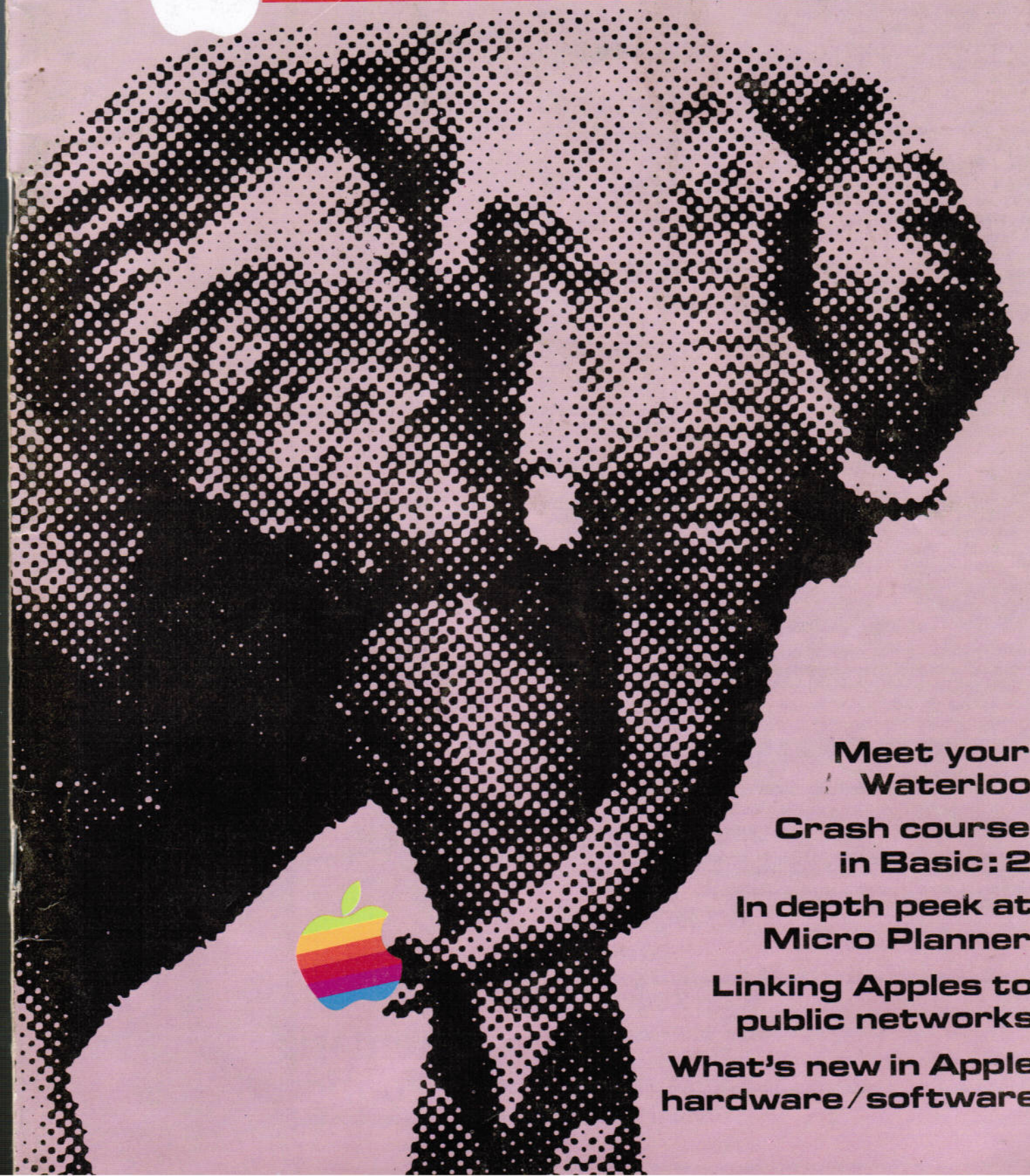
Windfall

No.4 October 1981 £1

The Apple computer magazine



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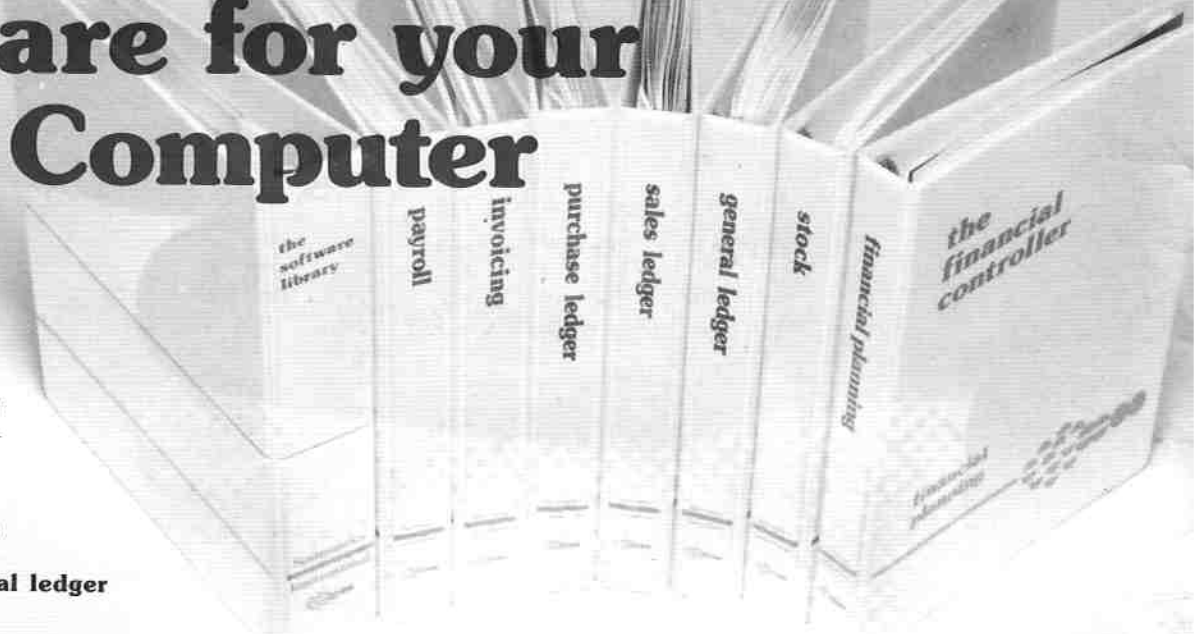

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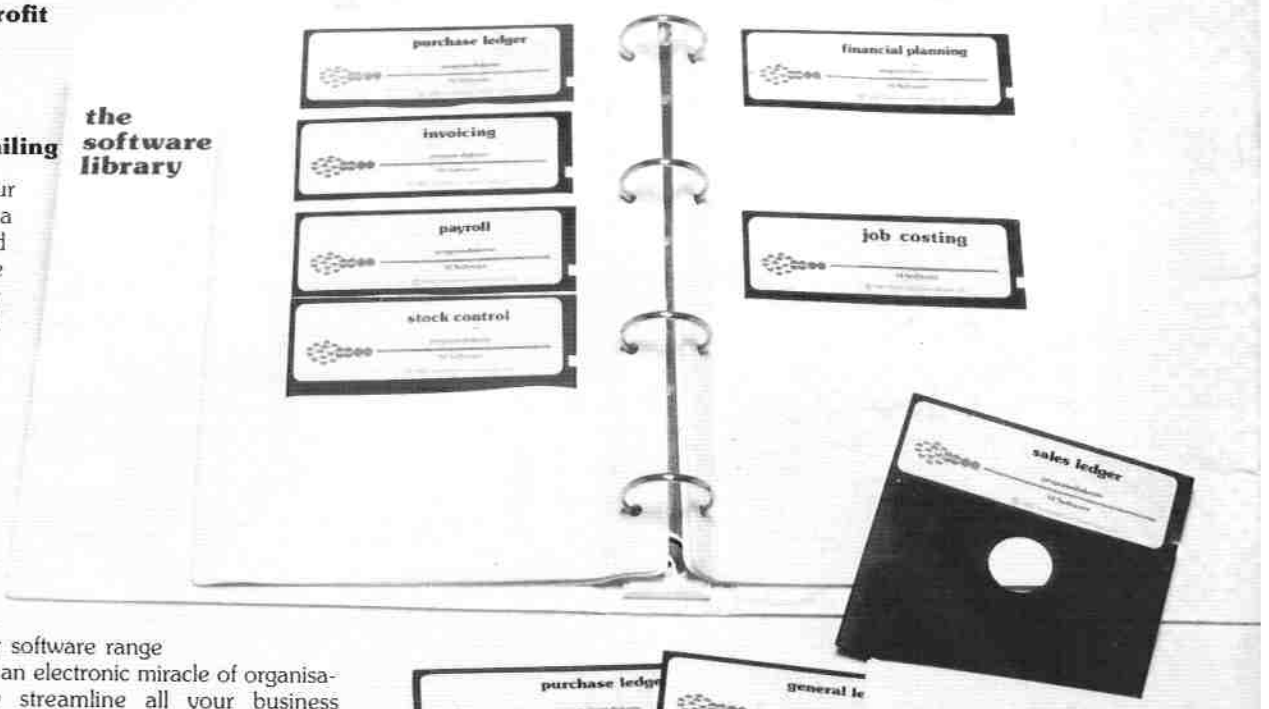

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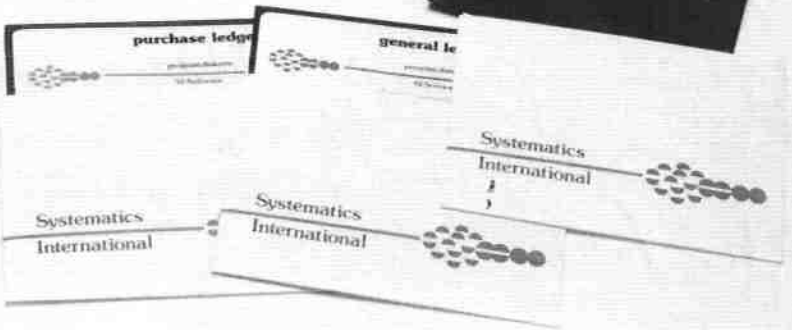

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Writing for Windfall: Articles and programs relating to the Apple are welcome. Articles should preferably be typed or computer-printed, using double spacing. Unsolicited manuscripts, discs, etc, should be accompanied by a self-addressed stamped envelope, otherwise their return cannot be guaranteed.

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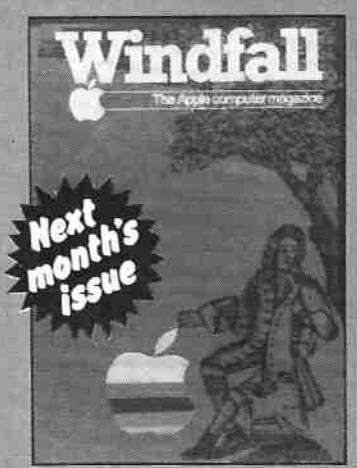

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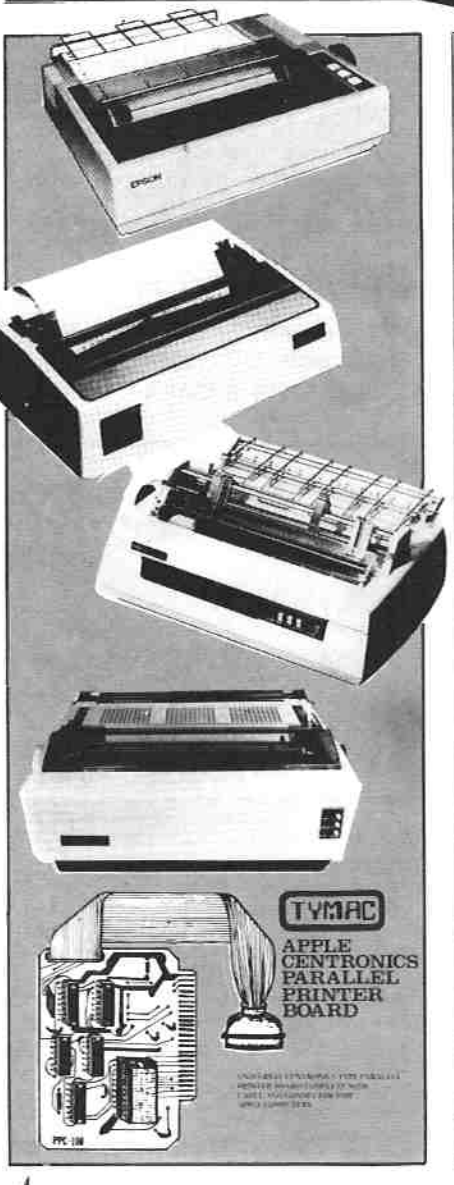

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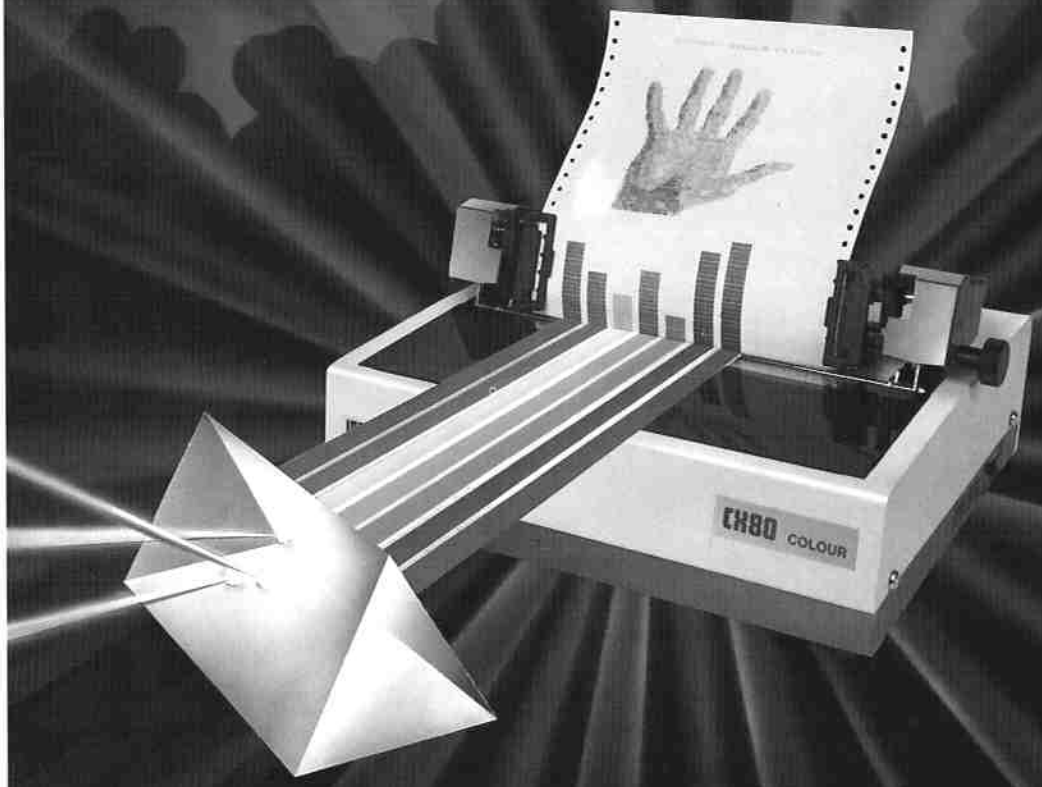
8/81

And behold...



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Micro Planner.. patient with the impulsive

By MIKE WILMOTT

THE perversity of nature states that you cannot successfully determine beforehand which side of the bread to butter. Running a project which includes many different types of activity and requests the use of varied resources demands that if you are unable to foresee the occurrence of an unscheduled activity you must recognise at the earliest possible opportunity the impact it will have on the successful and timely completion of the whole project.

A method of determining the influence that late completion of specific parts of a project will have on the efficient running of the whole project has been developed and is used widely on large computers throughout industry. Micro Planner is a very positive attempt to provide a similar facility on the Apple.

The planning method used to monitor and control the numerous aspects to be considered in managing a project is termed PERT, which stands for Program Evaluation and Review Technique. It was developed by the US Navy in 1958 and helped them to shorten their Polaris program by two years.

The method consists primarily of a network of activities and resources employed in a project, linked by time and logic considerations required to complete 'events'. Critical path analysis, another method of evaluating a network, became a second source of current PERT networks, enabling managers to trace a path through time or resource critical events within a network, arriving at the earliest possible completion date for the whole project.

This method of analysing a network of events can be applied in an extremely wide range of tasks, from carrying out surgical operations to designing and building aircraft, setting up government or company departments or planning the marketing of a new product. They work on a series of events by setting activities, the primary basic elements of the network.

An activity such as digging a ditch or building a wall takes a period of time, and will be completed at an event. When that event is reached another activity, such as erecting a roof, can start to take place, and this activity must also finish at an event.

A network can then be built up of all the activities within a project, from the initial drawing up of the plans to the finishing coat of paint and the removal of the contractor's signpost. The events can be made to create a more meaningful network by the appendage of factors at the event, such as the earliest or latest date for the completion of that particular event, or by imposing fixed dates for certain events.

The creation of earliest and latest dates allows for 'slack' in the completion of an activity. If there is no slack – that is, the difference between earliest and latest dates is zero – that event is termed a 'critical event.' Another term used, 'float', occurs when there is time available before an event need be started. Events with zero float are termed 'critical activities'.

Networks can be built up using these conventions, with many activities starting at different times and being interconnected where their culmination precipitates the start of another activity. Some activities can overlap where, for instance, drain laying will commence in a ditch before ditch digging is completed. Dummy activities can also be inserted to prevent directly unrelated activities from starting before another is finished.

With such facilities made available it is easy to see how such a model can be used to plan and control a project. By carefully creating a logically sound network, allocating dates and times to activities and events, and by placing resources at the disposal of the activities, a computer can analyse the allocation of time and resources throughout the network, with special attention given to critical activities and events, producing graphic and formatted reports of the progress and expected eventual completion of the project.

The major value of the method, however, is the fact that a model can be run repeatedly, accepting modifications before starting the project, for simulation purposes, and during the project for interactive control and reappraisal of completion dates.

The algorithms used to analyse the flow of resources and time through a PERT network are not complicated. The main part of such a program is the organisation of the large amount of data needed and the regulation and presentation of the program to enable users who are not computer experts to get the right answers out of the system.

Micro Planner was designed with such a user in mind. The exhortation at the beginning of the manual is to read and put aside. The program asks for all of the information that is required, and is very forgiving to the impatient and impulsive manager.

The program is as robust as it states, and this is a most welcome sign as the average user will probably get quite diffident about ploughing through the well written but tedious manual, and prefer to blunder his way through. A good program will foresee this and make his path as easy and as obvious as possible.

Being neither an impatient manager nor a computer novice, I am ill-equipped to say whether the relative ease with which I was able to use the program without the manual was relevant or not.

The manual is essentially a reference manual and as such can be referred to in chunks, instead of having to learn special methods of operation. A useful addition to the manual is a brief introduction to PERT techniques, as the availability of such systems at this type of price opens up the method to many more applications than must previously have been considered. For their benefit as well, there is also a small test exercise included.

Micro Planner runs on an Apple containing a language system. Although it can quite adequately run with two disc drives which I unfortunately had to do, it is better with three. This is because the system runs with three discs, one being a work disc which must reside in the drive permanantly. The two other discs are both used throughout the program.

Micro Planner uses the Pascal operating system as the organiser of data files, all other management of the program and data files being tightly controlled by the

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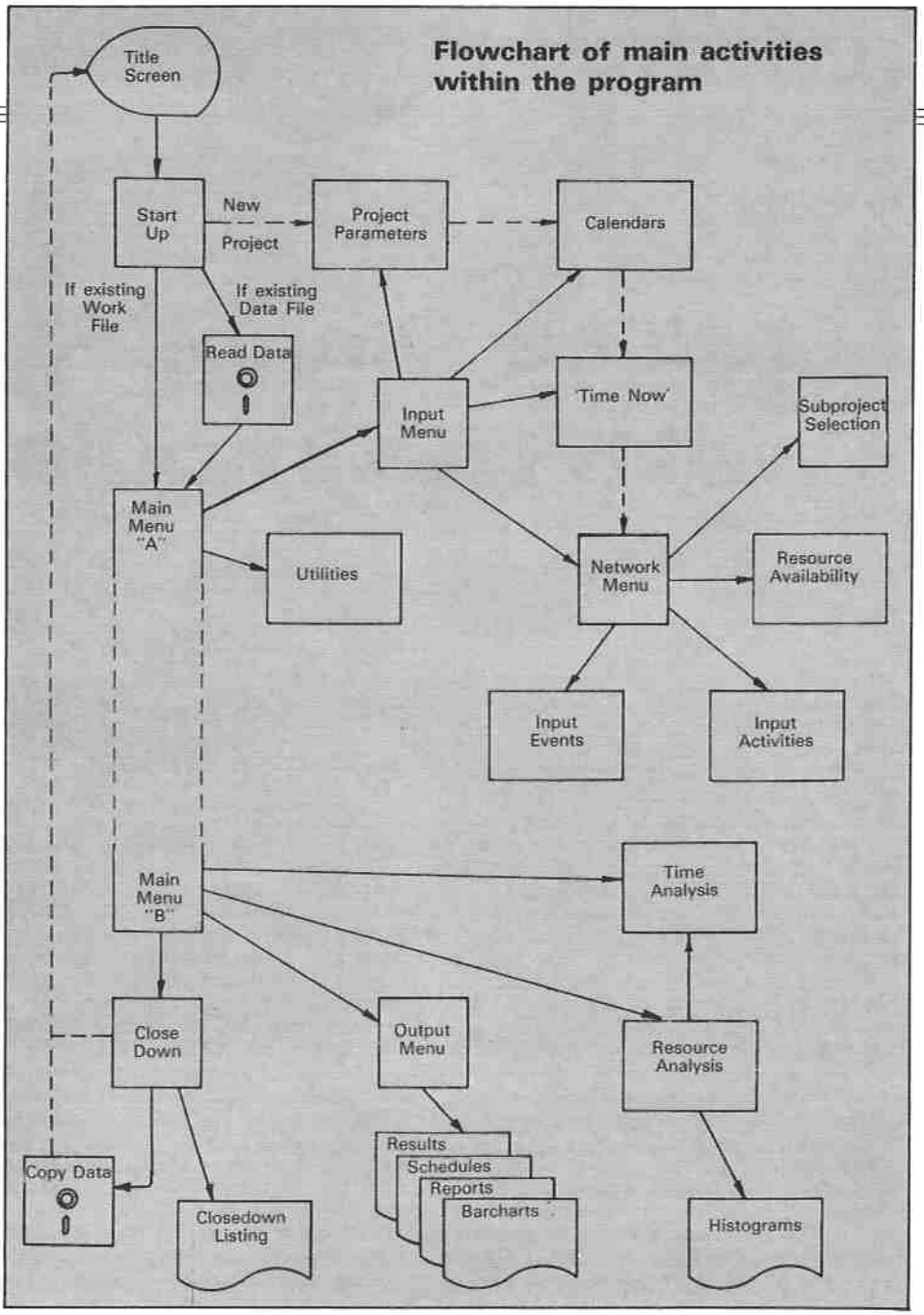


program. The system also requires a real time clock card for retaining the time and date on the screen, and for date stamping reports and graphic output.

Pascal is obviously the ideal language for a system such as this, giving the user all of the advantages of a micro in terms of immediacy and flexibility, plus speed of operation and efficiency of the program. One might also say that such a system should only use a language like Pascal.

Micro Planner has been developed as an 'activity on arrow' network rather than an 'activity on node' type. It has been able to achieve the increased efficiency of the 'node' system by increasing the numbers of activities available on the activity 'arrow', specifically names and messages, and its 'uniqueness identifier' (the means of identifying an activity which has similar preceding and succeeding events to another).

Micro Planner is operated in a series of routines, all accessible from menues. On booting up the program, however, first considerations are for setting the correct time and date. Then follows the routine for setting up the project data, which includes the external forces affecting the overall project, the calendar by which it has to work, including weeks, days and shifts, the project base date and the current date, working cycles, holidays and overtime periods. Up to six different calendars can be used, specified by individual activities within the network.

The network itself is created within a special routine entitled 'Network Data'. This routine allows the setting of activities, events, labels, resources and subprojects. The latter are finite parts of the overall network defining specific tasks and are used to simplify the analysis of a network. They can be linked together whenever required for total analysis.

When an activity is inserted it needs to be accompanied with information defining preceding and succeeding event numbers, the activity type and calendar specification, its duration, imposed date and time restrictions, varied progress reporting, a sorting code, a description up to 254 characters, two 12 character labels and any necessary resource usage or ladder information (overlapped activities of similar duration).

This is quite a full list and adequate for the creation of quite complex reports. The routine comes with the facility to amend, add and delete activities.

Once the network has been developed, resources have to be established on a separate file. These are not applied specifically to an activity but entered as manpower availability at a given date, allowing the computer to extract them from the pool of trades to be allocated to activities whenever required.

A link program is used to run through the network after it has been set up to establish that the system is 'correct', and there are no dangles (superflous activities with no end events) in the network.

It really is quite straightforward to set up all the data in the network and the capacities of the system are such that large projects can be handled with relative ease. A maximum of 900 activities is quoted per project for a basic configuration. This number will be reduced however if activities are used with long descriptions and resource data.

A lot of special events records will also take up activity space. Let us say that a moderate user of the system could get 900 activities in quite easily. A subproject can handle up to 150 activities and events, and there can be a maximum of 27 subprojects.

The maximum number of resources available are 35, and 21 of these can be allocated to any one activity. The calendar can go up to 2,144 time units (remember there are three methods of time), and output can list up to 900 activities with 100 running in parallel during resource analysis.

Analysis of the data is what the program is all about, and we have two principal things that we can analyse. Can we finish the job on time? And do we have the necessary resources to complete the job?

The time analysis program obviously handles the time analysis, carrying out forward and backward passes of the network, calculating earliest starts and finishes and latest starts and finishes for each activity.

It contains numerous other features, including the ability to identify 'unique' activities, handle negative durations and reverse logic (necessary in some networks), impose time limits on certain events or activities, and interface subprojects at any event or restrict activities to starting on specific days, such as Mondays.

Progress of an activity can be recorded in a number of ways, including time to completion, event achievement and percentage completion. Hammock activities where activities adjust their duration from start to finish events can also be handled,

and the result of the analysis is then stored in one of four schedules.

Resource analysis handles the allocation and analysis of resource availability, and in conjunction with the time analysis routine provides reports on 'ladders', 'part ladders' and other types of activity. The resource analysis routine will delay an activity if there are insufficient resources for that activity to be carried out, although parameters can be set to override resource limitations where the alternative would be to delay beyond the latest date for completion of the project.

An essential part of PERT is the production of easily digested information from the analysis routines. Extensive use of barcharts is made wherever possible so that overuse of time and resources is immediately apparent. Micro Planner can provide a series of reports in barchart or listing format. These are:

a. Date listings for time analysis.

b. Supercritical activity output. (A supercritical activity is one which has passed its latest date without being completed.)

c. Progress report, comparing current and previous schedules, enabling the evaluation of progress or slippage in the project.

d. Short term program. A preview of activities coming up in the next 56 time periods.

e. Full size barchart, displaying the whole schedule in barchart form. Micro Planner have made this easy by causing the printout to be capable of easy matching – out with the old scissors and sellotape, but you get what you need for your wall.

g. Resource barchart.

All in all, I found that Micro Planner was easy to use and sufficiently flexible to provide a very useful aide for project managers. The price is high – £695 – until one stops to consider the price that one would have to pay for such a program not too long ago. Micro Planner brings the computing capabilities of larger computers to the Apple in a very professional way.

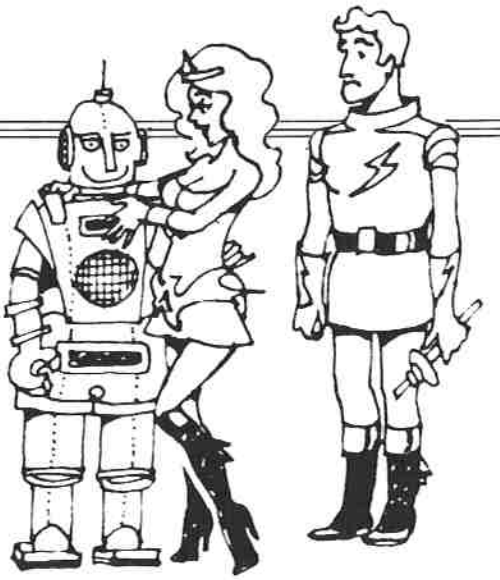
To summarise:

- Micro Planner is well presented and easily digestible by non-computer trained users. It has been designed as a tool to assist the manager in the field and fulfils that role well.
- Although it is suggested that the manual very quickly becomes unnecessary it is useful as a reference guide to the program and should not be discarded too readily.
- Reports, both listings and barcharts, are designed to be extracted and joined together to make full size planning charts. With the incorporation of activity names and full descriptions, they become clear and concise planning documents.
- The supercritical activity report is a useful device for examining causes of delay in meeting project deadlines.
- Although the size of the project is limited to 900 activities I do not find this a drawback. Once a project reaches a certain size I think it becomes unwieldy, even on a computer, and I would prefer that it be broken down into manageable subprojects.
- I like the 'prompt' facility, where questions which are not fully understood can be asked again in more wordy prose. Similarly the ability to go back and re-enter data which has been miskeyed, by typing 'Oops' is just great. Other programmers please note. People like using friendly programs.

Date : 14-MAR-81 * MICRO PLANNER *
Time Now: 12-JAN-81
Project : WAREHOUSE FOR MOVIT LTD. Generation: 2
Output : TIME ANALYSIS BAR CHART
Sheet No. 1

		EARLY Start	EARLY Finish	LATE Start	LATE Finish	Duration	Prec. Event	1981 JAN 12	19	26	FEB 2
DELIVERY CLADDERS	Order & Delivery of Cladding Materials	19JAN81	13MAR81	9FEB81	3APR81	8,0	1		=====	=====	===
ERECTORS	Delivery of Structural Steel	12DEC80	10MAR81	-STD-	13MAR81	12,0	4	=====	=====	=====	===
SUBSTRUCTURE BUILDER	Clear Site & Reduce Levels	19JAN81	30JAN81	4FEB81	17FEB81	2,0			=====	=====	...
	Excavate & Lay Foundations	2FEB81	25FEB81	18FEB81	13MAR81	3,3	2				===
	Drainage & Floor Slab	26FEB81	25MAR81	15APR81	15MAY81	4,0	3				
SUPERSTRUCT BUILDER	Blockwork	6APR81	10APR81	11MAY81	15MAY81	1,0	6				
ERECTORS	Erect Structural Steelwork	16MAR81	3APR81	16MAR81	3APR81	3,0	5				
CLADDING CLADDERS	Roof & Wall Cladding	6APR81	15MAY81	6APR81	15MAY81	5,2	6				
SERVICES SPARKS	Electrical Lighting & Distribution	18MAY81	12JUN81	18MAY81	12JUN81	4,0	7				
FINISHINGS BUILDER	Interior Finishings & Decoration	18MAY81	5JUN81	25MAY81	12JUN81	3,0	7				
BUILDER	Project Completion		12JUN81		12JUN81	0,0	8				

Sample report: Time analysis barchart



Now meet your Waterloo

By PETER GEE

IT'S not every day that the Grand Admiral gets a second chance to go through the scenario again, this time with a winning twist. It required a time warp opportunity only available to the dreamer and the war games addict.

But now, thanks to Strategic Simulations Inc, the man with an Apple and the box labelled Computer Bismark can span the seas looking for a phantom replay.

There is something eerie about this projection into the past. It brings home to the player the loneliness of command; the apparently limitless expanse of the oceans.

It is hard for the land-bound to accept that large fleets, shoals of submarines, flocks of planes can swan about the Atlantic without sighting one another. But it did happen. The sighting was the exception, not the rule.

And this state of affairs Computer Bismark faithfully mirrors. So don't expect to finish a game in an hour or two. No quickie Invaders frolic between pints at the pub, this.

The broad picture goes like this: Bismark and Prince Eugen, supported by submarine wolf packs, sail forth from Norway bent on decimating Allied shipping. And the British fleets deploy to meet them.

Two can play, taking the protaganist parts. Playing solo one can pit one's wits against the computer, which takes the German command in the shape of Admiral Otto von Computer. And he's no dumkopf.

If two are playing, the time scale lengthens considerably. For each player must take his turn before the screen to make his moves while his opponent retreats to a neutral corner.

On completion of each pair of moves the Apple weighs up the situation and reports back to the players as to whether enemy units have been sighted and battle should be joined.

These steps are repeated until either 30 complete turns have been played or Bismark has been sunk, whichever comes first. You can, at the end of any one turn, save the game to fight another day.

The preceeding is, of course, a gross simplification of the proceedings. The ramifications are endless. Planes have limited endurance; ships limited firepower, fuel, ability to take hits and seek out enemies by radar. And then there is the constantly changing weather, always a major factor in battle at sea.

The situation is displayed by a map of the North Atlantic – colour, naturally – with one's own ships displayed, but not the enemy's.

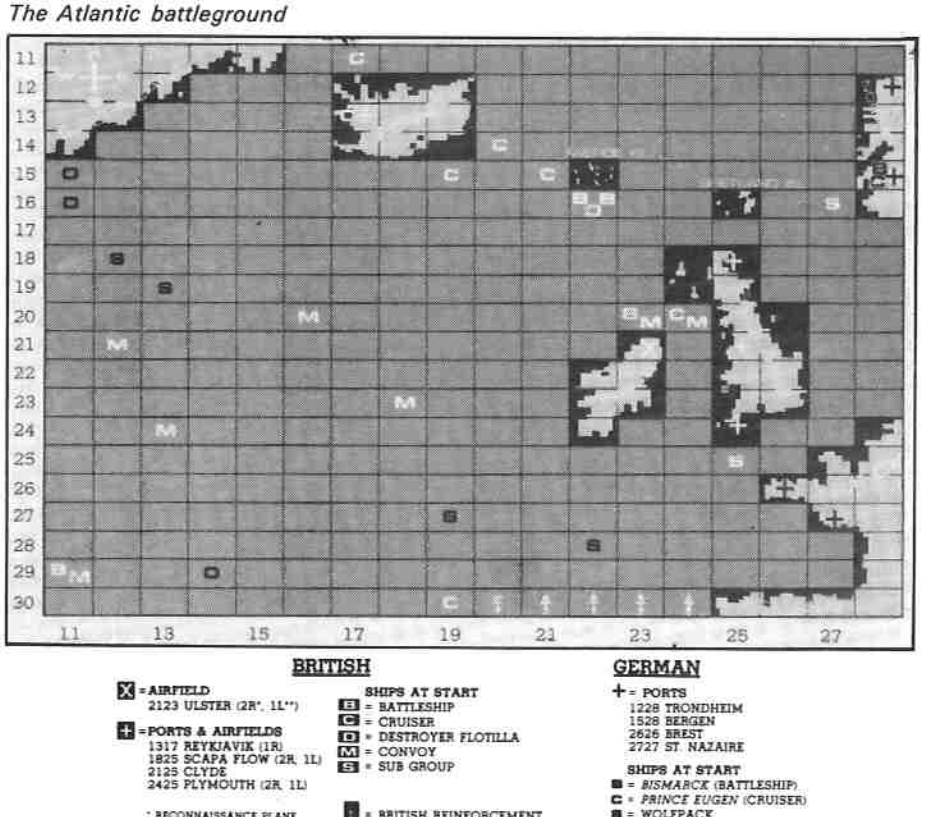
Plastic covered replicas, plus Chinagraph pencils, are provided so players can keep tabs on the enemy once he has been sighted.

And the name of the game is finding him. I ran up to 10 moves without a spot of foreign foam on the horizon. But I suppose it's no good bombing round the Barents Sea while your opponent is sunning himself off the Azores.

The game was first played on a 13 inch colour TV which provided most acceptable viewing. Once the family went to bed the 26 incher was brought into play, and the effort proved well worth while. I must invest in projection TV some day.

Incidentally, when battle is finally joined I found Frank Chacksfield's stereo version of Victory at Sea added a great

The Atlantic battleground

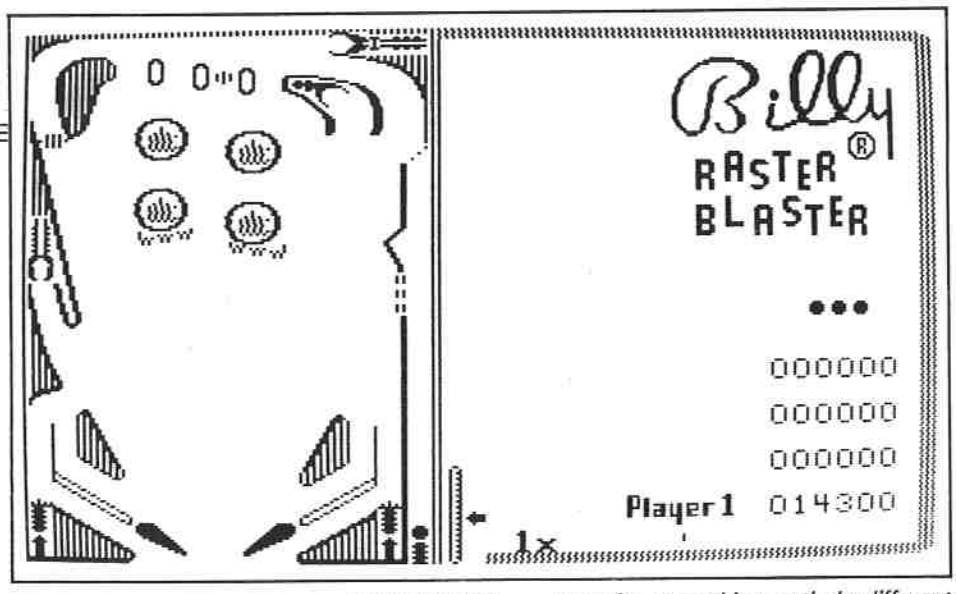


Computer Bismarck £29.99
The Battle of Waterloo £29.99

Supplied by Bill Unsworth, of U-Microcomputers, Long Lane, Warrington, Cheshire (tel: 0925 54117).

Raster Blaster £15.95

Supplied by Pete Fisher of Pete and Pam Computers, Waingate Lodge, Rawtenstall, Rossendale, Lancashire BB4 7SQ (tel: 0706 227011).



Raster Blaster . . . now for something entirely different

deal to the effect. Roused the neighbours something rotten.

Yes, I like Computer Bismark. But I'm not entirely sure Otto von is playing fair all the time. Perhaps he was just lucky.

Now let's shake the salt off our sea boots and consider SS Inc's second offering of the day, Computer Napoleonic – the Battle of Waterloo. And this is, if you'll pardon the pun, much more down to earth.

The reason being that both protagonists (you can play the computer solo, if you wish) sit before the screen and watch the infantry toiling and the cavalry charging right before their bemused eyes.

The screen shows a simplified map of the battleground, and units are indicated by coded letters, which tend to charge about with disconcerting speed.

Operation is much the same as for Bismark. Players take turns in moving their troops and engaging the enemy in combat. The computer is the final referee, which can lead to a certain amount of acrimony, for I have yet to find how to POKE it into changing its mind.

Waterloo also gains from the larger screen, although one must be careful to specify a white background – white on black is very hard on the eyes. Colour is there, but largely irrelevant.

For full appreciation of the closing stages gamesters might consider Antal Dorati's version of the Tchaikovsky 1812 Overture. Where else do you get six pound smooth bore bronze cannon plus a 12 pound howitzer? OK, so you like Herbert von Karajan and the Berlin Philharmonic. Be a purist!

Computer Napoleonic? I like it.

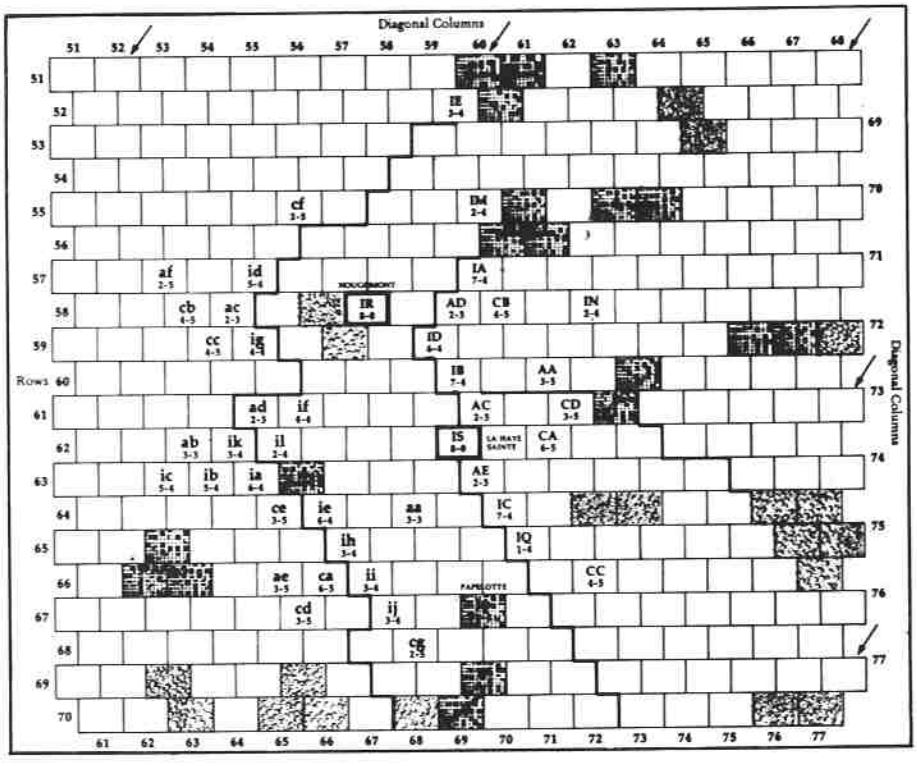
Gamesmanship's final offering this month is a very clever version of that electronic bagatelle machine to be found on Blackpool's Golden Mile and suchlike.

You know, you pull the plunger, the chrome plated ball boings around, flashing lights, depressing springs, and totting up a total nowhere near that required for another free game.

Raster Blaster it is called, by Bill Budge. And jolly cunning, too. You can vary the impact of those paddles at the base which keep the ball in motion, and the rest of the electro-magnetic gear on the real thing is faithfully copied, if not improved upon.

Bright, breezy and fun. Put on your "Kiss me Quick" hat and have a colourful go.

P.S. How do you find the shovel to dig up the foundations of Stashbuck Mansion? A clue will do nicely.



Scene of Napoleon's nemesis. This battleground loses a lot in monochrome reproduction, with one set of units, the Anglo-Prussion allies, being in red and the French in blue. The terrain includes woods, villages and chateaux, while the crests of hills are shown as lines on the mapboard. Each unit is represented by a two letter code, the first indicating the unit – artillery, cavalry or infantry – and the second its relative strength.

Strictly for squares

THIS game is a simulation of the popular sliding square problem. In brief, the aim is to get:

from this ... *... to this*

```
**************** ****************
**----------** **----------**
**-B--J--F--G-** **-A--B--C--D-**
**----------** **----------**
**---   ------** **----------**
**-E-   -A--O-** **-E--F--G--H-**
**---   ------** **----------**
**----------** **----------**
**-I--L--C--H-** **-I--J--K--L-**
**----------** **----------**
**----------** **---------  **
**-D--N--M--K-** **-M--N--O-  **
**----------** **---------  **
**************** ****************
```

where '-' represents an inverse space character.

The program begins by asking you to choose a number between 0 and 9. This is not a scale of difficulty but an attempt to further the random generator. The program then pauses and sets the square.

You are then requested to enter your move. You enter the letter you want to swop with the blank square. Needless to say the move is validated to ensure you can only move a letter adjacent to the blank.

The program then updates the display. It also checks the updated square to see if it has been completed. If not, it increments the move count and prompts you for your next move.

If you reply with the ESC key at the beginning of the program then it ends. If you reply with the ESC key at any prompt for your next move then the program resets everything and allows you to display a new 'random' square.

Andrew Esseen

```
1000  HOME :D$ =  CHR$ (4)
1010  VTAB 4: HTAB 1
1020  INVERSE : FOR I = 1 TO 40: PRINT
     "*";: NEXT : NORMAL
1030  VTAB 12: HTAB 1
1040  INVERSE : FOR I = 1 TO 40: PRINT
     "*";: NEXT : NORMAL
1050  VTAB 7: HTAB 9: PRINT "C O
     M P U T E R I S E D"
1060  VTAB 9: HTAB 8: PRINT "L E
     T T E R  P U Z Z L E"
1070  VTAB 17: HTAB 5: PRINT "WRI
     TTEN BY:- ANDREW ESSEEN"
1080  VTAB 19: HTAB 5: PRINT "CAR
     DIFF MICRO COMPUTERS LIMITED
     "
1090  VTAB 23: HTAB 8: INVERSE : PRINT
     "TYPE (SPACE BAR) TO PLAY ":
      NORMAL
1100  VTAB 24: HTAB 20: PRINT "";
     : GET D$
1110  IF D$ <  > " " THEN 1100
1120  DIM CH%(4,4),L$(16),L%(16)
1130 L$(0) = "A":L$(1) = "B":L$(2
     ) = "C":L$(3) = "D"
1140 L$(4) = "E":L$(5) = "F":L$(6
     ) = "G":L$(7) = "H"
1150 L$(8) = "I":L$(9) = "J":L$(1
     0) = "K":L$(11) = "L"
1160 L$(12) = "M":L$(13) = "N":L$
     (14) = "O":L$(15) = " "
1170 Z =  FRE (0): HIMEM:  PEEK (
     112) * 256 +  PEEK (111):Z =
      FRE (0)
1180  HOME
1190  REM   ***** SET UP THER BOA
     RD
1200  VTAB 2: HTAB 2: PRINT "****
     ************"
1210  VTAB 3: HTAB 2: PRINT "****
     ************"
1220  VTAB 16: HTAB 2: PRINT "***
     **************"
1230  VTAB 17: HTAB 2: PRINT "***
     **************"
1240  FOR I = 4 TO 15
1250  VTAB I: HTAB 2: PRINT "**";
     : HTAB 16: PRINT "**"
1260  NEXT
1270  FOR V = 1 TO 4: FOR H = 1 TO
     4:CH%(V,H) = 20: NEXT : NEXT

1280  VTAB 7: HTAB 22: PRINT "YOU
      HAVE TAKEN": VTAB 9: HTAB 2
     7: PRINT "000": VTAB 11: HTAB
     23: PRINT "MOVES SO FAR"
1290 MO = 0
1300  VTAB 20: PRINT " INPUT A NU
     MBER BETWEEN 0 AND 9 - ";: CALL
      - 958: VTAB 24: HTAB 5: INVERSE
     : PRINT " HIT (ESC) TO END T
     HIS SESSION ";: NORMAL
1310  VTAB 20: HTAB 35: GET D$
1320  IF (D$ < "0" OR D$ > "9") AND
     D$ <  > CHR$ (27) THEN  PRINT
      CHR$ (7): GOTO 1300
1330  IF D$ =  CHR$ (27) THEN  TEXT
     : HOME : VTAB 3: NEW
1340  PRINT D$
1350  VTAB 22: PRINT " PLEASE BE
     PATIENT WHILE I SET THE BOAR
     D": CALL  - 958
1360 D =  VAL (D$) + 1: IF D = 1 THEN
     1380
1370  FOR I = 1 TO D:L =  INT ( RND
     (2) * 16): NEXT
1380  FOR V = 1 TO 4
1390  FOR H = 1 TO 4
1400  IF V = 4 AND H = 4 THEN L =
     0: GOTO 1470
1410 L =  INT ( RND (2) * 16)
1420  IF L > 15 THEN 1410
1430  FOR CC = 1 TO 16
1440  IF L = L%(CC) THEN 1410
1450  NEXT
1460  IF L = 15 THEN X = V:Y = H
1470 CH%(V,H) = L
1480 L%((4 * (V - 1)) + H) = L
1490  NEXT
1500  NEXT
1510 Z =  FRE (0)
1520 D$ = "*"
1530  INVERSE
1540  FOR I = 1 TO 4
1550  IF I = 1 THEN V = 4
1560  IF I = 2 THEN V = 7
1570  IF I = 3 THEN V = 10
1580  IF I = 4 THEN V = 13
1590  FOR Z = 1 TO 4
1600  IF Z = 1 THEN H = 4
1610  IF Z = 2 THEN H = 7
1620  IF Z = 3 THEN H = 10
1630  IF Z = 4 THEN H = 13
1640  IF I = X AND Z = Y THEN  NORMAL

1650  VTAB V: HTAB H: PRINT "   "
     ;
1660  VTAB V + 1: HTAB H: PRINT "
     ";L$(CH%(I,Z));" ";
1670  VTAB V + 2: HTAB H: PRINT "
     ";
1680  INVERSE
1690  NEXT
1700  NEXT
1710  NORMAL
1720  VTAB 24: HTAB 5: INVERSE : PRINT
     " TYPE (ESC) TO RESET THE FR
     AME ";: NORMAL
```

Appletips

Very often a list or menu is presented indented on the screen. Most people use HTAB or TAB functions to achieve this, but it is much simpler to change the left hand side of the window before the table by the required amount.

For example POKE 32,5 ... TABLE ... POKE 32,0 has the same effect as a series of HTAB5's before each part of the table. Make sure that each entry will fit neatly on one line. If you're not sure, first set the window to the appropriate value, e.g. POKE 33,34. (See the Applesoft Manual Page 129.)

Dr. Max Parrott

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PUZZLE

```
1730  VTAB 22: HTAB 2: PRINT "WHI
      CH LETTER DO YOU WANT TO MOV
      E?      ": VTAB 22: HTAB 37: PRINT
      D$;: HTAB 37: PRINT "";: GET
      D$
1740  IF (D$ < "A" OR D$ > "D") AND
      D$ <  > CHR$ (27) THEN  PRINT
       CHR$ (7): GOTO 1730
1750  IF D$ <  > CHR$ (27) THEN
      1790
1760  IF D$ =  CHR$ (27) THEN  PRINT
      : FOR I = 1 TO 16:L%(I) = 0:
       NEXT :Z =  FRE (0)
1770  FOR I = 4 TO 15: VTAB I: HTAB
      4: PRINT "                ";: NEXT

1780  GOTO 1190
1790  PRINT D$
1800  REM   ***** CHECK ROUTINE
1810  FOR C = 0 TO 15
1820  IF L$(C) = D$ THEN 1840
1830  NEXT
1840  FOR V = 1 TO 4
1850  FOR H = 1 TO 4
1860  IF CH%(V,H) = C THEN 1890
1870  NEXT
1880  NEXT
1890 H1 = H:V1 = X - 1: IF V1 = 0
       THEN 1910
1900  IF V1 = V AND H1 = Y THEN 1
      980
1910 V1 = X + 1: IF V1 = 5 THEN 1
      930
1920  IF V1 = V AND H1 = Y THEN 1
      980
1930 V1 = X:H1 = Y - 1: IF H1 = 0
       THEN 1950
1940  IF V1 = V AND H1 = H THEN 1
      980
1950 H1 = Y + 1: IF H1 = 5 THEN 1
      970
1960  IF V1 = V AND H1 = H THEN 1
      980
1970  PRINT "": VTAB 24: HTAB 2: PRINT
      "WRONG !!! IT'S NOT ADJACENT
       TO THE GAP";: FOR J = 1 TO
      1000: NEXT : VTAB 24: HTAB 2
      : PRINT "
                                ";: GOTO
      1730
1980  REM   ***** ROUTINE TO EXCH
      ANGE POSITIONS
1990 MO = MO + 1
2000  VTAB 9: IF  LEN ( STR$ (MO)
      ) = 3 THEN  HTAB 27: GOTO 20
      30
2010  IF  LEN ( STR$ (MO)) = 2 THEN
       HTAB 28: GOTO 2030
2020  HTAB 29
2030  PRINT MO
2040 CH%(X,Y) = C
2050 CH%(V1,H1) = 15
2060 X = V1:Y = H1
2070  REM   ***** CHECK TO SEE IF
       GAME OVER
2080 COUNT = 0
2090  FOR V = 1 TO 4
2100  FOR H = 1 TO 4
2110  IF CH%(V,H) <  > COUNT THEN
      Z =  FRE (0): GOTO 1530
2120 COUNT = COUNT + 1
2130  NEXT
2140  NEXT
2150  FOR I = 1 TO 4: INVERSE
2160  IF I = 1 THEN V = 4
2170  IF I = 2 THEN V = 7
2180  IF I = 3 THEN V = 10
2190  IF I = 4 THEN V = 13
2200  FOR Z = 1 TO 4
2210  IF Z = 1 THEN H = 4
2220  IF Z = 2 THEN H = 7
2230  IF Z = 3 THEN H = 10
2240  IF Z = 4 THEN H = 13
2250  IF I = X AND Z = Y THEN  NORMAL
      ;
2260  VTAB V: HTAB H: PRINT "   "
2270  VTAB V + 1: HTAB H: PRINT "
      ";L$(CH%(I,Z));" ";
2280  VTAB V + 2: HTAB H: PRINT "
      ";
2290  INVERSE
2300  NEXT
2310  NEXT
2320  VTAB 19: HTAB 1: CALL  - 95
      8
2330  VTAB 20: HTAB 4: FLASH : PRINT
      " CONGRATULATIONS - YOU DID
      IT !!! ": NORMAL
2340  VTAB 22: HTAB 2: PRINT "ANO
      THER GAME ? ";: GET D$
2350  IF D$ <  > "Y" AND D$ <  >
      "N" THEN  PRINT  CHR$ (7):GO
      TO2340
2360  IF D$ = "N" THEN 2420
2370  FOR I = 1 TO 16
2380 L%(I) = 0
2390  NEXT
2400 Z =  FRE (0)
2410  HOME : GOTO 1190
2420  TEXT : HOME : VTAB 3: NEW
```


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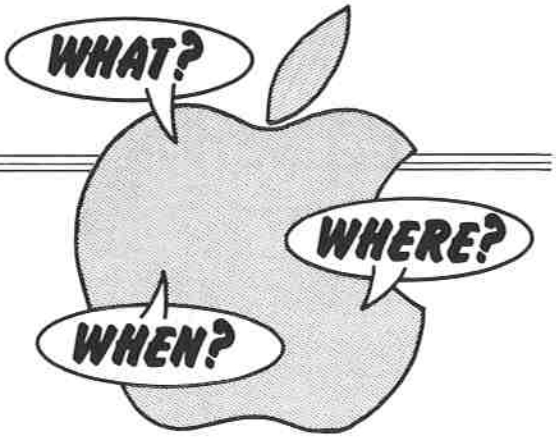


Safe, with a touch of Genius

BIT copiers again. Love them or not, you cannot get away from them, and over the last month they have been a recurring topic of conversation in the Windfall office.

It is no good sweeping them under the carpet as many people now have the expertise to produce their own version of bit-copiers, and there are quite a few versions already available in this country.

As we mentioned last month, they do have their uses for providing a security copy of important software, where no back-up is provided. They are also useful for providing a copy of games discs, which are invariably sold as single discs.

Floppy discs don't last for ever. How many people would buy an LP record if they knew that its quality was certain to deteriorate after a short period.

One important reason for not pretending that bit copiers don't exist is that producers of software must know what means are available for reproducing their programs, and must be encouraged to provide better and more foolproof methods of protecting their livelihood.

For this reason we commend a fully-tested copy proofing system which claims to have successfully defeated the well known 'Locksmith' and 'Back-it-up' discs.

The system has been developed by Little Genius, the people responsible for a series of programs teaching users how to get to grips with micros. It consists of a set of utilities used to produce a 'production master disc'. The utilities are uniquely tailored so that they may only copy their own master discs, and incorporate a range of features and facilities meeting individual requirements.

Litttle Genius set up the utilities for £300-£500, depending upon the requirements of the user. For this one master disc will be produced, and additional ones can be bought for £50.

Copying is done in two ways. Little Genius can provide the copy at a fee of £5 a copy on labelled discs supplied by the user, or the user can reproduce his own copies for an annual licence fee of £500.

Windfall will be evaluating this software in the near future, but as can be seen from its price, it is aimed at the serious supplier of software, where piracy of programs could affect the profitability of the product to a serious degree.

Little Genius say that they are confident enough about the system to test it out against any new bit-copier that might come along. As Windfall is as concerned as anyone else about safeguarding the people who provide the software we all use, we would like readers to keep us informed of any new developments in the field of protection. We will be happy to test and publish the results of any device brought to our attention.

• • •

THE National Computer Centre at Manchester is to install a Cluster One network from Zynar to automate its office and administration functions. The system will include 17 work stations in the communications systems division, keeping track of NCC clients.

One of Owl Computers latest products, Overview, which helps build up an in-house viewdata system, has also been adapted by Zynar, and is being evaluated by NCC for inclusion in the package, along with Zynar's own electronic mail system.

The package was reviewed in the August edition of Windfall and proved impressive. It allows users to communicate with one another and share the same data files. Zynar themselves have also created external links via modems to their American counterpart Nestar, the creators of Cluster One.

• • •

KEEN Computers have sold Apple systems to the RAC, complete with Corvus discs and the Constellation network system, the object being to keep track of members of their Motor Sports Association at race meetings.

They have in excess of 30,000 members turning up at race and rally meetings all over the country, and it is not easy to keep up-to-date information on members at each track. As well as checking whether subscriptions have been paid, the system will enable organisers to spot drivers under suspension and to enrol new members on the spot.

• • •

THE 1981 Personal Computer World Show turned out to be quite a success. Each day both exhibition areas seemed extremely busy, and reports were that a lot of business was done. Our thanks to Ed Leatham of March Communications for offering us space on his stand. We sold a lot of magazines at the show, and intend to come back in strength next year.

Although there was nothing earth-shatteringly new the dealers were showing some interesting products. and very useful software.

One hopes that next year the catering is better and the car park is finished. The police pound is convenient (100 metres away) but I didn't enjoy the walk to it.

• • •

FOLLOWING the items on communications in recent issues, readers might be interested in a couple of products which are going to be useful to anyone in the IBM field.

Their 3780, 2780 and 3276 terminals are pretty expensive to install, but Owl Computers of Bishops Stortford have now developed software written in Pascal to enable the Apple to emulate the 3780 data communications terminal and the 2780 terminal within the same program.

The software also emulates all the other costly peripherals, like printers, card readers and card punches, using the floppy disc, so for only £320 the Apple can emulate a system costing more than £15,000.

Owl Computers are looking to a big market for this product, and foresee similar response for the next stages in the series, a 3276 emulator and, at long last, an ICL batch terminal emulator.

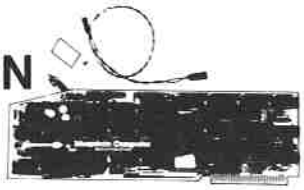
• • •

WINDFALL is being inundated with information about software and hardware products available for the Apple computer. We haven't the room to print it all, but what we are doing, is to store details on disc.

We would like to make this information available to readers of the magazine in the near future. To make sure it is comprehensive as possible we would like dealers and suppliers to keep us fully informed of their latest products. The sort of facts required are the product name, originator, supplier, price, type of product, any current literature about it and whether it is being supplied by a company or an individual.

Readers are already phoning us up to ask about the availability of certain items. Having this information easily available on disc will, hopefully, allow us to handle queries speedily and efficiently.

THE CPS MULTI-FUNCTION CARD



Three cards in one! Mountain Computers' CPS multi-function card has serial parallel interfaces, real time clock/calendar - all on one card - occupying only one slot in your Apple II. A 'phantom slot' capability lets you assign each of the functions of the CPS card to different slots in your Apple without the card actually being in those slots! For example you could put the CPS card in slot 4, and set it up to simulate a parallel card in slots 1 and 2, serial interface in slot 5 and leave the clock ssigned to slot 4. The CPS card is configured by a set-up program which stores parameters such as slot assignments, baud rate, parity, line length etc. in CMOS RAM on the card. On board battery backup retains this setup and the current time for up to two years. 2k on-board firmware controls the CPS card operation - this is paged into the $CN00 space and does not conflict with cards that use the $C800 ROM expansion space.

PARALLEL
● Centronics standard 8 data, STR, ACK ● Re-configurable to other standards ● Bit 8 toggle (on/off) for use with Epson, Microline and similar printers ● Lower case convert (Y/N) ● Regular/Absolute tabbing ● Video on/off etc..

SERIAL
● Uses the powerful 2651 PCI chip ● Full hardware handshaking ● 16 software selectable baud rates from 50 to 19.2k baud ● Asynchronous/synchronous operation ● Half/full duplex ● Transparent terminal mode ● CR delay, local echo ● Simultaneous serial/parallel output etc..

REAL TIME CLOCK/CALENDAR
● Battery back-up (2 years) ● One second to 99 years ● Compatible with MA clock/calendar card ● Uses OKI MSM 5832 chip.

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CPS PARALLEL CABLE (Epson, Microline, Anadex, Centronics type printers)		
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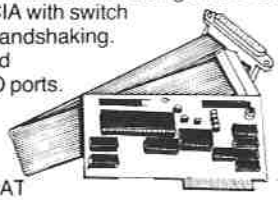
AIO

SSMs' combined serial and parallel interfaces on a single card. Serial interface uses Motorolas' 6850 ACIA with switch selectable baud| rates, hardware handshaking. In addition the card has an on-board 6821 PIA giving 2x8 bit parallel I/O ports.



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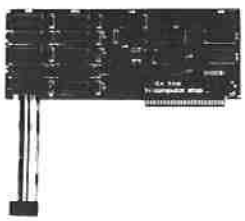
Our own printer card designed specifically for the Anadex DP9500/1 and new DP9000/1 printers. The card behaves as a normal Apple centronics interface but also includes powerful graphics dump software on the ROM permitting dot-for-dot reproduction of a hi-res image on the printer with almost any imaginable format - either hi-res. page, normal or inverse, expanded in X or Y directions with varying scale factors, left, right or centre justified across page.

Nett	VAT	Total
£140.00	£21.00	**£161.00**



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Expediter II converts a standard Applesoft program into a running 6502 machine language program. Expediter II compiles Basic programs at approximately 60 lines per minute. Compiler code runs up to 20 times faster than the original. Extensive statistics symbol table etc. are generated at compile time.

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The Versawriter is a low cost solution to the problems of graphic input on the Apple. It consists of a Mylor plotting board with a clear plastic overlay. Attached to this board is the drawing arm, which has a magnifying lens at its end. You simply place any graph, picture or drawing (up to 8½" x 11") under the plastic overlay and 'trace it' with the drawing arm. As you trace the drawing appears on the video screen. The Versawriter software then allows you to manipulate this drawing, adding text, scaling, rotating, filling areas with colour etc.

Nett	VAT	Total
£117.00	£17.55	**£134.55**

SSM A488 Interface

Based on Motorola's 68488 IEEE chip, the A488 is a powerful IEEE-488 interface for the Apple II. On board is 2K of firmware that links with Applesoft's string handling routines. Control and interface programs are easily coded in Applesoft without the need to resort to 6502 Assembly language.

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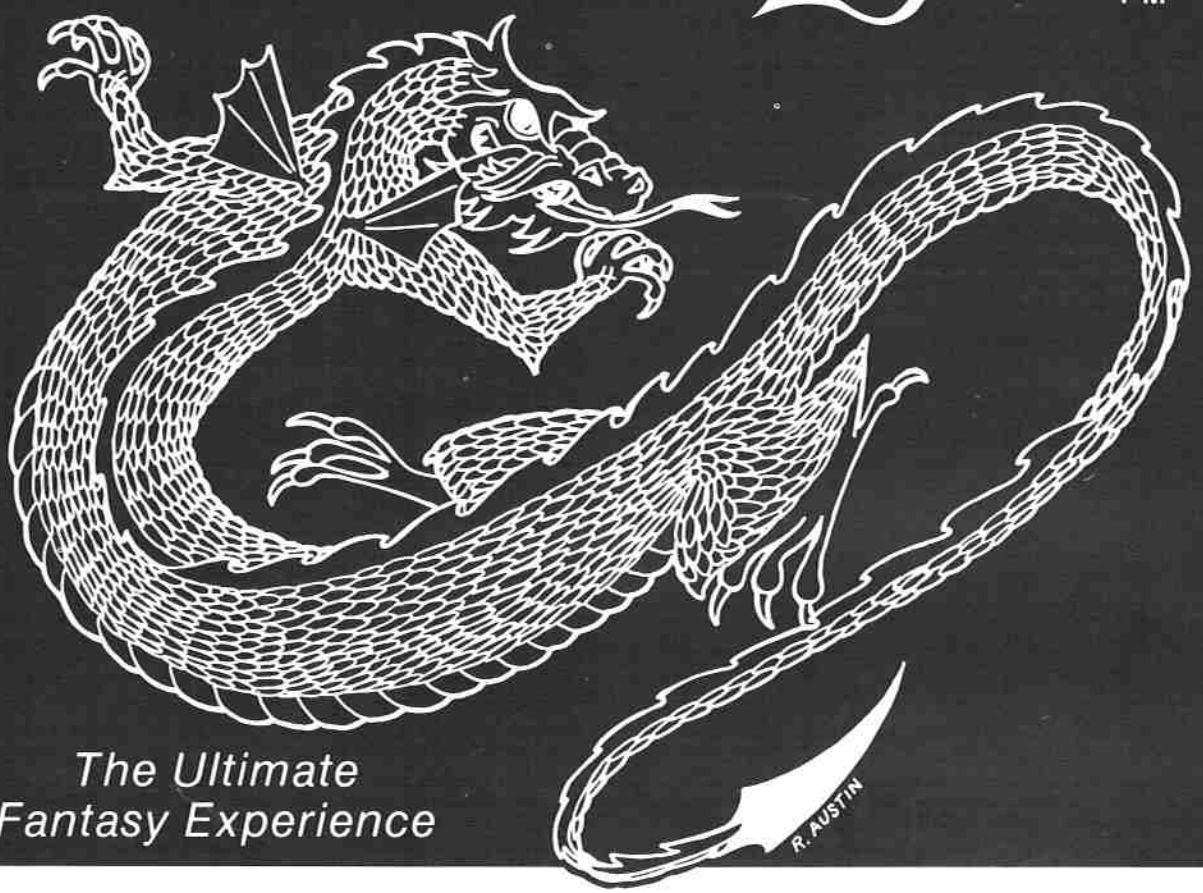

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A partial list of Wizardry features includes—A 10 level maze—8 character classes—5 races—20 stored on disk—3D maze display—complete castle—hundreds of monsters and magic items—monsters appear in mixed groups—50 castable spells, usuable by players, magic items and even monsters—44 page illustrated manual and much, much more all for £31.55*

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THIS is the third in a series of articles designed to help the reasonably experienced Basic programmer develop programs in machine code using the assembler in the DOS toolkit.

Let's keep our dumps elegant

By MIKE GLOVER
Leicester Computer Centre

SO far we have looked at screen mapping using the assembler, output to the screen, and how to input strings containing any characters we want using a short machine code routine.

This month I want to use the information we have learnt regarding the mapping of the Apple screen to help us develop a machine code program which will dump the contents of the screen to a printer.

Before we do so we need to consider the following:

☐ The Ascii screen characters are not the same as the Ascii printer set.

☐ Any command to start the screen dump should not appear on the screen.

☐ Some printer cards 'echo' the characters they print back to the screen, causing it to scroll. It is very difficult to dump a moving screen!

To deal with the first problem careful study must be made of the two character sets on Page 15 of the Apple II reference manual and Pages 138-139 of the Applesoft manual.

In order to avoid confusing the printer it would be useful if we convert all flashing and inverse characters to 'normal' Ascii before sending them. We can also save paper if we remove the control characters at the same time!

This needs careful study of the various character representations and as the Apple is looking at them in binary form it may well pay us to do the same.

For example the screen character 'V' can take on the following values.

MODE	DEC	HEX	BINARY
INVERSE	22	$16	0001 0110
FLASHING	86	$56	0101 0110
CONTROL	150	$96	1001 0110
NORMAL	214	$D6	1101 0110

From this you can see that the two leftmost bits control the screen mode (inverse, flashing, etc.) whereas the other six define the character.

In order to study the three number bases a cross reference chart is very useful. If you do not have one the program at the foot of the page will print one out. To run it, turn on a printer set to a column width of 80, and CALL 768. The output should look like this:-

```
000 $00 0000 0000    001 $01 0000 0001
```

... and so on, until:

```
254 $FE 1111 1110    255 $FF 1111 1111
```

Note that we are using the decimal print routine from DOS and the Hex print routine from the monitor. Study of the listing will show you how simple it is to incorporate these routines into your own programs.

Also note that in the binary print routine we are careful to make sure that the carry bit matches the leftmost bit of the byte we are testing. In this way when we ROL (rotate left) the byte under test we shift in from the carry exactly the same bit status that we shifted out to the right. Consequently, by the time we have finished the byte is restored to its former value, which is just as well as we are also using it as a counter.

The second problem raised was the need to invoke the screen dump from the keyboard (direct mode), without changing the screen by adding characters to it. This rules out the use of CALLs and the ampersand hook.

The approach used has been to monitor the keyboard input looking for a specific character which, if present, causes our routine to work. I have chosen CTRL SHIFT P as the character to look for.

All that remains is to somehow intercept the monitor input routines. This is, in fact, quite easy. Try the following:

Switch on your Apple with the disc drive empty and hit RESET when it tries to BOOT. (We don't want the added complication of DOS just now.)

Now get into the monitor with:

```
CALL - 151
```

type

```
*38.39
```

and you will see:

```
0038- 1B FD
```

If you didn't you probably still have DOS on board, so switch off and try again.

This address is the input vector KSWL ($38) and KSWH ($39). Normally it will point to the KEYIN routine $FD1B in the monitor or its DOS equivalent $9E81 (for a 48k machine).

Lets try pointing it to a routine of our own in Page 3 to get a feel for this business of intercepting.

Type in the following:

```
*300: A9 AD 20 ED FD 4C 1B FD
```

or in other words:

```
LDA #$AD
JSR $FDED
JMP $FD1B
```

Now type 38: 00 03 to point the input vectors to $0300 the starting address of our routine and go back into Basic with CTRL C RETURN.

Try typing something like:

```
J? "WHAT HAS HAPPENED?"
```

What happened of course is that input was sent to the routine at $300 which added the minus sign for every character input.

Study the listing of the screen dump program to see the method used to put

```
0300:                1          ORG  $300
0300:                2          OBJ  $300
0300:                3 *
0300:                4 *******LCC*********************
0300:                5 *                             *
0300:                6 *                             *
0300:                7 *  DEC/HEX/BIN CONV           *
0300:                8 *                             *
0300:                9 *                             *
0300:               10 * M G GLOVER  /05/01          *
0300:               11 *                             *
0300:               12 * LAST REVISION 03/05/81*
0300:               13 *                             *
0300:               14 ********************MGG*******
0300:               15 *
FDED:               16 COUT     EQU  $FDED
AE42:               17 DECPRNT  EQU  $AE42
FDDA:               18 HEXPRNT  EQU  $FDDA
F948:               19 PRBLNK   EQU  $F948
0300:               20 *
00A0:               21 BLANK    EQU  $A0
0300:               22 *
0300:               23 *
0300:A0 00          24 START    LDY  #$00
0302:8C 4A 03       25          STY  NUMBER
0305:               26 *
0305:               27 * DECIMAL PRINT
0305:               28 *
0305:84 44          29 NEXT     STY  $44
0307:20 42 AE       30          JSR  DECPRNT
030A:A9 A0          31          LDA  #BLANK
030C:20 ED FD       32          JSR  COUT
030F:               33 *
030F:               34 * HEX PRINT
030F:               35 *
030F:A9 A4          36          LDA  #'$
0311:20 ED FD       37          JSR  COUT
0314:AD 4A 03       38          LDA  NUMBER
0317:20 DA FD       39          JSR  HEXPRNT
031A:A9 A0          40          LDA  #BLANK
031C:20 ED FD       41          JSR  COUT
031F:               42 *
031F:               43 * BINARY PRINT
031F:               44 *
031F:A2 08          45          LDX  #$08
0321:E0 04          46 LOOP     CPX  #$04
0323:D0 05          47          BNE  SKIPBLNK
0325:A9 A0          48          LDA  #BLANK
0327:20 ED FD       49          JSR  COUT
032A:A9 B1          50 SKIPBLNK LDA #'1
032C:38             51          SEC
032D:AC 4A 03       52          LDY  NUMBER
0330:30 03          53          BMI  PRINT
0332:A9 B0          54          LDA  #'0
0334:18             55          CLC
0335:2E 4A 03       56 PRINT    ROL  NUMBER
0338:20 ED FD       57          JSR  COUT
033B:CA             58          DEX
033C:D0 E3          59          BNE  LOOP
033E:20 48 F9       60          JSR  PRBLNK
0341:EE 4A 03       61          INC  NUMBER
0344:AC 4A 03       62          LDY  NUMBER
0347:D0 BC          63          BNE  NEXT
0349:60             64          RTS
034A:               65 NUMBER   DS   1
```

FIRST STEPS

the address of 'CHECK' into KSWL and KSWL+1. By jumping to $3EA we have let DOS know what is going on.

There is a small trick here worth noting: What we really wanted to do was to JSR to $3EA and then RTS to our calling routine. However, as the DOS connecting subroutine has an RTS of its own a JMP instruction will cause the RTS to carry out the return, saving us a byte and some time.

Finally there is the problem of keeping the screen still. One way would be to tell the printer card not to send characters back, but that is difficult as there are so many different cards now on the market.

The solution I have adopted is to allow the text to come back if it wants to, but to a very much reduced text window (one byte in fact). This has been done by setting locations $21 (WNDLFT) and $22 (WNDTOP) to zero, and locations $21 (WNDWTH), $23 (WNDBTM) to one.

The cursor vertical position ($25) has been set to zero and a JSR to VTAB has set things up and moved the cursor to the top left position prior to output. The byte at location $400 has been saved on the stack so we don't mind if it gets clobbered as we can put it back later.

To use the routine you can CALL 768 to set up the intercept and then anytime you press CTRL SHIFT P at the keyboard you will get a dump. Reset will disable the routine.

Alternatively, from a program you could CALL 787. To change the printer slot you can POKE the new slot number into 829. If your printer prints the dump on one line making it hard to read then you may like to send a line feed as well as a carriage return at line 103.

Note that when you save information on the stack you must be careful to take exactly the same amount of information off again in reverse order. Subroutine return addresses are kept on the stack and if your routine changes the address of the stack pointer things could get quite exciting!

Next month we will look at sorting a Basic array in machine code using a simple bubble sort to change the array pointers rather than the strings themselves. This will mean taking a good look at just how Applesoft stores arrays and the screendump will be very useful to provide hardcopy to help us in our investigations.

```
SOURCE FILE: SCREENDUMP

------ NEXT OBJECT FILE NAME IS SCREENDUMP.OBJ0
0300:             1          ORG  $300
0000:             2          OBJ  $300
0300:             3 *
0300:             4 ****LCC*******************
0300:             5 *                        *
0300:             6 *     SCREENDUMP         *
0300:             7 *                        *
0300:             8 * USES INPUT VECTORS     *
0300:             9 *                        *
0300:            10 * M G GLOVER 25/04/81    *
0300:            11 *                        *
0300:            12 * LAST REVISION 07/06/81*
0300:            13 *                        *
0300:            14 ****************MGG****
0300:            15 *
0020:            16 WNDREG  EQU  $20
0036:            17 CSWL    EQU  $36
0038:            18 KSWL    EQU  $38
00FE:            19 SCRNPTR EQU  $FE
0400:            20 TOPLEFT EQU  $400
0300:            21 *
03EA:            22 TELDOS  EQU  $3EA
FC22:            23 VTAB    EQU  $FC22
FD18:            24 KEYIN   EQU  $FD18
FD8E:            25 CROUT   EQU  $FD8E
FDED:            26 COUT    EQU  $FDED
FE95:            27 OUTPORT EQU  $FE95
FF3F:            28 RESTORE EQU  $FF3F
FF4A:            29 SAVE    EQU  $FF4A
0300:            30 *
0001:            31 SLOT    EQU  $01        ;PRINTER SLOT
0300:            32 *
0300:A9 08       33         LDA  #>CHECK
0302:85 38       34         STA  KSWL
0304:A9 03       35         LDA  #<CHECK
0306:85 39       36         STA  KSWL+1
0308:4C EA 03    37         JMP  TELDOS
030B:            38 *
030B:            39 * LOOK FOR ;<CTRL> @
030B:            40 *
030B:20 18 FD    41 CHECK   JSR  KEYIN
030E:C9 80       42         CMP  #$80       ;<CTRL> @
0310:F0 01       43         BEQ  DUMP       ; FOUND ONE
0312:60          44         RTS
0313:            45 *
0313:            46 * SAVE HOOKS & REGISTERS ETC
0313:            47 *
0313:20 4A FF    48 DUMP    JSR  SAVE
0316:A2 05       49         LDX  #$05
0318:B5 20       50 NEXT1   LDA  WNDREG,X  ;SAVE WIDOW STATUS
031A:9D AE 03    51         STA  WNDSAV,X
031D:CA          52         DEX
031E:10 F8       53         BPL  NEXT1
0320:E8          54         INX             ;MAKE X ZERO
0321:A5 36       55         LDA  CSWL
0323:48          56         PHA
0324:A5 37       57         LDA  CSWL+1
0326:48          58         PHA
0327:86 FE       59         STX  SCRNPTR    ;START AT
0329:A0 04       60         LDY  #$04       $0400
032B:84 FF       61         STY  SCRNPTR+1
032D:88          62         DEY
032E:8C B5 03    63         STY  COUNT3     ;Y NOW IS 3
0331:86 20       64         STX  $20        ;X IS STILL ZERO
0333:86 22       65         STX  $22
0335:86 25       66         STX  $25
0337:E8          67         INX             ;X IS NOW 1
0338:86 21       68         STX  $21
033A:86 23       69         STX  $23
033C:            70 * POINT OUTPUT TO PRINTER
033C:            71 *
033C:A9 01       72         LDA  #SLOT
033E:20 95 FE    73         JSR  OUTPORT
0341:AD 00 04    74         LDA  TOPLEFT    ;SAVE TWICE
0344:48          75         PHA
0345:48          76         PHA
0346:20 22 FC    77         JSR  VTAB
0349:20 8E FD    78         JSR  CROUT      ;CLEAR PRINTER BUFFER
034C:68          79         PLA             ;RESTORE TOPLEFT BYTE
034D:8D 00 04    80         STA  TOPLEFT
0350:            81 *
0350:            82 * OUTER LOOP LEVEL
0350:            83 *
0350:A9 08       84 LOOP8   LDA  #$08       ;INITIALISE COUNTER
0352:8D B4 03    85         STA  COUNT8
0355:            86 *
0355:            87 * OUTPUT A LINE
0355:            88 *
0355:A0 00       89 LINOUT  LDY  #$00
0357:B1 FE       90 LOOP1   LDA  (SCRNPTR),Y ;GET A CHAR
0359:            91 *
0359:            92 * MASK OUT UNFRIENDLY CHARACTERS
0359:            93 *
0359:29 BF       94         AND  #$BF       ;1011 1111
035B:09 80       95         ORA  #$80       ;1000 0000
035D:C9 A0       96         CMP  #$A0       ;1010 0000
035F:B0 02       97         BCS  CTRL
0361:49 40       98         EOR  #$40       ;0100 0000
0363:20 ED FD    99 CTRL    JSR  COUT       ;SEND TO PRINTER
0366:C8         100         INY
0367:C0 28      101         CPY  #$28       ;FINISHED LINE?
0369:D0 EC      102         BNE  LOOP1      ;NO GET NEXT CHAR
036B:20 8E FD   103         JSR  CROUT      ;YES SEND CARRIAGE RETURN
036E:           104 *
036E:           105 * CALC POSN OF NEXT LINE
036E:           106 *
036E:18         107         CLC             ;CLEAR BEFORE ADC
036F:A9 80      108         LDA  #$80
0371:65 FE      109         ADC  SCRNPTR    ;CALC POS
0373:85 FE      110         STA  SCRNPTR    ;OF NEXT LINE
0375:90 02      111         BCC  SKIP
0377:E6 FF      112         INC  SCRNPTR+1
0379:CE B4 03   113 SKIP    DEC  COUNT8
037C:D0 D7      114         BNE  LINOUT     ;DONE THIS BLOCK
037E:CE B5 03   115         DEC  COUNT3     ;ALL DONE?
0381:F0 0D      116         BEQ  END        ;YES FINISH
0383:18         117         CLC             ;NO CALC NEXT LINE POSN
0384:A9 28      118         LDA  #$28
0386:65 FE      119         ADC  SCRNPTR
0388:85 FE      120         STA  SCRNPTR
038A:A9 04      121         LDA  #$04
038C:85 FF      122         STA  SCRNPTR+1
038E:D0 C0      123         BNE  LOOP8      ;ALWAYS TAKEN
0390:           124 *
0390:           125 * RESTORE HOOKS ETC
0390:           126 *
0390:20 8E FD   127 END     JSR  CROUT
0393:68         128         PLA             ;LAST IN FIRST OUT
0394:8D 00 04   129         STA  TOPLEFT
0397:68         130         PLA
0398:85 37      131         STA  CSWL+1
039A:68         132         PLA
039B:85 36      133         STA  CSWL
039D:A0 05      134         LDY  #$05
039F:B9 AE 03   135 NEXT2   LDA  WNDSAV,Y   ;RESTORE WINDOW INFO
03A2:99 20 00   136         STA  WNDREG,Y
03A5:88         137         DEY
03A6:10 F7      138         BPL  NEXT2
03A8:20 22 FC   139         JSR  VTAB       ;PUT CURSOR AS IT WAS
03AB:4C 3F FF   140         JMP  RESTORE    ;REGISTERS
03AE:           141 *
03AE:           142 * REGISTER SPACE
03AE:           143 *
03AE:           144 WNDSAV  DS   6
03B4:           145 COUNT8  DS   1
03B5:           146 COUNT3  DS   1

xxx SUCCESSFUL ASSEMBLY: NO ERRORS
```

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CBB isn't a breaker with a stutter

By DAVID CHADWICK

AN important use for Apples in the USA lies in the field of communications. It is estimated that about one quarter of all American Apples have a communications capability. In this country the number is very much lower, but the advantages are so great and with costs not so high as one might think the figure is expected to increase dramatically.

In most cases, the capability is achieved by means of a modem, the device described last month which allows the telephone system to be used as a sophisticated network linking Apples to other Apples, mainframe computers and a host of information providers.

In this country modems are generally acoustically coupled, which means that the modem feeds sound from a speaker into the telephone mouthpiece and receives sound from the earpiece.

The disadvantages are obvious. Loud noises, such as from a typewriter, are picked up by the modem, and create interference. Although this problem can be minimised by reducing the modem's sensitivity, this could give data errors on weak signals that can be encountered on long distance calls.

The ideal solution is to eliminate the acoustic coupling and feed audio information directly onto the telephone wires as electrical signals. This is the standard method of providing a modem link in the States, and is now becoming available in this country after many years resistance by the Post Office. These 'direct connect' modems plug directly into standard sockets in the line and prevent external noise from affecting the accuracy of data transmission.

The increased data reliability of direct connect modems makes it easier to install advanced features. For example, with one of this type of modem, the Microconnection, there is an auto-dial/auto-answer function. This allows the modem, under computer control, to dial another system at a pre-arranged time, or to automatically answer a call.

Using this feature it is possible to exchange information late in the evening when phone rates are cheapest. This modem is capable of operating in full duplex mode, simultaneously transmitting and receiving data.

Although these direct connect modems used to be more expensive than the acoustically coupled variety advances in technology have enabled the price to be reduced to compete directly with British Telecom modems. This, plus the increased sensitivity of the modems providing more reliable data transmission, will make them the cornerstone of the major expansion of communication due over the next few years. *(The Microconnection is featured in this month's Compucopia – Page 45.)*

Bulletin Boards

The reason the United States is so well ahead of this country in communications with computers and the reason why one in every four Apples has this capability, is because of the availability of better modems, and because local phone calls are free. Hence the major use of Computer Bulletin Boards.

Hundreds of these CBBs have been set up by private individuals, user groups or companies, who open their computers and phone lines to anyone wishing to call. All that is required to operate or log in to a CBB is an Apple with one of a number of communications cards, a modem, and some software.

These message centres function rather like newspaper classified ads. They can be used for leaving messages for each other, advertising hardware and software, or just for exchanging information about the Apple, or any other item of computing interest.

Some systems also offer the facility to download generally available software, providing the user with cheap access to useful programs. *(Windfall hopes to offer this service for software listed in the magazine in the not too distant future.)*

Users of such a system usually check their local bulletin boards daily to see if any messages have been left for them, and to keep up to date with local activities.

Forum-80

The operating costs of such a system can be kept very low if bulletin boards are maintained within local telephone areas and activity is centered around off-peak telephone times. As an example, Frederick Brown in Hull has been running a system called Forum-80, originally based on a TRS-80 computer. He has made his system available for Apple and Pet users, and there are other Forum-80 systems in Milton, London and Holland.

Before moving to the major information systems, let's take a quick look at the facilities offered by Forum-80. To access the system you require an Apple with an interface card handling RS232, a modem, and the Forum-80 software package. You dial up someone who is also on the system and when you hear a tone indicating that the other party has answered, set your modem to originate, or place your phone in the cups of an acoustic coupler. If all goes well a message will appear on the monitor screen.

The message is essentially a greeting which asks for your name and then checks to see if you have previously logged in under the system. If you have, a record of your system configuration will be recorded.

This is necessary because certain control characters peculiar to the Apple do not appear with other micros, and once the system knows you have an Apple it can log you into an Apple modified routine. A 'Universal' configuration exists for new users.

There then runs a routine telling you whether any messages have been left which you can retrieve. A series of bulletins are also available. While you are doing this, a reminder comes up advising how long you have been connected. At first people don't pay much attention, but after the first phone bill it assumes greater importance!

Forum-80 runs using a series of single key commands. The following list shows what one can do with the system.

S Summarise messages
E Enter messages
F Flagged message retrieval
O Other system numbers
H Help with system operation
C Configuration changes
T Terminate connection
R Retrieve messages
K Kill messages
M Messages in system
I Information about system
U User log
L Local features section.

Most of these features are obvious,

→

COMMUNICATIONS

others require explanation. "Summarise messages" gives the headings of messages only, allowing one to pick out those of interest. The category of a message is determined as Miscellaneous, Commercial, Graphics or Experimental and Personal. Personal messages can be passworded.

"Other system numbers" provides an index of other systems, including those which are not Forum-80 systems.

"Information about system" will give the times of operation. Many people use their Apples for other purposes and cannot be available 24 hours a day. "User log" shows the list of users who have called the system in reverse chronological order.

This type of system is ideal for local groups to keep in touch with each other and is used widely in the States. If you want more information on setting up your own system, or would like to access an existing system, try these addresses:

Forum-80 Hull: The World's First International Bulletin Board. Contact Frederick Brown. Tel: 0482 850169.

Forum-80 London: Contact Leon Jay. Tel: 01-286 6207.

Forum-80 Milton: Contact Leon Heller or Brian Pain. Tel: 0908 566660.

Forum-80 Holland: Contact Nico Karssemeyer. Tel: 010 313512 633.

CBBS London: Contact Peter Goldmann. Tel: 01-399 2136.

Frederick Brown can also be contacted by writing to him at 421 Endike Lane, Hull, HU6 8AG.

Post Read Apple

There is nothing to stop a user who has set himself up to use a system like Forum-80 from then going on to contact one of the major databases. As long as you have a system, know the telephone number of the system you wish to communicate with, and have a password issued to get into the system, you can go ahead.

Several large computer users have set themselves up to cater for the expanding number of personal computer owners who want access to their databases. As well as holding an enormous amount of information for specific computer user groups, operating on the same principles as the local bulletin boards but on a much wider scale, they maintain large files on most topics of interest, much like the Prestel service described in last month's Windfall.

Three major databases of interest to Apple users, all of which can be accessed from Britain, are the American systems, The Source and Compuserve, and the Euronet-Diane.

The Source is a network of Prime computers in Maryland. With it users can access the latest news headlines, consumer databases, domestic and international airline schedules, share and commodity prices and much more. In addition there is a section devoted to Apple users which can be accessed with the command POST READ APPLE.

More than 10,000 Apple users regularly log in to this system to find out what is new on the Apple scene. Because it is based on a series of powerful computers, it is essentially a multi-user system and there is no reasonable constraint on people wanting to link into it. Using The Source costs about £18 an hour, plus the cost of the phone call. This has been considerably reduced by British Telecom's introduction of the 'Packet Switched' network, IPSS, which allows data transmission over phone lines at a fraction of the cost of the ordinary PSTN (Public Switched Telephone Network).

Compuserve is a similar system to The Source, and is accessed under its more well known name Micronet. Euronet-Diane also uses packet switching technology to carry information between users and their selected databases within the EEC.

Diane stands for 'Direct Information Access Network for Europe'. It provides any interested party in Europe with a host of scientific and technical data. Examples of data stored include world patents indexes, a pharmaceutical news index, energy information and electronics components specifications. Compuserve, a network of DEC computers, allows one to access the UPI news wire, receiving the news as fast as local editors.

Andrew Newmark, of Spreebond Computers in London, markets the Microconnection modem, and communicates regularly with The Source and Compuserve. The program he uses for the purpose is Datacapture.

It transforms his Apple into an intelligent terminal, allowing automatic connections to be made into the system and enabling data to be stored in the Apple as a log of the transaction, to be printed out onto any printer whenever required.

Other programs, such as Z-term and Ascii Express, can also be used for the same purpose, as can the routine on the opposite page.

Appletips

MAGI Test 1 Integer is a benchmark for integer calculations, based on a non recursive solution to Ackerman's function (see Windfall, Aug 81).

The listing shows how the program was saved as a text file A (DS is CTRL-D) and an Integer Basic version of A was run by typing INT, EXECuting A, and RUNning for the example A(3,4)=125 (208 secs).

An FP altered the language to Applesoft, and EXECuting, then RUNning, gave a timing of 257 secs for A(3,4) (Applesoft was slower). Then the Applesoft program was modified so that all variables were "integerized" by the addition of % after each variable name – the time taken was 268 secs, even slower (so why use integer variables in Applesoft?)

The use of the EXEC facility would seem to have a great potential for purposes other than those originally considered.

```
LIST
    0 D$="": PRINT D$;"OPEN A": PRINT
      D$;"WRITE A": LIST 1,9000: PRINT
      D$;"CLOSE A": END
```

```
    1 REM
    2 REM     MAGI TEST 1 INTEGER
    3 REM     ********************
    4 REM
    5 REM     (C) G J BORIS ALLAN, 1981
    6 REM
    7 REM     ALL RIGHTS RESERVED
    8 REM
    9 REM
1010 DIM STACK(1000): REM     SOFTWARE ST
     ACK
1020 INPUT X,Y: REM     BECOME M,N
1030 M=X:N=Y: PRINT : PRINT
1040 GOSUB 2000
1050 PRINT "A(";X;",";Y;") = ";A
1070 GOTO 1020
1080 END
1990 REM
2000 A=0:I=A
2010 IF M)0 THEN 2040: REM    CONDITION(1
     ) CHECK
2020 A=N+1: IF I)0 THEN 2100: REM    CHEC
     K TO SEE IF STACK EMPTY
2030 RETURN
2040 IF N)0 THEN 2060: REM    CONDITION(2
     ) CHECK
2050 M=M-1:N=1: GOTO 2010
2060 IF I(1000 THEN 2090
2070 A=0: RETURN
2090 I=I+1:STACK(I)=M-1:N=N-1: GOTO 2010
     : REM    CONDITION(3) IS OPERATIVE G
     OING DOWN
2100 M=STACK(I):N=A:I=I-1: GOTO 2010:
      REM     GOING BACK UP THE STACK
2110 PRINT "IMPOSSIBLE BRANCH": REM    WE
     SHOULDN'T BE HERE !!
2120 END
```

Not-so-dumb teletype terminal

STEPHEN Alsop, of DMS Electronics, provides this routine enabling the Apple to be used as a dumb teletype terminal, using either the CCS asynchronous serial interface card or the Simon interface card.

Although the communications card is capable of providing the necessary connection to create the teletype terminal from the Apple it has a number of limitations which can be overcome by using more sophisticated cards.

The communications card is restricted to 300 or 110 baud, while the CCS and the Simon cards can operate up to 19,200 baud.

Printing functions, such as line feeds, carriage returns and print formatting, are not available with the communications cards but can be used quite readily with the serial interface cards. A problem also occurs when the originating computer requests commands other than ones provided by the communications card (CTRL A, for instance).

With an appropriate software routine such as the one listed here the interface to the host computer is made totally transparent and any command which you would need to type in on a teletype could be input on the Apple with the same effect.

If you wish to use this program to create a teletype terminal with your Apple it should be credited to Stephen Alsop and P. Auchterlonrie who wrote it. Although it was written for the CCS card, a couple of POKEs will enable it to drive the Simon interface cards too.

```
SOURCE FILE: SERIAL LINKUP
0000:             1 ;*************************************************
0000:             2 ;
0000:             3 ;APPLE TO MAINFRAME LINKUP VIA RS232 (+MODEM)
0000:             4 ;
0000:             5 ;USING A SERIAL ASYNCHRONOUS INTERFACE IN SLOT 2
0000:             6 ;(CCS OR SIMON TYPES)
0000:             7 ;
0000:             8 ;AND A PARALLEL CARD IN SLOT 1 IF REQUIRED
0000:             9 ;
0000:            10 ;
0000:            11 ;THIS IS FOR GENERAL USE BY SCHOOLS
0000:            12 ;
0000:            13 ;
0000:            14 ;
0000:            15 ;
0000:            16 ;
0000:            17 ;THIS HAS BEEN WRITTEN FOR THE CCS CARD
0000:            18 ;
0000:            19 ;ALTER THE VALUES OF STATUS AND DATA FOR DIFFERENT CARDS
0000:            20 ;E.G. SIMON SERIAL
0000:            21 ;STATUS = $C08E + N0
0000:            22 ;DATA   = $C08F + N0
0000:            23 ;
0000:            24 ;*************************************************
0000:            25 ;
0000:            26 ;
0000:            27 ;SET THE BAUD RATE CORRECTLY!
0000:            28 ;
0000:            29 ;
0000:            30 ;
C000:            31 KEYVAL  EQU  $C000      ;VALUE OF KEY PRESSED
C010:            32 KEYSTB  EQU  $C010      ;CLEARS LAST KEYPRESS
FDED:            33 OUTVEC  EQU  $FDED      ;THIS O/PS A CHARACTER VIA HOOKS
FC58:            34 HOME    EQU  $FC58      ;CLEARS THE SCREEN
C100:            35 PRTADD  EQU  $C100      ;$CN00 WHERE N=SLOT OF PRINTER CARD=1
9DBF:            36 BASIC   EQU  $9DBF      ;BACK TO BASIC VIA DOS (48K VALUE)
C0A0:            37 STATUS  EQU  $C0A0      ;$C0B0+N0 WHERE N=SLOT OF SER. CARD=2
C0A1:            38 DATA    EQU  $C0A1      ;$C0B1 + N0
0000:            39 ;
0000:            40 ;
0000:            41 ;
----- NEXT OBJECT FILE NAME IS SERIAL LINKUP.OBJ0
0300:            42          ORG  $300
0000:            43          OBJ  $300
0300:            44 ;
0300:            45 ;
0300:A9 23       46 INIT    LDA  £$23      ;ACIA RESET
0302:8D A0 C0    47          STA  STATUS
0305:A9 11       48          LDA  £$11      ;8 DATA, 2 STOP, 0 PARITY BITS.
0307:8D A0 C0    49          STA  STATUS
030A:20 58 FC    50 START   JSR  HOME       ;CLEAR SCREEN
030D:20 89 FE    51          JSR  $FE89     ;INEO AND DISCONNECTS DOS
0310:20 93 FE    52          JSR  $FE93     ;PR£0  -  -  -  -  -  -  -  -
0313:AD A0 C0    53 LOOP    LDA  STATUS    ;CHECK RX BIT
0316:4A          54          LSRA
0317:B0 1A       55          BCS  INPUT     ;CHARACTER READY
0319:AD 00 C0    56          LDA  KEYVAL    ;CHECK FOR KEYPRESS
031C:10 F5       57          BPL  LOOP      ;NO KEYPRESS
031E:2C 10 C0    58          BIT  KEYSTB    ;YES CLEAR STROBE
0321:20 3E 03    59          JSR  KEYCHK    ;CHECK FOR FUNCTION
0324:48          60          PHA            ;SAVE AWHILE
0325:AD A0 C0    61 TXLOOP  LDA  STATUS    ;CHECK TX
0328:29 03       62          AND  £$03      ;ISOLATE TX
032A:F0 F9       63          BEQ  TXLOOP    ;BUSY, WAIT.
032C:68          64          PLA            ;RETRIEVE  KEYBOARD CHAR.
032D:8D A1 C0    65          STA  DATA      ;OUTPUT CHAR. TO ACIA
0330:4C 13 03    66          JMP  LOOP      ;START AGAIN
0333:AD A1 C0    67 INPUT   LDA  DATA      ;GET CHARACTER FROM ACIA
0336:09 80       68          ORA  £$80      ;ADD TOP BIT FOR NORMAL VIDED
0338:20 ED FD    69 COUT    JSR  OUTVEC    ;PRINT IT
033B:4C 13 03    70          JMP  LOOP      ;START AGAIN
033E:            71 ;
033E:            72 ;
033E:            73 ;THIS IS A COMMAND TABLE TO ALLOW EXITS ETC.
033E:            74 ;
033E:            75 ;
033E:C9 9B       76 KEYCHK  CMP  £$9B      ;ESC KEY
0340:F0 10       77          BEQ  ESC       ;EXIT TO BASIC
0342:C9 88       78          CMP  £$88      ;BACKSPACE KEY
0344:F0 09       79          BEQ  RUBOUT    ;OUTPUT A RUBOUT TO THE TERMINAL
0346:C9 90       80          CMP  £$90      ;CTR P
0348:F0 0D       81          BEQ  PRTON     ;VECTOR OUTPUTS TO THE PRINTER
034A:C9 91       82          CMP  £$91      ;CTR Q
034C:F0 1B       83          BEQ  PRTOFF    ;RESTORE SCREEN ONLY
034E:60          84          RTS            ;NON FOUND & SO RETURN
034F:            85 ;
034F:            86 ;
034F:            87 ;THIS SENDS THE CODE "FF" TO THE MAINFRAME, WHICH IT
034F:            88 ;RECOGNISES AS RUBOUT. IF YOUR SYSTEM USES A DIFFERENT VALUE
034F:            89 ;THEN SUBSTITUTE IT HERE.
034F:            90 ;
034F:            91 ;
034F:A9 FF       92 RUBOUT  LDA  £$FF
0351:60          93          RTS
0352:            94 ;
0352:            95 ;
0352:            96 ;THIS EXITS THE ROUTINE AND JMPS INTO BASIC VIA DOS
0352:            97 ;
0352:            98 ;
0352:68          99 ESC     PLA            ;POP 2 BYTES OFF THE STACK TO
0353:68         100         PLA            ;ALLOW A JMP FROM WITHIN A JSR
0354:4C BF 9D   101         JMP  BASIC     ;****)
0357:           102 ;
0357:           103 ;
0357:           104 ;THIS STORES THE PRINTER ROUTINE AT THE OUTPUT HOOKS
0357:           105 ;$36 & $37. ALL DATA IS NOW PRINTED.
0357:           106 ;
0357:           107 ;
0357:A9 00      108 PRTON  LDA  £PRTADD   ;LOBYTE VALUE
0359:85 36      109         STA  $36
035B:A9 C1      110         LDA  £PRTADD/256 ;HYBYTE VAL
035D:85 37      111         STA  $37
035F:A9 0D      112         LDA  £$0D      ;C/R IS SENT TO THE PRINTER
0361:20 ED FD   113         JSR  OUTVEC    ;TO INITIALISE THE CARD THE 1ST TIME
0364:68         114 RETURN  PLA            ;POP 2 BYTES OFF THE STACK TO
0365:68         115         PLA            ;ALLOW A JMP FROM WITHIN A JSR
0366:4C 13 03   116         JMP  LOOP      ;START AGAIN
0369:           117 ;
0369:           118 ;
0369:           119 ;THIS RESTORES THE APPLE MONITOR OUTPUT ROUTINE BACK INTO
0369:           120 ;THE OUTPUT HOOKS AT $36 & $37 DISABLING THE PRINTER
0369:           121 ;
0369:           122 ;
0369:A9 F0      123 PRTOFF  LDA  £$F0      ;LOBYTE OF MONITOR
036B:85 36      124         STA  $36       ;O/P ROUTINE
036D:A9 FD      125         LDA  £$FD      ;HYBYTE
036F:85 37      126         STA  $37
0371:D0 F1      127         BNE  RETURN    ;ALWAYS BRANCHES BACK

*** SUCCESSFUL ASSEMBLY: NO ERRORS
```

```
*300.372

0300- A9 23 8D A0 C0 A9 11 8D
0308- A0 C0 20 58 FC 20 89 FE
0310- 20 93 FE AD A0 C0 4A B0
0318- 1A AD 00 C0 10 F5 2C 10
0320- C0 20 3E 03 48 AD A0 C0
0328- 29 03 F0 F9 68 8D A1 C0
0330- 4C 13 03 AD A1 C0 09 80
0338- 20 ED FD 4C 13 03 C9 9B
0340- F0 10 C9 88 F0 09 C9 90
0348- F0 0D C9 91 F0 1B 60 A9
0350- FF 60 68 68 4C BF 9D A9
0358- 00 85 36 A9 C1 85 37 A9
0360- 0D 20 ED FD 68 68 4C 13
0368- 03 A9 F0 85 36 A9 FD 85
0370- 37 D0 F1
*0

]7"


]LIST

10  TEXT : HOME
11  PRINT "(C) 1981 DMS ELECTRONICS": PRINT : PRINT : PRINT
20  PRINT "THIS ALLOWS AN RS232 LINKUP VIA AN": PRINT : PRINT "ASYNCHRONOUS SERI
AL CARD IN SLOT 2": PRINT : PRINT : PRINT
21  PRINT "ESC    RETURNS TO BASIC": PRINT
22  PRINT "CTR P  ENABLES THE PRINTER (IN SLOT1)": PRINT
23  PRINT "CTR Q  DISABLES THE PRINTER": PRINT
30  PRINT "BLOAD LINKUP.OBJ0,A$300"
40  PRINT : PRINT : PRINT : PRINT "PRESS A KEY TO BEGIN  ";: GET A$: PRINT : PRI
NT : CALL 768
```

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Back numbers of Liverpool Software Gazette – some of their major contents are listed below – are still available and can be obtained for £1 each, post free, from Windfall, Europa House, 68 Chester Road, Hazel Grove, Stockport, SK7 5NY.

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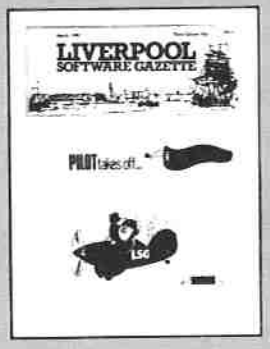
Two useful Pascal programs
Structured and not so structured programming.



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No 8 and 9.
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Macro's and Micro's
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A useful Romplus program
Apple DOS 3.3.

CRASH COU

With computers handling everyt home budgets to maths teaching, invoices to national accounts, wou nice to know how the computer numbers? In this second day of teaching you how to programme in days we examine this area of work, referred to as ''number crunching''.

IT IS easy to think of the computer as a calculator. However the facility to be programmed and to access a large internal memory sets the computer well above the domain of calculators. But this does not mean that the computer cannot act as a calculator.

There are two ways of handling numbers on a computer – *Direct Mode* and *Program Mode.*

In the *Direct Mode* we use the computer in the same way as we would a calculator. Try adding 25 and 75. Type 25, then the + key, then 75 and press the RETURN key. What happened?

According to your screen nothing happened but the computer has actually worked out the answer. This is one difference between calculators and computers.

Calculators have an automatic display. To get the computer to display the result we would have to type out our calculation as PRINT 25+75 then press the RETURN key. This time there is an answer on the screen for all to see.

Try adding three numbers. Throw in a few subtractions, etc., just to see how much use can be made of this facility. You should have as many functions as a good scientific calculator.

The arithmetic function keys are + for addition, – for subtraction, * for multiplication and / for division. Brackets can also be used, as well as SIN, COS, TAN, etc.

See if you can work out what the result of this calculation will be:

```
PRINT (5 * ((2–1)+(2+1)))/2
```

In order of priority the computer will operate on brackets first, multiplication or division secondly, addition or subtraction last of all. If there are two procedures of equal priority in one calculation stage the order of operation is taken left to right.

Looking at the calculation above the operations which the computer would perform would be like this:

Innermost brackets first with priority left to right:

(2–1) = 1
(2+1) = 3

Middle brackets next:

(1+3) = 4

Outermost brackets next:

(5 * (4)) = 20

Division last of all:

20 / 2 = 10

The answer, therefore, should be TEN. Try it on your computer to see if this is true.

In the *Program Mode* we could just put line numbers in front of all our calcula-

hing from
company
ldn't it be
deals with
our course
just seven
commonly

For our next trick let's try branching out..

By JEFF TURNER

tions. But what happens when you want to repeat one process over and over again?

Assume that we have been given a problem to solve. We are to start with 10p and add 2.5p to this starting value. We have to show the result of this calculation, along with the starting figure of 10p. We then have to add 1p to our addition value – 2.5p – and add this to our new total. This process has to be repeated five times with each new value being PRINTed on the screen in two columns.

The end result should be displayed like this:

10	**2.5**
12.5	**3.5**
16	**4.5**
20.5	**5.5**
26	**6.5**
32.5	**7.5**

A program which could solve this problem could be as follows

```
10 LET A = 10
20 LET B = 2.5
30 LET X = 0
40 PRINT A,B
50 LET A = A + B
60 LET X = X + 1
70 LET B = B + 1
80 IF X > 5 THEN 100
90 GOTO 40
100 END
```

Let us look at this program in detail.

Lines 10, 20 and 30

A,B and X are being used as labels for the numbers we wish to change, in the same way as letters are used to represent numbers in algebra. Because we can vary the values of the numbers these letters, or labels, are called *variables.* A,B and X are therefore the variables we use in this program. The range of variables which can be used within programs is A to Z, AA to ZZ, and A1 to Z9.

We have instructed the computer to give variable A the value 10, variable B the value 2.5 and variable X the value 0. When we refer to these variables later in the program the computer will look in its memory store to see what the current value of the variable is. This value will be the value used in any calculation involving the variable.

Line 40

This line prints the values of A and B (our starting amount and the addition amount) on the screen. The comma between A and B is a command used with the PRINT statement to display in a column format on the screen. Note that the current value of the variables A and B are displayed, not the actual letters.

Lines 50, 60 and 70

These are the program lines where we increase the values of our variables. On line 50 we add the current value of variables A and B to arrive at a new value for variable A. The computer treats the A to the left of the = sign as *new* A and the A to the right of the = sign as *old* A. Similarly we are increasing the value of X by one in Line 60, and the value of B by one in Line 70.

Look at the diagram below to see how each value is changing.

Line 80

On this line we are checking the current value of variable X to see if we have repeated our additions five times. X is therefore acting as a counter to allow us to repeat just as many times as we require – in this case five.

If X has the value greater than 5 then the program jumps to Line 100 and ends the program run. The IF . . . THEN statement is called a conditional branching statement because it allows a check to be built into programs so that procedures can be repeated a set number of times.

If the value of X is not greater than 5 the program continues to Line 90, where it is told to go back to Line 40 and work through those procedures again.

Using a counter within a program in this way is quite cumbersome as you, the programmer, have to remember to set the starting values of your variable and possibly reset the value from time to time as the program is executed.

To take the place of the variable X and the counting procedure just used we could alternatively use the FOR . . . NEXT statement. Using this program statement we set up the beginning and ending values in one line of programming. We can also compress the program into fewer lines, like this:

```
10 A = 10 : B = 2.5
20 FOR X = 0 to 5
30 PRINT A, B
40 A = A+B : B = B + 1
50 NEXT X
```

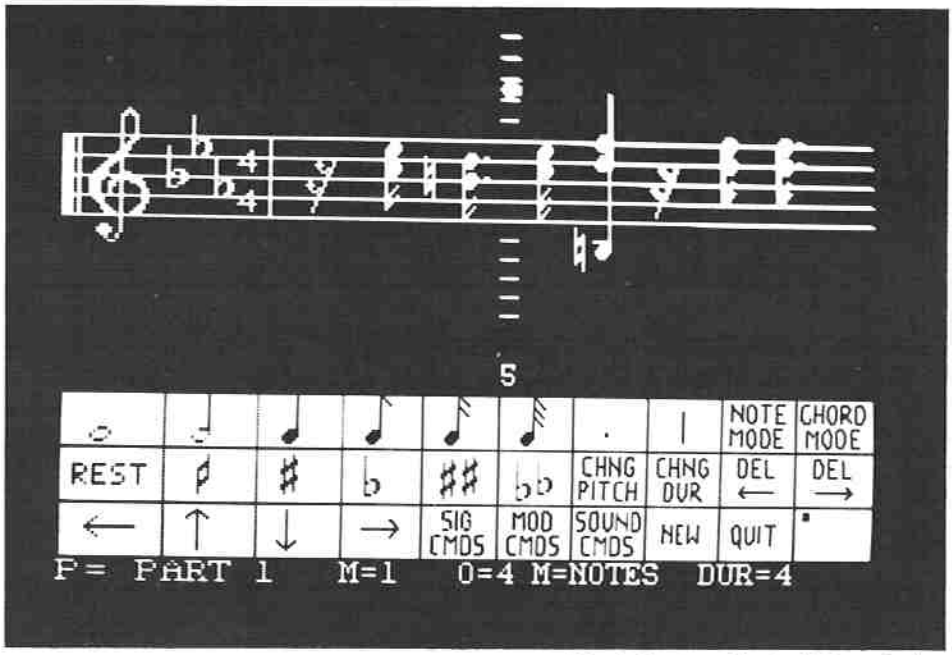
See if you can solve similar problems yourself using both techniques, and see which is the faster method.

Once again, GOOD PROGRAMMING.

	Variable A	*Variable B*	*Variable X*
Starting values	10	2.5	0
First addition	12.5	3.5	1
Second addition	16	4.5	2
Third addition	20.5	5.5	3
Fourth addition	26	6.5	4
Fifth addition	32.5	7.5	5

DIGITAL SYNTHESIS

DAVID ELLIS concludes his consumer's guide to Apple music



MusicSystem Music Editor display

LAST month we looked at the technical specifications of five music synthesis systems for the Apple.

These five runners fall into two categories of music input: alphanumeric keyboard and/or high resolution display (ALF AMII and MH MusicSystem) or AGO (American Guild of Organists) keyboard (Soundchaser and alphaSyntauri). This immediately sorts out the applicability of the systems for real-time performance rather than composition. The type of programs that the MH MusicSystem and ALF AMII use for entry of music fall under the heading of a compiler. This transforms the irrationality of human creativity into ordered bytes of command strings that are then processed as note files.

From here on, though, there are few similarities between the systems. Whereas the ALF AMII allows the entry of up to 5906 notes at a single sitting, the MH MusicSystem operates by filling up a note stack or music buffer that has a maximum capacity of around 250 notes, inclusive of duration values, expressive markings, dynamics and so on. To enter more notes than this it's necessary to save this short Comp file on disc, return to the Editor to enter the next 250 notes, repeat all that until you've reached the maximum Comp file size (approx 2500 notes), and then merge all the files together.

Regardless of whether an event – a note, dynamic or whatever – has been entered from the screen menus with the light pen, or by using the music composition language (MCL) from the Apple keyboard, the entry made to the music buffer also has to be added to the graphics display, and this would appear to result from the display routine searching through the entire buffer to find the newly inserted event.

Thus when the buffer is practically empty there's a 1.2 second gap between the entry of an event with carriage return and the event actually appearing on the screen. However when the buffer is near to its limit of 250 notes this gap increases to about 2.5 seconds, which isn't exactly good news for the time-conscious composer. All this means that no matter how adept you are at entering the music data in the first place, the lengthy time taken for updating the graphics slows down a theoretically very fast method of entering music to an extent that's extremely frustrating.

To illustrate this, I compared the time taken to enter the same piece of music (Fantasia from J.S. Bach Partita III, bars 1-20, 196 notes in total) with the ALF AMII Entry program (10 minutes) and the MH MusicSystem Music Editor program (19 minutes). There are numerous other differences between the two systems' music entry programs, as detailed below.

Notwithstanding the time lag problem in the Music Editor, both music entry programs are eminently usable as compositional tools, but the Alf AMII beats the MusicSystem hands down for ease of use and speed of entry. However compared with Version 1.2 of the MusicSystem, Version 2.0 is a great improvement.

I can't help comparing the Music Editor with the state of the art Fairlight CMI, which uses an analogous MCL in the Composer software to that of the MusicSystem, but with vastly greater flexibility and no display update lag-time quite simply because it doesn't bother

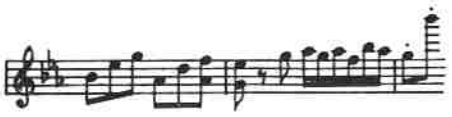
	MH MusicSystem	ALF AMII
Average speed of note entry: (seconds/note)	5.8	3.1
Maximum note file size:	2500	5906
Entered octave range:	8	4½
Maximum number of parts:	16	9
Irregular note lengths:	Not available	Triplets
Expressive markings:	Dynamics, accent modifiers and dynamic accents	Note-specific ADSR envelopes
Play facility from within music entry program:	No	Yes
Chords option:	Yes	No
Print-out from music entry program:	Yes	No
Repeat facility:	No	Via subroutine
Automatic bar lines:	No	Yes

Comparison of MH and ALF facilities

with music graphics.

It obviously takes some adjustment to 'write' music without the feedback of a conventional notational display, and for most composers, this would be a bit like throwing the baby away with the bathwater, but there's no denying that once the Fairlight MCL has been learnt it does enable a lot of music to be entered very quickly.

Wouldn't it be great if a compromise was possible between the pedantic but conventional operation of the MusicSystem and the ultra-fast but unconventional Fairlight Composer! In fact, if one compares these two MCLs directly, the MusicSystem uses about 2/3 the number of key-strokes necessary to enter music with the Fairlight Composer:



Fairlight key entries:

```
0010 !bA : bB : bE : B = 48 : 0 = 3
line      key of      48 time   3rd
number    E flat      units/beat octave
0020 B : E : G+ : A : D : (A : F+)
           G in 4th              chord
           octave
0030 (G : E) : R : O = +
              rest   4th octave

0040 G : B = 24 : A : G : A : F : B : A
           double
           speed
0050 G = ½ :      G, 2 : B+, 2
  ½ beat gap      2 beats
  for staccato    because
                  speed is
                  double
```

(95 key entries)

MusicSystem key entries

```
KEY 3* TEMPO 96 :4
key of  96          4th octave
E flat  crochets/min
EI B :5 E G :4 A :5 D CHORDS F :4 A M
eighth                              bar
note                                line
G :5 E NOTES R
       return
       to notes
G S A G A F B A M
sixteenth
note
EI G! :6 B!
staccato
accent
```

(65 key entries)

Actually the Music Editor doesn't allow such a long string of data to be entered in one go, and since the octave select option (:n) works unpredictably when included in such a string, it's necessary to enter this variable on its own. Illustrative as this MCL comparison may be, it is worth remembering that the Fairlight CMI costs about nine times that of an Apple-inclusive MusicSystem.

Various omissions in the Music Editor, like the lack of triplets (or, more generally, 'n-tuplets'), a slur option, a repeat facility, operating dynamic accents, graduation between dynamics, accelerandi and ritardandi, will quite possibly be implemented in Version 3.0 of the MusicSystem, though, as Mountain Computer appear reluctant to correspond with MusicSystems users it's difficult to estimate what sort of update will emerge from the MH stable.

I would also beg Mountain Computer to add a multi-part printing facility rather than the fairly useless part-by-part print out, and, if they can implement it, to increase the maximum Comp file size to those offered by the ALF AMII and alphaSyntauri. Though a literal increase in Comp file size may not be practicable for reasons of available memory, it might be worth investigating the possibility of adapting the Music Player program to load and play sequential blocks of note file data.

The business of real-time playing of a keyboard interfaced to a computer-based system really sorts out the men from the boys, and the Soundchaser and alphaSyntauri are no exception. The difference in maturity is apparent just from looking at the keyboards themselves.

The Soundchaser keyboard uses a standard four octave design with a rather stiff and noisy action, and one set of contacts per key. The wood cabinet is attractive and well-constructed, though the base panel is rather flimsy, but the ribbon cable carrying the vital key data just emerges via a cut-out in the back panel without the slightest hint of a cable restraint. The cable is also extremely short, which means that it's only possible to situate the keyboard to the right of the Apple.

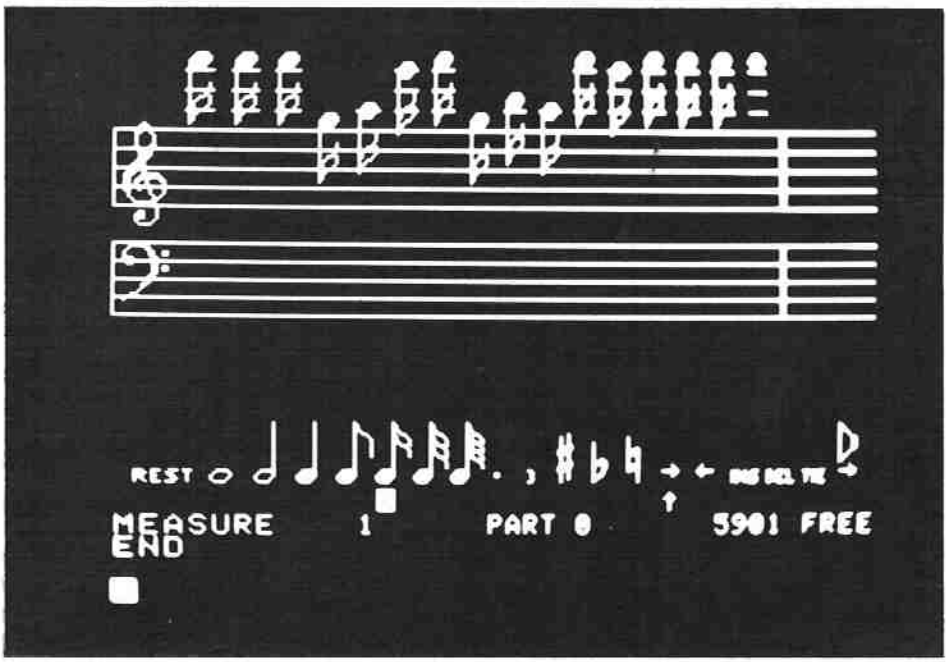
The alphaSyntauri, on the other hand, uses a five octave keyboard that has one of the most touch-responsive actions I have encountered for a long time. The cabinet is sleek and contemporary in design, and looks much more roadworthy than the Soundchaser as it is basically of wrap-around metal construction with wooden end pieces.

Key velocity data is derived from the time taken for a key to travel between two sets of contacts, and this provides the alphaSyntauri with a dynamic expressiveness that's rare even among the most expensive polyphonic synthesizers.

The degree of velocity sensing is variable and can be applied to either the primary envelope or both of the envelopes making up each dual oscillator voice. Each envelope (ADSR for primary and PFSF for percussive) is described by five parameters which can be entered or altered rapidly with a minimum number of keystrokes. Presets are entered as a bank of 10 combinations of waveform tables and envelopes for the two digital oscillators per voice. A single numerical command (1-0) is then sufficient to call up a new preset, just like using any conventional hardwired synthesizer.

In the case of the Soundchaser a bank of four presets are available for use, though, unlike the alphaSyntauri, it's not possible to instantaneously switch from one preset to another with present software. Although the "draw a contour" approach for describing envelopes and modulation waveforms is an excellent feature of the Soundchaser, in practice the

→



ALF AMII entry display

necessity to go from real-time playing to the Edit display to change a parameter, and then back to playing to hear the result of that alteration, is a considerable limitation as well as a frustration for the musician expecting instantaneous response from a system that advertises itself as offering the best of both analogue and digital worlds.

Another difficulty I encountered with the envelope drawing is that an alteration of, say, the Release portion of the envelope necessitated redrawing the entire envelope, and, furthermore, the "small blinking cursor" used for drawing contours is very, very small indeed.

Recording of keyboard data is via a one layer polyphonic sequencer in both systems. The new alphaPlus software enables up to 5000 notes to be entered at one sitting, whereas with the Soundchaster preliminary software limits storage to four 256-event banks, though I understand that there are plans to extend this to 16k-worth of notes.

Both systems allow the keyboard to be played on top of a sequence playback up to the limit of available voices, and in the case of the Soundchaser it is possible to program the real-time playing with a different voice to that of the sequence playback – a feature from which the alphaSyntauri could benefit as well. The alphaSyntauri sequencer also enables one to edit a recorded track by interrupting playback and redoing a new or correct sequence.

An echo mode engages the sequencer in its traditional role of repeatedly playing chord progressions or a bass riff, though this can also be applied to entire pieces. With some digital sequencers, including that in the PPG Wave 2, there is no indication of how much note space has been used up in 'recording' a track , but with the alphaSyntauri there is an "x notes recorded, 3285-x left" display similar to the ALF AMII to tell the user precisely where he stands.

As with most digital sequencers, both the alphaSyntauri and Soundchaser allow a sequence to be played back faster or slower without change of pitch. Change of pitch or transposition can also be applied in both cases. In the case of the Soundchaser this is limited to the usual octave displacements, but the alphaSyntauri has the facility to transpose right down to the $\frac{1}{4}$-tone level.

As with the ALF AMII and its Play display of bouncing, coloured squares on nine horizontal lines for nine parts, the alphaSyntauri also has a sophisticated form of visual feedback that operates with real-time playing as well as from a sequence playback. The Version 1.0 display consisted of coloured vertical bars that shot up from a line at the bottom of the display in accordance with key velocity and a note's prescribed envelope. Though fascinating to watch, it was somewhat distracting and rather reminiscent of Liberace's dancing fountains.

The new alphaPlus software has changed the display so that each 12-tone octave has its own horizontal row and each note its own colour within that row and others. This sounds an improvement, and less wasteful of processing time.

Conclusions:

The ALF AMII offers a cheap and very quick method of entering quite long and complex scores. The square wave output, limited range and resolution are disadvantages, but for many people – including those not concerned with the intricacies of waveform tables, or those that aren't particularly adept at keyboard playing, as well as schools and colleges looking for a way to bring the art of composition alive and at the same time teach programming techniques – it really offers a great deal.

The Vista Music Machine 9 is superior in terms of sound generation to the ALF AMII, but as the board promised from the States didn't materialise in time for this review. I'm unable to report how the Composer and Play programs match up with those of the ALF AMII. Vista are certainly not a company to take competition lying down, so it's worth watching out for future developments.

The Mountain Hardware MusicSystem offers value for money with its hardware alone, and the advanced capabilities of these boards should provide manufacturers and individuals with a quality of digital sound generation that's hard to match until 16-bit processors become the standard. That the Music Editor can be compared with the Fairlight Composer, at least in terms of language, is no mean achievement, but at the moment speed of use, Comp file size, and absence of essential musical facilities are limiting factors that prevent it from being a really serious compositional tool.

I'd imagine that Mountain Computer are tickled pink by the attention that manufacturers like Syntauri are directing to their product. I'm sure it will make them rich on the profits, but will it also make them a bit too complacent?

The Soundchaser contains many powerfully innovative features, but in the final analysis is let down by the limited capabilities of the oscillators on the voice cards and the lack of any real-time expressive control. The addition of full-function voice cards and more advanced software will hopefully correct most of these shortcomings, but to create the right initial impression in a market that's increasingly concerned about real-time control it does strike me that these limitations shouldn't have been there in the first place.

I don't know many synthesists that would look at a polyphonic keyboard lacking a sustain pedal and an expressive option like a convenient LFO speed control. Surely these could be derived from suitable input into the Apple game I/O connector?

The alphaSyntauri system oozes class from every key. Most of the limitations present in the original software seem, on spec, to have been counteracted with new software, though there is still no facility to split the keyboard with different voices either on its own or alongside the sequencer playback. The addition of facilities for real-time timbral change and variable LFO modulation, as well as the Composer/Sequencer software developments in the pipeline, suggest that the alphaSyntauri will be a really viable stage and studio instrument.

Above all, it is musical, and for those studios and musicians that can't afford the expensive delights of a Fairlight CMI it stands a good chance of being the answer to their prayers.

Availability:

Vista Music Machine 9 – not available at present in this country, but both Comp Shop and Peter & Pam intend to stock it.

Soundchaser – distribution is being handled by Keen Computers Ltd., and, for further details, ring Dr. Timothy Keen on 0602 412777.

Mountain Hardware MusicSystem – most Apple dealers.

alphaSyntauri – distribution should be arranged in the near future, but, for the time being, ring Mick Cross on 01-626 8121.

ALF AMII – any Apple dealer.

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SOUND SYNTHESIS FEATURES

	Means of synthesis	Output waveforms	Waveform animation	Envelope shaping	Range (octaves)	Mode	Real-time control	Maximum size of note files	Layering of sequences	Tuning offsets
Vista 9	Prog. sound generators (AY-3-8910)	Square	No	ADSR	8[1]	Stereo	No	4000 notes	Yes	No
Sound-chaser	Analogue[2] voice cards	Square/ sawtooth	Soft LFOs for mod of OSCs and VCFs	Multi-point ADSR	8	Stereo	No	4 x 256 events[4]	No[6]	No
Music-System	Multiple D/As	Infinite variety	No[7]	ADSR with multi-point AD	8	Stereo	No	2500 notes	Yes	No
alpha-Syntauri	Multiple D/As	Infinite variety	FM, soft LFO for OSC mod, timbral sequencing	ADSR/ PFSF[3]	8	Stereo	FM, sustain, portamento, presets	3400 notes[5]	No[6]	Both for key-board and between OSCs
ALF Apple Music II	Prog. sound generators (SN76489)	Square	No	ADSR	6	Stereo	No	5906 notes	Yes	Possible

1 *The theoretical range of the AY-3-8910, using the 1 MHz Apple clock, is up to 62 kHz. For musical applications, though, this chip is only really usable up to 8th octave C.*
2 *Presently using Intel 8253s to derive specific frequencies from the Apple clock. Other hardware elements include LM3080s for VCAs and CEM 3320s for VCFs. A future version of the board will use Curtis chips throughout.*
3 *A special percussive envelope applied to one of the OSCs making up each voice.*
4 *But will be extended to 16k-worth in subsequent software.*
5 *Extended to 5000 notes with alphaPlus.*
6 *But layering is a likely feature in future software.*
7 *Though a type of vibrato/tremolo is derived from 15-point frequency/ amplitude offsets applied to the AD portion of an OSC's envelope.*

GENERAL FEATURES

	Number of voices	Cost	Number of boards	Graphics/ paddles	Music Input Apple Keyboard	Music keyboard	Keyboard Velocity sensing	Range	Storage	RAM	Colour display	Dedicated user group
Vista 9	9	£10	1	Yes	No	No	–	–	disc or cassette	32k	Not known	Not at present
Sound-chaser	6	£1,00[1]	1-2 (3 voices/board)	No	No	Yes	No	4 octaves	disc	48k	No	In formation
Music-System	16	£312[2]	2	Yes	Yes	No	–	–	disc	48k	No	Not at present[5]
alpha-Syntauri	8	£1,000[3]	2(MH) [1-5 (ALF)]	No	No	Yes	Yes	5 octaves	disc	48k	Yes	Very likely
ALF Apple Music II	9	£100	1	Yes	No	No	–	–	disc or cassette	32k[4]	Yes	Yes[6]

1 *This price is a top estimate, but the eventual price will obviously reflect the state of the pound versus the dollar.*
2 *The actual price varies from £250 to £350, according to retailers.*
3 *Distribution for the alphaSyntauri in this country has not been finalised, so this figure is also a rough estimate. Also, the MH boards are extra.*
4 *With cassette, 24k (?) or more; with disk, 32k or more.*
5 *But, outside of the States, the Apple Music Synthesis Group perform this function.*
6 *Via Alpha, the ALF newsletter.*

CASE HISTORY

Last month David Wilcox described how South Eastern Gas obtained their first Apple and how their usage grew to such an extent that they now have three machines in almost continual use.

This article describes one of the recent applications, and also explains in some detail the ease with which accountants have been able to treat the micro as an extension of their calculators – so much so that the Apple is now considered to be an indispensable part of their 'tool kit'.

Quick, cheap dummy runs

By DAVE WILCOX, Chief management accountant

THIS is a list of some of the existing uses for the Apple within the Finance department of South Eastern Gas:

Investment accounting

- Asset register for vehicle purchases.
- Invoice matching (individual invoices within project).
- Capital budget (by individual project).
- Unit costs for replacement expenditure.
- Major project timetable (planning and control).
- DCF calculations.
- Project control (control of project proposal forms from receipt through to entry to accounting system plus appraisal information, eg average connect costs, contributions).

Financial accounting

- Employee loans calculations.
- HP loading.
- Word processing (standard memos on car allowances, redundancy, etc).
- Inland Revenue returns (P11D for region's cars, car allowances, etc)
- Sports clubs, tax calculations, etc.
- Rent and rates equalisation.
- Petrol costing (invoice checking, coding and analysis).

Management accounting

- Meter readers' performance indicators.
- Mobile inspectors' performance indicators.
- Customer service performance profiles.
- Engineering unit costs and variance analysis.
- Engineering overhead allocations.
- Transport unit costs.
- Budget model input (to reduce bureaux costs).
- Financial modelling (numerous applications).

Financial planning

- Monthly profit forecast.

This list is not exhaustive since it does not cover non-financial applications, of which there are many, but it does indicate some of the potential of microcomputers in a large-business environment.

One of the most noticeable things about the microcomputer scene is the massive array of software which is available off the shelf. Also this ready availability is combined with prices that are usually about one one-hundredth of an 'equivalent' mainframe package.

Some of these packages are not worth the paper the advert is written on.

Unfortunately, whereas it is common practice for mainframe systems to be properly demonstrated and evaluated before purchase, this is not always the case with micro packages. How much time would you spend with a client who may spend £100?

However, there are some excellent packages available and I will describe the use of one of these later.

It is also relatively easy for non-DP staff to write their own software, although they will not generally be able to develop large-scale systems. This is one of the problems with micros. Non-DP staff get over-ambitious and attempt to use the micro when the mainframe should be used.

Nevertheless we have many applications within financial planning and control which have been developed without the use of packages.

One particular application originated from a request by our Marketing department for advice on the financial implications of running an 'interest-free credit' campaign.

Some of the variables that had to be considered were:

- ☐ The period of credit.
- ☐ Range of appliances covered by the scheme.
- ☐ Substitution rates for each appliance type, from cash sales and from credit sales.

The crucial element, because of Government policy, was the effect upon cash flow during the current financial year.

So how did we proceed?

Surprisingly enough, along very similar lines to those adopted when developing a mainframe solution. It is worthwhile recounting the approach and showing that a micro solution can be created very quickly and prove to be of major benefit.

Planned sales: The aim of the campaign was to combat flagging sales and ensure that we achieved the volumes specified in our detailed sales plan. Therefore we did not consider the financial effects of any incremental sales, although this would have been simple to include if we had desired.

'A micro solution can be created quickly'

So the model was based on the originally planned sales. These were phased on a monthly basis and split by cash/HP for each appliance type.

Substitution rates: Each appliance type was likely to have different substitution levels. In addition, the substitution from cash sales would most likely be different from existing HP sales. The question of substitution is somewhat difficult to evaluate (even after the event). However, we had some data from previous campaigns and this was used as a starting point.

Campaign limitations: In order to encourage 'trading-up' and to reduce the incidence of low-value sales, it was thought advisable to restrict sales to a minimum sale price.

This was evaluated by estimating the proportion of each appliance sales within various price bands. Minimum price cut-offs then reduced the total value of sales accordingly.

Operation of scheme: Whatever the length of the interest-free period, the intention was for the scheme to be operated in the same manner – ie, equal monthly payments, the first of which would be due upon signing the agreement. In addition, there would be no loading of prices for administration of potential bad debts or interest.

Cash flow implications: The varying cash flow of both the existing sales schemes (cash and credit) and the proposed schemes (interest-free) were then evaluated. This took into account the delays involved in installing the appliance and invoicing for cash sales, HP loading, monthly repayment schedules, and the lengths of existing agreements.

Writing the model: Each of the attributes listed above had to be modelled and it was decided that the most suitable approach was to use the modelling package Visicalc. This package was already used by several of the accountants and is very flexible and costs less than £100 for outright purchase.

The model was written and tested in about two hours.

The first results: The initial runs of the model were used to evaluate the most advantageous periods of free credit. That is, we did not attempt to be too precise in terms of likely substitution levels but merely to give broad indications of the likely impacts under differing assumptions.

At this stage, we had evaluated schemes which provided credit for three, six, nine and 12 months.

We had, in the space of less than one

hour, calculated the financial implications of over 20 different sets of assumptions.

The first review: It was now necessary to discuss the results with our marketing management. The outputs were summarised (manually!) and the views of people from Finance and Marketing on each of the schemes were weighed against each other. Of these, the six and nine months appeared most promising.

Fine tuning: It was now necessary to evaluate the results a little more accurately. To do this, Marketing provided some alternative assessments of substitution rates. These, together with some Finance estimates, were then processed using the same model.

Again, this took about one hour to consider a similar number of alternatives.

Final agreement: A decision matrix was then prepared and presented to the director of Marketing, together with comments from both his own staff and Finance.

From this information, he was able to decide on a particular scheme, having knowledge of the opportunities and risks inherent in the plan.

So what had been achieved? And how much effort had been expended? How much had it cost?

Our colleagues in Marketing had been provided with a service that enabled them to enter into a sales campaign with confidence. The financial risks inherent in the final scheme were low and the opportunities high – and they had been quantified.

The service was provided rapidly with a total elapsed time of three days, most of this time being spent in discussions.

The time spent in designing, building and running the model was about half a day.

The cost, excluding manpower, was minimal since the only other resources were paper (about 100 pages) and electricity (about three hours equivalent of a light bulb).

Two of the spin-offs of this have been not only more models but also moves by Marketing to obtain similar facilities for their own staff.

This can only lead to an improved awareness of the uses of computer technology (both mainframe and micro). And from this a more effective use of these facilities in company planning and operation.

□ *This article is based on material presented at the Xephon seminar on "Personal Computing for IBM Users" held in London recently.*

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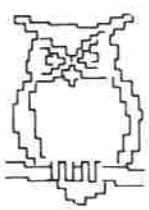

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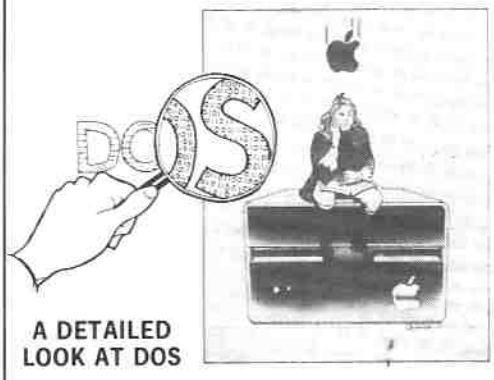

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COMPUCOPIA

DISCOM Computers have developed an interface which they say can be used between the Apple and all electronic typewriters and some electric ones. This means that by adding an Apple anyone with an electronic typewriter is now in a position to build it up into a computerised system, with a word processing quality printer.

The first typewriters to be interfaced were the Olivetti 121 and 221 series. Now Discom have earned the support of Olivetti in their development plans, which will eventually see the systems being implemented and supported from more than 60 sites throughout the country. Silver Reed and Adler are the next typewriters to be used, and both of these companies have given exclusive support to the project.

The interface costs £250. For this, Discom or their agents will take in the typewriter and modify the internal elextronics to incorporate a RS232C interface, which will then link the typewriter directly to the serial card in the Apple.

Contact Discom Trading Company, Old Manor Farm, Ashton under Hill, Evesham, Worcestershire (tel: 0386 881962/3).

The Bee takes wing

OF course you will have probably been hearing the buzz for some time, but the Bee is now officially available and has had final approval granted by the Post Office.

The Bee Adaptor, produced by B & B (Computers) Ltd of Bolton, Lancashire, is a new idea in Viewdata adaptors. It is designed to allow anyone with a microcomputer or a TV set to access any Viewdata system.

It is specifically a hardware attachment, controlled by the microcomputer keyboard and incorporating a modem and an autodialler. Viewdata information, once accessed, can be displayed or stored on disc or tape for subsequent display and perusal. Pages can also be reproduced on a standard printer.

Colour displays come as standard, and the Bee is already on-line to receive and run Basic programs and connect with the telesoft transmission system.

B & B are still developing the system further to include such features as alphanumeric response for messages, and to be used as a finite communications system, or as an intelligent terminal to a mainframe system.

The price is £575.

Contact B & B (Computers) Ltd, 124 Newport Street, Bolton, Lancs BL3 6AB (tel: 0204 26644).

Bytes by the million

THE Rodime British designed 5¼in. Winchester disc drive is now being distributed by Independent Computer Engineering (ICE) of Ashford. This attractive unit comes in four models, with capacities of 3.14, 6.28, 9.42 and 12.56 Mbytes.

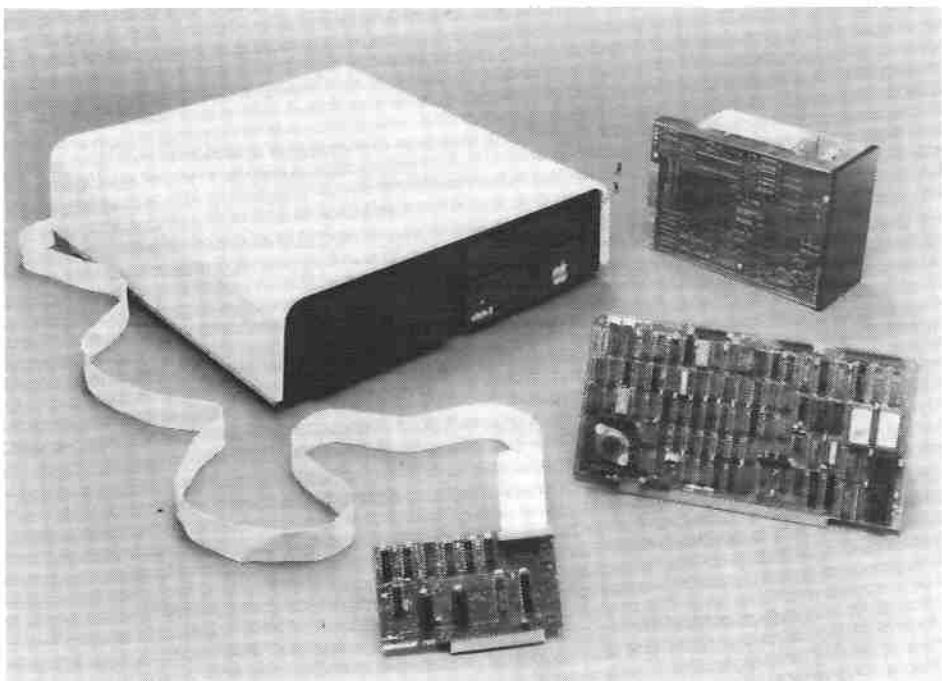
The cabinet can house both the fixed disc unit, and a standard floppy disc unit, although it must be noted that the floppy disc drive does not run off the fixed disc controller.

The fixed disc drive contains up to four platters and is formatted in much the same way as the Corvus systems, where the 12 Mbyte system will be configured as 80 floppy disc volumes.

The system is set up to run under DOS 3.3. ICE will supply a complete system, including controller, drives and power supply housed in the cabinet, with all necessary cables, adaptors and software for attachment to the Apple.

Prices: 3.14 Mbyte – £1,560, 6.28 Mbyte – £1,760, 12.56 Mbyte – £2,080.

Contact Mike Chandler, Independent Computer Engineering Limited, 16/18 Littleton Road, Ashford, Middlesex.



The Rodime mini Winnie

Adaptable interfaces

TWO new interface cards produced by Simon Computers of Croydon give the user very good facilities at a very reasonable cost. Called the Serial and Parallel Aristocards, they allow the Apple to be attached to printers, modems, paper punch readers and other computers.

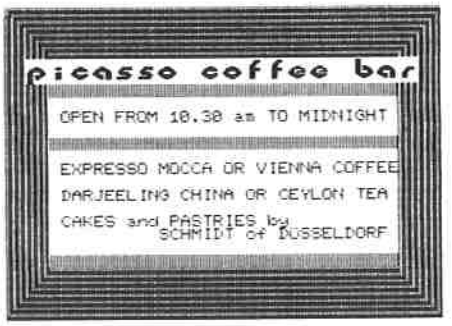
The parallel interface card is a general purpose printer card which comes with a standard Centronics-type wiring specification. It can be supplied with leads and cables for direct connection to Epson, OKI, Microline, Centronics, Anadex and Ricoh printers. Other printer interfaces can be specifically ordered. The card uses standard software commands to address on-board firmware, and graphics mode is selectable by toggling MSB with CTRL I T.

The serial interface card will allow communication with any RS232 device. The transmission is both asynchronous and bidirectional and the card can be supplied with a range of custom ROMs to make the card one of the most adaptable available.

The serial Aristocard operates at speeds up to 19200 baud, and comes supplied with lead and DB25 connector for Qume, NEC Spinwriter, Paper Tiger and Diablo printers. Custom leads are also available for the Olympia KSR 100, Anadex, modems and other devices. Other features available on the card are a variable line width up to 255 characters, delay after RETURN, half or full duplex, turn video off/on, disable Apple keyboard, reveal control characters within listings.

The Simon interface cards have been designed using the same 6850 I/O chip as the CCS series of interfaces and can be considered highly compatible with that popular range. They cost £65.

Contact Simon Computers, 28 Lower Addiscombe Road, Croydon, Surrey CR0 6AA (tel: 01-680 4646).



Getting the message

EYE-catching displays in shop windows, using text and graphics to advertise anything from goods to holidays and services can now be reproduced very easily on an Apple computer.

With the Video Message Display package from Great Northern Computer Services it is possible to create your own presentation slides, store them on disc, and then display them automatically, 24 hours a day day, seven days a week.

The package makes it possible to build up the screen using one of the several varieties of type faces – or even create your own – and include high resolution graphics created by other programs.

The Video Message Display system requires a 48k Apple using Integer Basic and costs £150. Great Northern will also assist in setting up the slides. The examples on this page show what can be done, but colour is also available.

Contact Great Northern Computer Services, 116 Low Lane, Horsforth, Leeds LS18 5PX (tel: 0532 589980).

Wordstar, an advanced word processor

WORDSTAR is claimed to be the most powerful and sophisticated word processing package available for microcomputers. Ranmor Computing of Southend-on-Sea are selling it together with a self teaching system called WP Workshop.

Wordstar costs £200. The system will run on any Apple system that has been provided with 48k of memory, the Z80 softcard and an 80 column card (Videx, Sup R Term). It can be used with a shift key modification for enhanced ease of operation or unmodified.

The system is also available in 13 and 16 sector formats. Most printers, daisywheel and dot matrix, are supported to the full extent, so that advanced printer features like embolding can be utilised.

A companion product called Mailmerge is a powerful data and text merging tool enabling Wordstar to produce personalised form letters. It costs £75.

WP Workshop is designed for potential operators of Wordstar. Through a series of lessons and exercises the operator is given the means to develop his expertise in using the system, at his own pace.

Workshop does not replace the system manual, but rather aims at giving the operator practical experience at an early stage. It is designed to help people understand the program functions and interpret the comprehensive and detailed instructions in the manual. Cost is £75.

Contact Ranmor Computing, Nelson House, 2 Nelson Mews, Southend-on-Sea, Essex SS1 1AL (tel: 0702 339262).

The clever connection

A NEW modem is now available for the Apple computer. Shortly to be granted approval by the Post Office, it is already in use on a number of systems. The Microconnection plugs directly into the Apple, eliminating all of the loss of data problems associated with acoustically coupled modems.

It also has an RS232 input/output socket built into it, enabling you to simultaneously run your printer for hard copy of transmissions or the inputting of data from an external keyboard.

Duplex and simplex modes are available at 300 baud, and the modem also has the ability to connect to two-way radio, providing keyboard energised transmission enabling computer-to-computer contact over the air. Software to run the modem is provided by the Microperipheral Corporation, and the documentation is directed at non-technical users.

At a cost of £200, and given the increased reliability of transmitted data, this type of modem must surely be one of the main devices in the large increase in computer communications using the Apple, and indeed, any other micro.

Contact Andrew Newmark, Spreebond Limited, 130 Pavilion Road, London W1

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How a Miracle system works

Each Constellation host multiplexer links 2-8 micros in star configuration to 5Mb, 10Mb or 18Mb of Corvus hard disc drive. Up to 8 host multiplexers can be connected together, allowing up to 64 micros to use four disc drives for a total system capacity of 72 Mb.

Inexpensive back-up for the hard disc system is provided by the unique Corvus Mirror. It interfaces the data signals on the disc with a 100Mb capacity video tape system; and the entire contents of a 10Mb disc can be archived in about 15 minutes.

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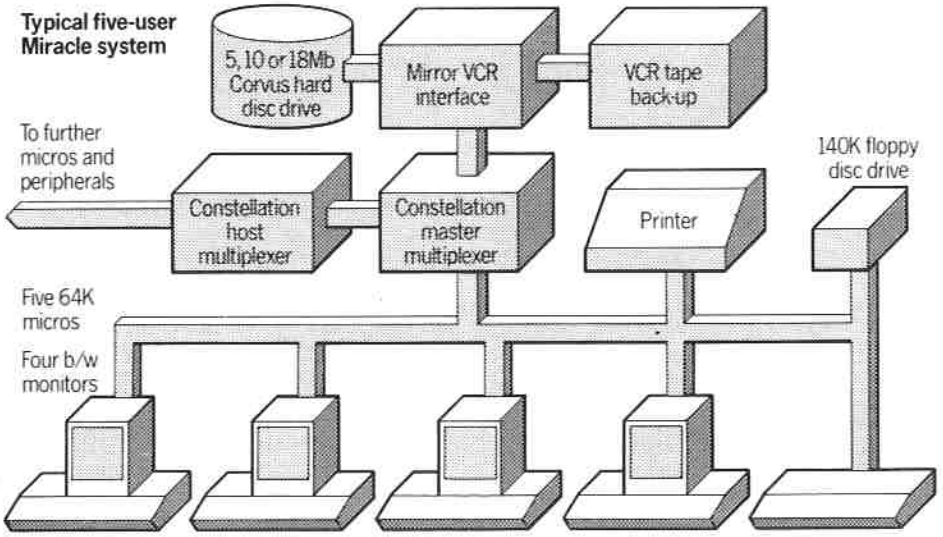

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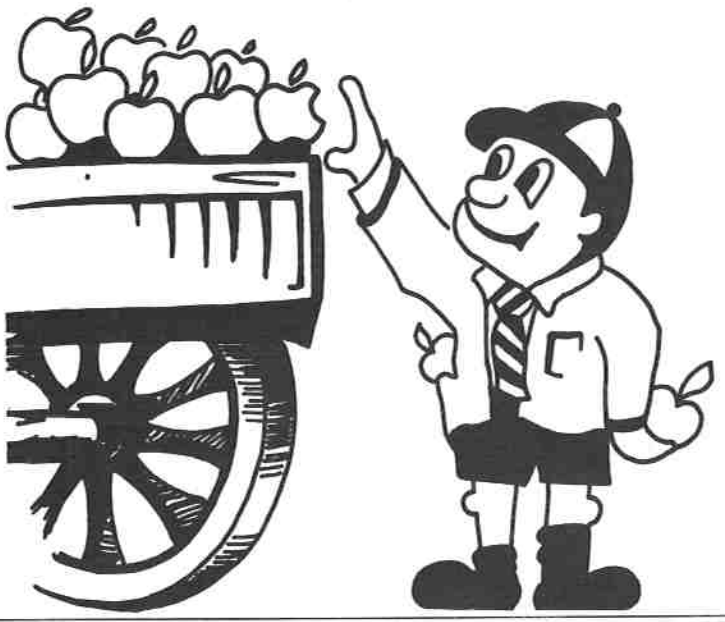


Applecart

Monthly review of
Apple in education

Computing Soweto's future

I WAS lucky enough recently to visit South Africa, a country with its own problems. A country with a complicated past, a confused present, but without doubt a great future.

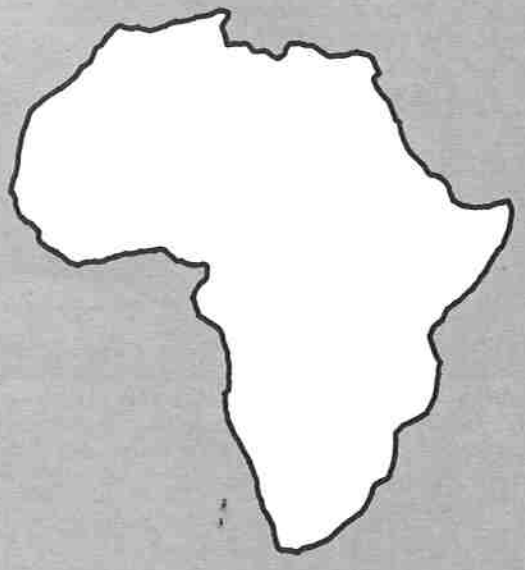
Before my visit my opinion of South Africa had been tainted by media reports but I was pleasantly surprised to find that the reality was a little different. The highlight of my trip was an unscheduled visit to the black township of Soweto, a few miles from the centre of Johannesburg.

Housing conditions were in many ways superior to some of our own inner city areas, but it was the government-sponsored educational programme which impressed me more than anything else. The training college which I visited offered a wide range of subjects up to matriculation standard. Emphasis is placed on vocational training and teacher training, so that on leaving the college students are equipped to move into either an apprenticeship for a variety of trades or on to higher education, including university.

Alternatively, a career in teaching is encouraged, and teachers qualifying at the college take up teaching posts in many of the new schools of which I was informed. Minimum qualifications for teaching are the equivalent of our own five 'O' levels for junior school teachers, and the 'A' level equivalent for prospective teachers in secondary schools.

The college has two Apples which are used extensively. One in particular is used to teach basic computer science, introduced into the syllabus for the first time this year. The students have taken enthusiastically to the new subjects and from the outset the course has been over-subscribed.

I sat in for some time on an electronics lesson with a group of youths designing their own electrical circuits. There was no shortage



of equipment and for a class of 12 I counted one oscilloscope per pair of students. This ratio would no doubt surprise a great number of teachers of electronics in our own schools and colleges.

I spent some time at an Apple with one boy in particular, Reginald. He continued to ask a series of pertinent questions with regard to a future career as an electronics engineer.

Apple is also used for a number of administrative tasks within the college. In particular the librarian, who is also a teacher, is busily computerising and cataloguing the wealth of books which are held in an ever-growing library. Part of her function is also to instruct students on the application of the computer in this field and to teach the

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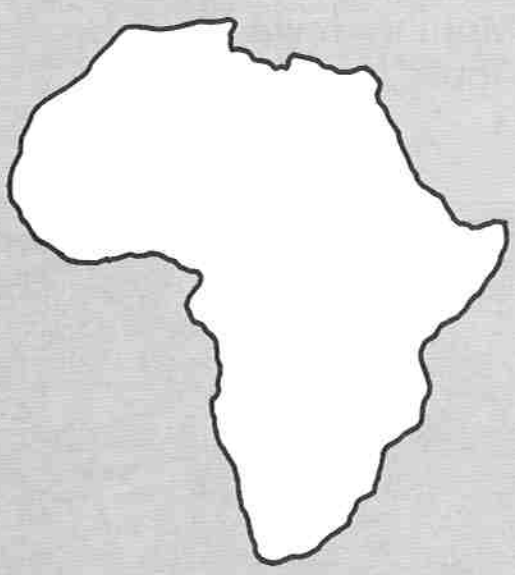


advantages of a computer-based system over more traditional library practice.

Maybe we can learn something from this in that perhaps the most important aspect of computer literacy is to understand the applications of computer power and its relevance to the world outside school.

Emphasis in the UK tends to be largely in the areas of computer science, and programming for the interested, when in fact all children need to grasp a firmer understanding of computer application in order to cope later with the changes occuring in our society due to the revolution in information technology.

The South African government is no doubt aware that the future success in terms of growth of the country's high technology industries lies to a great extent in the wealth of potential talent that exists in the black community.

The continued implementation of extensive educational programmes such as the one I visited in Soweto will lead to a large body of individuals, black and white, who will be on hand to support the growth of the computer and related industries. There will be less reliance on imported and expensive expertise and a great reliance on home grown individuals.

The successful integration of the white and black population must inevitably be carefully controlled and be based on education, and thus on a mutual understanding of the longer term needs and objectives.

Apple can be proud to have made a contribution in the education of black youths in Soweto, and with a little luck and a great deal of understanding and compromise we may be able to say in a few years time that the Apple and computer technology has helped South Africa to overcome some of its problems and will be welcomed back into the international fold where she undoubtedly belongs.

David M. King

IT may seem strange to note that with the use of the microcomputer in primary schools such a new innovation there are already differences of opinion regarding the structure of a program. There would seem to be two different philosophies. On the one hand there are proponents of programs built on a behavioural model of learning, and on the other advocates of programs designed around a cognitive model.

In reading an account of the fairly recent conference on microcomputers in the primary school held at Exeter University, one correspondent was bemoaning the fact that most of the programs to be seen were based on a behavioural model.

Basically the situation is this. The two main schools of thought regarding learning are behavioural or cognitive. The behavioural school of psychology was developed from the work of Skinner, Thorndyke and Hull and the cognitive school tends to be developed from the ideas and work of Figget and Bruner.

The behavioural program is one that depends on a direct stimulus response. For example, the child is presented with a problem and if the answer given is correct gets a happy face, or a couple of CTRL Gs before proceeding onto the next problem.

Programs based upon a cognitive model, however, would not have a black/white, yes/no situation but rather the child has to engage in thought to decide the best course of action in the circumstances prevailing at the time.

I would like to suggest that the debate regarding which learning model the program is based upon is a sterile debate. I would suggest that there are no completely cognitive or completely behavioural classrooms. The moment a teacher puts a tick alongside a correct sum in a child's book he is using a behavioural paradigm. If a program fulfills the aim of the author, it does not seem important which learning model it is based upon.

The two programs I wish to discuss here are both based upon a cognitive model. This is of necessity since both programs ask children to arrive at conclusions from available information and come to decisions based upon these conclusions. It is not my intention to either compare or contrast these programs or to be critical of them in the quality of their programming. I would like to describe the programs, consider the role the computer is playing in the classroom, and form some possible conclusions regarding the educational validity of the experience.

The two programs in question are "The Spanish Main" written by Barry Holmes of St Helens School, Bluntisham, Cambridgeshire, and the program "Destroyer" written by myself. Self advertising? I would like to acknowledge my debt to Barry since the essential feature built into both programs – that of group interaction – was his idea originally.

Group interaction involves the communication between members of a group of children and the arrival at a corporate decision without the intervention of the teacher. In fact this is the main idea as Spanish Main's documentation says: "A prominent feature of the game should be the group discussion and co-operation which, although it may be monitored, should be allowed to develop with-

Extending the interactive period

By ANTONY P. MULLAN
headmaster of a Devon primary school

out the participation of the teacher." It continues: "It is the children's ideas for solving the problem which are of paramount importance. The logic must be theirs and not externally imposed."

The Spanish Main is a game that involves two groups of children. One group has the role of Spaniards and the other the role of Pirates. The Spaniards must devise a strategy that will enable them to sail their ship to at least three ports, collect the treasure there, and then sail off the map. The role of the Pirates is to plan a strategy to capture the Spaniards and relieve them of their treasure.

Initially both teams are given limited information at the start of the game which they can increase when they visit a port. They know the direction of the wind that remains constant throughout the game, how much treasure there is on the islands and their starting position. This is all obtainable from the computer, but there is also other information that can be given verbally to the children prior to the game starting. This information concerns the way the ship behaves and the housekeeping information needed to run the program.

On visiting a port both groups are given information regarding the amount of treasure taken by their opponents and the direction they sailed upon leaving. There are various penalties incurred on breaking self discovered rules. The children plot their moves on a map that has been ruled into a co-ordinate system.

The other program under consideration is called "Destroyer." This is played between two groups of children, each of whom have a destroyer under their control. The object of the game is to find and sink the opposing destroyer.

The game itself is played on an imaginary sea that has islands, mines and bases embedded in it. The children can only become aware of the location of these hazards by obtaining information or by bumping into them. For each "go" the children are faced with an immediate decision: "What am I going to do?" They have this decision to make since there are several options open to them. They can opt to seek information, to sail, to obtain the location of the nearest base where they can obtain fuel, to attack or to employ a spy plane. They also have the option of saving the state of the game to disc so they can continue from where they left off at a later date.

The information the children are given depends upon a search in the immediate area around their ship. They can obtain information of wind and current patterns, the position of land, mines and bases and information about the opposing ship. They can also obtain information regarding their own fuel state. Positional information can be given either in co-ordinate form or as compass directions and a range. They can obtain similar information at a distance by using their spy planes, but they have only a limited number of these so they soon find out to use them sparingly.

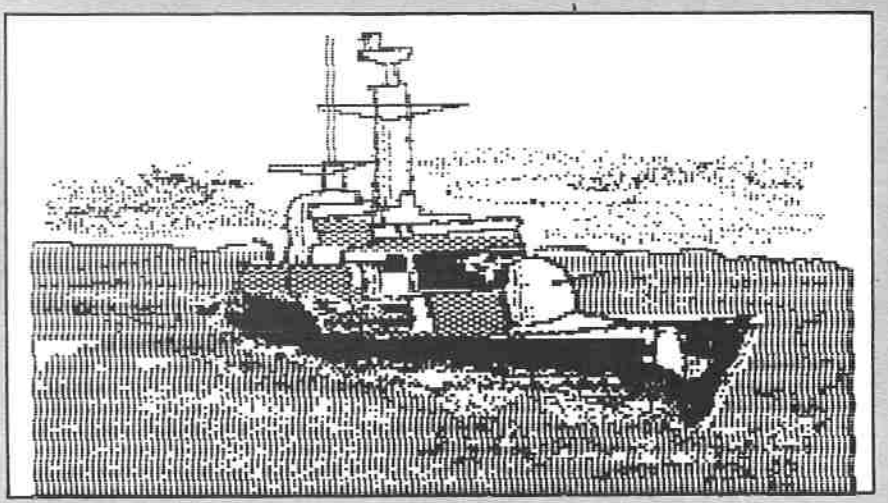
The difficulty level can be set by the teacher at the beginning of the game. This is set by opting to have wind, wind and current, or neither operating on the ships, as well as by the number of bases or mines the teacher wishes to have in the sea.

If the children hit mines or land then there are penalties in giving away their position and losing fuel. This last is important for if they run out of fuel then the ship drifts under the influence of wind and current. If the children attack and are in range then information will be given regarding the fall of shot and appropriate variations suggested.

These then are brief outlines of the two programs and they would seem to fall into the cognitive model class. There are no clear cut answers to any questions that may be raised. The answer depends upon the information available at the time and may have to be modified in the light of subsequent information.

Leaving aside for the present the question, "Is this a valid educational activity?", let us consider these activities from the point of view of the teacher. We can also ask the question: "What is the role of the micro in this context?"

We could consider it from this point of view. The school day is on average five hours, five days a week, which means 25 contact hours per week.



Graphics from Destroyer

Don't run away with the idea that this is the only work the teacher does though! Assuming an average sized class of say 30 children, if the available time is shared out equally, then each child would receive 50 minutes of the teacher's time a week, or to put it another way, 10 minutes a day per child, per teacher!

Now both these programs can involve usually eight children, but this could be increased to 10 with five in each group. Let us for the sake of argument say 10 at a time, so by utilising the computer we are reducing our class size down to 20 at any one time and the individual time available increases accordingly. In actual fact it is an increase of 50 per cent.

Looked at from this point of view the computer becomes an extension of the teacher's arm, allowing him to interact with individual children over a longer period. In actual fact the possibility is that the teacher will have grouped out his class so he can work with smaller groups for a greater period of time. However within that period of time there are many management problems likely to occur. To some extent the micro can monitor the group working with it and solve some of these management problems. In this case, and in any case where a group of children or a single child is interacting with the computer, the computer is acting as a manager when in use.

Again assume that the above games were considered a valid educational activity. Could the teacher put them into operation without the use of the computer? In both cases he would have to keep a continually updated state of play. Since secrecy of the information available to either group is of paramount importance, he would have to preserve this secrecy. In fact in both programs passwords are used to preserve this secrecy. He would have to be able to calculate immediately the continually changing position of the ships, do all the housekeeping needed to keep track of fuel or treasure and in the case of Destroyer keep from the children information that was out of range of the information gatherers. Of course at the same time he would have to manage the rest of the class. This would present difficulties to any teacher.

This then is the new universe open to teachers, a machine that can positively manage a situation, that can provide information, and can react to decisions made by the user. The teacher is freed to perform his most important function, that of a teacher, a leader out.

Let us consider such programs from the point of view of their educational worth. At this point though we should ignore the medium and concentrate on the message. It would seem to me that our society is going to need in the very near future members that are not conservative (small c) in their outlook but are adaptable to a great number of different situations. Coupled with this adaptability is the criterion of a problem solving mind.

I do not propose to go into detail regarding problem solving. However, using these programs children are put into a problem solving situation. I am also not saying that the teacher, unaided, is incapable of providing problem solving situations, I am continuing to suggest that we have a unique opportunity of putting to work an area of technology that can aid us in our work.

From the classical point of view the children are utilising many of the higher reading and study skills. They are interpreting information, internalising it and using it to form conclusions. They are identifying themselves within a game into the role of a real Spaniard, or Pirate, or captain of a destroyer. They are recording decisions and are engaging in argument, and it was a point in the Primary Report that argument was not seen in many primary classrooms. It was applied to writing, but speaking is a far more natural method of communication for the child.

Within mathematics the children are learning more about co-ordinates and bearings and are learning in a situation that is motivating. They soon realise that if they enter or record 3.2 rather than 2.3 the effect is either they get lost, sunk, or captured. They are gaining intuitive concepts of vectors that will serve them well in the future. They are forming attitudes to a piece of technology that will pervade our society and affect us even though we have nothing to do with computers.

Other skills being developed by the use of these types of programs is the formation of strategies and the solution of problems. For instance, in Spanish Main once an island is reached and the children obtain information regarding the cargo they can deduce which islands have already been visited. In Destroyer, since each ship leaves a track by plotting the track at certain points an indication of the possible direction of travel is obtained. Consideration of the amount of fuel left at a base is another indication of the position of the enemy.

Using Spanish Main children will soon arrive at the conclusion that a ship sailing with the wind will travel further than a ship sailing against the wind, and in Destroyer will discover ideas regarding vectors. They find out that the wind is affecting the direction they need to sail to reach a predetermined spot, and adjust their sailing directions accordingly.

Most important of all though, the children are going to have to make their own decisions and base those decisions on the information they have available, and not on the sayso of an authority figure. In Destroyer and Spanish Main the teacher cannot answer the question: "Where is the other ship?" He honestly does not know, and this could be a unique situation that is made available by the micro that the teacher does not have the answers at his finger tips.

From the above I would suggest that the children are receiving a valid educational experience in using these programs. Admittedly, similar things can be done without the use of the computer, but it would not be so easy for the teacher. If we consider the computer from the point of view of a manager in the classroom then it becomes a considerable asset. It does not replace the teacher, it enhances the role. Much technology has been used in the classroom starting with the blackboard and progressing from there. These early days are exciting, and the future will be also.

FEEDBACK

THANK you for what promises to be an excellent magazine. I have been looking for a periodical devoted to the Apple but without the extra cost of importation from America.

While I read your reports on Micromodeller and Talk to Another Apple with interest, please continue to cater for the hobbyist with articles like Mike Glover's Introduction to Machine Code. I would also welcome articles on programming techniques as there is often a quick solution to a problem instead of the obvious long winded method.

We are often recommended to make back-up copies of discs. My alternative to having an archive of discs is to use the reverse side of the floppy. I always test new discs by writing to all tracks/sectors on the correct side as well as on the reverse side, having ever had only one failure, and that was on the correct side.

I have discounted the argument that reversing the direction in which the disc rotates could cause problems as in my case this is only during archiving. Furthermore, one American manufacturer is marketing "flipover floppies" – at almost twice the price – and several kits are advertised to modify either the disc drive or the floppy sleeve to enable writing on the reverse side.

My method is to bypass the write protect switch with an additional switch (fastened to the back of the drive with double sided sticky tape), connected to pin 4 and pin D on the disc Analog board (p.146 in the DOS manual).

These pins are conveniently connected to the two solder pads alongside – but not connected to – register R8 at the top rear of the Analog board. Access to the Analog board is by removing the four screws on the underside of the drive as described on p.12 of the DOS manual. – **S. Heaney, Willaston, Nantwich, Cheshire.**

Starting to sell

I AM 12 years old and have been programming an Apple II Plus with a decrepit, pegged out teletype printer. I have written several word processing programs, umpteen arcade programs and no less than seven fantasy games.

I am thinking of starting to sell them. Have you any advice, Ed?

Also, can you include a "Kid's Corner"? Other mags have them but they have hardly anything about Apples – **Brian Millar, Hartford, Northwich, Cheshire.**

● I suggest you approach one of the dealers who specialise in your products and ask if they are interested in helping you to sell them. Keep your programs close to your chest, but remember that selling software requires a lot of expensive publicity and you may require help with that.

We would be happy to provide you with an unbiased view on the saleability of your programs, if you would like to send a copy of one to us, and if it could sell, we will tell you who to approach.

With regard to a 'Kid's Corner', I have never found a 'kid' with an Apple who needs talking down to. But space willing, if one is wanted and we get some serious contributions we will try and fit one in. **Ed.**

Drive routine required

I AM an author with some computer programming experience, and bought a computer to use mostly as a word processor. I have an Apple II Plus with 48k and two disc drives. My printer is a Radio-Shack TRS 80 Daisy Wheel II, interfaced via a parallel/centronics ver 2.0 card made by Simon Computers of Croydon.

I have tried unsuccessfully for two months to devise a drive routine that will allow me to utilise some of the printer's features from within the Applewriter suite of programs. The ideal is to designate certain characters – ', ~,], and so on – as control characters. The proposed driver would check all characters being output and on receipt of one of these characters would jump to an appropriate subroutine, for example to enable underlining, or subscripting.

A friend of mine, with a great deal more experience than I in machine code programming, has devised just such a drive routine for his Spinwriter. He told me that he had found a safe location for his driver, namely beginning at $9000.

I began too ambitiously with a program that, had it worked, would have performed all the functions I required. It didn't work, so I tried to pare it down to the bare essentials.

Nothing seemed to improve matters, so I decided to reduce the driver to an absurd minimum. I modified the print constants so that the printer address was $9000 (instead of the customary $C100 that normally works), and at $9000 I placed:

```
JSR # $C100
. RTS
```

Logically, this is surely equivalent to leaving the printer address at $C100, but when I attempt to print with this program all I get is form-feeds.

If I use:

```
JSR # $C102
RTS
```

I get some output on the printer, but it looks as if control characters to the printer are being printed, and the output on the printer bears no relationship that I can deduce to the text file. This is true whether the 8-bit is set or clear, though the output differs slightly between the two as expected.

To be perfectly honest I have no idea what is going on here. Why the first option has the effect it does is a total mystery. It should, surely, do absolutely nothing. Can you, or any of your readers, offer any suggestions?

My need is fairly urgent as I am a writer of biological texts and I am getting little pleasure out of my word processor because I have to go through and do underlining and subscripting by hand. If I could afford it I might consider buying a Spinwriter, but I cannot. In any case, there should not be any need – **Dr Jeremy Cherfas, London, W2.**

Question of definition

SOME thoughts on a letter from Jeff Hosier in the August issue of Windfall.

In producing any program there are three key aspects: *Formulation* – given a question, finding an answer; *Integration* – how to fit the needs of the process indicated in the answer to the system to be used; and *Translation* – how to turn the integrated answer into a program.

Translation, and necessity of systematic methods of program writing (ie, code generation), has taken too important a place in the education of the novice. The tail of Translation has been wagging the dog of Formulation.

"Exercising ingenuity" means finding the best possible answer to a question, and not doing things in an idiosyncratic way. When one has the best (or a very good) answer, the translation of the answer into a program can follow systematic lines. To exercise ingenuity can not be an excuse for sloppy presentation of either answers or programs.

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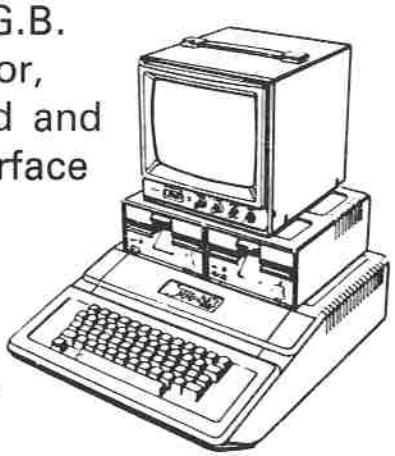

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where many people work on the same program it is only sensible to use systematic methods of program writing. If the answer (or algorithm, or flowchart) is sub-optimal then the program, though properly structured, is sub-optimal.

Edsger Dijkstra is a man whose connection with "structured" programming is more well-known than his actual writings. In his latest book, "A Discipline of Programming," Prof Dijkstra designs his own, idiosyncratic, programming language so that he can demonstrate his argument about structuring more clearly. One of his early points (p.xvii) is that there has been an over-emphasis on Recursion by those he terms "theoretical computing scientists."

One gets the strong impression that a multitude have read what others have quoted Dijkstra as saying, but few have read, and comprehended, Dijkstra in the original. (His ideas seem to run counter to many notions in Pascal.)

Many individuals have a dislike of sociologists (eg Margaret Thatcher, Rhodes Boyson) but a sociologist is probably more aware than most of the strains towards "professionalism" so amusingly present in some branches of computing.

The distinction between amateur and professional is nebulous, as it is in most spheres, for any person can call himself "computer consultant."

To suggest that amateurs are bringing amateur techniques to professional computing requires an explanation of what is an "amateur" and what is a "professional." – Yours professionally, **Dr G.J. Boris Allen.**

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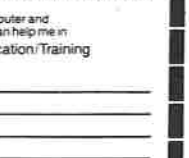

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Appletips

THIS program allows you to change any DOS command names and/or error-messages to your own. If, after your changes have been made, you initialise a disc the new commands/ messages will be implanted in that disc. The program will work with any version DOS and any size system.

```
                  ******************************
                  *                            *
                  *       'PERSONAL DOS'       *
                  *                            *
                  *            ****            *
                  *                            *
                  *    ITT 2020 OR APPLE II    *
                  *                            *
                  *        WITH DOS 3.2        *
                  *                            *
                  ******************************
```

```
20  PRINT  CHR$ (4)"MAXFILES3": REM   RESET HIMEM
21  GOTO 1000: REM   INITIALISE
99  REM LIST COMMANDS
100  FOR I = 1 TO 27 STEP 2
110  PRINT I: TAB( 4);C$(I);I + 1: TAB( 20);C$(I + 1)
120  NEXT
190  RETURN
199  REM LIST ERROR-MESSAGES
200  FOR I = 1 TO 14
210  PRINT I: TAB( 4);C$(I)
220  NEXT
290  RETURN
999  REM INITIALISE
1000  DIM C$(28),CO$(2,28)
1010 D$(1) = "COMMAND"
1020 D$(2) = "ERROR-MESSAGE"
1030 S(1) =  PEEK (115) +  PEEK (116) * 256 + 4740: REM  FIND START OF COM
     MAND NAMES          (HIMEM + 4740)
1040 S(2) =  PEEK (115) +  PEEK (116) * 256 + 4980: REM FIND START OF ERRO
     R-MESSAGES       (HIMEM + 4980)
1050 B(1) = 132: REM  MAX BYTES     FOR COMMAND NAMES
1060 B(2) = 202: REM  MAX BYTES      FOR ERROR-MESSAGES
1070 N(1) = 28: REM NUMBER OF        DOS COMMANDS
1080 N(2) = 14: REM NUMBER OF         DOS ERROR-MESSAGES
1089  REM  READ COMMAND NAMES      LISTED AT END OF PROGRAM
1090  FOR I = 1 TO 28: READ CO$(1,I): NEXT
1094  REM READ ERROR-MESSAGES      LISTED AT END OF PROGRAM
1095  FOR I = 1 TO 14: READ CO$(2,I): NEXT
1100  TEXT : HOME
1109  REM  HEADING
1110  INVERSE : PRINT  TAB( 53);: NORMAL : PRINT " PERSONAL DOS ";: INVERSE
     : PRINT  SPC( 54); NORMAL
1111  REM  PROGRAM EXPLANATION
1112  PRINT : PRINT "   THIS PROGRAM ALLOWS YOU TO CHANGE": PRINT "ANY 'DO
     S' COMMAND NAMES AND/OR ERROR-": PRINT "MESSAGES TO YOUR OWN."
1119  REM PRINT OPTIONS
1120 : PRINT : PRINT : PRINT
1130  PRINT  TAB( 6)"(1)...CHANGE "D$(1)"S"
1140  PRINT
1150  PRINT  TAB( 6)"(2)...CHANGE "D$(2)"S"
1155  PRINT : PRINT  TAB( 6)"(3)...EXIT"
1160  VTAB 19
1170  PRINT "SELECT 1,2 OR 3 :";
1180  GET A$:A =  VAL (A$)
1190  IF A < 1 OR A > 3 THEN 1160
1195  IF A = 3 THEN 3000
1200  HOME
1210  VTAB 12
1220  PRINT "READING DOS "D$(A)"S.."
1230 I = S(A)
1240  FOR J = 1 TO N(A)
1250 P =  PEEK (I): REM   PEEK      CHARACTER CODES
1260  IF P > 128 THEN P = P - 128: REM  LAST CHARACTER IS      ALWAYS ASCI
     I + 128
1270 C$(J) = C$(J) +  CHR$ (P): REM  BUILD COMMANDS/MESSAGES
1280  IF  PEEK (I) > 128 THEN I = I + 1: GOTO 1310: REM LAST     CHARACTER
1290 I = I + 1
1300  GOTO 1250
1310  NEXT : REM  NEXT COMMAND/    MESSAGE
1400 T = 0: FOR I = 1 TO N(A):T = T +  LEN (C$(I)): NEXT : REM COUNT BYTES
     USED
 410  HOME
 420  PRINT "PRESENT DOS "D$(A)"S" TAB( 30)"BYTES "T
 430  PRINT  TAB( 30)"(MAX="B(A)")"
 440  ON A GOSUB 100,200: REM      LIST COMMANDS/MESSAGES
 500  VTAB 19: CALL  - 958
 510  PRINT " 1-"N(A)"...CHANGE "D$(A)
 520  PRINT "  0.....EXIT"
 525  POKE  - 16368,0
 530  INPUT B
 540  IF B = 0 THEN 2000: REM      EXIT OPTION
 550  IF B < 1 OR B > N(A) OR B <  > INT (B) THEN 1500
1599  REM CHANGE COMMAND/MESSAGE
1600  HOME
1610  VTAB 5
1620  PRINT "DOS "D$(A)
1630  VTAB 10
1635  PRINT "ORIGINAL : "CO$(A,B)
1637  PRINT
1640  PRINT "PRESENT  : "C$(B)
1650  PRINT
1660  PRINT "NEW      :";
1670  INPUT A$
1680  IF A$ = "" THEN 1700
1685  IF A = 2 AND  LEN (A$) <  > LEN (C$(B)) THEN  PRINT : PRINT : PRINT
     "NEW "D$(A)" MUST BE SAME LENGTH AS ORIGINAL.": FOR D = 0 TO 5000: NEXT
     : GOTO 1600
1690 C$(B) = A$
1700  GOTO 1400
2000  IF T > B(A) THEN  PRINT "TOTAL CHARACTERS EXCEED "B(A)".": PRINT "SH
     ORTEN ONE OR MORE "D$(A)"S": PRINT "BY "T - B(A)" LETTERS.": FOR D =
     0 TO 5000: NEXT : GOTO 1410
2100  HOME
2110  VTAB 12
2120  PRINT "WRITING DOS "D$(A)"S.."
2129  REM POKE NEW COMMANDS ETC.
2130 I = S(A)
2140  FOR J = 1 TO N(A)
2150  IF  LEN (C$(J)) = 1 THEN K = 1: GOTO 2200
2160  FOR K = 1 TO  LEN (C$(J)) - 1
2170  POKE I, ASC ( MID$ (C$(J),K,1))
2180 I = I + 1
2190  NEXT
2200  POKE I, ASC ( MID$ (C$(J),K,1)) + 128: REM  LAST CHR
2210 I = I + 1
2220  NEXT
2230  IF A = 1 THEN  POKE I,0: REM 0 INDICATES END OF COMMAND     TABLE
2310  CLEAR : GOTO 1000
3000  PRINT : PRINT : PRINT "IF YOU INITIALISE A DISKETTE NOW, YOU
     R"
3010  PRINT "NEW COMMANDS/ERROR-MESSAGES WILL BE"
3020  PRINT "IMPLANTED IN THAT DISKETTE."
3499  REM ORIGINAL DOS COMMANDS
3500  DATA INIT,LOAD,SAVE,RUN,CHAIN,DELETE,LOCK,UNLOCK,CLOSE,READ,EXEC,WRI
     TE,POSITION,OPEN,APPEND,RENAME,CATALOG,MON,NOMON,PR#,IN#,MAXFILES,FP,
     INT,BSAVE,BLOAD,BRUN,VERIFY
3599  REM ORIGINAL DOS MESSAGES
3600  DATA LANGUAGE NOT AVAILABLE,RANGE ERROR,WRITE PROTECTED,END OF DATA,
     FILE NOT FOUND,VOLUME MISMATCH,I/O ERROR,DISK FULL,FILE LOCKED,SYNTAX
      ERROR,NO BUFFERS AVAILABLE,FILE TYPE MISMATCH,PROGRAM TOO LARGE,NOT
     DIRECT COMMAND
```

```
                  ********************
                  *   THIS PROGRAM   *
                  *    WAS  WRITTEN  *
                  *        BY        *
                  *  BERNARD  WYLDE  *
                  ********************
```

Pause for string cleaning

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": A=FRE(0)
```

An alternative method is to exclude 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 noticable.

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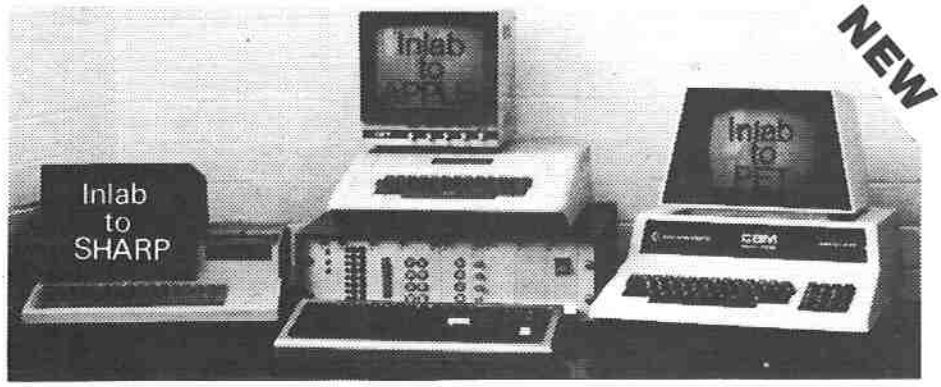

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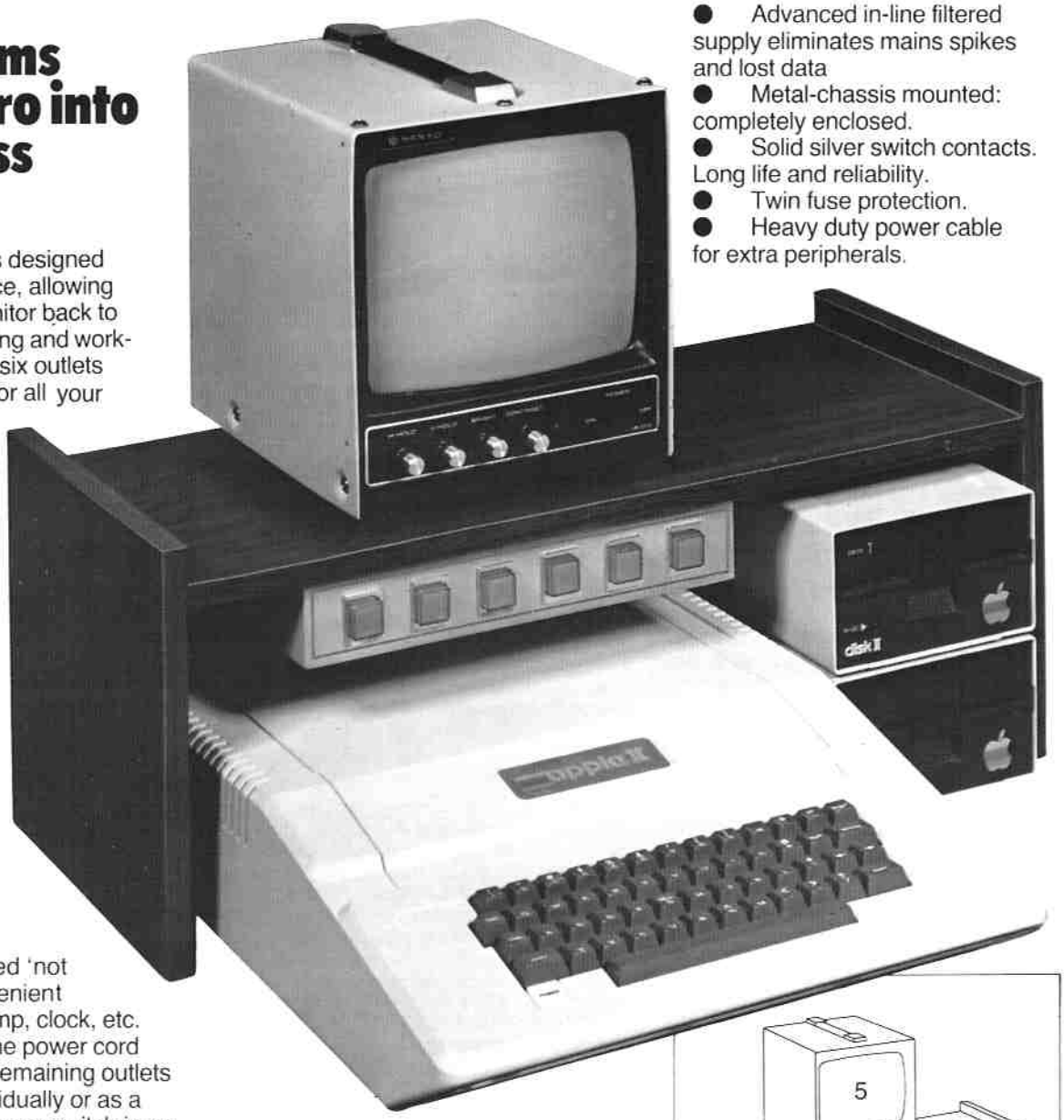

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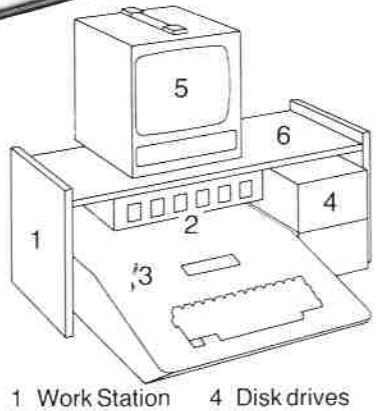

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User group round-up

Apple Project Managers / Micronet Users Group: *Contact Geoff Reiss, Construction Programming Services, 11 Meadow View, Wyke, Bradford BD12 9LA (tel: 0274-671859).* This is a new group formed by people using Apple Project Manager and its predecessor Micronet. The Apple Project Manager is part of the new Special Delivery Software supplied by Apple. Users are fairly widespread at the moment, so meetings are not that frequent, but a regular newsletter is being produced.

Apple Music Synthesis Group: *Contact Dr David Ellis, 22 Lennox Gardens, London SW1 (tel: 01-584 5816).* This is an embryo user group with a big potential. New members from anywhere in the country are welcome, whether they are already in another group or not. Windfall will let you know when they are ready to produce their first record.

BASUG (British Apple Systems User Group): *Contact John Sharp, PO Box 174, Watford, WD2 6NF.* Meets twice a month and arranges demonstrations on new equipment and talks by prominent Apple or other computer specialists. Provides courses at very reasonable rates on languages like Pascal. Has about 300 members. Publishes a bi-monthly newsletter.

BAUD (Bristol Apple Users & Dabblers): *Contact Geoff Symthe, Datalink Microcomputer Systems Ltd, 10 Waring House, Redcliffe Hill, Bristol BS1 6TB. (tel: 0272 213427).* Meets fortnightly at Datalink and anyone interested is welcome to attend. Formed September 1980. About 100 members. Hard core are high flyers from Bristol University and the Polys, and there is a great deal of expertise. No formal membership and no subscription, but charge of 20p per meeting to cover coffee and lighting costs. Publishes a monthly newsletter which details forthcoming events.

Cardiff and South East Wales User Group: *Contact Andrew Esseen at Cardiff Micro Computers, 46 Charles Street, Cardiff, South Glamorgan CF1 4EE (tel: 0222 373072).* Apple users in the South East Wales area – South Glamorgan, Mid Glamorgan and Gwent – will be interested in the creation of a new user group there. Andrew Esseen of Cardiff Micro Computers has offered the assistance of his company in getting it off the ground. He is very keen to pass on his experience with the Apple computer and to help coordinate and organise local meetings.

Croydon Apple User Group. *Contact Bill Macmillan, CAUG, 38 Box Ridge Ave, Purley, Surrey. CR2 3AQ.* This new group meets every two months on the second Monday of the month in the offices of Lawrence-Allison Ltd. It was set up by Peter Jarman after several Apple users asked him to help. Roger Caws, of Lawrence-Allison, is chairman and Bill Macmillan secretary. Peter Jarman offers technical advice and liaison with Apple Computers. The group intends to have a full programme of speakers, demonstrations of software and hardware and sessions on programming. One of the topics to be covered in the near future is a presentation on structured programming methods, hopefully run by the author of Database. Future meetings will include reviews of publications for Apple users, memory usage within the Apple, machine language programming and the Apple Monitor.

LAUGHS (Leicester Apple User Group for Help and Support): *Contact Hazel Brown, 7 Bude Drive, Glenfield, Leicester (tel: 0533 875252).* This group must be a load of fun. Anyway, they meet on the first Wednesday of each month at the Leicester Computer Centre, 67 Regent Road, Leicester. They have the usual type of group function, where various Apple related topics are discussed in depth, and products or software are demonstrated by members of the group. Membership fee is £5 a year.

London User Group: *Contact M.J. Want-Sibley, Data Management Systems, Crown Wharf House, 132 New North Road, London N1 (tel: 01-739 8692).* Data Management Systems have offered their premises, with extensive space and machines available, to be used as the location for the setting up of a Central London User Group. Anyone interested should contact Mr Want-Sibley. DMS are also offering free evening courses on the efficient use of microcomputers in business from September 14 to October 25.

● ***As you can see, according to our records many areas of the country are still without Apple user groups. If you are interested in setting one up in your area but need some publicity to get it going, write to us and we will ask potential members to get in touch with you. The address: User Groups, Windfall, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.***

North Lancashire User Group: *Contact John Robinson or Julian Morgan, 12 Harold Avenue, Blackpool (tel: 0253 47514).* Meets once a month.

North West Apple Computer Club: *Contact Roy Stringer, Long Lane, Warrington, Cheshire (tel: Warrington 542117).* A fairly new group of about 30 members, based around Warrington and Liverpool. Events include trips to major Apple installations, like at Keele University, and tuition in basic computing techniques.

North West Apple User Group: *Contact Peter Brameld, 35 Whitechapel Street, Didsbury, Manchester (tel: 061-236 3311 ext. 2519).* Meets once a month on Thursday evenings at the Staff House, UMIST, Manchester (with access to one of the cheapest bars in the city). Meetings often devoted to comparing new products. Has about 50 members and expanding rapidly. Publishes a newsletter.

Norwegian Apple Users Group: *Contact Einar Skjorten, Rytterfaret 21, N-1347 Hosle, Norway.* Tom Gilb, whose first contribution to Windfall will appear in the next issue, writes that a number of Apple users in Norway are getting together to start this user group. Details of their activities will be given in future issues.

SAPPLE (Southern Apple User Group): *Contact Pauline Martin, Miss Spoules Secretarial College, Winchester (tel: 0962-3393).* Meets about every sixth Tuesday, alternating between Southampton, Titchfield and Winchester. Intends holding organised games tournaments to give light relief at meetings. Plans to publish a newsletter.

Sheffield Apple User Group: *Contact Dr. Gordon Manson, Department of Applied Mathematics, Sheffield University (tel: 0742 78555).* This is a fairly new group, so they would welcome Apple users who are prepared to get involved in the organisation, as well as devoted attendees.

Scottish Apple User Group: *Contact Mrs B. Hunter, Hunters Lodge, Bankfoot, Perth. PH1 4DX (tel: Bankfoot 325).* This is a new group starting up in the Perth and Dundee area. As all the Tayside secondary schools use Apple computers this should be the first of several Apple groups to be formed in Scotland.

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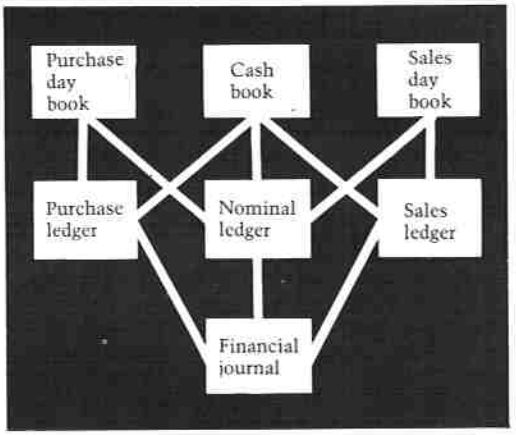

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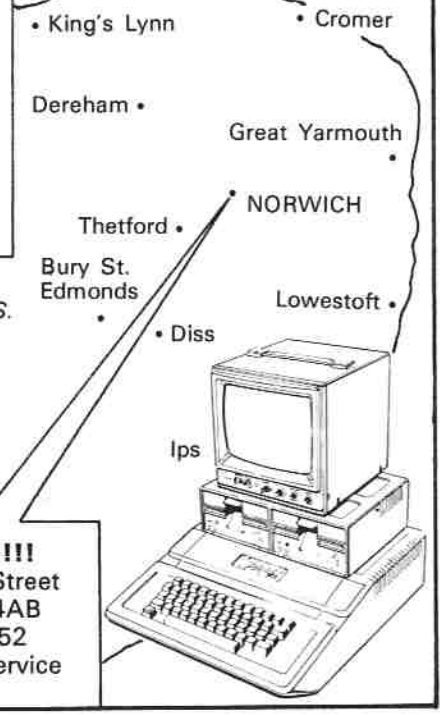

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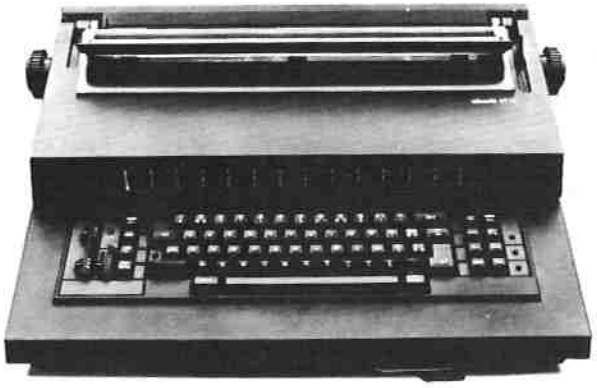

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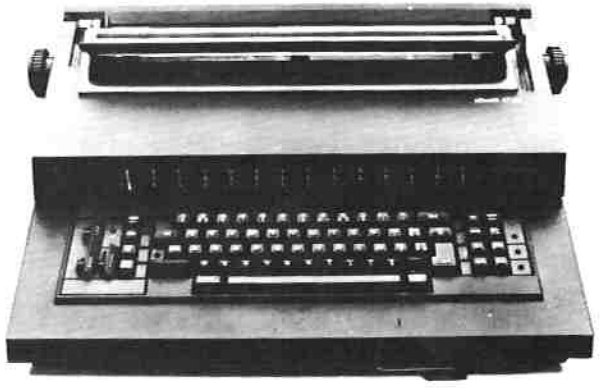

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GUESS WHAT ?

THE MONTHLY COMPETITION FROM GUESTEL

Two items in the above photograph have changed from the last issue.

There is no prize for noticing we've changed the printer, thats already a give away at **£275.**

It's the other item that you can win if your entry is the first to be drawn on November 14th at our Brighton office.

Send your entry to Dept. W at the Brighton office.

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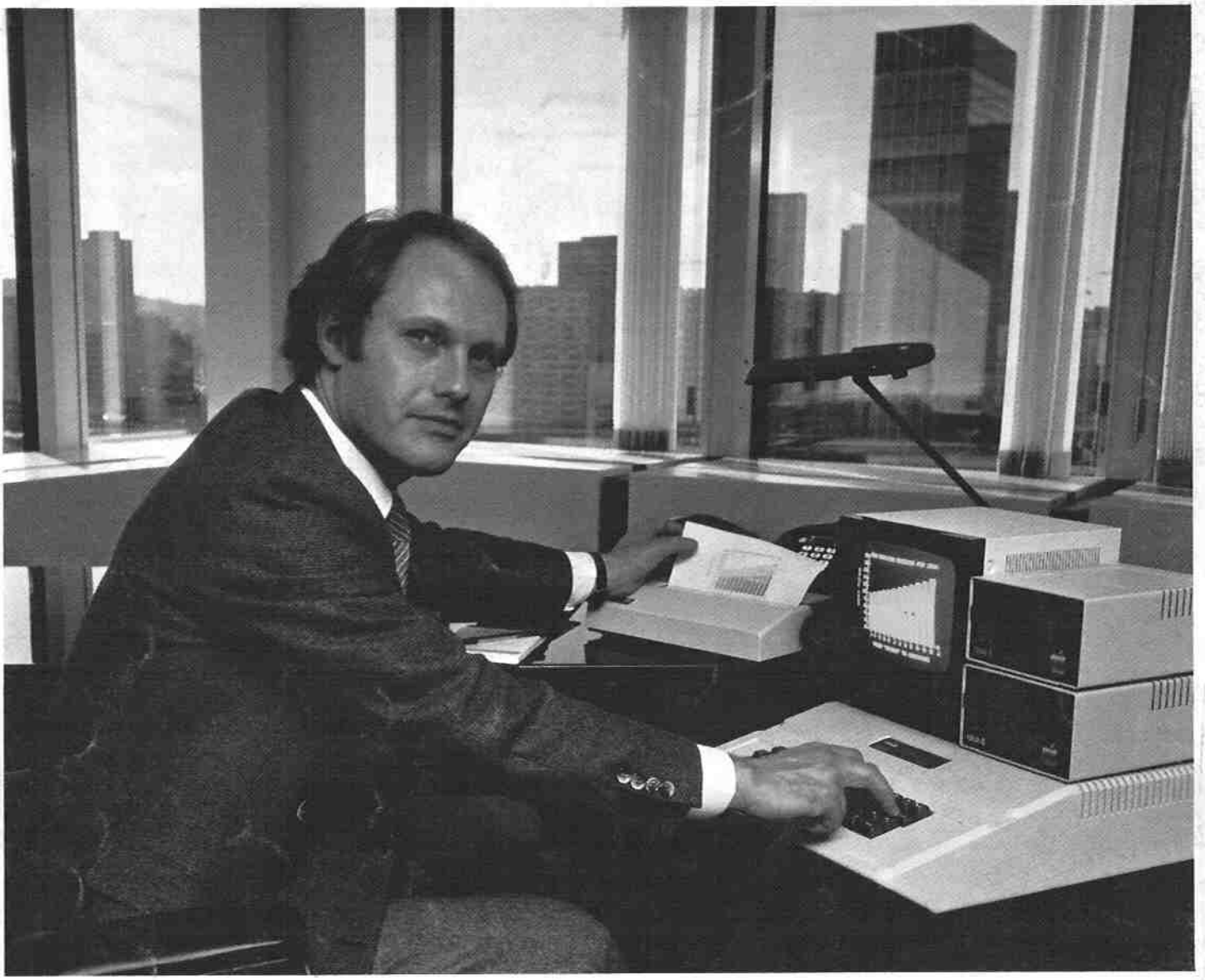

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