Windfall

No.1 July 1981 £1

The Apple microcomputer users' magazine

Micromodeller for high level business planning

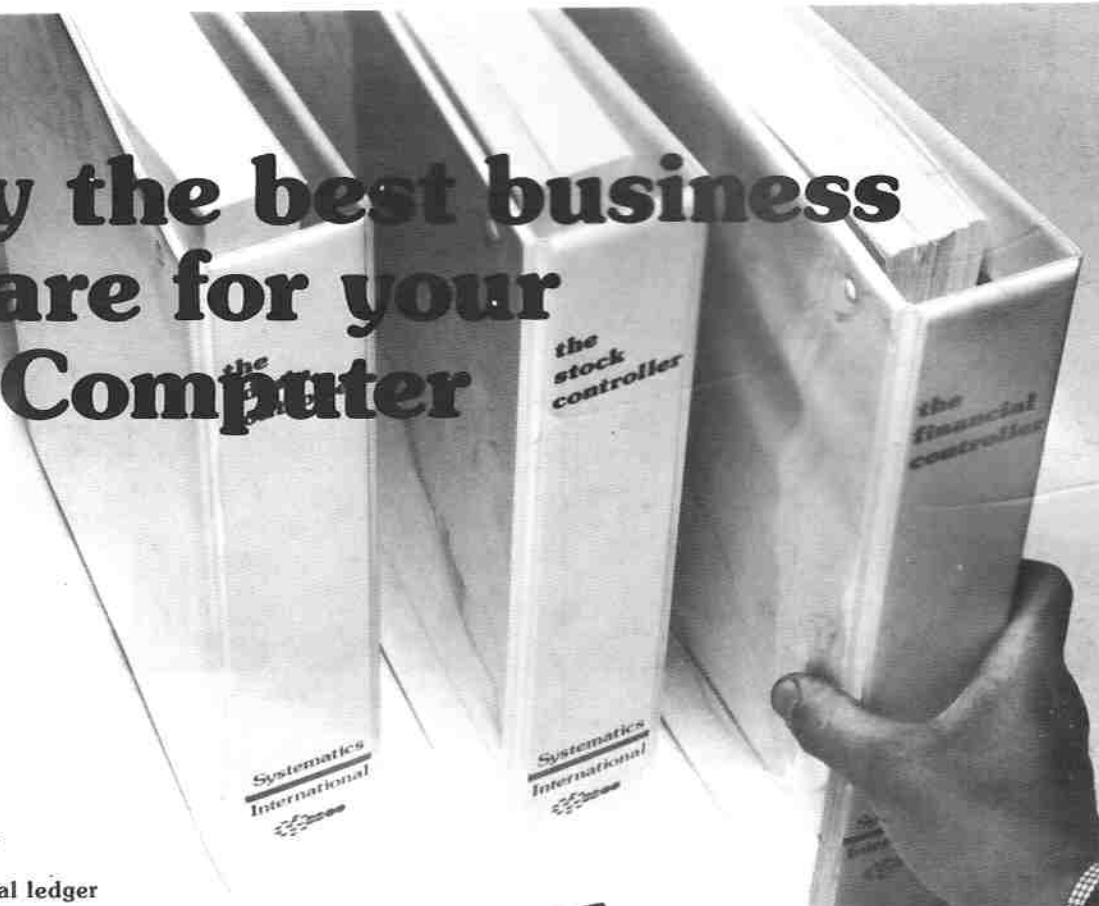
In depth peek at Format 80

MusicSystem, front runner in digital synthesis stakes

Apple and Cis Cobol, powerful partners

What's new in Apple software/hardware

Simply the best business Software for your Micro Computer



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WE'RE working on a fabulous holiday offer that will be exclusive to readers of Windfall – a 16-day visit to America's West Coast, staying in first class hotels in San Francisco, Las Vegas and Los Angeles . . . and with a tour of the Mecca of the world of computers, the legendary Silicon Valley.

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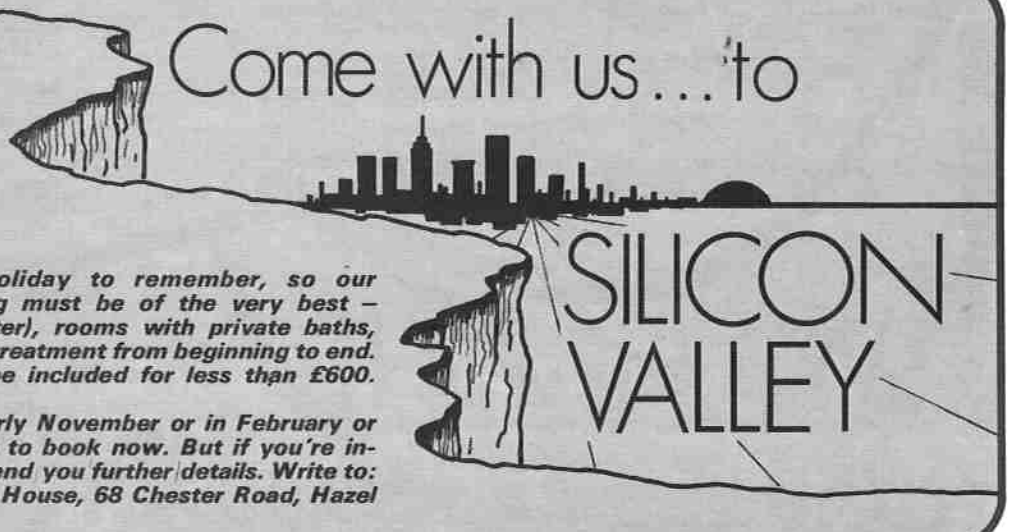
The dates we suggest are early November or in February or March of 1982. You don't have to book now. But if you're interested let us know and we'll send you further details. Write to: Holiday Offer, Windfall, Europa House, 68 Chester Road, Hazel Grove, Stockport SK7 5NY.



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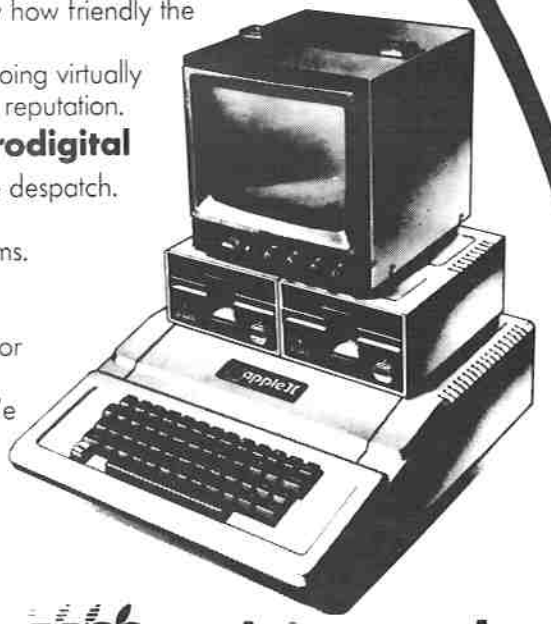

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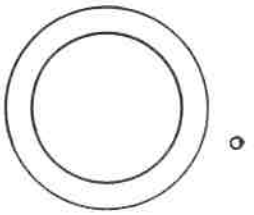

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The Apple II is a completely assembled and tested computer system. It includes a type-writer style keyboard with high-efficiency switching power supply, ROM-resident Applesoft extended basic interpreter, auto-start ROM, disassembler, two hand controllers (paddles), AC power cord, reference manuals and Applesoft Tutorial Manual.

Typical Business Starter Systems

Product Code Number	Description	Retail Price £
A2S1048P	Apple 48K Video Output	807.00
A2M0044	Disk Drive with Controller	383.00
A2M0003	Disk Drive without Controller	299.00 x2
VM910	Video Monitor 9" B & W	127.00
VM/C	Cable for Video Monitor	9.00
T445G	Paper Tiger Printer*	598.00
A2B0002	Parallel Printer Interface Card	104.00
E2D001/3.3	Visicalc	150.00
E2D002	Desktop Plan	75.00
A2D0026	Apple Writer (Word Processing)	42.00
A2D0033	Apple Plot	37.00
	TOTAL	2,631.00

*Alternative – the Centronics Printer

Typical Educational/Scientific Starter Systems

A2S1048P	Apple 48K Video Output	807.00
A2M0044	Disk Drive with Controller	383.00
A2M0036	Silentype Printer	349.00
VM129	12" Video Monitor B & W	189.00
VM/C	Cable for Video Monitor	9.00
A2B0017	Colour Card	113.00
D2M0014	TV Modulator for use with Colour Card	14.00
A2B0010	Integer Card	116.00
	TOTAL	1,980.00

APPLE HARDWARE

A2S1048P	Apple 48K Video Output	807.00
A2M0016	16K of RAM Add-On	56.00
A2M0044	Disk Drive with Controller (16 sec)	383.00
A2M0003	Disk Drive without Controller	299.00

LANGUAGES

A2B0006	Pascal Language System	299.00
A2B0009	Applesoft Firmware Card	116.00
A2B0010	Integer Card	116.00
A2D0028	Apple Pilot	76.00
A2D0032	Apple Fortran Package	120.00

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MC1	ALF Music Card 9 Voice	104.85
MC16	ALF Music Card 3 Voice	131.70
10-1-17	Timing Mode Input Board	11.30
13-3-2	ALF Music Album 1 for MC16	8.10
13-3-4	ALF Music Album 2 for MC16	8.10
13-3-5	ALF Music Album 0 (Xmas) for MC16	8.10
13-3-10	ALF Ear Training Disc A/Soft M16	26.85
13-3-9	ALF Ear Training Disc INTG MC16	26.85
13-3-11	ALF Process Series for MC1, MC16	26.85
13-3-12	ALF Music Album A for MC1	8.10
13-3-13	ALF Music Album B for MC1	8.10
13-3-14	ALF Music Album C for MC1	8.10
H/CON70	Heuristics Controller 70	63.05
H/SP/LAB	Speech Lab	140.20
H/SP/LINK	Heuristics Speechlink 2000	192.00
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A2M0027	Auto Start ROM Pack	38.00
A2M0029	Graphics Tablet	462.00
APPLETEL	Appletel System	595.00
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MHP-X006	Supertalker	193.50
MHP-X007	ROM-Plus Board	135.50
MHP-X015	ROMwriter	112.85
MHP-X022	Music System Complete	351.00
MHP-X026	Copyplus ROM	35.50
MHD-D007	Spare Music System Disk Pack	25.00
MHM-X011	Spare Music System Manual	12.00

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A0-03/8	Analog Output Board 8 Channel	328.00
A1-02	A1-02 Data Acquisition Card	224.70
D1-09	Digital Interface	248.35
AI-13	Analog Input Board 16 chl 12-bit	419.35
MHP-X023	AD – DA 16 Channel Converter	225.70
65-4104	Controller Card	106.00
A2B0017	Eurocolour Card	113.00
E2B107	IEEE Interface	94.00

SOFTWARE/DISCETTES

Personal Software . . .

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E2D002	Apple Desk Top Plan	75.00
A2D0003	CCA Data Management System	75.00
M/MOD	Micro Modeller	425.00

Other Software . . .

A2D0005	Contributed Software Vols 3-5	60.00
A2D0009	Microchess 2.0 Chess Disc	15.00
A2T0013	Microchess 2.0 Chess Cassette	15.00
A2D0010	Disc Utility Pack	15.00
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A2D0013	Apple Post Program	27.00
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E2D0003	Gammon Gambler	17.50
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MBA-S-ML	Microbase Mailing List	70.00
MBA-S-SC	Microbase Stock Control	100.00

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A2M0047	Qume Form Tractor	126.00
A2C0001	10 Rolls Thermal Paper for A2M0036	28.00
CENT.737	Centronics 737 Printer c/w Adaptor	424.00
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PAPER/3	11 × 15.15/16" Paper for TI810/QUME	14.06 x2
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T/D445/P	Pascal Graphics for T445G	20.00
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T/D460	Graphics Software for T460G	20.00
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T/D560	Graphics Software for T560G	20.00
T/D460/P	Pascal Graphics for T460G/T560G	20.00
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DP9501/GS	Graphics Software for DP9500/DP9501	20.00

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VM129	12" Black & White Video Monitor	189.00
VM/C	Cable for Video Monitor	9.00
VM12G	12" Video Monitor Green Display	193.00
MC/G	Monitor Cable for VM12G	3.75

DOCUMENTATION/MANUALS

A2L0001A	Apple II Reference Manual	11.00
A2L0002	6502 Hardware Manual	9.00
A2L0003	6502 Software Manual	9.00
A2L0005	Apple II Basic Program Manual	6.00
A2L0006	Applesoft II Reference Manual	6.00
A2L0012	DOS 3.2 Manual	6.00
A2L0018	Apple II Basic Tutorial Manual	6.00
A2L0019	Pascal Reference Manual	8.50
A2L0022	Autostart ROM Manual	4.50

DOCUMENTATION/MANUALS – continued

Product Code Number	Description	Retail Price £
A2L0026	Fortran Reference Manual	12.00
A2L0027	Pascal Language Manual	9.00
A2L0028	Pascal Operating Manual	11.50
A2L0033	Graphics Tablet Manual	5.00
A2L0034	Silentype Manual	3.00
A2L0036	DOS 3.3 Manual	5.00
A2L0041	Pilot Language Reference Manual	9.00
A2L0042	Pilot Editors Manual	7.00

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A2M0009	Vinyl Carrying Case	16.00
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MD5172	Diskoflex Filing Case-Mini	12.64
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TIGER/DUST	Dust Cover for Paper Tiger	9.95
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APP3	Two Tier Desk Economy Range	125.00
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MANUALS/BOOKS

Apple II Ref Manual	11.00
6502 Hardware Manual	9.00
6502 Software Manual	9.00
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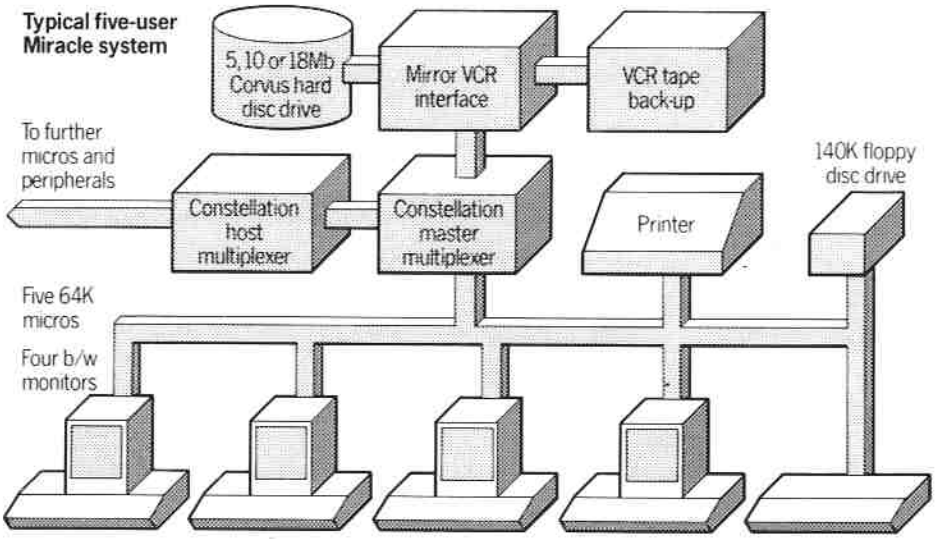

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ON THE SIDE OF THE ANGELS

ACCORDING to H.G. Wells, civilisation is a race between education and catastrophe. But how would Wells have reacted had he found that the race he described is turning out to be totally unlike anything he could have envisaged – a kind of everlasting marathon, where first one competitor and then another forges ahead, jostling for position as the contest unfolds.

The race of today is a spiral. You could say we are nearing the end of the contest, and both education and catastrophe are putting in their final sprint.

Education is essentially the communication of ideas and opinions. Finding no particular reason at this stage to side with the forces of catastrophe, this magazine plants its banner firmly on the side of education and communication and states in the most categorical terms that it is going to provide you, the proud Apple user, with the best means available for learning all about the Apple, discovering what bits you can add on to it and, should you be so confident, telling other users how to go about it.

Windfall is dedicated primarily to Apple users. It was born as a result of conversations within a local user group, and it will actively promote and encourage more participation in existing groups, as well as the formation of new groups in all parts of the country.

The information we shall be providing will be relevant to all kinds of Apple user – to programmers of many years' experience and to the complete novice who bought an Apple yesterday and wants to know how to take the floppy disk out of its black cardboard packet.

We are backed by a glittering array of Apple experts from Britain's universities, colleges, research institutes, major and minor accountancy practices, large and small businesses, as well as private individuals. Plus a wealth of expertise among the countrywide dealer network.

We will be using all these resources to review the ever-increasing variety of software and hardware products that are becoming available for the Apple, occasionally pitching similar products into the ring together and evaluating their performance.

We shall be taking products apart to find out how effective they are, describing the ways they can be used and helping you to decide how much use they might be to you.

An outstanding feature of many of the very expensive American magazines devoted to microcomputers is the wealth of technical information they provide. Because we are seeking a much wider readership, our policy is not to overload the magazine with programming or technical hints.

We do intend, however, to maintain a healthy section where we will look closely at program routines and bugs. Some of these – but not all – will be tested before publication, but you can be assured we shall leave you in no doubt which ones have been given the Windfall seal of approval (they work!) and which are merely included for your interest.

If you disagree with what our experts say, or if you feel you have a contribution to make on another Apple-related topic, we shall be delighted to hear from you. Or if you have an Apple problem which has so far defied a solution, then send us the facts and we will do all we can to find the answer.

Having been involved in the computing industry for a number of years, and understanding the basic principle that the sensitivity of experts in any field rises in direct proportion to their ability and experience, we would like to ask all of you who have risen above the plain of mortals to show us what incredible things you are doing with your Apple. We don't know who you are or what you have achieved until your letter (preferably with appropriate photographs, a set of diagrams or sample listings) drops on our desk.

Apart from providing a forum for educating users through a cross-pollination of ideas – that carefully selected term also implies the raising of Windfall's level of knowledge – we shall include a monthly section on Apples in education, primarily for the benefit of our younger readers. This will include reviews of educational software specifically designed for the Apple, either as an aid to computer studies or for the teaching of more traditional classroom subjects such as science, geography and languages.

As an offshoot of this, and it applies to all other subjects covered in Windfall, we shall be compiling comprehensive lists of all the software and hardware available to Apple users, and we shall be able to provide information on any item on request. Obviously this will take some months to develop. We shall ensure that it is continually updated, and we hope that one of the main sources of information about products and their effectiveness will be our readers themselves.

Apple user groups seem to have been rather

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the correspondent

by R. Wagner

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slow getting off the ground, but there are several now in operation which are listed in this issue, together with news of some of their activities. We want to encourage you to join these groups, because not only do they provide an ideal opportunity to pick up useful information about the Apple, but you will generally find members very friendly and sociable.

There are a number of things you can do to help promote the network of user groups. If you live in an area that doesn't have a group of its own – and there are many such areas in the country – then get together with some colleagues and form your own. Inside this issue you will find some useful advice on how to go about it from John Sharp of the British Apple System User Group. If you don't have the desire to lead or to join a committee, then persuade your local Apple dealer to initiate the setting up of a local group.

If you are an advanced Apple user you may be able to help in another way. Groups need to provide a variety of interesting material for the benefit of members at their periodic meetings, and you might like to consider giving a short talk to a group, or a set of groups, on some aspect of Apple with which you happen to be particularly familiar. If this prospect interests you, write to us and we will add your name to our list of Apple speakers.

We have enjoyed compiling this first issue of Windfall, and we have been most encouraged by the tremendous response we have received from advertisers, contributors and potential readers.

Already we have a vast amount of material to put before you, and in future issues you can start looking forward to major reviews on graphics, databases, interface cards, printers, colour systems, communications ... to name but a few. We are starting a monthly course on assembler programming in our second issue, and this will be followed by further courses on other languages and on techniques in Apple programming.

We have a large number of novel applications lined up which we know will create a great deal of interest among our readers. And because Apples are nothing without the people who operate them we shall be talking to some major users of Apples in business and education, to people who communicate with each other on Apples linked via radio and satellites, to those who create professional music on their Apple, and those who put it to work controlling their electronic homes.

Please remember, however, that while all this is well in hand, we still need to have a constant feedback from our readers. The quality of the magazine will ultimately depend on the quality of the input from its subscribers – the Apple users themselves.

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MicroModeller:

Crystal ball of the '80s?

By D.C. SUTTON
of System Six

IT is widely accepted that large companies take several years to go bankrupt. It is also widely accepted that among the last people to realise that a company is going bankrupt are those responsible for the running of the doomed company.

Quite often the imminence of disaster is revealed only when it becomes necessary to discuss with some independent body, such as the bank, what the longer term prospects for the company are. As the people concerned realise the implications of the analysis they are being obliged to carry out their alarm often communicates itself to their creditors and the end comes with a rush.

This is not an experience confined to the smaller companies with no budgets for corporate planning functions, Rolls-Royce was being used by lecturers in Manchester Business School as an example of a company headed for bankruptcy for two years before the crash came.

What, you may say, has this to do with an evaluation of a computer programme entitled MicroModeller? This can better be answered by considering what businesses require to improve their day-to-day awareness of their overall position and to improve the quality of their decision-making. The key to both these problems lies in the subject of models.

The fact is that whether they realise it or not no manager ever manages anything as tangible as the division, company or department for which he accepts responsibility. What he in fact manages is a *model* of that division, company or department. It can be argued that his effectiveness as a manager is solely governed by how good his model is.

I should at this point explain what is meant in this context by a 'model '. A model of something is, in the most general sense, a representation of it. In the worlds of philosophy and science models do not have to look, to a layman's eyes, anything like the object or situation being represented.

A model may be an accurate scale model instantly recognisable as such, or it may be as abstract as a mathematical equation. The key requirement for a model is that there must be a unique way of relating each part of the thing modelled to a specific part of the model.

A map is technically also a model. Each square mile, say, in a given area is represented by one and only one specific square inch on the map, and every road, river, etc, is shown in the same relative position on the map as is the case in the full size.

Models may be very detailed representations of what they model or they may be very approximate, just as a one mile to one inch map shows more detail than an atlas map of say ten miles to the inch. The detail and accuracy of a model is properly spoken of in terms of the quality of its 'mapping' of the subject modelled.

Thus to return to our manager, what he is managing is his model of his reality, whether it be division, company, etc. The model is in his head and, if he is a good manager and provided his section is not too complicated, he will have a pretty good idea of what will happen in a given situation. Other people may have different models of the same reality, but that is another issue.

In other words he uses his model of his section to simulate the effects of given courses of action. As a result of this simulation he chooses the one he prefers and gives the appropriate directions. If his model was a good one the desired effects occur. If not, effects still occur but he will be more or less surprised by them subject to whether the discrepancies are unfavourable or favourable.

The crux of management from this viewpoint then is how good are the models we are managing? Unfortunately the realities we manage are very complicated whereas the amount of complexity we can handle in our heads is very limited. There are very few people indeed who can even solve one pair of simultaneous equations in their heads (you try it!).

Thus for even moderately complicated management problems we need some form of external help to augment our very limited modelling capacities. Unfortunately management is carried out in the real world where time waits for no-man(ager) to sit for hours at his desk with pencil and paper rubbing out and rewriting figures into his forecast sheets and decision tables.

It is finally being accepted, even by some accountants, that there is more to running a company than measuring things and maintaining a tight watch on the cash flow. Measurement can tell you what the effects of a decision *were* but not what the effects of a decision *will be*. Prediction requires an ability to understand, or at least anticipate, the net effects of many interconnected factors.

For example, a decision to reduce stocks may reduce the cost of the money tied up in stock but, because of an attendant reduction in responsiveness to shop floor demand fluctuations, longer delivery times may reduce the earnings and offset

any saving of interest charges. The manager who tried to convince a finance orientated board without some way of putting figures to his 'feelings' would be rarely satisfied with the outcome.

What is needed therefore is some way of capturing the relevant information about a company or department in a form which depicts the important interactions and yet is easily assimilable by the managers in charge. Not only must this device contain the most up to date information available but it must also be capable of displaying estimated future conditions and allow the estimates to be changed at will. Such a tool would allow all the quantifiable information to be made explicit for inspection and so provide a more definite plot of the current state of affairs.

In addition, and of even greater benefit, the ability to try out the effects of different estimates and decisions on future states enables the judgement of the manager to accommodate to some extent the unquantifiable aspects of his situation. Naturally computers offer a way of answering both of the above needs.

Until recently the cost of computers and their related accessories meant that only the richer companies could afford the equipment. The cost ensured that tasks with more immediately visible savings were given priority in the allocation of computer time. Only companies with very large management problems tended to consider the development of computer-based modelling as an aid to planning and so such programs tended to be tailor-made, large and expensive.

The packages that became available as general purpose modelling systems tended to be developments of these earlier tailored products and were themselves expensive and complex. A potential user needed a large computer of his own or else access to a time-sharing network.

As the use of small and cheap micro-computers has begun to grow it has at last become feasible for companies to develop much smaller general purpose computer programs which may be used for some of the simpler modelling applications. The feasibility depends on the probability of selling large numbers of the programs, at prices that are a very small fraction of those for mainframe-based computer modelling packages. By aiming for unit sales of thousands rather than tens the price becomes tens or hundreds rather than thousands.

One of the disadvantages of the earlier computer modelling packages was that they were so complicated to use that the manager needed a team of systems analysts and operational researchers to create his model for him. As we all know the more people involved in any development the less likely it is to work.

Anything that puts the means of developing and experimenting with models in the hands of the ultimate user of the model must be a good thing. This is where the microcomputer-based modelling packages come in, at last!

A MicroModeller for the manager?

MicroModeller is the third program to be released for the Apple which lays claim to be usable as a modelling package. The other two are Visicalc and Desktop Plan. In cost terms it is a great deal more expensive but it claims to offer a great deal more.

The remainder of this article will discuss whether MicroModeller does deliver the goods and, to some extent, how it compares with its competitors.

It is perfectly possible to use any of the programs to simply organise and display, say, balance sheet information. The powerful facilities for rapid recalculation means that figures can be altered at will and all the related totals will be corrected automatically.

This in itself can drastically reduce the time and effort required when, say, end-of-year book-balancing is required. Each error and omission that comes to light and needs corrections often involves many tedious and repetitive corrections which ripple over the pages of figures.

The recalculation facility however offers much more than a rapid means of correcting entries. Systematic and thoughtful experimentation can be used to simulate the effects of decisions before they are made, the 'What if?' approach.

All three packages are designed around a worksheet which contains all the figures and relationships that the user has defined in order to represent his management problem. A worksheet may be thought of as a chart or ledger-like page consisting of rows and columns of figures. The rows and columns may be given names and titles and sub-headings may be included to make it easier to understand.

For example, when the model is a financial one the columns may be allocated to monthly or yearly results and totals and the rows associated with the individual sales and cost elements.

If we define a box as the intersection of a row and column then, when the model is set up, each box will contain a number or some explanatory text. Numbers may be entered individually or, and this is the great strength of all the packages, a number may be defined in terms of one or several of the other numbers in the model together with constants and mathematical functions.

Thus a box may be made to contain an individually defined number, the total of a row or column or a constant, or varying, function of any other box. For example, an annual growth rate of sales may be defined along a row and the values for each year automatically calculated by the model once the initial figure has been entered.

The recommended procedure for setting up models is to plan the layout of your worksheet with all the headings and relationships defined on paper before you start to enter them into the computer. A key feature of these packages is the ease with which the figures and calculation rules may be entered or changed and the results viewed.

Visicalc wins hands down in this respect as both MicroModeller and Desktop Plan require several stages to proceed from model definition to results display, whereas Visicalc does it all at once.

Model building

When setting up a model on Micro-Modeller you would have to proceed via the following steps:

1. Sketch out on paper the layout of the final reports you are going to want.
2. Plan and enter the rules which will tell the model how to calculate the numbers which will be derived from whatever data you will enter to start the model off. (The program saves this on a 'Logic' file.)
3. Plan and enter the rules which will define the layout, headings, titles, etc., of the result reports. (The program saves this on a 'Report' file.)
4. Assemble and enter the data which is available. (This can be made easier by an option to specify and print out a 'work-sheet' which can also be saved on a file. The entered data is saved on a 'Data' file.)
5. Instruct the computer to use the calculation rules on the data provided to work out all the other values in the model. (Termed 'Using the Logic'.)
6. Ask the computer to display 'Dataview' or print out 'Report' the results for your inspection.
7. Carry out any revisions necessary by returning to steps 2, 3 or 4.
8. If desired you can then try the effect of changing data or calculation rules in the classic 'what if?' mode, each time returning to the appropriate step above.
9. After each run of the model you can request a hard copy printout of the results or proceed to the options which give graphical representations of your results, of which more later.

When you have set up a 'working' model the information about it is saved on one disc but on several files. The essential information is distributed over three files: the Logic file, the Report file and the Data file. In addition you may need to save the computed data on a Results file and the information to printout a blank data input form on a Worksheet file. Keeping track of all these different files does force the user to approach the subject systematically but this can put off someone who is not used to working closely with computers.

Of course any modelling programs must be designed around these functional areas but it is not necessary to obtrude the distinctions upon the user to this extent. Visicalc manages excellently in this respect. The user can switch from entering data to entering relationships at will and every change is instantly recalculated and visible on the worksheet which is constantly in view.

Both MicroModeller and Desktop Plan require the user to consciously proceed to different sections of the program for each type of operation. In the case of Micro-Modeller some of the behaviour of the

→

Pascal operating system intrudes upon the user to a noticeable degree. Many of the user prompts are borrowed from it and are rather terse for the unsophisticated user.

Accepting that MicroModeller is more complicated to use than the other two programs let us consider what extra capabilities it offers to compensate.

The functions and operations that can be used to define the logic of models is impressive and has a strong financial bias. In addition to the basic mathematical operations of addition, subtraction, division and multiplication it is possible to evaluate the internal rate of return of a row of cash flows, to automatically evaluate depreciation by a choice of bases on a row of capital investment figures, to automatically derive interest payments given the location of the principle and the repayment details and to compute the amount of tax loss carry forward given the profit and loss and the years eligible.

The highest or lowest figure in a row can be found, figures from a box can be moved sideways to represent leading or lagging influences and even 'spread' over several other periods to represent varying influences on other time periods. Logical comparisons are also available. Whilst an ingenious user of Visicalc could duplicate most of the functions their ready availability on MicroModeller is a point in its favour.

Reporting

When we come to the printing out of results MicroModeller comes into its own. You can select the rows and columns of your model that you want printed in any order that you wish, so you can create several reports from the same model by choosing different combinations of rows and columns.

Thus you could print separately balance sheet, profit and loss, cash flow projections, sales forecasts and modelling assumptions even if the relevant rows are interspersed in the overall model. You can even have the rows and columns exchanged if it will help the interpretation of the results.

Apart from the selecting the actual data to display on the report you can define row and column titles which do not have to be identical to those you gave them when defining the model. Thus you can make them appropriate to their intended use.

Naturally you can define report titles, headings and sub-headings throughout the page and insert blank lines to aid readability. You can choose the format of the numbers to be printed from a wide range of useful options and you can vary the widths of the columns individually. Finally you can arrange to insert dates and various explanatory comments at the time of printing to tailor even further individual versions of a report.

Most of this is well beyond what Visicalc or Desktop Plan can offer, although the latter is a more report orientated package and may be adequate in many cases and a skilful user can even make a Visicalc printout quite presentable.

Another useful option for users in larger companies is the Consolidation facility. If you have models of, say, several departments, you can combine them into one master report to show the aggregate picture as well. You can add whole models together or extract the key rows and merge those alone. Desktop Plan can achieve a relatively rudimentary type of consolidation, Visicalc cannot.

Displays

We now turn to the area where MicroModeller comes into its own: the visual display of results. Once you have run a model you can select critical rows or columns (or a combination of rows and columns) to be displayed in a variety of plotted forms. The range is fairly comprehensive including as it does:

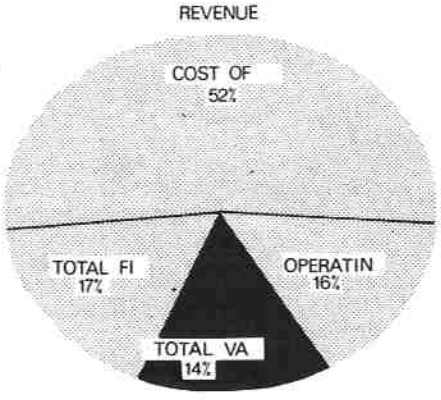
- Pie charts, with an option to highlight a segment,
- Bar charts (histogram form), with an option to 'stack' several on top of each other
- Line graphs, with up to eight lines at once.

All formats permit the user to define titles and labels or use those already defined for the model elsewhere.

In addition the user can save the images plotted and recall them in a planned fashion to create an effective slide show presentation of his results. Text only 'slides' can be prepared for inclusion and the package even comes with a trailing lead control switch to enable the computer to step through the stored sequence of slides under speaker control. This device plugs into the games socket and also contains something to ensure that the program will only run when it is installed (to protect against pirate use).

Despite the seductiveness of this option it should be borne in mind that the quality and definition of the Apple graphics is not up to photographic standards even with a high quality video projector to enlarge the images. The sort of user who needs to put on a visually aided presentation of results is going to have to ensure that his audience will be small enough to cluster around a (preferably) colour monitor rather than fill a lecture theatre.

Needless to say neither Visicalc nor Desktop Plan offer these aids to presentation, although there is a program available which can produce lines and bar charts from Visicalc models.



Pie chart of revenue

Usability:

Having outlined the facilities offered by MicroModeller we now turn to its ease of use. You may already have deduced that I am an advocate of programs which require no expert computing knowledge on the part of the user. MicroModeller is not really in the same league as Visicalc in this respect. Even Desktop Plan is better in this area.

The accepted way of protecting the innocent user from needing to know much more than the location of the on/off switch is to provide at each stage a menu of options from which the user indicates his preference. The principles of this menu driven approach is that the user is at all times able to see a full list of the options available to him.

MicroModeller's approach is to face the user with a terse prompt such as 'COMMAND:' and expect the user to discover all the valid responses by reading the manual.

There is a facility in MicroModeller which claims that a clever user can set up a prompting file so that another unskilled user can operate the package. But on examination this proves to be limited to making selections from anticipated alternatives to build models, printout reports, enter or consolidate data. The major requirements of being able to ask the 'what if?' is not available under this option.

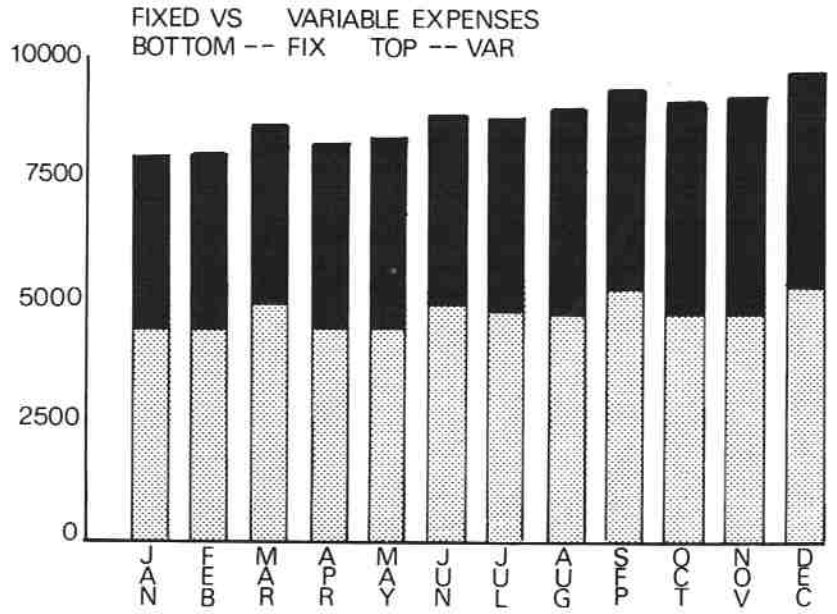
I expect some readers will feel that I am being unduly hard in this respect but I also expect that such readers will be those who have been softened up by exposure to large computer systems where the user is expected to fit in with the requirements of the system.

All I can say is that users get the products they deserve and we know from Visicalc and other packages that the computer can be made very user friendly indeed if the designers will put in the effort.

MicroModeller goes some way to offset this objection however by providing a tutorial seotion in the manual and a prepared disc of demonstration data for the buyer to familiarise himself with some of the capabilities of the package. This seemed initially to be working well apart from a few minor irritations.

When I started off it seemed that the guide was indicating exactly what the user would see on the screen as he proceeded through the example. However the correspondence soon broke down. Fortunately I am reasonably familiar with computers and so I managed to bridge this hurdle and those of a few minor misprints. The package managed the printout stages excellently without asking for any printer details so it must be quite intelligent in this area, or lucky.

My progress, under tutorial commands, to the graphics section was not so smooth



Stacked bar chart of fixed and variable expenses

however. The fault was partly due to poor arrangement in the manual. I was using a two disc drive system and a different procedure was required from that for a three disc system which MicroModeller tacitly assumed in the manual.

Unfortunately the paragraph containing the changeover instructions was some 17 pages and 30 minutes before I needed it and the tutorial at the critical point contained no reminder of any likely problems. It was as a consequence of this that I encountered a bug in the program itself.

What should have happened was that I had to temporarily remove the disc containing the demonstration data and insert one of the Apple Language Card system discs before telling MicroModeller to run the graphics section. I did not do this and so caused problems when the program running utility could not be found. The disc drive whirred briefly and then a message flashed on the screen asking me to insert the required system disc. Before I could act upon this reasonable request the disc drive again set in motion and the same message flickered on the screen.

This behaviour continued and short of whipping out the disc from a moving disc drive (not to be recommended if you want to use the disc again) the only way was to switch off and start again. It was some time before I chanced upon the misplaced section in the manual that caused the trouble in the first place.

The whole area of disc management is very poorly covered in the manual as a whole and the user is likely to be at the mercy of the program as to which disc his data is saved on unless he is very good at reading between the lines. The intrusion of the operating system could easily be reduced by copying vital utilities onto the MicroModeller program disc with an attendant reduction of complication for the user.

The print quality of the manual and the initial impression is excellent. It is unfortunate that the content should fall somewhat short of its first promise. The main criticism must be that its style assumes a fair level of familiarity with computer concepts and a willingness to pore over the examples to clarify the rather sketchy explanations of some of the procedures. A task not made easier by the sprinkling of errors in the examples themselves.

This shortcoming is not unusual in the field of mainframe computer documentation but should be firmly stamped out in the microcomputer field if we want it to uphold the principle of user friendliness that is rightly being promised by the better microcomputer program coming onto the market.

As I have already mentioned the package is very poor with regard to on-screen prompting. The user has no idea what his options are unless he has the manual at hand. Incidentially an index or at least quick reference card would be very useful, particularly as many of the options are well buried in the text.

I am quite sure that anyone with experience of mainframe modelling packages would not consider many of my complaints very serious but in my role of 'defender of the user' I feel that they are avoidable and should be removed if the program is to deserve success.

This evaluation would not be complete if it did not compare the costs of the three packages and the type of computer system they require to run. Both Visicalc and Desktop Plan will run on a 32k Apple with one disc drive. MicroModeller requires a 48k Apple, the Language Card with Pascal and two disc drives. If we accept that most Apple installations with any serious business usage will be 48k and two disc drives, there is still a 'hidden' cost of £299 for the Language Card before a user could run MicroModeller on his business system.

MicroModeller itself costs £425 and so you will have to spend £724 to run it even if you have the business system described above. Visicalc costs £85, Desktop Plan costs £75, and the plotting program compatible with Visicalc (Apple Plot) costs £37.

Conclusions

MicroModeller is:

☐ *Very strong* on the display of results, whether in terms of formal printed reports or in the terms of the creation of visual aids to interpretation and presentation of the results.

☐ *Good* in terms of the general quality of its packaging and presentation.

☐ *Good* in terms of the facilities it offers for the construction of relationships in models built by users.

☐ *Poor* in terms of overall value for money compared with Visicalc and Desktop Plan.

☐ *Poor* in terms of clarity of its manual and of its ease of use by users with little previous experience of computers.

MicroModeller should be considered by:

☐ Users who wish to develop quite complex models and experiment with them to improve their understanding and control of the situations modelled.

☐ Users for whom the clear presentation of data to others is of major importance.

☐ Users who are familiar with time-sharing modelling systems and want to have the same range of facilities at a fraction of the cost and with greater independence.

☐ Users who already have a language system installed and therefore have some familiarity with the Pascal operating behaviour.

☐ Users who will have the time or supporting staff to learn how to get the best out of the undoubtedly wide range of facilities that MicroModeller offers.

☐ Such users will probably work in the planning or OR departments of companies. They might also be teachers or researchers in academic institutions.

MicroModeller is not for:

☐ Individuals who want a model building package but do not want to spend a lot of time learning irrelevant things like computer languages.

☐ Users who want to get quick and dirty numbers preferably right before their eyes as they make their alterations.

MicroModeller should be viewed as a low cost competitor with time sharing or mainframe modelling packages rather than with the two ultra-low cost modelling packages Visicalc and Desktop Plan.

Unless you are an experienced computer modeller I would suggest that you try Visicalc first and only when you are sure that you cannot get what you want out of that should you contemplate MicroModeller. And who knows a Super-Visicalc may have appeared by then to undercut MicroModeller.

The value of a computer to you is only as much as the programs that go with it, because you're buying equipment to solve your problems now – not when you've found the time to become a computer expert, as well as controlling your business.

When you look at our list, you'll find out why 250,000 other people have gone for Apple. Not only is the Apple a thoroughly versatile piece of equipment, growing with you as you need it, but your Apple will be ready to help right from the moment it is installed. Why? Because there are so many readily available proven programs developed specifically for the requirements of many different sections of industry and commerce, scientists and the professions.

Whatever you do do it better with Apple

So, if you can tick any one of these boxes from the list as an area where you have responsibility, then an Apple computer could help your business be more competitive and help you be more efficient.

What's more, it won't cost as much as you think. Most of the programs will run on an Apple system costing £1700-£2500 – little more than the cost of a photocopier. And if you've got more time, but not that much money, you can start to learn computing with Apple for as little as £800!

Every Apple comes with a One-Year-Warranty as standard, and there's the option of renewing this with Apple's Extended Warranty Plan. Any Apple Dealer will be pleased to give you details, and to show you how an Apple can help solve your problems. There are over 400 Apple Dealers nationwide, so help is never far away.

Now check the list and if you need more details, complete and return the coupon. That first decision could be all that stands between you and a brighter and more successful future.

☐ **Accountancy**
Sales analysis and accounting package which also handles money collection and delivery input. Produces VAT output and Tax and VAT returns.

☐ **Administration**
A database system which can be used to maintain and up-date information on any type of records – personnel, stock, clients, customers, patients, bookings or property.

☐ **Agriculture and Farming**
A financial package for purchase, sales and general ledger plus special programs for Dairy, Arable and Pig farming as well as farm budgeting and cash-flow.

☐ **Antique Dealing**
Prepare accounts for those businesses paying VAT on the difference between purchase and sale price. Stock analysis and search also available.

☐ **Architecture**
Drawing record system records the receipt and issue of drawings from contractors and subcontractors.

☐ **Asset Planning**
Standard fixed planning requirements as well as a range of options including multiple depreciation methods and current-cost accounting.

☐ **Auctioneering**
Covers the main functions of an auction from registration of lots and producing a catalogue through to sale day billing and sellers' accounts.

☐ **Beam Analysis**
Analyse a beam with any loading configuration and display the load, shear force bending moment and deflection diagrams.

☐ **Bibliographies**
A suite of programs allowing the storage of titles, subjects, authors and dates and the association of keywords with each article for retrieval.

☐ **Building**
Job-costing and VAT coding for construction companies. Handles retention certificates for sub-contractors and allows for stage payments based on valuation certificates.

☐ **Cash-Flow Planning**
A general purpose discounted cash flow program for assessment of capital projects. In use by local authority.

☐ **Construction**
From man hours and disbursements generated against a particular job, display work in-progress figures (total and against each job) job record sheets etc.

☐ **Contract Costing**
Provides display or hard-copy of current months's material labour and transport costs together with brought-forward costings since start of contract.

☐ **Credit Control**
Stores details on up to 1000 customers per month so that under or over payment or requests for supplies while accounts are unpaid can be monitored.

☐ **Critical Path Analysis**
Designed by network engineers for project management to use CPA on any number of projects to control and monitor progress.

☐ **Data Communications**
Convert Apple into a time-sharing terminal. Can be used to replace any teletype compatible terminal operating at 10 or 30 cps.

☐ **Dental Practice**
A system to monitor the administration of dental practices with up to 4 operators and 4000 active patients.

☐ **Design and Graphics**
With the Apple Graphics tablet you can enter pictorial information on Apple directly by sketching from maps and graphs, architectural drawings and other materials.

☐ **Direct Mail**
Stores names, addresses and telephone number on file indexed in various ways for total or selective output onto address labels.

☐ **Doctor's Administration**
Holds up to 20 000 patient's records retrievable by name or NHS number.

☐ **Draughting**
With the use of a stylus and graphics tablet, sketch drawings can be turned into accurate scale drawings and produced on a quality graph plotter.

☐ **Earthworks**
Calculate the cross-sectional area of intersecting ground profiles at given distances. Calculate cut-and-fill volumes.

☐ **Education**
Apple Pilot helps teachers develop their own individually-tailored lessons which can be conducted by the Apple.

☐ **Engineering**
Analyse stress on plane frames consisting of complicated frameworks with repetitive joint and member loads.

☐ **Estate Agency**
Estate agents can quickly match property with prospective buyers or vice versa.

☐ **Financial Planning**
VisiCalc and Micromodeller are essential financial planning tools in use throughout business to examine the implications of future financial policy.

☐ **Frame Analysis**
Analyse any pin-jointed three-dimensional structure. The shape is displayed and can be printed together with forces and displacements.

☐ **Hire Purchase Management**
Handle all aspects of hire purchase agreements and calculations. Statements and audit trails can be printed out.

☐ **Hotel Booking**
Accounts, billing and booking system for small and medium-size hotels with up to 35 bedrooms.

☐ **Hotel Management**
Supports all booking functions over a 400-day period together with non-guest incomes and full analysis of cash-chargeable items.

☐ **Housing Administration**
Rental accounting system designed for professional agents collecting money from tenants on behalf of landlords.

☐ **Indexing**
Sort, amend and index any data base. Facilities for cross-indexing and selective retrieval of specific items.

☐ **Insurance Broking**
A complete system for insurance broker's accounts with analysis and management statistics. Handles 13 500 policies.

☐ **Investment**
Enables the user to record details of share portfolios with pricing to calculate gains and losses.

☐ **Invoicing**
A complete invoicing system with flexibility to take account of varying delivery addresses if necessary. Summaries may be recorded for analysis.

☐ **Job Costing**
Fee and job costing for small to medium-size consultancies. Gives up-to-date information on project or client costs and the financial position of the practice.

☐ **Kitchen Design**
From a kitchen plan, show the units in elevation and in detail and print a listing with costs for different units.

☐ **Legal Fees**
Programs for both solicitors' and barristers' accounting systems are offered.

☐ **Management Information**
A data storage, update and retrieval system designed for the Apple to give managers the information they need – quickly.

☐ **Mathematics**
A series of mathematical tools that give fast answers to a number of common numerical problems.

☐ **Noise Levels**
Data entry for Noise Abatement Zones in the format recommended by the Building Research Establishment.

☐ **Payroll**
All wages, tax, NI and pension details can be calculated and detailed pay slips and summaries printed.

☐ **Personnel**
Maintain an index of personnel/job records which can be expanded, updated and printed in various forms.

☐ **Petty Cash**
Produce accurate day books and VAT analysis for companies even with high levels of petty cash transactions.

☐ **Pharmacy**
Produce chemists labels with details of drug name, dosage details, patient's name and date.

☐ **Pipe Sizing**
Calculate pressure drops in pipe work or find the nearest standard size pipe for a pre-determined pressure drop.

☐ **Prestel**
With the Appletel package, you can access your Apple Computer direct to Prestel.

☐ **Production Planning**
Produce production plans with re-scheduled alternatives based on changing variables.

☐ **Property Management**
A complete system for automatic management of client's accounts from the receipt of rents.

☐ **Purchase ledger**
Open item purchase ledger program to support 1000 transactions and 500 suppliers. Reports of creditors, turnover and VAT can be printed.

☐ **Quantity Surveying**
Calculate all professional fees, forecast increased costs and valuations with an inflation factor.

☐ **Retail Management**
Your Apple can be converted into a multi-total cash till with variable or pre-set prices. Can be linked to stock records.

☐ **Road Haulage**
Facilitate the automatic calculation and printing out of invoices using the Road Haulage Association rate tables. Can be integrated with Sales Ledger.

☐ **Sales Accountancy**
Ledger systems with statements, debtors' reports, turnover and VAT reports. Sales invoicing can be linked.

☐ **Sales Prospecting**
Store suitable prospective customer details and schedule visits by salesman. Mailing list label printing is integrated.

☐ **School Administration**
Assists school staff by maintaining up-to-date and readily accessible basic information on their pupils with cross-referencing and sorting facilities.

☐ **Scientific Analysis**
Collects data from scientific instruments including spectrometers and gas chromatographs.

☐ **Space Frame Analysis**
Analyse any pin-jointed three-dimensional structure with output of the forces and displacements. The structural shape can be displayed and printed.

☐ **Statistics**
Determine means, variants and standard deviation, calculate linear regression.

☐ **Stockbroking**
Prepare contract notes for the buying and selling of stocks and shares. Calculate and print consideration, commission, VAT, contract stamp, CSI Levy and stamp duty.

☐ **Stock Control**
Fast and easy search facilities for stock levels of many different items, even when supplied by many different manufacturers.

☐ **Stress and Structural Analysis**
Perform stress analysis of reinforced concrete sections and foundations under the action of direct loads and bi-axial bending moments.

☐ **TV Rentals**
Store comprehensive client details and use monthly rental, depreciation period, initial deposit and commencement date to print reports.

☐ **Time Analysis and Work Study**
Record job numbers and perform job and time analysis with cost analysis.

☐ **VAT**
Maintain records of all invoices and payments and calculate all figures for VAT returns.

☐ **Valuations**
Deal with leasehold and freehold valuations with summaries of data based on various standard methods.

☐ **Vehicle Fleets**
Store basic details of each company vehicle together with service records and reminders.

☐ **Word Processing**
Create, edit, sort, amend and finally print letters and reports, including charts and graphs.

This is only a small selection from the vast Apple library of ready written programs.

Imagine what you can do with an apple computer

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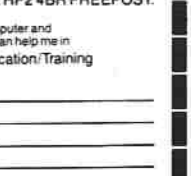

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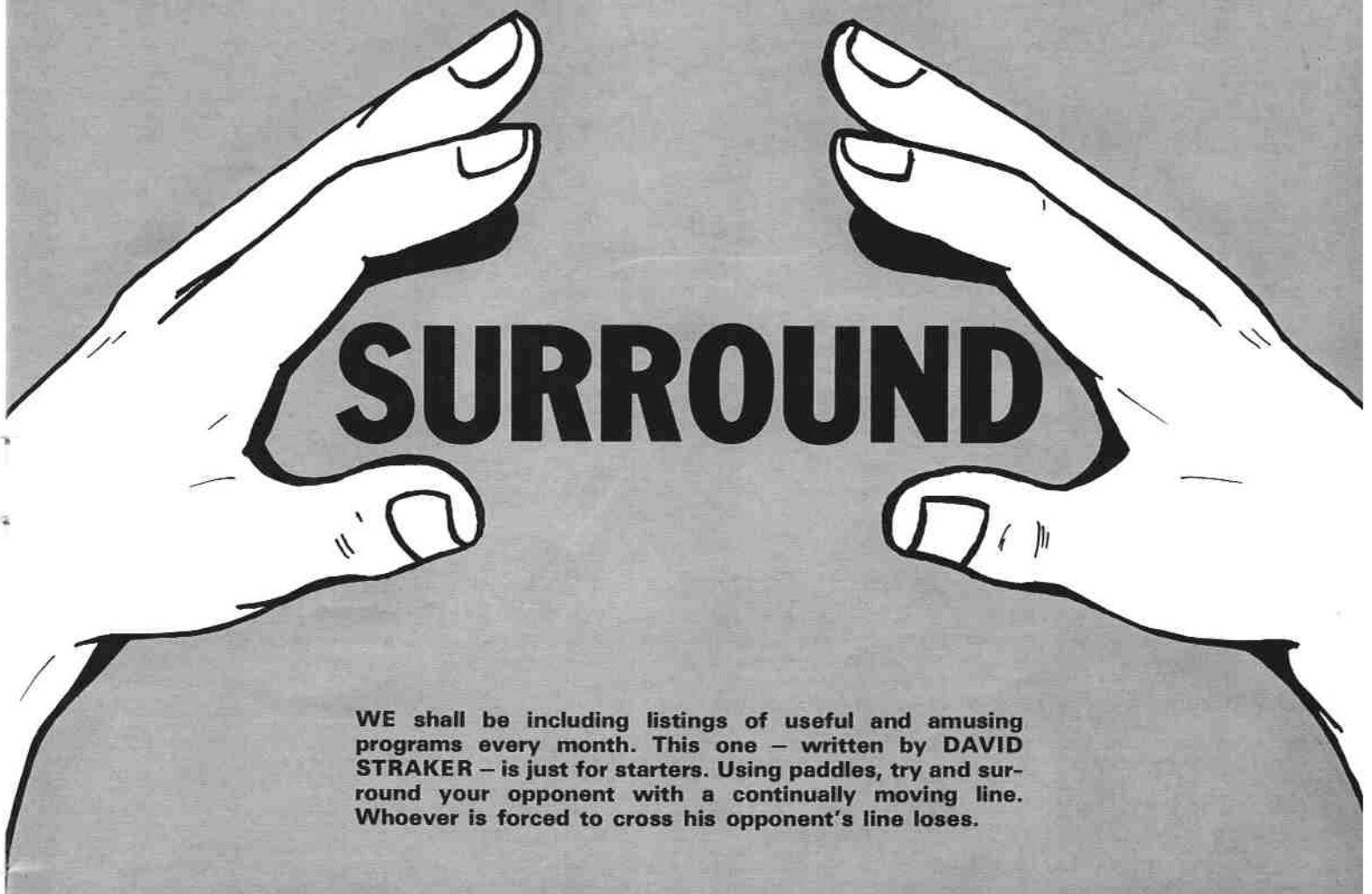


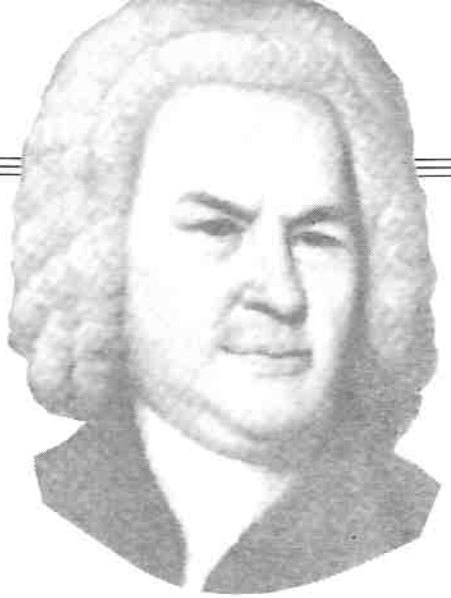
WE shall be including listings of useful and amusing programs every month. This one – written by DAVID STRAKER – is just for starters. Using paddles, try and surround your opponent with a continually moving line. Whoever is forced to cross his opponent's line loses.

```
10  REM  <><><><> SURROUND <><><>
    <>
20  REM
25  HTAB 28: PRINT "31-JULY-79":
    PRINT
30  REM  <>THIS VERSION BY DAVE S
    TRAKER<>
40  REM
50  GOSUB 500: REM  INITIAL INFO
    PAGE
60  GOSUB 100: REM  GAME INITIALI
    SATION
70  GOSUB 200: REM  RUN GAME
80  GOSUB 800: REM  FINALISE
85  IF  LEFT$ (Z$,1) = "Y" THEN 6
    0
90  TEXT : HOME : END
100  GR
102  IF D > 0 THEN 115
104 D = 2
110 CA = 2:CB = 9:CF = 14:CE = 0
115 C = GB
120  COLOR= CE: REM  BORDER
125  PRINT : PRINT : PRINT S$:
    PRINT
130  HLIN 0,39 AT 0: HLIN 0,39 AT
    39: VLIN 0,39 AT 0: VLIN 0,3
    9 AT 39
140  COLOR= CF
150  FOR I = 1 TO 38: VLIN 1,38 AT
    I: NEXT I
170 XA = 17:YA = 17:XB = 22:YB =
    22
180 AX = 1:AY = 0:BX =  - 1:BY =
    0
182  IF D = 1 THEN  RETURN.
184  GOSUB 1000
186  GOTO 120
190  RETURN
200  REM  MAIN LOOP
210  COLOR= CA: PLOT XA,YA
220  COLOR= CB: PLOT XB,YB
222  IF C < GF THEN 226
224 C = C - GD
226  FOR I = 1 TO C: NEXT I
230 PA =  PDL (0):PB =  PDL (1)
240  IF PA > 51 THEN 250
245 DA =  - 1: GOTO 270
250  IF PA > 204 THEN 260
255 DA = 0: GOTO 270
260 DA = 1
270  IF PB > 51 THEN 280
275 DB =  - 1: GOTO 300
280  IF PB > 204 THEN 290
285 DB = 0: GOTO 300
290 DB = 1
300  IF DA = 0 THEN 340
310  IF AX = 0 THEN 330
320 AY = AX * DA:AX = 0: GOTO 340
```

```
330 AX =  - AV * DA:AV = 0
340  IF DB = 0 THEN 380
350  IF BX = 0 THEN 370
360 BY = BX * DB:BX = 0: GOTO 380

370 BX =  - BY * DB:BY = 0
380 XA = XA + AX:YA = YA + AY
390 XB = XB + BX:YB = YB + BY
395 SA =  SCRN( XA,YA):SB =  SCRN(
    XB,YB)
400  IF CF = SA AND CF = SB THEN
    210
410  RETURN
500  TEXT : HOME
510 S1$ = "<><><><><><><><><><><>
    <><><><><><><><>"
520 S2$ = "<>
                    <>"
530 S$ = "<>                  SURROUND
                  <>"

535  PRINT S1$: PRINT S2$: PRINT
    S$: PRINT S2$: PRINT S1$
540  PRINT : PRINT "   (THIS VERS
    ION BY DAVE STRAKER)"
550  PRINT : PRINT "THIS IS A TWO
    -PLAYER, ARCADE TYPE GAME"
560  PRINT "EACH PLAYER CONTROLS
    AN EXTENDING,"
570  PRINT "ORTHOGONALLY MOVING L
    INE WITH A PADDLE"
580  PRINT : PRINT "THE WINNER IS
     THE ONE WHO REMAINS FOR"
590  PRINT "THE LONGEST WITHOUT H
    ITTING ANYTHING"
600  PRINT "THE SPEED WILL GRADUA
    LLY GET FASTER"
610  PRINT "AND FASTER"
620  PRINT : PRINT "WHAT ARE YOUR
     NAMES?"
630  PRINT : INPUT "1ST PLAYER (P
    ADDLE 0)?";A$
640  PRINT : INPUT "2ND PLAYER (P
    ADDLE 1)?";B$
700  PRINT : INPUT "DIFFICULTY LE
    VEL(1-5) ?";Z$
710 Z =  VAL (Z$)
720  IF Z < 1 OR Z > 5 THEN 700
730 GD = 5
740 GB = 1055 - Z * 150
750 GF = GB - 300
760  RETURN
800  IF CF <  > SA AND CF <  > SB
     THEN 850
810  IF SA <  > CF THEN 830
820 CW = CA:W$ = A$: GOTO 840
830 CW = CB:W$ = B$
840 W$ = "CONGRATULATIONS," + W$ +
    ", YOU WIN"
845  GOTO 860
850 W$ = "..HOW ABOUT THAT! IT'S
    A DRAW!"
855 CW = CE
860  PRINT : PRINT S$
870  PRINT : PRINT W$
880  PRINT "        .....ANOTHER G
    AME? ";
890 Z =  PEEK ( - 16384): POKE  -
    16368,0
900  IF Z > 127 THEN 960
905  FOR I = 1 TO 50: NEXT I
910  COLOR= CW
920  HLIN 0,39 AT 0: HLIN 0,39 AT
    39: VLIN 0,39 AT 0: VLIN 0,3
    9 AT 39
925  FOR I = 1 TO 100: NEXT I
930  COLOR= CE
940  HLIN 0,39 AT 0: HLIN 0,39 AT
    39: VLIN 0,39 AT 0: VLIN 0,3
    9 AT 39
950  GOTO 890
960 Z = Z - 128
970 Z$ =  CHR$ (Z)
975 D = 2
980  RETURN
1000  REM  CHOICE OF COLORS
1010  COLOR= CA: PLOT XA,YA
1020  COLOR= CB: PLOT XB,YB
1025 D = 1
1030  PRINT : PRINT "THESE COLORS
     OK? ";: GET Z$
1040  IF  LEFT$ (Z$,1) <  > "N"
     THEN RETURN
1045  HOME
1050  GR
1055 D = 2
1060  FOR I = 0 TO 15
1070  COLOR= I
1080  VLIN 0,39 AT I * 2: VLIN 0,
    39 AT I * 2 + 1
1090  NEXT I
1100  PRINT "0 1 2 3 4 5 6 7 8 9
    1 2 3 4 5"
1110  PRINT "
    0 1 2 3 4 5"
1115  POKE 37, PEEK (37) - 1: POKE
    36,0
1120  PRINT "BACKGROUND COLOR";:
     INPUT CF
1125  POKE 37, PEEK (37) - 1
1130  POKE 36,0: CALL  - 868: PRINT
    A$;"'S COLOR";: INPUT CA
1140  POKE 36,0: CALL  - 868: PRINT
    B$;"'S COLOR";: INPUT CB
1160  RETURN
```



Bach and the byte

Dr DAVID ELLIS reviews the Mountain Hardware MusicSystem

IT is extremely reassuring to those of us who are both musicians and Apple II owners that this microcomputer is the one clear-cut front runner in the digital synthesis stakes. This statement needs qualifying, as there is the remarkable Fairlight CMI (Computer Musical Instrument) which does things barely hinted at in the average Apple synthesis system, but at a cost of around £15,000.

In a future article I'll be examining the various systems available, along the lines of a consumer guide to music synthesis systems using the Apple II, but for the time being I'd like to concentrate on the Mountain Hardware MusicSystem.

The MusicSystem package consists of two boards containing a total of about 40 chips that plug into adjacent expansion connectors on the Apple II motherboard. One lead from these provides left and right line output to a mixer or amplifier, and the other terminates in the form of a light pen for selection of screen-based options.

The MusicSystem runs on a 48k RAM Apple II or Apple II Plus with either one or two disc drives. There's also the option to use a Silentype printer, but for various reasons that I'll come to later this is pretty low on my list of system priorities.

The present software (version 2.0) on the double-sided discs provided as part of the package includes three programs for three stages of music production:

Music Editor inputs data into COMP files and is designed "to approximate the process of composing a musical score on regular music staff paper". This program includes the following functions:

(a) Input and editing of music data, either in a short-score format (extremely short if you're using eight parts), or as much longer single-line sequences.

(b) Display of music saved in COMP files, but only on a part-by-part basis.

(c) Printing of music (again, part-by-part) using the Silentype.

(d) Loading and saving compositions to and from COMP files.

Music Merger merges small COMP files created with the Music Editor to create larger COMP files. This is an essential bit of knitting that has to be done in order to produce music of reasonable substance and duration.

Music Player plays the data created by the Music Editor and joined together by the Music Merger. The following functions are included:

(a) Conversion of COMP files to PLAY files as a result of 'bonding' instrument definitions (from IDEF files) to respective parts of the score. The IDEF files are themselves constructed from waveform built by additive harmonic synthesis (forming WAVE files) together with other sound control parameters.

(b) Change of instrument assignment, either using predefined IDEF and WAVE files, or by creating one's own instrument definitions using the Instrument Definer program.

(c) Assignment of speaker locations for each part, but only at the start of each part.

Some background to digital music synthesis is necessary if we're to appreciate how the practical operation of the MusicSystem compares with theoretical expectations.

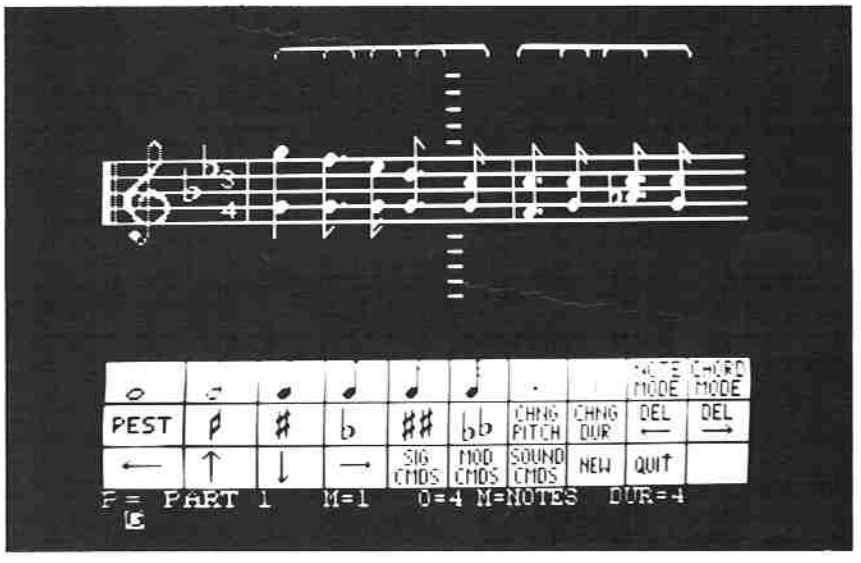
Briefly, a computer may produce musical sounds either by controlling analogue synthesizer modules (as in the case of the extremely popular Sequential Circuits Prophet 5), or by computing the sound waveform itself and using a digital-to-analogue (D/A) converter to make it audible.

This is easy enough to do, but in practice an acceptable frequency response requires a very high rate of waveform computation. To do this in real time with 8-bit microprocessors requires incredibly efficient programs, and even then quantisation error usually produces rather poor signal to noise ratios.

Empirically, it's found that the top end of the frequency response, F_o, is defined by the relation, $F_o = 0.5F_s$, where F_s is the sampling rate, or the speed at which the processor updates an output waveform. This so-called Nyquist frequency achieves the quite remarkable value of 15.6 kHz in the MusicSystem. In order to get a sound from a D/A converter it's necessary to update the input of this with numbers that represent discrete points along the desired continuous waveform.

Since real-time analogue sounds could be described as having an infinite sampling rate, a finite sampling rate will obviously lead to some degree of distortion, and the faster the sampling rate, and the larger the number of bits of resolution, the more accurate is the end-product.

What all this means in reality is that the



Music Editor graphics – high resolution display shows entry of music.

quality of output from the MusicSystem compares pretty favourably with a state-of-the-art digital synthesis system like the Fairlight CMI.

Auntie Beeb is also up to the mark with their practical implementation of this theory, as they're currently using 12-bit conversion at a sampling rate of 40 kHz for their digital broadcasts.

Returning to theory, it's important to consider how the waveform(s) is actually computed. The numbers representing the waveform to be sent to the outside world via the D/A converter originate in the form of a waveform lookup table. As the MusicSystem provides 16 independent 'digital oscillators' (actually, 16 D/A converters), it uses waveform table lookup on 16 tables simultaneously. Generally, this would take much too long for 'serious' musical applications, but as a result of the magical ingredient of DMA (direct memory access), each oscillator is updated every two microseconds, giving a total loop time of 32 micro-seconds for all 16.

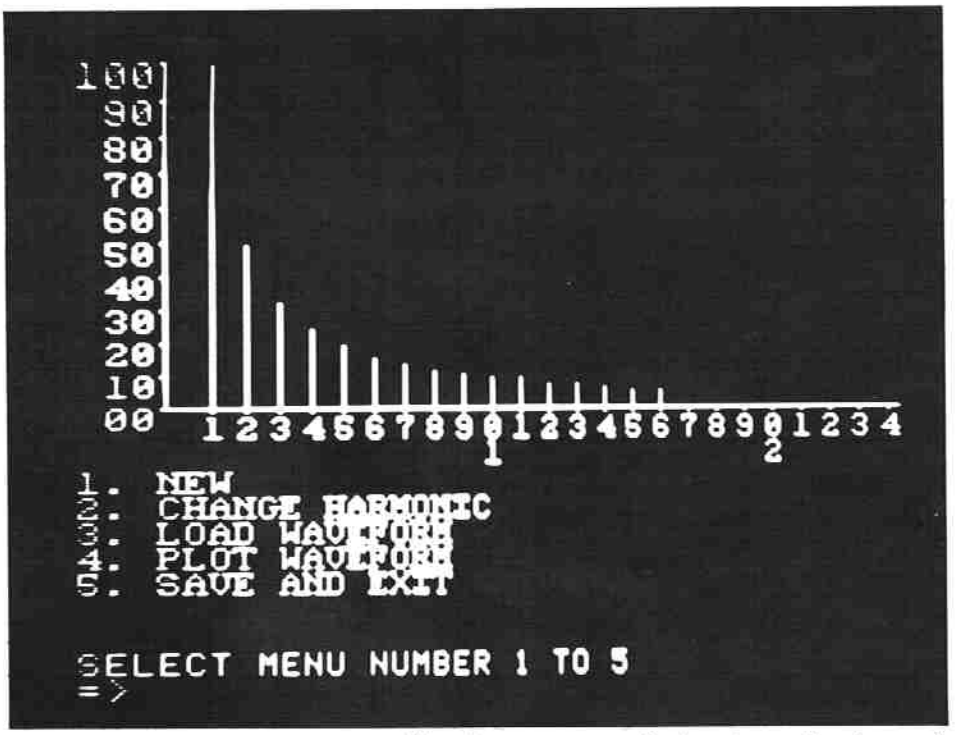
DMA enables data to be transferred rapidly in and out of RAM without having to program every transfer with the processor, and, in the MusicSystem, is used to access entries from the waveform tables stored in memory.

The other clue to the fast loop speed of the MusicSystem is provided by the 6502 processor itself. Other microprocessors could perform these operations too, although all other 8-bit microprocessors seem to be significantly slower than the 6502 when standard programming techniques are used.

The point about the 6502 is that the table lookup operation is doubly fast because of its indirect addressing modes. Each waveform table is made of 256 bytes (2) and begins on a page boundary with each of the 16 waveform tables addressed by one of the 16 address lines. The DMA places the page address of the oscillator being updated out onto the upper eight bits of the address lines. The lower 8 bits of the DMA's address come from a waveform table entry pointer. Each of the 16 oscillators has its own pointer into its own waveform table, so every 32 microseconds the DMA will fetch the entry from the table to which the pointer points and feed that entry into the D/A converter.

Eight of the outputs of the oscillators are summed for each channel, and then processed through a low-pass filter to smooth the additive waveform and remove beat frequencies between the sampling frequency and high harmonic components (so-called 'aliasing'). The outputs are then subjected to amplitude control via a couple of digitally-controlled VCAs and emerge finally in all their analogue glory.

Further confirmation of the quality of the MusicSystem hardware is provided by the faith that another American company, Syntauri Inc., have in Mountain Hardware's product, in that they're using the same boards for their alphaSyntauri system, an Apple II-based synthesizer with keyboard input of music.



Waveform create – display shows the harmonic profile of 'SAW', with up to 24 harmonics amplitude-definable.

Two methods of entering music into the system via the Music Editor are included in present software. Firstly, game paddles can be used in conjunction with a moving pitch cursor to enter notes. To do this, it's necessary to define the parameters corresponding to one's music intentions, and this is provided by four Music Editor menus: *Signature commands* – clef identity, key and time signatures; *Main commands* – note duration, note or chord mode, accidentals, edit facilities, menu selection and 'New' and 'Quit' options; *Sound Control* – dynamics, tempo and speaker allocation; *Note Modifier* – articulation, dynamic accents and 'Tie' option.

Secondly, the QWERTY keyboard can be used to enter notes as well as determining parameters otherwise selectable with the light pen from the various menus.

The former method of data entry is slow, needs considerable co-ordination skills with the paddle controls, and can only really be recommended to those that like zapping notes rather than flying saucers, albeit at a snail's place. With the second method, Mountain Hardware have produced a pretty flexible music composition language (MCL) that still uses traditional notation as its basis. This can be summarised as follows:

Clef selection: 'BASS', 'TREBLE', 'TENOR', 'ALTO', or SYSTEM '.

Key selection: 'KEY n*/#' where n refers to the number of flats (*) or sharps (#).

Time selection: 'TIME n/n' where n can be a number from 2-32.

Octave selection: ':n' where n refers to pitches between CO and B7 in octave groups, C-B.

Duration selection: 'W' for breve (whole), 'H' for semibreve (half), 'Q' for crotchet (quarter), 'EI' for quaver (eighth), 'S' for semiquaver (sixteenth), 'T' for demi-semiquaver (thirty-second), and a dotted option, '.', to increase the duration of a note by a half.

Pitch selection: 'C', 'D', 'E', 'F', 'G', 'A' or 'B'.

Accidental selection: '#' for sharp, '*' for flat, and 'N' for natural.

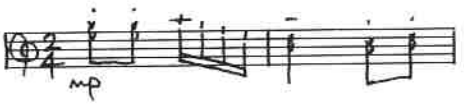
Accent selection: '!' for staccato, '!!' for staccatissimo, and '%' for tenuto.

Dynamic selection: either with Italian dynamics, 'PPP' to 'FFF', or with numerical dynamics, 'DYNO' to 'DYN127'.

Temp selection: either with Italian markings, 'LENTI' to 'PRESTO', or with numerical values, 'TEMP0040' to 'TEMP0160'.

Other options: 'M' for bar line (measure), 'NOTES' for single notes, 'CHORDS' for chords, 'TIE' to tie notes together, and 'R' for rests.

Using these options to code a piece of music like the following:

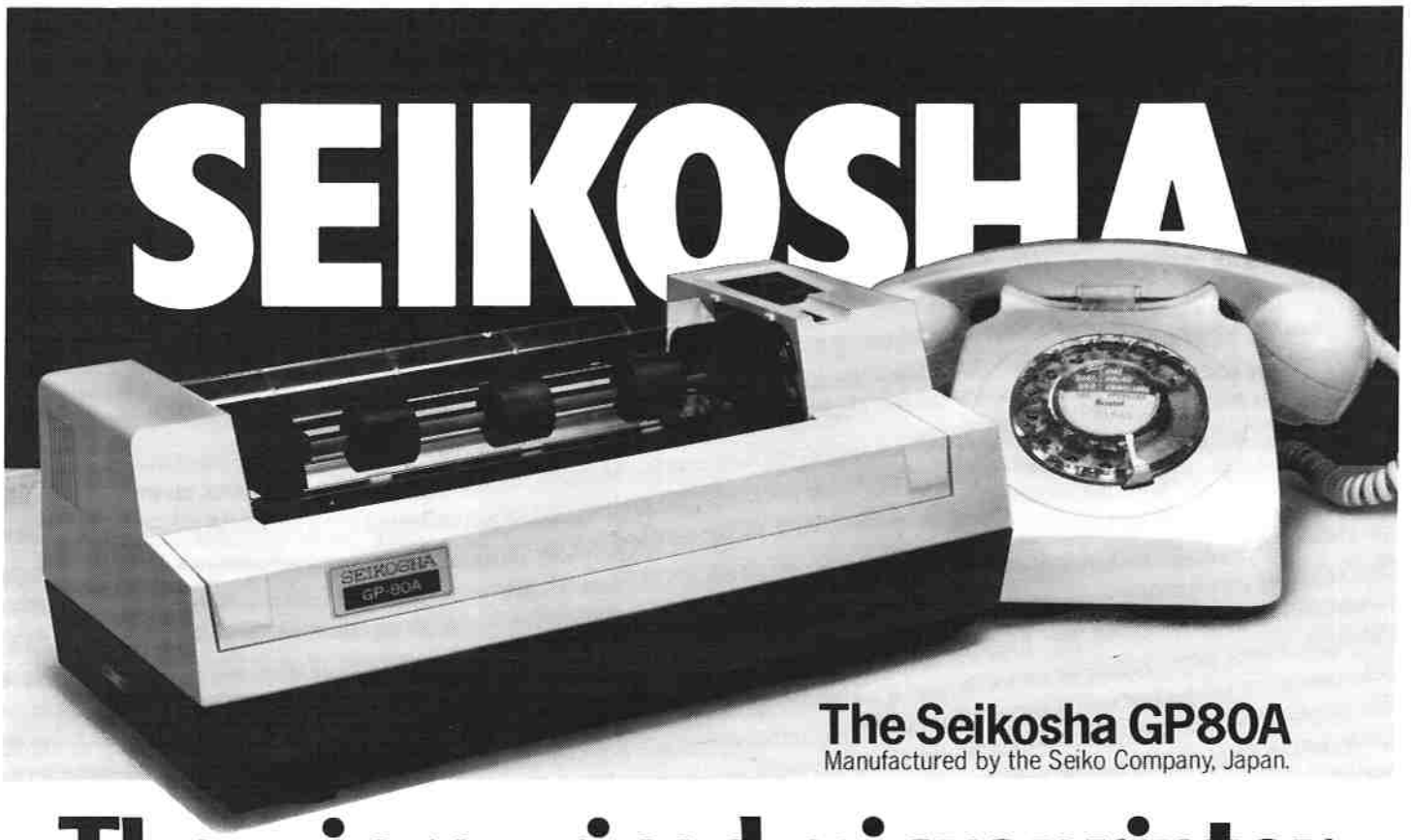


we get a string of MCL like: TREBLE KEYO TEMP0126 DYN70 2/4: 5 CHORDS EI E G! NOTES CHORDS E G! NOTES S A G F E M CHORDS Q D: 4 B% EI A :5 C! NOTES CHORDS D :4 B! M.

Even though it's possible to enter music as such a string of variables, there are certain system limitations: Firstly, the

→

SEIKOSHA



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MCL is only enterable one line at a time at the bottom of the screen. Secondly, the octave selection operates in a semi-stochastic fashion when included in such a string – sometimes notes end up in the right octave, sometimes they don't. Thirdly, the Music Editor buffer is limited to about 300 notes.

It would be a considerable advantage if it was possible to enter an entire screen of MCL, which the Apple could then compute and enter into the Music Editor while the composer gathers his thoughts and has a quick drink! The curious behaviour of the octave selection option when entered in a string is an annoying bug in the software which needs attending to.

Another limitation as regards the MCL is the nonavailability of note lengths less than a demisemiquaver and the lack of irregular note groups such as triplets and quintuplets. There's plenty of variety of accents to modify articulation and dynamics, but the latter aren't currently integrated with the present Music Player software, and the former tend to act in a rather unpredictable fashion. For instance, the low percussive option drastically attenuates notes rather than accentuating them.

The present software also lacks a 'SLUR' option to inhibit reattack of groups of notes. This means that it's not possible to enter phrasing with the MCL, and there's a danger that the end-product can sound rather mechanical unless you use some ingenious accent/dynamic modifications to get around this.

Having filled the buffer with one section of a composition, this is then saved as a COMP file. Data entry into the Music Editor is repeated with other sections of the score and then all the segments are joined together with the Music Merger. The maximum length of a mergeable composition is extended by deriving polyphony from chords in a small number of parts rather than using one part of one monophonic line.

Other factors to bear in mind are the number of dynamic markings, accent modifications, and so on. As a general rule, I've found that it's possible to successfully merge and play a COMP file of around 2,500 notes, provided that one's fairly cautious in using expressive instructions.

Attempts to enter the 3rd Brandenburg Concerto as a five-part COMP file, with accent modifications on every note, as well as a lot of dynamic changes, resulted in the Music Merger running out of space after about 30 bars. This amounts to something in the order of 1,800 notes, but these were of a high-tuned, super-charged nature!

Moving on to the next stage of music production, the COMP file is then processed by the Music Player. To do this, all the parts have to be compiled, separating pitch elements from sound control elements, and generally putting everything in the right place. With a large COMP file this can take as long as 10 minutes, and provides another period of nail-biting anxiety while you hope that the merged COMP file meets with the approval of the Music Player.

Instrument history – overall statistics for 'SAW', a one oscillator sawtooth-based instrument.

Instruments can then be assigned to parts, either out of Mountain Hardware's own IDEF files or from your own constructed with the Instrument Definer program. The preset IDEF files are extremely predictable (woodwind, organ, piano, etc.) and do a disservice to the potential of the Definer.

The basic principle of the Instrument Definer is that any sound can be generated by adding together separate harmonic components in the form of individual sine waves. This 'additive synthesis' forms the fundamental distinction between digital and analogue synthesis, where the latter used 'subtractive synthesis' to effect the removal of unwanted harmonic components generated by a VCO.

Various options on the Definer menu allows different aspects of this synthesis to be carried out. To start with, a waveform is created by entering the required amplitude of up to 24 harmonics. One cycle of this additively-synthesized waveform can then be plotted to give the composer visual feedback of the end-product.

The waveform is actually made up of discrete values, and it's the binary representation of these numbers that is entered into the waveform table of each oscillator in the Mountain Hardware system.

There's an important point to realise at this state, and that's that the waveform as it stands is totally static. With real instruments, the harmonic components of any given pitch are constantly changing – what's called 'dynamic timbral change' – and it's this quality that gives real instruments or their digital counterparts a 'natural' sound.

Analogue systems are able to do this in part by using the VCF to sweep the frequency response over the duration of a note's envelope, and, in an extreme application, will produce the characteristic 'wah-wah' sound so evident in American cop movies.

To actually change the harmonic composition of a note as it sounds – that is, in real time – entails switching the input of a D/A converter from one waveform table to another for as long as you want the timbral change to occur. Valuable processing time is taken up in sequencing through waveform tables, and the usual result is a considerable degradation of the frequency response.

Version 2.0 of the Music Player allows you to animate the otherwise static sound of each oscillator by defining the amplitude and frequency history of each oscillator in the IDEF file. Both of these variations are imposed upon the attack portion of a note's envelope. This is very sensible, as it's the initial perception of the start of a note that determines its psychological impact on the listener.

In analogue terms, such amplitude and frequency offsets form the basis of tremolo and vibrato, and certainly help to add a bit of spice to the sound of instruments synthesized by the Instrument Definer.

The overall statistics of the 'SAW' instrument definition are shown above. You will see that apart from details of the amplitude and frequency history over the attack portion of a note's envelope, the composer is also reminded of the number of oscillators allocated to a particular IDEF.

Now in theory if it was possible to spend enough processing time on updating each oscillator, then one oscillator alone should be quite sufficient to pro-

Music Player display for Nightride.

duce any sound that you might have a desire to create. But if one starts trying to mimic the behaviour of real instruments with the MusicSystem – i.e., by modifying the waveform in real time – then the implementation of extra processing loops needed to do this results in the frequency response flying out of the window.

The Fairlight CMI is one of the very few digital synthesis systems around where this real-time change of waveform is provided for, but at the expense of using individual voice cards holding 16k of RAM just to store all the necessary elements of a non-static waveform.

Disregarding the sonorous limitations of one-oscillator 'static' voices, it is in fact perfectly feasible to produce a composition with as many as 12 individual parts, provided that you don't mind fairly drastically shortening the length of the piece.

The Music Player display for "Nightride," a piece containing a total of 11 parts, shows that by far the most common instrument is "Cheapo", a one-oscillator voice, and therefore cheap in implementation terms. With such a large number of parts, it's vital to watch the spatial disposition of oscillators, as there are only eight allocatable on each channel.

A variety of different one-oscillator IDEFs would have produced slightly more variety in terms of the 'orchestral' texture, but with such a complex piece I found that there was insufficient space left in the PLAY file to accommodate any extra IDEFs. One pays for one's greed!

Therefore, to produce interesting sounds with the MusicSystem, it is on the whole necessary to use more than one oscillator for a particular voice, and any momentary excitement at the prospect of 16 oscillators doing their own thing in 16 parts of your very own music is brought back down to earth with the inevitable compromise of having to use two oscillators per voice, or in other words limiting the number of parts to just eight, though the Fairlight provides no more than this.

By giving one oscillator a percussive envelope, and the other a more conventional set of attack-decay statistics, it's possible to produce some fairly ravishing sounds. In fact I've used this idea to produce various 'hybrid' instruments, including one first suggested by the computer music innovator, Hal Chamberlain, called the 'glockenflute' – a marriage between the glockenspiel and flute – which is rapidly assuming the role of a general purpose IDEF in my own studio.

Usually when one is using two oscillators per voice in analogue systems it is customary to detune one of the oscillators slightly in order to produce a 'chorusy' sort of sound from the slow beat frequencies generated. This isn't implemented in the present MusicSystem and is something that Mountain Hardware would do well to consider as one simple but effective way of waveform animation.

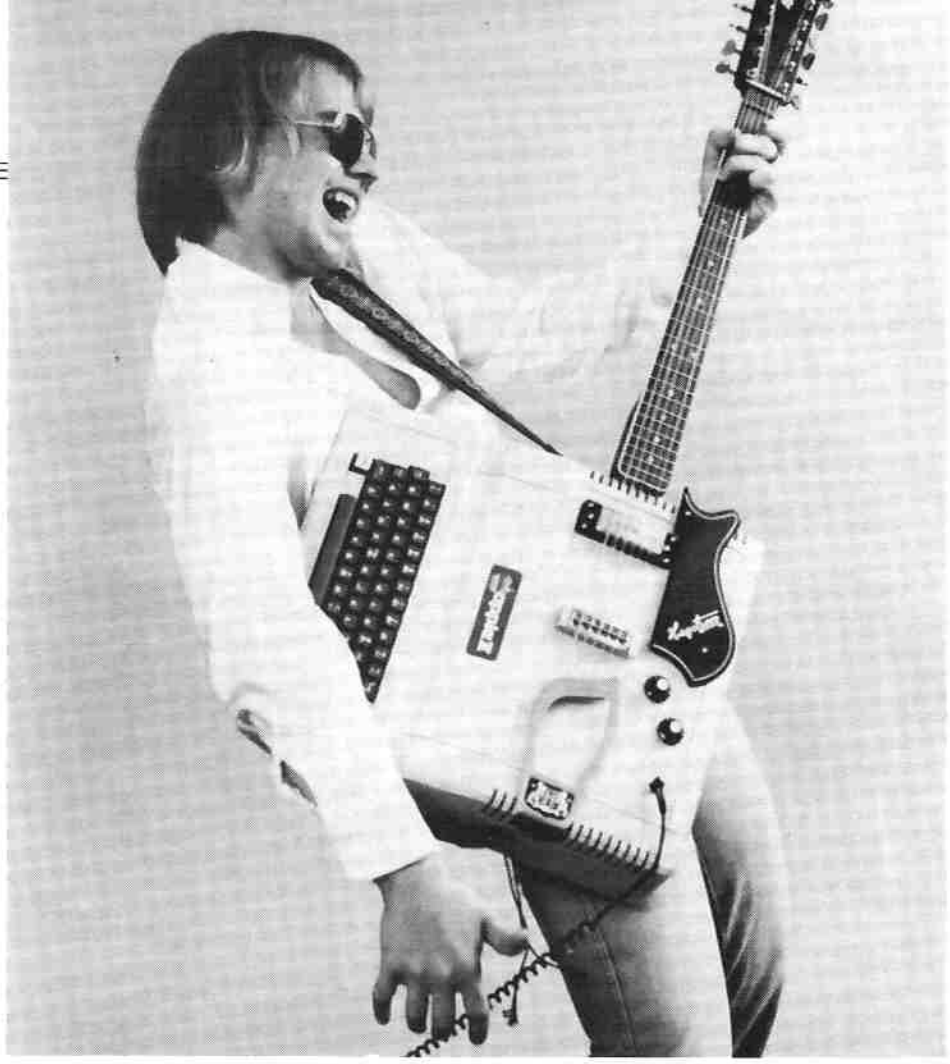
On the subject of frequency offsets, a feature that I'd like to see included in software updates is the ability to alter the tuning away from the Western standard of equal subdivisions of the octave – i.e., equal temperament. Twenty-four tone scales could be included, such as Just ('scientific') and International (1850), and there's no reason why this shouldn't be extended, allowing the composer to define his own notes in the cracks between the keys. Better still would be if 24 tone music was enterable from the Music Editor with, say, '–𝄲' for $\frac{1}{4}$ tone sharp (♯) and '+𝄲' for $\frac{3}{4}$ tone sharp (𝄪).

I feel that it's wholly rational to develop the aspects of a digital synthesis system that allows it to move away from imitation of conventions (IDEF files, take note), and the use of alternative pitch elements seems to me to be an ideal point of departure. What's more, the average professional musician doesn't appreciate composers that try out $\frac{1}{4}$ tone experiments on instruments that the centuries have moulded into forms unsuitable for playing music that isn't disposed towards equal temperament. Isn't this where the computer-based system can step in and earn its keep for the composer who wants to do more than just copy?

In summary, I feel that the MusicSystem represents a really important evolutionary step in terms of accessible digital synthesis systems. Mountain Hardware claim to be committed to continued development of the MusicSystem, so I presume that a software update is fairly imminent. With all the other Apple-based music synthesis systems around, Mountain Hardware have plenty of competition, and it'll be fascinating to see what results.

To provide an audio back-up to this review I've prepared a cassette of ten pieces using the MusicSystem to the limits of present software, ranging from Bach and Mozart to 20th century music and compositional devices that only computer-based MCL can provide. This is available directly from me at 22 Lennox Gardens, London SW1, for £2.50, including postage and packing. This should be of interest to all Apple users, but in particular I hope it encourages musicians interested in computer synthesis to investigate the excellent MusicSystem.

For those who already have the MusicSystem, I'm offering a disc of PLAY files, including those pieces on the cassette, which can either be played as they stand or reassigned with your own IDEF files. This disc (please specify 3.2 or 3.3 DOS) is available from me for £15 inclusive of postage, and it should certainly show much more of the MusicSystem's capabilities than the PLAY files offered by Mountain Hardware themselves.



IF this is your idea of music making by computer, don't bother to write to ALF Products in Denver, Colorado. They've been inundated with calls since they included this picture in one of their ads – and now they wish they'd never thought of the idea. "No, we don't market the instrument – it was just a one-of-a-kind custom fabrication ", Philip Tubb of ALF told Windfall. Even so, guitarist Bill Fickas had fun proving that now that computers are taking over, music will never be the same again.

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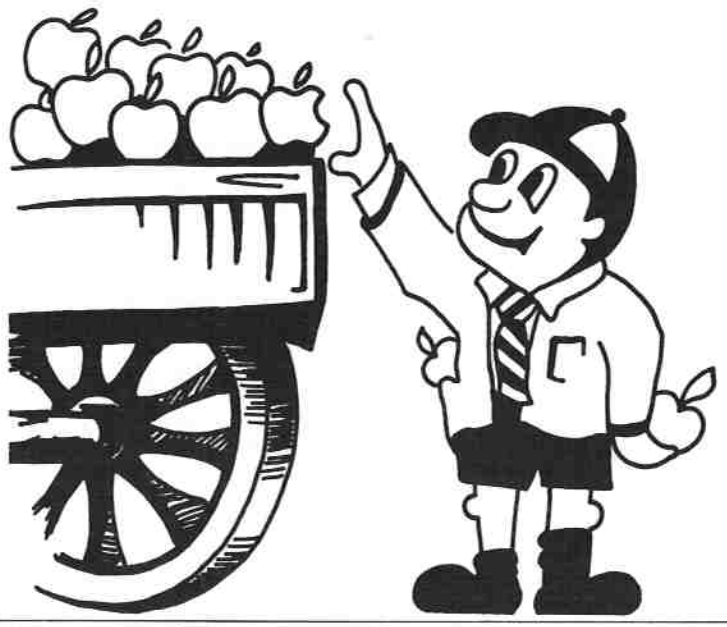

Applecart

. . . covering the ever-widening scope of computers in the field of education

WELCOME to the first issue of Applecart, which month by month will be bringing you news of the ever-growing ways in which the Apple is being used in education.

We now have an extensive user base throughout the UK, in schools, colleges, polytechnics and universities, and it is hoped that through these pages we shall be able to overcome some of the problems of communication among our users throughout the educational system.

Through the medium of Applecart we want to relay items of news and interest to all our users. In particular I hope we are able to highlight those curriculum areas where Apples are being put to good use and thus to catalogue the reciprocal exchange of ideas between schools.

New educational software packages for the Apple will be reviewed so that you, the users, are in a better position to judge the usefulness of a particular package to your regime of study. We hope to promote across the curriculum use of the Apple in this way.

Details of new hardware packages will be made available when a particular device could be of use to educational users.

You may already be aware of the extensive use of Apples in the area of special education, but we intend to bring to you some of the many fascinating ways in which microcomputer use is helping in the education of both physically and mentally handicapped people, as well as the ESN children, the blind and the deaf.

Some examples of work in this specialised, but highly rewarding field are given in this issue.

Most important of all I would like you, the users, to feel this is your magazine. I hope, therefore, you will submit articles for review and possible publication. This may be an article ranging from technical appreciation or programming, up through the spectrum to a human interest story on Apple usage.

I have no means of predicting the eventual form this section of Windfall will take, and I have no doubt it will undergo several metamorphoses during its development. In the initial stages I will try, however, to include items relating to primary, secondary, tertiary and special education, as well as matters of more general interest.

Last, but not least, I would like to tell you about the "The Apple Crumble Column". What is a magazine without just a touch of humour? There is scope for all those would-be comedians, or comediennes, who take great delight in seeing the funny side of microcomputer use.

I will start the ball rolling in this first issue, but I fully expect this column to be over-subscribed in the months to come.

I look forward with great interest to hearing of your experiences with the Apple.

Good computing!

David King

● *David M. King, BSc (Hons), Cert Ed (Loughborough), is manager for educational and scientific services with Microsense Computers (Apple UK).*

THE vital role the Apple can play in primary education has been dramatically demonstrated in the ITV schools series, "Living in the Future", which is designed to give seven to nine year olds in Britain's 19,000 primary schools a vivid insight into what life could be like in the computer age.

The Apple had a starring role, and children were seen operating it to study maths, English, geography, music and foreign languages.

"The computer is one of the most powerful learning tools yet", Professor Tom Stonier of Bradford University told his young viewers. And he forecast: "It will start a trend back to home based education. The average child will learn at home, from the computer, and perhaps have personal tuition as well – reading, writing, arithmetic, science ... all the traditional skills will be learned in the home. School will be a place where you learn social skills, dramatics, sports, perhaps handle dangerous equipment, and perform community activities. Any school that isn't preparing pupils now to work with a computer is handicapping those pupils as if they were making them illiterate".

The urgent need to explain and demystify the new technology to junior school children is discussed here by the man who devised the series, writer and producer MICHAEL FELDMAN.

'The new elite teaching force seemed unable to communicate

MOST mornings I am awakened by the dawn chorus of my eight and five year-old children, fighting over whose turn it is to use the Apple microcomputer. Such is their enthusiasm for the micro that the greatest punishment that can be inflicted upon them is not to be allowed to use it.

Computers in education – what will this mean for today's schools, teachers and, most important, pupils?

Most of these questions were raised years ago, but the answers have been less than positive. Concern was expressed: computers were too expensive, too difficult to use and too unreliable. Recent developments, however, have virtually eliminated these concerns.

Just think back a decade or so ago, when Neil Armstrong walked on the moon – he could not tell the time using a digital watch, because they had not been invented. When they did arrive on the scene they were so expensive that only the privileged few could afford them. By now, I imagine, most pupils possess one.

This only serves to emphasise the rapid advance of technology and the reduction of costs that mass production of the new technology brings. It is a sobering thought that a micro-computer is now less expensive than a teacher's annual salary!

Twelve months ago, when I first began to research computer education in schools, I soon realised that specific ground rules had been established by secondary schools: computer education was controlled by the maths or science departments. Maths and science teachers, the new elite computer teaching force, seemed unable to communicate with other departments regarding the use of a computer as a teaching aid. Thirteen seemed the magic age for pupils to be allowed access to computer education – and even then only a selected few.

I began to ask myself what was going on, when a visit to any High Street shopping area was a computer education in itself – remote control TV sets with Oracle and Ceefax services and Prestel capability; microprocessor-controlled cash registers; even MacDonald's french fries are controlled by silicon chips!

As for the toy shop, here the electronic revolution has really taken over. Texas Instruments have developed educational aids for the parent market, which include Speak and Spell , an electronic voice synthesiser.

Having selected your level of difficulty, the synthesised voice utters, 'Now spell "awareness", and as the child presses the keys each letter is pronounced as it is displayed. The voice comments on the result: 'That is correct' or 'Wrong; try again'.

In my naivety, I thought surely this must be of potential value to primary schools. Speaking to numerous LEA primary education advisers, I was dismayed to learn that they had dismissed such an aid, because it has an American accent.

'Wrong; try again' is my response. What they had failed to recognise was the educational potential of these machines; their motivating and reinforcing value; their important role in remedial education; and, of course, that micro-computer education opens up a whole new world for the deaf.

Computers provide practice, without making demands on the teacher, freeing him to utilise his skills for more professional tasks.

These machines signal the arrival of a society

which now has simpler and faster methods of retrieving information. Within five to ten years, computers will be as commonplace as television sets.

The home of the not too distant future, say, by the late 1980s, may well have an information centre. The television set would receive not only BBC1, BBC2, ITV, the new Channel Four, Oracle and Ceefax, but possibly also programmes from orbiting satellites.

Computer software could also be transmitted and then stored in your television set's memory for later use. Your telephone will enable your bank statement to be displayed in glorious red on your television screen.

The changes being created by modern computing, microprocessors and information technology are part of wider developments, based on rapid progress in silicon-integrated circuit technology. An essential part of contemporary education must be computer awareness.

So far there is little sign that our educational system is equipped to face the challenge of computers. Indeed, in many schools where they have invested in a micro, many pupils are now far more knowledgeable and competent in computing than their teachers.

What is needed is a massive investment in the training and in-service training of all teachers, making them aware of not just the social implications of this micro-electronic revolution, but also the educational implications and potential. An essential outcome of contemporary education is computer literacy. We hope that "Living in the Future" will encourage such an awareness.

ITV for Schools

Computing the ESP factor

NEW insights into ways of presenting traditional experiments are being unveiled by the Apple, according to Roger Harnish, assistant professor of Psychology at Rochester Institute of Technology in the USA.

He first introduced the Apple into his department for record-keeping purposes only – to control the mass of statistics generated by students enrolled in the Introduction to Psychology course. But he soon found it was also an invaluable tool for demonstrating psychological phenomena.

The 200 students in his totally self-instructed class read texts at their own pace, only coming into the classroom to take the required eight tests a quarter. If they fail they have to retake the tests until they pass.

With the help of the Apple Harnish can accurately assess where each student is in the course, which tests he has passed, the grade he has reached, and the concepts he needs to review. And, he says, it saves him hours of manual record-keeping.

But the Apple does much more than this. Harnish found he could use it to demonstrate extra-sensory perception and the phi and masking phenomena, which depict the illusion of movement. This left him more time to monitor the experiment better and to interact with his students.

Not only that, the Apple eliminated the need for four pieces of equipment – the tachistoscope, phi phenomenon demonstrator, reaction timer and memory drum.

An Apple for Mr Pascal

FIFTY Apples have been bought for one of Europe's most respected centres of technical and scientific education, the Swiss Federal Institute of Technology (ETH). Even more significant, perhaps, is the news that the man behind the purchase is one of the teachers there – Dr Nicklaus Wirth, the man who invented the computer language, Pascal.

About 1,500 students a year will use the Apple to study introductory and advanced computer science.

Wirth justified the emphasis ETH is now putting on the Apple: "We chose it because of the rugged design, company support and, of course, the availability of Pascal." And he added that interactive computers encouraged the student to remain motivated.

About his baby, Pascal, Wirth said modestly: "I never presumed it would have such widespread use. It is both surprising and gratifying to see its popularity." But he added a word of warning. If a tool was to succeed it must progress beyond the ivory tower of the university into the world of industry. And that is what the news from the ETH is really all about.

Using technology, people can fly without wings and breathe underwater without gills. Now, using personal computers, people without voices are speaking and people without hands are typing.

Apple Crumble

ON my travels around the UK visiting various LEAs, schools and colleges I make no secret of the fact that I am an avid supporter of computer literacy courses for schools, especially for those taking their first tentative steps in introducing a computer into their school.

Surely in the present climate an appreciation of computer power, its implications and its applications is something which all children can benefit from, whereas a computer studies course, which is examination-based and concentrates on the teaching of Basic, will benefit only the few in the longer term.

In terms of the applications of microcomputer power I never cease to marvel at some of the extraordinary ways in which I find Apples are being used to benefit our community as a whole.

For example, did you hear of the Apple used at British Leyland? It is placed on the back seat of a driverless car which then proceeds at a steady 50mph into a wall of solid concrete. OUCH! A series of sensors are connected to the Apple which monitors and reports on the safety of the car design, which as you can imagine comes under a great deal of scrutiny on impact!

In my continuing quest for the more esoteric of Apple applications, I recently discovered the one which currently tops my list.

It concerns the true story of a gentleman in America who purchased his Apple during the time of his wife's pregnancy. By profession the man is an engineer, but the Apple was intended as the focal point of his new-found hobby of computing.

In the due course of time his wife produced a bouncing baby boy whose lungs appeared to be slightly overdeveloped at birth. The family doctor soon diagnosed a touch of recurring colic and he assured the parents that the pride of their upset lives would grow out of it soon.

Not wishing to be at the mercy of Old Father Time our proud, though sleepless, parent proceeded to mount the baby's cot on four sturdy coil springs. He attached to the cot a motion detector of the type used in car burglar alarms and placed a small microphone under the cot.

The motion sensor and the microphone fed information into his Apple which was connected to an old electric motor from a washing machine which in turn was linked by a textile belt to the cot on springs. So far, so good.

If the baby's minor but disturbing ailment caused it to wake up crying in the middle of the night then the Apple monitored the extent of the movement and the noise, and responded by triggering the washing machine motor which gently rocked the cot on its springs and lulled the baby back to sleep.

Maybe you have an Apple story with a humorous twist? If so, send it to Apple Crumble and give us all a smile.

David King

RESEARCHERS are still writing the programs and redesigning the hardware, but personal computers are already being used to write letters, answer the phone, turn down the radio, and perform dozens of other tasks that can make independent living tedious or impossible for the severely handicapped.

"It's easy to get excited about what is being done," says Gregg Vanderheiden of the Trace Centre at the University of Wisconsin-Madison. "But it's important to remember what has yet to be done."

Vanderheiden is holding out for a system that takes notes while answering the telephone, runs any piece of standard software, and adapts to the abilities of persons with different physical handicaps.

"There are simply too many different kinds of people with too many different types of degrees of disabilities for us to approach this on a case-by-case basis," he says. "A lot of what exists can be useful . . . but it's still a long way from where we have to go."

The stories that follow show something of what has been achieved so far.

Last word for the deaf

THE MOST ambitious and innovative aid for the deaf in the last decade – that is the claim being made for a new Apple-driven speech display computer.

The system, which provides feedback for deaf children, has been developed by the Royal National Institute for the Deaf. It has been under test at three colleges for the deaf, where users say it is the biggest step forward since electronics were first used to test speech synthesis.

Through a microphone link voice patterns of both the therapist and the pupil are displayed on the Apple's screen and the two patterns compared, providing a graphic illustration of the degree of hearing loss.

The display also provides additional information about specific problems, such as the overall difficulty with timing the speech and the pitch of the voice.

Explained the RNID's adviser on speech therapy, Ann Parker: "A deaf person is no more dumb than anyone else, but lack of auditory feedback in early childhood can prevent the development of spoken language".

One big advantage of using the Apple is that other vital information about the pupil can be stored, such as background data on the pupils. It can also be used for testing the efficiency of hearing aids.

Cost of the complete system is £1,750.

Computing more power to the handicapped

PROBABLY the most versatile computer system package yet designed for the handicapped is the C2E2 (Control, Communications, Education, and Entertainment) system developed at the University of Alabama.

C2E2 was designed to operate on voice commands, but it will also accept switch and joystick input from users with speech difficulties. It can translate motion as slight as the movement of one little finger into control over electrical appliances, computer programs, a telephone, and even a music synthesizer.

It can be used by a person with any of several disabilities to operate almost any appliance that runs on 100-volt AC power.

"You really couldn't achieve the versatility that this system allows without a programmable computer," says its designer, Jim Rogers. This versatility makes C2E2 economically feasible by minimising expensive custom modifications.

The C2E2 system includes an Apple II with two disc drives, two CRT monitors, a Heuristics speech interface, and a printer. The only custom hardware is a simple "black box", which connects the Apple system to the users telephone and appliances. Rogers is confident the box is "simple enough to be built by a person having a minimal electronics background."

Dr. Russ Fine, director of the research at the university, said: "We wanted an alternative to custom-made environmental control units, which are inordinately expensive to build and often impossible to have repaired."

Fine expects C2E2 to make certain aspects of independent living much easier for the severely disabled.

"If you have this equipment, you don't require a separate communication system," he said. "You don't have to rig up special controls for your television and lights and locks. You don't have to find someone to type your letters. We've got an operational system that addresses some very basic requirements of persons with severe physical limitations."

Speedy response

GRANT Grover's Microcommunicator programs were designed for rapid communication. The "Make a sentence" program displays an entire sentence at a time, in response to just a few key strokes. The program calls up "nested" or interlocking menus, with the most urgent messages – "I'm in pain. Call the doctor." – in the most accessible locations.

The "Make a message" program allows the user to build sentences one word at a time, using only two or three keystrokes for each word.

Grover spent months studying speech patterns, trying to determine which words to include on the disc and how to organise them. He finally settled on 50 words for each letter of the alphabet. He put the 10 most frequently used words at the beginning of each list, and arranged the remaining 40 alphabetically.

When the user types in one letter, the computer starts listing words starting with that letter. One or two keystrokes will then add the desired word to the message.

Handier keyboards

KEYBOARDS specially designed to make it easy for the handicapped to use the Apple have been developed by Mr P.C.F. Porter, head of resources at City School, Sheffield, in conjunction with Datron Micro Centre. Called City Keyboards, they allow the user to bypass the conventional typewriter keyboard of the Apple II, which can prove a difficult means of communication for the inexperienced or handicapped.

Young children, slow learners, mentally and physically handicapped people can use the special keyboard to achieve immediate success in using computer assisted learning programs.

The 'keys' on the special keyboard can have any value assigned to them, perhaps a chemical formula or an electrical circuit symbol or even a geographical outline, and so it can be used at any level of complexity or with learners of any ability.

The standard City Keyboard has a surface designed to be covered by an A4 sized paper overlay on which numbers, words, symbols or pictures – diagrams or photographs – are drawn to assign values to the keypads underneath. By pressing on the paper at the appropriate place, the user operates one of 20, or 12, keypads. They give the user a positive tactile feedback and are not simply touch sensitive.

To protect the paper overlay in use there is an acetate flap which also holds the overlay securely in place. There are two press button switches provided at one end of the keyboard that can be used for program control, or if required they can duplex the system of keypads to give 40, or 24, possible key responses.

City Keyboards plug into the game controller socket of the Apple II and are supplied complete with operating software on cassette tape or disc, together with simple instructions for use.

When development is complete the special keyboards will be available from Datron Micro Centre, Sheffield. They can be designed to meet the individual customer's requirements.

Applecart

EVERY year the mathematical and statistical section of the British Psychological Society carry out a survey on 'Computer Use in British Psychology'. Last year they found the most popular microcomputer was the Pet. But this year they report the most significant change was what they call 'the Apple harvest'. The number of Apples has soared from just 18 machines at 15 sites last year to more than 80 machines at 30 sites today. Some have bought Apples on a large scale to equip teaching laboratories or form a general resource. Bangor has eight, Glasgow seven and Manchester and Goldsmith's College has 10 each. Why should Apple prove so popular? That was the question DAVID HALE of the Psychology department at Queen's University, Belfast, asks in the section's newsletter. And this is how he answers it:

A MAJOR advantage of Apple, certainly for the cognitive psychologist, is its two high resolution graphics pages, each of 280 by 192 points, which even neglecting the eccentric and unreliable colour capability, allow complex figures to be drawn from points, vectors or even psuedo-half tones and displays presented tachistiscopically by switching from one page to another within the screen's 20 msec refresh cycle.

Together with a pair of separate display pages, which can display either text or low resolution (40 by 40) colour graphics, the high resolution pages make Apple almost unique in terms of display capability.

In comparison a single 300 by 200 point graphics page can be added to Pet for an extra £300, and while the colour facilities are much better on the RML graphics system this is again at extra cost.

Unlike Pet the Apple has internal expansion slots which allow sufficient peripherals to be located inside Apple – for example, a terminal or printer interface, real time clock, digital interface, analogue interface – avoiding masses of external boxes common with less modular system. Another related point is that a vast range of plug-in devices are cheaply available for Apple. These include: graphics tablets with useful software, light pens, TV digitisers and frame grabbers, speech input and output, music and tone synthesisers, graphics printers, analogue and digital systems, high capacity disc storage and many more.

Plug-in boards are available which counteract text display limitations by giving lower case or user-defined characters and a full 80 by 24 display size. Most of this hardware comes with appropriate software to enable the fairly naive user to quickly start to use it. Good examples of user-oriented software relate to the graphics.

While there are primitives in the AppleSoft Basic for plotting points or vectors and for drawing predefined shapes of specified size, rotation and position these need the user to be able to program in order to use them.

Most graphic input devices such as the Apple Graphics Tablet come with software which allows pictures to be directly drawn onto the screen from where they can be saved to disc or printed.

A quite excellent cheap (under £150) graphic input device is the Versawriter, which allows screen images to be drawn directly in colour (which appear in different grey shades on a black and white monitor), with lettering, infilling of colour areas and lets elements drawn on the screen be converted to a 'shape table' format for subsequent use in a program.

There is a TV digitiser board called a Digisector made by the Microworks Corporation which has software in ROM on the board to digitise a TV picture directly onto a high resolution graphics page.

Appleworld is an amazingly cheap software package (under £30) which allows a naive user to develop three dimensional line drawings of considerable complexity and then view them from any position within a cube 65,000 elements on a side.

An auditory example comes from the music synthesiser boards (from ALF, Vista or Mountain Hardware) which allow, say nine part music to be easily generated and played without programming as such. Some might regard such devices as low-precision toys yet they allow Apple to do many things which would be difficult for a minicomputer costing maybe five or 10 times as much and then only with a much greater programming effort.

Apple is very portable – with a single disc drive it is easily and safety carried about, say to a school to run an experiment or home for program development (or, dare one say it — playing the many excellent games available) via a domestic TV.

Other systems, particularly those with built in displays, are much larger, heavier and less portable, or tend to be nightmare collections of separate boxes with connecting wires and mains leads all over the place. Apple has some limited built-in input/output capability apart from the keyboard and display including analogue inputs, digital input and output at logic levels, and a small loudspeaker. This may be all the I/O needed for many experiments.

At a more technical level the interrupt system is not used by either display refresh or the keyboard both working by hardware. This means that the interrupts can be easily used for timing and device I/O. Many other machines, such as Pet, drive the display and scan the keyboard using interrupt driven software which greatly restricts the use of interrupts (to the really skilled or persistent programmer).

Finally there are market forces again – Apple is widely marketed, available and used with all that means in terms of potential services, easy purchase and advice from existing users.

Without wishing this note to be a eulogy or sales pitch for Apple (even though I have been asked by audiences in the past just why I'm selling Apples!) it should be noted that Apple is also unique in being able to totally change its basic processor type. By plugging a Microsoft softcard into any internal expansion slot and using appropriate discs Apple will work as a Z80 based machine running CP/M software – which includes compiled basic and Pascal as well as other languages. Apparently there is an equivalent card which allows the use of the 6809 processor and real-time software. Apple then is also amazingly versatile and adaptable.

An argument against getting an Apple II now is that Apple III may eventually be available. I suspect this will be very much a 'stopgap' machine – at least double the cost of Apple II yet offering more to the small business user than the experimental psychologist.

One awaits with interest the projected Apple IV with a 68000 processor and the possibility of truly powerful hardware and user-friendly software.

Appletips

Renumber is a very powerful tool for developing programs but if you use it and you find some strange alterations in your program, Renumber may have done it. What happens is that the number after a '*' sometimes is mistaken as a line number and Renumber renumbers it.

So if you had a line

```
10 LET A=B*10
```

it might renumber as

```
20 LET A=B*20
```

The fix is:

For RAM Applesoft	For ROM Applesoft
(DOS 3.2)	
]LOAD RENUMBER	]LOAD RENUMBER
]POKE 14342,172	]POKE 4815,172
]POKE 13343,171	]POKE 4816,171
]UNLOCK RENUMBER	]UNLOCK RENUMBER
]SAVE RENUMBER	]SAVE RENUMBER
]LOCK RENUMBER	]LOCK RENUMBER
(DOS 3.3)	
]LOAD RENUMBER	]LOAD RENUMBER
]POKE 14316,172	]POKE 4789,172
]POKE 14317,171	]POKE 4790,171
]UNLOCK RENUMBER	]UNLOCK RENUMBER
]SAVE RENUMBER	]SAVE RENUMBER
]LOCK RENUMBER	]LOCK RENUMBER

Not so random

THE following is a program to demonstrate graphically the problems that can occur when making extensive use of the RND function in Applesoft. If the program is allowed to run for five minutes or so and then stopped and re-run then a clear pattern of lines will appear on the screen showing that a definite sequence of numbers is recurring.

The numbers generated fall into five categories. Those generated four times per cycle (only one of them), three times per cycle, twice per cycle, once per cycle and those never generated.

```
0  REM RANDOM DEMO
1  DIM A(280), A%(280), B(191), B%(191)
10 HGR2
15 FOR I = 1 TO 280:A%(I) = 3:NEXT
20 A = RND (8) * 280
30 A(A) = A(A) + 1: IF A(A) < 191 THEN A(A) = 0:A%(A) = A%(A)
   + 1: IF A%(A) = 5
   THEN A%(A) = 3
40 HCOLOR= A%(A)
50 HPLOT A A(A)
55 GOTO 20
100 REM RUN THE PROGRAM FOR TEN MINUTES
    THEN STOP IT AND RUN IT AGAIN.
```

You'll never trust a random no. generator again!

Roy Stringer, U-Microcomputers

And there it was – gone . . .

ANYONE who has used the HRCG program on the DOS 3.3 Toolkit and has written a fairly large program which utilises it will have found that part of their program is stored in the first page of HGR and each time the character generator is called (even if it is mapping onto HGR2), it either wipes out the upper part of their program or if they call that part of HRCG which reinstalls the generator without clearing the screen as well then their program will simply crash. All together an unhappy set of circumstances.

The simple remedy is to have the program start above HGR1 which can be achieved by making the HELLO program set up the program base address with an EXEC file:

```
10 REM HELLO PROG TO SET UP PROGRAM BASE FOR MAIN PROGRAM
20 D$=CHR$(4)
30 PRINT D$ "OPEN SETUP"
40 PRINT D$ "WRITESETUP"
50 PRINT "POKE 103, 0"
60 PRINT "POKE 104, 64"
65 PRINT "DELETE SETUP"
70 PRINT "RUN MAIN PROGRAM"
80 PRINT D$ "CLOSE SETUP"
90 ?D$ "EXEC SETUP"
```

This program will set the start address for your program to the first byte above page 1 of HGR, but by changing the POKEd values you can force your program to load at any suitable address. Notice that the next to last statement in the EXEC file will delete the EXEC file itself. This practice may cause problems if the file contains more than the 256 characters (including carriage returns) that can be contained in the DOS file buffer assigned to it.

Roy Stringer, U-Microcomputers

Colourful HPLOTs

DID you know that when you reset HCOLOR, any HPLOT TO will remain at the old colour until the next HPLOT is executed. Try the two following examples:

```
5  HGR
6  HCOLOR = 3
10 HPLOT 0
20 GOTO 60
40 A = RND(8) * 279: B = RND(8) * 191
50 HPLOT TO A, B
60 HCOLOR = RND(8) * 7
70 GOTO 40
```

```
5  HGR
6  HCOLOR = 3
10 HPLOT 0
20 GOTO 60
30 HPLOT A, B
40 A = RND(8) * 279: B = RND(8) * 191
50 HPLOT TO A, B
60 HCOLOR = RND(8) * 7
70 GOTO 30
```

The first program will plot random lines all in white (HCOLOR 3) while the second program draws each line in a new colour.

Roy Stringer, U-Microcomputers

EXEC files are a powerful ally

EXEC files are a facility almost unique to the Apple among microcomputers, but quite essential on all mainframes and many minis.

Most Apple users we know don't tend to make any use of them, the main reason being that the program 'EXEC DEMO' on the DOS System Master is rather complicated for programming novices to follow and after the initial novelty of running every program on the disc (and EXEC DEMO will only run on an unwrite protected disc, so it must be copied first) it never gets looked at again.

Briefly, an EXEC file is a list of 'immediate execution mode' instructions stored in a disc text file from which they can be read one at at time and executed as though they were typed normally on the keyboard eg:

```
FOR I = 1 TO 1000: NEXT
LOAD HELLO
CALL - 151
10 FOR I = 1 TO 1000: NEXT
```

The last of the above examples is a line to be entered into a program showing that a program is capable even of modifying itself under given conditions. An example of how to do this is:

```
5  ONERR GOTO 100
10 REM PROGRAM TO MODIFY ITSELF
15 NC = 20: D$= CHR$(4)
20 DIM A$(NC)
25 I=1
30 INPUT "NAME"; A$ (I)
40 PRINT "FINISHED Y/N";
50 GET G$: IF G$ <> "Y" AND G$ <> "N" THEN 50
60 IF G$= "N" THEN I = I + 1: GOTO 30
65 FOR J = 1 TO I: PRINT A$(I): NEXT
70 END
90 REM BAD SUBSCRIPT ERROR WILL BRING
   THE PROGRAM HERE IF 'I' EXCEDES 'NC'
100 REM MODIFY PROGRAM IF MORE THAN 'NC' NAMES REQUIRED
110 PRINTD$ "OPEN MODIFY"
120 PRINTD$ "WRITEMODIFY"
130 PRINT" 15 NC =";NC + 20;: REM ALLOW
    20 MORE NAMES NEXT TIME
135 PRINT ": D$ = CHR$(4)"
140 PRINT "SAVE PROG" REM NEXT TIME
    IT IS RUN IT WILL BE THE MODIFIED VERSION
150 PRINT "RUN"
155 PRINTD$ "CLOSEMODIFY"
160 PRINTD$ "EXEC MODIFY": REM EXECUTE
    THE COMMANDS IN THE EXEC FILE
```

Clearly EXEC files are a very powerful utility of Apple DOS which is not always used to its full potential.

Roy Stringer, U-Microcomputers

WE are pleased to announce that Windfall has taken over Liverpool Software Gazette, which since its launch in November, 1979, has played an ever-growing role in the interchange of knowledge between microcomputer users.

The Gazette's popular "Apple Pips" section will be continuing in Windfall, starting with our next issue, and we shall also be including regular articles from some of the Gazette's main contributors.

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

There are two items that are important to remember when using Visicalc on a Language system (or when using a 16k RAM card).

One: Visicalc has a 'dynamic' memory allocation. This means that as you enter in more rows or columns the actual size of the array held in memory increases.

The thing to watch out for is that if you delete some rows or columns the actual array held in core does not decrease!

The only way to reduce a Visicalc array is to delete the appropriate number of rows or columns and then save the array. Upon recall the array will be at the smaller size.

Two: Visicalc 'reserves' two bytes for each unused position that is in the actual matrix.

This space is not taken off the memory indicator as it is not actually used. Under normal circumstances this is of no importance, but when you are working with a 35k model and there is a lot of empty space inside the model you can reach the point where you have 5k left on your indicator and yet you cannot add any more lines to your model (although you can fill in your model).

These two problems can combine to give you a rather more difficult situation. If you extend your model to a very large size and you run out of 'reserved' space you will get the message 'ERROR: TOO BIG'. Once this message appears the only thing to do is to reduce the size of the model by deleting some characters.

User defined functions in Applesoft may cause problems if CHAIN is used. When a DEF FN statement is encountered in Applesoft there is an entry made in the simple variable table that points to the rest of the function in the text of the program.

Strange and perhaps fatal things can happen if you use a function defined in the previous program without having the same image of the function at the same memory locations.

The easy way around this problem is not to use defined functions. If you need them then put all the definitions in the front of ALL chained modules.

First program:

```
10 DEF FN A(X)=X*X
20 PRINT FN A(2)
30 PRINT CHR$(4); "BLOAD CHAIN,A520"
40 CALL 520 "PROGRAM 2"
```

Second program:

```
10 DEF FN A(X)=X*X
20 PRINT FN A(3)
30 END
```

NICOMTECH

apple computer

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COMPUCOPIA

Backup for your micro

CAPRICORN Computer Systems Ltd of Worcester are now offering a backup power supply for microcomputers and VDUs.

Drawing its power from a standard 12v car battery the Microguard will support a normal micro system, including printer, for up to two hours.

It comes in three versions. Microguard 'S' has smoothing added and Microguard 'H' is heavy duty for use with fixed disc systems.

Contact Capricorn Computer Systems Ltd, 24 Foregate Street, Worcester (tel: 0905 21541).

New reader for barcodes

DMS Electronics of Sheffield have produced two items for use with barcodes.

Their barcode reader consists of the HP HEDS 3000 wand and interface which plugs into the games i/o port and a software driver routine on a DOS 3.3 disc. It will allow you to read 8 and 13 digit EANA barcodes and 12 digit UPC barcodes.

Inbuilt checksum facilities validate barcode readers, which take less than 0.1 of a second, including deciding which type of code is being read. The price is £120.

Their barcode printer routine is provided on a DOS 3.3 disc and allows you to print any number of labels on plain paper or gummed address labels. The printer will produce 8 and 13 digit EANA or 12 digit UPC labels, capable of being read by their own reader or existing scanners. The price is £90.

Contact Stephen Alsop, DMS Electronics, Sheffield Road, South Anston, near Sheffield (tel: 0909 563918).

Seek and ye shall find – faster

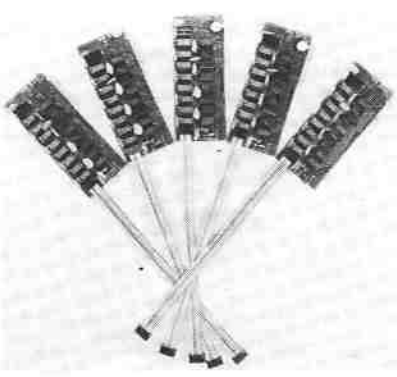
THE Micro-Sci is a new disc drive with its own controller, produced by Standun Controls Inc of Tustin, California, and designed to produce a system with increased capacity, reliability and speed at a cost slightly lower than standard Apple prices.

The Micro-Sci controller retains compatibility with all standard Apple operating systems – DOS 3.2, 3.3, Pascal and CP/M – and a quick change jumper allows users to swap between 13 and 16 sector formats. Two separate models – the A40 and the A70 – give you a 40 track or 70 track count, increasing capacity of the discs by 14 per cent and 100 per cent respectively. Speed of access is also increased by a factor of three, the seek time on the Micro-Sci being 5mS as opposed to Apple II drive's 15mS.

Two components designed to increase reliability are a steel band positioned for faster, more accurate head alignment, and a two piece clutch for more accurate disc registration causing less distortion of the centering hole.

Prices are £343 and £269 for an A40 drive, with and without controller, and £484 and £410 for the A70 in similar configuration.

Contact Computopia Ltd, 30 Lake Street, Leighton Buzzard, Beds (tel: 0525-376600).



New 16k memory cards

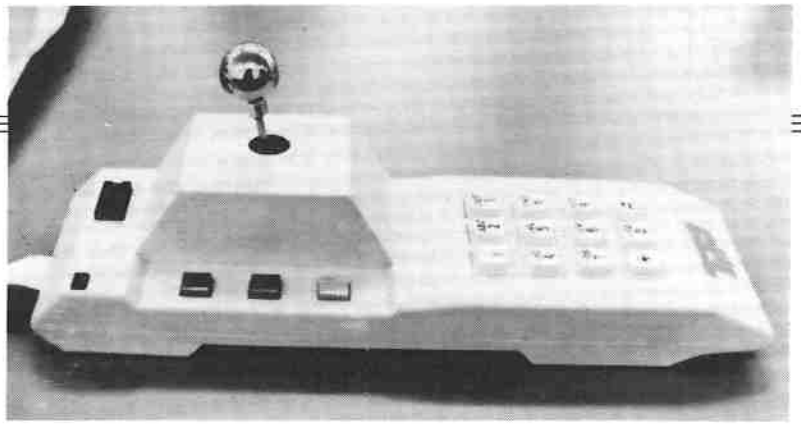
16K Ram card

U-MICROCOMPUTERS Ltd of Warrington have launched a UK manufactured 16k memory card as the first of a new range of accessories which they are producing.

The card will run Pascal programs, boosts CP/M program space from 48k to 56k and Visicalc model files from 25k to 35k, and makes the Integer Basic Rom card obsolete. It can also be used with the new Hayden Applesoft compiler.

Called the U-Ram 16, the card sells at £130 assembled and tested, or £99 as a kit.

Contact Bill Unsworth of U-Microcomputers on 0925 54117.



Stir the colours with Fanta Stick

FANTA Stick is a multi-functional terminal that lets you draw, colour and move patterns on the screen, and is also capable of analysing drawn shapes.

It is plug compatible with Apple II and especially designed for such fields as production of commercial animation, demonstrations, graphic analysis and development of software. Overall dimensions are $9\frac{1}{2}$" x 3" x 3".

The software provides seven modes of operation and can operate in either low or high resolution. The main function is "Pattern", which is used to create shapes and to memorise the created pattern in a table.

Shapes are created in "boxes" which can be assembled to provide a full screen display. Stored shapes can be recalled from disc for display or modification or addition on the screen. Assembled shapes can be moved using the "Slide" command for animation or rotated using "Revolve". Scaling and colouring commands provided make this a powerful, flexible and low cost Apple II graphics system.

You need 48k Apple with DOS 3.2 or 3.3, plus Colour Card and modulator if colour is required. Fanta Stick 1 consists of a joystick, command buttons and I/O expansion connection for games paddles. The joystick and buttons are used for creating shapes and game playing. The keypad is used for inputs to the computer, graphic mode command etc, and to save and load shapes.

Basic cost is £70 for the hardware, £80 for the Fanta Stick with Machine Code software, and £99.50 for the Fanta Stick plus box of software.

Contact Ian Dunkley, Datron Micro Centre, 2 Abbeydale Road, Sheffield.

SOFTWARE SCENE

Z80 applications for Apple

HALLAM Computer Systems Ltd of Sheffield are currently selling a number of packages already running under the CP/M operating system which can now be run on the Apple with the Z80 card installed.

BCPL is a structured programming language similar to Algol 60 or Pascal, though generally more flexible. Business application software can be demonstrated by Hallam using BCPL. Price is £225.

Transfer is a communications package containing two programs – 'Send' and 'Receive'. Using the Z80 card and a serial interface card, the Apple can communicate with other Apples, Z80 machines or larger 'host' machines. Price is £50.

Wordstar is stated to be the most sophisticated Z80 based word processing package. It contains a wealth of good features and can be used with any terminal or printer. It needs either an 80 column card and monitor or serial interface and VDU. Price is £275 for Wordstar V2.1 and £75 for Mailmerge (optional).

Contact Hallam Computer Systems Ltd, 1 Berkeley Precinct, Ecclesall Road, Sheffield S11 8PN (tel: 0742 663125).

Pharmacy labelling

THE West London Microcentre have designed a pharmacy labelling program for those chemists who find hand writing prescription labels a bore. It will produce printed labels for up to 1,500 drugs with any combination of up to 300 dosage directions.

A facsimile of the label produced is displayed before printing on a personalised label. Spacing and pitch of the printing can be varied so that any standard size labels may be used.

Further enhancements will include stock recording and incompatible drug warnings, available to users at nominal cost.

Price of the pack is £400.

WLM have also modified a Microline M80 printer to use the program more effectively. An adapted printer, with tractor, serial card, serial interface and data cable costs £725.

Contact West London Microcentre, 6 Pavilion Parade, Wood Lane, London W12 0HQ (tel: 01-743 9000).

Z80 based payroll

A PAYROLL, running under CP/M and handling up to 300 employees per disc has been produced by Western Computers Ltd of Blackpool. The program performs wages, tax, national insurance and pension calculations, and will print detailed payslips, summaries and departmental analyses for up to nine departments.

The automatic pension contribution can be produced on a flat-rate or on a percentage basis, and is deducted from the gross wage before tax and after national insurance has been calculated. Contributions may also be made by the employer, and this can be calculated either as a lump sum per employee or as a percentage of each employee's wage.

The payroll also produces all of the standard reports and analyses.

Contact Western Computers Ltd, Blackpool Airport, Blackpool, Lancs (tel: 0253-404676).

The Data Factory

PERSONAL Computers Ltd of Bishopgate, London, are now offering a universal database management system called The Data Factory.

The system gets the "universal" designation because of the vast choice of files it is capable of handling. It consists of nine modules and a wide selection of search, sort and comparison features. The extended search facility alone permits up to four retrieval variations. It functions on record numbers or data with up to 20 levels and will allow numerous different items to be selected at any one moment.

Priced at £100, it is another useful addition to PCL's large range of software.

Contact Fred Bullock, Personal Computers Ltd, 194 Bishopgate, London EC2M 4NR (tel: 01-626 8121).

Appletips

Do you get irritated by having to type **PR#1** and **PRINT "CTRL-I 80N"** whenever you want a quick 80 column listing of your program on the printer? This routine in machine code allows you to do all that with one command – the '&'.

First you **BLOAD** the program and go to part of it with a **CALL 805**. This moves the & pointers to your routine at **$300**. Then, whenever you want the printer come on, you type **& RTN**. Then type **LIST RN** as usual. This gets you full 80 columns printing but no screen. If you don't mind short lines and need the screen then try another **& RTN**. Hey Presto, the screen returns and the printer is still on!

RESET cancels this routine any time. The '&' may be used again but, depending upon where you 'reset' it, you may need an extra **& RTN** before it 'takes'. Try it!

WORD PROCESSING

WITHIN the last six months the Apple has proved to be a serious and extremely proficient word processor, competing on very nearly equal terms with products costing twice as much. Although the basic ability has been available for a number of years with some quite advanced 40 column systems, it was not really until recently that the concept matured, with the facility to use 80 columns in upper and lower case becoming more widespread and the advent of cheaper quality printers.

As with all Apple software a plethora of products usually appears in one great rush. We are in the middle of one now, with several new word processing packages being unveiled seemingly every other week. The fact that they are so suited to the Apple, and compare so favourably to the more expensive dedicated word processors, is encouraging a growing number of people to consider taking up word processing. People are now using the Apple to write books, devise scripts for plays, and even compose theses for fellow students at college.

During the next few months it is the intention of Windfall to look at all the major word processing packages currently available for the Apple, explain how they are run, illustrate their advantages and point out their shortcomings. As with all other articles in this magazine we welcome correspondence on the topics under review and we also want you to inform us when we miss a product you think we should know about.

The first word processing package we review is one of the most widely used outside Apple's own products, such as Applewriter, which will be discussed in future issues. Format 80, from Personal Computers in London, is a home-grown product and has much to commend it.

FORMAT 80 was developed within Personal Computers Ltd by Mike Hardwick and Gordon Beckmann. It is an Assembler based program, and is a successor to Format 40 and Format 41, two 40 column based systems which were useful programs but not widely distributed outside PCL's own customer network.

The aim was to develop a straightforward screen oriented and fast program to be used as an adjunct to standard accounting packages.

It has now been on the British market for about nine months, but is continually being updated with further modules to widen its scope and improve its efficiency. Most of these modules and improvements were scheduled as part of the original concept and have been added to the program after considerable field testing.

An example of this policy is the mailing list, a complete module which it was felt should be left out of the original package until PCL were fully satisfied with its performance. It is now running on various sites and all Format 80 discs will be updated, if required, in the near future.

Format 80 has been designed to run on a standard 48k Apple, currently under DOS 3.2, with either a single or double 5in disc system. There are also plans to run it on the Pom 8in disc system which PCL market in Britain.

The format is specifically geared to disc volumes, so when this is achieved you should be able to configure an 8in disc system with eight disc volumes (5in size) on line at any time.

To achieve the 80 column and upper and lower case screen, PCL have concentrated on using the Doublevision card. Although this is reputedly the most reliable of the 80 column cards it does not show true descenders on lower case characters, and although these characters are elongated to compensate for this it does create a slight unsettling effect until you get used to it.

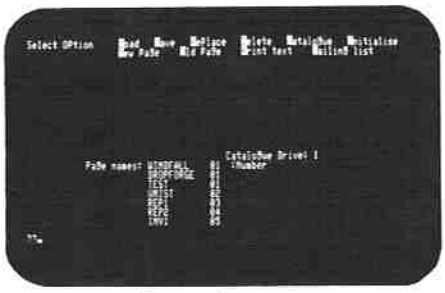
A pleasant feature is the use of the shift key to produce upper case characters. This is achieved very simply by a minor modification inside the Apple which takes about 15 minutes and two short pieces of wire. The minimising of control key commands makes the Apple more like a typewriter than other packages. This enables typists and other operators to adapt to its use in a very short space of time.

There is complete independence in the choice of printers. They all run from slot 1, and an 'install' module within the program allows you to configure to printers requiring control characters for various functions and to set up headings, pagination and other facilities.

In a word processor which is designed to be easy to use the layout of the screen and the simplicity of commands is of paramount importance. Format 80 is specifically a screen oriented program with a maximum page width of 80 characters. Each page is limited to a maximum depth of 80 lines, which is scrolled using the return key or by various commands in format mode.

All commands are prompted from the screen, the options occupying a couple of lines at the top or the bottom of the screen. These single key commands either derive from the initial letter of the action required or a single depression of another key. This allows the major portion of the screen to retain text while only those commands currently needed are displayed.

When the system is booted initially, the



The main menu

main menu is displayed at the top of the screen. This allows you to choose the following facilities:

Catalog
Load
Save
Initialise
Replace
Delete
New page
Old page
Print
Mailing list

Pressing the initial character of each option allows you to jump straight to that option, where additional commands, just as accessible, become available. A catalog will allow you to catalog either disc. A load will ask you for page name, number and disc. Program reaction is quick, and the screen remains uncluttered by superfluous information.

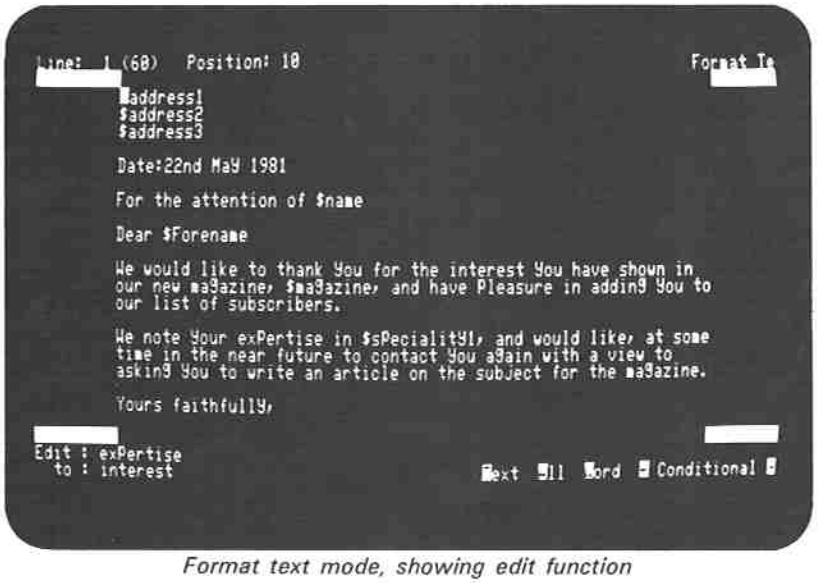
If you wish to edit or enter text you either use 'New page' to start a new page, or 'Old page' to look at a page already in memory. Once you are in this mode all of the many features become available.

There are two main operating modes which you can use at this stage. You can enter text, or you can switch to format mode for editing or other functions. Switching from one mode to another is simple. The Escape key drops you in and out immediately.

In enter mode you have the facility to enter text in free format. Your initial task is to set the number of lines you wish to use (this can be amended in the middle of an

FORMAT 80

Pretty well guarantees to please your typists



Format text mode, showing edit function

insertion) and then to set margins and tabs. This is the only time you need to use control keys, except when you wish to jump back to the main menu when you press Control D.

Because it is written in Assembler the typing in of text is fast, wrap-around is immediate and hyphenation, although in strange places at times, is just as quick. The shift key can be locked and released just as on a typewriter, and the whole feel is as sure and as easy as any typist could wish it to be.

Once the text has been entered and you wish to amend it you can switch to format mode immediately with the Escape key.

Once in format mode you have access to a large number of features which are not displayed on the screen. However, as with the rest of the program, most of them can be accessed from the initial character of the function. The commands available are listed on Page 44.

When initiated most commands allow further options. For instance, the Edit function gives three different ways of replacing words in the text.

The functions are quick to operate too. Total edit, justifying text, moves within text all occur instantaneously. An insertion containing extra text will cause a ripple of altered lines of text throughout the whole page.

A function I enjoy using is the Go and Load, where I can define a block of text and remove it from the screen to store it in a separate buffer. This can be recalled and inserted on subsequent occasions, providing it is not overwritten.

At the moment not all the features designed for Format 80 have been implemented, but these will be added to the program when they become available.

Printing a copy of the text held in memory is fast and easy. Printing documents is straightforward providing you want nothing fancy, such as numbering pages, producing page headings or using some of the special features of the printer. The biggest difficulty, however, is the present quality of the manual provided to support the program.

While I appreciate the fact that it is economically unwise to produce a professional manual until the product is virtually complete the standard of the written assistance currently available is poor, and where that assistance is required in greatest clarity, such as in the operation of special printing commands, it is at its poorest.

→

WORD PROCESSING

The 'Install' option in the secondary print menu gives you a number of very useful options, including the provision of multi-code commands to printers and the titling of multi-page reports. Before these can be used, however, some hard thinking is required to unravel the correct method of using this section.

If, as PCL say, their manual will be aimed at making everything perfectly clear, even to the extent of warning you not to remove the floppy disc from its jacket (someone did!) then hopefully this problem will be cleared up.

The mailing list section of the package has only just been released for general sale, but it looks as if the policy to withhold it until now was justified.

It allows you to create a number of labels – up to 16 – with an individual name on each. It is suggested that the name is preceded by something like a $ sign for easy recognition. Where this name is found in the text being printed out it is replaced by the subsequent corresponding entry in the mailing list.

A 5in disc will take about 440 entries, or names and addresses corresponding to the labels, plus one entry reserved for universals. This allows an entry, such as the date, product name or other item, to be inserted on every piece of text printed.

This routine retains all the good features of the rest of the package and fits in very neatly.

Format 80 is being sold at £300 for the package, which includes the mailing list and all other modifications currently in the pipeline. On top of this you will need a Doublevision card (£172 from Microsense) and your Apple will have to be modified to use the shift key, which with parts and labour – mainly labour – will cost between £30 and £50.

CONCLUSIONS

- Format 80 certainly lives up to its name in being a straightforward, easy to use word processing system. It is probably the easiest system for a standard typist to convert to, and would certainly encourage constant use. But this is very much a personal view, and I know of other users who will disagree with me on this.
- The package must have been well tested because all the systems I have seen in use have been stable and reliable and have generated no software related problems after installation.
- The manuals provided are only preliminary versions and are poor, giving little information and tending to confuse. However, the program is so easy to use that once the manual has been assimilated a simple aide-memoire pinned up near the Apple is all the future assistance you should need.
- Compared to other word processing packages the price, with the Doublevision card, seems rather steep, although it falls well within the range of what I would call 'professional' word processing systems on the Apple.
- Providing the user can stay within the defined 80 column format and is interested in straightforward document and letter production, Format 80 is a well thought out and useful package. But for the time being don't try and use it for the compilation of complex documents involving considerable paragraph handling, unless you enjoy manipulating floppy discs.

Having said this the options that you do get are quite comprehensive and allow you to produce very professional looking documents. Within the current release you are able to print with proportional spacing and also to create proportionally spaced justification. You can define character width, spaces between words or characters, or even define how aggressive you want the justification to be. (An aggressive justification is one where a line with a 2in space at the end will be justified.) You also have the facility to switch these features on and off within the body of your text.

- Two features which are scheduled for inclusion in the very near future, and which would have been a considerable lapse if they were not to be included, are the Edit facility being extended to include whole documents, and the ability to redefine margins.

Align	Align text.
Blank	Blank out word, line, sentence, paragraph or text.
Centre	Centre text on a line, in a paragraph, etc.
Delete	Delete. Once confirmed remaining text closes up.
Edit	Edit string of characters.
Find	Find chosen string of characters.
Go	Copy block of text elsewhere on page or remove into buffer.
Insert	Insert text at cursor's current position.
Justify	Justify text by inserting additional spaces between words.
K/closes	Close up text.
Load	Bring text sent by GO to buffer, back onto page, either overwriting or inserting.
M/Down	Move cursor down one line.
N/Up	Move cursor up one line.
Options	Allow entry of printer codes, or typing of characters not available at keyboard.
Paragraphs	*Not yet implemented.*
Start	Take cursor to start of word, line, etc.
Tidy	Change multiple spaces to single spaces and eliminate soft hyphens.
Underline	Underline text by single character or group.
V/Slide	Slide page or part of page up or down.
W/Slide	Slide words left or right on line without affecting rest of line.
X/Delete	Delete single character.
Y/Following	Move cursor to following word, line, etc.
Z/End	Move cursor to end of current word, line, etc.

Format commands

Appletips

The Phone List program provided on the DOS 3.2 Plus master disc will not print correctly on the Silentype printer. This can be corrected by adding the following line to the program:

```
1111 IF PR THEN PRINT
```

When typing quickly, many people do not completely release one key before striking the next. If you attempt to hold down more than one key at a time, the encoder chip sees the logical "AND" of the keys currently being held down. The AND operation results in bits being turned off, so it is quite likely that many combinations of keys will result in an Ascii 0 (Nul), which is a BREAK in Pascal.

The reason this doesn't happen in Basic is that an Ascii 0 from the keyboard has no function in the Basic system.

Apple Post examines the machine code on the printer interface card to determine what type of card it is – serial, parallel or communications. If you have a non-Apple printer card Apple Post will not recognise it, and will not print.

If you have this problem adding the following lines may help:

In the Utility Module:

```
13135 V = 2
```

In the Output Module:

```
1125 X2 = 2
```

Be sure to make backup copies of your discs before making ANY changes!

The sample data file in Apple Post is for example purposes only! It has room for only a few names. If you used this file as a mailing list file you must re-enter the data into a new file.

See NEWLIST on Page 9 of the manual.

Buying an Apple Personal Computer is just the begining...

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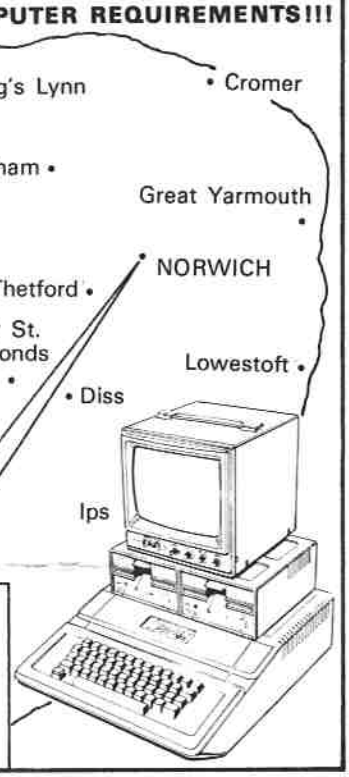

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The man behind Apple's UK success story

AS a young man he talked himself into a plum job as engineer on the first commercial computer in the world – Britain's revolutionary Leo I. Now, with electronics experiencing an unprecedented boom, he once again finds himself making history – steering the fortunes of the Apple computer as it makes its big push to completely dominate the country's desk-top micro market.

For Mike Brewer, the big decision that was to change his whole life came just three years ago when, at the age of 40, he set up Microsense Computers. He started by distributing the ITT 2020, but after only a short period he became convinced that Microsense should "Go Apple".

In May, 1979, with heaps of enthusiasm and a pocketful of dollars, he flew to New York for the prestigious National Computer Convention where he bearded the president of Eurapple, Andre Sousan.

The deal he was seeking was to secure for Microsense the sole distributorship of Apple in the UK. After some tough talking they shook hands on the deal – and Microsense was all set to become one of the top flyers in Britain's biggest growth market.

What followed was to become part of computing history. Mike started with 25 Apple dealers. Today there are more than 400, in all parts of Britain. And the trickle of Apples arriving here turned into a flood, with sales of just £30,000 a month in June, 1979, soaring to well over £2 million a month today.

Mike's next big decision came this year when after lengthy negotiations he agreed to the takeover of Microsense by Apple Computer International. It will be October before the protracted legal moves will be complete, and then the name of Microsense will disappear and his company renamed Apple Computer (UK) Ltd. But Mike, of course, stays on as chairman and managing director.

Of the takeover he says enthusiastically: "We are all looking forward to working for Apple, simply because they are a first class company continually creating an exciting atmosphere".

But Mike Brewer has always worked in an exciting atmosphere, and that goes right back to his days at technical college where he first developed an insatible interest in electronics. His keenness and dedication landed him his first job in a government research laboratory, where he stayed four formative years and learned much that was to stand him in good stead in his future career.

Feeling the need to try his luck in a more commercial environment he went into industry as a development engineer on tape recorders, before moving on to spend six months as a BBC engineer working on radio transmitters at Daventry.

Then came what must have been a most exciting offer for a young man fully aware of the exciting frontiers of electronics about to be crossed – the chance to join the team that gave the world the first glimpse of the dramatic commercial possibilities of the computer. Mike joined Joe Lyons, the cake empire, to work on the cumbersome, temperamental but mind-expanding Leo I.

Lyons formed Leo Computers to market the Leo II and III machines. Mike was given the job of chief engineer on the impressive Shell Mex and BP installations where they used two very large Leo IIIs.

Not long afterwards he began to realise that with large organisations starting to move into computing there would be a growing need for someone to supply them with computer room furniture and other accessories.

In 1964, on a part-time basis and with a capital of only £100, he launched Data Efficiency with Bill Mercer. Demand for Data's small product range grew rapidly and in 1969 he left Leo and threw all his energies into building up the new company. Bill Mercer joined him full time a year later.

Over the next decade the staff of five who started with him grew to 85, and the business developed to become one of the most successful suppliers of computing and office equipment in Britain. Then in 1978 he felt the time was ripe to diversify into microcomputers and set up Microsense – and started his honeymoon with Apple.

Of the last three years, when he has had to cope with unprecedented growth and a rate of success that was to amply prove his unflappable adaptability, he says simply: "This period of my life has been very intense and by far the most interesting, but I couldn't have done it without the excellent team of managers and the committed Microsense staff."

And he didn't forget the people out in the field who played such a vital part in helping Microsense break target after target. "The Apple dealer network all along demonstrated unfaltering enthusiasm in selling Apples", he said. "You can be certain that in turn Apple will continue to support them by supplying new products which will incorporate the very best in future technology."

Talking about technology it seemed an appropriate moment to ask Mike Brewer about Apple III, which judging by the acid comments of the gossip columnists has experienced a far from chequered career so far.

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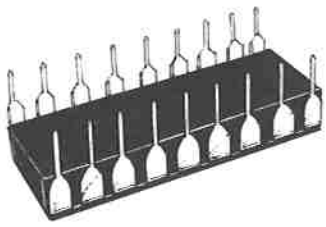

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Mike Brewer: "It's the best machine for the job".

"It's true there have been delays", he admitted, "but they have been caused by mechanical faults. The electronic design and system software have never presented any problems. It was in order to ensure that the market place would be happy with the product that Apple had to delay distribution.

"But now the teething troubles are over. Our first volume delivery of the Apple III is scheduled for August, and we are looking forward to launching it in the UK."

One of Mike's favourite subjects is computer learning and he is putting a lot of effort into encouraging schools to take the fullest advantage of Apple's tremendous power as a teaching tool.

"Apple is No. 1 in the USA in education, and deservedly so", he said. "It is undoubtedly the best machine for the job with its unequalled range of languages and software and its real commitment.

"A huge amount of money has gone into researching this market, and to provide the right applications. What other micro can run two types of Basic, Fortran, Cobol, Pascal and Pilot languages, talk to you, listen to you, play music and give superb colour graphics?

"We want to emulate the United States in making Apple No. 1 in education in the UK. We have the resources and more importantly the right machine to do just that".

A subject that gets Mike Brewer hot under the collar is dealer discounting. It's a practice Microsense are taking active steps to discourage, and Mike had no doubts about the harm it could do.

"Dealers who regularly sell Apples below the recommended retail price cannot possibly support the user to the extent the user should expect or that we ourselves require", he said. "Dealers providing a good installation and after sales service will still be dealers in years to come. It's a process of natural selection. Those who don't will disappear quickly.

"And as a point of interest dealers importing Apples direct from the USA can no longer obtain computers with 240 volt power supplies. The only source in the UK is Microsense".

And what of the future? There is a lot of informed talk – and even more intriguing uninformed talk – about the directions Apple Computers will be taking, not only in the UK but throughout the world. Now he was part of Apple's international hierarchy, what could he reveal about the company's future plans? But Mike Brewer would only give a tantalising hint of what lies ahead.

"There are some exciting products under development in Apple's engineering laboratories", he said. "Users and dealers alike can look forward to – and will be delighted with – the features and capabilities of new models and accessories".

And he added: "But for these you'll just have to wait and see!"

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Bringing Cobol into the Apple II orchard

UP to now all of the developments on Cobol have been of little interest to Apple users. Recently however a British firm, barely four years old, has stepped into the limelight and changed all that.

Within the last couple of months it has won a Queen's Award to Industry for technological achievement, and has announced a major deal to supply software directly to Apple Computers.

The company is Micro Focus, and the product which is now available to Apple users is their version of Cobol – Cis Cobol. Initial stocks ordered by Apple are worth more than £1.25 million, making it Micro Focus' largest ever software distribution contract. Company president Paul O'Grady said the order covered software and documentation sufficient for Apple to offer initial stocks to more than 1,000 of its dealers all over the world, including those in the UK.

The product consists of Cis Cobol, the US Government-certified Ansi '74 Cobol compiler, together with Forms-2, a Cobol source code generator. Both products run on Apple II under the CP/M operating system.

Cis Cobol has been specifically designed for fast and convenient development of business programs on a number of microcomputers. It has been certified in the USA for two years at Federal low-intermediate level, which is the same certified implementation level as Dec Vax-11/780 Cobol, IBM Series I Cobol, and Data General AOS Cobol.

At £425, Cis Cobol with Forms-2 is one of the highest priced pieces of software available for Apple II – but is claimed to be the one with the greatest potential. The product was first announced last October, and the new deal is the result of a long search to find the ideal distribution channel.

"We have adapted Cis Cobol to take advantage of Apple II's unique features", said Paul O'Grady. "Cis Cobol programs on the Apple II can access the low resolution colour graphics facilities, as well as Apple II's tone generators and paddle controls. In addition a version of Forms-2 designed for 40 column screens is supplied, as well as the standard 80 column version."

After stringent testing by the Federal Compiler Test Centre in the USA, Cis Cobol last year became the first Cobol to be certified by the General Services Administration (GSA) for use on microcomputers. Cis Cobol now carries second year certification from the GSA following successful completion of the annual revalidation procedure.

In the UK both Cis Cobol and Apple II are on the list of microcomputer products recommended for Government use by the Central Computer and Telecommunications Agency (CCTA).

Any software which has been around for almost 20 years and has been implemented on all mainframes, most minicomputers and now on selected microcomputers has got to be stable, well-proved, useful and easy to use.

Cobol (which stands for Common Business Oriented Language) has been the standard commercial software on larger computers for a long time. This factor alone implies the existence of a large number of Cobol-experienced programmers and a vast amount of useful commercial software.

The fact that it was specifically designed for business use means that Cobol has an abundance of commercially-oriented facilities. It has powerful file handling and data structuring capabilities, and its commands are in English, making programs easy to read and maintain.

A major reason for the widespread acceptance of Cobol is its stability. Because of its use in a critical environment, a standard of operating efficiency has been created, and all commercially acceptable implementations of Cobol must conform to this standard.

As software develops the standards must obviously be revised to contain new features, but certain milestones emerge as the accepted guarantee of the quality of the product. In Cobol's case this is Ansi (American National Standards Institute) '74 Standard.

As well as guaranteeing quality, the desire for manufacturers of systems to ensure their software products match this standard creates a further situation where Cobol programs are more readily transferable from one type of computer to another.

This happy situation gives you two major benefits. If your computer can run a standard Cobol compiler you will have access to many existing programs, including payroll, accounting packages, stock control, order entry, general ledger and many more, all of a high professional standard.

The sheer mass of Cobol applications, and its portability from machine to machine, will continue to ensure users a healthy life for their programs and the ability to use existing software as the hardware develops, instead of having to rewrite the next time they buy a computer

JIM FEATHERSTONE considers Cis Cobol and its flexible file-handling facilities

WHAT exactly is Cis Cobol? Any why should it be so beneficial to micro users?

If I gave a quick breakdown, describing some of the facilities you will have available, together with an overview of how the language works. you may be encouraged to consider it in more depth yourselves.

CIS stands for Compact, Interactive, Standard.

Compact: Cis Cobol runs on 48k systems and up, although a reduced version will run on 32k Apples.

Interactive: Features have been built in which allow you to create interactive applications. Cobol is traditionally a batch-processing language. The system also allows you to create programs interactively.

Standard: Conformation to Ansi 74 standard.

The two principal components of Cis Cobol are the Cis Cobol compiler and the Cis Cobol run-time system.

It is possible to use your Apple for compiling Cobol programs to run on other Ansi 74 Cobol computers, including minicomputers and mainframes. A compile-time switch allows you to run a program through the compiler checking for conformance to Ansi 74 standards. Those programs which will compile can be recompiled on other machines.

With the compile-time switch set for Cis Cobol, the resultant program will only run on those machines which can be

→

```
** CIS COBOL V4.2                STOCK1.DEM                          PAGE: 0001
**
000010 IDENTIFICATION DIVISION.                                              0118
000020 PROGRAM-ID.                        STOCK-FILE-SET-UP.                 0118
000030 AUTHOR.                            MICRO FOCUS LTD.                   0118
000040 ENVIRONMENT DIVISION.                                                 0118
000050 CONFIGURATION SECTION.                                                0118
000060 SOURCE-COMPUTER.                   MDS-800.                           0118
000070 OBJECT-COMPUTER.                   MDS-800.                           0118
000080 SPECIAL-NAMES.                     CONSOLE IS CRT.                    0118
000090 INPUT-OUTPUT SECTION.                                                 0118
000100 FILE-CONTROL.                                                         0118
000110     SELECT STOCK-FILE ASSIGN "STOCK.IT"                               0176
000120            ORGANIZATION INDEXED, ACCESS DYNAMIC                       0176
000130            RECORD KEY STOCK-CODE.                                     0176
000140 DATA DIVISION.                                                        01A5
000150 FILE SECTION.                                                         01A5
000160 FD  STOCK-FILE  RECORD CONTAINS 32 CHARACTERS.                        01A5
000170 01  STOCK-ITEM.                                                      01A5
000180     02  STOCK-CODE                PIC X(4).                          01A5
000190     02  PRODUCT-DESC              PIC X(24).                         01A9
000200     02  UNIT-SIZE                 PIC 9(4).                          01C1
000210 WORKING-STORAGE SECTION.                                              01C7
1▶000220 01  SCREEN-HEADINGS.                                               01C7 00
000230     02  ASK-CODE PIC X(21) VALUE "STOCK CODE     <    >".            01C7 00
000240     02  FILLER   PIC X(59).                                          01DC 15
000250     02  ASK-DESC PIC X(41) VALUE "DESCRIPTION    <                   0217 50
000260-    "         >".                                                     0217 50
000270     02  FILLER   PIC X(39).                                          0240 79
000280     02  ASK-SIZE PIC X(21) VALUE "UNIT SIZE      <0000>".            0267 A0
2▶000290  01  ENTER-IT REDEFINES SCREEN-HEADINGS.                           01C7 00
000300     02  FILLER                    PIC X(16).                         01C7 00
000310     02  CRT-STOCK-CODE            PIC X(4).                          01D7 10
000320     02  FILLER                    PIC X(76).                         01DB 14
000330     02  CRT-PROD-DESC             PIC X(24).                         0227 60
000340     02  FILLER                    PIC X(56).                         023F 78
000350     02  CRT-UNIT-SIZE             PIC 9(4).                          0277 B0
000360     02  FILLER                    PIC X.                             027B B4
000370 PROCEDURE DIVISION.                                                   0000
000380 START-UP.                                                             001A
3▶000390     DISPLAY SPACE.                                                 001B
000400     OPEN I-O STOCK-FILE.                                              001E
4▶000410     DISPLAY SCREEN-HEADINGS.                                       0022
000420 READ-INPUT.                                                          0033
5▶000430     ACCEPT ENTER-IT.                                               0034
000440     IF CRT-STOCK-CODE = SPACE GO TO END-IT.                           004B
6▶000450     IF CRT-UNIT-SIZE > 999 GO TO READ-INPUT                        0055
000460        ELSE IF CRT-UNIT-SIZE < 1 GO TO READ-INPUT.                    0062
000470     MOVE CRT-PROD-DESC TO PRODUCT-DESC                                0076
000480        MOVE CRT-UNIT-SIZE TO UNIT-SIZE                                0076
000490        MOVE CRT-STOCK-CODE TO STOCK-CODE.                             007C
000500     WRITE STOCK-ITEM INVALID KEY GO TO READ-INPUT.                    008A
7▶000510     MOVE SPACES TO ENTER-IT MOVE ZERO TO CRT-UNIT-SIZE             0096
000520        DISPLAY ENTER-IT.                                              009C
000530     GO TO READ-INPUT.                                                 00BA
000540 END-IT.                                                              00BD
000550     CLOSE STOCK-FILE.                                                 00BE
000560     DISPLAY SPACE.                                                    00C2
000570     DISPLAY "END OF PROGRAM" UPON CONSOLE.                            00C5
000580     STOP RUN.                                                         00DC
** CIS COBOL V4.2 COMPILER COPYRIGHT (C) 1979 MICRO FOCUS LTD URN AA/0000/AD
**
**ERRORS=00000 DATA=00636 CODE=00255 DICT=00392:19791          END OF LIST
```

Cis Cobol in action . . . this simple programme shows how powerful and convenient CIS COBOL'S screen handling facilities are

accessed by Cis Cobol.

The run-time system executes both the compiler and Cis Cobol application programs. As the compiler is written in Cobol, the same run-time system can be used in each case.

It is a modular system, handling the interpretation of Cis Cobol intermediate code, file handling, support, VDU interfacing and interactive debugging. It uses a minimum amount of space, as each unit is only loaded when it is required.

Besides Cis Cobol having a comprehensive interactive debug package, there are two powerful utilities which support interactive programming – Forms and Forms-2.

Forms allows you to create record fields using the screen to handle input and output. Forms-2 is an extension of Forms and enables you to generate the programs which handle input data, loading it into files. It also provides a simple method of handling file enquiries.

Cis Cobol produces an intermediate code, similar to Pascal P-code, which is interpreted by the run-time system on execution. The run-time system is written in Assembler. The programs which can be compiled and run can be quite substantial. A 64k byte system can handle more than 8,000 lines of source code, although it may be preferable to split it into discrete modules. These modules can be loaded by the run-time system whenever they are required. If you use the modular approach there is no real limit to the size of program you can handle.

The standard features which the Cis Cobol compiler contain conform to the GSA specification for Federal Low-Intermediate Cobol, which is the level of Cobol normally implemented on minicomputers.

Apart from the nucleus module, which is the central portion of the compiler, Cis Cobol contains eight other Level 1 modules. These are concerned with table handling, sequential, relative and indexed I/O, libraries, debugging, program linking and segmentation.

The program linking or inter program communication module has been further enhanced to Level 2, which means that you will have the facility to overlay programs dynamically using CALL and CANCEL verbs. These are a great help when dealing with machines of limited memory size.

Other facilities available at Level 2 include nested IFs and REDEFINES, non-numeric, unequal length operand comparisons, and verbs such as PERFORM ... UNTIL, and ... ON OVERFLOW.

One of Cobol's most attractive features is its capabilities in handling files. With Cobol you are able to work with sequential, relative and indexed sequential files, using standard OPEN, CLOSE, READ, WRITE, REWRITE and DELETE verbs. Sequential files can be enlarged using the EXTEND facility.

A useful feature of Cis Cobol's indexed sequential file handler is that a file can be loaded in any sequence, and not necessarily in key sequence. This means that you have a little bit more flexibility in designing your applications, Cis Cobol can have 12 files open concurrently.

The simple program opposite shows how powerful and convenient CIS COBOL's screen handling facilities really are.

❶ *The first step is to set up an image of the screen headings in working-storage. This is done with a series of alphanumeric literals, separated by fillers.*

For each line of the screen, the length of literals plus filler adds up to the length of the line as a whole – in this case, 80 characters.

❷ *Next, the input fields are overlayed on the headings using REDEFINES. Again, the length of the fields on the line plus the fillers adds up to 80 characters.*

If fields are to be output on the same screen – for example, an error message or a confirmation message – a second REDEFINES can be used.

❸ *The statement DISPLAY SPACE is used to clear the screen initially.*

❹ *DISPLAY followed by the name of the appropriate 01 item displays the form headings on the screen.*

In any data division screen image, no data transfer takes place for areas designated as filler.

❺ *ACCEPT followed by the name of the input image invites the operator to begin entering data to the form.*

He does this by using the cursor control keys. Pressing the 'Home' key, for example, positions the cursor at the first character of the first field. Subsequently, the operator can skip forwards or backwards between fields and within fields by using the cursor.

❻ *When the form is complete the operator presses 'Return' to return control to the next line in the program. Validation, reformatting, and other processing can be performed by the program at this stage. In the sample program, one of the first tests is a range check on the input item UNIT SIZE. The input data is then reformatted into a record for the stock-file, and an attempt is made to WRITE it to file, using the entered stock code as the key.*

If either the range check or the file update should fail, control is returned to the operator by repeating the statement ACCEPT ENTER-IT. He can then correct the fields which are in error. Because he has cursor control, only the data which is incorrect needs to be re-entered.

❼ *When the form has been fully processed, the cycle can be repeated.*

So far we have dealt mainly with standard Cobol functions. What are the features which Cis introduce into the compiler?

As mentioned briefly before, in its former locations on minicomputers and mainframes Cobol was run as a batch-oriented system. For those of you unfamiliar with larger machines this was, and still is in some cases, where all of the data was fed into 80 column cards or onto tape before it was put into the computer for one mass processing run, and the results were spooled out onto a printer.

The obvious problem with this system was that data was only correct up to the time of the last run, and it could take a day to interrogate a file or produce an invoice.

These batch systems are now being front-ended by more intelligent terminals and sophisticated software to produce transaction processing systems. These TP monitors enable terminal users to communicate interactively with the Cobol programs, although through complex interfaces.

Cis Cobol is an extension of this system which allows the user to create screens quite simply within Cobol itself. It's amusing to think that Cis Cobol had to be developed to bring a major system up to the standard that users of small computers like yourselves have come to take for granted – the ability for full interaction with your system.

Forms is a utility which makes the creation of screens even more straightforward. It gives you the ability to build up, edit and store on disc application formats with protected and unprotected fields. It then creates a source code which you can include in your programs using a COPY statement. It also contains the facility to exercise your screens prior to inclusion.

Forms-2 is an extension of Forms which, as well as offering you all of the features of the simpler product generates programs which can load the input data as a record to an indexed sequential file. Forms-2 can also be used as a tool for interrogating files.

To put all of this in perspective we now have a compiler, based on a well-proven standard for batch processing, and used because of its excellent file handling capabilities. To this has been added routines simplifying the creation of an interactive "transaction processing" system, and as the icing on the cake, we now have Forms and Forms-2, which take even the drudgery out of defining the application screens in Cobol by creating the subroutines for you.

And we can go a step further by introducing an interactive debug package which allows you to monitor and control the execution of a program on line. This standard facility allows you to insert breakpoints, stop by single instructions, examine and modify memory, trace to specific points, and then to continue execution. Previously you could only get these sorts of facilities with Assembler.

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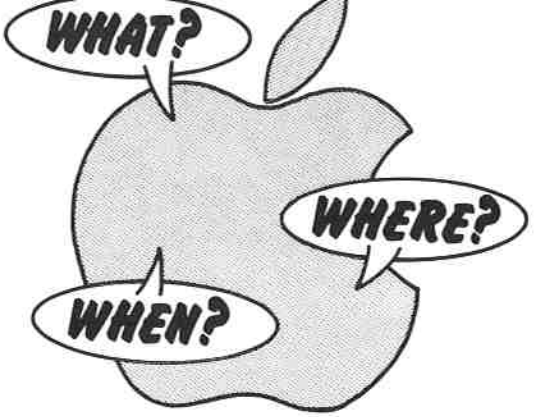

High speed apple cart

INTELLIGENCE UK – the firm who produced the Micromodeller – are raising the dust in other fields as well. In conjunction with ACT Microsoft, who are currently marketing their hot software package, they are sponsoring a racing car in the production and saloon car championships.

The car they have chosen is a Volkswagen Scirocco GLI with a 1600cc engine producing 135bhp. It's a tasty little thing, weighing under 15cwt, all black with a large Apple logo on the side.

The car is part of a team of three run by Tony Lanfranchi. Drivers in races being held this year will be Tony Lanfranchi, Stirling Moss and Ashley Ward of Intelligence UK. Some of the races you should go to and see this car in action are:

July 5, Silverstone; July 12, Mallory Park; July 26, Snetterton; August 3, Brands Hatch; August 16, Brands Hatch; August 30, Mallory Park; September 6, Silverstone; September 12, Oulton Park; September 27, Oulton Park; October 10, Oulton Park; October 18, Brands Hatch; October 25, Thruxton.

A Windfall contributor's tie to the best photo received of the car in action.

Big bite

NIBBLE, the American Apple magazine, is being forced to increase its subscription rate to UK readers by a massive 68 per cent.

An announcement in the latest issue indignantly states: "The rates of international postage of Nibble have suffered an explosive increase! These huge rate increases, together with Nibble's increased size and weight, are forcing a major increase in our cost and price to international subscribers."

For a reader in the UK the subscription for eight issues is now $17.50 plus $32 postage.

That works out at £3.17 a copy!

Ultimate?

THERE is a lot of talk at the moment about the "ultimate" program – one that writes your program for you after you have fed it with your requirements in good old fashioned English.

I remember seeing a program designed to do this for commercial systems at one of the larger computer company's premises about six years ago. Since then many people have gone into the possibilities and a number of programs have turned up. Some useful, some not. And now we have companies advertising the fact that their program really is "the last one," and we mean no offence to one of our current advertisers who's program name was designed to invite such interest and comment.

Just how valid is the claim we have yet to see. We would like to see a lot of discussion about this in the pages of Windfall in the next few months, and we will be throwing in some provocative articles by Boris Allen, that scourge of Practical Computing, which also may help to throw some light on the matter. Anyone else who wants to contribute please do so.

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User group round-up

BASUG

USERS of Apple computers in Great Britain have been slow to get successful user groups off the ground. Now a number are sprouting up all over the country. The largest is BASUG – the British Apple Systems User Group. It was started last year as a voluntary group totally independent of manufacturer, dealer or indeed any commercial enterprise.

Because there was such an obvious need for an active user group for the Apple membership has grown very rapidly, from 20 last December to more than 300. There are members in all parts of Britain and a growing number in other parts of the world, from mainland Europe to as far afield as Africa and Hong Kong.

The ideal situation is for users to talk with others at a local meeting, and mull over any mutual problems. But a national group is also needed to help those who can't attend regular meetings, or who are isolated and have no one to turn to to answer the thousands of problems large and small that arise, either with existing software or when writing their own.

BASUG is centred near London at present for no better reason than that is where the inaugural group happened to live. The aim is to liaise with other existing groups and to put members and inquirers in touch with each other. Where a number of people in a particular locality do not have meetings to go to, then BASUG will do its best to help them get a group started.

A large group can offer a number of benefits. There is more muscle to use if a manufacturer is not providing the service the users expect. Suppliers are often willing to offer deals to larger groups but not to a proliferation of little groups, for which they just couldn't justify the effort.

Any group will have members with a diverse range of interests, and the larger the group the more likely it is to find someone with a similar problem or a common solution. BASUG is setting up special interest groups to cope with this.

A similar argument applies to courses, since it is unlikely that a small group could have sufficient to pay for such an undertaking. Co-operation can only benefit everyone.

What does BASUG have to offer? Initially a clearing house for information on all aspects of the Apple and ITT 2020 (and the associated problems), from the beginner level to the most advanced. There is a bi-monthly journal, Hardcore, which has the personal touch of the user as well as having a very high standard of content.

There are two software libraries. One, contributed by the members, contains listings from magazines as well as those written by members themselves. This works on an exchange basis. The other exists as the result of contacts with other user groups throughout the world. There are 20 to date with more arriving each month. Where else can you get a disc full of software for £3 including the disc? Then there are meetings with demonstrations and talks.

The membership fee is £10 for which you get an introductory disc (or set of tapes) and copies of the magazine, as well as the other benefits described here.

BASUG can be contacted via PO Box 174, Watford WD2 6NF. – *John Sharp.*

APPLE MUSIC SYNTHESIS GROUP

THE APPLE is emerging as the leading microcomputer for the application of digital synthesis or control techniques to music-making. The Apple Music Synthesis Group will initially concentrate on the Mountain Hardware Music System and the Alf System, but as other systems become available over here so our horizons will broaden.

To start the ball rolling I need as much feedback as possible on what users are doing with their systems. This could include waveform create programs and Comp/Play files in the case of the Music System, subroutines and note files for the Alf, audio cassettes of end products, and any other sparks of the imagination that you might have come up with.

I'll be continuously liaising with software development groups and manufacturers in the States, and the intention is to make this, as well as any home-grown developments, easily available to users.

Finally, just to give everyone a goal in mind, I envisage releasing a compilation LP of Apple-synthesised music. Indeed, there's no reason why this shouldn't become a regular feature of the AMSG.

Please contact me at 22, Lennox Gardens, London SW1, and enclose a SAE if you would like a reply. For the time being, or at least until the AMSG is a respectable size, there won't be a membership fee and the main form of feedback to members will be regular articles in Windfall.

In the meantime, look out for an article comparing all the available Apple music synthesis systems. – *Dr. David Ellis.*

● ***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.***

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 (British 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.

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.

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.

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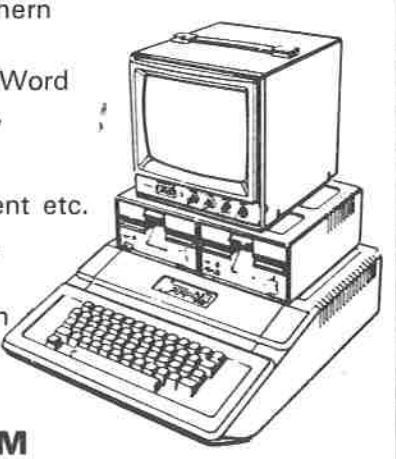

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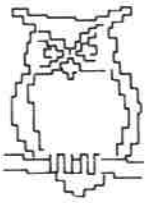

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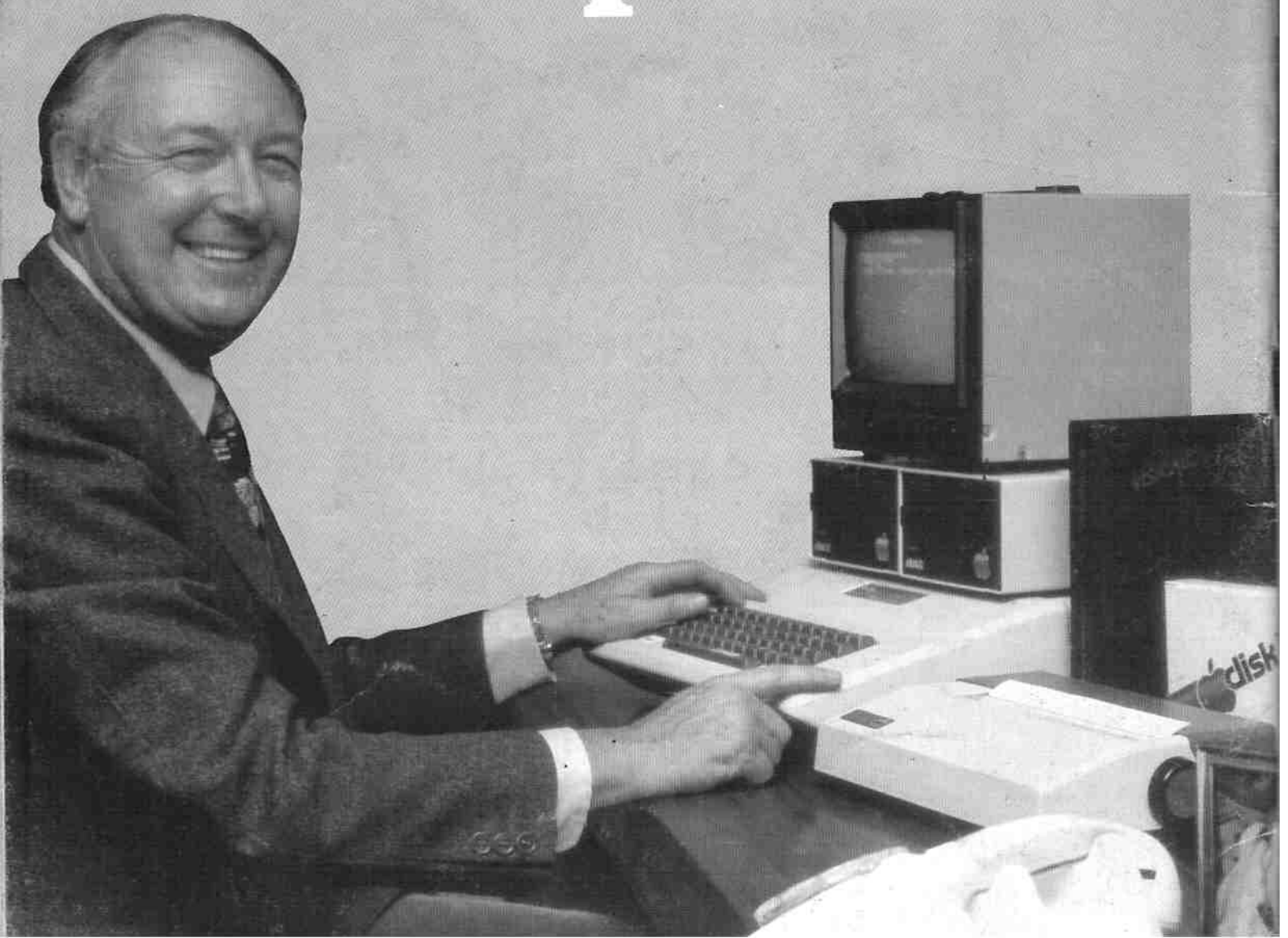
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