flex Cable 36pin–36pin £16.00
KPC 105-6 • Flex IBM Parallel printer cable £15.00
KPC-105-10 • Flex IBM Parallel printer cable £17.00
KPC-106 • Flex (25 lines) 25pin–25pin £14.00
KSC-101 • Flex (10 lines) 25pin–25pin £12.00

Add postage: Switches & Buffer £4.00 each, & cable £0.75 each +15% VAT

KEYZONE COMPUTER PRODUCTS LTD
U14, Acton Business Centre,
School Road, London NW10 6TD
Telephone: 01-965 1684/1804. Telex: 8813271 GECOMS G

Keyzone

Access VISA

CENTEC - THE BEST DISKS AT THE BEST PRICES!

5.25" COMPUTER DISKS - BULK PACKED

QTY	SS 48TPI	SS 96TPI	DS 48TPI	DS 96TPI	DS 48 C/R	DS 96 C/R
10	£5.95	£6.95	£6.95	£7.95	£8.95	£9.95
25	£10.99	£11.99	£11.99	£12.99	£14.99	£17.95
50	£19.99	£20.99	£20.99	£21.99	£27.99	£32.95
100	£36.99	£37.99	£37.99	£41.99	£45.99	£57.95
150	£52.99	£55.99	£55.99	£57.99	£63.99	£80.95
250	£85.99	£87.99	£87.99	£91.99	£103.99	£126.95
500	£167.99	£172.99	£172.99	£179.99	£202.99	£248.95

C/R = Coloured or reversible disks - please state.
Reversible disks have two holes and two notches!

All Centec disks are packed with a protective jacket (envelope) and com with a full user set, including a label and a write protect tab. The disks ar manufactured to top international standards and have a hub ring fo added protection.

3.5" DISKS - BULK PACKED

QTY	SS 135TPI	DS 135TPI
10	£14.95	£16.95
25	£29.95	£35.95
50	£55.95	£62.95
100	£105.95	£119.95
150	£149.95	£169.95
250	£239.95	£269.95
500	£459.95	£519.95

All disks are supplied with full user labels.

SPECIAL OFFERS & BEST BUYS!

Storage Boxes
Holds 100 5.25" Disks £9.95
Holds 90 3.5" Disks £9.95
90 Double sided 3.5" & A Box £115
100 Double sided 5.25" & A Box £4
3.0" Amsoft CF2 Disks
1+ £2.29 10+ £19.49 50+ £96.99

Packs of 10 are supplied in plastic boxes (worth £1.49)

CENTEC ELECTRONIC SYSTEMS

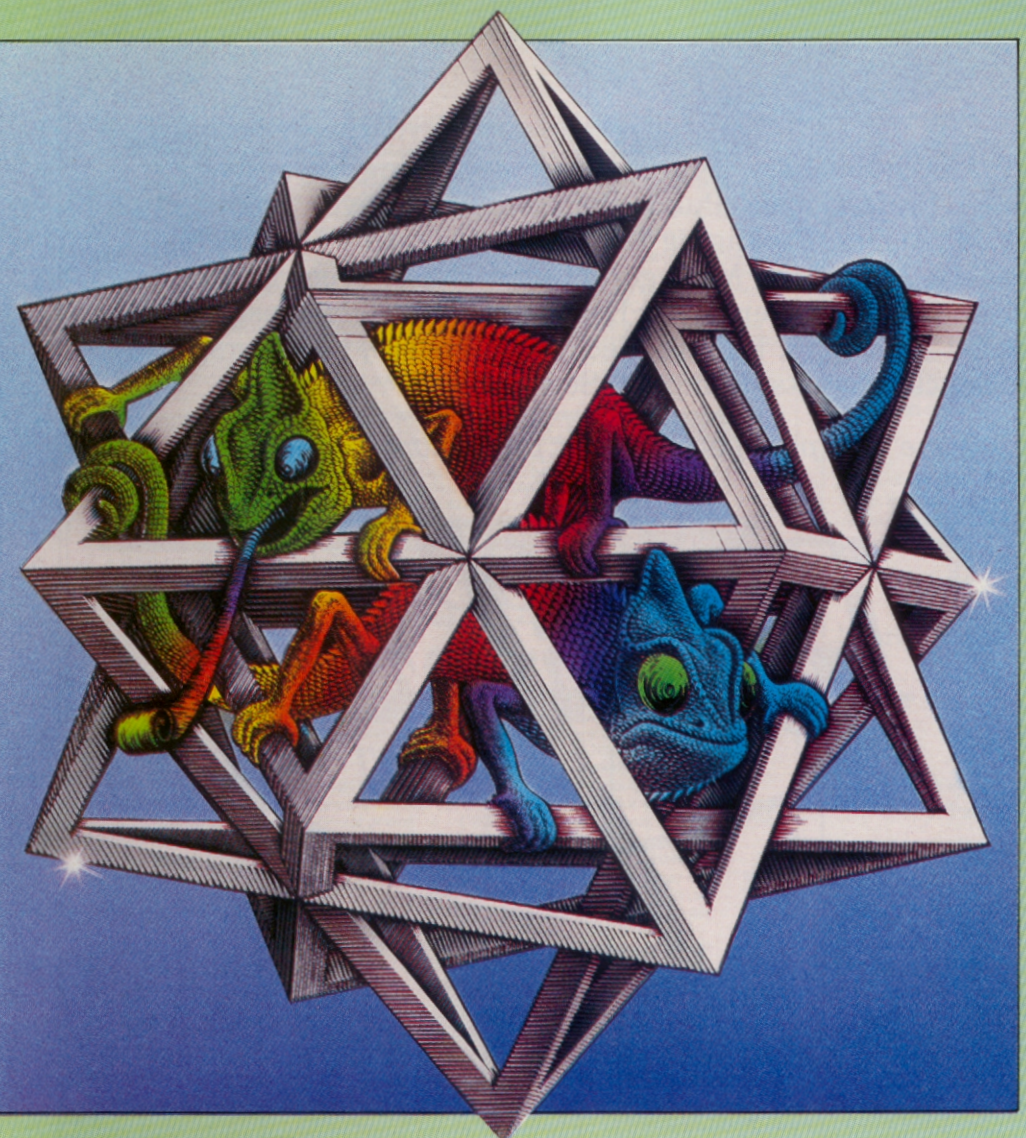
Access VISA

UNIT 3
THE METRO CENTRE
BRIDGE ROAD
ORPINGTON
KENT BR5 2BE

TEL: (0689) 61947/62103
Ansaphone service out of office hours
Remember - all prices include VAT and delivery - no extras to pay!

In the second part of his series, Stuart Bell explains how the chip at the heart of the Apple IIgs is interfaced to the outside world

Exploring the 65C816



Last month we looked at the register layout of the 65C816 – the microprocessor at the heart of the Apple IIgs; now we move on to its interface to the outside world, and its instruction set.

Before proceeding further, we must note that there are in fact two members of the 65C816 family; the 65C816 itself, and the 65C802. Both are housed in 40-pin Dual-Inline-Packages (DIPs), just like the 6502. However, they are designed for two distinct applications.

The 65C802 is nominally pin-compatible with the 6502, and can nominally replace a 6502 in an existing micro-computer. Note my use of the word nominally: In its data sheet, the Western Design Centre describes the 65C802 as being "pin-to-pin compatible with 8 bit devices currently available."

However, without having any evidence to dispute the claim, I do recall that there are problems in an Apple II+ with the simple change from a 6502 to a CMOS (low power) version of the same processor. The 65C802 may be able to replace a 6502 or a CMOS 6502 directly, or there may be minor timing problems.

So, I don't recommend that you throw your 6502 away immediately: If you do change and it doesn't work, don't blame me. If it does, in particular if a 65C802 can be plugged into a Titan Accelerator, please let me know immediately!

But, you may well ask, if a 65C802 can be plugged into a socket intended for a 6502, how can it address 16Mb via a 24 bit address bus? The answer is that it can't. The output from the Data Bank Register and the Program Bank Register are not brought to the outside of the device. Hence, the X and Y registers and the Program Counter can only work on the first 64k, thus limiting addressable memory to that figure.

It may seem that we are left with a 6502, but this isn't the case. In emulation mode, that is all that we have, but in native mode, even with addresses limited to 16 bits, we can employ the full 16 bit Accumulator – the 'C' Register – and data can be moved around in 16 bit units. This "truncated" 16 bit micro gives the power of the 65C816 constrained to the memory space of a 6502. As a quick plug-in replacement for the 6502 it is quite neat. I can't imagine any one using it for a brand-new system.

The true 65C816 device is not 6502 compatible, despite still having only 40 pins. There are two distinct differences. Firstly, the control and timing signals have been significantly changed, both to provide better control of data transfer to and from memory and peripherals, and also to inform other devices what the processor is doing at any instant.

This latter characteristic facilitates the use of multiple micro-processors in one system, by aiding synchronisation. We need not get worried about the details of the signals; all we need to note is that they are different.

We are still left with the problem of getting the top eight bits of the address bus (the output from the Data Bank and Program Bank Registers) out of the device and into the system. Clearly, there are not eight spare pins available on a 6502. The answer lies in the technique of multiplexing.

This means that one pin can be used for more than one purpose. It was used with the early 8080 device – but rejected in the Z80 version because multiplexing requires more complex hardware outside the micro-processor in order to separate the two signals.

To understand how it works, consider

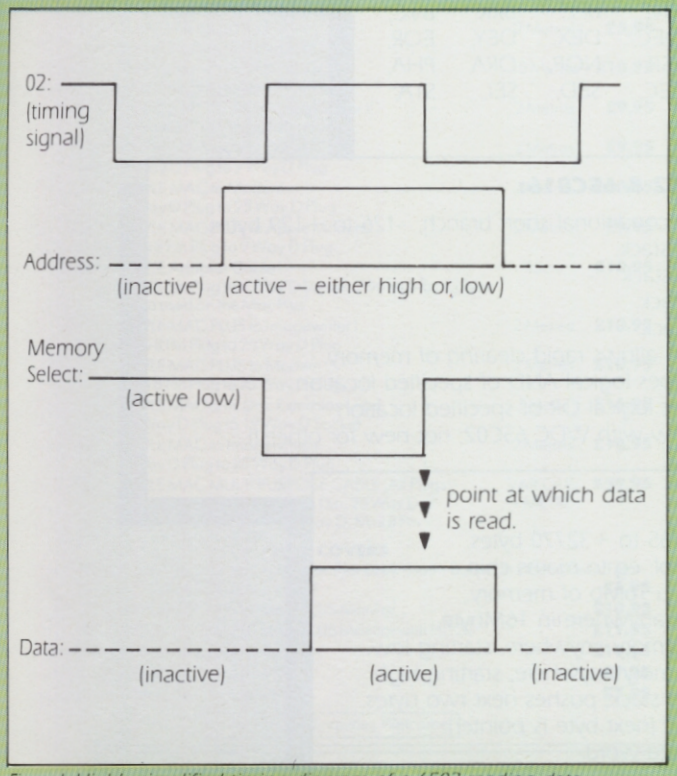


Figure I: Highly simplified timing diagram of a 6502 reading data

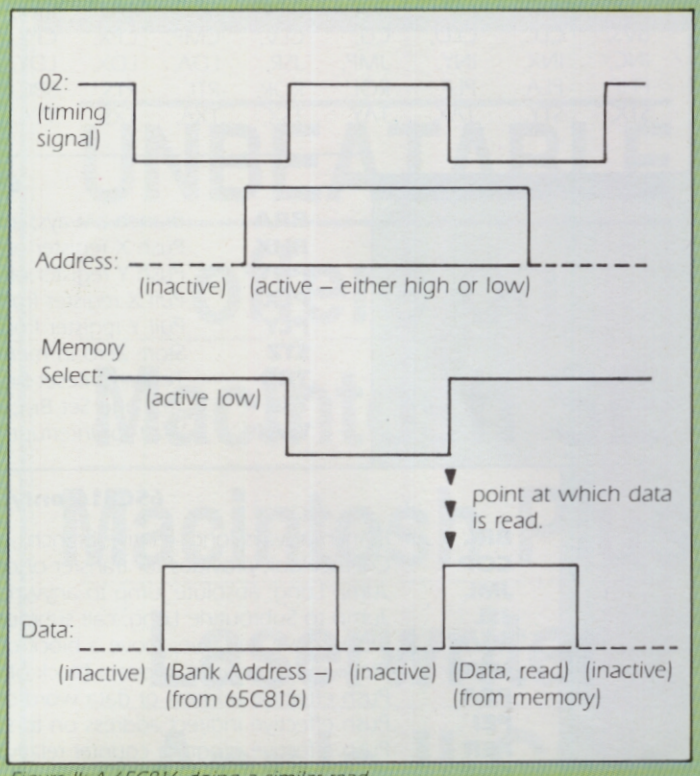


Figure II: A 65C816 doing a similar read

the much simplified timing diagram (in Figure I) showing a 6502 reading data from memory. Note that the data lines are only active for a very small period within the read cycle. Effectively the microprocessor sends an address to memory, which then sends the data back to the processor along the data lines.

The 65C816 exploits this unused period of time, employing the data lines to send out the high 8 bits of the address – the contents of the Data Bank Register or the Program Bank Register – collectively known as a Bank Address (BA0-BA7). A simplified timing diagram is shown in Figure II: Note the increased use of the Data/BA lines.

That is, the Data and Bank Address pins on the 65C816 are multiplexed; external hardware must separate the two sets of signals, the BA lines going to address lines into the memory area, and the data lines being connected to the data lines of the memory devices.

Thus, micros using the 65C816 must, like the Apple IIgs, be custom-designed for that device. The de-multiplexing hardware does add complexity to the system, but it can quite rightly be argued that the cost of a 40-pin CPU plus that hardware is less than the cost of a 64-pin processor.

Note, however, the second limitation of the 65C816's hardware implementation: there are only 8 data-lines into the processor. While logically the 65C816 in native mode handles 16 bit words of data at a time, the actual physical transfers of data to and from the processor are done eight bits at a time. Hence, two transfers are required, and for a given speed of memory, data will be processed less quickly than would be the case with a full 16 bit data path.

This truncated data-width approach has two well-known precedents in the microprocessor world. Firstly, the now defunct Sinclair QL used the 68008, a version of the 68000 microprocessor with an 8-bit data path (and only 20 address lines – limiting its range to 1Mb). Clive Sinclair was strongly criticised for saving a few pounds by using a cut-down 48-pin device (no multiplexing) rather than the full 64-pin 68000.

Secondly, the standard-setting IBM PC has at its heart the 8088, a version of the 8086 with only an 8 bit data path. Again, this has led to criticism because of its effect on performance, and even cost-conscious Amstrad has used the full 16 bit 8086 in the PC clone.

While it may validly be argued that the 6500 family does make efficient use of memory, the use of an 8 bit data path, while allowing the use of a 40-pin device, does serve to limit the overall performance of the 65C816.

Popular upgrade

When the first Accelerator card was released for the Apple II+, just as the IIe was being announced, it immediately became one of the most popular upgrades for Apple II systems. Both it and later cards for the IIe were not used simply because they used the latest CMOS 6502 (which they did), but because they ran at 3.6MHz, rather than the standard 1.024MHz. This may point to a possible future application of the 65C816. In the Apple IIGS, it runs at 2.8MHz, but can be slowed down for speed-critical code. (See the description in *Apple User*, October 1986).

However, the Western Design Centre data sheet for the 65C816 gives timing values for components rated at up to 8MHz. The implication is clear; even if we forget native mode, and a 16Mb address space, and all the new instructions which the 65C816 offers, the use of one in a Super Accelerator with its own memory running at 8MHz could produce a very cost-effective upgrade.

Because of the efficient use which members of the 6500 family make of the system bus, an 8MHz 65C816 is potentially a very fast microprocessor; what a shame that Apple was content with 2.8MHz. Perhaps it was to keep the IIgs significantly less powerful than the Macintosh? After all, that's what the company did with the Apple II when it wanted to promote the Apple III.

But is the 65C816 really a powerful 16 bit device? Let us now move on to consider the set of instructions which the 65C816 can execute. It is clearly a development of that of the 6502.

However, the issue isn't quite as simple as this because there isn't in fact a standard 6502 instruction set. The problem is not only that the CMOS 6502 introduced a few extra instructions, but that one manufacturer – Rockwell – implemented its own additional instructions to set or reset individual bits in the zero page, and to branch on the state of those bits.

Ignoring that particular pair, which have not been implemented by the Western Design Centre in the 65C816, the instruc- ▷

6502, 65C02 & 65C816:

ADC,	AND,	ASL,	BCC,	BCS,	BEQ,	BIT,	BMI,	BNE,	BPL,	BRK,	BVC,
BVS,	CLC,	CLD,	CLI,	CLV,	CMP,	CPX,	CPY,	DEC,	DEX,	DEY,	EOR,
INC,	INX,	INY,	JMP,	JSR,	LDA,	LDX,	LDY,	LSR,	NOP,	ORA,	PHA,
PHP,	PLA,	PLP,	ROL,	ROR,	RTI,	RTS,	SBC,	SEC,	SED,	SEI,	STA,
STX,	STY,	TAX,	TAY,	TSX,	TXA,	TXS,	TYA.				

65C02 & 65C816:

BRA	Branch always; an unconditional short branch, –126 to +129 bytes.
PHX	Push X register on to stack.
PHY	Push Y register on to stack
PLX	Pull X register from stack.
PLY	Pull Y register from stack.
STZ	Store Zero in memory; allows rapid clearing of memory.
TRB	Test and Reset Bits; does logical AND of specified location.
TSB	Test and Set Bits; does logical OR of specified location.
WAI	Wait for Interrupt. (new with WDC 65C02; not new for others!)

65C816 only:

BRL	Branch always long; relative branch, –32765 to +32770 bytes.
COP	CoProcessor; provides for transfer of control, eg to maths chip.
JML	Jump Long; absolute jump to anywhere in 16Mb of memory.
JSL	Jump to Subroutine Long; call subroutine anywhere in 16Mbyte.
MVN	Block move negative; move a block of memory anywhere, starting low.
MVP	Block move positive; move a block of memory anywhere, starting high.
PEA	Push effective address or data word on to stack; pushes next two bytes.
PEI	Push effective indirect address on to stack; (next byte is pointer).
PER	Push effective program counter relative data word.
PHB	Push Data Bank Register on to stack.
PHD	Push Direct Register on to stack.
PHK	Push Program Bank Register on to stack.
PLB	Pull Data Bank Register from stack.
PLD	Pull Direct Register from stack.
REP	Reset bits in processor Status Register; allows direct bit changing.
RTL	Return from subroutine long; return from routine called by JSL.
SEP	Set bits in processor Status Register.
STP	Stop the clock; only a RESET will restart the processor!
TCD	Transfer Accumulator to Direct Register.
TCS	Transfer Accumulator to Stack Pointer.
TDC	Transfer Direct Register to Accumulator.
TSC	Transfer Stack Pointer to Accumulator.
TXY	Transfer X Register to Y Register.
TXY	Transfer Y register to X Register.
WDM	Reserved for future use by WDC – currently has same effect as NOP.
XBA	Exchange A and B registers; swap two bytes of Accumulator.
XCE	Exchange Carry and Emulation bits – used to enter/exit Emulation mode.

Figure III: Instruction sets

◁ tion sets of the 6502, 65C02 and 65C816 are shown in Figure III. The instructions of the 6502 are simply listed; those of the 65C02 and 65C816 are described briefly. For details of the 6502 instructions refer either to the Apple II Reference Manual, or to various other books on 6502 Assembly Language programming.

We must also remember that, as we shall see later, the increased power offered by the 65C816 is not indicated only by the new instructions, but also by new addressing modes now available with old instructions, and furthermore by the fact that many old instructions now apply to a 16 bit accumulator, rather than only to eight bits.

Most of the instructions are simply there to allow manipulation of the new 65C816 registers. Others (eg BRL and JML) extend old-style operations to handle the increased address space of the new device.

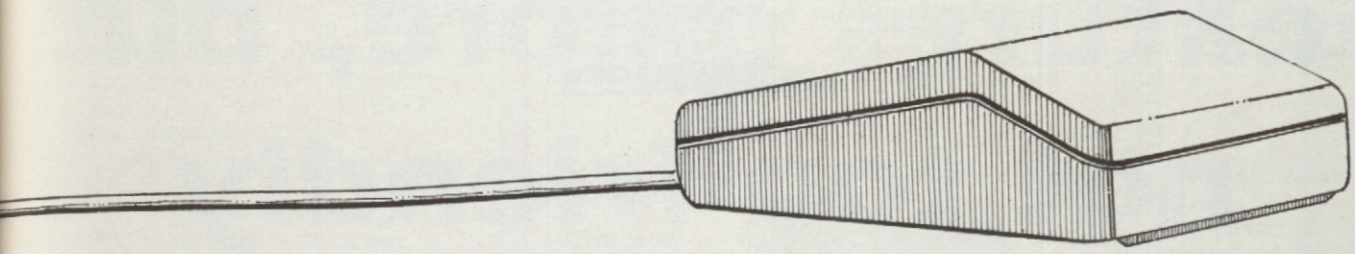
In fact, I would describe the instruction set of the 65C816 as being boring. It offers but two interesting new instructions; those which move blocks of data from one place to another. In that they can move data across banks, they are pretty powerful (and should make RAMDISC software go like lightning). Before we get too ecstatic, however, let's remember that the 8 bit Z80 had block-move instructions 10 years ago.

Far more critically, not only is there no integer DIVIDE instruction, but there's not even a MULTIPLY. I find this inexplicable for any device that has any pretensions to be a modern 16 bit microprocessor. Motorola's 68000 had one seven years ago.

With the advent of high-resolution graphical user interfaces,. the ability to perform multiplication quickly is increasingly important. By omitting a MULT, the Western Design Centre have forced microcomputer designers and programmers either to resort to lethargic software loops, or else use additional hardware to perform this function.

● *We've now considered the register layout, the hardware interface and the instruction set of the 65C816. Next month we'll look at some of the new Addressing Modes which it offers, and then conclude by discussing how some of its power can be used in specimen pieces of code.*

Open mouse surgery



Paul Russell's step-by-step guide converts a IIgs mouse into one the Macintosh can use

THE Macintosh mouse is a reasonably well designed piece of hardware, but like all mechanical devices it is subject to wear and will eventually need to be either repaired or replaced.

My own mouse had been in almost continuous use for over two and a half years before it began to develop any serious problems. Finally a small but critical piece of plastic inside the mouse gave way, rendering it unusable. All attempts at repair failed, so a replacement became necessary.

A replacement mouse is not cheap, and takes time to obtain – if you use the Macintosh to earn a living then this can be a costly interlude. In desperation I sought an alternative, and fortunately found one in the shape of a spare Apple IIgs mouse – like many people, I use the Apple IIgs as a turbo-charged Apple IIe, hence the mouse is redundant.

The modification described here converts an Apple IIgs mouse into one a Macintosh can use. It can be carried out by anyone who is reasonably competent with a soldering iron in about an hour at minimal cost and is reversible, should you ever wish to restore the mouse for use on an Apple IIgs.

You will need a screwdriver, soldering iron, one metre of 8 core cable and a 9-way male D connector and shell.

The 8-way cable should have an overall diameter of no more than 6mm, or alternatively ribbon cable may be used – coloured ribbon cable looks pretty.

● Remove the mouse ball by twisting and removing the black cover and put the ball and cover in a safe place.

● Remove the four black screws from the base of the mouse and separate the base from the top cover.

● Remove three screws from the mouse innards and separate the innards from the base.

● Remove the cable by desoldering the four connecting wires. Ideally you should use a solder sucker to remove the solder from the four pads to which the wires are attached, leaving a clean hole afterwards. Keep the cable in case you later wish to restore the mouse for Apple IIgs operation.

● You should now be able to identify the following items on the mouse PCB (printed circuit board):

Four pads where the cable was connected, marked V, G, D and AG.

IC – an 18-pin IC on the main board: Note the pip identifying pin 1 of the IC.

The mouse button microswitch.

● Prepare the 8-way cable – one end is connected to the 9-way D connector (pin 6 is not used). At the other end strip approximately 20mm of the outer insulation from the cable and then strip and tin each of the eight conductors to a length of about 2mm.

● Connect the eight wires to the following points on the Apple IIgs mouse PCB (see Table I):

9-way D connector	Function	Apple IIgs mouse
1	(GND)	AG
2	(+5V)	V
3	(GND)	G
4	(X2)	IC pin 8
5	(X1)	IC pin 7
6	(not connected)	
7	(SW)	Microswitch (pin nearest pads)
8	(Y2)	IC pin 13
9	(Y1)	IC pin 10

Table I

● Reassemble the mouse, being careful not to trap any wires and not to overtighten the screws at the cable end of the base of the mouse as this tends to jam the mouse button down.

If this happens you will notice that the Macintosh will not boot and will repeatedly attempt to eject its discs – slacken off the two screws to cure this.

If you have done everything correctly the mouse should now work on a Macintosh (128k, 512k, 512k/800 or Plus – but not SE or II). Note that the Apple IIgs mouse takes slightly more power from the Macintosh power supply than the original did, so if you suspect that your power supply is working near the limit (large memory upgrade or similar installed) then don't risk it.

If it doesn't work then check your wiring, visually and also with a multi-meter if possible. If either or both of the mouse directions are reversed then you have probably switched the X1,X2 or Y1,Y2 connections.

If the mouse button doesn't work then check that the SW connection is made to the correct place on the PCB. If the Macintosh doesn't work at all there is probably a short circuit on the +5V connection – switch off at once and check for solder bridges on the D connector or the mouse PCB.

The modified mouse has been in use for some time now on my MacPlus (an original 128k Mac upgraded first to 512k and later to a Plus) without any problems. The different feel of the mouse takes some getting used to – in particular the button has a much lighter action – but now a standard Macintosh mouse feels odd and the converted Apple IIgs mouse has become a permanent fixture. □

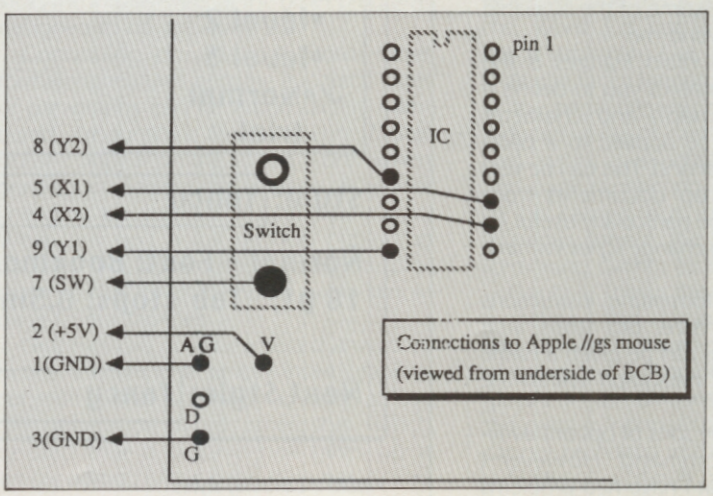
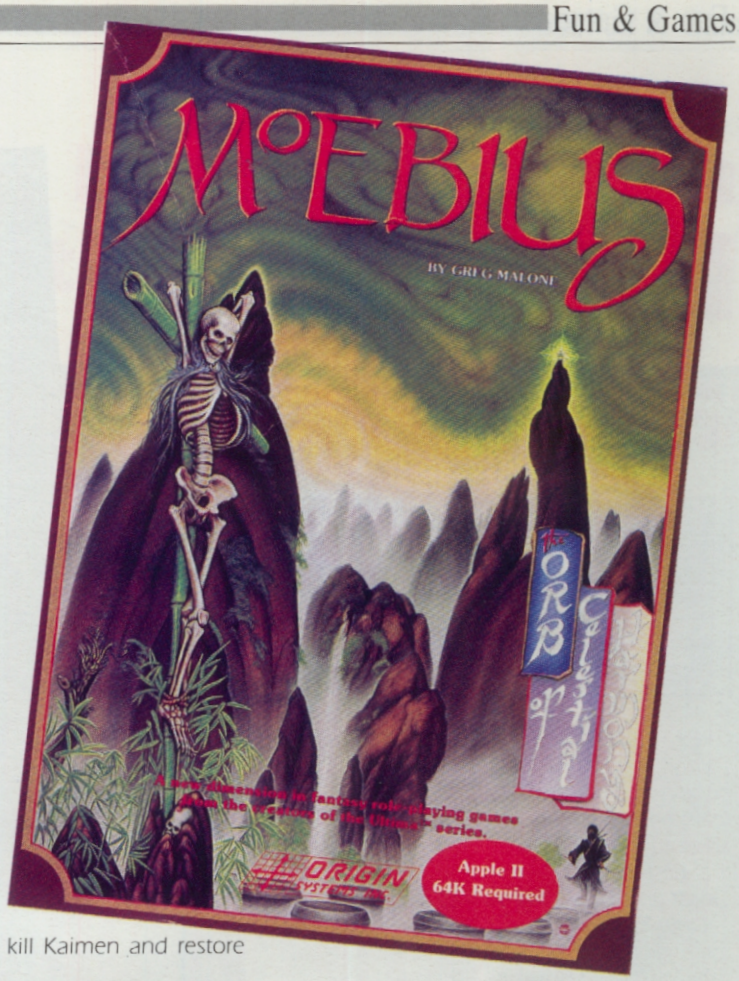


Figure I: Connections to Apple IIgs mouse (viewed from underside of PCB)

Four sides of solid adventure



Program: Moebius
Price: £24.95
Supplier: Origin Systems c/o Microprose, 2 Market Place, Tetbury, Gloucestershire GL8 8DA.
Tel: 0666 54326
Requirements: Apple II with 64k.

ADVENTURES for the Apple have always been in short supply (Infocom and – more recently – the Kerovnia duet being notable exceptions) so the arrival of Moebius on the review desk was a welcome surprise.

And Origin has kept to its previous high standards of presentation. The two double-sided games discs are encased in a sturdy box, and accompanied by playing notes, quick reference card and a poster.

According to the blurb, a headband is also included, but that seemed to be missing from the review copy, unless the oriental theme is continued to the extent of using the map for origami practice and making it yourself.

Back to first impressions. The box illustration shows a cheerful skeleton (you try drawing one) dangling from a bamboo crucifix. Presumably the penalties for failed adventurers are extreme in the land of the orb of celestial harmony.

The oriental theme extends to the poster, where an assortment of individuals are doing unpleasant things to each other (and, for some reason, to the scenery) with fist, foot or sword against a backdrop of Chinese lanterns, Japanese mountains and bamboo.

The manual too is full of eastern promise, and repays careful reading – if you can find the bit you want among all the bamboo. The style is early Kung Fu, though nonetheless readable for all that, but I'm sure disciples of Confucius didn't often lapse into twentieth century-isms like "Let's get on with it".

The plot, as if it matters, concerns a Darth Vader clone, Kaimen the Evil One – originally a disciple of ultra-goody Moebius until he saw the light and absconded with the Orb of Celestial Harmony, which generally holds things together in downtown Khantun.

Making up for lost time, The Evil One has unleashed a horde of assassins, guards, demons, giant water beetles and complicated maps on the unsuspecting population. Moebius is indisposed, and it's up to you, Grasshopper, to battle through the four planes to kill Kaimen and restore the status quo.

As I said, the plot doesn't matter. The approach does though, and Origin has come into its own by combining traditional adventuring techniques with magic and combat interludes.

On starting out, you'll have chance (in the training arena) to practice the talents you'll need. Be warned – time spent here will save a lot of lives later. In any event, you'll have to master certain skills – sword play, martial arts and divination – before proceeding with the game.

Having satisfied your teachers (who have a regrettably small vocabulary) you can set off on your travels, via the keyboard. More than 20 keys are employed, some with more than one function, and it's essential to have the reference card to hand. Fortunately, the Escape key provides a pause, so you can take stock of what's going on.

You're initially equipped with food, water, light, sword and whetstone, body elixirs to prolong active life, and three shurikens – those rather nasty metal stars guaranteed to take an opponent's mind off his headache.

You're also outfitted with a costume that seems to have been left over from the Desert Song, but that's another story.

The goodies provided will keep your strength up, but you also have to maintain your Mind (depleted by prayer and spell casting), Karma (don't maim any innocent passers by) and Dexterity.

This last is damaged if you get hit by an assassin's shuriken (or similar), and "if your dexterity is damaged you'll have problems opening doors". I'll say.

As you progress you'll be able to acquire more tools and potions, communicate with other characters, invoke spells and hurl fireballs – you're spoilt for choice really.

The playing area, a three dimensional representation of the landscape, changes as you move. It takes a little getting used to, especially on a mono screen, but an excellent touch is the facility to call up a map to have an overall view. The catch is that the map only shows the ground you've traversed.

Contact with other characters is frequent and often ends in combat – hand-to-hand, sword-to-sword or any combination. At this point the screen switches to full-size characters, with you guiding your blows.

Again, this takes a little getting used to, but practice makes perfect. Well, nearly. And if in doubt as to what to do, "blows aimed to the legs are the most demoralising to male opponents". They certainly demoralised me.

Space doesn't allow me to give more than a taste of the game. The combination of adventure and interaction is a winning one, and the sheer breadth of the action allows for almost endless permutations.

And where else can you speak with the dead, walk on water, turn invisible or practice ventriloquism?

Moebius could easily have been a jack of all techniques and master of none, but its creator has achieved a working balance – though he deserves a bigger machine.

It's the scope of the game that leads to its shortcomings. Graphics are a little robust and some of the action a little slow, and constant key hunting is a distraction. But that's a small price to pay for four sides of solid adventuring.

W.F.Wilberforce

Dream of a trilogy

Program: Silicon Dreams
Price: £19.95
Supplier: Rainbird Software, First Floor, 74 New Oxford Street, London WC1A 1PS.
Tel: 01-631 3589.
Requirements: Apple Macintosh, Apple II with 64k.



GREAT! Rainbird has now issued the second Level 9 trilogy and it's every bit as good as the first, Jewels of Darkness, which featured three superb text and graphics adventures, Colossal Adventure (still one of the best ever for my money), Adventure Quest and Dungeon Adventure.

Now comes Silicon Dreams containing three more highly acclaimed adventures – the massive Snowball, the marvellous Return To Eden and the deliciously baffling The Worm In Paradise.

In Snowball, you take the part of Kim Kimberley (gender left cunningly ambivalent to please parties of either sex). The interstar transport, Snowball 9, is in transit from Earth to the planet Eden when the cryogenic system goes awry.

Chaos reigns, the life-suspended crew and potential colonists are in mortal danger and the ship is plunging out of control towards Eden. Can Kim save the day?

Having successfully rescued Snowball 9 from catastrophe, Kim is unjustly accused of sabotage in Return To Eden but manages to escape before the death sentence is, if you'll forgive the pun, executed. On Eden, you must seek out the city of Enoch and discover how to stop the planet's defence robots from destroying Snowball 9. Be warned – Eden is certainly one weirdo of a planet, and its inhabitants more so.

A century on, in The Worm In Paradise, you are virtually an Enochian geriatric. Well, maybe not old but certainly absent-minded; you have mislaid your memory. Something is terribly wrong, but can you regain your memory quickly enough to find out what and do something about it? Even if it means joining the ruling party?

As with the Jewels of Darkness trilogy, all these adventures were originally text only. But Rainbird is not content with re-issuing old material, even if it is of top quality.

Each of the original adventures has been subjected to a thorough rewrite, changing the overall style yet, thankfully, leaving the text faithful to the original classics.

Incorporated is a superb new parser which allows input of far more complex, multi-command sentences, a truly massive vocabulary (not less than 1800 words – is this a record?), more than 600 colourful illustrations and hundreds of locations to explore.

The response times are very fast and there's the ability to type ahead – multi-tasking allows you to keep entering your commands regardless of whether a picture's being drawn or a response is spilling out.

And there's more. The text messages have been expanded to give fuller, more richer detailed descriptions. The program records the last 1,000 characters typed and with the inbuilt full function line editor you can backtrack and edit past commands.

In addition, an OOPS command lets you backtrack over 250 moves. Where others provide a snack of features, Level 9 proffers a feast.

And if that's not enough, the package comes handsomely boxed with a quality, glossy 64 page novel, Edensong, which includes a 12 page playguide to the three adventures.

If you've never visited the planet Eden, you're in for a real treat. Don't miss out.

Bob Chappell

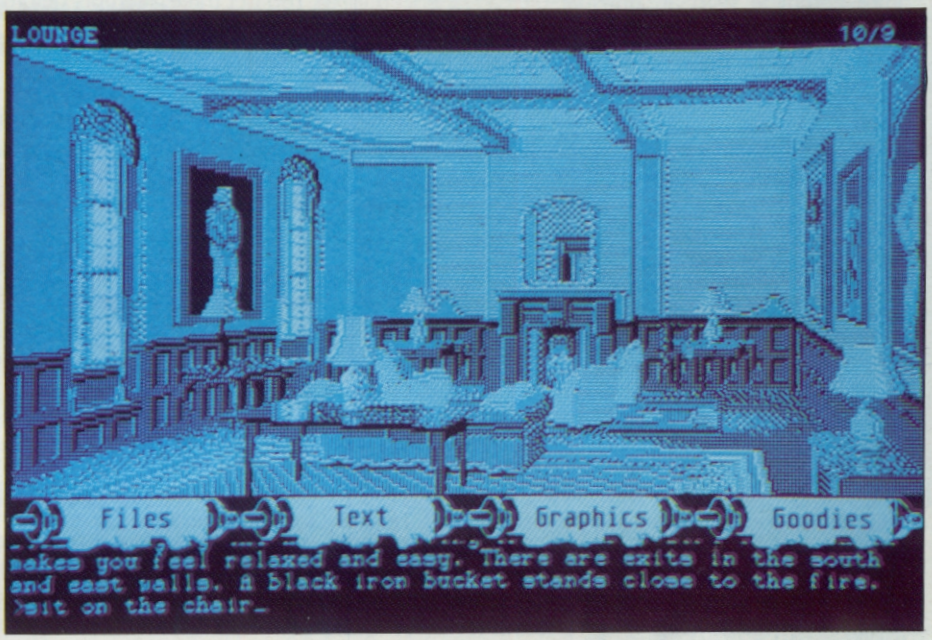
Prince prices

Last month's Fun and Games had incorrect prices for Baudville's Prince. Here are the correct details:

Product: Prince
Prices: £78.20 (with four special heat transfer ribbons for Imagewriter/DPM or Epson
£45.99 (without ribbons)
£34.50 (Prince Refill Kit – set of four special heat transfer ribbons)
£19.50 (Prince Refill Kit – set of four standard colour ribbons)
Requirements: Apple II with 64k
Supplier: MGA Microsystems, 140 High Street, Tenterden, Kent TN30 6HT.
Tel: 05806 4278

Program: Guild of Thieves
Price: £24.95
Supplier: Rainbird Software, 74 New Oxford Street, London WC1A 1PS.
Tel: 01-240 8838
Requirements: Apple Macintosh and Apple II with 64k.

Beg, borrow or steal – but join the Guild



GATHER round, all fellow brigands, rogues, pilferers, cutpurses, purloiners, thieves, vagabonds and assorted knaves, and hearken to the tale I have to tell.

Guild of Thieves, like its illustrious predecessor The Pawn, is a massive text and graphics adventure designed and written by Magnetic Scrolls. Now I know that graphics in adventures are not everyone's chalice of honeyed mead but Magnetic Scrolls' efforts are something special. If you liked the pictures in the Pawn, you're going to be delighted by the 29 illustrations in Guild.

In Guild of Thieves, you are a novice thief who has applied to become a member of the illustrious Guild of Thieves. Should be a doddle for any role-playing burglar, pickpocket or plunderer, you might think. Think on. This game starts out gently enough but before long you're being baffled, bamboozled and bewildered by all manner of devious puzzles and predicaments.

Put down your gelly, jemmies and skeleton keys for a moment and let me relate my first ill-starred efforts to you.

The Master Thief of the Guild had accompanied me to an island. Sitting on the jetty, he challenged me to come ashore and ransack the island for all its treasure and so prove I was worthy to be considered for membership of the Guild.

Carrying my bag marked swag and wearing jeans and de rigeur thief's striped jersey (well, a tee shirt actually), I made my clumsy way to the jetty and began to explore. Woods, copses, scrub and golden wheatfields abounded, but then I came upon my first landmark – a windmill.

Owing to the breeze, the spinning blades of the mill made it a mite dangerous to get past. But a thief's cunning paid off and brought the first, smug smile to my thin lips. There were not to be too many of such complacent grins, I am ashamed to confess.

Elsewhere, a splendid temple offered a chance to gaze upon the impressive statue of Hurligan the Sweet (famed Kerovnian confectioner) and an opportunity to inspect an organ that played itself. Nearby, I encountered a sign saying "WORNIAR" and soon found myself in a fiendishly designed room where one false move would mean instant obliteration.

Fortune favours the brave, they say, but since I am a natural coward and much prefer discretion to valour, I made a quick save of the current game before stepping out. Several unpleasant deaths and consequent restores later, I decided enough was enough and left.

Staggering up a hill, I soon found myself in a dark place. Once some light had been cast, I discovered a circular chamber inhabited by a skeleton whose finger bone rested on a closed chest.

The contents of the chest I will not reveal – the memory is too painful – but when I use the word "gruesome" to describe the unmentionable contents, be warned that I'm not talking about those slavering denizens of the dark that lurk in Infocom adventures.

Scampering from the scene as fast as my trembling legs would take me, I blundered into a room filled with hot coals. At the far side was a stone stairway – dare I cross the fiery embers to reach it? You're right – I dared not!

I fared little better in a cemetery but at least had a giggle at what I found there. Not having the means of access, I also failed to enter the Bank of Kerovnia, the Zoological and Botanical Gardens and the Undertaker's Shop ("Stiffs a speciality. Discounts for dig-it-yourself arrangements").

The drawbridge of the castle was welcoming. However, once inside, I found lots to investigate an intrigue.

What was all this talk by the Gatekeeper of a real rat-rabe? What was odd about the Billiards Room? What is the use of the disgusting object in the tub? (try eating it!). Why did the toilet roll in the lavatory keep breaking?

Incidentally, an unnecessarily stronger word than "pee" pops up in the description if you try to use the toilet, so parents of younger adventurers, watch out. Score one black mark to Rainbird.

So here I am, newly returned from my first sojourn in the world of the Guild of Thieves, not much nearer to being granted membership than I was when I started. But I am a happier if not a wiser man. Happier because this is a superbly entertaining adventure, possibly more so than The Pawn.

The illustrations are exceptionally good – I particularly commend the title picture and those of the cemetery, castle, skeleton, courtyard and temple if you want to see graphics at their finest. The text is literate and fulsome, a rich stew of detail, atmosphere and incident and liberally laced with humour.

Here's just two examples of the many instances of humour and surprise in the game. If you hang around in the boat long enough at the start, the Master Thief will lose patience and hurl you bodily on to the jetty. In the Billiards Room, a blackboard reveals that the scores are "Tiggins 0 Haylor 148". Beware also of spending too long in the loo – the Master Thief may burst in and ignore the usual modesties.

Puzzles are here in plenty, some reasonably easy, many most decidedly not, but all stimulating in their own way. The parser, as players of The Pawn will know, is very powerful.

Commands can be as short or as long as you like and there are some handy shortcuts. I particularly liked being able to "go to" any place that I had already visited and being able to "find" or "search for" any object that I had previously dropped but had forgotten precisely where!

It was also a pleasure being able to examine all objects with one command instead of having to look at each item sep- ▷

◁ arately (Infocom, hang your head and weep). On the other hand, the parser didn't seem to like the use of "all" when the objects, although clearly visible, were inside another object. A tiny blemish, though, in what is otherwise a flawless performance.

The game is handsomely boxed and comes complete with an unusual die, a short system-command guide, a Kerovnian credit card, a Guild contract of service and a 40 page copy of What Burglar.

This last serves as a guide to communication with the program, entertainment and as an aid to copy protection. During the game, you'll be given the number of a page, column, line and word in this document and asked to enter the word referenced there. You get three attempts before the program shuts down.

Guild of Thieves is a cracking adventure. Rainbird and Magnetic Scrolls are charged with combining superior illustrations, gripping text, teasing puzzles and general good humour to produce an irrestible adventure. I find them guilty on all counts and hereby sentence the public to rush out and buy this remarkable game. Take the defendants down to the cells and make them start work on a follow-up immediately.

Bob Chappell

Program: Dark Castle
Price: £51.70
Supplier: MacSerious, 17 Park Circus Place, Glasgow G3 6AH.
Tel: 041-332 5622
Requirements: Macintosh with 512k minimum.

Attention to detail produces a winner

IF there's one product that emphasises the importance of the playability of a computer game over mere graphic gimmickery, it must be Dark Castle. The Mac is far from most people's idea of a games player's computer – after all the screen is only black and white.

However, the Mac's high-resolution graphics and superb sound capabilities, if used by an imaginative team, can put most products for any other machine to shame.

Silicon Beach showed it had the ability to produce saleable games for the Mac with Airbourne, an unsophisticated, fun and totally addictive game, which sold in vast quantities.

Dark Castle has you in control of an intrepid little hero trying to discover the deep inner secrets of the citadel and defeat the Black Knight who is said to live there.

You arrive unarmed and soon face onslaughts of vampire bats and peckish rats who have a liking for fresh hero. Luckily, handy bags, each containing 10 rocks, have been left by previous adventurers. Only 80 can be carried at once though. These rocks can, by an ingenious method, be thrown anywhere, or at anything on the screen.

You start in a central hallway with four different routes into the main castle: Two doors to the left with question marks above them, an archway to the right, and directly ahead, an impressive set of large doors. Pressing keys one to four will select the doorway of your choice.

The first two doors randomly send you into one of two areas – to the dungeon screens called Trouble 1/2/3 or Fireball 1/2/3/4.

Trouble One to Three serve no real purpose, but give you time to arm yourself with the stone and potions you will need later on. It also acts as an annoying diversion, because if you choose the random route and enter the dungeons there is no way back as the door slams behind you.

The only way out is to travel all the way through the three screens which make up the dungeon, grab a key at the end, return to the door and open it. Once you know which of the random doors leads to the dungeon you can avoid the arduous trip.

Fireball One to Four lead to the Wizard's Room, where he will give you the very necessary ability to throw fireballs.

The archway on the right of the main hall leads to the four screens called Shields 1/2/3/4. As you may have guessed from the names, at the end of the section is a shield which you will also need to complete your adventure.

Finally there are the great doors at the centre of the Grand Hall which lead through to the Black Knight screens. I do not know how many of these there are – I have only seen the first three as they are very, very difficult.

The game is a platform and ladders (or in this case a platform and stairways) game, with the hero running around the floors of the castle defeating the robot guards and other nasties.

What really makes this product stand out is the overall attention to detail – so much effort has gone into the sound effects and the animation, producing a very professional product. The hilarious digitised sound effects have to be heard to be appreciated. It's no wonder the game comes on two discs and will only work on the 512k machines.

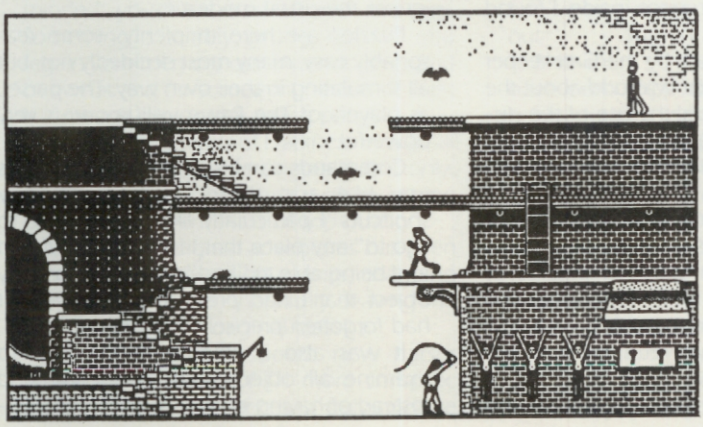
You can record a high score by typing in your initials, and this is then saved to disc for all to see. You will receive a bonus life every 5000 points.

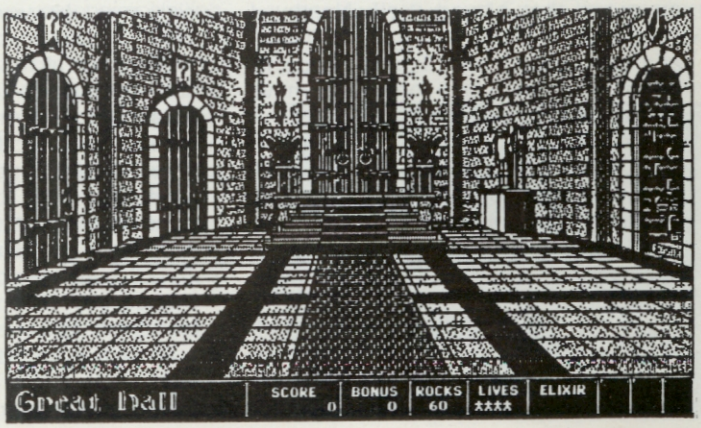
If I was forced to level a complaint at this product it would have to be at the control method for the hero – it is different to say the least. You have to move the mouse and handle the keyboard at the same time, and if you do not master this I cannot see you getting very far.

In its defence, I can see no simpler way of giving the hero the many actions he can perform. At least you can change the layout of the keyboard to suit your taste.

Next time an Atari ST or Amiga owner gives you ear ache about the latest game on their machine, show them Dark Castle. I have seen nothing to match it for playability, and that's what matters.

Hugh Green





COMPILATIONS

Max Parrott finds how Beagle Brothers' new Prodos compiler measures up to the competition

IN March I reviewed the first Prodos/ Applesoft-based compiler on the UK market. Manufactured by Micol Systems of Canada, it is available in this country from Apple 2000. Now that there are two Prodos compilers available (the second being Beagle Bros' Prodos compiler version 1.1), it seemed sensible to review the latter and also to make some comparisons between them and the Microsoft Dos 3.3 compiler, TASC, which is so successful under Dos 3.3. There are several other DOS-based, basic compilers but I feel that TASC is the most successful and the most widely known.

If you want to compile and execute programs under Prodos then you will need a Prodos-based compiler: If you want to compile and execute under Dos, then use TASC.

The three compilers differ in what they will compile, how they compile and in their speed of compilation and execution.

TASC is a Dos 3.3 based compiler which works from a source file held on disc and which compiles to another object file on disc. The source file is a normal, tokenised, Applesoft Basic file. Hence the usual mode of operation is to write the Basic program in the normal way, using an online editor if necessary. Then to check it out thoroughly, running it as an interpreted program and when satisfied to compile the saved program by running TASC.

The actual compilation is slow – usually taking several minutes – and if a non-compilable statement is found the program has to be edited, resaved and recompiled.

The object code, once written, is BRUN, but an online library has to be co-resident in memory and is usually BLOADed first. Some care has to be taken over the position in memory of the modules when using, for example, hires graphics. Most legal Applesoft statements compile but there are some restrictions.

Renumbering problems

Micol Basic is a Prodos-based compiler which also works from a source file held on disc and compiles to another, object file on disc. However, the source is *not* a normal Applesoft Basic file but is a text file created within an editor which comes with the system. Because of problems with renumbering the lines of the text file and the availability of logical looping structures which Applesoft does not offer it is generally not easy to test a program in the interpreted mode and then to compile it.

In other words a programmer would normally stay within the Micol Systems environment, editing, compiling and then testing. The compiler does not actually run under BASIC.SYSTEM and Prodos and there are problems when an unexpected end of program occurs, which usually means a reboot. Compilation is faster than with TASC but I found it generally best to run the system from a virtual disc such as provided by the Flipper in order to have an acceptable rate of work.

The new compiler from Beagle Brothers, like the TASC compiler also compiles from a normal Basic source file, but unlike TASC will compile to memory, which makes it very fast. In fact for most programs I tested, compilation takes hardly any longer than loading the program. If required, you can compile to a disc file directly.

It also seems to cope perfectly with just about any legal Applesoft command and on the basis of some general timing experiments its object code executes slightly faster than the object codes produced by the TASC and Micol Systems compilers.

For example, I used as a good test of arithmetic calculations, boolean logic and hires plotting, a program published in *Windfall*, back in March 1983, which draws a dart board and then plays darts. The drawing of the board (which takes 52 seconds when the Basic is interpreted) takes 35 secs under TASC, 32 seconds under Micol and 30 seconds under Beagle Bros' (however, see below regarding a speed up utility).

Compilation took several minutes under TASC, about 50 seconds under Micol and about 4 seconds under Beagle Bros. I should point out that I had to make some adjustments to the code under TASC, a lot of adjustments under Micol (which took the best part of an hour to figure out) and absolutely none under Beagle Bros.

Clearly, from these simple comparisons the Beagle Brothers compiler is a very good product. But you cannot have something for nothing – what does it cost?

Actually, surprisingly little; about £80 in cash and 6 to 15k of memory, depending on how you run it, and – something I'll return to – a copy of the COMPILER.SYSTEM in memory whenever you want to run a compiled program.

For your money you get a Prodos 8 v1.2 disc containing the COMPILER.SYSTEM and compiler together with a series of test programs, a 40 page manual and a Beagle Bros' chart of useful Peeks, Pokes and Pointers.

I should at this stage mention that although it is not mentioned in the manual you also get an 8 bit program launcher written by the author of the compiler, Alan Bird. This is not seen when you start up ProDOS but when leaving a system program or when issuing the BYE command at the Basic prompt you will be presented with a list of the system files (or possible sub-directories) on the currently selected (prefixed) disc and you can choose which to execute using the up and down arrow keys and Return.

Pressing Escape causes the launcher to look at the next disc drive it can find. It will in turn look at all connected 5.25in, 3.5in, and RAM drives. This program launcher is nothing whatsoever to do with the compiler itself but it is an extremely useful utility which is well worth copying to all your ProDOS discs. Although not directly involved with the compiler, it is useful to have in memory because it enables rapid switching between COMPILER.SYSTEM and BASIC.SYSTEM for debugging purposes.

Loaded into memory

Booting the disc (or -prodos) causes COMPILER.SYSTEM to be loaded and in turn the compiler loads into memory. COMPILER.SYSTEM occupies 17k of memory (BASIC.SYSTEM occupies 11k) and understands most of the commands that BASIC.SYSTEM does. In other words you can CAT and CATALOG the disc, and use PREFIX, CREATE, RENAME, DELETE, LOCK, UNLOCK, SAVE, RUN, OPEN, CLOSE, WRITE, READ, APPEND, POSITION, FLUSH, PR#, IN# AND FRE in immediate or deferred statements.

RUN FILENAME causes the program called FILENAME to be loaded from disc and compiled in memory and executed. If ▷

◁ you LOAD the filename and then type RUN you are told that the program is not compiled. There is a way of running the program at normal speed under COMPILER.SYSTEM but I found it easier to debug a program at the interpreted level using the program launcher to offer BASIC.SYSTEM and to work as normal.

Licensing fee

COMPILER.SYSTEM replaces the more familiar BASIC.SYSTEM and *has* to be present to run compiled programs. This in turn means, that if you want to give your compiled program away, the lucky recipient has to have bought a copy of the compiler.

If you want to sell your compiled software you have to pay an annual licensing fee (presently $50) to the author so that you can put COMPILER.SYSTEM (not the compiler itself) on the disc. This should be contrasted with the approach of Micol, which does not expect you to pay any more money when you sell (or give away) your compiled program (note that that does not, obviously, stretch to giving away the compiler as well).

To get a feel for Beagle Bros' COMPILER-.SYSTEM I used a public domain program which installs itself as an extra Prodos command under BASIC.SYSTEM and gives the user the new command TYPE and found that it behaved exactly the same under COMPILER.SYSTEM. Since this utility uses several calls to BASIC.SYSTEM and uses its global page to pick up data the two systems must be reasonably similar.

The manual says that most relocatable program editors will not run under COMPILER.SYSTEM because there is not enough room. Beagle Bros' Program Writer (also by Alan Bird) will work.

No bugs on view

Having satisfied myself that it is possible to edit a program under COMPILER.SYSTEM using normal Applesoft editing or to quickly change to BASIC.SYSTEM, I began to examine more closely the compilation of several, short Applesoft programs. I was very impressed. Basically I found nothing which would not compile and execute properly. I was unable at this point to find any bugs with the compiler. The March issue of Open Apple mentions a bug found with string to number conversion [that is, the VAL() function] in the Beagle compiler version 1.0 but it is not present in version 1.1 (dated 29/12/86).

I deliberately chose programs which used maths, graphics, boolean constructions and which accessed discs, both at the file and the sector level under Prodos. I also tried the compiler under Prodos v1.1.1 on an Apple II Plus, a IIe with old roms) and a IIgs; everything worked well. So I returned to using the compiler on the IIgs under Prodos 8.

Most compilers require the programmer to flag whether a numeric variable is a real or is an integer and it's always worth doing because integer arithmetic runs so much faster. This is usually accomplished by declaring the variable as such with % as the end of the name or by declaring all integer variables at the start of the program by a compiler directive (often in a pseudo REM statement). The Beagle compiler is unusual in this respect – it makes its own decisions.

I wondered about this and thought that this was the most likely area to find bugs. After all, how can a compiler know what's going to happen to one of the variable spaces that it has set aside?

My first test was to use the program:

```
5 SUM = 0
10 FOR K = 3000 TO 6000
15 SUM = SUM +1
20 NEXT
30 PRINT CHR$(7);SUM
```

and to time it. This took five seconds when interpreted and under a second to compile and run from a RAM disc under the Beagle compiler.

I then changed the loop counter to run from 33000 to 36000, that's with values out of the integer range. The interpreted time stayed the same at five seconds; the compiled time changed from under a second to nearly two seconds. Clearly the compiler had changed from integer to real arithmetic. It still gave the correct result.

I then changed line 15 of the program (with the second loop) to:

```
SUM = SUM + K.
```

The time for the interpreted program fell by about half a second, presumably because 1 no longer has to be translated. The time for the compiled version was about the same, at just under two seconds.

The acid test was next. I changed the loop counter back to the original values and let it run adding K to SUM. The times were as expected but the compiled version gave the "wrong" answer. It gave 13504499 in place of the correct answer of 1350500 which the interpreted program gave.

Rounding errors

Changing the loop variable to K% made no difference, but changing SUM to SUM% caused the error message 'ILLEGAL QUANTITY ERROR AT $0824' which is what I expected. This "bug" in the compiler is not what I was actually looking for, namely confusion over integers and reals, but was in fact caused by rounding errors in the compiler's real arithmetic routines being different from the rounding errors of the interpreted routines. This surprised me a little because I expected the compiler to use the Apple rom routines as much as possible to save on memory.

I decided to examine the differences between interpreted and compiled real arithmetic with a view to finding other, differing rounding errors. Generally the Beagle compiler gave very similar answers to those provided by the interpreted Basic. The difference was always in the eighth or ninth significant figure. The Micol compiler always seemed to give the same answer as interpreted Basic.

I decided to change tack and look at the thorny question of what to do with machine language subroutines. Applesoft Basic has three ways of communicating with such subroutines: USR(), CALL nnnn and the & technique. Micol supports these but the often popular page 3 of memory cannot be used and the & vector is not at its usual position and there are problems with passing information from the Basic to the subroutine. The TASC compiler does not support the &, indeed it is used to restart the compiled program.

The Beagle compiler does support all three with a minimum of fuss. CALLs and USR()s will work as normal and since the compiled code is generally shorter than the corresponding Applesoft source code there should not be a problem in finding a place in memory – especially as page three is available as normal.

Compiled to disc

A simple & – that is, one not followed by information required by the machine code subroutine – will compile and run without any effort on the part of the programmer. The incredible thing is, that the "extended &" is supported by the Beagle compiler although the command has to become && and the actual code has to be changed to pick up the parameters. The manual gives information on this and even lists the addresses of the start of compiler library routines so that the programmer can interact more efficiently with the coded routines in RAM.

A program can be compiled to disc rather than memory by using the command:

```
COMPILE FILENAME,NEWNAME.
```

If the source program CHAINs other programs then the first can be compiled in this way and the others compiled with the similar:

```
COMMON OLDNAME,NEWNAME1
```

command. The first program is then run in its compiled form with the dash or run command. As well as support for the ProDOS CHAIN command there is support for STORE and RESTORE and the sharing of variables between programs. A disc file of type CVR holds the compiled data.

To be honest, this Beagle Bros' Compiler is a very hard program to review because

there is no way that I have found to fault it. It is fast and convenient to operate, it produces fast code with a minimum of effort on the part of the programmer and it supports just about all the Applesoft and ProDOS commands.

Full support

The commands it does not support are the ones you don't want in a compiled program, namely CONT, DEL, LIST, LOAD, NOTRACE, SAVE, SHLOAD, TRACE and STORE. Note though, that the Prodos STORE is supported as mentioned above. It has reasonable error messages and full support is given to the programmer dealing with errors which may arise in his program.

When an error does occur in a program the system reports the address and a small disc utility can be run to translate this into a corresponding line number so that the source code can be edited.

Other utilities exist on the disc. For example a patch can be applied to the compiler so that INPUT becomes 'INPUT anything', another slows down PDL reads (as recommended by the Applesoft manual) and yet another allows faster plotting of hires points although at a cost of more code space (in the compiler space, not the object code).

I used this patch and then compiled and ran the darts program mentioned earlier. The time only decreased by about one second but the drawing time is heavily dependent on trigonometrical calculations rather than HPLOTing.

You should note that the compiled object code can be run at an address other than the normal $801 and if problems are found with lack of memory the program can be compiled to disc and then run in memory without the compiler being present. A Menu program is given to illustrate how to set up STARTUP discs.

Minimum fuss

How then, do the Micol and Beagle Bros compilers compare? First, if you want to compile Applesoft programs with the minimum of fuss and gain the greatest speedup then there is no question that the Beagle Bros is by far the better compiler.

Second, if you are developing a program and wish to debug it in the compiled form then again the Beagle Bros' compiler is the better buy. It is easy to switch between BASIC.SYSTEM and COMPILER.SYSTEM and indeed many operations can be carried out under COMPILER.SYSTEM so that there may well be no need to swap. Under the Micol.system there is a constant need to reboot the machine unless greater care is taken over the program itself and the way it finishes.

However, the Micol system does offer a more structured approach to programming and does have a decent (though limited) editor. For a student of programming it may well be a better system to learn on, and if all goes well it is easy to edit, compile, link and execute and to rerun the cycle. I do feel though, that the Micol system needs some work doing on it to make it more user friendly.

The two compilers cost about the same and so I'm sure that most people will opt for the Beagle Bros' compiler because of its greater affinity with Applesoft.

Product: Beagle Bros' Compiler, version 1.1
Price: £80.50
Manufacturer: Beagle Bros Micro Software, 3990 Old Town Avenue, San Diego, California 92110
Supplier: Any dealer or MGA, 140 High Street, Tenterden, Kent TN30 6HT.
Tel: 05806 4278.
Requirements: Apple II series with Prodos utilities

□

COMPUTER SUPPLIES
NOBODY DOES IT BETTER

PAPER

		PER BOX	1 BOX	5 PLUS
11x9.5				
11x9.5 60 GSM PLN/MUS		2000	£11.90	£ 9.83
60 GSM MICRO P		2000	£12.40	£10.66
70 GSM PLN/MUS		2000		
70 GSM MICRO P		2000	£13.90	£11.92
7PT NCR		1000	19.53	15.93
11x14.5				
60 GSM PLN/MUS		2000	£17.00	£12.65
70 GSM PLN/MUS		1750	£17.40	£12.74
TRUE A4				
90 GSM		1500	£17.90	£16.09
70 GSM		2000	£19.50	£14.40

CONTINUOUS LETTERHEADS FROM £110.20 FOR 2000

LABELS

	IMPERIAL	METRIC	500	1000	5000
1/15 VERTICAL SPACING					
2 WIDE	3 1/2x1 7/16	89x36	£2.20	£4.10	£17.00
	4x1 7/16	102x36	£2.30	£4.40	£18.50
	5x1 7/16	127x36	£2.70	£5.40	£20.30
3 WIDE	3 1/2x1 7/16	89x36	£2.20	£4.10	£17.00
1/4 VERTICAL SPACING					
1 WIDE	3 1/2x1 15/16	89x24	£2.10	£4.20	£16.00
	3 1/2x1 7/16	89x36	£2.20	£4.10	£17.00
	4x1 7/16	102x36	£2.30	£4.40	£18.50
2 WIDE	3 1/2X 15/16	89X24	£1.50	£3.00	£11.50
	4X1 7/16	102X36	£3.10	£5.50	£17.50
3 WIDE	2 3/4X1 7/16	70X36	£2.20	£4.10	£15.00
	3 1/2X1 15/16	89X49	£3.90	£5.50	£22.00

OVER PRINTING OF LABELS ALSO AVAILABLE

PARROT DISCS 5 1/4

	SS/DD	DS/DD	DS/QD	DS/HD
10 PER PACK*	£12.40	£15.20	£19.50	£25.50
50 PER PACK*	£45.00	£49.90	£67.50	£95.00
* FREE PLASTIC DISK BOX				
COPY HOLDERS A4				£19.50
BINDERS				£2.60

MORE QUANTITY MORE DISCOUNT
ALL PRICES INCL DELIVERY ENGLAND AND WALES *PLEASE ADD VAT*
RING FOR FULL PRICE LIST AND SAMPLES
****TRY US FOR SIZE****

VISA

PHONE CLP on 0258 89 400
BOX 18, BLANDFORD, DORSET, DT11 7YE

Gloucester House



SONY® - the one and only!

The makers of the Macintosh disk drives only recommend one brand of disks. . . their own!

Single Sided (boxes of 10) - £13.00
Double Sided (boxes of 10) - £17.50
Single Sided Bulk (boxes of 50) - £60.00
Double Sided Bulk (boxes of 50) - £75.00

Peak Systems™

Hard Disks & Tape Drives

20Mb - £650 30Mb - £795
50Mb - £1295 80Mb - £1595
160Mb - £2295
20Mb Tape - £650 60Mb Tape - £850

SCSI kit for Mac 512(E) when ordered with a Peak drive - £99

30 Day Money Back Guarantee
(Prices do not include VAT or Carriage)

Gloucester House
Malmesbury, Wilts. SN16 0AA
Tel: (0666) 824665

Access VISA

A Database Publication

AppleUser

Vol. 7 No. 8 August 1987 £1.50

$ 5.20

Apple in control at the National Museum of Photography

Infocom's Dave Lebling reveals all

The dos and don'ts of page design

Modifying the Mac's control panel

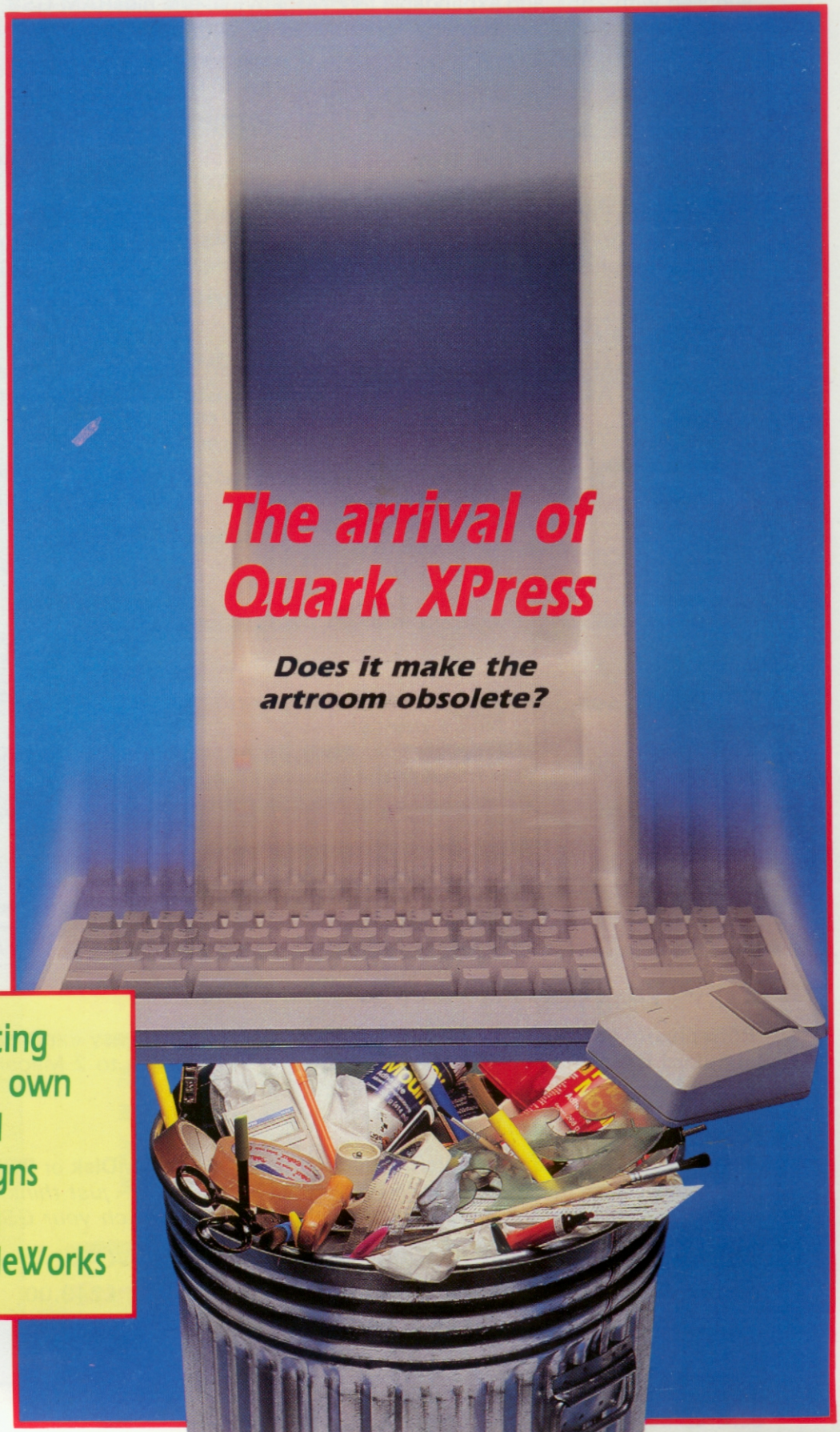
Shareware: To pay or not to pay?

Voice controlled environments

REVIEWS

- Guide
- Visualiser
- GraphicWriter
- Music Studio

+ all the latest games for the Apple II and Mac



The arrival of Quark XPress

Does it make the artroom obsolete?



Printing your own label designs from AppleWorks

The Apple™ Collection







Apple are pleased to announce the launch of The Apple Collection. An exclusive range of top quality items designed and produced with Apple enthusiasts in mind.

Each item carries the Apple name, and is designed and produced to the highest standards, to complement your lifestyle.

The Apple Collection is available exclusively through Authorised Apple dealers, so for full details of the Collection, and how you can order your items, contact your nearest Apple dealer now.

Take your Pick from The Apple™ Collection

Apple and Apple logo are trademarks of Apple Computer Inc. ©1987 Apple Computer U.K. Ltd.



Interview at the end of the universe

Mike Gerrard meets Infocom's Dave Lebling

WHEN the 1986 awards were handed out by the Software Publisher's Association in America, the software industry's main trade association there, the name of Infocom was prominently featured.

Silver Certificates were awarded to its recent adventures, Wishbringer and Leather Goddesses of Phobos, for selling more than 50,000 copies, a Gold Certificate went to an earlier game, Suspended, for passing the 100,000 mark.

And there were Platinum Certificates (for over 250,000 sales each) for Infocom's two most famous titles, Zork and Hitchhiker's Guide to the Galaxy.

Sales of Zork have obviously come on a little from when it was originally released, as I discovered when I spoke to the game's co-author, Dave Lebling, making his first visit to England.

Early days

"Zork did start slowly", he told me. "We were originally distributed by Visicorp, which is the company that also distributed VisiCalc, the first spreadsheet program, and they sort of had the feeling I think that, well, this is a very nice game but games were not very exciting at the time, but we've got this spreadsheet which is really exciting.

"So it started off with pretty much what games sold then in the United States when they were introduced, which was about ten or twelve thousand copies. That was pretty much what they expected, and they weren't terribly interested in pushing it harder.

"So we got the distribution rights back from them and started distributing it ourselves. We repackaged it and it was very successful, and because it was our own product we were very motivated to make it a success and it began to pick up from that time".

As well as helping to write Zork, Dave Lebling was one of the men behind the setting up of Infocom in the late 1970s.

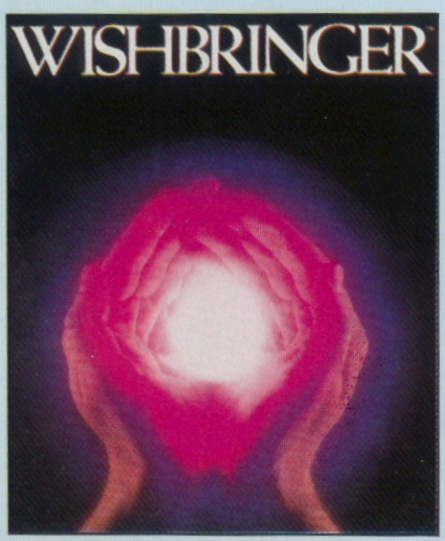
'The Dynamic Modelling Group was really where we all started from, which was a research group at MIT (Massachusetts Institute of Technology) and we did many different things. We did electronic mail and database systems and all kinds of very serious funded research-type stuff. But we also spent a lot of time fooling around in our spare time, hacking.

"At the time we were on a computer network, ARPAnet, that was run for research sites that got money from the Department of Defence in the United States and one of the things that this network is used for is sending interesting software around from place to place.

"One such piece was this game called Adventure or Colossal Cave Adventure, and everyone just went totally berserk over it.

"The excitement was astonishing because nothing like it had ever been seen before, and all work ceased throughout almost the entire country at these research sites.

"It was almost like an infection. One site would get it and all work there would cease for a couple of weeks and then it would spread to sites nearby...you would look at the computers, because these were all time-sharing machines, and there would be 12 people logged in but they were all playing Adventure".



This original game was written by two programmers called Crowther and Woods, and because it was public domain software it has since appeared in various versions, notably in the UK by Level 9/Rainbird as the first part of the Jewels of Darkness trilogy for the Apple II and Macintosh. Adventure was inspired by Dungeons and Dragons, as was Dave Lebling himself.

Magic and mystery

"I used to play D&D and I liked the idea of being able to play it on a computer. I've always been a science fiction and fantasy fan and that was a way of indulging that interest, so the combination of D&D, fantasy, computers, was so seductive that it was impossible that I wasn't going to end up playing it".

The game and the idea of computerised adventures attracted several other people at MIT who set about trying to write their own game. This dealt with magic and mystery in the great underground empire of Zork.

Dave Lebling was principally involved in the creation of a parser that would extend the simple verb-noun format of adventure to read and understand quite complex inputs from players.

Zork was hacked into ARPAnet, and when the group of people from MIT decided they wanted to form a software company it was to be their first release.

Says Dave: "We wanted to have a software company, and we weren't quite sure of what it would do, but we thought Zork was a good thing to start with because we had seen Scott Adams' adventures, which were the first ones to be seen on micros.

"We said they were all very nice but we could do much better and it was just a question of how much of our mainframe adventure game we could fit on a micro. We found the answer was about one-third, so we did that and then the next third and the next, making three games out of it".

Zork proved to be the making of

Infocom, and although the company's published a couple of other products – Cornerstone, which was a relational database, and Fooblitzky, a graphic strategy game – it is the text adventure game they are renowned for.

The latest release, Hollywood Hijinx, is the 23rd in a row. It comes, as do all the others now, with the familiar detailed packaging that makes the opening of the box containing an Infocom game such a treat.

Hollywood Hijinx is written by Dave "Hollywood" Anderson, who started with Infocom as an adventure tester, a route taken by several people now writing adventures for the company.

"Four of our writers are former testers", Dave Lebling explains, "such as Steve Meretzky, who wrote Hitchhiker's with Douglas Adams, then Jeff O'Neill who did Ballyhoo, Dave Anderson, and a new writer named Amy Briggs.

"What often happens is that people come into our testing department and they start hinting that they have a good idea for a game, and that's how they turn into writers. The way we typically write games is to write a short scenario of three or four pages of 'This is what it's going to be about' and circulate it to other authors to see what they think, almost like a job application, and that's what Hollywood did – his nickname really is Hollywood, by the way.

"We get together at least once a week, all the writers, and discuss what's going on. That's another incentive for a tester to become a writer, because testers are barred from our lunches! Every so often someone will say 'Don't tell me any of the details of any of the puzzles,' and you even get people saying, 'I'm going to get up and leave now, I don't want to hear it.' That's so you get the pleasure of playing the game for yourself when it's finished.

"With Hijinx I knew in slightly more detail what was happening because Hollywood, being a new writer, was asking a lot of questions about how to implement particular things, how to make an elevator work, or how to program the Atomic Chihuahua. As a result we knew far more details of that game than we would of a Steve Meretzky game, for example.



Putting it together

"All our authors do both the programming and the creation of scenarios, the writing of the adventures, but it works out pretty well because the level of programming ability that it takes is not all that high.

"We use a very high-level language and you can learn the rudiments in a few hours. From then on it's just a question of when you get in a sticky spot you come to someone else, like myself or Steve Meretzky, and say 'Well, I've got this rope...how do I do a rope? It can be in two rooms at once if you tie it to something and take the end with you, and can you tie things up with it and drag them around with you?'

"Then we'll stop and think and say, 'You don't want to have a rope in your game,' and that makes it much easier for the new writers, you see.

"My new game has a chain in it, and it's even worse than a rope in almost every respect you can imagine and it's caused me no end of horror...the number of bugs that have come in on this chain alone would stack from here to there and back again".

What next?

Having enjoyed Dave's previous games, which as well as Zork were Starcross, Suspect, Enchanter and Spellbreaker, I ask him what his new one will be about.

"I'm afraid we have this stock response to questions about our new products, which is that it's not our policy to talk about them until about six weeks before they're released...but I can tell you a bit about it.

"It's got some very bizarre stuff in it, and it's in a new genre. It's not a Tolkein-style fantasy and it's not science fiction and it's not a mystery and it's not a comedy".

I thank Dave for this detailed information, and ask about the fact that Infocom no longer seems to categorise its games or rate them as to how difficult they are meant to be.

"No, we no longer do that as it seemed to be becoming a little meaningless. Like the new game, Bureaucracy. What is Bureaucracy? It's got some science fiction elements and some fantasy elements but it's mostly just bizarre, so we'd have had to create a special category to put it in".

"It's the third that we've done on our fairly new 256k system, which will only run on the larger and newer machines.

"The story is set off by your ill-fated decision to move to accept a wonderful new job that involves having to accept a free trip to Paris. So you send a change of address form to your bank, which promptly does what banks always do with that sort of thing, which is to throw it away.

"As a result your entire life begins to collapse into a shambles of total uselessness. You basically have to acquire the means to extricate yourself from this situation of having no money, of having your mail going to the wrong address, having your credit cards cancelled, your computer not working, all the kinds of terrific things that can happen.

Wandering the halls

"One of the people who tested it – fortunately in the minority – didn't like it very much because he said 'I have enough of this happening at work. I don't want to go home and have it happen too'

With Hitchhiker's such a success, and Bureaucracy set to follow it, I wondered if there would be any more Infocom/Douglas Adams' collaborations.

"Well, I'm afraid it's not company policy etc etc...but the obvious next thing to do would be The Restaurant at the End of the Universe, and there's always the possibility that that will happen".

On leaving I ask Dave, just for the record, what his job title is at Infocom.

"It's officially written in my job description that I wander the halls, clutching a cup of coffee . . . and that's about the size of it!" □

Words and pictures

Max Parrott reviews a package which promises the best of both worlds

THE advent of the IIgs has spawned a new range of software for the Apple II series of computers although, inevitably, much of it is only for the IIgs itself. The new software is very definitely in the WIMPS and WYSIWYG camp and the lessons learnt from the Macintosh approach to life, generally appear to have been handed down from the old to the new.

Word processing programs are very current among the new software and they have always been to the fore on the Apple. I have no idea how many have been pushed on to the market, but only a few have succeeded.

The most recent, successful word processor is Multiscribe *(Apple User*, February and May 1987) and the IIgs version of this is very much what you would expect given the IIe/c version and the extra facilities of the IIgs.

GraphicWriter (here reviewed as version 1.1) is in the Multiscribe mould, with pull-down menus, windows, and icons but has the extra facility of graphics. Text and graphics may be imported into the word processing document or created from within GraphicWriter and, as long as an ImageWriter II is used, up to 48 colours can be printed on the page.

A program with GraphicWriter's capabilities sounds good enough to make anyone's mouth water. So I sat down to learn how to use it and on the basis of half an hour's work (it really is that easy to use) I can say that this is definitely the word processor to buy – but not in this version. Wait until version 2 or 3 is available. On second thoughts, wait until version 3 or 4.

Problems with the program fall into two areas:

First, the program is easy to use, but it is rather slow at times and several features which I expect in a word processor are not available.

Second, and fatally as far as I am concerned, the printing is not always correctly carried out.

Interestingly, the manual has two update slips. The first points out a few changes between version 1.0 – for which the manual was written – and version 1.1, which is currently in use.

This is the 9 point which is the smallest size.
This is the 12 point
This is the 18 point
This is the 24 point which is the biggest size.

You cannot apparently change size in the line without moving it to accomodate the largest size in it.

Helvetica	Bookman	*Script*
9 point	**9 point**	***9 point***
12 point	12 point	*12 point*
18 point	18 point	***18 point***
24 point	24 point	*24 point*

Figure I: The fonts and sizes available: Note the poor tabbing.

The second slip says "Due to the delay of printing software being developed by Apple Computers ... we at DataPak were forced to write our own print routines. When Apple Computer releases their printing software, we will incorporate them into Graphicwriter. Because of this delay, some of the print features are not currently active. We will provide a free upgrade to owners of Graphicwriter version 1.1."

The printing features which are offered are the Imagewriter, as a black only or as a colour printer, the LaserWriter, and a daisywheel printer. The Laserprinter is the option not currently active.

The daisywheel can only handle normal printing (no graphics) so that effectively, the only printer supported is the Imagewriter (Imagewriter II only, if you want colour).

With the Imagewriter there are three main modes of printing. Draft uses the standard font and treats the Imagewriter as a normal, text-only printer. The intermediate or standard mode prints a page in about one-and-half minutes, giving a printout which is rather pale but a good representation of what was on the screen, both text and graphics.

Better to wait

The last mode – high resolution – takes about six minutes to print a black only page (longer with colour as well) but gives a startlingly good output (see Figure I).

It is, however, marred by two things. The program has trouble calculating where to print, and when several spaces or tabs occur together in a line it can get the end of the page wrong, usually printing two or more lines more than required.

Curiously enough, the standard print mode does not make these mistakes – compare Figures II and III. That is why I say wait for version 2 or 3, when a new set of printing routines should cure these problems.

The reason why I say perhaps it would be even better to wait for version 3 or 4 is that the word processor lacks some important facilities, ones which I think are necessary in a modern program.

For example, it lacks the ability to use superscripts and subscripts. There are no find or find and replace commands, and very few tab positions. There are just two tabs, plus one decimal tab and a left and a right margin and a paragraph indent tab. And keyboard control of functions is limited to say the least.

On top of this I would like the program to be quicker when reformatting text, and

I'd like to be able to position text to pixel or near pixel accuracy in the drawing modes.

Before describing all the good things about the program – and there are many – I must mention one more nasty.

The program comes on a protected, 3.5in disc and you are expected to pay another $15 and fill out the registration card to get just one backup copy directly from the manufacturers. Quite who handles the postage costs, especially from abroad, is not mentioned.

Easy to launch

Now I don't know how long 3.5in discs last, but there is no way I would trust my weekly output of words and pictures to just one working copy. And in my experience the most widely bought programs are those which are not copy protected – just look at WordStar, AppleWriter, AppleWorks and Multiscribe in the field of word processing alone.

The program runs under Prodos 16 and is launched from the Apple Launcher v1.1. This may not be familiar to UK IIgs users who were given MouseDesk v2 in place of the launcher, but it is easy to use and "intuitively" simple. The slim manual with GraphicWriter explains its use.

The disc also contains a program to install GraphicWriter on to a hard disc, and another to remove files from disc.

Once the program is run, the screen displays the main writing area, a ruler, and vertical and horizontal scroll bars. There is a drawing aids palette at the bottom of the screen and a Menu bar at the top with the Apple symbol, File, Edit, Font, Style, Format, Page, Display, Regions and Goodies as the options.

The mouse will pull down each menu in turn as long as the button is depressed, and will move from menu to menu if moved sideways. Moving vertically highlights an option if available, and releasing the button will select it.

In other words the mouse and pull-down menus are fully implemented, as on the Mac. Unlike most Mac programs, however, very few options are available via option or control keys and this I consider to be a fundamental mistake.

I like using the mouse because it sometimes frees the mind from thinking, but I also like using the keyboard if that is where my fingers are at the time.

There are three fonts: Helvetica, Bookman and Script, each available in four sizes: 9, 12, 18 and 24 point. Figure I shows these printed at the highest resolution (note that GraphicWriter got the tabbing wrong – it was correct on screen).

Mixed styles

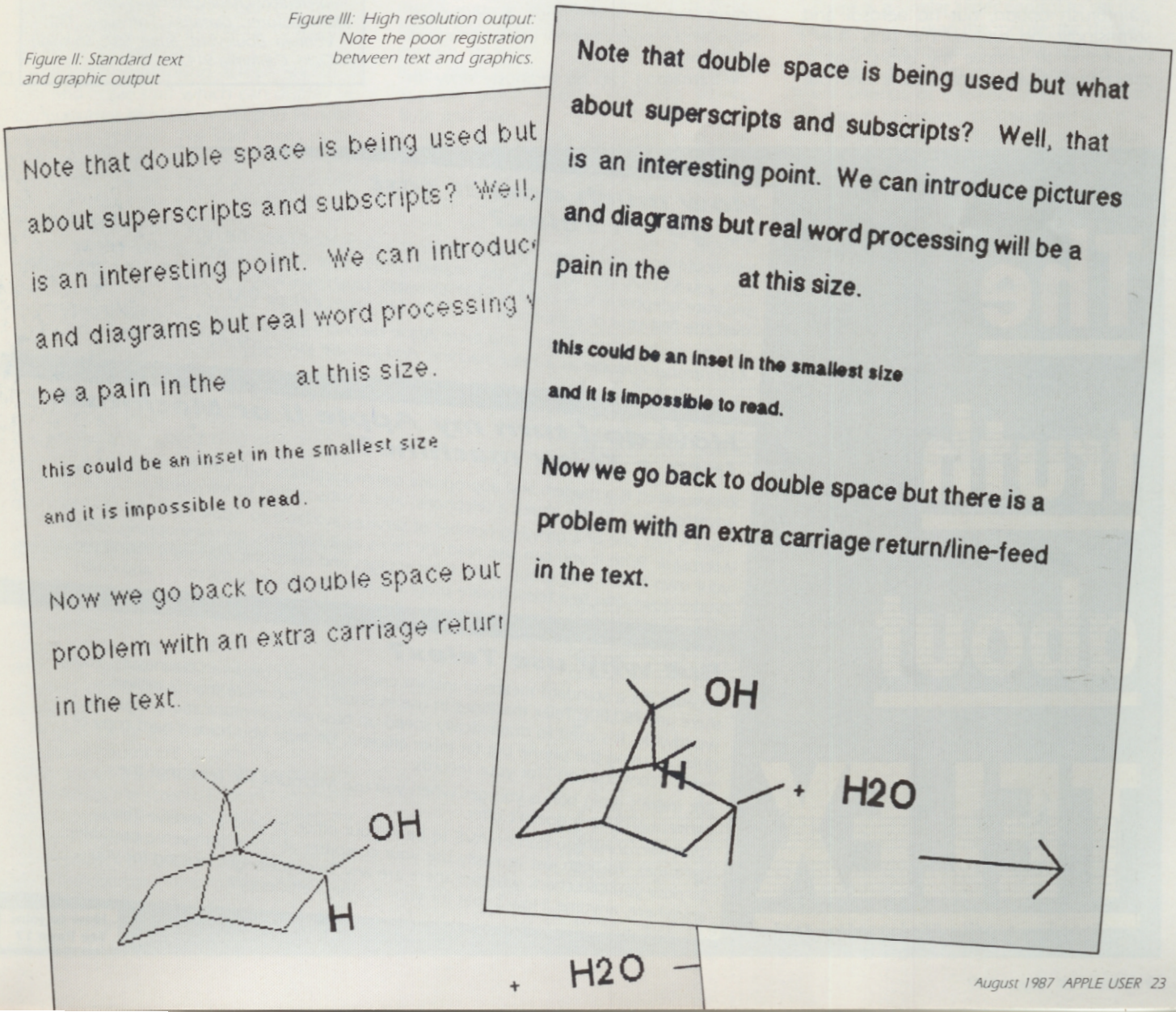
Each font, at each size, can be used in plain or italic text, emboldened and/or underlined. The text may be left, right fully, or centre justified in single or double line spacing.

Text styles and sizes may be mixed on one line which will move vertically to accommodate the largest size. Page breaks are shown as a red line and may be forced if required. A header and a footer may exist if wanted.

The smaller sizes do not show up well▷

Figure II: Standard text and graphic output

Figure III: High resolution output: Note the poor registration between text and graphics.



◁ on the IIgs screen, so this may be shown "vertically stretched", in which case they are pleasantly legible. An option may be selected to show the page on the screen in full.

This is not always faithful to the selected margins and paragraph indents but is nevertheless extremely useful because sections of text and graphics may be dragged around the full page and repositioned giving a PageMaker like feel.

Some of the program's power comes from setting regions (which could be columns on the page) and selecting objects which can be grouped and then moved together. Objects may be rotated in 90 degree steps, but grouped objects do not rotate together – each moves around its own origin. Regions may be fixed in size and framed or left open ended.

A region can contain text and graphics objects, or may be designated as canvas in which case freehand (mousehand?) drawing is allowed in the area. To help, you can select ellipses, triangles, rectangles and curved corner rectangles which may be positioned and sized with the mouse.

They can be drawn in different colours and thicknesses and can be filled. There is a paintbrush option, but no aerosol and, surprisingly, no rubber. The only way I could find to remove my errors was to select white as a colour and paint them out.

Paint can be defined as heavy (cover everything), watercolour (let that underneath show through), and dye (changes anything black to the selected colour). Colour may also be solid or dithered. The screen may be shown in "living colour" or as "black & white" which uses just that plus shades of grey.

Leisurely reformatting

A canvas region can be filled with a picture generated from outside GraphicWorks and there is a scrapbook in which pictures may be saved. Artwork from the scrapbook can be copied into the more usual Clipboard and then into the document. Rudimentary colour editing can be done by removing the IIgs primary colours from the screen.

Editing involves cutting, copying and pasting via the Clipboard though it cannot be saved. There is an undo facility but it is not always available.

Reformatting, deletion and other changes are carried out by highlighting a block (using the mouse to sweep over it or by double clicking on a word) and then selecting the required option from a pull-down menu. Sometimes a keyboard equivalent is given, but not often enough in my opinion.

Reformatting can be tediously slow. In fact, even highlighting a block which stretched over 12 pages took 40 seconds. Importing this text (created as a disc text file from Appleworks) took so long that I gave up timing, but at least it did it.

The idea of a word processor with inbuilt graphics abilities is so good and so convenient for a wide variety of purposes that it is obvious that only lack of technology has held back development. Macintosh word processors are beginning to approach that ideal and clearly the IIgs is not far behind.

In this program, however, the power expected of a modern word processor has been sacrificed to get in the graphics. I think that a buyer should realistically expect search and replace, super and subscripting, half-line spacing, multiple line spacing, fast formatting and many tabs. A dictionary and a thesaurus should also be in a modern package and all of these are missing from GraphicWriter.

A shame, but hopefully the next version...

Product: GraphicWriter version 1.1.
Price: £109.95 or bundled with Notes'n'Files £189.
Requirements: IIgs with at least one 3.5in drive and 512k of memory, ImageWriter (preferably ImageWriter II) printer.
Manufacturer: DataPak Software, 14011 Ventura Boulevard, Suite 507, Sherman Oaks, California 91423.

□

The truth about TELEX

How much does it cost to go on Telex?

You could go the conventional way and buy a dedicated Telex machine. The cheapest will cost you £1,604 (the Whisper), the dearest £2,892 (the Cheetah). You will also need a separate telephone line, costing £101 to install, plus £404 a year rental. That's a total outlay over the first year of a minimum of £2,109. (All prices include VAT.)

Or you could do what more and more Apple users are doing – use your Apple II or Macintosh to double as a Telex machine. And just use your ordinary telephone!

How do I turn my Apple II or Macintosh into a Telex machine?

All you need is a modem and appropriate communications software (see the advertisements in this issue), a telephone, and a subscription to *MicroLink*.

Telex is just one of a growing number of services available to Apple users on *MicroLink*. With it you can also read the news as it happens, go teleshopping, create your own closed user group, send telemessages and electronic mail right round the world, download free telesoftware programs directly into your micro . . . and much

But why use Telex?

Because it's a standard means of instant communication between businesses. Today there are 150,000 Telex machines in use in Britain – and more than 2 million worldwide. It's used to dramatically speed up business communications – just as quick as using the phone but far more efficient, because you have a hard copy of every "conversation" for your records.

But there's a big bonus you get when you use *MicroLink* for Telex that the conventional way doesn't offer.

With *MicroLink* you don't HAVE to be in your office to send or receive Telex messages. You can just as easily use your computer at home (or even a portable). So now you can check whether there are any Telex messages waiting for you – anywhere, anytime. How's that for your business efficiency?

How to join: See Page 17

Conducting from the keyboard

Geoff Wood reviews a versatile Apple IIgs package aimed at the amateur musician

A MAIN advantage of the Apple IIgs over the Apple IIe is its sound, and one program that utilises this special feature is The Music Studio, designed and developed by Audio Light.

It enables you to write music on the screen and to play it back through the micro, or through any Midi compatible musical instrument or synthesiser. The manual of 120 small pages is easy to understand. There is no index, but the table of contents is adequate enough.

The disc is copy protected, and the manual warns you not to try to save files to it – in any case, it has only two free blocks. The program takes almost two minutes to start up. Thereafter, it does not refer to the disc unless you wish to change to a different set of instruments.

The main composing screen shows a bass and treble staff which can display up to 24 columns of notes, with up to 15 notes in any one column. The staff scrolls to the right, or to the left when you wish to add more notes. It really needs a colour screen because colour is used to distinguish the notes for different instruments.

A piece of music is said to be limited to 8,000 notes, but I managed to enter 2,000 columns with five notes in each. Playback time depends on the tempo, the size of notes and whether any passages are repeated. Without repeats, it could be from five minutes to over an hour.

Virtually all operations on Music Studio are controlled by the mouse. The only time you need the keyboard is to add lyrics to the music or to respond "Y" to a few prompts where a hasty click on the mouse might lead to disaster.

Colour coded

The first step is to select one of the 15 instruments, by pointing to the instrument palette symbol above the staff. When you press the mouse button, a menu of 15 numbers drops down, each in a different colour.

As you drag the mouse to highlight successive numbers down the list, the name of each instrument is displayed in the top centre of the screen. To select an instrument, release the mouse button while the appropriate number is highlighted.

Thereafter, all notes written on the staff are in the corresponding colour. When you play the music back, the colour of each note determines the instrument on which the note is played.

There are four ranges of instruments, held as files on the disc. The default range is called Jazz and consists of piano, short piano, sustained piano, string bass, short bass, pluck bass, mute bass, tenor sax, alto sax, two drum kits, vibes, and three guitars.

If you want a different selection of instruments, you can load one of the other three files in from disc. One is called Classical and consists of violin, viola, cello, string bass, flute, oboe, clarinet, bassoon, harp, piano, acoustic guitar, celeste, pizzicato, vibrato flute and horn.

Rock consists of phaser, electric bass, slap bass, guitar, guitar aw and wa, two electric pianos, hi-hat, open and closed, simmons, tom tom, kick, clavinet and echo.

The last range is Voices: The "instruments" here make sounds like a backing group. You can also design your own instruments or modify existing ones.

Before entering the notes, you may wish to set the key, time, tempo and volume. Along the bottom of the screen are symbols to set these features, and when you click on the key box, a menu springs up offering a choice of the 15 keys – just drag the mouse to select a key.

Similarly, when you click the time signature box, a menu springs up offering a choice of seven times.

To set the tempo, there is a slider control offering a range from 56 to 200 crotchets per minute. As you drag the mouse to move the slider, the chosen number is displayed alongside a corresponding musical term ranging from grave to prestissimo.

There is a similar slider control to set the volume: As you drag the mouse, the display shows the abbreviation for the setting.

Unfortunately, you cannot have two different settings of the key, time, tempo or volume in one piece of music, which is a serious shortcoming. You can change the settings, but any changes affect the whole piece.

To put notes on the staff, you first select the duration of the note by pointing to a crotchet permanently displayed above the staff.

Pressing the mouse button drops down a ▷

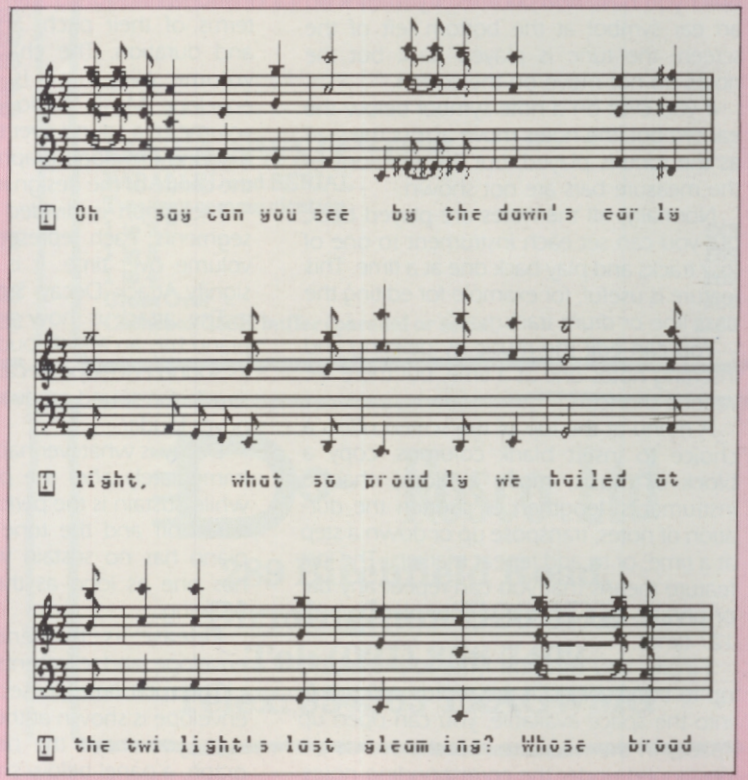


Figure 1: The Star Spangled Banner – sample output from Music Studio

◁ menu displaying six notes of different duration ranging, from a breve to a demisemiquaver. You drag the mouse to select the note you want, then position the selected note on the staff.

As you move the note through the staff, you have the option to hear the notes being played, which helps you to position the note by ear as well as by sight.

When the note is in the correct position, click on the mouse to display it permanently. To delete a note, position the pointer over it and click once.

You can position as many notes of the chosen duration as you wish, then change to one of a different duration with the note menu. Unlike many Macintosh programs, Music Studio offers no keyboard shortcuts. It would have been easier if, say, the up and down arrow keys had allowed you to change note duration.

Before selecting a note duration, you can use another menu to add a dot to the note to increase its duration by half. From the same menu you can also add an accent (to play at maximum volume) or a triplet symbol.

Moving notes

Another menu allows you to add a sharp, flat or natural to a note. You can also add ties to play two or more consecutive notes as one.

There is also a menu of six rests corresponding in duration to the six notes. Again, these can be enhanced with dots to increase their duration by half.

Having entered some notes, you can insert vertical measure bars. However, the program does not calculate the duration of a bar and insert the measure bar for you, so it is possible to put them in the wrong place.

To play the music back through the computer you have two choices. If you click on an ear symbol at the bottom left of the screen, the tune is played back but the notes do not move on the screen.

If you click on a note symbol below the ear symbol, the notes move across the staff as the tune is played, but the positions of the measure bars are not shown.

Normally, all the notes are played back, but you can set each instrument to one of four tracks and play back one at a time. This feature is useful, for example for editing the bass line or drum track.

You can edit the music by deleting and inserting notes one at a time, but there are various shortcuts.

A menu at the top of the screen offers a choice to insert blank columns, copy a block of music, move a block, change instruments, lengthen or shorten the duration of notes, transpose up or down a step at a time, or to add repeat markers. The last feature means that you can repeat any bar or phrase, or even the whole piece, up to 127 times.

Finally, you can add lyrics to the music, up to three verses. If the words will not fit into the space available, you can open up spaces in the music so that the words are positioned under the corresponding notes. When you add lyrics, the maximum number of notes in a piece of music is reduced.

Music Studio calls each piece of music a song, regardless of whether it has lyrics. You can save each song as a binary file on a disc, giving it a suitable name with the suffix .sng.

When you use the file menu to load in a song, it lists only those files with this suffix. Files that contain the ranges of instruments are known as sound files and bear the suffix .snd.

The disc comes with 20 songs which you can load and play. They range in duration from one to four minutes, and in style from a Mozart requiem to original compositions in jazz and rock.

Music Studio also features what it calls the Music Paintbox, an alternative to the main composing screen. Instead of using standard musical notation, you paint notes on to the staff as coloured rectangles. The size of the rectangle determines the duration of the note.

When you switch from the main composing screen to the Music Paintbox screen and vice verse, any music is translated from one notation the the other.

I could see no advantage in the Paintbox, except that it is easier to switch instruments because the palette of 15 colours is permanently displayed at the foot of the screen. On the other hand, it takes longer to erase a note because you have to click on a note eraser symbol first.

If you want to design your own instruments, Music Studio offers powerful facilities, even while you have a piece of music in memory. Here the main composing screen is replaced by the design instruments screen.

Sound envelopes

Instrument sounds can be described in terms of their pitch, amplitude (volume) and duration. The change in a sound's volume over time is called a sound envelope. Music Studio lets you specify the volume of a sound over time in the form of a sound envelope graph, displayed across the centre of the design instruments screen.

The graph is divided into up to seven segments, each representing a change of volume over time. It is labelled ASDR to signify Attack, Decay, Sustain and Release.

The attack is how a sound begins: A piano has an attack louder than the rest of its sound envelope because, after the key is struck, the sound gradually becomes softer, never louder.

Decay is whatever happens to the sound immediately after the peak of the attack, while Sustain is the period when the decay levels off and the tone is held evenly. A piano has no sustain whereas a trumpet has one as long as the player keeps on blowing.

Release is the end of the sound envelope, and represents how a tone stops.

The total time (in seconds) for a sound envelope is shown at the right of the graph – as you move the pointer through the graph, a panel below shows the time at its position. At the left of the graph, a panel displays a three digit number representing the volume of the segment.

Designing new instruments really means modifying existing ones. First you select an instrument from the current range, then modify the duration and volume of each segment of the sound envelope. At any stage, you can click on the word "Test" to hear the sound played up and down a scale.

You can add regular pitch variations to a sound to create a vibrato effect. The depth and rate of the variations can be set to give different sounds.

Midi parameters

If you have a stereo card for your micro, you can assign an instrument to either the left or right channel. You cannot assign an instrument to both, and the default is the right channel.

You can also set the octave range of an instrument. All instruments have a range of five octaves which can be adjusted within an eight octave range.

However, the staff can only display notes over five octaves, so when you set an instrument to play above or below this, the notes are transposed up or down depending on the setting of the octave range.

When you are satisfied with the new sound, you can rename the instrument to distinguish it from the previous one and save the current range under an appropriate name. You can also copy instruments from one range to another.

One of the options of The Music Studio is to set the Midi parameters. These include assigning instruments to the Midi channels, setting the octave range and selecting presets.

The Midi parameters are saved with the song in which you use them. The manual gives instrucions for setting up a Casio CZ-101, but it should not be difficult to adapt them for other equipment.

However, Music Studio does not record back when you play your Midi linked keyboard. Thus it cannot be used to compose at the keyboard and then print out your composition: It can only be used to play back pieces you have composed on-screen.

The Music Studio is not really suitable for professional musicians. It has limitations, such as the length of a piece of music.

And, more important, you cannot change key, time, tempo or volume within a piece. There is no way of setting it to play several pieces in succession, and you can append one song to another only up to the limit of 8,000 notes.

Nevertheless, Music Studio is versatile, easy to learn and use, and reasonably priced. It could give many hours of pleasure to amateur musicians, especially those interested in composing or in creating new instruments.

Product: Music Studio
Price: £39.99
Supplier: MGA Microsystems, 140 High Street, Tenterden, Kent TN30 6HT.
Tel: 05806 4278

Point to point

Geoff Wood tries out a package that adds graphs to spreadsheets

APPLEWORKS is a popular program because it offers spreadsheet, database and word processing in one integrated program. But it doesn't offer graphics. However, if you want to draw graphs from data in your Appleworks spreadsheet files, you can now do so – with Visualiser.

I've previously (*Apple User*, June 1986) reviewed PB1 Software's GraphWorks for drawing graphs and charts from AppleWorks spreadsheet files. I found it had some limitations, especially in formatting the graphs.

Visualiser is from the same software house, but by different authors. It draws much better graphs – and overcomes the problems of GraphWorks.

Visualiser is designed for the Apple IIgs, but there is also a version for the Apple IIe and IIc. For the Apple IIgs the program is supplied on a 3.5in disc and is not copy protected. It comes with a 30 page manual that covers all the basics but is not fully comprehensive.

Visualiser needs at least 512k of ram, so you must have a memory expansion card with at least 256k installed. Ideally, you should also have a colour monitor and a colour ribbon for your ImageWriter II.

Whereas GraphWorks presents menus similar to AppleWorks, Visualiser presents screens like a Macintosh, with pull-down menus, dialog boxes and scroll bars, all operated by the mouse.

After booting up (which takes just under a minute) you see a pale blue screen with a menu bar above showing the words File, Edit, Graph, Axis, Options, Lines and Window.

The first step is to use the File menu to start a new file or to open a file already on disc. Choosing *New* opens a blank worksheet with 1000 rows and 127 columns. You can enter words or figures in the cells, but if you enter formulae they appear as labels. Any worksheet you create can be saved to disc, but only as DIF file which, of course, can be loaded into AppleWorks.

Choosing *Open* causes the program to access the disc and display a list of its files and folders. You can change to another disc drive if you wish, and open a file or a folder by clicking twice on its name.

Visualiser does not list AppleWorks word processor and database files, but it does list other Prodos files such as Apple Writer 2.0 or FlashCalc. In fact it will load in DIF files created by FlashCalc or other spreadsheet programs.

However, if you try to open a file that is not an AppleWorks spreadsheet file or a DIF file, an error message appears.

Unlike AppleWorks, Visualiser allows you to have only one file at a time in memory. With large files, it does not hold the whole file in ram but accesses the disc for the parts it requires.

Editing cells

The appearance of the worksheet is more akin to Macintosh than AppleWorks because it uses the graphics screen. You can use the scroll bars to move the matrix of cells up or down or sideways.

Alternatively, if you place the mouse arrow outside the matrix of cells and hold the button down, the matrix moves in the appropriate direction. Scrolling is rather slow compared to AppleWorks, especially for large files, but not unacceptably so.

You can edit the contents of any of the cells of a worksheet. However, if you change values in cells that affect formulae, the answers will not change – Visualiser loads AppleWorks files as though they are DIF files with labels and values but no formulae. You cannot change the column widths on a Visualiser worksheet, except via AppleWorks.

If your AppleWorks worksheet has cells that are formatted with integer or decimal places, the numbers will be displayed as formatted. However, if you save such a file as a DIF file and then load it back, the numbers will be displayed with as many significant figures as will fit in the column.

I tried this with some simple worksheets and had no problems, but some more complex worksheets were not saved properly and reloaded with zeros in some cells. In practice, this may not matter to most people.

To draw a graph, you select the cells whose values you wish to plot. Selection is made by clicking on the first cell then dragging the mouse until all the cells are highlighted.

You can also use shift click to select a block, as with Macintosh Multiplan or Excel. You can highlight a single row or column, or a complete block of cells. Visualiser can cope with up to 52 points and up to 24 ranges in a graph.

The next step is to use the Graph menu to select one of the eight types of graphs, namely, 3D Pie, Pie, Bar, Point/line, Area, High-Low, Scatter and Regression. In a few seconds, the graph is displayed in glorious colour.

Three dimensional pie charts take slightly longer to draw than flat ones, but they do look more impressive. Bar charts normally come up as flat columns, but you can select four alternative types from the Options menu – three dimensions with shadowing, three dimensional columns overlapping, standard format overlapping or stacked bars.

Point/line charts are normally displayed with the points for each value joined together by lines for each variable, though you can suppress the points or the lines. You can choose to have tick marks that cross the axes, inside or outside the axes, or no tick marks at all.

Initially, the graph may appear too small. But if you click almost anywhere on it, it is surrounded by a scale box with handles at the corners and in the middle of each side (like MacDraw) which you can drag to reposition and resize the graph.

Pie charts with a scale box also have handles on each pie so that you can drag one or more sections away from the centre. However, there is no quick way to draw an exploded pie with all the sections away from the centre. ▷

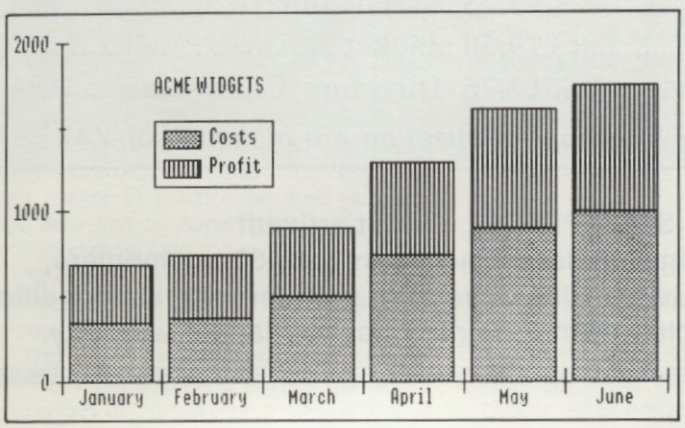


Figure 1: Shaded bar graphs can be presented in several formats

holdens
Computer Services

191 - 195 Marsh Lane, Preston, Lancs. PR1 8NL
Telephone (0772) 561321 and 52686

The Apple Specialists

WE NEED YOUR OLD APPLES!

Yes, we are experiencing an unprecedented demand for used Apple computers and peripherals, in particular the Apple IIe and IIc. This is undoubtedly the best time to obtain top allowances against that new Apple IIGS or Macintosh. Here are just one or two examples of what you can expect in part exchange.

Apple IIe	£200.00	Apple IIe *(Enhanced)*	£225.00
Apple IIc	250.00	Apple II Europlus	60.00
Apple Disk II	60.00	Apple Disk IIc	75.00
Apple Duodisk	200.00	Apple Imagewriter I	150.00
Apple Monitor II	50.00	Apple Monitor IIc	50.00

In addition to the above we also make generous allowances for various unwanted cards and software.

SYSTEMATICS

One of the industry standards when it comes to business software.
Full range to choose from, including Sales, Purchase and Nominal ledgers; Invoicing, Job costing, Stock control and Payroll.
Fully supported and available for Apple II range and Macintosh.
Originally selling for up to £450 -
but now available from Holdens at a realistic £89 per module.
Superbly documented - Fact sheets available

PERSONAL TRAINING SYSTEMS
These packages consist of an audio cassette and a 3.5" Disk, and offer an ideal way of either learning from scratch or improving your existing knowledge. Available for Excel, Word 3.0 and PageMaker 2.0

Excellerate
1A Fundamentals (First time user)
1B Fundamentals (Experienced user)
2 Creating Business Graphs
3 Adding Power to your Spreadsheet
4 Using the Database
5 Macros
6 Linking Spreadsheets
7 Advanced Spreadsheets
8 Advanced Macros
All £34.95 each

Word 3.0
1 Beginning Word 3.0
2 Intermediate Word 3.0
3 Advanced Word 3.0
All £44.95 each

PageMaker 2.0
1 Beginning PageMaker 2.0
2 Intermediate PageMaker 2.0
3 Tips and Techniques
All £44.95 each

We are delighted to be among the select number of Apple dealers who have been specially appointed to operate the **Apple Educational Scheme.** This means that we can offer advantageous prices to Bona Fide Educational establishments, including **Universities, Polytechnics, Colleges, Schools, Hospitals and Registered Charities.**
To qualify for the special prices we must have an official written order

For immediate
Part Exchange Quotations
ring
HOLDENS APPLEXCHANGE
0772 561321

Apple II GS

APPLE IIGS

Apple IIGS 256K	**£650.00**
Apple Drive 3.5	250.00
Apple Drive 5.25	175.00
Apple Hard Disk 20SC	895.00
Apple Hard Disk 40SC	1295.00
Apple Mono Monitor	90.00
Apple RGB Colour Monitor	375.00
Apple SCSI Interface Card	65.00
Apple SCSI Peripheral Cable	35.00
Apple Peripheral Adaptor Cable	20.00
Apple Exp Card 256K	95.00
Apple Extra memory per 256K	25.00
Apple Exp Card 1Megabyte	175.00
Apple Fan Kit	50.00
Apple Joystick	39.00
IIGS Monochrome System 256k	*895.00*
IIGS Monochrome System 1 Mb	*995.00*
IIGS Colour System 512k	*1195.00*
IIGS Hard Disk System 512K	*1895.00*
IIGS Hard Disk Colour System	*2150.00*

Crazy IIGS Software Prices
Paintworks Plus
and
The Music Studio
now only £39.00 each

With the exception of The Apple Collection, prices do not include VAT

..... The Apple Collection .....

The Apple Collection is a range of Apple branded products and as you'd expect from Apple every item in the range is of the highest quality

Executive Bag	£23.00	Enamel Badge	£1.50
Diskette Box (3.5)	£17.00	Microfile	£31.50
Mug	£3.75	Sweat Shirt	£16.00
Wall Clock	£19.50	Jacket	£26.00
Pen (Parker Roller Ball)	£2.75	Directors Chair	£34.00

All prices for The Apple Collection are inclusive of VAT

STOP PRESS - Just arrived!
Limited number of used Macintosh 512/400k computers, each with 400k external disk drive and all in immaculate condition.
£850.00 complete with 3 months parts & labour warranty.

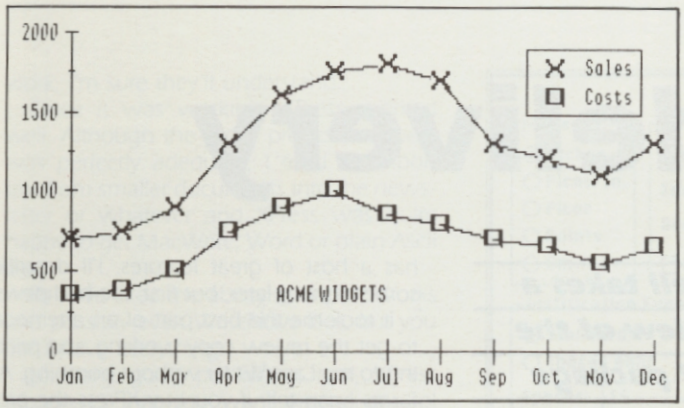


Figure II: Points and their connecting lines can be displayed or suppressed

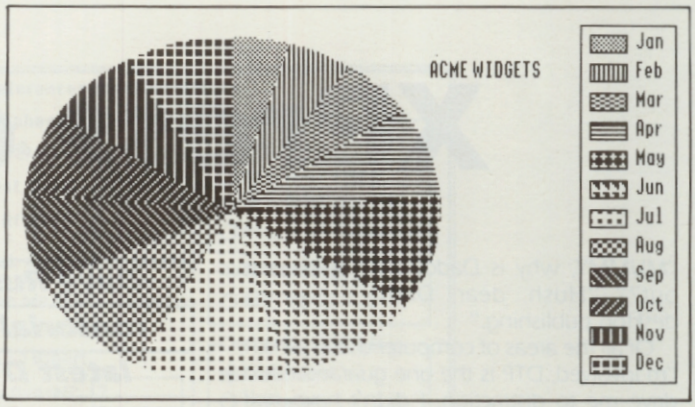


Figure III: Pie charts can be complete or exploded

◁ You can add text to a graph from the Options menu. This allows you to enter headings, sub headings or axis labels.

There seems to be no easy way to enter a vertical heading alongside the vertical axis, but it can be done by entering and positioning one character at a time. You can also add lines or arrows to a graph or chart to link, say, a point on the graph and a piece of text.

With any type of graph, you can add a legend to identify the lines, bars or portions of a pie. If there are no labels in the worksheet to identify the values you have plotted, the legend is just a set of coloured blocks which correspond to the colours in the graph or chart.

But if there are labels in the column to the left of the values you are plotting (or in the row above the values), they will appear in the legend. The legend block can be moved around the screen but it cannot be enlarged or reduced.

Labels for the legends must be in the row immediately above (or the column immediately to the left of) the values. Something not mentioned in the manual is that if your worksheet has a blank row between the row of labels and the first row of values, no labels will be included in the legend.

This problem can be overcome by using a command in the Edit menu to copy the range of labels into the blank row. The same applies if there is a blank column between the labels and the data.

If you want to plot two or more sets of values on the same graph, they must be in adjacent rows or columns. If you blank out the unwanted rows or columns, then select a block, these blanks will be plotted on the graph or chart. The answer is to use the range copy command from the Edit menu to bring the data together.

When I tried this, it worked most times, although sometimes it plotted the copied data as zeros. Again, this minor bug may not matter in practice because you can always revert to AppleWorks and amend the worksheet layout.

As with the legend labels, labels for the horizontal axis must be in an adjacent column or row.

This means that if you try to plot, say, just the values in column G of your worksheet, the values or labels in column F will appear along the bottom of the graph. To avoid this, you can blank out the values in column F and replace them with labels.

The Windows menu allows you to choose between looking at the worksheet or the graph. Alternatively, you can resize them to have both on the screen at the same time. If you then alter a value in the worksheet, the graph will change accordingly, but not until you click on the graph window.

Another option in the Windows menu allows you to fill the whole screen with the graph. This gives an idea of how it will look on paper.

On point/line graphs there is an option in the Graph menu to display the mean or standard deviation of the points. The mean is shown as a horizontal line across the graph at the average of all the points plotted.

Standard deviation is shown as a thick horizontal line at the average position and two thinner lines above and below the average at one standard deviation from the mean. This means that two thirds of all values are between these thinner lines.

The mean and standard deviation lines are normally drawn on top of existing lines but they can be drawn in the background. The mean and standard deviation options do not work if only a single row or column of values is plotted. There must be at least two rows or columns.

Best fit lines

With point/line graphs you can also display a regression line. This is the line of best fit (presumably calculated by the least squares method) through all the points plotted. Again there must be at least two rows or columns of values plotted.

From the Options menu you can amend the display of line/point and bar graphs in various ways. For example, you can change the colour and the background, lines and text.

Text is limited to a range of four colours (black, magenta, green and white) but if you opt to change the background or line colour, you are offered a palette of 136 different shades from which to choose.

Another option sets a grid on the graph. Normally, there is no grid but you can choose either horizontal lines, vertical lines, lines both ways or just points at what would be the intersection of the lines. The grid can be coloured in any of the colours on the palette.

A useful feature of Visualiser is the option to exchange the X and Y axes, which automatically changes the labels too, and the scales can be inverted so that the graph is drawn upside down and/or left to right.

You can also set the maximum and minimum values of both axes, the position at which the vertical axis cuts the horizontal, the main divisions (at which numbers are displayed on the scale) and also the minor ones, which display only tick marks.

For some people, the most useful feature of Visualiser will be its ability to display and print a background picture created by a program such as Mousepaint to your graph.

You can move the graph around on the background by using the grab handles on the scale box surrounding it. However, pictures must be binary files and limited to about 32k.

You can have two or more graphs on the same background picture. Create the first graph, load in the background, then choose the option *set background* from the File menu. You can then no longer move or resize the first graph, but any subsequent one will have the current image in the background.

You can also save the background with any graphs drawn on it. If you reload this picture, you cannot change the position or size of the graphs against the background, but you can draw more graphs if you wish.

Despite a few minor bugs, Visualiser is a good program for anyone who wants to draw graphs from AppleWorks spreadsheets or from DIF files created by similar programs. Undoubtedly it is more impressive in colour, but even in black and white it draws excellent graphs and charts.

If you want instant graphs from within your spreadsheet program you should choose either SuperCalc 3a or VIP Professional, but Visualiser does offer some useful features that the other packages do not.

Product: Visualiser
Price: £99 for IIgs, £89 for IIe or IIc.
Supplier: Bidmuthin Technologies, PO Box 264, Harrow, Middlesex, HA3 9AY
Tel 01-907 8516.

□

Ian Byfield finds an Apple in control at the National Museum of Photography

For your eyes only

FIREWORKS, fountains and film feature in a new generation of multi-media entertainment put together with Apples.

Indeed visual presentations for pleasure or to promote products have now become so sophisticated that it is virtually impossible to compile them without a computer.

And it is at the home of more popular media, the National Museum of Photography, Film and Television, that special entertainment programmes are being prepared with a IIe at the centre of the creative process.

Curator of Film and Audio Visual, Michael Harvey, puts together special presentations for the Museum's giant Imax screen. He uses 16 slide projectors, all of which are controlled individually, plus a host of sound and lighting effects.

"You program the Apple to put into operation a series of instructions to, say, switch on and off, flash, or dim to specific levels. The computer also controls at which point these things happen", he said.

The latest result is a six-minute piece called A Museum for our Times about the museum, in Bradford, West Yorkshire, and Imax, the biggest screen in Europe.

With only a little knowledge of computers and Basic, Mr Harvey finds it relatively easy to program the Apple for the productions.

"The day the system arrived, I was asked to do a very simple show, very quickly. My background is as a producer and so I had some knowledge of how such presentations are put together.

"But in order to complete the task I very quickly had to learn the programming language; I found it was easier to pick up than Basic".

He explained the way he goes about producing a presentation – the programming stage is usually reached after the soundtrack has been prepared.

"You get your story together and develop a story board, which is a step by step visual representation of each image which will be on screen.

"Then you have to work out how you create those images and make the computer ensure that effect happens at the right time.

"All the mechanical devices can be made to move to a particular point in the proceedings at once".

There may be a series of slides in the carousels of all the projectors. Any one can be found quickly and projected on to a screen to tie in with the music, sound, lighting effects, and any other slide being shown at the same time. The result is recorded on film.

"There are certain special effects to set up and certain rules to follow. But once you get into the swing of things it is most satisfying.

"People ask me how I feel about using scientific devices to create art.

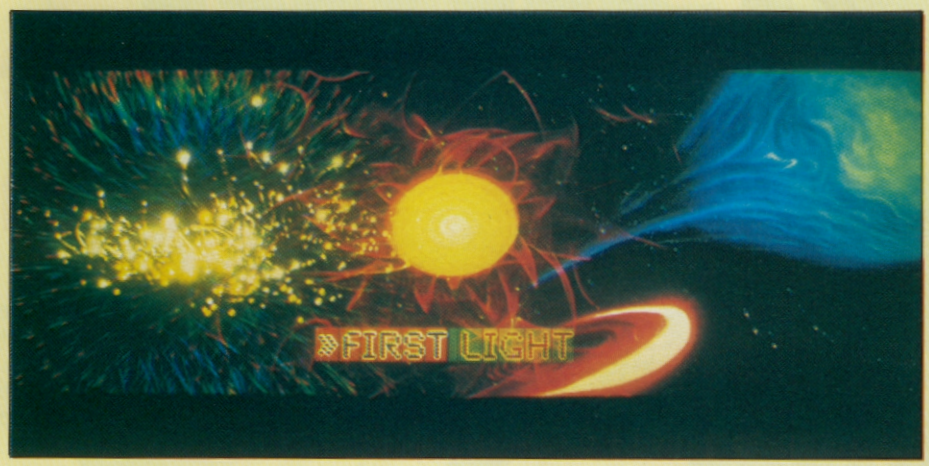
"It doesn't worry me. You still have trial and error. Once you get used to it, it is just another mechanical object you use to create; it doesn't separate me from the job. It is a tool.

"After a while you forget about the process and just get on and do it. It can start to respond to what you want to do."

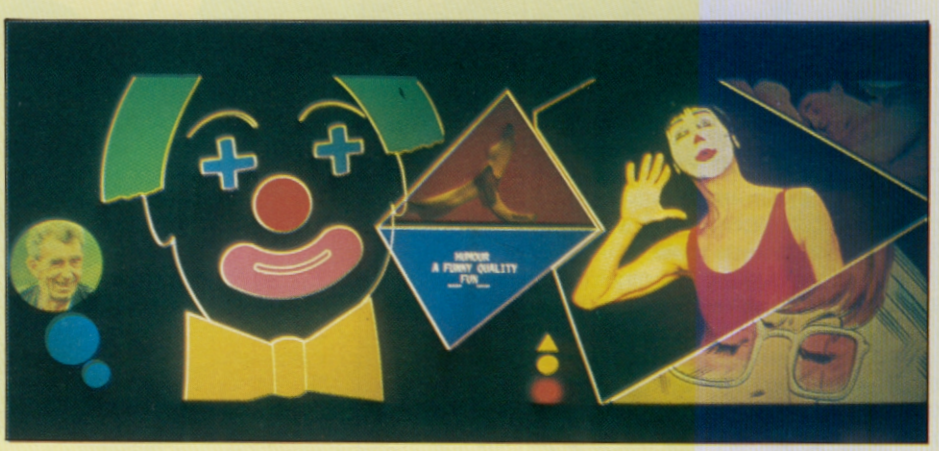
The museum uses System 4000 from multi-media experts Electrosonic. Managing director Bob Simpson explained that the systems were designed especially for presentations of all kinds, such as conferences and seminars, as well as in theatres and outdoors. Electrosonic itself has been using



The National Museum of Photography, Bradford, W. Yorkshire



Slides from Light Fantastic



Apple computers since 1980 as the basis both for audio visual, multi-image and multi-media programming.

Once the company had commited itself to using computers, it decided to work with just one type of machine.

The Apple II was chosen because of its wide international distribution, it was the right size for most applications and it lent itself to accepting additional cards.

Bob Simpson said: "The communications requirements of these applications are such that you cannot really get a reasonable result just using the standard computer cards. All our programs depend on these add-on cards to provide the time code and high-speed communications facilities".

The 4000 package, for instance, includes an Apple IIe, two disc drives with disc controller card, Electrosonic communications card, Electrosonic clock card, 12in monitor, and Esclamp III – the language used to program the Apple to drive the other devices.

The cards and the language are available separately for existing Apple Plus and IIe users. Esclamp (Electrosonic Computer Language for Multivision Programming) is disc-based and self booting.

Events are stored as cues, each of which is a statement that can include two different projector commands and the time to the next cue.

The 1,100-cue capacity in working memory is sufficient for most audio/visual programs says Electrosonic. Unlimited cue capacity is available on disc, and working memory can be expanded to 3,600 cues by the addition of a memory card.

Cue, clock time and fade instructions can be edited. And the program listing allows for plain text remarks to be included. The activities of up to 36 auxiliary devices can also be programmed.

The monitor can display lamp status, slide tray position, tab status, cue contents, program catalogue, program listing and the command syntax. Program commands are abbreviated to use the minimum number of key strokes for cue entry.

Most of the programs sold are used for shows employing multiple slide projectors. But the firm has been involved in a great deal of other mixed media presentations controlling lighting effects, fountains, fireworks, searchlights, and even animated figures.

And the company is not above producing special presentations itself. Its visual extravanganza, Light Fantastic, recently had a six month season at the museum.

Meanwhile Mr Harvey is preparing a new presentation featuring the work of the museum's Fellow in Photography, Faye Godwin, who specialises in landscapes – a branch of the art considered perfect for the Apple-based multi-media shows.



The System 4000 package with Apple IIe □

Monsters on the march



Title: Movie Monster
Author: Jon Leupp and a cast of thousands
Price: £19.99
Publisher: Epyx
Requirements: Apple II with 128k
Supplier: US Gold, Units 2 & 3, Holford Way, Holford, Birmingham B6 7AX
Tel: 021-356 3388

THE lights dim, the curtain lifts. A few adverts flash across the screen, then the plot of the monster movie starts to unfold. As the huge creature stalks the city you grip the edge of your seat...

Actually, I never gripped the edge of my seat. I was always too busy avoiding the ice-cream cartons as I huddled on the floor. I was the one who was terrified by Bambi.

The Movie Monster game starts just like the old days at the cinema, complete with lights, curtains and adverts before a series of text descriptions which set the scene. At the end of the game there are some final words before the credits roll and the lights come up.

Before starting out on the road to fame you have to choose the storyline of your epic. You have a choice of six monsters, six locations and five plots. This means that you have a choice of 180 different games in which to fulfil your wildest monster dreams.

The monsters are headed by the world famous Godzilla. In fact, as far as I can tell he is the only genuine star, the others being typical of the genre but not (yet) box office pin-ups.

Spectra, the giant wasp, and Tarantus, the giant spider, represent the insects while Mechatron understudies for all the robots-on-the-rampage. The Glog is a none too subtle double for the Blob, a 1958 "little piece of glop" which co-starred Steve McQueen.

The reason I can drop such interesting snippets of cinematic gossip is that the manual contains a potted history of monster movies to put you in the picture.

The only monster which doesn't ring any bells either from reading the notes in the manual or from any other source is Mr Meringue, a "tasty hunk of monster" they say, even though he "looks like a cream puff".

Enough of the cast and scenery, what about the plot? You play your chosen monster in one of six major cities. You can go berserk, smashing everything in sight or try one of the more subtle character parts.

One scenario is a simple escape – try to leave the city before someone gets you. More subtle still, you can search for your missing offspring or locate and destroy a landmark. You can also choose to take an extended lunch-break and find out what monsters really like to eat.

The manual contains maps of the various cities, although to be honest they are little more than boxes showing water (river or sea) and rough locations of the various landmarks. This is fine if you are playing with a colour monitor because you can work out roughly where you are by striking out until you find the blue bits.

In monochrome there is little to distinguish between grassy bits and water. Fortunately none of the cities is very big so you can easily find an edge by walking straight in any direction, but it's unlikely that you would stay alive long enough to walk all round the city.

The monsters have different characteristics so some are easier to work with than others. Mechatron, for example, is powerful, tough and of average speed but he doesn't recover from damage. On the other hand, the Glog recovers fast but has only average strength.

Incidentally, fast is the programmers term, not mine. Three speeds are listed for the monsters: Fast, average and slow. I would say they were slow, very slow and hardly moving at all. I suppose that is meant to show their great ponderous size but it doesn't make for an exciting game.

The program needs 128k to run but I can't see that you get anything better for the size. The graphics aren't marvellous – not double hi-res despite the memory requirement – and the monster shapes seem to be defined in blocks, so you get strange effects when they pass over certain colours, particularly around water. I've seen better running on 64k or even 32k machines.

The game uses both sides of the disc so you have to do a fair amount of swapping. All the atmospheric adverts, text and so on come on the first side after choosing the monster, location and plot. The action is all on the flip side but you have to go back to side one for the finale and your score.

No high scores are saved and if, like me, you think the program has hung after your death or victory and indulge in a few key presses you can miss your score as it takes the buffered input. I'm not usually impatient and I am not a nimble-fingered arcade addict – but this was slow.

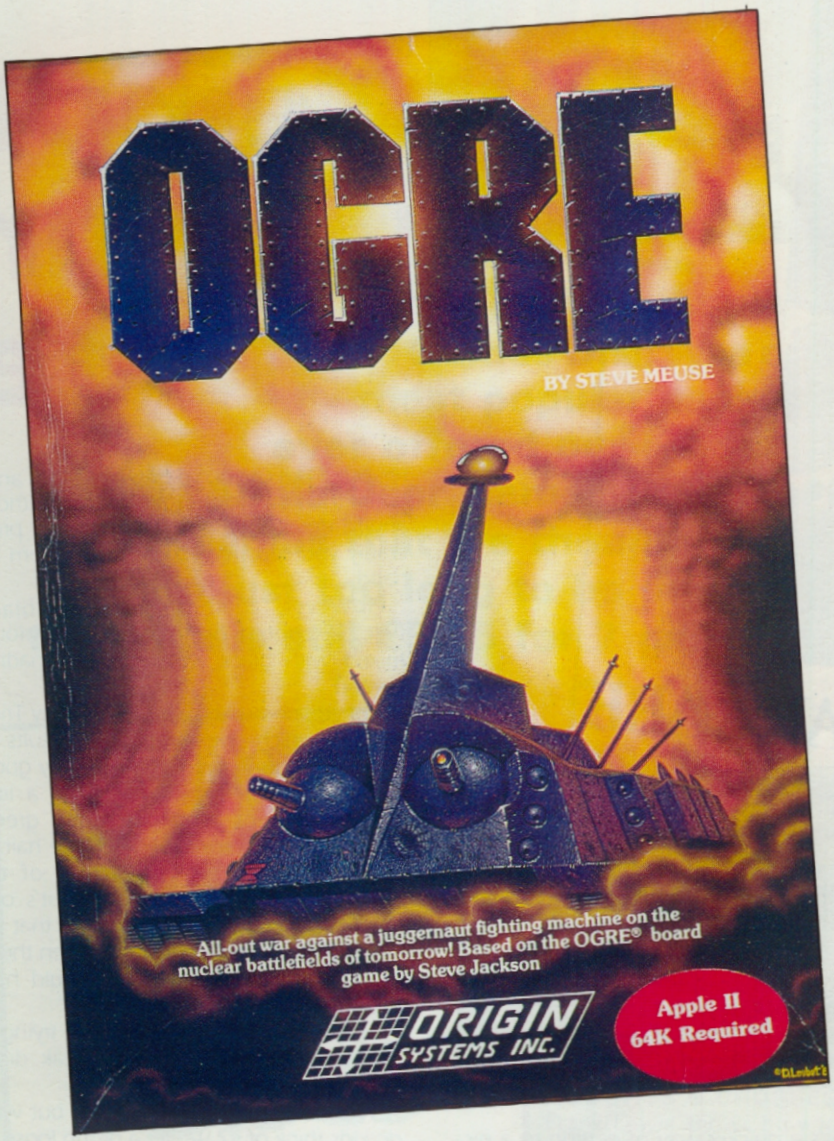
At first glance, Movie Monster was an interesting idea. Why not be the monster for a change rather than zap hordes of alien beings and other assorted monsters?

After a few plays however, I had second thoughts about the wisdom of encouraging people to smash famous buildings, cars and innocent passers-by. Listening to the kids saying "Quick! There's a person – squash him!" and gloating because they had demolished the Empire State Building began to have sinister overtones.

All in all, I can't recommend Monster Movie, although I have to admit that my kids liked it. The final insult was the manual's blurb about London. After a reasonable few lines about London's history and present situation they say its trademarks are double-decker buses, taxis and "the dense London fog."

No wonder all those American tourists arrive with the wrong impression.

Denise McKnight



The all action Ogre

OGRE is a game of mechanised warfare set in the 21st century. A cybernetic fighting unit called the Ogre rules the battlefields. Totally computer-controlled, and completely merciless, it is a cold, calculating war machine, whose prime objective is the destruction of your only Command Post.

Your objective is to protect yourself – and destroy the Ogre. Achieving this is pretty hard when it is you versus the computer. But you can choose to be the Ogre and have the computer assume the role of defence, or you can even choose a two-player game if you want some human competition.

Most of the screen is taken up by the map display which is made up of a hex sheet reminiscent of table-top games. The total play area is two-screens worth – you can flip between the two halves vertically or scroll up or down. Occupying about one fifth of the screen is your options display.

The game is played with a little black arrow cursor, which is moved around via keyboard, joystick or AppleMouse II. The mouse option works particularly well and makes the game very easy to play. Ogre utilises pull-down menus, as well as the usual clicking and dragging features associated with Mac games.

In fact this is just like a Mac game, and it's very impressive indeed. I wish more companies would adopt the system, as it makes play easier and faster.

Program: Ogre
Price: £19.95
Supplier: Origin Systems c/o Microprose, 2 Market Place, Tetbury, Gloucestershire GL8 8DA.
Tel: 0666 54326
Requirements: Apple II with 64k.

Initially the terrain is pretty blank. You can start filling it up with various objects such as nuclear craters (impassable), rubble, gun emplacements, mobile infantry (rather like the ones in the sci-fi novel Starship Troopers) and various tanks, as well as your Command Post.

Once you have created a field you can play it, save it to disc, load a previously saved one or use one of the game's preset options. Then the battle commences.

Within each side's turn are various movement and attack phases. During the former, any pieces that haven't been disabled can move up to their maximum limit.

To get information on a particular unit, just click on it and statistics will appear – moves allowed, attack strength, defence strength and so on.

You can even ask for the piece's movement and firing ranges to be graphically shown on the play area. Firing is accompanied by good sound effects and followed by a status report.

You can choose which part of the Ogre to attack, such as its treads, missiles, or guns. Some take several hits to disable or destroy, depending on which of the two types of Ogre you are up against. Addedto this you can decide the method and distance of your attack, and there's even a random factor for good measure.

A total Ogre victory occurs if the Ogre destroys your Command Post and all your other pieces: A marginal Ogre victory is awarded if it destroys the Command Post but is itself destroyed before it can escape. These are just two of the various degrees of success and failure given at the end of the game.

Included in the package are a well laid out, clean Play manual and another concerning Strategy and Notes. Also provided are cut-out badges for the various types of attacking unit. These have room on them for little yellow spots – radiation detectors, which come in a protective black bag.

The spots are designed to respond to gamma radiation from Cobalt 60 and electron beam radiation, which make them go red. Luckily mine are still yellow, but I'm told that after a few weeks of exposure to sunlight they turn red anyway! Now that's worrying.

Apart from the novel packaging the game is great fun to play, even for those not into strategy games. The display is very clear and the gameplay fast and absorbing, although as far as strategy games go it is not a very exciting concept.

Yet Ogre has instant appeal which most strategy games lack. With the more traditional type of strategy game, a lot more time and effort is required before you really start to enjoy it. With Ogre, you can be playing a full game in a few minutes. I highly recommend it. ▷

Leon Seltsikas



Tempt your palette

◁ THE idea of an electronic colouring book has been around for some time. *Apple User* reviewed Color Me in May 1984, for example. By a strange coincidence, that issue of *Apple User* featured the Apple IIc whose 128k seemed quite big at the time.

Now from PolarWare (nee Penguin Software, but the book publishers got nasty about the name) come three Electric Crayon packages. These all require 128k in which to run, suggesting that Parkinson's Law applies to computer memory too.

The three packages each have a theme there's ABC's, Fun on the Farm, and This Land is Your Land. In this last case, the land in question is America, but the pictures have a fairly broad appeal.

The ABC set contains 26 pictures, as you might expect. They are well-drawn, and they're not always the obvious ones. It's A for Acrobat rather than the usual A for Apple.

Fun on the Farm and This Land is Your Land both have 30 pictures. These too are well drawn, with a different artist being responsible for each package.

The possible actions are depicted at the top of the screen and the two direction arrows control movement through the set of pictures. This can be rather slow if the pictures have already been coloured, because you have to wait for all the colour fills to be performed before you can move to the next picture.

The alphabet keys can be pressed to move to a specific picture, but you still have to wait for the colour fills between pictures. With ABCs, the alphabet keys move to the obvious picture, but with the other packages it's not quite that simple.

For example, T will take you to The Ozarks; press T again and you get The Redwoods. Still, if you can remember the titles it's a quicker way of getting to a picture than cycling through using the arrows.

Program: Electric Crayon ABC's; Fun on the Farm; This Land is Your Land
Price: £18.99 each
Supplier POlarware/MGA Microsystems, 140 High Street, Tenterden, Kent TN30 6HT
Tel: 05806 4278
Requirements: Apple II with 128k and preferably colour display

The Erase option clears all the colours from the currently displayed picture, so they can be recoloured time and again. The Stop option quits the program after saving all the current colours of the pictures. The Oops option undoes the last fill, so mistakes can be rectified.

Colour is selected from the palette at the bottom of the screen. Also, the current colour can be mixed with the entire palette, so in principle up to 256 colours could be produced. Clicking the Mix option a second time returns the palette to the pure colours.

You can move the selection arrow and the crayon using keyboard, joystick or even the IIc mouse. This needs to be set up at the beginning, as does the choice of printer (ImageWriter or Scribe) and printer slot. However, once it's set up for your configuration you don't have to bother again.

The other thing available from the set-up menu is the calendar option. With this selected, any picture you print will have the chosen month's calendar printed beneath it.

The only slight draw back with this is that the month and year is input in the set-up menu which can only be accessed at boot-up. To produce a complete year's calendar you'd have to boot up a dozen times. The programs support a colour printer, but if like us you've only got black-and-white then the pictures are printed without any fill detail. The idea is that you (or preferably your kids) can then colour them by hand.

However, anything coloured black will be printed black, and any colours mixed with black will have the shading printed.

For colour display, we used a Sony Trinitron TV which gives reasonable results. In fact, the colour from the IIe was very good, but the output from the IIc was a little strange browns tended to look green, which produces some very strange hair.

This is obviously a function of the machine, not the packages, and it's only because we have both machines that we realised the difference. If it had been the IIe producing strange effects, it would have been relatively easy to fine-tune.

However, opening the IIc and trying to locate the relevant pots to tweak didn't seem worth the effort.

Well, that's the technical side, but what do kids think of it? We let a group loose on the packages and their comments were as follows: "It's good fun. Younger children would need to have it explained to them. The colours are very nice and there's lots of pictures to colour in."

One of the kids also noticed that the B on the Balloon picture shown on the front of the box was back-to-front. On closer examination, the photo has obviously been printed in reverse unless the children shown were using a unique combination of back-to-front IIc and ImageWriter the latter apparently not needing a power lead. It's irrelevant to the contents, but it shows what kids notice.

From a parent's point of view, Electric Crayon has the advantage that it never appears on the wallpaper or carpet, never needs sharpening or clean water providing and (hopefully) never falls down behind the radiators.

It doesn't let kids learn the skill of staying within the lines, but they do need a fair amount of coordination to position the crayon accurately in some of the small details.

All in all, these packages are probably the best set of electronic colouring books we've seen. What's more, if you get the kids organised they could provide you and your relatives with calendars for years to come. □

Denise McKnight

```
0211 0E04               mvi   c,4
0213 7E        loopw:   mov   a,m
0214 F5                 push  psw
0215 1F                 rar
0216 1F                 rar
0217 1F                 rar
0218 1F                 rar
0219 CD2602             call  nibble
021C F1                 pop   psw
021D CD2602             call  nibble
0220 23                 inx   h
0221 0D                 dcr   c
0222 C21302             jnz   loopw
0225 C9                 ret
0226 E60F      nibble:  ani   0fh
0228 F5                 push  psw
0229 A7                 ana   a
022A C23302             jnz   print
022D B0                 ora   b
022E C23302             jnz   print
0231 F1                 pop   psw
0232 C9                 ret         ;do nothing if first and
zero
0233 F1        print:   pop   psw
0234 C630               adi   30h
0236 47                 mov   b,a   ;flag in b that printing
begins
0237 5F                 mov   e,a
0238 C5                 push  b
0239 E5                 push  h
023A 0E02               mvi   c,2
023C CD0500             call  CPM
023F E1                 pop   h
0240 C1                 pop   b
0241 C9                 ret
0242 116902    error1:  lxi   d,string1
0245 0E09      general: mvi   c,9
0247 CD0500             call  CPM
024A C9                 ret
024B 117E02    error2:  lxi   d,string2
024E C34502             jmp   general
0251 119702    error3:  lxi   d,string3
0254 C34502             jmp   general
0257 11A802    error4:  lxi   d,string4
025A C34502             jmp   general
025D           wordcount: ds  4
0261           charcount: ds  4
0265           reccount:  ds  4
0269 4E6F20666 9string1: db   'No file name given'
027B 0D        down:    db    cr
027C 0A                 db    lf
027D 24                 db    '$'
027E 57696C642 0string2: db   'Wild cards not allowed'
0294 0D                 db    cr
0295 0A                 db    lf
0296 24                 db    '$'
0297 46696C652 0string3: db   'File not found'
02A5 0D                 db    cr
02A6 0A                 db    lf
02A7 24                 db    '$'
02A8 4572726F7 2string4: db   'Error when closing file'
02BF 0D                 db    cr
02C0 0A                 db    lf
02C1 24                 db    '$'
02C2 0D        string5: db    cr
02C3 5265636F72         db    'Record no: $'
02CF 0D        string6: db    cr
02D0 0A                 db    lf
02D1 0A                 db    lf
02D2 4E6F2E206F         db    'No. of Words: $'
02E1 0D        string7: db    cr
02E2 4E6F2E206F         db    'No. of characters: $'
02F6                    end
```

□

VERY HIGH QUALITY VERY LOW PRICES

5.25" COMPUTER DISKS - BULK PACKED - TOP QUALITY

QTY	SS 48TPI	SS 96TPI	DS 48TPI	DS 96TPI	DS 48 C/R	DS 96 C/R
10	£5.95	£6.95	£6.95	£7.95	£8.95	£9.95
25	£10.99	£11.99	£11.99	£12.99	£14.99	£17.99
50	£19.99	£20.99	£20.99	£21.99	£27.99	£32.99
100	£36.99	£37.99	£37.99	£41.99	£45.99	£57.99
150	£52.99	£55.99	£55.99	£57.99	£63.99	£80.99
250	£85.99	£87.99	£87.99	£91.99	£103.99	£126.99

C/R = Coloured or reversible disks - reversible disks have two holes and two notches!
Boxes of 10 disks are supplied in plastic cases (worth £1.49).
These disks are packed with a protective jacket (envelope) and come with a full user set, including a label and a write protect tab. The disks are manufactured to top international standards and have a hub ring for added protection.

3.5" COMPUTER DISKS - BULK PACKED - with labels etc . . .

QTY	SS 135TPI	DS 135TPI
10	£14.95	£16.95
25	£29.95	£35.95
50	£55.95	£62.95
100	£105.95	£119.95
150	£149.95	£169.95
250	£239.95	£269.95

STORAGE BOXES

THE BEST RANGE!

Lockable Storage Boxes from Centec

3.00" Lockable–Holds 60	£9.95
3.50" Lockable–Holds 40	£7.99
3.50" Lockable–Holds 90	£9.95
5.25" Lockable–Holds 50	£7.99
5.25" Lockable–Holds 100	£9.95

COMPUTER MONITORS – FULL RANGE STOCKED – BEST PRICES!

Philips CM 8533/CM 8833 – Colour Monitor IRGB for Nimbus/BBC etc	£269.95
Philips CM 8852 – Colour/RGB/TTL/Linear Inputs	£299.95
Philips BM 7502 – High Res Green Screen Monitor – Composite	£79.95
Philips BM 7522 – High Res Amber Screen Monitor – Composite	£89.95
Philips BM 7542 – High Res White Screen Monitor – Composite	£89.95
Microvitec 1431 – Standard Resolution Colour Monitor	£179.95
Microvitec 1451 – Medium Resolution Colour Monitor	£229.95
Microvitec 1441 – High Resolution Colour Monitor	£379.95

REMEMBER – All Monitors are delivered free by Securicor! No extras to pay!

CENTEC ELECTRONIC SYSTEMS LTD
UNIT 3, THE METRO CENTRE
BRIDGE ROAD, ORPINGTON
KENT BR5 2BE
TEL: (0689) 61947/62103 (24 hours)
Remember - all prices include VAT and delivery !
There are no hidden extras to pay!

VISA

"SPECTRAGRAM" – INTELLIGENT RGB COLOUR CARD FOR APPLE II & IIe

255 user – definable colours – 16 text/foreground colours – 16 full flood background colours – reduces or removes colour anomalies – colour under full software control – commands in programs can change colour while running – simple pseudo-animation of graphics by changing colours without re-plotting – included monitor cable and demonstration disc with utility programs to control colours – extensive manuals explains programing, animation, true 3D pictures.

£75

RGB COLOUR CONVERTER FOR IIe & IIc (TTL OR LINEAR)

Plug in module for *IIe* connects to slot of the mother board OR plugs to video socket of *IIc* – no additional power supply required – XR XG XB X4 TTL available – SOFTWARE TRANSPARENT – high definition, saturation & sharpness – 240 useful combinations of colours – switch selectable functions: 16 foreground/text colours : 16 full flood background colours – DUOCHROME – cleans up fuzzy hi-res text – solid or striped video reduces fringes.

£60

Prices are exclusive of VAT (Postage £1.50)

KEYZONE LTD
U14, Acton Business Centre,
School Road, Park Royal,
London NW10 6TD
Tel: 01-965 1684/1804 Tlx: 8813271

VISA Access

AppleUser SPECIAL OFFERS!

SAVE UP TO £10

Play football's first interactive computer and board game

Brian Clough's Football Fortunes is a football management game with a difference – it combines an excellent range of computer-based features with a fascinating board game.

The result for the players is a package which is as much fun and as skillful to play as other best-selling board games, combined with the flexibility and speed of play which only a computer can supply.



'A great family game – and no crowd trouble' – Niels Reynolds, Apple User, May 1987

CONTENTS INCLUDE

- Apple IIe software
- Playing board
- Five coloured counters
- 112 Player cards
- 10 spare Player cards
- Six immunity cards
- Pack of money

FEATURES

- Two to five players
- Four skill levels
- Variable game length
- Computer die
- Teleprinter
- Constantly updated league tables
- Assessments of each manager's performance

Apple IIe	RRP	Special Reader offer	You Save	Offer Inc. Subscription	You Save
Brian Clough's Football Fortunes	£24.95	£19.95	£5	£32.95	£10

TO ORDER PLEASE USE THE FORM ON PAGE 73