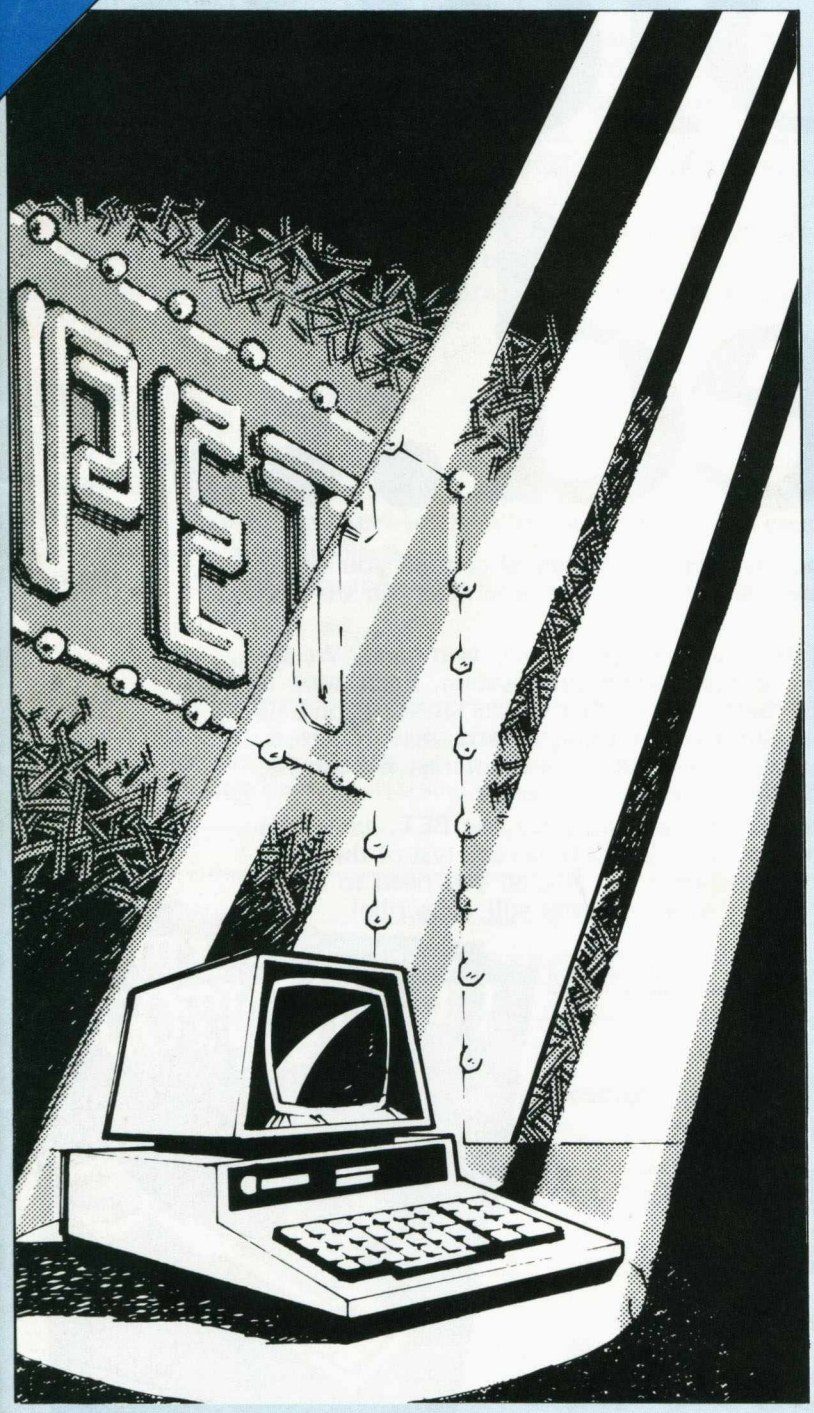
The Second International **PET SHOW** Butterfield Is Here!!!!!!

COMMODORE CLUB NEWS

June 1981



Volume 3 Issue 5

SILICON OFFICE

From the people who brought you OZZ

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More on security

IEEE — 488

A journey on the bus

DISK DRIVES

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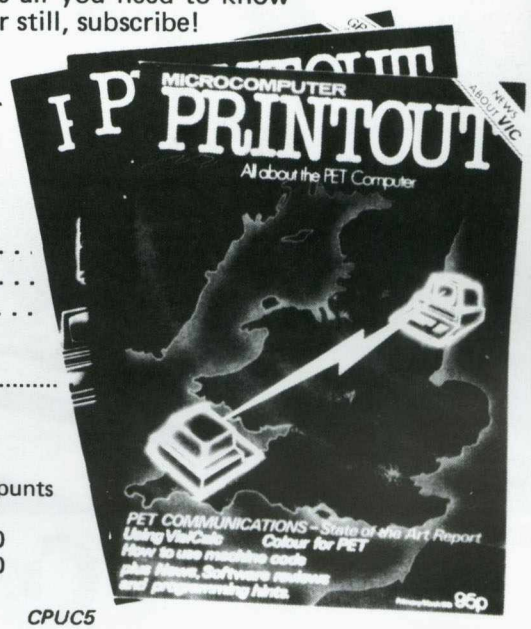
But if you own, or are thinking about a PET, CBM or VIC computer, help is at hand. We are *PRINTOUT,* the independent magazine specialising in the Commodore system. Each issue is packed with news, articles about programming in PET Basic, test reports on the latest peripherals and really thorough software reviews. Plus regular columns by leading experts, readers letters, solutions to programming problems, even a gossip column! Whether your interest is Business, Education, or just plain fun, *PRINTOUT* can save you time, trouble and money.

The current issue has a comprehensive guide to business software for the PET, advice on buying a computer, a List program for non-PET printers, our 12,000 mile road test of the 8032 Super PET, help with cassette files, a guided tour of the new VIC, plus all you need to know about multi-PET systems. And much more. Send for a copy now, or better still, subscribe!



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Free Entry To PET SHOW

Please Note:- Only by filling in and presenting this form will *User Club Members* be entitled to free entry for two people to the Second International Pet Show.

Name.....

Address.....

.....

.....

Pet User YES / NO

My System is used for.....

COMMODORE USER'S CLUB MEMBER — OFFICIAL REGISTRATION FORM

Editorial

Introduction

Welcome to Volume 3 issue 5 of the magazine. You'll have noticed if you saw the last newsletter a significant change in appearance, hopefully for the better. I think this has been a step in the right direction, and that we've continued the trend with this issue. If you disagree you are free, as ever, to contact me and air your views. The Pet Show will be a fine opportunity to do this, and I look forward to seeing many of you there. I'll be on a stand in the front foyer, so you've no excuses! (Neither have I.....).

Continuity

With the introduction of a monthly newsletter, one of the things we'll be doing is to introduce an amount of continuity amongst the articles. So, each month you will know that certain features will be appearing. For instance, David Pocock's series on the use of Disk Drives is a regular contribution, and even if you've thought so far that you've known it all, I can guarantee you that David has a number of tricks up his sleeve that you certainly won't have known. We'll be regularly reviewing a number of products, and each month will also see a review of a Commodore Approved Product. This is because we feel that the Approved Product range is a very important part of the Commodore world, and ought to be given as wide a coverage as possible. After all, the Approved Products catalogue contains some of the finest hardware and software available for the Pet.

The next issue will be again featuring the special educational section, as it will be doing every other month, but that doesn't mean that you'll be seeing issues totally devoid of information on the Pet in education. This month there are a number of articles of this nature, and we hope that not only schools and colleges will find these interesting, but the rest of you will as well. There are a vast number of Pets in the educational field - they represent something like 20% to 25% of the Pet population in the U.K. - so we can't afford to ignore you! The list of educational workshops in the last issue has already proved to be of use, and next time we'll be publishing the ones that we missed first time round. This list will be continually updated as the newsletters go by.

This time the special middle section is devoted to the Pet Show, and is really 'everything you've always wanted to know about the Show but were afraid to ask'. Do you approve of this pull-out section policy ? Let me know.

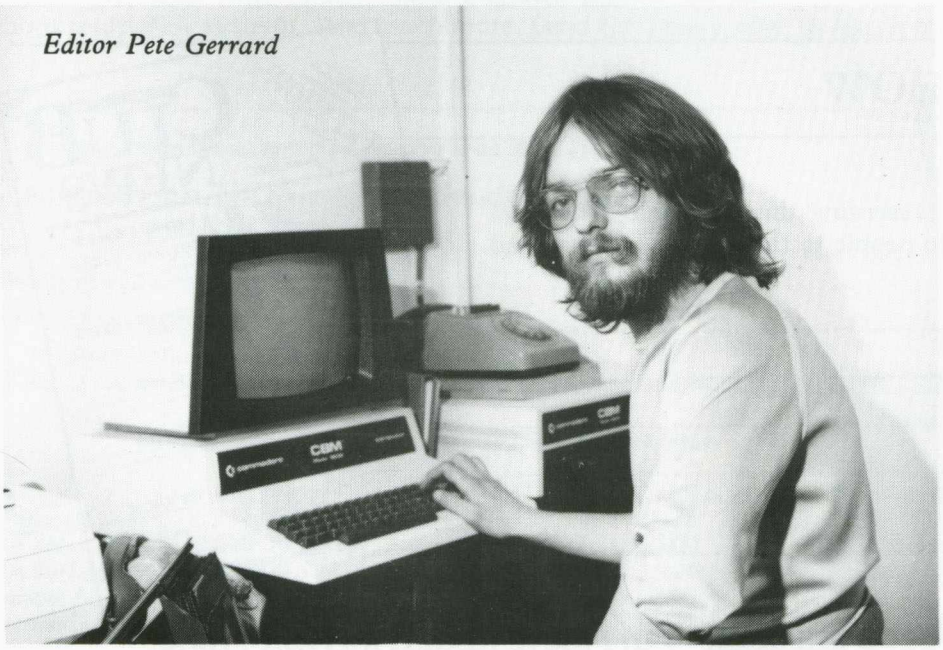
Second-hand Pet Equipment

I've had a number of requests from club members about the availability of second hand Pet equipment. If you know of any source of this, if you've got any Pet equipment that you want to sell (e.g. you've just upgraded to a disc based system from cassettes, and now have a cassette unit to sell, or you've upgraded from Basic 2 to Basic 4 and find yourself with a spare set of Basic 2 roms), or there is an item of hardware that you're after, write to me, with all the details (i.e. item, price and address), at the address at the end of the editorial.

We have available, at a price of £1.00 each, around 700 empty high quality plastic diskette cases. You can buy any number from 1 to 700, but as you can appreciate this is strictly on a first-come-first-served basis. If you're interested in obtaining any of these, write with your cheque made out to C.B.M. (U.K.) Ltd. to Margaret Gulliford at the address below.

Continuing Debate

Finally the continuing debate on what goes into the newsletter. There are a number of requests from people who own 80 column Pets who want to do more than just run their applications software on them. The newsletter has helped in the past, by publishing the various Basic 1, 2 and 4 memory maps, but not everybody is competent enough to convert, alter, play with, whatever programs they've got. I've tried to make amends for this lack of information a little by including in this newsletter an article describing some useful peeks, pokes and chr$ values, but this is really only a begining. So, a plea on behalf of myself, and everybody else who's got an 8032 and wants to know more about it. If you're an 8032 'whizz-kid', and would like to share your learnings with other Pet users, send any contributions to the Editor, at the address below-:



Editor Pete Gerrard

Commodore Business Machines
818 Leigh Road
Trading Estate
Slough
Berks.

If there's ever anything you want to discuss, I'm available on Slough 74111

New Products

Audiogenic

Audiogenic, who supply and make all of Commodore's cassette based software, have just announced a new catalogue of products for the Pet. These are a range of analog and digital interfaces from the company "Connecticut MicroComputer Inc.", and Audiogenic are now the U.K. distributors.

The catalogue should really be called a manual, as it contains much valuable information as well as the product descriptions. In the catalogue you will find such things as a 16 channel analog to digital converter, which converts each of the 16 inputs in turn to an 8 bit digital signal. There is an extremely interesting product known as SADI, which is an interface that allows communication between three devices - an IEEE 488 controller (such as the Pet), a serial RS 232 input/output device, and a parallel output device. This means that, amongst other things, you can have Pets talking to each other. As well as this the catalogue features serial and parallel printer adaptors, and overall is a very useful addition to the Pet world. To obtain a copy of the catalogue, telephone Reading (STD code 0734) 595647. It costs £2.50, offset against your first order, and is really well worth it because it does much more than simply telling you what is available. Described by genial Audiogenic director Martin Maynard as "Cheap at twice the price", I'm inclined to agree with him.

As a footnote, Audiogenic also supply a vast range of books and hardware add-ons for the Pet, and are a good, quick source for such material. A copy of their latest complete catalogue is well worth a browse through, and can be obtained from the same number as above.

Audiogenic Director, Martin Maynard (seated bottom right), with cohorts.

Pets in Space

People have asked me in the past if I knew of any astrological programs for the Pet, or any that calculated planetary orbits for instance. Well, up until now I've been at a loss for an answer, but not any longer! An enterprising company in Michigan, called Matrix, have boldly gone where no company has boldly gone before, and really put the Pet into orbit by producing a lot of astrological programs, amongst other things.

Some of the programs they've got cover such things as the positions (to seconds of arc accuracy) of the Sun, Moon and outer planets, transits and secondary progressions, 10 house systems with planets, and so on. They also publish a comprehensive magazine on all aspects of micros and programming in this particular field. For further information, including a catalogue, write to:-

Matrix Magazine
1014 North Main Street,
Ann Arbor,
Michigan 48104
Ohio
U.S.A.

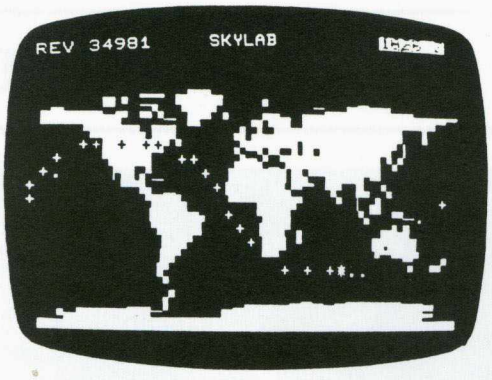
Now, I believe that somewhere in England this company has a U.K. outlet. Can anyone tell me who it is ?

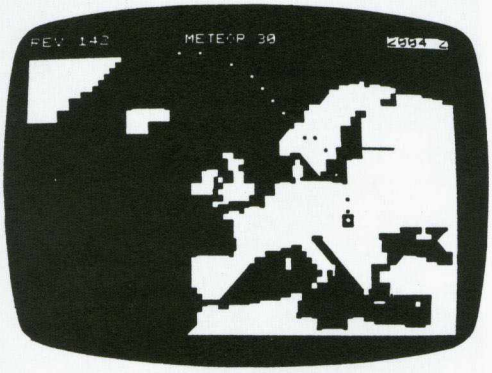
Real Time Orbit

One program that has been generated in the U.K. is one called Real Time Orbit, by G.E. Perry. This program, in Basic, and written for 16k+ 40 column Pets, shows the ground-track and current location of a satellite in real-time.

The internal clock of the Pet is set to Greenwich Mean Time before inputting satellite identity, rev. number, nodal period (in minutes), inclination (in degrees), mean motion (in revs/day from NASA two-line orbital elements), and epoch and longitude of an ascending node for any orbit on the day concerned (in the format of the NASA prediction bulletin).

After computing the current location the program generates a map and plots the ground-track of the current orbit with a cross if the satellite has already passed that point and a dot for future positions (reverse field is used over land masses). Locations coinciding with coastlines are not plotted thereby preserving outline. The current location is indicated by a flashing asterisk. As the satellite moves forward its previous location is replaced by a cross or the appropriate coastline graphic character.





For most of the time a world map is displayed with a ten degree resolution in latitude and longitude. The example above shows the re-entry of Skylab over the south-western corner of Australia on rev 35981 on the 11th of July 1979.

When the satellite reaches Europe, the world map is replaced by a two degree resolution map as displayed above. On leaving this area the world map is regenerated. At the completion of one orbit the world map is regenerated together with the new ground-track. The program works continuously through midnight. There is another version of the program in which the past ground-track is not indicated at all.

Further details are available from:-

G.E. Perry
101 Northampton Road,
Kettering,
Northants NN15 7JY

Educational Plea

A request and a plea for help. The School of Management Studies and Languages, in Buckinghamshire, is looking for tutorial programs in foreign languages (French, Spanish etc.). Hopefully not just straightforward phrase for phrase translation, but if that's what you do have, all well and good. If you use such programs, or know of anywhere that does, could you get in touch with the School at the address below:-

Dr. Tony Bastick,
School of Management Studies and Languages,
Bucks College of Higher Education,
Newland Park,
Gorland Lane,
Chalfont St. Giles,
Bucks.
Or telephone Tony on Chalfont St. Giles 4441. Thanks.

Intex Datalog Compiler

Intex Datalog have just announced the release of their PC-Basic Compiler for Commodore's range of micros. This is written entirely in machine code, and is fully compatible with Commodore Micorsoft interpreted Basic. It supports all Basic 2.0. commands, and all Commodore peripherals. A Basic 4.0 version will be available by the end of September. The compiler takes a program which has been normally saved on disk, and compiles it back on to disk as a directly loadable program file. It can be used with any of the various disk drives, and is used in conjunction with a run-time package in Eprom. The speed of compilation obviously depends on the complexity of the program being compiled, but it is of the order of 50 lines a minute. Increase in speed can be very good - some programs running more than ten times faster. Sale price is £300 plus V.A.T.

For further information, contact Intex Datalog on Eaglescliffe (STD 0642) 781193.

Mannesman Tally

Mannesman Tally, the company who produced Commodore's 8024 printer, are now offering a substantial number of 80 column matrix printers, all of which are now classified as ex-demonstration printers, and these are available at substantially reduced prices. These units have been used and maintained by the company itself, and are offered with a return to factory warranty of 30 days. The prices range from as little as £300 up to £500 for almost new printers. Cash with your order qualifies you for an additional 3% discount, and if you collect youself delivery charges are also deducted. All enquiries about this should be addressed to :-

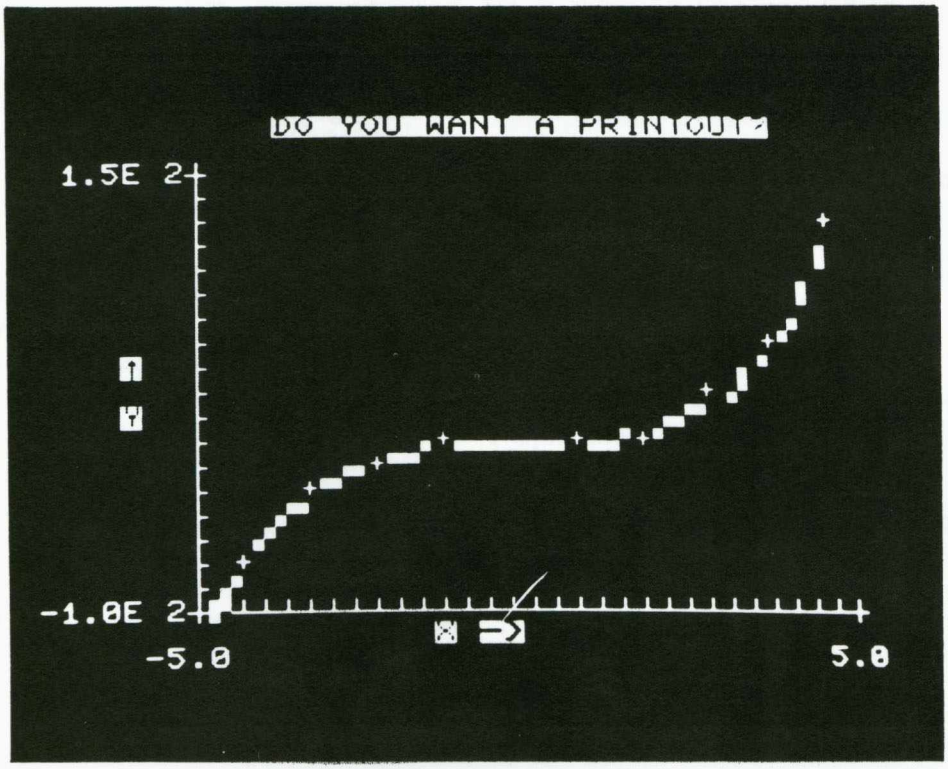
Bernard Lavelle,
Mannesman Tally Ltd.,
(Ex-demo stock)
7 Cremyll Road,
Reading RG1 8NQ

Alternatively you can 'phone Bernard on Reading (STD 0734) 580141 extention 33, quoting "ex-demo stock". This is what I did, and found Bernard a helpful and obliging person. In these inflationary times it might be worth a try.

Tecpacs

I recently attended a press conference, where BHRA Fluid Engineering (developed from the British Hydromechanical Research Association) announced the release of a large number of programs for the Pet. These go under the generic name of Tecpacs, and each program covers a specific topic in a technical area such as Civil Engineering Hydraulics. There are at present 16 programs in the series, all of them being concerned with engineering applications such as Mechanical Engineering, Structural Analysis, and Statistical Data Analysis. All of the

Tecpac System Set-up



Typical screen print

programs are now part of the Commodore Approved range. Time and space forbid too much coverage this time around, but there'll be more in the next issue. Ar the present, for further details contact:-

Technical Software Centre,
BHRA Fluid Engineering,
Cranfield,
Bedford MK43 OAJ
Tel. 0234 750102

A Microcomputer based Record System in an Accident Unit

The following article really proves that Pets get everywhere. It comes from the Accident Unit of the Caernarfonshire and Anglesey General Hospital, in Bangor, Gwynedd, and formed the abstract of a proposed talk by the presenting author Mr. R.H. Gray. We haven't got the full details of the talk, but this does show you what an enterprising lot they are in Bangor.

A microcomputer system for casualty patient records has been developed in the Gwynedd Accident Unit. The hardware consists of standard, readily available business equipment at modest cost. The computer system which has evolved is organised as follows. On admission, direct input of patient information and known details of circumstances concerning the accident and injury is performed by clerical staff. This information is stored on floppy disk and a casualty card printed.

Encoding of medical information is performed by the attending Casulty Officer and at this stage more detailed data on specific "special interest" projects (e.g. Road Traffic Accidents) is put onto the casualty card. This new information is fed into the computer system by the clerical staff and stored. An upgraded hardcopy file is printed on discharge/disposal of the patient. Each patient receives a unique casualty number and retrieval of an individual's file is based on either number or name. The accumulated file is used for routine tasks such as the printing of a daily log book and enquiry into referral of a particular patient.

Also, clinics (Fracture, Hand etc.) can have a print out in individual card form of referred casulty patients. This information can be manipulated to include only the pertinent details relevant to each specialist clinic. This allows the Accident Unit to maintain a master manual hardcopy file of Casualty patient records, simultaneously allowing the main Hospital Records to have a programmable subset of information for each particular clinic.

The use of Basic programming language and involvement of medical personnel directly in program development, combined with hardware that is dedicated solely to use in the Accident Unit, allows marked flexibility. Rapid progress has been achieved with minimal resources. The use of a decentralised system such as this, modified for individual Accident Units, would allow ready compilation of National Statistics.

So, the initiative has been taken -who will follow ?

Silicon Office

Silicon Office is the latest arrival from the Bristol Software Factory, already well known for their earlier programs such as Trader, Item, Monitor, and of course the enormously succesful OZZ, a package which sold over 2,500 copies in the first six months of release. OZZ was the first microcomputer program to begin to exploit the true potential of a small single user system by enabling the user to keep track of information in his own individual way. Silicon Office takes the next step, by covering many office procedures but still keeping the individuality of OZZ. The program will only work on the newly announced 8096 Commodore microcomputer, and will be released concurrently with it at the Pet Show on June 18th.

Silicon Office is constructed from five main building blocks, namely :-

1) An advanced file system for maintaining files of information.

2) A word processor for typing letters, reports etc.

3) A point-to-point communication facility for information transfer.

4) A fourteen digit calculator for mathematical manipulation.

5) Programmibility, to control the system as a whole.

Now you can see why it requires 96k of memory! Not having access to an 8096 I can't give you a detailed review of the product yet - suffice it to say that what I've seen so far is staggering, and in summary Silicon Office is quite simply a revolution in programming. Details are available from the Bristol Software Factory, and their address is :-

Bristol Software Factory
Strahearn House,
88 Queen's Road,
Clifton,
Bristol BS8 1SA
Tel.0272 314278

Pet Paradox

(By Nikki Saunders, and reproduced from the Australian Commodore magazine)

I dedicate this article to the woman whose man has a PET. Not the furry type, or even the lascivious sort, but a cold, calculating machine. My sympathy is extended to every lady whose mate flits away the hours programming his new toy. It really makes you see green!

Life is bad enough when you are confronted with the latest issue of Penthouse, only to be compared with the luscious Pet of the month. However, your feminine instincts know the tactics necessary to divert his attention from this source. Yet, this totally logical device is a real Fast Sort.

Your conversation becomes limited to his ravings in Syntax Errors. Occasionally your intercourse is interjected by Dumps and Traces. Now and again, he wafts into graphic detail on Machine Language - does this mean it talks to him ? But when he wakes up in the middle of the night, proclaiming he must Poke and Peek, you distinctly feel he is being obscene.

Disrupted

My life was disrupted thus about 12 months ago. Before then I was blissfully ignorant of mainframes, minis and micros. I vaguely thought of them to be some new dress fashion. Now my Lord and Master has urged me to abandon all former ways. I have been instructed to discover the menacing Word Processor; fathom the meaning of Interfacing and Bus -which seems a rather ridiculous notion to me. No longer can I visualise Rams gaily prancing around fields on a bright Spring day. I hold chips I cannot devour (with or without vinegar) and foresee that ships are not the only entrants to ports. All these new innovations have been mind-boggling for a simple soul like myself, but the worst is yet to come.

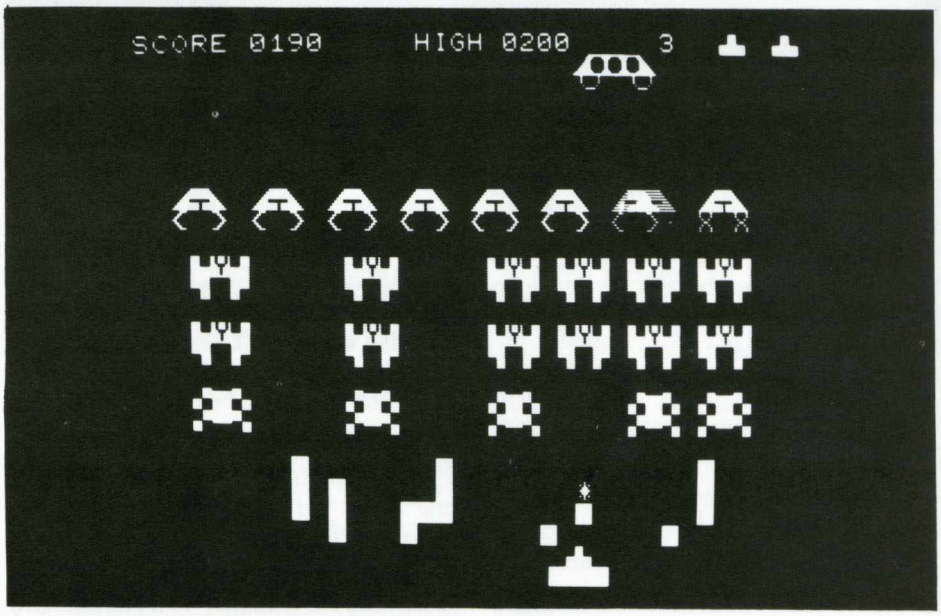
I have a fervent paranoic desire to personally hang, draw and quarter the man (and it could only be a man), who developed the Space Invaders program as Pet food. I spend hours watching the love of my life torn in agony as he tries to combat his wits against those infernal descending little blobs. His face alters rapidly while his body becomes rivetted to the machine. It reminds me of a Jekyll and Hyde film I once saw. Every muscle tenses as he attempts to bash hell out of the 'A' button whilst co-ordinating his movements on the '4' and '6' keys. He becomes impervious to all around him (especially me).

Bad Enough

You think this is bad enough - not so. Somewhere along the line, some bright enterprising little spark has manufactured a speaker unit for our dear little Pet. Now not only can you see the Invaders advancing but their speedy promenade is accompanied by weird sounds reminiscent of a Benjamin Britten opera. Like chalk screeching on a blackboard the excruciating 'Bleep-Bleeps' echo through your brain. This repetitious drumming is occasionally interspersed with a high pitched police siren type of noise announcing the arrival of a trolley bus. The bonus points for this hit are too much for your man to resist. He tracks it along, only to misfire and be bombed by an un-looked for Invader. Too much! Too much!

I am an optimistic person and believe that there is light at the end of every tunnel. There is an old saying - "if you can't beat them, join them". So the answer to this conundrum - we have two Pets, his and hers.

Close encounters of the fourth kind



Business User's Column

Barry Miles

This column will examine further the question of program and data security. You will recall that last time we began to examine the possible hazzards and their prevention and minimisation. Perhaps now would be a good time to emphasise that I do not have a negative attitude towards microcomputing, and indeed think it to have an extremely important part to play in increasing business efficiency. However, such enthusiasm should not be allowed to blind one to the danger inherent in handing over important activities to an alien machine, which may not be fully understood by the people operating it. It is a tool, to be used for easing your work. But, like all good tools, it needs care in its use. A sharp chisel, in the hands of a sensible user is a safe tool, because the pressure needed to operate it is far less than that needed to operate a blunt one. However, such a chisel, used by someone who does not know how to protect himself from harm, is dangerous indeed.

Major Dangers

The major dangers of employee dishonesty seem to fall naturally into two categories: Fraud, and data theft. Fraud takes two main forms in data processing: one consists of changing the program so that it operates in a way which distorts the data produced, so as to fraudulently change accounting information. For example, one could arrange for the payroll program to give more pay to a selected group of employees, and collect a share of the spoils from each of them. This might be done by changing the gross pay and distorting the control totals. How might we deal with this danger? Well, the simplest way is to arrange for the original program or security copy, kept out of the hands of the usual operator, to be run at irregular intervals by another operator, and the results checked against those produced in the ordinary way. You may choose to let it be known that such checks will be part of the normal work processes, "As the auditors insist", so that the deterrant effect may be achieved.

This type of fraud requires that the operator shall have sufficient knowledge of computer programming to be able to alter the program sucessfully. If the program is in machine code, this will be unlikely, and even simple alterations to someone else's program are not too easy to make, because there is always the possibility of the changes' having subtle unforseen effects on other parts of the program.

"Need to Know" Principle

Another way of protecting your programs from this type of tampering, is to ensure that they will run immediately on loading. This ensures that they cannot be listed in order to be changed. Not many commerical programs have this facility, but there are a few programming experts who could add it for you. Alternatively, it is now possible to buy a program which will change your programs in this fashion. Whilst you are at it, you may wish to commission work to be done to make access to your data-file impossible without use of a password, and to restrict knowledge of the password to those few people who must have the information in order to carry out their work: back to the "Need to know" principle!

Data Security

Data security is another matter. The extreme portability of your data disks is a matter for careful thought. The dangers include theft of information about your customers to enable a competitor to steal your business, theft of customer information for purposes of blackmail of customer or, if you are foolish enough to understate your income to the Inland Revenue, of yourself!

It is not only the theft of your own disks which must be prevented, but the information upon them must be safeguarded. This means that unauthorised copying of disks must be prevented. Duplicating a disk takes very few minutes, and the disks themselves can easily be carried into and out of your premises in any convenient briefcase or bag. So what can we do?

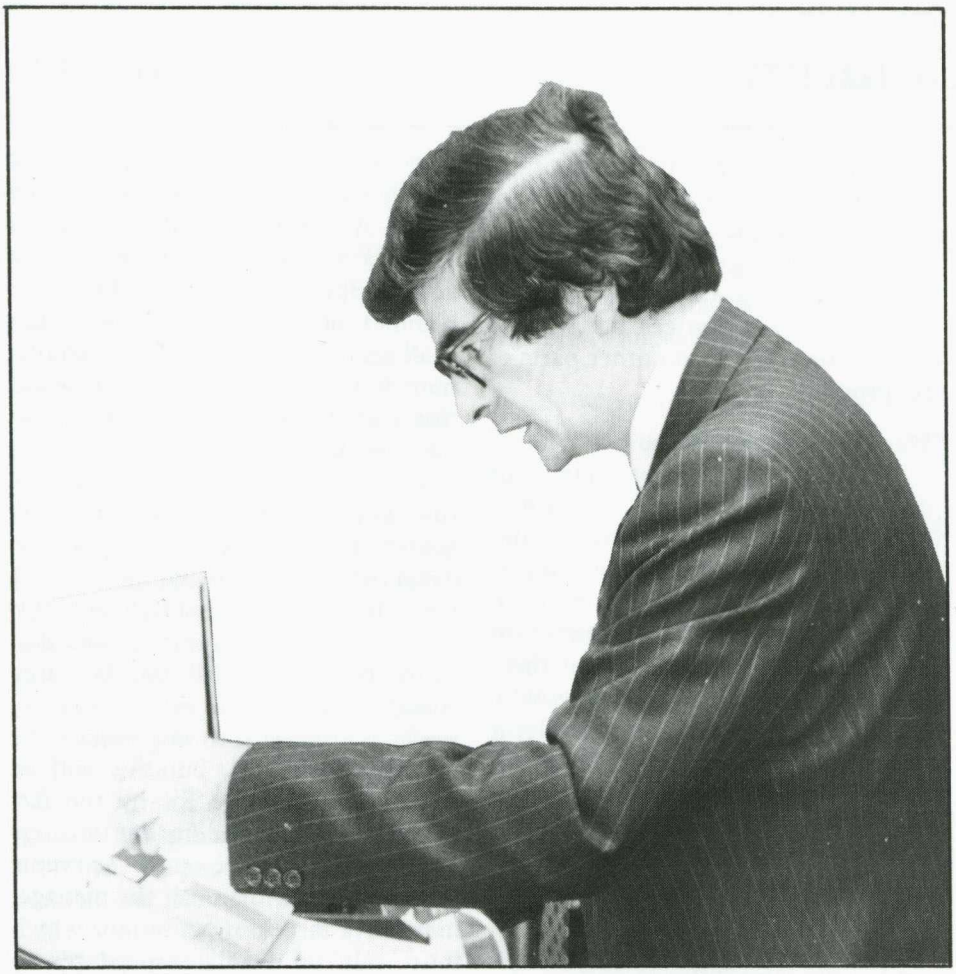
The main thing seems to be to avoid disks coming into the premises which are not the property of your business, **AND IDENTIFIABLE AS SUCH.** A cheap way of doing this is to have special disk labels printed, numbered, and in distinctive colours, and to ensure that all disk supplies are re-labeled as soon as they arrive. A record of receipts and issues of disks should be kept, with dates and recipients recorded, by some member of staff who has no other dealings with the computer installation. It should be clearly understood that alien disks will not be tolerated in the machine, and you should keep a wary eye open for infringment of this rule. If your staff become so keen on games that serious work is endangered, this will go some way towards reducing the difficulty.

It will be readily appreciated that many businesses will not be large enough to enable the various security methods suggested in this series to be carried out in full, but this will be largely compensated for by the fact that the owner of the smaller business can keep a closer eye on all the events in his business, than can the management of a larger organisation, which must rely on formal procedures to provide the necessary degree of protection.

You should not be reluctant to discuss the question of program and data security with your dealer, when considering buying a program; taking an interest in whether any precautions have been built into the program, and whether they can be custom-designed to your requirements. A useful enhancement would be to have the program stop operation at intervals, insisting that backup disks are recorded before continuing operation.

Consultation

A useful way of getting things organised in the most satisfactory manner is to arrange a consultation between your auditor and a skillful programmer, discussing all aspects of program and data security, and resulting in the programs being adapted in the most effective way, before being put into use. This will ensure that time is not wasted in setting up procedures which the auditor thinks are insecure, or in considering in detail suggestions from the auditor which the programmer can tell you immediately are not suitable for implementation, because of system limitations, of which neither you, nor the auditor are aware.



Barry Miles meaning business

Such a consultation will be even more important if you are going to the trouble and expense of having programs specially written for you.

Program Selection

Let us now examine the availability of programs which are so widely useful that any business would be justified in buying them, without bothering to go into them in the fashion which I have suggested in previous articles in CPUCN.

What we are looking for is routine operations of such universal applicability that it is almost inconceivable that they would not be of use in almost every business which is likely to acquire a Commodore system.

Firstly we should consider what we are aiming to do. It is usually the case that the machine's purchase will have been for a particular purpose, and the purchase will have been justified on the basis of time saved or increases in efficiency or speed. We are now interested in obtaining good value for money by using spare machine-time in a cost-effective fashion. This implies being able to use programs intermittantly, fitting the operations around the existing machine-load schedule.

Word Processing

An obvious choice is word processing. In case any reader is not fully aware of what this means, I will just say that it is a form of highly intelligent typewriting, enabling an amazing range of editing, alteration, storage, and printing facilities to be used.

We are fortunate that very fine machine-code word processing programs exist for the Commodore machines, and they offer facilities matching those on dedicated word processing machines costing many times more than the equipment we are using.

The selection between the two programs which lead the field is a matter of personal choice, some prefer *Wordpro*, and some *Wordcraft*. If you are using the 40 column machine, then using Wordcraft is the only way to see on the screen how your formatted output will look. If you are using an 8032 then you have the choice between Wordpro 4 and Wordcraft 80. Either of these programs will suit you very well, and many an installation is used just for word processing and is fully justified by so doing. With a daisy-wheel printer you can impress your clients or customers with the skill of your typists, who appear to reject anything less than perfect output. Some people feel insulted by receiving a letter printed by computer, so a daisy-wheel printer will save their feelings, and maintain good customer relations.

I suggest you read the reviews of these programs in earlier editions of the Commodore Newsletter, and make up your mind from them. If your requirements are not so sophisticated, you may find Papermate an attractive, and cheaper alternative.

Visicalc

Another program, this time of astonishing versatility is Viscalc. Some people have the mistaken idea that this is a financial modelling package, and as such, only suitable for use by accountants. This is not true. It is really a way of carrying out tabulations of any figures, and anyone who is called upon to set figures out in rows and columns for any purpose, and who needs to be able to carry out calculations for the purpose, or change any figures, should buy this program without delay. In my opinion, used properly, it is capable of being the most exciting innovation for microcomputers since the word-processing programs were developed. Unfortunately it suffers from some defects which limit its usefulness, indeed, I have been forced to write some programs myself to eliminate two of its most serious defects: firstly to enable printing to be carried out on a non-Commodore printer, and secondly, to enable the formulae which you are commanding Visicalc to implement, to be printed. Without this facility you are in the position of a programmer who is not able to check the logical flow of the program which he has written, because he cannot list it!

However, even with these reservations, I cannot recommend the program too strongly. The latest versions print on any printer, having been modified by Harry Broomhall for the purpose.

If you are interested in carrying out some Basic programming yourself, or expect one of your staff to do some programming, then Basic Aid is an amazingly cheap program from Commodore, which will be enormously helpful. The more ambitious will go for some of the attractive add-ons.

Reviews

Cathedral saved from collapse by Constructional Software

Well that's not quite the case but the editor suggested this might be an eye-catching little article about some unusual application.

Constructional Software programs are generally for use, as the name implies, in the construction industry. They are not usually spectacular in effect — not for us the claims of revolution in small businesses. At least, it depends what you mean by revolution. Ours is a quieter revolution.

Take an example: frame analysis is a job regularly done by structural engineers. Before the computer it was done the long way using a slide rule and log tables. A bit later bureau service was available using computer techniques, then a terminal might be seen in the design office using a telephone link to a large computer. While this was happening the powerful programmable calculator appeared and calculations were lovingly entered for immediate results. This adds up to an established background of computer use. Constructional Software offers, in its Keypac and new Strider suite, programs which enable the CBM microcomputer to combine the roles of powerful calculator and terminal link. Delays and frustrations experienced with either postal bureaux or time sharing terminals are gone.

Set this sort of function beside a general accounting package, a Wordcraft 80 and Ozz and then, perhaps, we have a real revolution.

These comments apply to most of our products: after all, no one is going to get excited about Keypac 20 for drainage design. Critical path analysis is seen by many as a tedious and unending calculation because everything keeps changing. Use Prenet for your small networks or the new Project program (shortly to be released) for large networks and updating becomes a real pleasure. We have one customer who freely admits that he only wanted Prenet to impress his customers — when he had used it for a couple of weeks he 'phoned to say that he used it all the time and wouldn't be without it.

Workmanlike Programs

I hope by now that you can begin to see a picture of a series of workmanlike programs solving established problems. No bells and whistles but reliable tools. Just as the engineer might have kept a slide rule in his pocket because it seemed to answer so many questions then a PET on your desk could feel the s a m e .

On the other hand, integration is a common topic when computers and their programs are being discussed. Again, it depends what you mean by integration. If you mean a series of programs which will all talk to each other and are linked into an all-singing all-dancing megalith, then forget it — that sort of common language is about as useful as Esperanto (with respect). Everything to everyone and nothing to anyone. See yourself as integrator: a central control with access to the appropriate tools. Our Specwriter package is a good example. Take a regular (and astonishingly good) word processor package in Wordcraft 80 and couple it with our massive National Building Specification text database and, between the two, you have something which will not only write a specification but also send out your Christmas cards, write your letters, type your Section 27 notices and prepare articles like this. A good example of two useful tools combined to satisfy both general and specific applications.

Don't be put off by trying to find something that does everything and getting hopelessly confused in the process. Let the PET micro do something, anything, which takes advantage of its power and accessibility and you will find that the computer is friendly and useful and gives you more time to worry, or not as the case may be, about the things worth worrying about.

Roy Stephenson — Claremont Controls Ltd. A Commodore Approved Product Supplier.

Great Traditions taken into the Micro-Age

The Commodore PET with a Landsoft program has chalked up two firsts in the world of fine food and wine in the midst of the yachting mecca of Lymington. The Stanwell House Hotel and Railings Restaurant has been able to take the traditions of comfort, service, food and great wines into the microcomputer age; and was the first establishment to take the Landsoft G.B. 2 System on a Commodore PET.

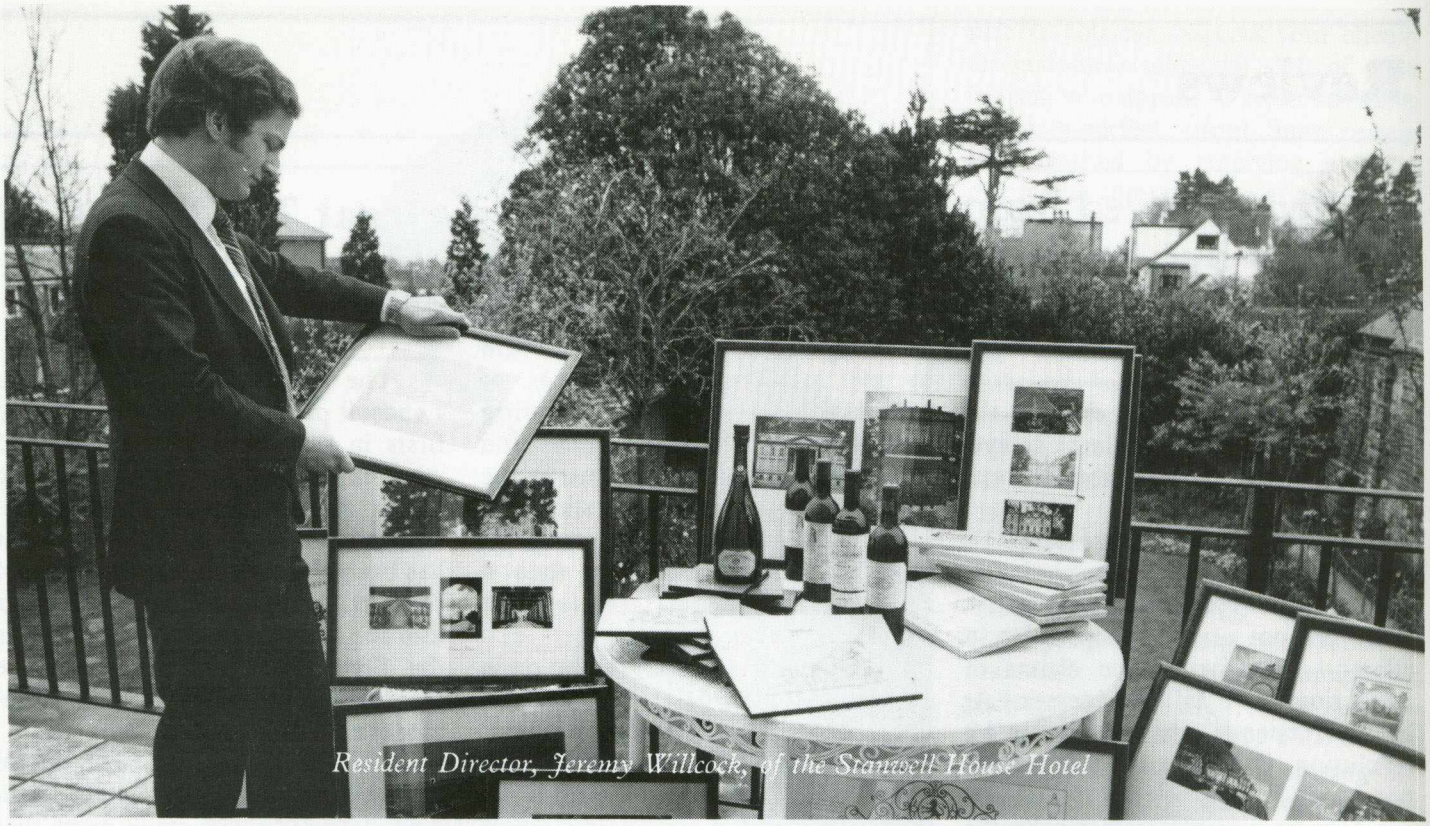
This both bills and analyses all charges automatically, enters standing charges for the small items that make a major contribution to the well being of guests. Early morning teas, and fresh juices, late night sandwiches or newspapers are all automatically entered. But this Landsoft PET system is not only used to incorporate numerical amounts.

The Stanwell House Hotel was the first to use the system for bedrooms that are named, not numbered. All the bedrooms are called after famous wines and the system copes with the names — and more. For, guests ordering their wine after which their bedroom is named are offered a discount. And the system takes care of that as well.

Says Jeremy Willcock, Resident Director, "The system is ideal for individual high class hotels. I cannot understand why the majority — which after all are owner-run like ourselves — have not installed a micro-aid which is alpha numeric."

The PET system in the Stanwell House Hotel handles guest billing and payroll using Landsoft programs, and wordprocessing using Professional Software's Wordpro 3 through which it can take care of menus and wine lists, etc.

This facility is particularly important to the restaurant as the demand for fine wines is growing all the time and different wines and vintages are being introduced constantly. These can be added very simply with the Wordpro 3, providing the restaurant with a list which is always



Resident Director, Jeremy Willcock, of the Stanwell House Hotel

up to date and clean with nothing scratched out or listed but out of stock.

"We ran the system as a back-up for a month while we trained ourselves in", says Jeremy Willcock. "It became our primary system on January 1st 1981. Since then we've had no problems — except for the time when a new receptionist put her fingers on a disk!"

Landsoft is a Commodore Approved Product Supplier, and their telephone number for further information is: 01-339 2476.

Master Directory/Index *Supersoft*

This program is a "must" for anyone who has a large number of disks, and uses a 4040 or 3040 Disk unit.

Written partly in machine code for speed, it takes the directory from each disk, sorts it into ASCII order, and stores it on the directory disk. This process is so quick that you can feed the disks into the unit as fast as possible; by the time you have hit the necessary keys, the drive light has gone out, and you can remove that disk while the sort takes place. Furthermore, you can update the details of any changes as a result of adding or scratching files, simply by re-entering the disk into the catalogue.

Being menu-driven the program is pleasant to operate, and you can list any selected disk's directory, find any program, (using just the first letter if you wish), delete an entry, find the number of blocks free on each disk, **or sort through the disk to find one with enough space on it for that long file you wish to create.** This last feature is very useful to help you get the maximum usage out of disk space. The program will also handle the master disk itself, and add it to the catalogue!

Criticisms? Well, I would like to see an 8050 version as soon as posible! Also, it would be better if the files were listed in columns, with the full screen used.

"Master Index"

The companion program "Master Index", will enable you to print out an alphabetical list of every program in the catalogue, at as high a speed as your printer is capable. You may feel that this is a bit expensive at £12, but that will depend on the number of diskettes you have, and whether time is money to you!

Supersoft also offer a machine code "Compactor". There was a Compactor program in BASIC, published by "Compute" magazine, but, although it is reliable, it is rather slow, and this program represents a quantum speed improvement.

What it does is to remove all the REMs in a program, all the spaces, and semi-colons which are unnecessary. Then, preserving all lines which are targets of GOSUB or GOTO, or RUN, it links lines together, to form lines of up to 250 bytes long!

People who are going for maximum space-saving and speed, will find that examination of the "compacted" program will show ways of changing the code, reducing the number of target lines, so that compacting the program again is very fast to use, and is available for both New ROMs and BASIC 4 machines. It represents the next best thing to a compiler, and its speed is such that it is perfectly feasible to use it at run-time only, so that you do not have to store two versions of the program if you don't want to. The instructions show you how to protect the routine, very simply, so that you can run a series of programs, compacting each one as you use it. At £15, this represents very good value for money.

There are a large number of programming-aids available now, and it is difficult for the user to decide between them. They vary from out-and-out aids to the actual process of programming, e.g. Toolkit, Programmer's Friend, through those which are both aids to programming and routines for incorporation in programs, e.g. Commando and Disk-o-Pro, to those which are intended for incorporation within programs only, e.g. Multisort.

PET Enhancement Package

This package, available from Supersoft again, is mainly a set of routines for incorporation into your programs, although it does have features for use in direct mode also.

The program is not on a chip, and if you want mobility between machines, this is important. With true portability in mind, the author, Mike Todd, has arranged that it is possible to save the P.E.P. tacked onto your program, by using a normal-looking BASIC SAVE command, and a LOAD will bring the enhanced program into your machine.

It offers a computed GOTO and GOSUB; a POS function, which tells you where a substring occurs within a string; a user definable print routine, the ability to turn the package on and off, from software (this is important, because the use of the interrupt routines implies a speed penalty, and there is no point in suffering this if speed is paramount, and the section of code being processed does not call on any P.E.P. routines.)

Also available is a repeat key, (I should add that the program is for New Roms only, a BASIC 4 version not yet being available); the stop key can be disabled and enabled at will; the upper and lower limit of RAM can be set; double density plotting is available ("Little squares"!); variables can be zeroed en bloc, degrees can be converted to radians, and vice-versa; the case of alpha characters can be inverted in a string, this will help you convert programs written on the BASIC ROMS to run with ease on the New Roms.

A very powerful command is the "DO" Command. This is in the form of "DO A$", where A$ contains a Basic statement. This will have many uses for the lively-minded programmer, offering as it does the possibility of the equivalent of self modifying programs.

Also included is a carefully thought-out set of input routines, to help you prevent the user who hits return with no data from dropping out of the program. This uses a special variable to tell you what has happened, so that the program can branch as you wish.

All in all a very interesting package, and cheap at £25.

For Computer Aided Instruction:— MTC PILOT

An interpreter for an extended version of common PILOT, implemented as a machine-code program for any model of 16K or 32K PET computer, using cassette or floppy disk drive.

Common PILOT is a powerful, dedicated language for writing interactive instructional programs, developed at Western Washington University. Using this language, it is possible for novices to start writing useful instructional programs within four hours of first sitting down at a computer keyboard. Thus common PILOT is ideal for many applications in schools, colleges and universities. Further applications for easily-written interactive programs arise in business and industrial training.

The language will also be found useful in Computer Science teaching. The simplicity of its structure and its ease of use make it a very suitable first language for a beginner. Advanced programmers will find that common PILOT has some very powerful features, including easy program self-modification using the 'execute indirect' command.

MTC PILOT is an adaptation and extension of common PILOT, implemented as a new interpreter for the PET. All the features of common PILOT are supported, including automatic editing of user input, sophisticated 'window strings' response matching, 'execute indirect' command, random block access, floppy disk file handling, and 'escape' and 'goto' options allowing run-time modification of program execution. A number of extra features have been added, including extended PET graphics, sound generation, full BASIC string handling and string arrays, plus PEEK, POKE and USR facilities. Using MTC PILOT, programs can be entered, edited, saved, verified, loaded and run just like BASIC programs. The full PET screen editor can be used with PILOT programs plus extra facilities like automatic line numbering, renumbering, block deletion, listing to printer, and repeat on all keys.

By making full use of routines already available in PET ROMs, all this has been achieved in approximately 5K of machine code. This code relocates the top of RAM when PILOT is loaded, leaving the rest of memory free for PILOT programs.

Although MTC PILOT will function using cassettes only, users of Commodore disk drives and Mu-PET will find a number of special features in disk versions of the program. An enhanced DOS SUPPORT is incorporated, which checks the error channel after every disk access, so that any errors are trapped automatically. In addition to this, the random block access file facilities allow student records to be kept so that progress can be monitored, and also allow a single PILOT program to access well over 100 kilobytes of text.

MTC PILOT - A Sample Routine

From a program designed to introduce Cartesian coordinates:—

```
500 r:start of plotting routine
510 t:Enter some coordinates, and watch where
520  :points appear on the screen.
530 *plot th:x-coordinate (0-79)?
540 a:#x
550 te:Input a number using the keys on the far right.
560 je:@a
570 th:y-coordinate (0-49)?
580 a:#y
590 te:Input a number using the keys on the far right.
600 je:@a
610 s:c
620 t:x=#x  y=#y
630 ss:s x,y
640 tne:Sorry, point out of range.
650 c:counter=counter+1
660 j(counter<5):plot
670 c:counter=0
680 pr:sl
690 t:Would you like to plot some more points?
700 a:
710 m:yes!alright!okay!sure
720 jy:plot
730 r:next block of program starts here
```

The action of this program is as follows:—

500 remark — ignored on execution
510 -520 type instructions
530 starts with a label which can be used as the destination of branch instructions. Followed by a type instruction with a 'hang' modifier, which inhibits carriage return/line feed.

540 -560 accepts an input from the user, and stores the first number input in variable x. If no number is input an error message is printed, followed by a jump back to the accept command.

570 -600 accepts the value of variable y in the same way.

610 -640 clears the screen, types the chosen coordinates, and plots the point by setting point (x,y) in a double-density graphics display. If an error in encountered due to the point being out of range, an appropriate message is displayed in reverse field.

650 -660 increments a counter in a compute statement, then if the counter is less than five performs a conditional jump back to label *plot.

670 -680 resets the counter, then in a problem command sets automatic editing options to remove all spaces from user input, and force it into lower case.

690 -700 types a question, then accepts an input from the user, which is automatically edited and stored in a special 'answer buffer'.

710 searches the answer buffer, looking for a match for any of the strings specified anywhere in the buffer.

720 -730 if the match was successful, branches back to the label *plot. Otherwise execution continues from line 730.

MTC PILOT — Programming Features

- Allows simple linearly-structured programs, with remark statements for self-documentation.
- Type statement with hang and reverse-field modifiers prints text, variable values, and full PET graphics.
- Special screen command gives programmed cursor control and screen poking, plus computed cursor positioning and double-density graph plotting set reset and test commands.
- Crash-proof accept command allows input into answer buffer, or into numeric or string variables. Single modifier can be used to get single character, and exact modifier to suppress automatic editing.
- Problem command allows various automatic editing options to be set, including removing spaces or forcing upper or lower case.
- Versatile match instruction can search for a number of alternative responses anywhere in the answer buffer. Special characters match with any string or with any single character, allowing compensation for simple spelling errors.
- Jumps can be made to labels of up to six characters anywhere in the program, or to the last label, last accept, next match, or next problem command. Jump modifier on match gives automatic jump to next match if current match fails.
- Subroutines nestable up to 24 deep. Subroutine end instruction can be used with a label.
- Computer command gives all BASIC functions including PEEK and USR. Special string editing commands can force upper case, force lower case, capitalise, remove or replace specified characters.
- Numeric or string arrays with any number of dimensions as in BASIC.
- Execute indirect command allows strings to be concatenated, and the result to be executed as a line of PILOT. Allows easy program self-modification.
- Random block access file commands usable with Commodore disk drives. Particularly useful for keeping student records, and/or for storing extended passages of text.
- Sound effects command gives music or noise generation on a simple external sound box.
- Escape and goto options allow user to jump to a label or call a subroutine in the middle of normal program execution. Can be used to provide a calculator facility in scientific exercises.
- Six types of conditional execution, including on match flag, error flag or relational expression.

MTC Pilot - Editing Features

- Full PET dynamic screen edit. NEW, LOAD, SAVE, VERIFY and LIST function as in BASIC.
- Programs can be run from first line or from a specified label. Also possible to goto a specified label.
- ? can be used to check values of variables during debugging.
- Single command gives listing on Commodore printer in either upper or lower case modes.
- Automatic line numbering in steps of any size.
- 3-parameter line renumbering facility.
- Block deletion facility.
- Direct mode commands BASIC and PILOT allow transfer between languages.
- Repeat function can be enabled on all keys (also functions in BASIC)
- Upper and lower case commands give easy transfer between alternative character sets (also function in BASIC).
- Disk version incorporates enhanced DOS SUPPORT, with full error trapping on all disk access, including program load.

The Registered Users Scheme

All purchasers of MTC PILOT are automatically entered in the registered users scheme, entitling them to the following:—

- MITAC Publishing will supply extra copies of the program and manual to registered users, for only 20% of the original cost.
- Later updates of MTC PILOT will be made available to registered users at substantially reduced prices.
- MITAC will circulate information about programs written in MTC PILOT as they become available. This includes programs published by MITAC and approved programs released by other companies.
- Modern Tutorial College will endeavour to provide support to help with any difficulties encountered in the use of MTC PILOT.

MTC PILOT is available in a package consisting of the interpreter, a manual, and sample programs on tape or on disk, for £65 plus VAT. Enquiries to MITAC Publishing Ltd., Modern Tutorial College, Kilburn Lane, London W10 4AA. Tel: 01-960 5899.

8032 — Screen Facilities

There have been a number of requests for more information about the 8032 screen control facilities, basically how to use them. These are a nice feature of the machine, and set it apart from earlier Commodore computers. Since these facilities are not explained in the manual that accompanies the 8032 they are explained below, along with one or two other little-known facts. All of the commands can be used quite easily from within a Basic program by a series of CHR$ commands. If you're new to PETs, and CHR$ (otherwise known as character string) doesn't mean too much to you, here goes.

Turn the PET on, and type printchr$(65) and hit the return key. The result will be a letter 'a' appearing on the screen. If you type printchr$(65+128) you'll get a capital 'A' this time. And so you can go on through the alphabet, and onto all the graphics characters and the various numbers and symbols that appear on the keyboard. Now, some of the chr$ numbers do not produce characters on the screen, but perform actions. For instance, if you type printchr$(147) the screen is cleared. Some of the more interesting chr$ numbers are shown below, along with an eplanation of what will happen. Experiment yourself — there's no chr$ command that will do any damage to your PET!

Number	Action
7	Sounds the bell.
14	Sets the PET into lower case mode. It is in this mode when you turn it on.
21	Moves everything below the cursor on the screen up one row.
25	Moves all the screen up one row.
142	Sets the PET to upper case mode — this gives you all the interesting characters that you can't see on the keyboard.
149	Moves everything below the cursor on the screen down one row.
153	Moves all the screen down one row.

Onto the screen control features. There are two CHR$ numbers that set respectively the bottom right hand corner and top left hand corner of a 'window' on the screen. This would then happily allow you to show changing information in that window while the rest of the contents of the screen remain unchanged. This has many obvious uses, for instance in education where the ability to have a display on the rest of the screen, and the instructions for proceeding within the window, would be very useful. To set the bottom right hand corner, position the cursor where you want that corner to be, and type printchr$(143). Do the same for the top left, only this time use 15 instead of 143. Experiment!

An alternative to using CHR$ is to use the POKE command. This gives you rather more control over the setting up of the window. There are four necessary POKEs to do, and these are:- To set the top of the window — type POKE224,w
To set the bottom of the window — type POKE 225,x
To set the left margin — type POKE226,y
To set the right margin — type POKE213,z

I'll leave it up to you to play with values for w, x, y and z, but they are within the ranges of 0 to 25 for w and x and 0 to 80 for y and z. Once you've created your window and had a play, press HOME twice to escape from it. As I've said, experiment with the commands and see what happens — you can't do any harm. There are a number of POKE commands that do interesting things. Typing POKE231,a where a is any value between 0 and 255, is quite good. It alters the speed of the little bell that sounds when you're reaching the right hand margin. 0 turns it off altogether, and 255 sounds for a long, long time. To make the bell sound without having to go to the right hand margin, type printCHR$(7) followed by return. Another location with an interesting use is 144 — POKE144,88 disables the stop key, and POKE144,85 re-enables it again.

Onto setting tabs. You've no doubt noticed that there is a TAB key on the keyboard, but are not quite sure how it works or even what it does. To set a tab in column 8, type POKE1007,1 — for column 16 POKE1008,1 — and so on in jumps of 8 up to column 80 and POKE 1015,1. Pressing the TAB key will then move the cursor to wherever the next tab is set. To remove the tabs, poke the same location but with 0 instead of 1.

Hopefully you now have a clearer idea about at least some of the workings of the 8032, and can begin to work on your own programs.

Use of Arrays in BASIC: An Introductory Guide

Margaret Skinner, Program Advisor,
Computer Centre,
King's College London

An array is a set of consecutive locations in the store of the machine which is given a name conforming to the usual rules for the formation of variable names, i.e.
(i) The name consists of one or two characters
(ii) The first character must be a letter
(iii) The second character must be a letter or a digit
(iv) If the array is to hold character strings then a dollar sign is appended to the name.

Thus A, K9 and OK$ are all legal array names, but MI5 and 3A are not.

Individual elements of an array are identified by the use of subscripts — the elements of array K are K(0), K(1), K(2), K(3) ... and so on.

Use of the DIM statement for dimensioning arrays

The DIM statement is used to reserve a specified amount of room in store for each array, and every array that is to consist of more than eleven elements must be referred to in a DIM statement before it is referred to in any other statement. Smaller arrays may appear in a DIM statement and

for reasons of clarity it is good practice to dimension all arrays in this way, whatever their size. The following statements are examples of valid DIM statements:

```
DIM A(20)
DIM P(50), Q(20), R$(10)
```

A program may contain several DIM statements, but no array should be dimensioned more than once. Although it is possible for these statements to appear scattered throughout the program it is usually clearer and tidier to group them together at the beginning of the program.

There are occasions, however, when considerations of the speed of execution of a program require that the DIM statement should appear later.

An array may be dimensioned dynamically during program execution; thus the statement

```
DIM K(N)
```

reserves N + 1 locations for array K (remember that the first location is K(0)). The value of N must be set in the program before the DIM statement appears.

Using an Array

Suppose a factory's quality controller wishes to examine a batch of widgets. All widgets whose length deviates by more than 10% from the mean length are to be discarded, and so she needs to calculate the mean length and then examine each widget in turn to see if it is to be discarded. We assume that the data is to be entered from the keyboard. The following program will allow the data to be stored in array L and then processed.

```
10  INPUT  "HOW MANY WIDGETS IN THIS BATCH ";N
20  DIM L(N)
30  SM = 0
40  PRINT "ENTER ONE LENGTH ON EACH LINE AND PRESS RETURN"
50  FOR K = 1 TO N
60  INPUT L(K)
70  SM = SM + L(K)
80  NEXT
90  REM CALCULATE MEAN AND 10% OF MEAN
100 MN = SM/N : TN = MN/10 : PRINT "MEAN IS ";MN
110 FOR K = 1 TO N
120 IF ABS (L(K) - MN) > TN THEN PRINT "WIDGET";K;
    "LENGTH ";L(K)
130 NEXT
140 END
```

Note that as the data is input a running total is kept in location SM (Line 70). SM is initially set to zero in Line 30; strictly speaking this line is not necessary on the PET as all variables are initially set to zero automatically, but as this is not true of all machines you are advised to get into the habit of initialising variables yourself. The mean and 10% of the mean can then be calculated easily (Line 100). The ABS function (Line 120) is a standard function used to find the absolute (i.e. disregarding sign) value of a number. When this program is RUN the quality controller will be able to see both the serial numbers and the lengths of the widgets to be discarded.

Arrays of more than one dimension

So far all reference has been to arrays with just one dimension but it is possible to use any number of dimensions. In practice one-dimensional arrays are used a great deal, two-dimensional arrays are used occasionally but higher dimensions usually create more problems than they solve. Users familiar with matrices will be used to the idea of "rows and columns" and a two-dimensional array can be used to store data in this form. Let's suppose that 100 students each take 3 examination papers; their marks could conveniently be stored in a 100 by 3 array. Thus we might have

```
10  DIM MK(100,3)
20  FOR K = 1 TO 100
30  INPUT MK(K,1),MK(K,2),MK(K,3)
40  NEXT
```

Each student's set of marks will be entered on one line, and will be stored in the appropriate place in the array.

The DIM statement actually reserves 404 elements of store, since the first subscript can range from 0 to 100 and the second from 0 to 3. If space is at a premium then the following would be more efficient:

```
10  DIM MK(99,2)
20  FOR K = 0 TO 99
30  INPUT MK(K,0),MK(K,1),MK(K,2)
40  NEXT
```

If, however, clarity is more important than conservation of space, then the original form is to be preferred.

Conclusion

Sensible use of arrays makes programs easier to write and easier to debug. Their most important use is probably for the storage of data which is to be processed in various ways as illustrated in the examples in this article, but the experienced programmer finds many other situations in which judicious use of an array will make her program more elegant.

Hurray for Arrays

Following on from that article on arrays, we have an interesting letter from Dr. B. Orchard of the Horticultural Advisory Service in Guernsey. He writes:—

In Volume 2 issue 5 you give two programs as examples of methods of redimensioning arrays.

These do not work because new simple variables are defined after the top-of-arrays value has been stored. This is not mentioned directly in the article and I am surprised that a fundamental point of this nature has been overlooked. (Ed. sorry ....).

A simpler method seems to be to measure the size of the temporary arrays and then re-set the top-of-arrays pointer by this amount immediately before they are re-dimensioned. There is then no risk that using a new variable within the program will suddenly stop the re-dimensioning system working. An example is enclosed.

```
115 DEFFNP(I)=PEEK(I)+256*PEEK(I+1):DEFFNH(P)=INT(P/256)
120 DEFFNL(Q)=Q-256*FNH(Q)
```

The example.

```
1500 REM DIMENSION TEMPORARY ARRAYS
1510 P%=FNP(46)+DP%:POKE46,FNL(P%):POKE47,FNH(P%)
1520 DIMD(G+2),M(V),N(V),N$(V),F%(V),G(V,V),F(V,G)
1530 DP%=P%-FNP(46):RETURN
```

V here is just a variable number, whatever you want to dimension the arrays. All well and good, but the saga doesn't stop here. I showed Dr. Orchard's letter and sub-programs to Mike Gross-Niklaus, Commodore's Software Manager, who came up with the following program which deals with the problem in a rather more straightforward manner. As is Mike's good habit, the program is heavily REMmed for ease of understanding. Incidentally, it helps myself and readers of the magazine if ALL submitted programs come in like this — REMs can always be removed after the program has been digested and understood. The program:—

```
10 PRINTFRE(0):REM SPACE BEFORE BUSINESS COMMENCES
20 DIM A$(100):REM TYPICAL ARRAY
30 PRINTFRE(0):REM SPACE REMAINING
40 POKE46,PEEK(44):REM MOVE START OF BASIC ARRAYS
50 POKE47,PEEK(45):REM TO END OF BASIC ARRAYS
60 DIMA$(100):REM DOES IT WORK
70 PRINTFRE(0):REM YES IT DOES, NO EXTRA SPACE USED
```

Thanks to Dr. Orchard and Mike Gross-Niklaus.

Auto Data Entry

Trevor Lusty, who wrote the review of Pascal in the last issue, has come up with the following program:-

This program has been used to enter large amounts of data without entering line numbers or 'DATA'. The following instructions assume that the user does not have a Toolkit fitted.

1) LOAD the 'auto-data' program into the Pet.
2) LIST the 'auto-data' program onto the screen.
3) LOAD the program to which DATA is to be added.
4) HOME the cursor and press 'return' to append each line of the 'auto-data' program.
5) RUN
6) Enter a line of data and press 'return'.
7) Repeat step 6 until all data is entered.
8) Press the STOP key to exit.
9) Delete the 'auto-data' program.

The program itself is as follows :-

```
1 REM *** AUTO DATA ENTRY ***
2 REM ***  TREVOR LUSTY.  ***
3 INPUT "[clr][rvs]START AT LINE ";N
4 INPUT "[rvs]LINE INCREMENT ";K
5 IFN<16 THEN N=16
6 PRINT "[clr][crsr down][crsr down]";N;"DATA ";
7 GETA$:IFA$=""THEN7
8 IFA$=CHR$(13)THEN10
9 PRINTA$;:GOTO7
10 PRINT:PRINT "N=";N+K;":K=";K
11 POKE158,8:POKE623,13
12 POKE624,13:POKE625,71
13 POKE626,79:POKE627,84
14 POKE628,79:POKE629,54
15 POKE630,13:PRINT "[home]";:END
```

Just remember to take care of your line numbers!

Inputs on INPUT

A comment from Donald Skene of Maidstone in Kent, on INPUT on the Pet. He remarks :-

I have come across a rather annoying problem with the Pet Input command which I have not seen reported elsewhere. Keying in a string should only cause the Keyed characters to be placed in the string variable. This may not be the case, however, if :

1. Any other I/0 files are open, and
2. The cursor 'wraps around' and appears in the next screen line.

If these conditions occur, then the prompt associated with the Input command is liable to appear as a part of the string variable. Thus, to be sure of accurate input, you must :

```
OPEN 1,15: ...

INPUT "PROMPT";I$: PRINTI$

IF LEFT$(I$,8) = "PROMPT? " THEN I$ = MID$(I$,9)

IF LEFT$(I$,1) = CHR$(34) THEN I$ = MID$(I$,2)..
```

It is not sufficent to test the length of the string because if you go over the screen wrap and then delete back again, you can have a string of less than 40 characters and still have the prompt included.

Note that you must test for a quote mark and that the problem becomes insoluble if some of the prompt characters are deleted during input. The term prompt includes the ? output with 'INPUT I$'.

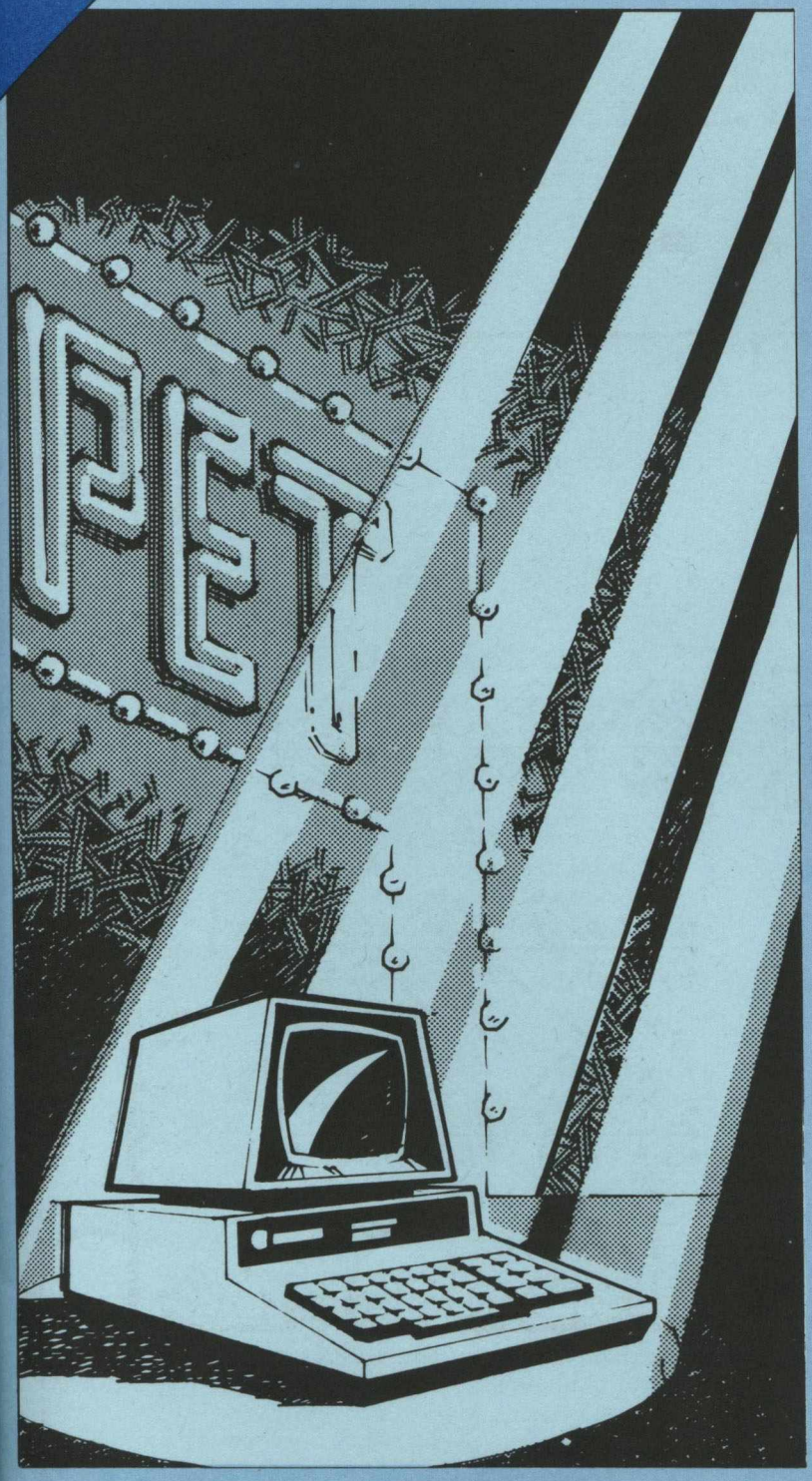
The effect is rather unpredictable because it does not always happen if a program is run after inputting, saving or loading it. If it does not happen than it seems to be provoked by stopping the program with a null string and then running it again.

During the summer of 1981, Commodore will be moving to larger premises on the Slough Trading Estate. This is to cope with expected expansion over the next five years. Full details will be published as and when available, but until this is done the address remains as 818, Leigh Road, Slough, Berks.

BUTTERFIELD COMES TO TOWN

The Second International

PET SHOW



June 1981

EDITORIAL

What, Where and When

WINE & DINE

Guide to the area

EXHIBITORS

Complete Guide to The Show

SEMINARS

Details of What and When

commodore COMPUTER

PET SHOW
Floor plan

The Second International PET SHOW

The Second International PET Show is here, and promises to be bigger and better than 1980. More space, more time, more exhibitors and more of you, the PETpourri of users and interested parties. This is a complete guide to the Show, and contains details of all the known exhibitors at the time of going to press – if we've missed you out you've only yourselves to blame! But this is more than just a guide as to who is where – there's information on where to stay, where to eat out (and we've tried to cover as many tastes as possible, from English to Indian to French, and more besides), where to go for a drink, and most importantly of all, how to get there and when it's open.

Why does the PET Show exist anyway? We're the only company in this country big enough to hold one, and with over 40,000 PETs in this country I think we've already proved that! The amount of support that there is for the PET is shown by the number of dealers that there are, and also the vast array of software and hardware available suitably demonstrates the great backup you get when you purchase a PET. It gives you a chance to meet us, the people behind the Commodore machine, and also it affords us the opportunity of meeting you, the people who, lest we forget, keep us in a job! Finally it's a chance to see, assembled under one roof and in comfortable surroundings, all that's best in the way of products available for the PET – more than for any other micro.

The people who are at the Show cover Commodore, Approved Products suppliers, dealers, overseas dealers and distributors, local user groups plus a lot more. There'll be a special VIC stand to let you know the latest news, the boffins of Commodore will be on a 'programmers clinic' stand for all your queries, and there are a number of representatives from the world of journalism.

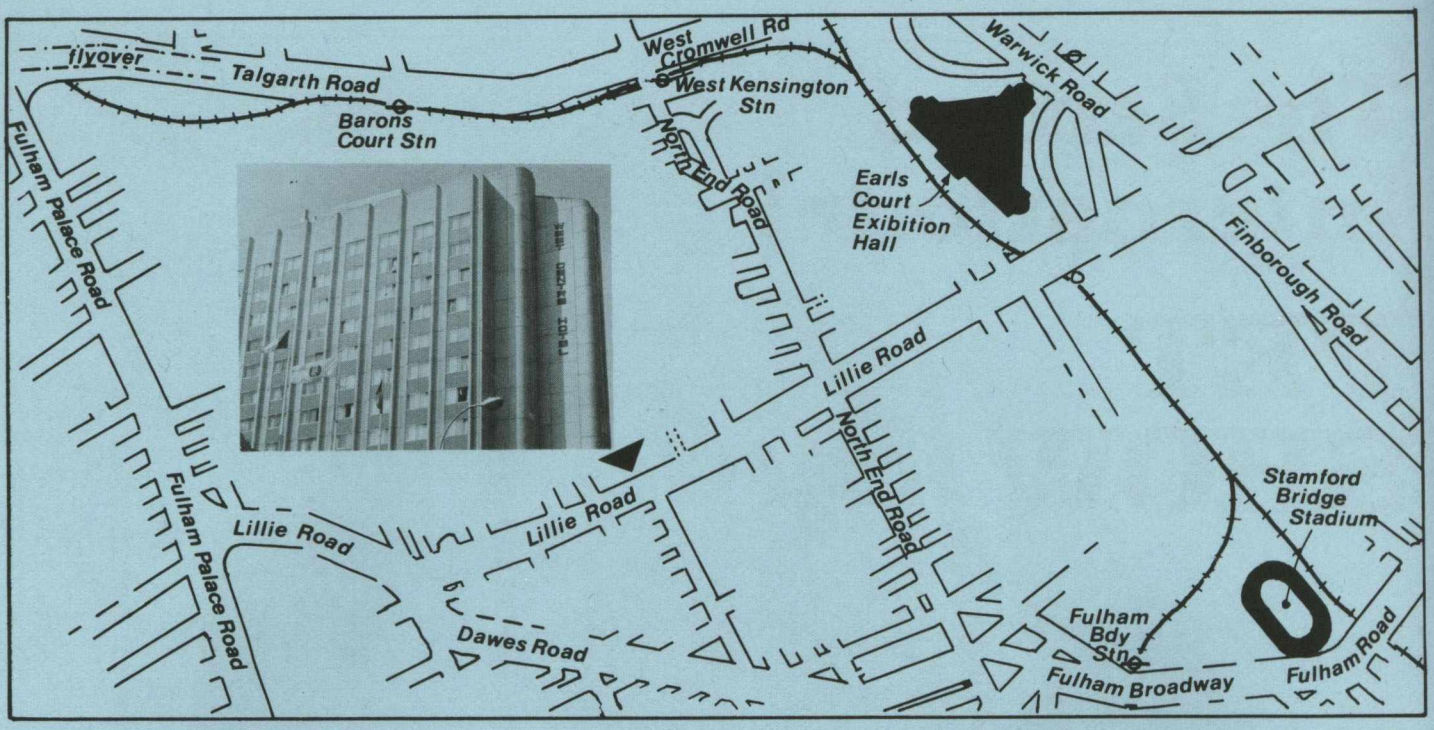
As was the case last time, there will be a number of interesting and informative seminars, and details appear elsewhere in this special PET Show catalogue. We've managed to secure the services of the well-known Jim Butterfield for a number of talks. Try and find the time to attend, if you can – I'm sure you'll find them useful.

A special feature of the Show this year will be presentation of various prizes, including a VIC, three PETs, and numerous watches and calculators. Detailed information will be available at the Commodore Information stand at the Show.

In the newsletter itself you'll find a cut-out form. This form, once filled in of course, will enable TWO people to get into the Show for free. Bring a friend!

If you've never used a PET, but are perhaps thinking of owning one, don't be put off but feel free to come along and talk to the people at the Show – they and we are here to help. If you know absolutely nothing about the computer world, again don't be alarmed – everybody had to start some time! This is a Show for the hobbyist, the serious business user, the educational user – anybody. This is what the Show is here for – you.

You may arrive not owning or using a PET – it's a fairly safe bet that at the end of the day you'll want one!



Where is it?

There was some confusion last year over the actual location of the PET Show, as the special edition of the newsletter devoted to the Show didn't, in fact, say where it was! This year the map above should enable you to find your way there , but a few hints might come in useful.

a) It's at the West Centre Hotel, Lillie Road, London SW6.

b) If you're coming by underground, the nearest station is West Brompton, on the District Line. However, West Brompton is closed on Saturdays, so if you're coming on that day you'll have to find an alternative exit. The nearest other stations are Fulham Broadway, Earl's Court, West Kensington or Barons Court, all of which are on the District Line as well.

c) If you're arriving by 'bus, the following run by the West Centre Hotel. These are the numbers 30 and 74.

d) If you're travelling down by train, all of the main-line stations are connected up to the underground, so just aim for any of the underground stations named above. If you're lucky and arrive at Euston Station, you can have a play with their marvellous machine which tells you how to get to any station on the underground network from Euston Station, and in several foreign languages! Something all stations should have.

e) If you're flying down by 'plane, Heathrow is the airport to aim for, as there is a direct underground link from Heathrow to Barons Court or Earls Court on the Piccadilly Line.

f) If you're coming by any other means, take a taxi!

Times and Dates for the Show

The Second International PET show commences at 1.00p.m. on June 18th 1981, at the West Centre Hotel, Lillee Road, London SW6. The Show on that first day continues until 7.00p.m. in the evening.

On the second day, Friday the 19th June, the Show gets under way at 10.00a.m., and continues until 7.00p.m. in the evening again.

Saturday the 20th June, the third and final day, the Show commences at 10.00a.m., and will finish at 5.00p.m. in the evening.

Jim Butterfield

Jim Butterfield, possibly the most well-known PET person in the world, will be appearing at the Second International PET Show. He'll be giving a couple of seminars (see details elsewhere in this magazine), and these are bound to be a tremendous attraction, so try and get in early if you want to see him. Details of what he'll be talking about aren't known at the time of going to press, but whatever it is it's bound to be interesting. Knowing Jim, he'll have one or two surprises for everybody.

His appearance marks a welcome return to our shores, as he does most of his work in Canada and so rarely gets the opportunity to come and visit us. The last time he was here in fact was for last year's show, where he gave two talks on PET developments in North America. Always a fascinating speaker, these were very well received.

Now something of a cult figure in the world of micro-computing it is a pleasure to be able to announce his coming. I look forward to seeing him, and you, there.

Places to Stay

For those of you from abroad, or those who are intending to stay for the duration of the Show, listed below are a number of hotels and pensions in the South-West London area, and also some of the more famous hotels in London in general if you fancy doing it in style. As in the restaurants and public houses section, I'll simply list the name, address and telephone number. Again, they're arranged in no particular order.

Major Hotels

Cunard International, 1 Shortlands W6, 01-741 1555.

Grosvenor Hotel, 101 Buckingham Palace Road, 01-834 9494.

Grosvenor House, Park Lane W1, 01-499 6363.

Holiday Inn, Sloane Street SW1, 01-235 4377.

Hyde Park Hotel, Knightsbridge SW1, 01-235 2000.

Inn On The Park, Hamilton Place, Park Lane, 01-499 0888.

Londonderry Hotel, 19 Park Lane, 01-493 7292.

Mayfair Hotel, Berkeley Street, 01-629 7777.

Penta Hotel, 97 Cromwell Road, 01-370 5757.

Royal Kensington Hotel, 380 Kensington High Street, 01-603 3333.

Royal Westminster Hotel, Buckingham Palace Road, 01-834 1302.

Sheraton Park Tower Hotel, 101 Knightsbridge, 01-235 8050.

West Centre Hotel, Lillee Road, 01-385 1255.

Pensions

Alexander Hotel, 9 Sumner Place SW7, 01-581 1591.

Alison House Hotel, 82 Ebury Street SW1, 01-730 9529.

Belgrave House Hotel, 30 Belgrave Road SW1, 01-834 8620.

Campden Court Hotel, 28 Basil Street SW3, 01-589 6286.

Concord Hotel, 155 Cromwell Road SW5, 01-370 4151.

Eden House Hotel, 110 Old Church Street SW3, 01-352 3403.

Elizabeth Hotel, 37 Eccleston Square SW1, 01-828 6812.

Fenja Hotel, 69 Cadogan Gardens SW3, 01-589 1183.

Kensington Court Hotel, 33 Nevern Place SW5, 01-370 5151

Knightsbridge Green Hotel, 159 Knightsbridge SW1, 01-584 6274.

Mowbray Court Hotel, 28 Penywern Road SW5, 01-373 8285.

Number 16, 16 Sumner Place SW7, 01-589 5232.

Hotel Oliver, 198 Cromwell Road SW5, 01-370 6881.

Rutland Court Hotel, 21 Draycott Place SW3, 01-589 9691.

Terstan Hotel, 29 Nevern Square SW5, 01-373 5368.

Willet Hotel, 32 Sloane Gardens SW1, 01-730 0634.

I hope you find somewhere suitable for your stay at the Show.

Restaurants

We're sure that, as well as looking around the Show, you will at some time or another want to have something to eat. You may want to conduct your business lunches and evening dining in somewhere away from the world of PETs and computing – somewhere perhaps a little more relaxing, where the talk around you isn't likely to be about machine code, where business discussions can be held without the feeling that the rest of the world (and Inside Trader!) is listening in. Or perhaps you just fancy eating something different.

The West Centre Hotel itself is of course one place to go, but if you feel like going elsewhere we've compiled a list of good restaurants within easy access. You should be able to find most of the streets on the map at the front of the catalogue. With all of them I've listed simply the name, the address, the type of food and most importantly the telephone number – always try and book in advance.

So, in no order other than alphabetical, here goes. I've tried to include something to suit everybody, and I hope, if you do choose one of these, that you enjoy yourself.

Al Ben Accolto, at 58 Fulham Road, which serves a mixture of French and Italian cooking, and their 'phone number is 01-589 0876.

Barbarellas, at 428 Fulham Road, which has three eating areas, including one disco oriented if you're that way inclined, serves Italian food, and is on 01-385 9434.

Busabong Thai Restaurant, at 329 Fulham Road, which as you might gather serves mainly Thai food, and is on 01-352 4742.

Chantarelle, at 119 Old Brompton Road, which serves all kinds of food in imaginative ways, on 01-373 5522.

China Kitchen, at 53 Old Brompton Road, serving, in pleasant surroundings, chinese food, on 01-589 3149.

La Croisette, at 168 Ifield Road, with the emphasis on seafood, and their number is 01-373 3694.

Drakes, at 2A Pond Place, off Fulham Road, is a feast of traditional English cooking, with a 'phone number of 01-584 4555.

Il Giorno e La Notte, at 60 Old Brompton Road, serving mainly Italian food, on 01-584 4028.

Hungry Horse, at 196 Fulham Road, which, as you might guess from the name is a traditional English restaurant (go there feeling starving), on 01-352 7757.

Meridiana, at 169 Fulham Road, serving Italian food, on 01-589 8815.

Salloo's, 62 Kinnerton Street, whose Pakistani food matches their superb wine, and their number is 01-235 4444.

San Frediano, 62 Fulham Road, an Italian restaurant this one, and their 'phone number is 01-584 8375. Again, the wine is highly recommended.

September, 457 Fulham Road, who serve a mixture of Anglo and French cooking, on 01-352 0206.

Shezan, 16 Cherval Place, serving an excellent range of Pakistani food, with a 'phone number of 01-589 7918.

Sri Lanka Malaysian Restaurant, at 19 Child's Street, who serve south-east asian food if you fancy broadening your eating horizons, and they are on 01-373 4116.

Tandoori of Chelsea, at 153 Fulham Road, who, as you might have guessed, serve Indian food, on 01-589 7749.

That's the end of the list – I hope you find somewhere to your liking. There are, needless to say, plenty of other restaurants in the area, but hopefully the ones above will give you a good guide to an enjoyable meal.

Public Houses

There comes a time at every exhibition, wherever it is and whatever it's about, when the world overwhelms you and you need a pint of beer. Usually this feeling comes at the end of the day, when you could quite easily imagine that you've been on your feet since Monday of the week before, and all you want to do is collapse with a beer. In order to relieve you of this feeling, your correspondent spent many hours toiling around pubs in the South-West of London (not necessarily within quick walking distance of the West Centre Hotel, but all certainly a short taxi ride away), and what you read below are the findings.

I'll admit a preference for real ale, and this strongly influenced the selection below. That, of course, wasn't the only consideration – conditions and general atmosphere also came into it. You could always drink at the Hotel itself, but, if like me, the last thing you want to see or hear about at the end of the day is a computer, a browse through the list below ought to give you an alternative destination.

These are presented in no particular order, but I've saved my favourite till the end.

The first one is the Grove Tavern, at 43 Beauchamp Place (SW3), and this serves Wethered Bitter and the wonderful Fremlins Tusker – if served properly (as this one was) it is a superb pint of beer, and the sort of drink where you've had three or four pints before you realise it.

The Builders Arms, at 13 Britten Street (SW3), which serves the same as the above. Of course, all of these pubs serve other drinks as well, but why mention them when these are available? (Especially Fremlins Tusker).

The Drayton Arms, at 153 Old Brompton Road (SW5),

and this one's a place for Charrington's IPA, and draught Bass.

The Wheatsheaf, at 562 King's Road (SW6), which serves Wethered Bitter and Fremlins Tusker again. And also has available Winter Royal. A nice place.

The Duke of Cumberland, at 235 New Kings Road (SW6), which is a Young's pub, and has the Mild, Bitter and Best Bitter available, as well as Winter Warmer.

Finally the pub amongst pubs, the Anglesea Arms, at 15 Selwood Terrace (SW7). If you don't take a taxi there, you may well find yourself taking one back, because it serves (deep breath) Brakespears Special Bitter, Everard Old Original, Samuel Smith's, Old Brewery Bitter, Ruddles County, Young's Special Bitter and Winter Warmer. An excellent place for a drink – you feel you're amongst friends as soon as you walk in.

Good health, but don't forget the exhibition does last for three days and not just Thursday!

Seminars

There will be a seminar registration desk in the foyer area, and if you want to go to any of the seminars at the Show you must book there when you arrive. Entry is of course free, but you have to register for the Show before you can get in. If there are any seats left immediately prior to a particular seminar starting this will be broadcast over the P.A. system. One of the prime attractions at these seminars will be Jim Butterfield, who kicks off with the first talk on the first day.

Thursday

1.30 to 2.30 – Jim Butterfield
2.45 to 3.45 – The Institute of Small Businesses
4.00 to 5.00 – Heather Kearsley of Compsoft on D.M.S.
5.15 to 6.15 – A talk on word processing
7.15 to 8.15 – Jim Butterfield again, in case you missed him first time around.

Friday

10.30 to 1.00 – A series of talks on communications
1.30 to 3.45 – Talks on the PET in engineering
4.00 to 5.00 – The Institute of Small Businesses
5.15 to 6.15 – Jim Butterfield on the VIC

Saturday

10.30 to 11.30 – The Independent PET Users Group, featuring a panel of PET experts – Harry Broomhall, Pete Dawson and of course Jim Butterfield
11.45 to 12.45 – A special aimed at the youngsters
2.45 to 3.45 – Graham and McPhee from the U.S.A. talking about Commodore's new MMF9000 – the micro-mainframe
4.00 to 5.00 – Jim Butterfield to close the Show.

All these talks will be in the seminar room, and you'll be told where that is at the seminar desk in the foyer.

Independent PET Users Group brings the finest panel of PET expertise in the world. For the first time ever available together in the same forum, for your advice the following IPUG members: Jim Butterfield, Harry Broomhall, Pete Dowson.

Bring along your PET problems to this "Programmer's Clinic". If possible hand in your queries beforehand at the IPUG stand number 60/61 so that replies can be co-ordinated. The Clinic will begin with a short presentation on IPUG about it's regional activities.

The Exhibitors

Stand 1 – Baroness International Public Relations

Baroness International are a public relations company who specialise in computer electronics accounts. They have been responsible, with Commodore, for the organisation behind the Second International PET Show. They will be acting as a distributor and co-ordinator of information at the Show.

Baroness International Public Relations
1-3 Old Compton Street
London W1V 5PH
01-734 2907.
Contact name – Janice Ellis.

Stand 2 – CBM Information Desk

The Commodore Information Centre is the branch of Commodore that liaises direct with the public, and sends out a vast amount of information each week, as well as handling more telephone calls than any other department in Commodore. They will be disseminating literature and answering your queries at the Show.

Commodore Information Centre
818 Leigh Road
Trading Estate
Slough
Berkshire
Slough (STD 0753) 74111.
Contact name – Millie Newman.

Stands 3 & 4 – Bristol Software Factory

New this year from the authors of OZZ is the revolutionary SILICON OFFICE. The first microcomputer program to successfully combine word processing, data processing and communications, SILICON OFFICE runs on the new CBM 8096 computer. Visit us on stands 3 and 4 for a demonstration of the latest advances in microcomputer software.

Bristol Software Factory
Strathearn House
88 Queens Road
Clifton
Bristol BS8 1SA
Bristol (STD 0272) 314278.
Contact name – Rita Roberts.

Stands 5 & 6 – Commodore Business machines

On these stands Commodore staff will be demonstrating OZZ, the first computer program ever to give you real freedom to tackle your problems in your own way, in that it has intelligent features that allow you to perform an almost limitless range of tasks. Runs on 8000 series hardware only. Also being shown will be the range of Business Software available from Commodore. Products on show will cover such applications as Payroll, Accountancy and Stock Control, demonstrated by the software department of Commodore. These are for 3000, 4000 and 8000 series hardware.
Contact name – Graham Sutherland

Stands 7 & 8 – Commodore Business Machines

Two stands devoted to the PET in education, with a number of contributors from the education field, who will be exhibiting a range of schools and colleges software. As well as this we'll have Nick Green, Commodore's Special Projects manager, on hand to discuss work being done in this area.
Contact name – Nick Green

Stands 9, 10 & 11 – Commodore Business Machines

Three stands have been set aside for the U.K. public launch of the VIC, Commodore's new micro, costing just £175. There'll be plenty of VICs around, to give you ample opportunity of getting hands-on experience of the latest revolution in the microcomputer industry.
Contact name – Andrew Goltz

Stands 12 & 13 – Commodore Business Machines

This will be an area of great interest to PET devotees, as it is being used as a 'technical and programmers clinic', to give you the chance to ask those questions you've always wanted an answer to, but were never quite sure who to ask. If the people on this stand cannot answer it, it isn't worth asking.
Contact name – David Briggs

Stand 14 – Commodore Business Machines

This stand is going under the name of 'Expand with Commodore', and promises to be VERY interesting. Don't miss it!!

Stand 15 – Mator Hardisk

Ever wanted to see a 25 megabyte disk drive? For the PET? For £2750.00? Mator have the answer. See their stand for address and contact details.

Stand 16 – JCL Software

JCL Software specialize in reliable, user-friendly software, combining machine code and Basic to exploit the advantages of each. We supply Assemblers, a professional Eprom Programmer, and turnkey Roms, allowing faster, more reliable programs to be written. Application programs using our Roms are available, separately or integrated – Mailing List, Address Book, Text Processor, File Handling System and much more – ask for details.

JCL Software
47 London Road
Southborough
Tunbridge Wells
Kent
Tunbridge Wells (STD 0892) 27454
Contact name – Mrs. J.C. Leman

Stand 17 – Petalect Ltd.

Petalect offers a comprehensive range of both software and hardware to suit any business requirement. They can also provide their own specialised interfaces for use with weighing equipment. A twelve month warranty is offered with any system leased or purchased from Petalect, with a variety of service contracts being available.

Petalect Ltd.
33/35 Portugal Road
Woking
Surrey GU21 5JE
Woking (STD 04862) 69032/68497
Contact name – Miss G. Forde

SEEING IS BELIEVING!

Come along to the PET SHOW and take a look at our top quality products for the Commodore PET range - we think you'll be impressed!

Who else can offer 4 different machine code sorts - or a full-featured word processor for only £25? And of course when it comes to plug-in chips we really are the experts - SUPERCHIP, PIC-CHIP, MIKRO ASSEMBLER, ROM-X and SUPER-PIC are exclusively available from us or our dealer network.

Busy programmers and programming businessmen come to us because they know that they'll get a good deal - and good backup too. But there's also a lighter side to our range: Catacombs is the best adventure game we've seen, and our new adventure HITCH-HICKERS GUIDE TO THE GALAXY is pretty good too. You've probably seen the rave reviews of HALLS OF DEATH, our top-selling fantasy game, but we think that WIZARD'S LAIR deserves some attention as well. Right now we're working flat out trying to get our new HI-RESOLUTION GRAPHICS BOARD ready for the Show. Come along to our stand and find out whether we make the deadline - even if we don't, you can pick up a FREE copy of our latest catalogue so it won't be a wasted trip.

Finally, if you can't make it to the Show, don't despair. Give us a ring on the number and we'll answer your queries and send you a catalogue - it'll be a pleasure!

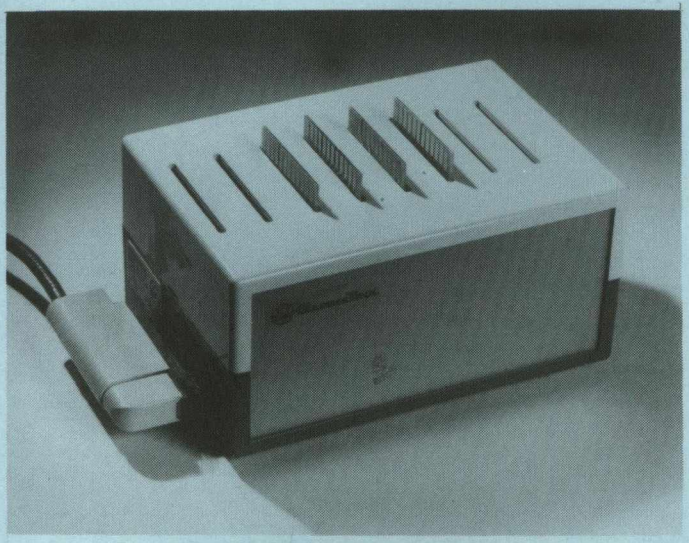
SUPERSOFT

First Floor, 10–14 Canning Road, Wealdstone,
Harrow, Middlesex, HA3 7SJ, England
Telephone: 01-861 1166

Stand 18 – Wego Computers Ltd.

The Mark Sense Card Reader is a product receiving development in many spheres; In market research, educational test scoring, entering binary code for Prom programming etc. The Sequential Switching Unit sells with complete PET systems, making use convenient and observing unit by unit switching on and off.

Wego Computers Ltd.
22a High Street
Caterham
Surrey CR3 5UA
Caterham (STD 0883) 49235
Contact name – G.D. Duck



Stand 19 – I.C.I. Ltd (Petrochemical & Plastics Division)

The Gammatrol Interface system allows communication between the PET and a variety of external devices. It consists of a master unit which connects to the PET, and signal boards which plug into the master unit. The master unit will accommodate up to 8 signal boards. *STOP PRESS* Latest idea is the PET 'teasmaid'. The PET will be making cups of tea. Yes really!!!

I.C.I. Ltd
Petrochemicals and Plastics Division
Physics and Radioisotope Services
P.O. Box 2
Billingham
Cleveland
0642 553601 ext. 3752/2727/3761
Contact name – R. Broadbridge

Stand 20 – Adda Computers Ltd.

Mupet gives PETs a powerful multi-user capability by allowing from 2 to 8 PETs to share disk and printers and thus enjoy significant financial savings. Medicom 'Practice Manager' is a practical computer system for General Practice designed to control and print repeat prescriptions, maintain and age/sex register, monitor patient care and automate the practice pharmacy.

Adda Computers Ltd.
14 Broadway
West Ealing
London W13 0SR
01-579 5845
Contact name – David Whitehead

Stand 21 – Stage One Computers

A range of business software products which provides the complete solution, programmed to the highest computer (& User) standards as a result of many years computer and business experience. YOU REALLY NEED LOOK NO FURTHER. Make YOUR own system with PETAID. The General Accounting Package will satisfy your accountant. Complete flexibility in Incomplete Records. All programs are completely structured around PETAID ensuring compatibility and ease of use.

Stage One Computers
6 Criterion Arcade
Old Christchurch Road
Bournemouth
Dorset 0202-23570/295395

Stand 22 – Small Systems Engineering

Cobol on a PET?? . . .Fortran on a PET?? . . .Coral 66 on a PET?? . . .Microsoft Basic Compiler on a PET?? . . .In fact, 60K CP/M on a PET with a Z80 and no internal connections!! See this and the most comprehensive range of PET interfaces at the Show.

Small Systems Engineering
2-4 Canfield Place
London NW6 3BT
01-328 7145/6

Stand 23 – Claremont Controls Ltd.

Claremont Controls Ltd has developed the CONSTRUCTIONAL SOFTWARE suite of programmes from its background in architecture and civil engineering. New developments include PROJECT and HORNET (network to 1024 activities), STRIDER (frame analysis), HEAT LOSS, and SPECWRITER (NBS text).

Claremont Controls Ltd.
Chimney Mill
Claremont Road
Newcastle Upon Tyne
NE2 4AL
0632-610210
Contact name – Roy Stephenson

Stand 24 – L & J Computers

Programs specially written for the small business. CASH BOOK saves a lot of writing and adding. . .! OUTSIDE SERVICES, wherever external customers are supplied with service(s). STOCK-TAKING, complete print-out of stock position, % and reconciliation. STOCK CONTROL/INVOICING, invoicing debits stock quantity: stock search and print-out.

L & J Computers
192 Honeypot Lane
Queensbury
Middlesex
01-204-7525
Contact name – Jack Goodman

Stand 25 – A.C.M. Ltd.

Manufacturers of desks designed specifically for the Commodore range of computer equipment. Design features include hidden wiring and built on paper feed.

A.C.M. Ltd.
Pear Tree House
Woughton on the Green
Milton Keynes MK6 3BE
0908-679528
Contact name – Mr B.P. Hogan

Stand 26 – 3D Digital Design and Development

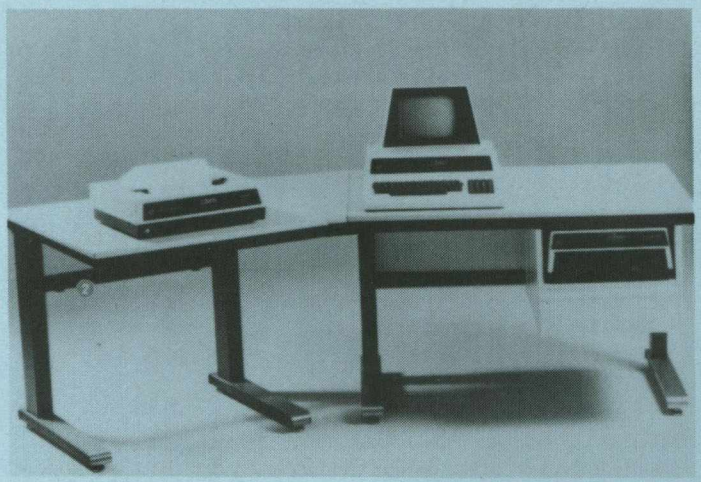
3D are exhibiting a wide range of PET-compatible interfaces for monitoring and control purposes in industrial, scientific, medical and engineering applications. These include A/D and D/A convertors of various specifications, relay and TTL outputs, BCD or contact closure inputs, motor controls, almost all such units being fully IEEE-488 compatible. 3D will also be launching their new 8 channel 12 bit D/A unit.

3D Digital Design and Development
Duchess House
18-19 Warren Street
London W1P 5DB
01-387 7388
Contact name – Alan Mills

Stand 27 – M.M.S. Ltd.

M.M.S. latest packages will be shown, including their Microfacts 80 fully integrated ledger system, which is being released at the Show. Microfacts 80 uses only 2 diskettes plus backups and can hold on-line all ledgers with high volumes split over a maximum of 5 different companies.

M.M.S. Ltd.
26 Mill Street
Bedford MK40 3HH
0234 40601
Contact name – John Percival



Stand 28 – IDA International Data Automation Ltd.

IDA will be showing a new height-adjustable PET desk, a matching printer table for PET peripherals, a paper trolley which also serves as an adjustable continuous form stand, the new Vari-Clean Kit including cleaning diskette and materials for cleaning PET screens and printers, and anti-static treatment of "chargeable" surrounds, and FOR THE FIRST TIME Kurta's Graphic Input Tablet with PET interface and software support.

IDA International Data Automation Limited
11 Station Parade
Virginia Water
Surrey GU25 4AB
Wentworth (STD 09904) 4944
Contact name – George M. Herzfeld

Stand 29 – Printout Magazine

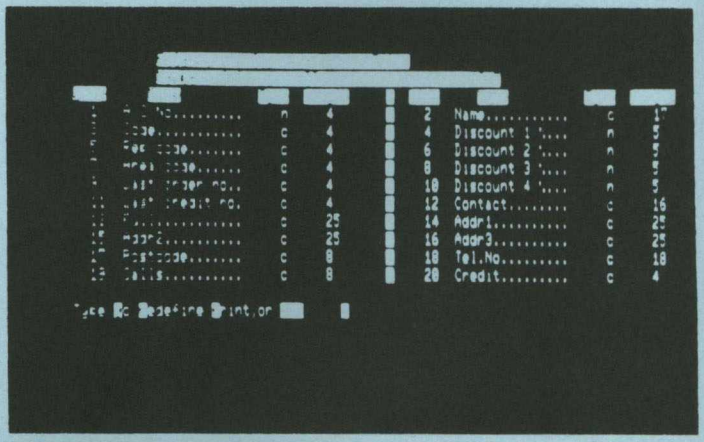
Printout is the independant magazine specializing in the CBM, PET and VIC computers. Each issue is packed with news, program listings, software reviews, tests on peripherals and articles on programming. VIC NEWS is the new magazine dedicated to the VIC. Both publications cost 95p each, but why not subscribe? Also available: The PET Companion, a book containing all the editorial from the first volume of Printout. You will find it indispensible.

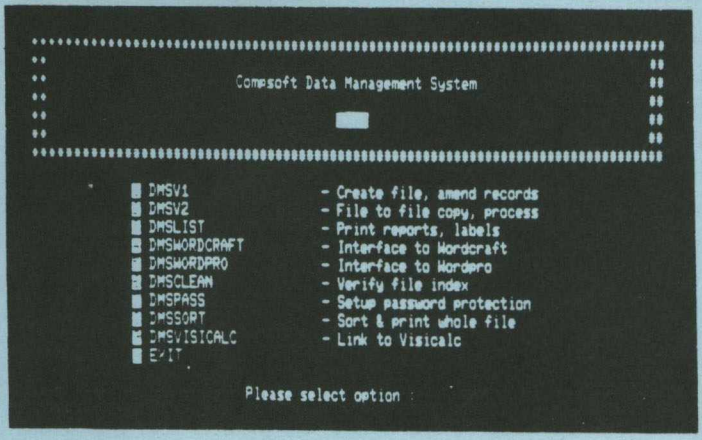
Printout Magazine
PO Box 48
Newbury
Berkshire RG16 0BP
0635-201131
Contact name – Wendy Cheetham

Stand 30 – Professional Software Ltd

Two new products just introduced are being displayed – the newly revised and updated Wordpro 2+ package has been relaunched with facilities specifically designed for light commercial use. Also on exhibit is POWER, a program designed by Brad Templeton. Created to help with program writing, checkout and updates, many features for revising or looking through a program are included. With a manual written by Jim Butterfield, all indications are that this will be the most indispensible program for programmers in the year to come.

Professional Software Ltd.
153 High Street
Potters Bar
Herts EN6 5BB
0707 42184
Contact name – Robert Webb





Stand 31 – Compsoft Ltd

This superb record keeping program, chosen by Commodore themselves for an internal application, has a unique direct information transfer facility to Wordpro, Wordcraft and Visicalc. It stores any information required, searches on multiple criteria, sorts, amends and prints reports, as well as doing batch calculation. Its many uses include business/student/client/patient/sales/stock and agency records etc. It acts as a powerful and flexible mailing list/label printer and is an essential 'front-end' for wordprocessing for storing names, addresses etc. On 3000, 4000 and 8000 series hardware, and prices around £200.00.

Compsoft Ltd.
Great Tangley Manor Farm
Wonersh
Nr. Guildford
Surrey GU5 0PT
0483-505918/39665
Contact name – Heather Kearsley

Stand 32 – Dataview Ltd

Dataview will be showing the latest version of Wordcraft 80, now a best seller internationally, as well as Microclerk, which can handle text retrieval and archival operations. Also on the stand will be our RS232 interface that allows background printing on daisywheel printers.

Dataview Ltd.
Portreeves House
East Bay
Colchester
Essex CO1 2BX
0206-865835
Contact name – Paul Handover

Stand 33 – Computer Services Midlands Ltd

With over 300 installations in Accountant's practices the C.S.M. 3/4000 Series Incomplete Records Systems leads the market. Now to the same standards come our 8000 series with a host of additional features including FLEXIBLE ACCOUNT FORMATS, Directors Reporting, Notes to the Accounts and extended Nominal Structures. Designed to compete with systems in the £10,000 to £15,000 price range the C.S.M. system represents the most cost-effective solution to accounts preparation anywhere.

C.S.M. Ltd.
Refuge Assurance House
Sutton New Road
Erdington
Birmingham B23 6QX
021-382 4171
Contact name – Peter Mart

Stand 34 – Computastore

Computastore will be exhibiting their popular Payroll system at the Show, but at the time of going to press no further details are available.

Computastore
16 John Dalton Street
Manchester M2 6HG
061-832 4761

Stand 35 – The Technical Software Centre

They will be showing TECPACS, which are high quality software packages for engineering, scientific and technical applications. They are of a high technical standard, and fulfil the need for reliable technical software which can be used in the design/drawing office or laboratory to automate routine calculations. Subject areas include: statistical data analysis, function evaluation, analysis and plotting design/drawing office aids, civil, mechanical and chemical engineering, structural analysis, sealing and lubrication, control theory.

The Technical Software Centre
B.H.R.A.
Cranfield
Bedfordshire
0234 750422
Contact name – Dr. E.T. Sweeney

Stand 36 – I.J.J. Design

I.J.J. will be exhibiting applications in the business, engineering, educational and medical areas, as well as showing their famous high resolution graphics board, for the complete range of Commodore computers. There will also be examples of bank switching.

I.J.J. Design
1 Cardigan Road
Marlborough
Wiltshire
0672 54487
Contact name – John Irwin

Stand 37 – Mills Associates Ltd

Mills Associates Ltd. is the newly appointed official maintenance organisation servicing Commodore products throughout the United Kingdom. The company has a nationwide network of computer centres and services a comprehensive range of peripherals. Our maintenance service is designed to meet the requirements of Original Equipment Manufacturers and end-users.

Mills Associates Ltd.
Wonaston Road
Monmouth
Gwent NP5 4YE
0600-4611
Contact name – Peter Howard

Stands 38 to 45 – Communications area

This is a special area at the Show set aside for communications in general, and includes exhibits from the following five companies:-

Taylor-Wilson Systems Ltd

New from Taylor-Wilson is an extension to their "TAPEPREP" suite of programs. Having used Tapeprep to create a CNC machine tool part program, the new addition, Toolpath, can be used to display on the screen the billet, the tools, and their movements, as the NC program is interpreted block by block so that the program can be checked for errors.

Taylor-Wilson Systems Ltd
Oakfield House
Station Road
Dorridge
Solihull
West Midlands B93 8HQ
05645-6192
Contact name – Sandy Livingstone

B & B Computers Ltd

B & B will be showing a new product which has recently been granted Commodore approval, and this is known as the BEE. This device has many uses, but perhaps its chief one is to allow the saving of pages of Prestel information onto disk via the PET, and being called back onto the PET screen, thus giving you colour on your PET! The Bee also allows you to download telesoftware. But it is more than just a communications box – it is a general purpose bi-directional IEEE to RS232 interface.

B and B Computers Ltd
Suite 1
124 Newport Street
Bolton
Lancs BL3 6AB
0204-26644
Contact name – John Blackburn

Cortex Computer Systems Ltd

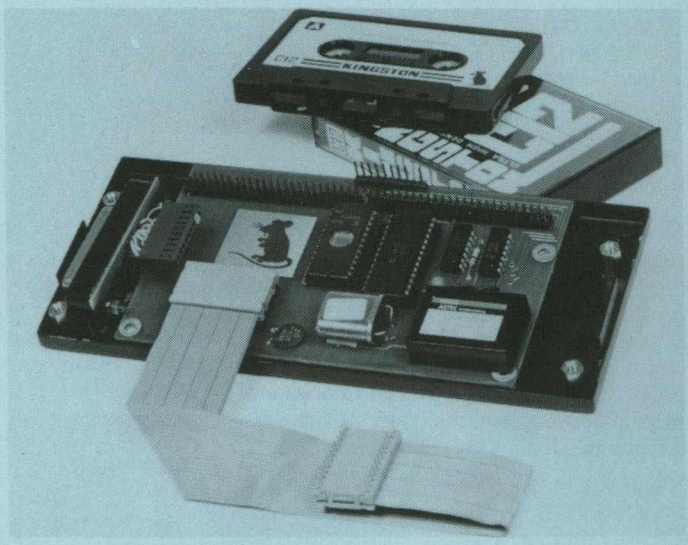
INTERCOMM and SYNCOMM are easy to use asynchronous and synchronous communications packages from CORTEX, which allow the PET to emulate both an interactive V.D.U. and a remote job entry/retrieval device to most other computers. MICROPAD allows handwritten data to be input directly to a range of computers including PETs.

Cortex Computer Systems Ltd.
Tavistock House
34/36 Bromham Road
Bedford MK40 2QD
0234-213571
Contact name – Mike Mitchell

Davidson-Richards

Davidson-Richards widely acclaimed communications controller is being demonstrated at the PET Show. This controller allows the PET to operate as an intelligent mainframe terminal. The PET can therefore operate in interactive, distributive or local mode as decided by the operator. A low cost colour printer/plotter and software development system will also be demonstrated.

Davidson-Richards
14 Duffield Road
Derby
England
0332-366803
Contact name – David Goodley



Kingston Computers Ltd

Kingston will be showing the Kingston "NETKIT" communications device (a hardware/firmware package which dramatically widens the scope of the PET). Netkit allows the PET to link to any RS232 device, including another PET, most micros, mini and mainframe computers, thus converting your PET into a terminal. Easy to use, no complicated machine code for input.

Kingston Computers Ltd
Electricity Buildings
Filey
North Yorkshire
0723-514141
Contact name – David Pollard

The overall stand contact will be Rod Wellburn of Commodore Business Machines.

Stand 46 – Alphatronic Microprocessor Applications Ltd

They will be exhibiting a light pen for the PET.

Alphatronic Microprocessor Applications Ltd
Kingsgate House
115 High Holborn
London WC1 6JP
01-404 4622
Contact name – Michael Shearing

Stand 47 – A.C.T.

Distributors of decision support software for management: financial modelling and forecasting; strategic planning; stock control, with parts explosion: word processing; programming utilities; business simulation programs; sophisticated strategy games. Sole appointed distributors in the U.K. for Personal Software Inc., and for Intelligence U.K. Ltd in the U.K. and Western Europe.

A.C.T. (Microsoft) Ltd
Shenstone House
Dudley Road
Halesowen
West Midlands
021-501 2284
Contact name – D.P.S. Low

Stand 48 – Radan Computational

Radan computational will be showing the Commodore approved plotting system and graphing software together with paper tape punchers and readers for the PET. The Radan plotting system enables accurate graphs and designs to be produced, and allows digitizing of information from drawings and photographs. Radan specialize in PET applications in engineering.

Radan Computational Ltd
19 Belmont
Lansdown Road
Bath
Avon BA1 5DZ
0225-318483
Contact name – Tony Billett

Stand 49 – Audiogenic

Audiogenic, who market all of Commodore's cassette and General Disk software via mail-order, also supply numerous computing books both general and PET-based. On display at the Show, as well as the above, will be such products as the Visible Music Monitor, the Connecticut microComputer Inc. range of interfaces and A to D convertors, and much more besides.

Audiogenic
34-36 Crown Street
Reading
Berks.
0734-595647
Contact name – Martin Maynard

Stand 50 – ECC Publiications, Educational Computing

The full range of ECC Publications is on sale. Educational Computing – essential reading in schools, colleges and universities if you are involved in teaching computing or its use as a teaching aid. Which Computer? – the magazine for all business computer buyers and users. Business Matters – the monthly magazine which takes a consumer approach to solving problems arising in the day-to-day running of a business; plus The Computer Guides.

ECC Publications
30/31 Islington Green
Islington
London N1 8DU
01-359 7481
Contact name – Tom Moloney

Stand 51 – Automation Facilities Ltd

A compact book-kit containing a selection of cleaning products has been launched by Automation Facilities Limited. The AF SAFE-KIT CONTAINS: Safeclene tape drive cleaning fluid, Safebuds Cotton Bud sticks, Safewipes lint-free cotton squares, Foamclene anti-static foam cleanser, spun-bonded Safecloths and Safeclene anti-static VDU screen wipes, and the new Floppiclene flexible disc/diskette head cleaning system.

Automation Facilities Ltd
Blake's Road
Wargrave
Berkshire RG10 8AW
073522 3012
Contact name – Mrs. P. Kinsbury

Stand 53 – Wilkes PCA

Wilkes PCA
4 Abercorn Trading Estate
Manor Farm Road
Alperton
Middlesex HA0 1FQ
01-900 0471
Contact name – Keith Brook

Stand 57 – Kadek Vision

Kadek Vision are an audio-visual company, who will be presenting a series of a-v's on equipment controlled by PETs. See their stand for address and contact details.

Stand 58 – Commodore Business Machines

The consumer division of Commodore will be showing all the latest innovations in the world of calculators and watches – many of these will be offered as prizes in a series of competitions on the VIC stands.
Contact name – David Spiers

Stand 59 – Association of London Computer Clubs

This will be an opportunity to meet several of the London-based PET user groups, under the auspices of the North London Computer Club, who will be acting as an 'umbrella' grouping the various clubs together. Numerous representatives of these clubs will be there over the duration of the Show, and will give you the chance to find out what's happening in your particular bit of London.

Association of London Computer Clubs – contact address:-
Department of Electronics
Polytechnic of North London
Holloway Road
London N7
01-607 2789 extension 2173
Contact name – Robin Bradbeer

Stand 60 – I.P.U.G.

The Independent PET Users Group – gives details of regional user groups and their activities – get to know other PET users in your area. Our beginners' machine code course will be launched and the I.P.U.G. COMPENDIUM will be on sale. For a small subscription each year (£6.50) take advantage of the group's facilities, including a bi-monthly newsletter, software library, discount scheme and a technical query service.

I.P.U.G.
164 Chesterfield Drive
Riverhead
Sevenoaks
Kent TN13 2EH
0732-53530
Contact name – Mike Ryan

Stand 61 – Regional User Groups

A number of the regional user groups will be using this stand over the three day period of the Show. Details will be available from the I.P.U.G. stand.

Stand 62 – Technofor GMBH

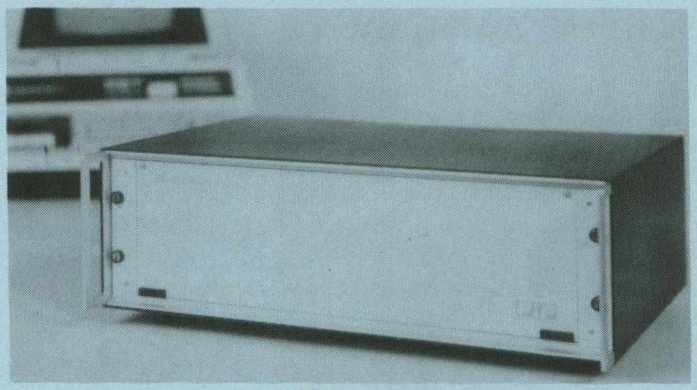
Technofor will be displaying the following:- Assembler Software Development System (Monitor Utility System MOUSY), Eprom programmer for 2K. . . 8K Eproms, Eprom emulating Rams 2K and 4K, 6502-Assembler, Teachware disc, Assembler/Linker for Add-to Basic machine programs, Sourcefile Editor, and various other accessories.

Technofor GMBH
Adalbert-Stifler-Ring 21
D-8026 Ebenhausen
West Germany
08178-3531
Contact name – Dietrich Gottstein

Stand 63 – Heronview Ltd

Heronview Limited not only supply interfacing software/hardware for specialised applications, but also supports the entire range of Commodore compatible commercial software. Professional, critical appraisal of your applications and poossible solutions is supported by the highest level of post-sales support. Our research into new hardware and applications is unparalleled.

Heronview Ltd
3 Errol Street
London EC1Y 8LX
01-628 5423
Contact name – Peter Coleman



Stand 64 – MC Computers Limited

MC Computers will exhibit a new PET-compatible analogue Input Module, type 2014, and their Plant Interface Peripheral (PIP). Both have software handlers for PETs. The 2014 incorporates an integrating ADC, is self powered and uses an IEEE 488 port. PIP is configurable for analogue and digital inputs using plug-in cards.

MC Computers Ltd
Park Street
Newbury
Berkshire RG13 1EA
0635 44967
Contact name – Mark Graves, on 01-668 4151

Stand 65 – Alphatronix B.V. shared with Herman Tirk

Alphatronix will be showing BASIC MUX installed in a PET computer. With this BASIC MUX a choice can be made out of four different roms (or eprom sets). Also, the universal eprom program will be shown (only 8 lines needed to connect it). The unique universal IEEE 488 interface for industrial purposes will be shown.

Alphatronix B.V.
Hoefslag 74
3862 KC
Nijkerk
Holland
03494-53149
Contact name – Ruud van Ginkel

Herman Tirk's address:-
Sparrenlaan 11
1272 RN
Huizen
Holland
02159-19387
Contact name – Herman Tirk

Stand 66 – Commodore Switzerland

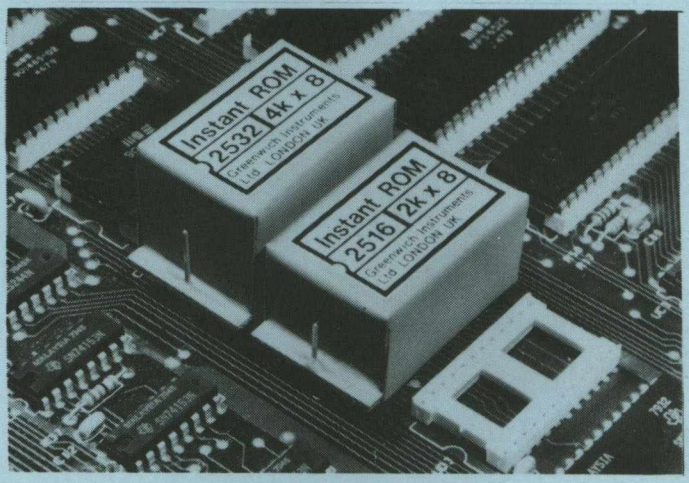
Our Swiss distributor will be at the Show, exhibiting various PET related hardware and software products.

Commodore A.G. Schweiz
Durourstrasse 9
4010 Basel
Switzerland
061-237800
Contact name – Kit Spencer

Stand 67 – Ortholog Ltd

The Ortholog 181 is a complete analogue interface unit, which turns your PET into a storage oscilloscope, an audio spectrum analyser, a speech processor and an 8 channel voltage monitor. It measures input voltages at 60,000 times per second, and gives outputs up to 100,000 times per second, for only £249.00

Ortholog Ltd
P.O. Box 72
Edgware
Middlesex HA8 6RD
01-952 2459
Contact name – Dr. M. Forshaw



Stand 68 – Greenwich Instruments Ltd

Greenwich Instruments will be exhibiting the INSTANT ROM – a new programming aid; instantly programmable yet non-volatile memory for use in PET Rom-expansion and allows quicker, easier writing of machine language utility programs. An application package for using INSTANT ROM as a 'custom font' character generator. A clock-calendar for the PET.

Greenwich Instruments Ltd
22 Bardsley Lane
Greenwich
London SE10 9RF
01-853 0868
Contact name – J.S. Blackburn, on 01-318 1510

Stand 69 – S.E. Labs E.M.I. Ltd

S.E. Data Products, a member of the Thorn E.M.I. group, supplies powerful peripheral packages for the PET user. Digital Tape transports with PET IEEE 488 interface provides for data interchange, disc backup or archival data on 1/2 inch computer compatible tape – price from £2,300. 8 inch Winchester technology discs will soon be available with a similar interface to provide fast access of data up to 24 megabyte capacity.

S.E. Labs E.M.I. Ltd
Data Products Division
Spur Road
Feltham
Middlesex
01-890 1477
Contact name – Ken Lunn

Stand 70 – Computer Sales and Software Centre Ltd

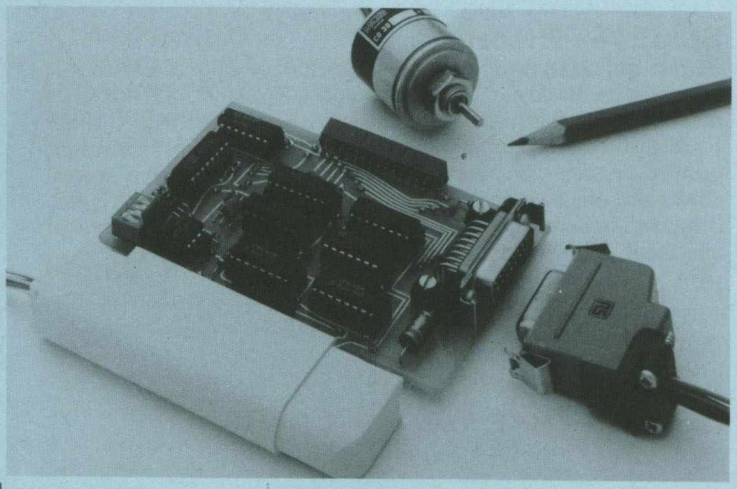
The Software Centre will be exhibiting applications in the business, education and home consumer markets, and will have all Commodore products on their stands. They will also be showing an IEEE 488 to RS232 interface.

Computer Sales and Software Centre Ltd
190-192 Cranbrook Road
Ilford
Essex
01-554 3344
Contact name – K. Neal

Stand 71 – Practical Computing

Practical Computing is Britain's leading microcomputer magazine. PET software and applications are regularly featured and every issue contains a PET ideas and advice column. Also on show is Your Computer, the new magazine for the newcomer to computing who is interested primarily in home computers costing less than £300.00. Make sure you get the first issue!

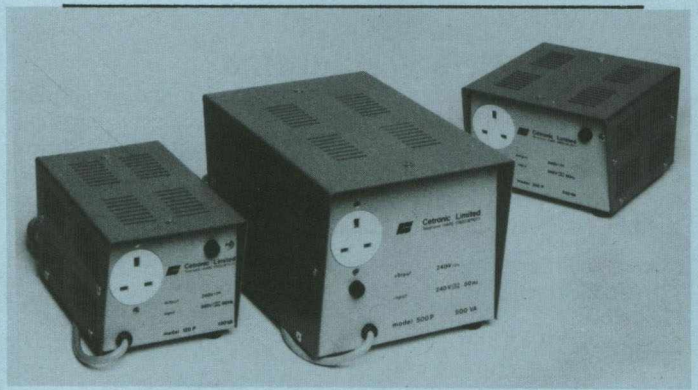
Practical Computing
Quadrant House
The Quadrant
Sutton
Surrey
01-661 3500
Contact name – David Lake



Stand 72 – Catlands Information Systems Ltd

Termi-PET is here! Termi-PET uses proved hand held data capture terminals from MSI data corporation. Data is transferred directly from terminal to PET or by GPO line and modem. Many applications with or without wand-scanning – stock, labour, research, accountants, order control. Come and see it and think of many others.

Catlands Information Services Ltd
Harrison Buildings
Green Lane
Wilmslow
Cheshire
0625-527166
Contact name – Mike Dalson



Stand 73 – Cetronic

Cetronic will be exhibiting the following: the CD30C absolute optical encoder, with specially designed PET interface to communicate with mechanical systems in the outside world. A computer controlled stepping motor driving system, and the reguvolt "P" range of constant voltage transformers.

Cetronic
Hoddeston Road
Stanstead Abbots
Ware
Hertfordshire
0920-871077
Contact name – David Everett

Stand 74 – Capital Computers

They will be showing the MULTICOM communications system, as well as a number of applications in the business area.

Stand 75 – Landsler Software

Landsler Software will be showing the following 5 programs:- Hotel GB2, the well-proved Guest Billing program; Hotel MF, a new combined Guest Billing and Booking system; Restaurant MF, a special version of MF for restaurants; Payroll Plus, the well-known and successful Plain Paper Payroll; and Wordform, a brilliant new machine code word processor at only £75.00 plus VAT.

Landsler Software (Landsoft)
29a Tolworth Park Road
Surbiton
Surrey
01-549 1178 and 01-399 2476
Contact name – Ted Landsler

Stand 76 – Supersoft

Supersoft produce many software and hardware packages for the PET, some of which have been reviewed in the newsletter in the past, and these will be on display at the Show.

Supersoft
28 Burwood Avenue
Eastcote
Pinner
Middlesex
01-866 3326

Stand 77 – Unicorn Software Limited

Want to run Cobol, Fortran or Wordstar (trademark) on your PET? Our plug-in Z80 module supports the full CP/M (trademark) version 2.2 disk operating system, allowing these and hundreds of other CP/M compatible packages to be run on any PET. No internal modifications are required.

Unicorn Software Ltd
8 Runnelfield
Harrow on the Hill
Middlesex
01-864 2069
Contact name – K. Frewin

Stand 78 – Procep

Procep will be showing the following:- EDEX 2.0 and EDEX 4.0, extension to Basic for CBM 3032 and CBM 8032; SYSMOD, a modular industrial system composed with European cards; Utilities Package, index sequential, sort language, screen (editor) generator, printing (editor) generator; Multex, connection between several 8032's and one disk drive and printer by software only; IEEE 488, firmware for complete IEEE bus on an 8032; RS232, incorporated into Basic, allowing use of PET as an intelligent terminal.

Procep
19-21 reu Mathurin Regnier
75015 Paris
France
306-82-02
Contact name – Mr. E. Kenan, Mrs. S. Voisin

Stand 79 – Commodore Benelux

Commodore Benelux will be presenting the versatile interface card for CBM 3/4/8000 series computers, containing a complete sub-microprocessor system, taking over control of the computer. The card adds the following features: 96 additional I/O lines, 2 complete RS232 ports, real-time clock (C-Mos buffered), auto-start possibility of programs, C-Mos memory with battery back-up.

Commodore Benelux
Marksingel 2E
4811 NV Breda
Holland
076-149-173
Contact name – E.P. Schol

Stand 80 – Micro Computation

Incomplete records accounting – 300 accounts, automatic double entry, totalling and VAT. Saves computation, checking, mistakes and typing. Petelex – system offers fast, accurate and portable telex tape preparation – no more interruptions from incoming telexes. The Word Processor allows editing, storage, retrieval and merging of telex messages.

Micro Computation
8 Station Parade
London N14
01-882 5104
Contact name – Claude Quinn

Stand 81 – Personal Computer World

Personal Computer World is the U.K.'s biggest selling computer magazine. Every issue contains at least one bench test, and many PET-related news items, features and program reviews. The latest issue, binder and back issues will be available at the Show.

Personal Computer World
14 Rathbone Place
London W1
01-637 7991
Contact name – Steven England

Stand 82 – Whymark Instruments

Whymark Instruments of Reigate, Surrey will be exhibiting their range of Matrix Printers from 20 to 136 chars. including the fully PET Compatible "801" Intelligent Printer of 80 to 132 columns.

The Whymark PET controlled "point-of-sale" system for retailers will be on display providing stock control for up to 10,000 product items together with a PET Compatible Bar Code Reader.

Labelling systems and Balance Interface will be on display.

Whymark Instruments
6 Holmesdale Road
Reigate
Surrey RH2 0BQ
07372-21937
Contact name – J. Whiteside or D.H. Hardy

Stand 83 – Business Electronics

Business Electronics will be showing the following products: a machine code support package for 'MIPLOT'.This is a Rom based enhancement package to greatly speed up the use of the 'MIPLOT' A3 digital printer plotter, and to add an 'easy to use' and improved command structure. Also, the PET Analogue Plotter, specially designed by Business Electronics and J.J. Lloyd Ltd. This features a unique interface and machine code subroutines for fast and simple use, and also includes character printing.

Business Electronics
Rownhams House
Rownhams
Southampton
0703-738248
Contact name – Keith Taylor or David Trew.

Stand 84 – Stage One Computers

Stage One have two stands this year – stand 21 will be displaying PETAID (and see that catalogue entry for address details) and this one will be displaying the many other programs that they have produced.

Stand 85 – CBM Germany

One of a number of Commodore outlets around the world who will be at this International PET Show.

Commodore Bueromachinen GMBH
Dornhofstr. 38
6078 Neu-Isenberg
West Germany
06102-27042
Contact name – Harold Speyer

Stand 86 – Merchant Systems Ltd

Micro 80/40 – integrated accounting system. Nine invoice types, automatic postings to nominal ledger, 800 sales/purchase accounts, 400 nominal, 24,000 postings p.m., invoices, credit notes, cash in/out, journal entries. Outputs – statements, purchase/nominal ledgers, trial balance profit and loss, balance sheet, debtors/creditors list, full audit trail. Cost, from £750.00 to £1,100.

Merchant Systems Ltd
Bride Court
5 New Bridge Street
London EC4
01-583 6774
Contact name – Neil Hiscox

Stand 87 – Microhex Computers

Four models of Eprom programmer, priced £40.00 to £300.00. Software packages include "Tillstock", a retail point of sale program for use with Whymark Instruments till. "Microrent", a consumer hire control package. "Study One", a viability and cashflow study program for the building trade. "Microsafe", a powerful software and disk security system for CBM machines.

Microhex Computers
89 Union Street
Trowbridge
Wiltshire
Trowbridge (STD 02214) 63828
Contact name – J.A. Gamson

Stand 88 – Micro-Facilities Ltd

Micro-Facilities, a leading Commodore dealer and established software house, will be showing their portfolio management system. This package, designed to meet the requirements of investment brokers, allows easy maintenance of clients portfolios, giving fast and accurate printed valuations showing profit/loss and estimated yield by category, share and client.

Micro-Facilities
129 High Street
Hampton Hill
Middlesex TW12 1NJ
01-941 1197 and 01-979 4546
Contact name – Chris Phelps

Stand 89 – Micro Computer Centre

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Stand 91 – Datatronic AB

[illegible]

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The Foyer Area

The foyer is the first thing you will see on entering the Second International PET Show, and at the time of going to press there are 6 stands there, including the Commodore newsletter stand. As with the exhibitors, the map will show you where all the stands are.

Stand 1F – Mind Your Own Business

This monthly magazine covers a wide variety of subjects ranging from investment and financial matters to advice and help in selecting word and data processing systems. Whether it's computers, copiers, consultants or general business advice 'Mind Your Own Business' offers sound, sensible editorial to its 30,000 readers.

Mind Your Own Business
Cairnmark Ltd.
The Workhouse
106 Church Road
London SE19 2UB
01-771 3614
Contact name – Judi Beckett

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As well as producing a journal described as a profit making business ideas letter, the Institute of Small Businesses will also be contributing to the series of seminars that are being organized at the Show this year.

Institute of Small businesses
13 London Road
Bromley
Kent
01-464 8686
Contact name – Mike Chantry

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Contact name – see the Baroness International Stand.

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The official voice of Commodore – a monthly magazine that contains reviews, programs, PET news and hints and just about everything you've ever wanted to know about the PET. There is a special pull-out section in each issue, which every other month turns it's attention to the PET in Education. Copies of the two latest issues will be on sale at the Show for 90p each, plus free copies of issues from volumes 1 and 2 will be available as stocks dictate.
Contact name – Pete Gerrard

Stand 6F – Future Memories

Patrick Moraz, now in the Moody Blues has written, arranged, produced and performed an outstanding potential single hit record, due for special pre-release at the Show. Also, a most unusual feature – the single is available to Show visitors in cassette form and has a special computer read out that only PET owners will decipher.

Future Memories
53 Greek Street
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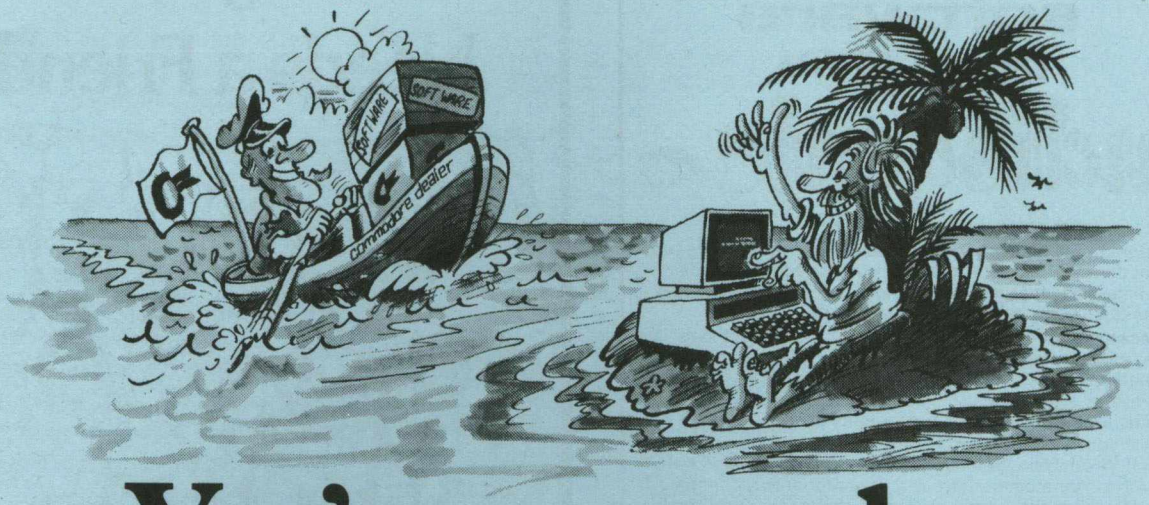

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M/Code Sequential Read Program

(From the West Australian Commodore Computer Users Association, Suite 3, 870 Beaufort Street, Inglewood, West Australia, 6052.)

I was prompted in writing this program by the frustration of trying to debug two other programs that purported to do the same thing. They were from Petsoft's 'A Hitchikers Guide to the PET' and from 'Library of PET Subroutines' by Computabits. Information, programs and program utilites are essential for the continued interest in Commodore Computers in all fields. It is a pity that so many programs and books are not fully debugged before distribution as this creates an air of unreliability that reflects on the product itself. It also causes tremendous frustration whilst programming at 1 o'clock in the morning !!!

Both the Assembler listings and hex code are enclosed for those who may not have an Assembler. If the routine is loaded after 'Dos Support', and the top of memory lowered to protect it, then they will co-exist very well. During programming it is very useful to be able to read a sequential file 'directly' without having to save the program currently in memory and writing a routine to read the sequential file. For speed reasons I did not use the Rom Screen routine as it is too slow, but instead utilised the Rom Scroll routine for effective display. To execute the routine enter SYS 32177, and then enter the file name. During display, the listing can be halted by pressing the stop key, and released with any other key.

You will note that the program initially sets up the fast screen poke; as this is not suitable for some machines it should be deleted in those cases.

By Roger Davis.
Chairman - W.A.C.C.U.A.

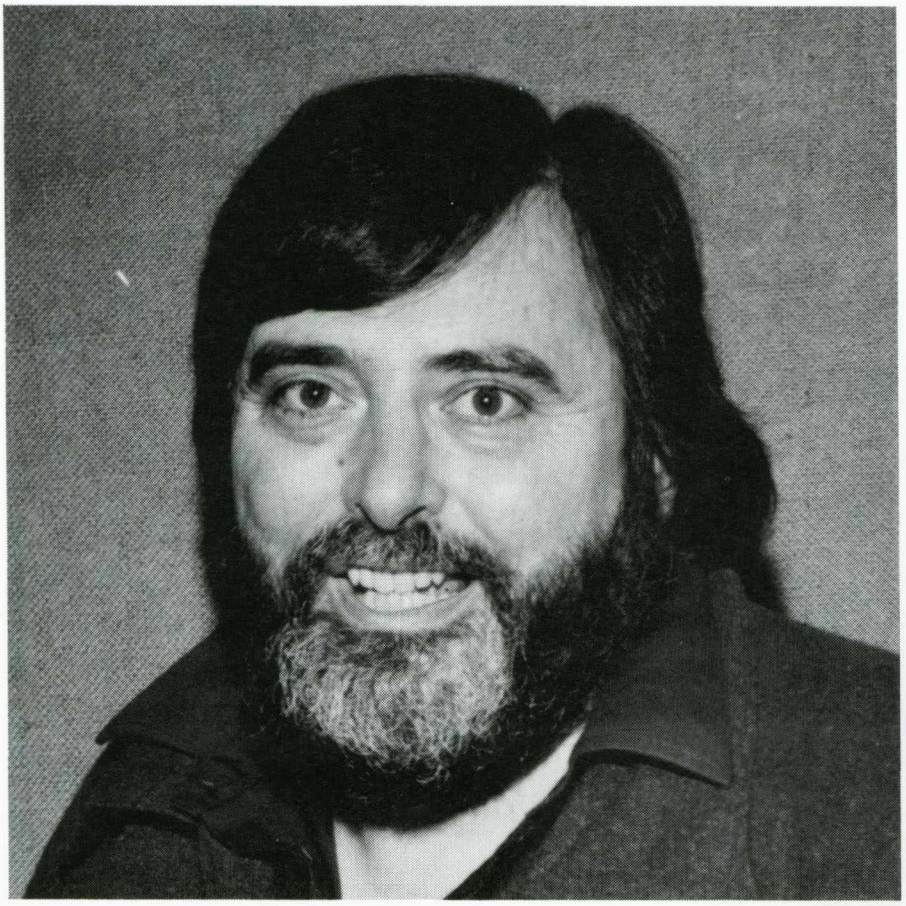
```
B*
     PC   IRQ   SR AC XR YR SP
.;  0401 E62E 32 04 5E 00 F4
.
.:  7DB0 AA A9 0E 8D 4C E8 A9 3E
.:  7DB8 8D 62 E8 20 6F C4 A9 00
.:  7DC0 85 DA A9 02 85 DB A9 02
.:  7DC8 85 D2 A9 08 85 D4 A9 02
.:  7DD0 85 D3 A2 00 BD 00 02 F0
.:  7DD8 07 E8 20 01 F3 4C D4 7D
.:  7DE0 86 D1 20 24 F5 A2 02 20
.:  7DE8 70 F7 A2 00 A0 00 8E 00
.:  7DF0 10 20 01 F3 F0 03 4C 03
.:  7DF8 7E 20 E4 FF F0 FB A2 02
.:  7E00 20 70 F7 A9 00 20 8C F1
.:  7E08 A4 96 D0 08 AE 00 10 A0
.:  7E10 00 4C 23 7E A2 00 A0 00
.:  7E18 A5 D2 20 AE F2 20 CC FF
.:  7E20 20 8B C3 A8 C0 0D D0 08
.:  7E28 20 3F E5 A2 00 4C EE 7D
.:  7E30 98 9D C0 83 E8 E0 28 90
.:  7E38 B5 4C 28 7E AA AA AA AA
.?
.
READY.
```

```
SEQSRC......PAGE 0001

LINE# LOC   CODE          LINE

0001  0000                ;*********************************
0002  0000                ;*
0003  0000                ;*         PROGRAM TO READ
0004  0000                ;*
0005  0000                ;*      SEQUENTIAL DISK FILES
0006  0000                ;*
0007  0000                ;*        VIA M/CODE ROUTINE
0008  0000                ;*
0009  0000                ;*********************************
0010  0000                ;*
0011  0000                ;*********************************
0012  0000                ;*
0013  0000                ;*
0014  0000                ;*         BY ROGER DAVIS
0015  0000                ;*
0016  0000                ;*     15TH - 19TH AUGUST 1980
0017  0000                ;*
0018  0000                ;*
0019  0000                ;*********************************
0020  0000                ;
0021  0000                ;
0022  0000                ; SYSTEM VARIABLES
0023  0000                ;
0024  0000                ;
0025  0000  LONAM=$DA      ;ADDRESS OF FILE NAME LOW BYTE
0026  0000  HINAM=$DB      ;ADDRESS OF FILE NAME HIGH BYTE
0027  0000  LD=$D2         ;LOGICAL DEVICE NUMBER
0028  0000  PA=$D4         ;PRIMARY ADDRESS
0029  0000  SA=$D3         ;SECONDARY ADDRESS
0030  0000  FILEN=$D1      ;LENGTH OF FILE NAME
0031  0000  ST=$96         ;STATUS CODE
0032  0000  BOTT=$83C0     ;LEFT BOTTOM SCREEN
0033  0000                ;
0034  0000                ;
0035  0000                ; SYSTEM SUBROUTINE CALLS
0036  0000                ;
0037  0000                ;
0038  0000  TESTOP=$F301   ;TEST STOP
0039  0000  GETKEY=$FFE4   ;GET KEY PRESS
0040  0000  READY=$C38B    ;READY !!!!!!
0041  0000  INPUT=$C46F    ;INPUT FROM KEYBOARD
0042  0000  FOPEN=$F524    ;OPEN FILE LA,FA,SA
0043  0000  CHKIN=$F770    ;SET INPUT DEVICE
0044  0000  INBYTE=$F18C   ;INPUT SOURCE BYTE
0045  0000  FCLOSE=$F2AE   ;CLOSE FILE
0046  0000  CLRCHN=$FFCC   ;CLOSE I/O CHANNELS
0047  0000  SCROLL=$E53F   ;SCROLL SCREEN
0048  0000                ;
0049  0000                ;

SEQSRC......PAGE 0002

LINE# LOC   CODE          LINE

0051  0000                ;
0052  0000                *=$7DB1;BEGIN HERE
0053  7DB1                ;
0054  7DB1                ;
0055  7DB1                ;** NOTE THAT TOP OF MEMORY MUST
0056  7DB1                ;** FIRST BE LOWERED TO PROTECT
0057  7DB1                ;** THIS ROUTINE AND ALLOW IT TO
0058  7DB1                ;** BE USED AS A UTILITY WHILST
0059  7DB1                ;** PROGRAMMING.
```

Continued on Page 21.

Multi Key Sorting

Mike Gross-Niklaus



Mike Gross-Niklaus, this month sorting out sorts

1. Sorting column by column.
When sorting a two dimensional array using two or more columns as primary and secondary keys, many of us would chose to do it column by column. For example, if you have a table containing NAME in column 1, SEX male or female in column 2 and AGE in column 3, then to sort the array into "NAME within AGE within SEX", most people would do a sort on column 1, then on column 3 and finally on column 2.

```
BUBBLE BY COL
BROWN       F       21
BROWN       F       22
JONES       F       30
SMITH       F       30
WHITE       F       46
BLACK       M       30
BLACK       M       31
GREEN       M       41
JONES       M       41
GREEN       M       45
```

```
ORIGINAL ARRAY
WHITE       F       46
SMITH       F       30
GREEN       M       41
BROWN       F       21
JONES       F       30
JONES       M       41
BROWN       F       22
BLACK       M       30
GREEN       M       45
BLACK       M       31
```

```
SELECT COL BY COL
BROWN       F       21
BROWN       F       22
JONES       F       30
SMITH       F       30
WHITE       F       46
BLACK       M       31
JONES       M       41
GREEN       M       41
GREEN       M       45
BLACK       M       30
```

```
BUBBLE FLD BY FLD
BROWN       F       21
BROWN       F       22
JONES       F       30
SMITH       F       30
WHITE       F       46
BLACK       M       30
BLACK       M       31
GREEN       M       41
JONES       M       41
GREEN       M       45
```

```
SELECT FLD BY FLD
BROWN       F       21
BROWN       F       22
JONES       F       30
SMITH       F       30
WHITE       F       46
BLACK       M       30
BLACK       M       31
GREEN       M       41
JONES       M       41
GREEN       M       45
```

```
READY.
```

Some sorts, however, such as the 'Select', sorting column by column will not give you the desired order. And that's a pity because the 'Select' sort, (and the Shell-Metzner of course), can be faster than a Bubble sort.

2. Sorting field by field.

An alternative method to column by column sorting is to do the sort just once, but comparing as many fields per element as are necessary to determine the correct order. Taking the example above, the sort would for each pair of elements, look at the SEX field, then if both fields were the same, at the AGE, and if they were equal then the NAME. Using this scheme, multi-key sorting works using any of the common sorting routines.

3. A demonstration

Shown below is a demonstration program which sorts the same array of data, using BUBBLE and SELECT sorts, in both 'column by column' and 'field by field' modes. I've laid out the program in my usual style, but spaced out the statements on to a line with plenty of REM statements to help you see what's going on.

```
10 REM MULTI-KEY SORT DEMO
20 REM MIKE GROSS-NIKLAUS
30 REM 9.5.81
40 REM FOR CPUCN
99 REM"

1000 REM PRELIMINARIES
1010 DIM DA$(10,3), CO(3)
1099 REM"

2000 REM DO FOUR SORTS
2010 GOSUB 9000          :REM SETUP
2020 PRINT"■■ORIGINAL ARRAY"
2022 GOSUB 8000          :REM ARRAY PRINT
2030 CO(1)=1 :CO(2)=3    :REM COL BY
2032 CO(3)=2             :REM  COL
2040 GOSUB 3000          :REM BUBBLE
2050 GOSUB 4000          :REM INSERT
2060 CO(1)=2 :CO(2)=3    :REM FLD BY
2062 CO(3)=1             :REM  FLD
2070 GOSUB 5000          :REM BUBBLE
2080 GOSUB 6000          :REM SELECT
2090 END
2099 REM"
```

READY.

In the Preliminaries block the Data array which is to be sorted is set up as DA$(10,3). The small CO(3) array is used to hold the pointers to the next sort column in the correct order of processing.

In the main block, starting at 2000, the original data is fed into the array and displayed in unsorted sequence. Then the column priorities are set up and each sort obeyed. Notice that the column priorities are different for the two modes. Column by column sorts require the columns specifying in reverse order of importance. Field by field sorting requires them in priority order.

```
3000 REM BUBBLE COL BY COL
3010 PRINT"■■BUBBLE BY COL"
3012 T1 = TI              :REM STRTTIME
3020 FOR PR = 1 TO 3      :REM COLS
3022 FOR LM = 9 TO 2 STEP -1
3024 SW= 0                :REM SWOPFLG
3026 FOR RO = 1 TO LM     :REM EACH
3028 A$= DA$(RO,CO(PR))   :REM  ELMNT
3030 B$= DA$(RO+1,CO(PR)):REM   PAIR
3032 IF A$<=B$ THEN 3036  :REM SKIP
3034 X= RO+1   GOSUB 7000:REM SWOP
3036 NEXT RO              :REM NXT PR
3038 IF SW=0 THEN 3042    :REM COL END
3040 NEXT LM              :REM NXT PASS
3042 NEXT PR              :REM NXT COL
3050 T2 = TI              :REM STOPTIME
3052 GOSUB 8000           :REM DISPLAY
3054 RETURN
3099 REM"

4000 REM SELECT COL BY COL
4010 GOSUB 9000 : PRINT"■■SELECTCOL BY COL"
4012 T1 =TI               :REM STRTTIME
4020 FOR PR = 1 TO 3      :REM COLS
4022 FOR LM = 1 TO 9
4024 FOR RO = LM+1 TO 10  :REM MATCH
4026 A$ =DA$(LM,CO(PR))   :REM  TWO
4028 B$= DA$(RO,CO(PR))   :REM   ELMNTS
4030 IF A$<=B$ THEN 4034  :REM SKIP
4032 X=LM : GOSUB 7000    :REM SWOP
4034 NEXT RO              :REM NXT PR
4036 IF SW=0 THEN 4040    :REM COL END
4038 NEXT LM              :REM SHORTEN
4040 NEXT PR              :REM NEXT COL
4050 T2 = TI              :REM STOPTIME
4052 GOSUB 8000           :REM DISLPLAY
4054 RETURN
4099 REM"
```

READY.

The first sort, in block 3000, is the ubiquitous Bubble, nested into a loop, PR, to define which column should be sorted next. The code for swopping over all three fields of the two elements being processed has been placed in a subroutine, 7000,

```
5000 REM BUBBLE FIELD BY FIELD
5010 GOSUB 9000 : PRINT"■■BUBBLE FLD BY FLD"
5012 T1= TI               :REM STRTTIME
5020 FOR LM = 9 TO 2 STEP -1
5022 SW= 0                :REM SWOPFLAG
5024 FOR RO = 1 TO LM     :REM EACH
5026 FOR PR = 1 TO 3      :REM  FIELD
5028 A$= DA$(RO,CO(PR))   :REM   ELMNT
5030 B$= DA$(RO+1,CO(PR)):REM    PAIR
5032 IF A$<B$ THEN 5042   :REM SKIP
5034 IF A$=B$ THEN 5040   :REM FLDS =
5036 X= RO+1 : GOSUB 7000:REM SWOP
5038 GOTO 5042            :REM & NXT PR
5040 NEXT PR              :REM NXT FLD
5042 NEXT RO              :REM NXT PAIR
5044 IF SW = 0 THEN 5050  :REM FINISH
5046 NEXT LM              :REM NXT PASS
5050 T2= TI               :REM STOPTIME
5052 GOSUB 8000           :REM DISPLAY
5054 RETURN
5099 REM"

6000 REM SELECT FIELD BY FIELD
6010 GOSUB 9000 : PRINT"■■SELECT FLD BY FLD"
6012 T1= TI               :REM STRTTIME
6020 FOR LM = 1 TO 9
6022 FOR RO = LM+1 TO 10:REM MATCH
6024 FOR PR = 1 TO 3      :REM  FLD
6026 A$= DA$(LM,CO(PR))   :REM   ELMNT
6028 B$= DA$(RO,CO(PR))   :REM    PAIR
6030 IF A$<B$ THEN 6040   :REM SKIP
6032 IF A$=B$ THEN 6038   :REM FLDS =
6034 X= LM   GOSUB7000    :REM SWOP
6036 GOTO6040             :REM & NXT PR
6038 NEXT PR              :REM NXT FLD
6040 NEXT RO              :REM NXT PAIR
6042 NEXT LM              :REM NXT PASS
6050 T2= TI               :REM STOPTIME
6052 GOSUB 8000           :REM DISPLAY
6054 RETURN
6099 REM"
```

READY.

because all four sorts require elements to be swopped. The start finish times are placed in T1 and T2, and a call to the display routine in 8000 allows you to see that the Bubble has done its stuff, and tells you how many jiffies it took.

The second sort in 4000, is a 'Select' sort using column by column mode. First the array is restored to it's original unsorted order, by calling the setup routine in 9000. The sort works by comparing every element in turn with element 1, and swopping if appropriate. The element 2 is treated the same way and so on. Unfortunately, while it works fine on one-key sorts, in this case, when the sorted array is printed you will see that it has failed to achieve the desired order!

The sort in block 5000 is the Bubble again, this time using field by field mode. After restoring the original array, the column loop, PR, is this time nested within the RO loop which specifies the elements being compared. PR selects the fields in the correct order, only moving on to the next field when the previous one has resulted in an exact match.
The final sort in block 6000 is the 'Select' used in field by field mode.

Again the PR loop is nested within the Row selection loop, RO.

```
7000 REM SWOP ELEMENTS
7010 FOR SC = 1 TO 3
7020 F$ = DA$(RO,SC)
7030 DA$(RO,SC) = DA$(X,SC)
7040 DA$(X,SC) = F$
7050 NEXT SC : SW = 1 : RETURN
7099 REM"
```

```
8000 REM PRINT ARRAY
8020 FOR RO = 1 TO 10
8030 FOR CO = 1 TO 3
8040 PRINT DA$(RO,CO),
8050 NEXT CO : PRINT
8060 NEXT RO
8070 IF EF=0 THEN 8090
8080 PRINT "          ■■"T2-T1; "JIFFIES"
8090 EF=1 : RETURN
8099 REM"

9000 REM SET UP ARRAY
9010 RESTORE
9020 FOR RO = 1 TO 10
9030 FOR CO = 1 TO 3
9040 READ DA$(RO,CO)
9050 NEXT CO, RO
9060 RETURN
9099 REM"

10000 REM SAMPLE DATA FOR THE SORT
10010 DATA WHITE,F,46
10020 DATA SMITH,F,30
10030 DATA GREEN,M,41
10040 DATA BROWN,F,21
10050 DATA JONES,F,30
10060 DATA JONES,M,41
10070 DATA BROWN,F,22
10080 DATA BLACK,M,30
10090 DATA GREEN,M,45
10100 DATA BLACK,M,31
```

READY.

Blocks 7000, 8000 and 9000 contain subroutines for Swopping, Printing the array, and filling up the array from Data statements respectively. Block 10000 contains some sample data.

Some sample results using the test data are shown in the printouts. Obviously the 'Select by column' has failed, while 'Select using fields' has worked. The times of the two Bubble sorts indicate that field mode is considerably quicker than sorting by column, and this difference should become more and more pronounced as the size of the sort increases.

4. Applications.

I've illustrated this article with the Bubble and Selection sorts because they are the easiest to follow, and it's the principle, rather than clever sorting, that is the point here. You may like to try applying the scheme to the Shell-Metzner, (versions of which have been published in this magazine), which is faster than either the Bubble or the Selection sort.

It's worth noting that many of the machine sorts now commercially available use the 'field' method described here to accomplish multi-key sorting. Those of you who are into assembler code will find that the principle can be adapted to the sort shown in an earlier volume of CPUCN, published a couple of months ago.

Mike Gross-Niklaus

Disk Use for Beginners

David J. Pocock

Hello again! Unfortunately I must start this months article with an apology. Last month I said that there was no difference between the 2040 and 3040, but this is not quite true. The operation of the two units is the same, certainly as far as programming them is concerned; however there is a difference in the 'Main Board' inside the unit. This difference only becomes apparent if you want to upgrade from DOS 1.2 (2040/3040) to DOS 2.1 (4040). Converting a 3040 to a 4040 is simply a matter of changing ROMs on the main board, but to change a 2040 to a 4040 involves changing the 'Main Board'.

With that out of the way, here goes for PART 2. This month :-
DUPLICATE, LOAD, SAVE, VERIFY, COPY, the COMMAND CHANNEL and ERRORS.
WARNING : As we are doing much more serious stuff this month do not attempt any of the commands until you have finished reading the article.

DUPLICATE

Before you go any further insert the Utility Disk into drive 0 (left) and a blank disk into drive 1 then CAREFULLY type the following:-
OPEN 1,8,15
PRINT#1,"D 1 = O" (no spaces)
Ensure that you have inserted the disks in the correct drives. The disks should both spin for 3-4 mins (8 for 8050s) and the LEDs on the drives will both be lit (the central LED should not be on (green for 8050)). At the end of this period remove the Utility Disk from drive 0 and put it away safely. Now remove the disk from drive 1 and re-insert the disk in drive 0.

What you have just done is to make a copy of the Utility Disk onto a blank disk.

If the centre LED glows RED make sure that the disks are in the correct drives, and then try it once more. If it fails again see your dealer and tell him that your Utility disk is corrupt.
NOTE :- If you get the disks in the wrong drives you may end up copying a blank disk onto the Utility Disk.

LOAD

Before we can SAVE a program we must first of all have a program to SAVE. For those of you who know any BASIC you can write your own small program (anything, even just printing 'HELLO'). Otherwise you can LOAD an existing program off the Utility Disk. Pick any of the programs on the utility disk (those with PRG against the name not SEQ), then load the program :-

LOAD"x:name",8
w h e r e
x is the drive number (0 or 1).
name is the Program name.
8 is the disk device number.
LIST to show something has loaded. Now that you have done that take another blank disk and place it in drive 1. Format the disk (see last months article on formatting new disks).

SAVE

Now that you have a program in the PET you will want to store it on the disk for later use. To do this type :-
SAVE "x:name",8

Save the program onto the blank (formatted) disk 1, in which case x becomes 1.

If you miss the drive number out the program will not be saved correctly, and garbage will be written onto the disk. If this happens you must delete the program from the disk (check both) and tidy up the disks (See next month).

VERIFY

As with cassettes you will want to check that the information stored on the disk is correct. To do this type :-
VERIFY"x:name",8
x and name are the same for SAVE. If the PET responds with 'VERIFY ERROR' delete the file and re-save. If the information is correct the PET will respond with OK.

COPY and the COMMAND CHANNEL

This command enables you to copy a file (PRG or SEQ. USR files can be copied on 4040s and 8050s but not 3040s) from one drive to the other without it passing through the PET. For those of you with more than one disk unit (there are some!) it cannot be used to copy from one disk unit to another.

The syntax (i.e. the structure for the COPY command is :-
C x:new = y:old (no spaces)

where
C Stands for COPY.
x is the destination drive number.
new is the destination file name.
y is the source drive number.
old is the source file name.

To use the COPY command you must open the command channel. You have done this before when you initialised the disk, formatted the disk and when you duplicated a disk. To open the command channel :-
OPEN f,8,c
where
f is the file number (1-255).
8 is the disk divice number.
c is the channel (15 = Command Channel).

Normally I use f = c as this reminds me what the file is for and saves confusion when commands use 'f' and 'c' for different things (a later article).

The secondary address or channel 'c' has various values for different uses. Its value is 15 for the command channel.
To send a copy command :-
PRINT 1, "Cx:new=y:old"

You can send as many commands as you wish until you close the command channel with 'CLOSE 1' or you LOAD, SAVE or VERIFY a program.

ERRORS

The command channel has another use apart from telling the disk unit what you want it to do. The command channel is also used by the disk unit to leave messages that will tell you that things have worked correctly or what has gone wrong.
To access these 'ERROR' messages you must read from the command/error channel. This is done using the INPUT Command. As INPUT can only be used in a program, below is a program which reads and prints the 'ERROR' message.

```
NEW
10    OPEN 15,8,15
40    INPUT#15,EN,EM$,ET,ES
50    PRINT EN; EM$; ET; ES
70    CLOSE 15
```

The message consists of four parts :-

EN The Error Number. This number gives an accurate error report. Details of what each number means is in the disk manual.

EM$ The Error Message. This string gives a brief description of the error, for example 'READ ERROR'. This tells you that the disk unit could not read part of a disk for some reason. A more detailed reason is found in the disk manual under the correct error number. (Note that there are 6 different READ ERRORs).

ET The Error Track. This tells you the track on which the error occured.

ES The Error Sector. This tells you where on the track the error occured.

Some of the messages are not associated with a particular TRACK and SECTOR and so these parts of the message are set to zero

When you delete files from the disk the message left tells you how many files have been erased in the Error Track part of the message (more on that next time).

If you add the following lines to the program above it will give a short utility program to use while experimenting.

```
20 INPUT "COMMAND *
(CLR)(CLR)(CLR)";CM$:IF
CM$="*" THEN 70
30PRINT$ 15, CM$
60 GOTO 20
```

This program will now ask for a command string, send the command to the disk and then print the 'ERROR' message. To finish just press RETURN when asked for the command.

e g s .

```
COMMAND ?
C1:PROGRAM2=0:PROGRAM1
```

This will copy PROGRAM from drive 0 and put it on drive 1 and call it PROGRAM2.

While we're still here I suggest that you SAVE this program for later.

THATS ALL (for this time) FOLKS.

Next Time :- SCRATCH, VERIFY, RENAME, SHORT HAND (and MORE ???)

Continued from page 17

```
0060  7DB1                                ;**
0061  7DB1                                ;** DO THIS WITH:-
0062  7DB1                                ;**              POKE 52,176
0063  7DB1                                ;**              POKE 53,125
0064  7DB1                                ;**
0065  7DB1                                ;** THE ROUTINE WILL THEN
0066  7DB1                                ;** CO-EXIST WITH DOS-SUPPORT.
0067  7DB1                                ;
0068  7DB1                                ;
0069  7DB1  A9 0E           LDA #$0E      ;LOAD ACC WITH 14
0070  7DB3  8D 4C E8        STA $E84C     ;STORE IN 59468
0071  7DB6  A9 3E           LDA #$3E      ;LOAD ACC WITH 62
0072  7DB8  8D 62 E8        STA $E862     ;STORE IN 59490
0073  7DBB                                ;
0074  7DBB  20 6F C4  START  JSR INPUT     ;GET FILE NAME
0075  7DBE  A9 00           LDA #$00      ;LOW BYTE OF FILENAME ADDRESS
0076  7DC0  85 DA           STA LONAM     ;STORE IN POINTER LOW
0077  7DC2  A9 02           LDA #$02      ;HIGH BYTE OF FILENAME ADDRESS
0078  7DC4  85 DB           STA HINAM     ;STORE IN POINTER HIGH
0079  7DC6  A9 02           LDA #$02      ;SET LOGICAL FILE NO:2
0080  7DC8  85 D2           STA LD        ;STORE IN LOG. DEV. NO:POINTER
0081  7DCA  A9 08           LDA #$08      ;SET DEVICE NO:8
0082  7DCC  85 D4           STA PA        ;STORE IN DEV. NO:POINTER
0083  7DCE  A9 02           LDA #$02      ;SET SECONDARY ADDR.2
0084  7DD0  85 D3           STA SA        ;STORE IN SEC. ADDR. POINTER
0085  7DD2  A2 00           LDX #$00      ;SET INDEX TO ZERO
0086  7DD4                                ;
0087  7DD4  BD 00 02  LOOP1  LDA $0200,X  ;GET CHARACTER FROM INPUT BUFFER
0088  7DD7  F0 07           BEQ EXEC      ;IF ZERO THEN FILENAME END
0089  7DD9  E8              INX           ;BUMP UP INDEX
0090  7DDA  20 01 F3        JSR TESTOP    ;TEST STOP KEY
0091  7DDD  4C D4 7D        JMP LOOP1     ;AND DO AGAIN
0092  7DE0                                ;
0093  7DE0  86 D1     EXEC  STX FILEN     ;SET FILENAME LENGTH
0094  7DE2  20 24 F5        JSR FOPEN     ;OPEN FILE
0095  7DE5  A2 02           LDX #$02      ;SET X REGISTER TO LOG FILE NUMBER
0096  7DE7  20 70 F7        JSR CHKIN     ;SET INPUT DEVICE
0097  7DEA  A2 00           LDX #$00      ;SET X REGISTER TO ZERO
0098  7DEC  A0 00           LDY #$00      ;SET Y REGISTER TO ZERO
0099  7DEE                                ;
0100  7DEE  8E 00 10  LOOP2  STX $1000     ;SAVE X VALUE
0101  7DF1  20 01 F3        JSR TESTOP    ;TEST FOR STOP KEY
0102  7DF4  F0 03           BEQ WAIT      ;YES ?...THEN HOLD IT!
0103  7DF6  4C 03 7E        JMP CONT      ;NO ?...CONTINUE
0104  7DF9                                ;


SEQSRC.....PAGE 0003

LINE# LOC   CODE          LINE


0106  7DF9  20 E4 FF  WAIT  JSR GETKEY    ;LOOK FOR ANY KEY
0107  7DFC  F0 FB           BEQ WAIT      ;NO ?...THEN STILL WAIT
0108  7DFE  A2 02           LDX #$02      ;RESET X REGISTER
0109  7E00  20 70 F7        JSR CHKIN     ;..AND RE-CHECKIN
0110  7E03                                ;
0111  7E03  A9 00     CONT  LDA #$00      ;CLEAR ACC ??
0112  7E05  20 8C F1        JSR INBYTE    ;GET CHARACTER FROM FILE
0113  7E08  A4 96           LDY $96       ;TEST STATUS
0114  7E0A  D0 08           BNE END       ;END OF FILE OR ERROR DETECTED
0115  7E0C  AE 00 10        LDX $1000     ;RECOVER X REGISTER
0116  7E0F  A0 00           LDY #$00      ;CLEAR Y REGISTER ??
0117  7E11  4C 23 7E        JMP LOOP3     ;PRINT CHARACTER
0118  7E14                                ;
0119  7E14  A2 00     END   LDX #$00      ;CLEAR X REGISTER ??
0120  7E16  A0 00           LDY #$00      ;CLEAR Y REGISTER ??
0121  7E18  A5 D2           LDA LD        ;LOAD LOGICAL FILE NUMBER
0122  7E1A  20 AE F2        JSR FCLOSE    ;CLOSE FILE
0123  7E1D  20 CC FF        JSR CLRCHN    ;CLEAR CHANNELS &
0124  7E20                                ;RESET DEFAULT I/O
0125  7E20  20 8B C3        JSR READY     ;BACK INTO COMMAND BASIC
0126  7E23                                ;
0127  7E23  A8        LOOP3 TAY           ;TRANSFER ACCUM. TO Y-INDEX
0128  7E24  C0 0D           CPY #$0D      ;COMPARE TO CARRIAGE RETURN
0129  7E26  D0 08           BNE PRINT     ;NO ?...THEN PRINT IT!
0130  7E28                                ;
0131  7E28  20 3F E5  SCRL  JSR SCROLL    ;ELSE SCROLL SCREEN
0132  7E2B  A2 00           LDX #00       ;RESET X-REGISTER
0133  7E2D  4C EE 7D        JMP LOOP2     ;AND RETURN ...
0134  7E30                                ;
0135  7E30  98        PRINT TYA           ;TRANSFER Y-REGIS TO ACCUM.
0136  7E31  9D C0 83        STA BOTT,X    ;PRINT CHARACTER TO SCREEN
0137  7E34  E8              INX           ;INCREMENT X-REGISTER
0138  7E35  E0 28           CPX #$28      ;COMPARE TO 40
0139  7E37  90 B5           BCC LOOP2     ;NO ?...THEN RETURN
0140  7E39  4C 28 7E        JMP SCRL      ;ELSE SCROLL SCREEN
0141  7E3C                                ;
0142  7E3C                    .END


ERRORS = 0000


SYMBOL TABLE

SYMBOL  VALUE
 BOTT     83C0    CHKIN    F770    CLRCHN   FFCC    CONT     7E03
 END      7E14    EXEC     7DE0    FCLOSE   F2AE    FILEN    00D1
 FOPEN    F524    GETKEY   FFE4    HINAM    00DB    INBYTE   F18C
 INPUT    C46F    LD       00D2    LONAM    00DA    LOOP1    7DD4
 LOOP2    7DEE    LOOP3    7E23    PA       00D4    PRINT    7E30
 READY    C38B    SA       00D3    SCRL     7E28    SCROLL   E53F
 ST       0096    START    7DBB    TESTOP   F301    WAIT     7DF9


END OF ASSEMBLY
```

PET and the IEEE Bus

1 The operation of the IEEE or HP Interface Bus is generally admitted to be somewhat complicated. However it is now a well established industry standard for scientific and techinical application and is one of the unique features of the Commodore PET system.

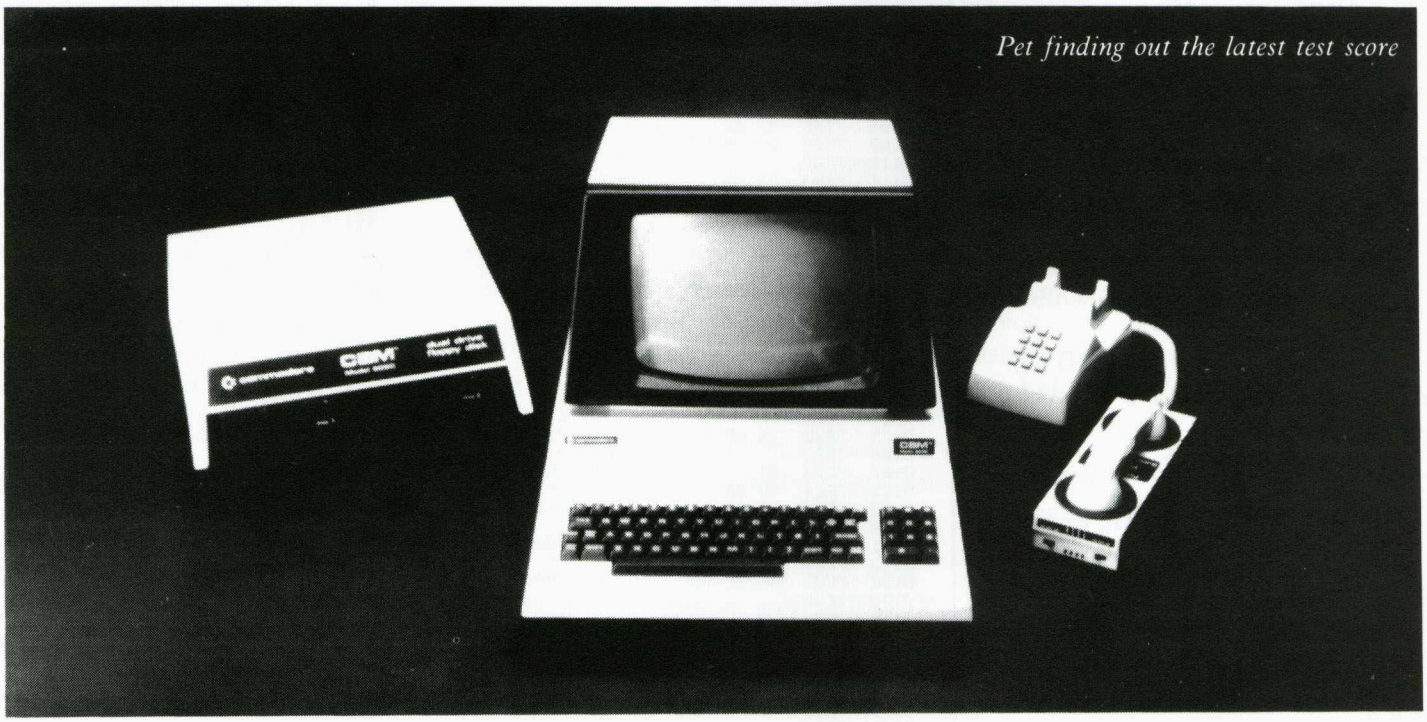
As well as the 'IEEE-488 Standard Digital Interface for Programmable Instrumentation - 1978', which was a revision of the 1975 Standard, a great deal has been written about the working of this bus, both by the Hewlett Packard people who originated the protocol, and by enthusiasts for the PET interested in interfacing it to the many IEEE compatible instruments, such as programmable power supplies and digital voltmeters, which are now available. In addition an excellent example of the bus protocol implemented in machine code has already been published in CPUCN. No. 04.

This article attempts to examine the actual machine code ROM routines employed in the original 2001 version of the PET. A number of articles, and a book published recently, have given detailed information on the IEEE bus, interpreting the operation of BASIC commands and statements with reference to the bus, but little appears to have been shown of the machine code or assembler mnemonic routines which actually implement the protocol. The register bit manipulations which activate the management and transfer bus signals are detailed here together with the corresponding register addresses.

IEE ROM routines

The IEEE ROM routines can be obtained by disassembling the code from $F0B6 on to $FICB in the upper ROM area of the operating system, and are reproduced, with comments, in the Appendix Pages 1-3. These are easily found as they follow immediately after a number of File Messages ending with 'READY', and are followed by the routines which execute the BASIC commands for CMD devices. A (hopefully) complete list of IEEE-488 Register Addresses is given in Table 1 along with the addresses of those locations which are repeatedly used by the IEEE routines in Table 2. Return entry points are given in Table 3.

Since many detailed descriptions of the IEEE bus signals are given elsewhere only a summary will be given below. It should be noted that negative logic is used on the IEEE bus so that bus signals and commands are active low-true, and high-false, and that data bits are inverted on the bus i.e. it is necessary to complement data bits transmitted or received on the bus and to leave the bus in an active high state. →



Pet finding out the latest test score

Apologies section

In last month's article by Mike Gross-Niklaus, the section headed A Counting Algorithm contained a mistake. Sorry...Step B should have read "Pick up the RIGHT hand digit and add one to it", not the left hand digit. The same error also occured in describing the ADDONE routine. Mike's explanation was that after spending so many years giving talks and demonstrations in front of people he is used to thinking of right as left and vice versa for the benefit of people looking at him. Seems reasonable to me.

Apologies to John Collins who occasionally goes boldly rather than bodly.

No doubt there are other spelling mistakes but I don't think there was anything disastrous.

Finally, a mention for the North London Computer Club (rah rah!!) who supplied the pictures of John Collins and Barry Miles in last month's issue but who didn't get an acknowledgment themselves. Thank you North London Computer Club - you're doing a grand job, keep it up.

The same message applies to all other user (usr?) groups everywhere - when the Supreme Being gets round to producing a day that's got a lot more than 24 hours in it I'll be getting in touch with you.

Original Implementation

The original 2001 PET implementation of the IEEE-488 Bus is a subset of the standard suitable got most purposes (this has been rectified in the new ROM sets). In a PET system, the PET can be the only controller on the bus. Of the Interface Management Lines - REN is held permanently grounded by the PET (enabled), IFC is driven low-true during the reset sequence, and SRQ is not implemented from BASIC but accessible from machine code. ATN is asserted low-true during addressing and command sequences otherwise is high-false for data. EOI is always pulled low-true by the controller during the transfer of its last data byte on the DIO lines. Of the Transfer Control Lines (handshake lines) the talker originates DAV and listeners originate NRFD and NDAC. The handshake signals are:-

NRFD (Not Ready For Data) - active low signal line indicates that one or more assigned listeners are not ready to receive the next data byte - when all the assigned listeners for a particular data transfer have released NRFD, the NRFD line goes inactive - high - this tells the talker to place the next data byte on the Data Bus.

DAV (Data Valid) - line is activated by talker shortly after talker places a valid data byte on the data bus - an active low DAV signal tells each listener to capture the data byte presently on the bus - the talker is inhibited from activating DAV when NRFD is active low.

NDAC (Not Data Accepted) -signal line is held active low by each listener until the listener captures the data byte then NDAC goes inactive high - this tells the talker to take the byte off the Data Bus.

The PET uses ASCII codes to transmit and receive characters on the bus, and an extended version of these ASCII codes to transmit primary and secondary addresses and other control information on the IEEE bus.

Any instruments on the bus must have a device number in the range 4 to 30 (0-3 are used by the KYBD, cassettes 1 and 2 and video screen respectively) which is usually set by DIL switches in the instrument, and the instrument must be addressed accordingly. This is done by transmitting on the bus the primary address evaluated from the Talk or Listen Address Group. The formats are TAG = 0100 AAAA and LAG = 0010 AAAA with MTA = $40 (sets bit 6) and MLA = $20 (sets bit 5) and evaluated as:-

TAG = (MTA) OR (Device No);
LAG = (MLA) OR (Device No).

The secondary address formats are SCG = 0110 SSSS, 1110 SSSS, 1111 SSSS with the latter forms used with 'OPEN' or 'CLOSE'.

The universal command Unlisten and Untalk are:-

UNL = $3F = 0011 1111, UNT = $5F = 0101 1111,

the lower nibble having the effect of overwriting any data bits on the bus. As to the assembler codes used, the 6502 mnemonic BIT instruction is worth noting as this sets both the N and V flags in the P register as well as the Z flag, i.e.:-

BIT : AM, M_7 — N, M_6 — V and if AM = 0 then Z = 1

which is a most powerful and useful instruction.

Typical Transaction

In a typical bus transaction, proceeded by an 'OPEN' statement in BASIC, the PET controller must take command of the bus and output the appropriate Listen (LAG) or talk (TAG) command to assign devices as listeners or talkers on the bus. Meanwhile PET indicates that command or control characters are valid on the bus by putting ATN low-true. However PET must first ensure that bytes remaining (deferred) in the IEEE output buffer from a previous transaction are transmitted on the bus, along with EOI, before this is done. In general PET transmits the previous character (deferred char.) and stores the current character in the IEEE output buffer, thus delaying transmission at all times by one byte. NRFD and NDAC are normally held high-false so that unless NDAC is pulled low by an active device on the bus a "Device Not Present" error will result - indicated by setting bit 7 of the status byte (ST =-128). A flowchart of the "Send TALK/LISTEN to IEEE" routine is given in Fig 1 and the Rom routine in appendix page 1.

Send TALK/LISTEN to IEEE - routine stores MTA or MLA on the stack, generates the appropriate bus signals, then tests the deferred output flag byte and as a result either transmits the last byte with EOI set low-true, followed by the TAG or LAG (evaluated from the MTA/MLA values retrieved from the stack), or else sends TAG/LAG directly.

To actually transmit the byte and effect the handshake protocol PET enters the "Send Byte to IEEE" routine shown in Fig 2 and appendix page 1.

Send BYTE to IEEE - in this routine PET is controller/talker and so originates DAV and expects to receive RFD and DAC - NDAC must go high within the 65 ms time out limit or the timer times out and the status bit is set for time out on WRITE - this routine gets the deferred data character from the IEEE output buffer then handles the handshake signal (as shown in the timing diagram Fig 2a) and so transmits the character on the bus.

To get a byte or character from the IEEE bus PET enters the routine 'GET Byte from IEEE' shown in Fig 3 and page 3 which is essentially similar to the output routine.

Get BYTE from IEEE - in this routine PET is controller/listener and so originates NDAC and NRFD and expects to receive DAV - again the timer is reset and tested for the time out on READ so that DAV must go low-true within 65 ms of NRFD being set high-false - PET performs the input handshake with the timing as shown in Fig 3a and returns the data byte in the accumulator.

The ROM routines which generate the Secondary Address for Talker/Listener and the Untalk/Unlisten routines are shown on page 2 of the appendix.

It is hoped that the above will provide some insight into how the PET ROM routines implement the IEEE-488 bus protocol. However I am much indebted to the many people, including Fisher and Jensen, Ron Geere and Mike Todd, Nick Hampshire, Dr C Preece, John Cooke and Gregory Yob, who have previously published material on the IEEE bus or indicated the address locations in ROM. I would also be grateful to anyone pointing out any errors, inaccuracies and omissions (of which there must by many), as this will contribute to the general understanding of how the bus is operated in the PET.

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Continued over

TABLE 1
IEEE-488 Hardware Addresses and Signal Information

Hardware:- PIA 652Ø #1 (KYBD PIA), PIA 652Ø #2 (IEEE PIA), VIA 6522

HARDWARE LOCATION	SIGNAL SYMBOLIC NAME	HEX ADDRESS	DEC ADDRESS	BITS USED	IEEE SIGNAL	SIGNAL MODE	I/O LINES
652Ø#2	IEEIØ-7	E82Ø	59424	Ø-7	DIO1-8	INPUT	PAØ-7
652Ø#2	IEEOØ-7	E822	59426	Ø-7	DIO1-8	OUTPUT	PBØ-7
652Ø#2	IEEIS	E821	59425	3	$\overline{\text{NDAC}}$	OUTPUT	CA2
				7	$\overline{\text{ATN}}$	INPUT	CA1
652Ø#2	IEEOS	E823	59427	3	$\overline{\text{DAV}}$	OUTPUT	CB2
				(bits 4,5 = 1)			
				7	$\overline{\text{SRQ}}$	INPUT	CB1
						(not buffered)	
652Ø#1	PIAL	E81Ø	594Ø8	6	$\overline{\text{EOI}}$	INPUT	PA6
652Ø#1	PIAL1	E811	594Ø9	3	$\overline{\text{EOI}}$	OUTPUT	CA2
				(bits 4,5 = 1)			
6522	PIAØ	E84Ø	59456	Ø	$\overline{\text{NDAC}}$	INPUT	PBØ
	PIA1			1	$\overline{\text{NRFD}}$	OUTPUT	PB1
	PIA2			2	$\overline{\text{ATN}}$	OUTPUT	PB2
	PIA6			6	$\overline{\text{NRFD}}$	INPUT	PB6
	PIA7			7	$\overline{\text{DAV}}$	INPUT	PB7
6522	T1C-H	E845	59461	Timer for timeout on READ/WRITE (enter # FF to reset)			
6522	IFR	E84D	59469	6 Register to control timeout			IFR

TABLE 2
IEEE-488 Adresses

Address	Location/Contents/Function
ØØEF	Current logical file number.
ØØFØ	Current secondary address
	(has bit 5 and bit 6 set-defaults to FF)
ØØF1	Current device number.
ØØFD (253)	Timeout status bit.
Ø2ØC (524)	Status Byte (BASIC variable ST)
	bit Ø AND mask #Ø1 Timeout on data transfer from PET (WRITE)
	i.e. no response on NDAC line for 65 ms from listener
	if NDAC is low-true bit Ø is set (ST = 1).
	bit 1 AND mask #Ø2 Timeout for data transfer into PET (READ)
	i.e. no response on $\overline{\text{DAV}}$ line for 65 ms from talker
	if $\overline{\text{DAV}}$ is high-false bit 1 is set (ST = 2)
	bit 6 AND Mask #4Ø EOI signal (ST = 64)
	bit 7 AND mask #8Ø Device not present (ST = 128)
Ø21D (541)	IEEE deferred output flag byte
	(contains FF if character waiting to the output, ØØ if none)
Ø222 (546)	IEEE output buffer
	(used to delay IEEE output by one character)
Ø263	Device no. for INPUT
	(current CMD input device - defaults to ØØ - KYBD)
Ø264	Device no. for OUTPUT
	(current CMD output device - defaults to Ø3 - SCREEN)
F13B (61755)	Flag status for TIME OUT error on WRITE
F142 (61762)	Flag status for 'Device Not Present' error
F146 (61766)	Flag status for TIME OUT error on READ
F1B5	Flag status for End or Identify (EOI) set
FBE5	Flag error in ST (set ST error flag)
	(accumulator has error bit set on entry).

TABLE 3
Routine Entry Points for IEEE-488 Bus

ROUTINE START ADDRESS	FUNCTION	ENTERED FROM
	MACHINE CODE ROUTINES	
FØB6	Send TALK (TAG) to IEEE Bus	F378, F7BC
	(Sets IEEE device (device No in $F1) as talker)	
FØBA	Send LISTEN (LAG) to IEEE Bus	F6C6, F6EA,
	(Sets IEEE device (device no in $F1) as listener)	F8ØD
FØBC	Set ATN true and send character in accumulator	F182
FØF1	Send BYTE (CHAR) to IEEE Bus	F172, F1F2
	(Gets a character from IEEE output buffer in $222 into accumulator and sends it on the IEEE Bus)	
F12C	Send SECONDARY ADDRESS (SCG) to listener	F6FS, F81E
	(Sends character in accumulator to IEEE listener device)	
F132	Inhibit SECONDARY ADDRESS	F164, F185,
	(Sends no secondary address if not specified)	F814
F15B	Send SECONDARY ADDRESS (SCG) to talker	F7CD
	(Sends char. in accumulator to IEEE talker device)	
F164	Inhibit SECONDARY ADDRESS	F7C3
F167	Send deferred CHAR to IEEE Bus	F244
	(Sends previous character and saves current char.)	
F17A	Send UNTALK (UNT) to IEEE Bus	F296
	(Untalk all devices on the bus)	
F17E	Send UNLISTEN (UNL) to IEEE Bus	F288
	(Unlisten all devices on the bus)	
F187	Get a BYTE (CHAR) from IEEE Bus	F22D
	(Gets a single char. from IEEE bus to accumulator)	
	BASIC ROUTINES	
F1CC	BASIC routine for 'GET' from CMD device	FFE4
F1DF	BASIC routine for 'INPUT' from CMD device	FFCF
F231	BASIC routine for 'OUTPUT' to CMD device	FFD2
F27D	BASIC routines for UNLISTEN and UNTALK all devices on IEEE Bus	FFCC, CAD8
F2C8	BASIC routine for 'CLOSE'	FFE7
F52A	BASIC routine for 'OPEN'	FFCØ
F78B	Set CMD INPUT device in 263	
F7DC	Set CMD OUTPUT device in 264	

FIG 1
Send TALK/LISTEN to IEEE Bus

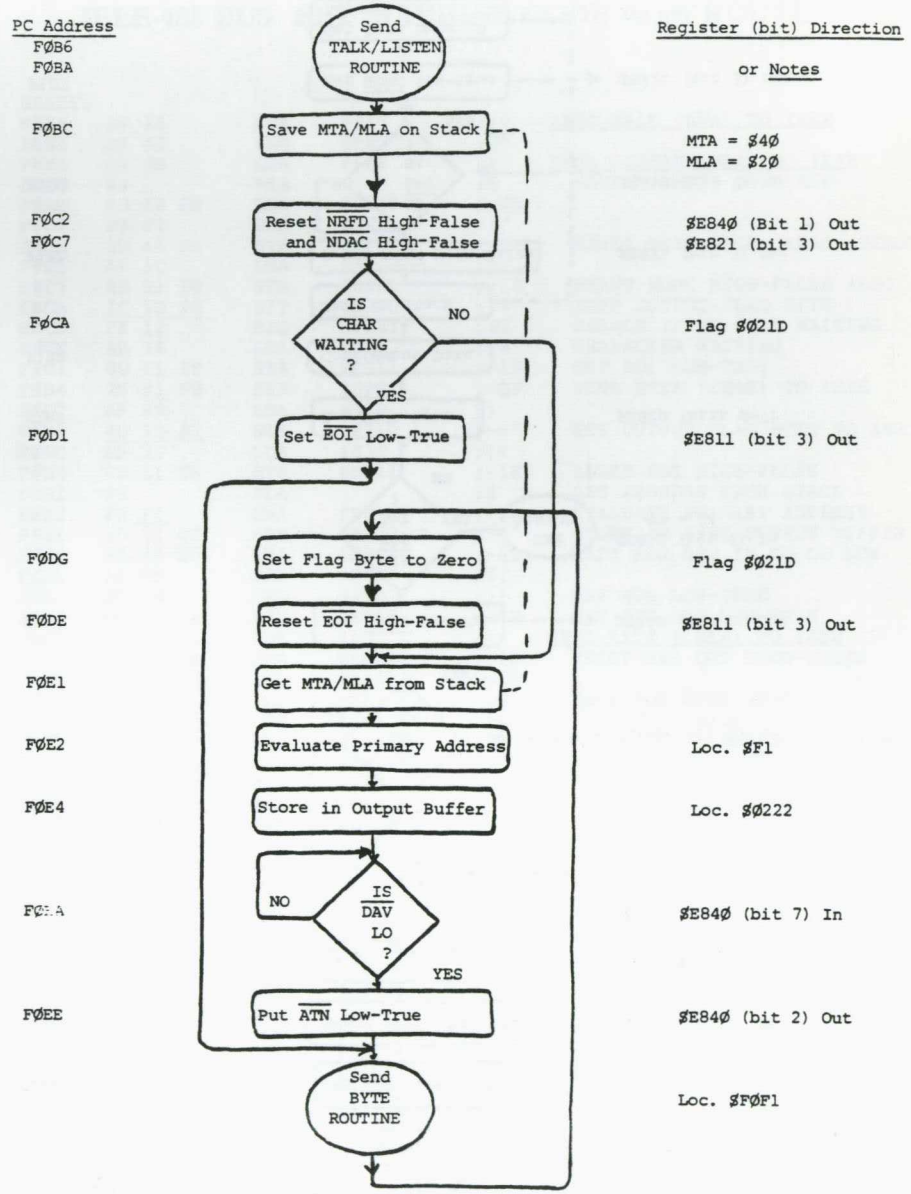
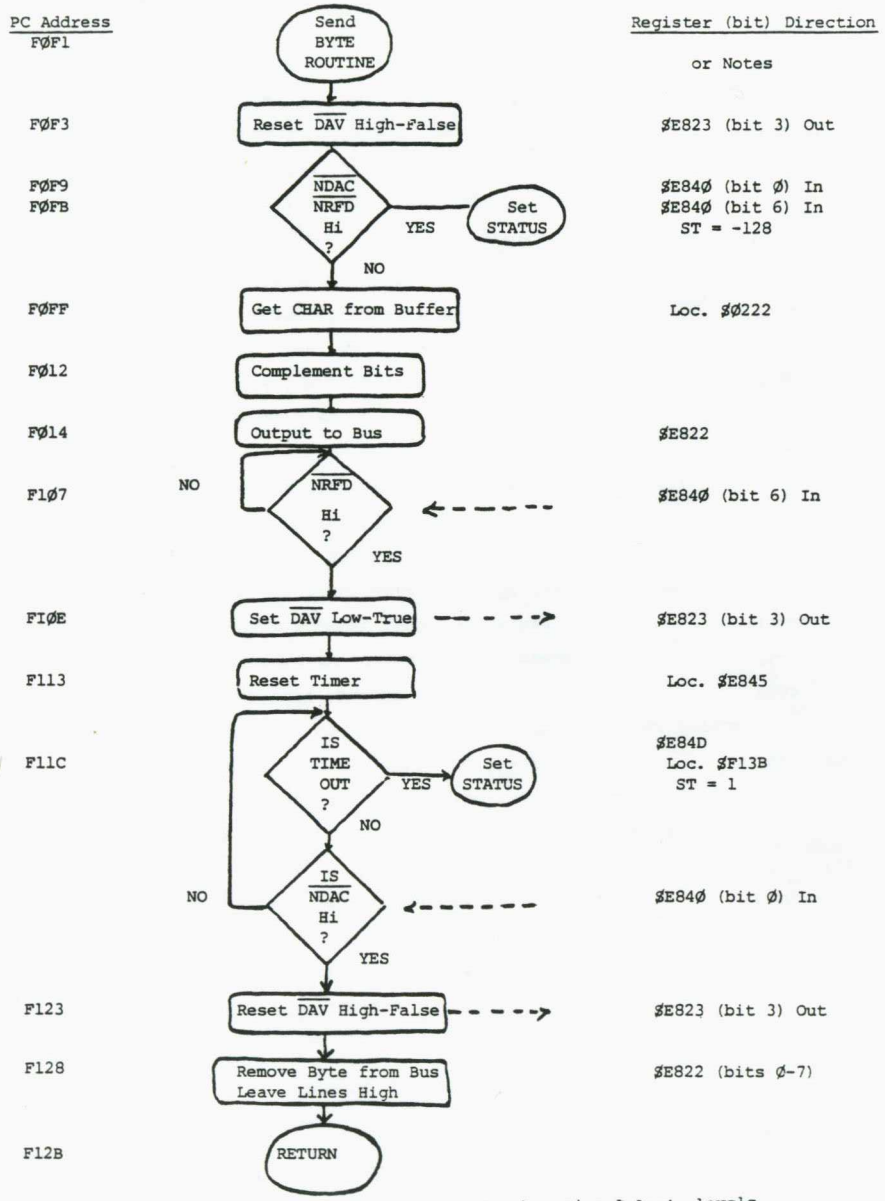


FIG 2
Send Byte (CHAR) to IEEE Bus



Note: Broken lines indicate testing of transfer bus signal logic levels.

FIG 3
Get BYTE (CHAR) from IEEE Bus

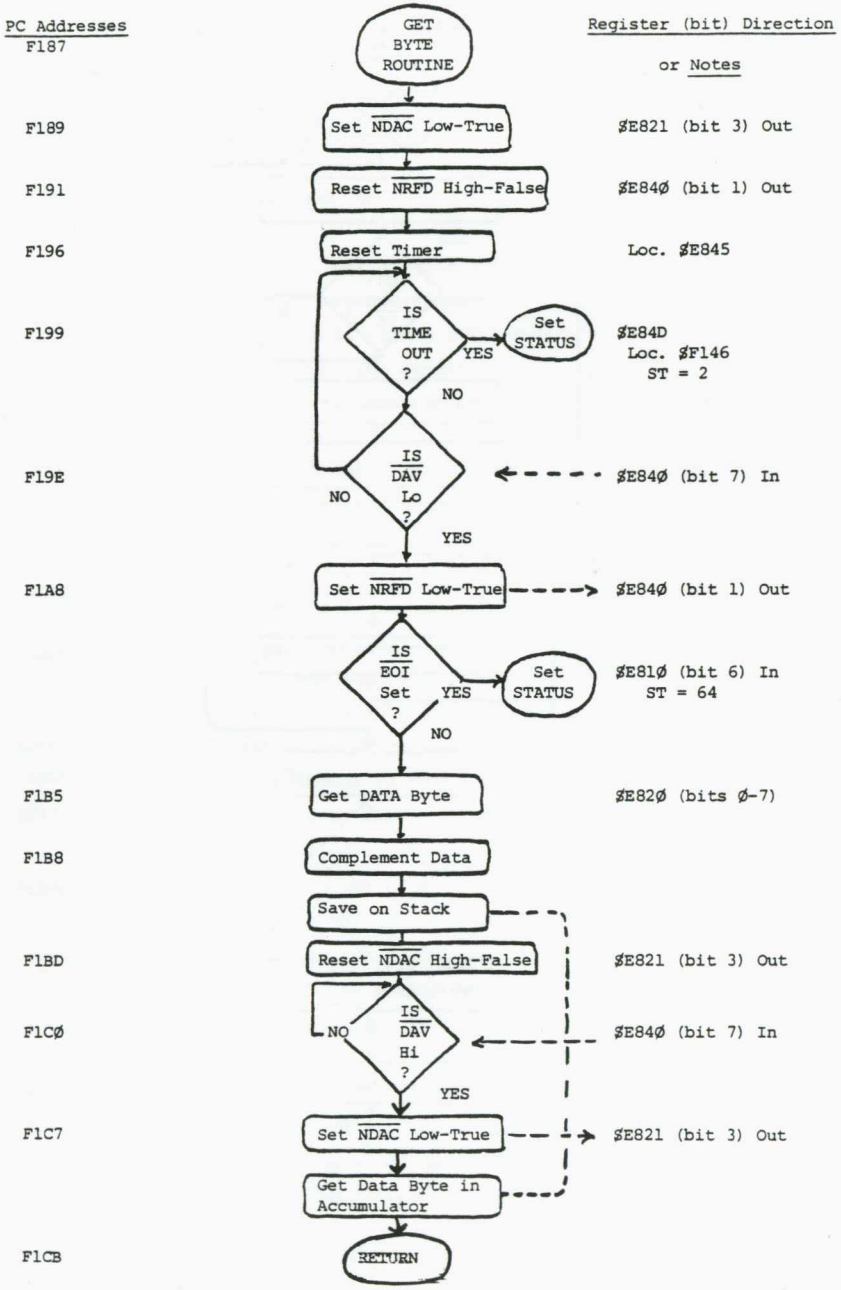


FIG 2a
Handshake Timing Diagram for Send BYTE to IEEE Routines

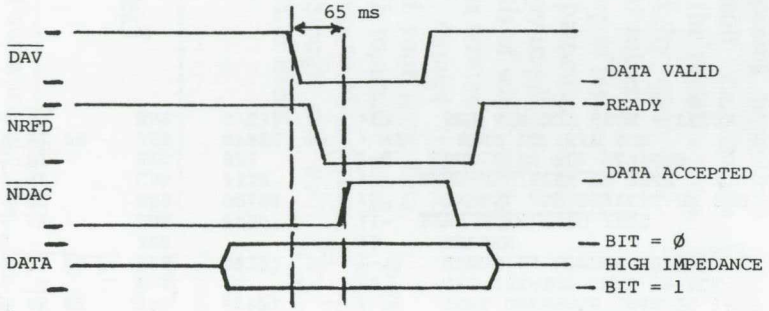
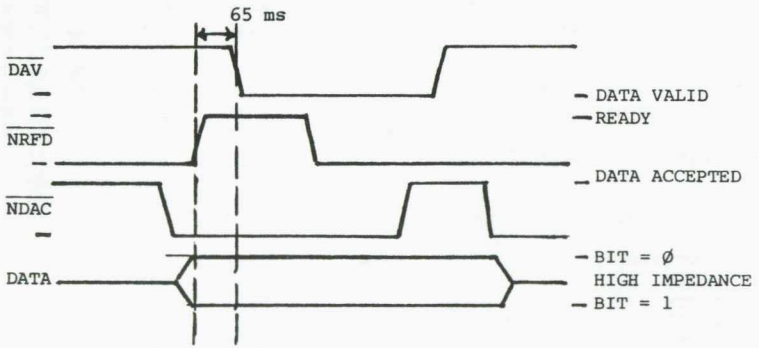


Fig 3a Handshake Timing Diagram for Get BYTE from IEEE Routine



TRANSFER BUS HANDSHAKE PROTOCOLS

IEEE-488 BUS PET MACHINE CODE ROM ROUTINES

```
READY.
F0B6   A9 40      LDA   #$40      ;)@   SEND TALK (MTA) TO IEEE
F0B8   D0 02      BNE   $F0BC     ;P"
F0BA   A9 20      LDA   #$20      ;)    SEND LISTEN (MLA) TO IEEE
F0BC   48         PHA             ;H      SAVE ADDRESS ON STACK
F0BD   AD 40 E8   LDA   $E840     ;-@H
F0C0   09 02      ORA   #$02      ;)"
F0C2   8D 40 E8   STA   $E840     ;-@H    RESET NRFD HIGH-FALSE (READY)
F0C5   A9 3C      LDA   #$3C      ;)<
F0C7   8D 21 E8   STA   $E821     ;-1H    RESET NDAC HIGH-FALSE ALSO
F0CA   2C 1D 02   BIT   $021D     ;,="    TEST OUTPUT FLAG BYTE
F0CD   F0 12      BEQ   $F0E1     ;P2     BRANCH IF NO CHAR WAITING
F0CF   A9 34      LDA   #$34      ;)4     CHARACTER WAITING
F0D1   8D 11 E8   STA   $E811     ;-1H    SET EOI LOW-TRUE
F0D4   20 F1 F0   JSR   $F0F1     ; QP    SEND BYTE )CHAR) TO IEEE
F0D7   A9 00      LDA   #$00      ;)
F0D9   8D 1D 02   STA   $021D     ;-="    SET OUTPUT FLAG BYTE TO ZERO
F0DC   A9 3C      LDA   #$3C      ;)<
F0DE   8D 11 E8   STA   $E811     ;-1H    RESET EOI HIGH-FALSE
F0E1   68         PLA             ;H      GET ADDRESS FROM STACK
F0E2   05 F1      ORA   $F1       ;%Q     EVALUATE PRIMARY ADDRESS
F0E4   8D 22 02   STA   $0222     ;-""    STORE IN IEEE OUTPUT BUFFER
F0E7   AD 40 E8   LDA   $E840     ;-@H    WAIT FOR DAV IN TO GO LOW
F0EA   10 FB      BPL   $F0E7     ;0[
F0EC   29 FB      AND   #$FB      ;)[     DAV NOW LOW-TRUE
F0EE   8D 40 E8   STA   $E840     ;-@H    SET ATN OUT LOW-TRUE
F0F1   A9 3C      LDA   #$3C      ;)<   SEND BYTE (CHAR) TO IEEE
F0F3   8D 23 E8   STA   $E823     ;-#H    RESET DAV OUT HIGH-FALSE
F0F6   AD 40 E8   LDA   $E840     ;-@H
F0F9   29 41      AND   #$41      ;)A     TEST FOR BOTH NDAC
F0FB   C9 41      CMP   #$41      ;IA      AND NRFD HIGH-FALSE
F0FD   F0 43      BEQ   $F142     ;PC     BOTH HIGH - SET STATUS BYTE
F0FF   AD 22 02   LDA   $0222     ;-""    GET CHAR FROM OUTPUT BUFFER
F102   49 FF      EOR   #$FF      ;I      COMPLEMENT BITS FOR BUS
F104   8D 22 E8   STA   $E822     ;-"H    OUTPUT DATA BYTE TO BUS
F107   2C 40 E8   BIT   $E840     ;,@H    TEST IF NRFD HAS GONE HIGH
F10A   50 FB      BVC   $F107     ;P[     IF NOT THEN WAIT
F10C   A9 34      LDA   #$34      ;)4     NRFD HIGH-FALSE (READY)
F10E   8D 23 E8   STA   $E823     ;-#H    SET DAV OUT LOW-TRUE
F111   A9 FF      LDA   #$FF      ;)      RESET TIMER
F113   8D 45 E8   STA   $E845     ;-EH     FOR 65MS TIMEOUT
F116   AD 40 E8   LDA   $E840     ;-@H    WAIT FOR NDAC TO GO HIGH
F119   2C 4D E8   BIT   $E84D     ;,MH    TEST FOR TIMEOUT ON WRITE
F11C   70 1D      BVS   $F13B     ;P=     TIMEOUT ERROR - SET STATUS
F11E   4A         LSR             ;J
F11F   90 F5      BCC   $F116     ;0U     TIME NOT OUT - TEST AGAIN
F121   A9 3C      LDA   #$3C      ;)<     NDAC HIGH (DATA ACCEPTED)
F123   8D 23 E8   STA   $E823     ;-#H    RESET DAV OUT HIGH FALSE
F126   A9 FF      LDA   #$FF      ;)      REMOVE DATA BYTE FROM BUS
F128   8D 22 E8   STA   $E822     ;-"H      LEAVE LINES HIGH
F12B   60         RTS             ;@      RETURN
```

```
IEEE-488 BUS   PET MACHINE CODE ROM ROUTINES

F12C   8D 22 02    STA    $0222      ;-""  SEND SECONDARY ADDRESS
F12F   20 F1 F0    JSR    $F0F1      ; QP   TO IEEE LISTENER DEVICE
F132   AD 40 E8    LDA    $E840      ;-@H   SEND NO SECONDARY ADDRESS
F135   09 04       ORA    #$04       ;)$     NO SEC ADDR SPECIFIED
F137   8D 40 E8    STA    $E840      ;-@H   SET ATN OUT HIGH-FALSE
F13A   60          RTS               ;@     RETURN
F13B   A9 01       LDA    #$01       ;)!    FLAG ST FOR TIMEOUT ON WRITE
F13D   20 E5 FB    JSR    $FBE5      ; E[
F140   D0 DF       BNE    $F121      ;P-
F142   A9 80       LDA    #$80       ;)     FLAG ST FOR DEVICE NOT PRESENT
F144   30 F7       BMI    $F13D      ;0W
F146   A9 02       LDA    #$02       ;)"    FLAG ST FOR TIMEOUT ERROR
F148   20 E5 FB    JSR    $FBE5      ; E[     ON READ
F14B   AD 40 E8    LDA    $E840      ;-@H
F14E   29 FD       AND    #$FD       ;)]
F150   8D 40 E8    STA    $E840      ;-@H   SET NRFD OUT LOW-TRUE
F153   A9 34       LDA    #$34       ;)4
F155   8D 21 E8    STA    $E821      ;-!H   SET NDAC OUT LOW-TRUE
F158   A9 0D       LDA    #$0D       ;)-
F15A   60          RTS               ;@     RETURN
F15B   8D 22 02    STA    $0222      ;-""  SEND SECONDARY ADDRESS TO
F15E   20 F1 F0    JSR    $F0F1      ; QP   IEEE TALKER DEVICE
F161   20 4B F1    JSR    $F14B      ; KQ   SET NRFD AND NDAC LOW
F164   4C 32 F1    JMP    $F132      ;L2Q   SEND NO SECONDARY ADDRESS
F167   2C 1D 02    BIT    $021D      ;,="   TEST OUTPUT FLAG BYTE
F16A   30 05       BMI    $F171      ;0%    BRANCH IF CHAR WAITING
F16C   CE 1D 02    DEC    $021D      ;N="   NO CHAR - RESET BUFFER
F16F   D0 05       BNE    $F176      ;P%
F171   48          PHA               ;H     SAVE ACC ON STACK
F172   20 F1 F0    JSR    $F0F1      ; QP   SEND DEFERRED CHAR TO IEEE
F175   68          PLA               ;H     GET CURRENT CHAR IN ACC
F176   8D 22 02    STA    $0222      ;-""   STORE IN OUTPUT BUFFER
F179   60          RTS               ;@     RETURN
F17A   A9 5F       LDA    #$5F       ;)-   SEND UNTALK TO IEEE
F17C   D0 02       BNE    $F180      ;P"    UNTALK ALL DEVICES ON BUS
F17E   A9 3F       LDA    #$3F       ;)?   SEND UNLISTEN TO IEEE
F180   85 F1       STA    $F1        ;%Q    UNLISTEN ALL DEVICES
F182   20 BC F0    JSR    $F0BC      ; <P    SEND TO IEEE BUS
F185   D0 AB       BNE    $F132      ;P*    SET ATN OUT HIGH - FALSE
```


IEEE-488 BUS PET MACHINE CODE ROM ROUTINES

```
READY.
F187   A9 34       LDA    #$34       ;)4    INPUT BYTE (CHAR) FROM IEEE
F189   8D 21 E8    STA    $E821      ;-!H    SET NDAC OUT LOW-TRUE
F18C   AD 40 E8    LDA    $E840      ;-@H
F18F   09 02       ORA    #$02       ;)"
F191   8D 40 E8    STA    $E840      ;-@H    RESET NRFD OUT HIGH-FALSE
F194   A9 FF       LDA    #$FF       ;)
F196   8D 45 E8    STA    $E845      ;-EH    RESET TIMER FOR TIMEOUT
F199   2C 4D E8    BIT    $E84D      ;,MH    TEST FOR TIMEOUT ON READ
F19C   70 A8       BVS    $F146      ;P(     BRANCH IF TIMEOUT ERROR
F19E   2C 40 E8    BIT    $E840      ;,@H    TEST IF DAV HAS GONE LOW
F1A1   30 F6       BMI    $F199      ;0V     IF NOT TEST AGAIN
F1A3   AD 40 E8    LDA    $E840      ;-@H    DAV NOW LOW (DATA VALID)
F1A6   29 FD       AND    #$FD       ;)]
F1A8   8D 40 E8    STA    $E840      ;-@H    SET NRFD LOW-TRUE
F1AB   2C 10 E8    BIT    $E810      ;,0H    TEST IF EOI IS SET
F1AE   70 05       BVS    $F1B5      ;P%     BRANCH ON EOI NOT SET
F1B0   A9 40       LDA    #$40       ;)@     EOI NOW SET LOW-TRUE
F1B2   20 E5 FB    JSR    $FBE5      ; E[    SET STATUS 'EOI'
F1B5   AD 20 E8    LDA    $E820      ;- H    INPUT DATA BYTE FROM IEEE
F1B8   49 FF       EOR    #$FF       ;I      COMPLEMENT DATA (ACTIVE HIGH)
F1BA   48          PHA               ;H      SAVE DATA BYTE ON STACK
F1BB   A9 3C       LDA    #$3C       ;)<
F1BD   8D 21 E8    STA    $E821      ;-!H    RESET NDAC HIGH (DATA ACCEPTED)
F1C0   2C 40 E8    BIT    $E840      ;,@H    TEST IF DAV HAS GONE HIGH
F1C3   10 FB       BPL    $F1C0      ;0[     BRANCH ON DAV STILL LOW
F1C5   A9 34       LDA    #$34       ;)4     DAV NOW HIGH-FALSE
F1C7   8D 21 E8    STA    $E821      ;-!H    SET NDAC OUT LOW-TRUE
F1CA   68          PLA               ;H      GET DATA BYTE IN ACCUMULATOR
F1CB   60          RTS               ;@      RETURN
```

Education

The Missing Link

(An article by Nick Green, Commodore's Special Projects Manager)

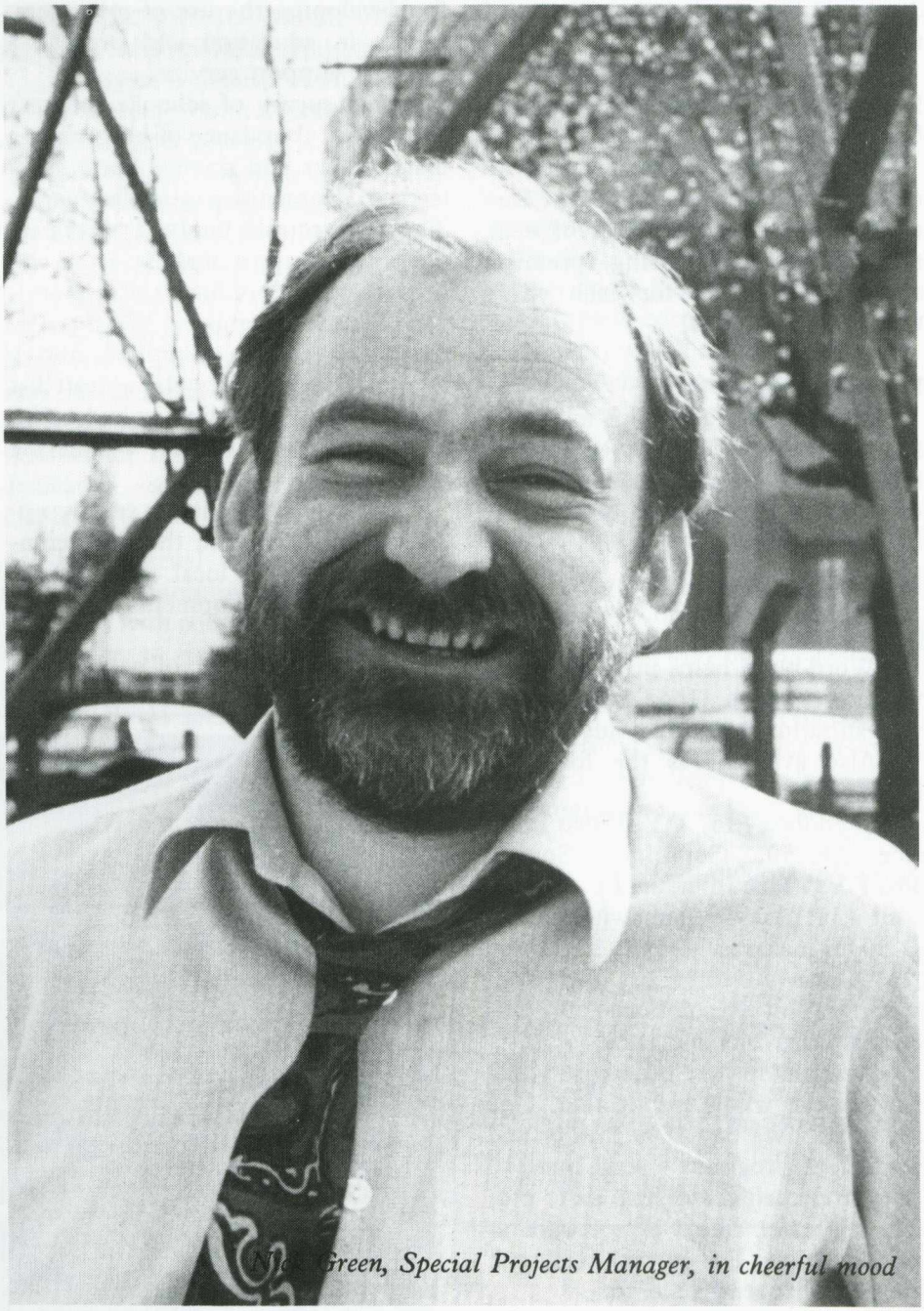
At a Commodore Education conference in London, teachers insisted on a more systematic approach to the provision of C.A.L material for the curriculum.

In total around the country the past twelve months have seen the development of well over 1000 pieces of teaching material in the "Teachers' Aid" category.

The need is to co-ordinate a similar software writing effort in such a way as large areas of the curriculm are covered. The method is for Subject Matter Experts e.g. people who have written text books, or groups of concerned teachers, to produce a breakdown into topics of the particular areas they wish to tackle. These topic lists should be used to indicate how many programs or sets of programs have to be written to cover that area of the curriculum.

If Subject Matter Experts or Subject Matter Expert Groups have any difficulties in proposing topic lists they should consult examination syllabi or some of the revision notes that are published by many companies for particular subjects.

If there is a group of teachers who want to tackle a particular subject area we will be happy to publish their topic lists and details of which topics are having programs written for them and which topics require teacher-programmers. Send your topic lists, with notes on which topics are being tackled by your group, to Nick Green or Jean Frost at Slough and we'll publish them in future issues.



Nick Green, Special Projects Manager, in cheerful mood

Low Priced Software

Getting hold of software at a low price is very difficult in today's market place. This situation is due to the normal commercial pressures of cost recovery and profit generation, however, when the former is low and the latter is low then prices can reflect it. This is the situation at Qwerty Computer Services; we have refrained from heavy advertising and kept other costs as low as possible — the result is very competitive priced software. No programs in our present catalogue cost more than £1.25 (plus a little contribution towards post and packing) and they all come on cassette - not listings. Many people have bought the software and **no-one** has complained at their value - we do not provide documentation - wherever possible it is incorporated into the program. The range of software is fairly good, interactive games, business simulation, utilities and novelties. For educational use we have various programs which have been tried out in the classroom.

Remedial:

A 3 program suite which allows the teacher to drill students in spelling, word formation and vocal presentation. The program is for setting up data files of words, sentences or phrases which will be presented to the student by the Remedial Run program. This second program does the actual testing/drilling e.g. Prints word etc to screen, generates signals

for teacher vocalisation, accepts pupils input and vocalisations, prepares an analysis file for the last program: Analysis is provided in the form of error display -the word is displayed then each letter attempted incorrectly is shown.

Payroll Simulation and Business Simulation:

Shows the effect of taxation, insurance, overtime etc. upon pay. Run a company -decide number of men, raw material, advertising, premises etc, results shown for each year's trading - interactive.

Name/Grade Sort:

Sort any size class plus marks for any number of subjects into alphabetical order or class order **per subject** - no more than one minute for a batch size of 500 pupils - whole year groups.

Junior and Infants:

Word-build helps pupils increase word recognition. Good graphics provide stimulus for correct answers.

Also available is the following hardware.

Soundbox £15, T.V./Video Interface £31.50, Combined Soundbox/T.V. Video Interface £45, Switch Unit £11 plus £5 per switch (extra £1.50 for mains switching), Light Pen £15, Crash Restorer £7, A/d Converter 12 bit Resolution £55, plus various other bits and bobs.

I must stop here otherwise I will take up the whole publication. One last thing - we pay 15% royalty and need more programs - send them to the address below and help us to provide a greater range of software at realistic prices. For current catalogue and price list send s.a.e. to:

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Manchester Education User Group

Following the introduction of Pet microcomputers into Manchester schools during the past year the work of co-ordinating their uses and impact has started.

In order to provide a central sevice for teachers in all areas of microcomputing using the PET a user group has been established.

The user group will provide a forum for developing the use of microcomputers in education and provide a software support service.

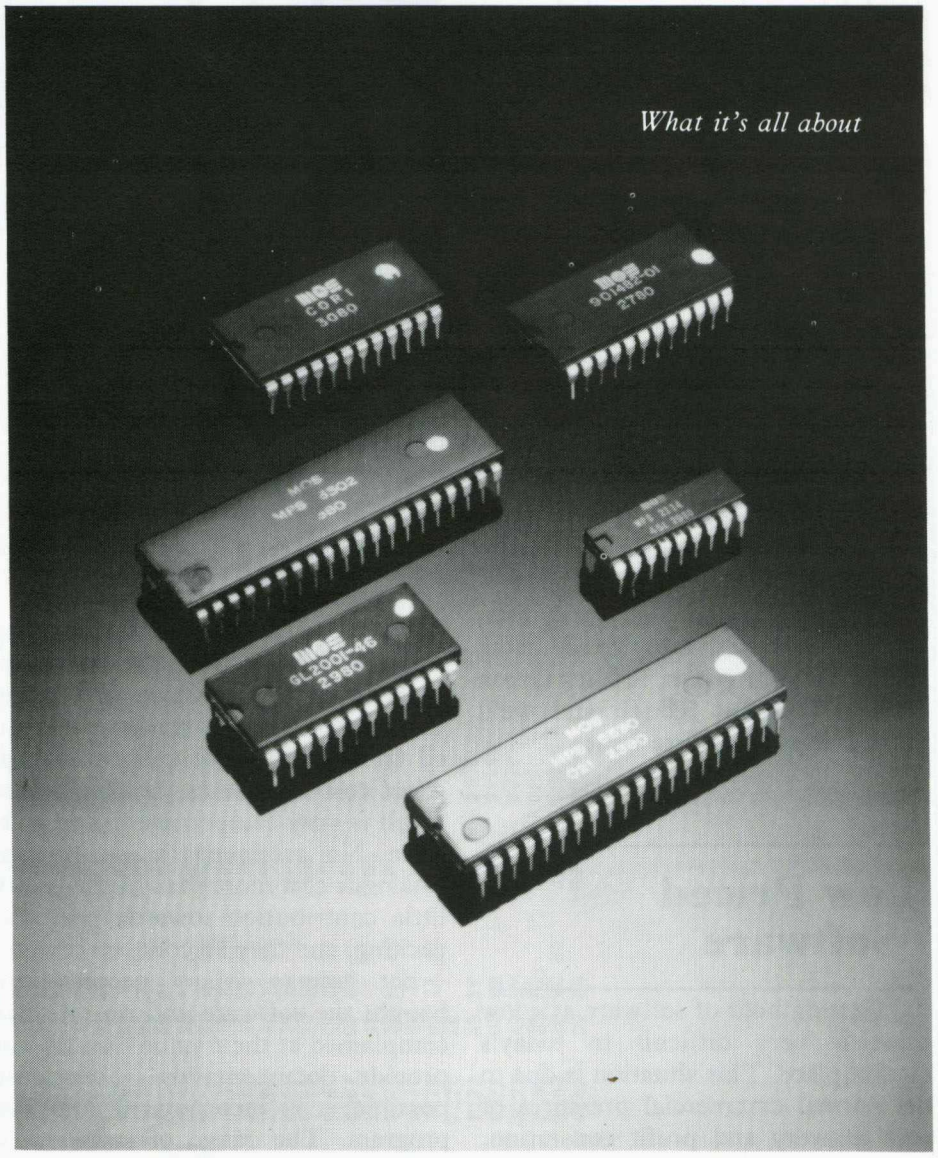
A recent survey of school's software showed an abundance of programs in mathematics and science but a shortage in humanities and languages. The user group is hoping to find people with interests in these areas and help them to produce suitable software for use in schools. The Survery results have been compiled into a reference list for schools, a draft list of the user groups library and to inform teachers of contact within the authority.

It is hoped to publish termly up dates of this list with the microcomputer bulletin of local information, news, recent developments and programming hints.

The appointment of a full time co-ordinator for microcomputing has meant an expansion in the services to be available to local schools. The software advice service for the curriculumn is being expanded to include administration programming and hardware advice. At the moment the area of control technology is generally left untouched in most schools. It is hoped in the future to be able to provide schools with the imformation and help in using their PET to control experiments and other peripherals within the class. The establishment of a control technology group may then become a neccessity.

Data Based Administration Programs

Already a few schools are running Data Based Administration programs. These are mainly concerned with the saving of examination results, student course information and the printing of class lists. The systems in use are being run by home produced software compiled by the



individual schools and tailored to their requirements. The portability of such software to other schools needs is being investigated as well as the extension to include information needed for the D.E.S. form 7.

The final, and most important area, of work in the authority is the provision of service training courses. It is hoped during the next year to have service courses in all area of educational computing. Courses are now being planned for:- using the PET in administration; using the PET in the classroom; programming in BASIC and programming in assembler.

The user group would be pleased to hear from other educational user groups with a view to future exchanges of ideas and help in educational developments of microcomputing. The work in Manchester is being co-ordinated by:- Mr P. Murphey, Teachers Centre, Barlow Moor Road, Manchester, Mr A. Goodall, Xaverian College, Lower Park Road, Manchester 14

A. Goodall, Xaverian College, Manchester

High Resolution Graphics for the PET

The MTU high resolution graphics package distributed in the UK by IJJ Design Limited is a simple and inexpensive addition to the PET which allows the full resolving power of the monitor to be realised for plans, drawings, graphs, forms, games and the like, with complete software control over the display, involving the superimposition of text and keyboard graphics symbols.

The system consists of 8K of additional memory which contains the data for a 320 x 200 matrix of dots on the screen, and comes in two forms, mounted internally or externally.

The external version resides in a box alongside the PET, which also contains slots for two other MTU boards, such as the PROM programming board and the memory expansion board. It also has a socket which provides a composite video signal suitable for driving a video monitor dedicated exclusively to graphics display.

The internal version provides a convenient intergrated system within the PET, with additional control over the display to simplify the use of the same screen for both purposes. It also has five ROM sockets which provide a home for ROMs such as Toolkits and Word Processors which occupy the same addresses as the graphics memory. These are addressed whenever the display is in the normal mode, the graphics taking their place in graph mode.

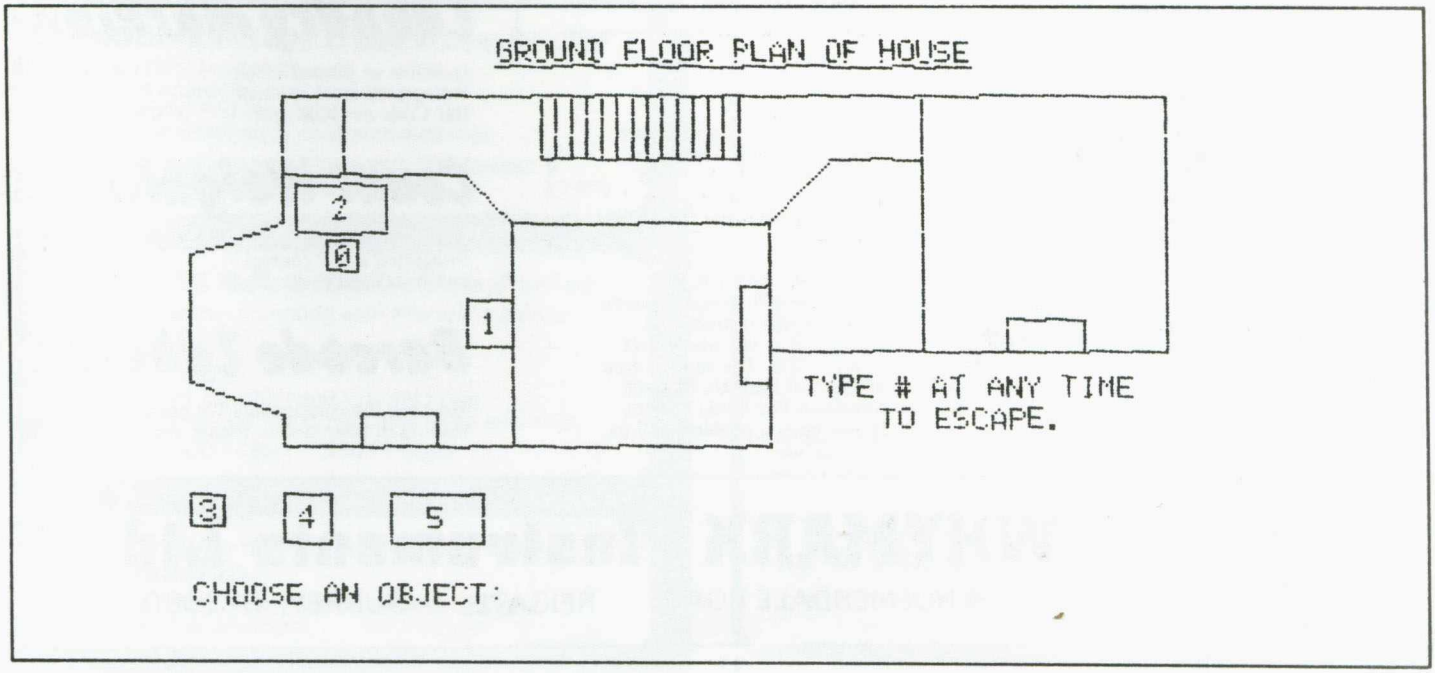
Advanced software is available which gives powerful control over the system through the use of 19 BASIC keywords, which can be incorporated into the programme in just the same way as any other command. The advanced software, called PETGRAPH, occupies 4K of RAM, and includes command for the control of the screen, for drawing dots, lines and dotted lines using xy coordinates, for superimposing text and for declaring, moving and storing chosen objects on the screen.

A Typical Application Example

A typical application example (which is included with the software) draws a ground-plan of house and a selection of numbered shapes representing furniture to be fitted into the plan. The user selects a shape number and a flashing dot at the bottom left-hand corner of the shape acts as a cursor, which can then be repositioned anywhere on the plan by using the number keys in the usual way. When the desired position is reached the space bar is pressed and the shape then glides smoothly across the screen to its chosen destination.

A new shape then takes its place in the line-up of shapes for selection and the process may be repeated. The shapes may be moved as many times as desired, until the layout meets with the approval of the user. Having achieved a plan using the above example programme, the Print Graph programme may be loaded to print out the plan on a Commodore 3022 tractor printer.

The user of this graphics system makes a valuable and easily used addition to the PET which greatly increases its potential as an educaional, research or business machine. In particular, its utility in the areas of visual aid and computer assisted learning will be apparent immediately to teachers and lecturers.



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Next Month's Issue.

Volume 3 issue 6 will be featuring a lengthy article by Mr. Christensen, Father Figure of Comal, on it's design and implementation. The Approved Products reviews will be concentrating on taking care of and maintaining your Pet system. There'll be an article on control statements in BASIC, hints on getting the best out of Wordpro, the continuing saga of learning all about disc drives, Apfel Basic by Super-Basicman David Simons, plus lots of tiny machinecode programs for incorporating into your own programs. PLUS! Clive Booth, Applications Manager, speaks to the World. What's more, an article intriguingly titled "Why do I need a PET anyway?"
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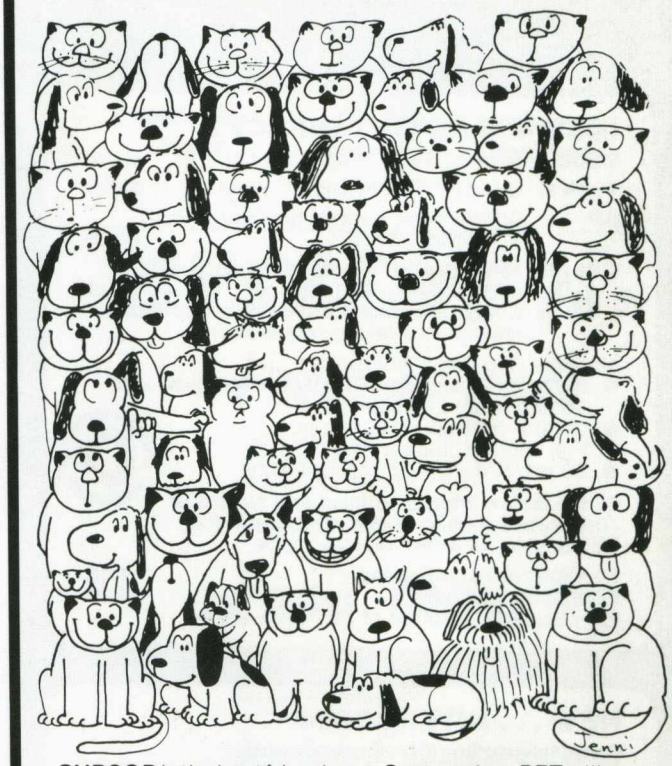

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