C= commodore newsletter

Volume 1, Number 8

1980

PET

PET USERS CLUB

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The Charter of the COMMODORE PET USER CLUB is to provide a
method of sharing up-to-date information, and programs
relating to the PET Computer between the many PET owners and
users. Membership charges in the United States and its
possessions are $15.00 annually, while subscriptions outside
the U.S. are $25.00 yearly.

We would like to publish features from PET Users concerning
specific applications, interesting discoveries or even bits
worthy of sharing. If you would like to contribute to future
NEWSLETTERS, please send your article, letter or comments to:
THE EDITOR, COMMODORE U.S. PET USERS CLUB, COMMODORE BUSINESS
MACHINES, INC., 3330 SCOTT BLVD., SANTA CLARA, CA. 95051.

EDITOR NOTES

Dear PET User Club Readers:

Education is one field in which the PET/CBM can be utilized. Unfortunately, the lack of quality curriculum materials is a barrier to instructional computing. A majority of this issue (Software Section) is devoted to introducing educational software, which are designed to help break this barrier.

Once again the DATA EXCHANGE section will answer questions that you have sent.

CBM is proud to introduce the new 8K PET in CBM NEWS. This section also features an article concerning a weekly computer program sponsored by Computer Town USA.

In addition to educational software, the SOFTWARE section will present a review of business software. A review of the PET Machine Language Guide is also presented to assist PET users.

CBM receives many letters from users which relate new applications of the PET/CBM system. The APPLICATION section conveys one such letter.

If you are interested in examining data blocks when writing programs with the 2040 Floppy Disk, be sure to read the PROGRAMMING section. This section also contains excerpts of acronyms and definitions from the MICROPROCESSOR LEXICON (courtesy of SYBEX, INC.)

The PERIPHERAL AND ATTACHMENTS section contains tools available in a BASIC PROGRAMMER'S TOOL KIT which aid in the modification of programs.

Two future additions to the newsletter are discussed in the ANNOUNCEMENT section.

Excuse us for the delay in issuing this newsletter. We have compiled a great deal of information and unfortunately this takes time. Starting the first of the year newsletters will be issued on a regular basis. Your subscription fee entitles you to twelve issues, including back issues if you wish. Have a HAPPY NEW YEAR!

Your response to this newsletter is valued. In order for us to effectively answer any questions you may have regarding your PET/CBM or newsletter contents, write:

> The Editor
> COMMODORE BUSINESS MACHINES
> 3330 Scott Blvd.
> Santa Clara, California 95051

DATA EXCHANGE

OVERRIDING THE VIDEO SIGNAL TO AN EXTERNAL DISPLAY DEVICE

Mr. Joseph Cannata of Medford, NY presents us with our first question.

Q CAN THE VIDEO SIGNAL BE OVERRIDDEN TO THE CRT AND SENT TO AN EXTERNAL DEVICE?
A Horizontal, vertical and video signals are brought out on the User Port. You'll need some hardware to make the PET talk to a TV. Look through some of the computer magazines for some equipment names. There is a "Petunia Video Board" to give you composite video. You can get more information on by contacting HUH Electronics, 1429 Maple Street, San Mateo, California 94402.

Break Even Analysis

The following question is from R.F. Estoppey of Sierra Madre, California:

Q I HAVE RECENTLY BEEN ABLE TO PUT THE BREAK-EVEN ANALYSIS PROGRAM FROM THE NEWSLETTER ON TO MY PET. I HAVE LEARNED A GREAT DEAL ABOUT PROGRAMMING FROM THIS PROGRAM AND FOUND THE DISCUSSION OF THE PROGRAM TO BE VERY HELPFUL. THE PROGRAM WORKS WELL EXCEPT FOR ONE PROBLEM. FOR EXAMPLE, WHEN FC=80,VC=80, AND UN=100, THE CALCULATED SP IS 80.8 AND THE GROSS PROFIT (GP) IS 1.1920929 INSTEAD OF 0. OTHER NUMBERS OFTEN GAVE ODD RESULTS FOR GP. I FINALLY DECIDED THAT THE COMPUTER WAS TRYING TO PRINT A SMALL NUMBER AND COULDN'T. THIS WAS PROVEN TO BE THE CASE SINCE CHANGING THE NUMBER 10 IN LINE 280 TO 15 ALLOWED THE COMPUTER TO PRINT GP=1.1920929-E06.

I DECIDED IT WOULD BE BETTER TO HAVE THE GP COME OUT AS ZERO. THIS WAS ACCOMPLISHED BY DELETING EVERYTHING BEFORE THE COLON IN LINE 280 AND REPLACING IT WITH S%=GP. S$ AT THE END OF THE LINE WAS ALSO CHANGED TO S%. THIS WORKS FINE AND NOW GP ALWAYS PRINTS OUT AS ZERO.

I HAVE ALSO MODIFIED THE PROGRAM TO DO THE CALCULATIONS FOR A PROFIT OF 10% OF SALES. MORE DIFFICULT THAN THIS WAS ANOTHER MODIFICATION CHANGING THE CALCULATED VARIABLES FROM THREE TO FOUR BY ALLOWING THE GROSS PROFIT TO BE ONE OF THE VARIABLES.

I MIGHT ADD THAT WHEN I FIRST SAW THE DISPLAY ON THE SCREEN, I WAS SURPRISED TO SEE WHAT IT WAS AND HAD TO FIGURE OUT HOW TO USE IT. PRINTING THE DISPLAY AND INSTRUCTIONS FOR USE IN THE NEWSLETTER WOULD HAVE BEEN HELPFUL FOR THE NOVICE WHICH IS MY SITUATION AT THIS TIME.

MY WIFE, WHO IS AN ENGLISH TEACHER, WOULD ALSO LIKE TO SEE "TO" IN LINE 11 CHANGED TO "TOO" IN TWO PLACES.

I WISH TO THANK J. PARSONS AND C. WESTFALL FOR A VERY INFORMATIVE AND WELL DESCRIBED PROGRAM. I HOPE TO FIND MORE OF THEIR PROGRAMS IN FUTURE ISSUES OF THE NEWSLETTER.

A It will work. It is better to round off because you have more control over it. Also, it is better to do so during the calculation as opposed to the printing because you can keep the integrity of the program. You do one calculation when you calculate the answer; then you do another calculation when you integrate the printing. If you run into problems with an answer, you don't know which one is causing it. It is better to come out with a final answer rather than truncating it, which is what happens when you integerize prior to printing.

Double Sided Diskette

We've received many inquires which may be summarized as follows:

Q I WAS THINKING OF PURCHASING DOUBLE SIDED DISKETTES FOR MY 2040 FLOPPY. ANY SUGGESTIONS?

A Yes, our suggestion is don't use any type of double-side floppy disk. Commodore does not endorse the use of double-side floppy disks because they have not yet been perfected to eliminate the problem of print-through, (seeing the image of data on the other side of the disk). In fact, we've only heard from users who have lost valuable data when using double-sided diskettes.

Schematics for the 16 and 32 K Pets

The next three questions are from Mr. Louis Bussard of Edward, CA:

Q ARE MANUALS AND SCHEMATICS AVAILABLE FOR THE 16 AND 32 K PETS? WHAT IS THE COST?

A The CBM 16K/32K User Manual is $9.95 and is available through your local Commodore dealer. The 16K and 32K service kits, which include schematics, will be available to the end-user in the first quarter of 1980 for approximately $40.00. Service Reference Manuals have been shipped to your local dealers and will address any inquiries which may arise.

New Character Generator

Q WITH AN 8K, 6540 ROM, IS THERE A CHARACTER GENERATOR IN THE UPPER, LOWER CASE ONLY WITH NON-SHIFT LOWER CASE FOR TEXT WORK?

A Yes, it's available through your Commodore dealer. The part number is 901439-08 and is priced at $30.00.

Q WHAT IS THE DIFFERENCE BETWEEN THE 16K AND 32K "PETS" AND "CBMS"?

A The models 2001-8,16 and 32N have full sized PET styled keyboards (N stands for NUMERIC) and have therefore retained the "PET" product label. The models 2001-16 or 32B computers employ a standard typewriter style keyboard (B stands for BUSINESS) ideally suited to the business application environment. The Commodore Business Machines logo - CBM - was assigned to this product line.

Difference in Memory Locations Between the 8K and the 32K

The following is from Mr. Jack Moss of Denver, CO:

Q IS THERE A DIFFERENCE IN THE POKE LIST BETWEEN THE 8K AND THE 32K?

A Yes, there is a difference. Check your back issues of the Newsletter (3,4-5&7) for cross references between zero page memory locations.

Q IS THERE ANY WAY TO LOCATE THE END OF THE LAST PROGRAM ON A TAPE FOR RECORDING A CURRENT PROGRAM ON THE SCREEN WITHOUT LOSING THE CURRENT PROGRAM (IE, LOAD 'X' ERASES CURRENT PROGRAM)?

A Yes, by using verify, i.e., verify "last saved program". This will then be positioned after the last saved program.

Q: CAN A SEGMENT OF A PROGRAM (LIST X-Y) BE ISOLATED BY THE SYSTEM SOFTWARE AND SAVED ON TAPE?

A: No, unless you delete all other lines and then save.

Break Even Analysis

Another question on Break Even Analysis is from Mr. Michael Baltay of Sun Valley, California:

Q THE BREAK EVEN ANALYSIS PROGRAM DOES NOT WORK FOR ME. I'LL MAKE AN ADDITIONAL TESTING OF THE KEYED-IN PROGRAM. I FOUND A FEW ITEMS, WHICH MAY BE ERRONEOUS (SEE PAGE 10 AND 11, ISSUE #2 OF THE NEWSLETTER).
1. LINE GOSUB900 INSTEAD OF GOTO900 IN LINES 110,120 AND 140.
2. RETURN IS MISSING AT THE END OF LINE 160.
3. LINE 1090 IN READS $; THE ; IS TO BE REPLACED WITH ,.

A When the basic performs a GOSUB it takes the return address from the GOSUB and puts it with the program stack. When it executes a GOTO it doesn't do anything with the program stack. When you say GOSUB, then GOTO, then return it performs will go back to the last GOSUB. The reason why Break Even Analysis was designed in this way is for two reasons:

1. It saves space and was originally written for an 8K.
2. It allows anyone to call the same sub-routine from any point in the program without having to go to a GOSUB and a return after.

An example of this technique is:

```
10 GOSUB200          10 GOSUB200
20 GOSUB100          20 GOSUB100
30 END               30 END
100 GOTO200          100 GOSUB200
200 RETURN           101 RETURN
                     200 RETURN
```

CMD Command

Q I HAVE FOUND A USEFUL EXTENSION OF THE 'CMD' INSTRUCTION WHICH YOU MAY FIND INTERESTING. THE 'CMD' OPERATION MAY BE FOLLOWED BY A COMMA AND ANY EXPRESSION TO BE PRINTED. THAT IS, YOU MAY TYPE A CMD4,"HELLO" WHERE THE FILE #4 HAS BEEN OPENED FOR A PRINTER. "HELLO" WILL APPEAR ON THE PRINTER. I FIND THE COMMAND USEFUL FOR WRITING HEADERS ON PRINTERS FOR A PROGRAM NAME. FOR EXAMPLE:

CMD4, "DISASSEMBLER 4.0":LIST

WILL PRINT OUT "DISASSEMBLER 4.0" AND START LISTING. I AM USING AN 8K PET WITH A TRENDCOM PRINTER. HOPEFULLY, THE COMMAND ISN'T JUST A FEATURE OF THE PRINTER INTERFACE.

A The CMD Command is a feature of the PET's Operating System and can indeed be useful. The usage you point out is described in our Printer Manual (P/N 320838) on page 14. The CMD Command is equivalent to the PRINT command except it leaves the channel open. Of course, with either the Model 2022 or the Model 2023 you would be able to emphasize the heading "DISASSEMBLER 4.0" as follows: single enhanced, double enhanced or reversed field.

```
READY.

10 OPEN4,4:CMD4
20 PRINTCHR$(1)"?SINGLE "CHR$(1)"DOUBLE"CHR$(13)
30 PRINTCHR$(1)"?LOWER CASE ?REVERSE"
40 PRINT#4:CLOSE4
READY.
```

SINGLE DOUBLE

lower case REVERSE

IEEE-488

Q CAN THE IEEE-488 PORT BE USED AS A SECOND PARALLEL PORT? I HAVE AN APPLICATION THAT NEEDS TWO 8 BIT PARALLEL PORTS. ONE TO READ-IN INFORMATION AND THE OTHER TO READ-OUT INFORMATION.

A Yes, you can use the IEEE port as a second parallel port. In order to do this, you need the PET Manual (P/N 320845) and the 6502 Hardware Manual (P/N 320524) which describes the options of the 6520 I/O Chip. The user port is a 6522VIA and the IEEE port is a 6520PIA, so programming the two ports will be slightly different.

You can obtain additional information on the usage of the IEEE-488 port in the CBM User Manual, pages 76-82, or PET User Manual, pages 57-64.

The following question is from Mr. Robert Francis of Glen Burnie, MD 21061:

Q I HAVE A DISAPPOINTMENT. MY FRIEND HAS AN 8K MACHINE AND WE FREQUENTLY PLAY THE MICROCHESS GAME TOGETHER. I NOW HAVE A 32K MACHINE, BUT FIND THAT WE CANNOT PLAY THIS GAME ON MINE. IS THERE ANY SOLUTION TO THIS PROBLEM? SOME OF THE OTHER OWNERS OF 16K AND 32K MACHINES HAVE MENTIONED WHAT APPEAR TO THEM AS MINOR DIFFERENCES IN THE OPERATION OF SOME GAMES THAN WHEN THE SAME GAMES ARE RUN ON THE 8K. I KNOW THERE WAS SOME STATED DESIGN DIFFERENCES, BUT I WONDER IF YOU COULD BE MORE SPECIFIC.
A Please refer to our memory listing in Newsletters 4,5 and 7. There is a new version of Microchess that works on both machines, which can be obtained from Personal Software, 592 Weddell Drive, Sunnyvale, California 94086.

Q I PRESENTLY HAVE A PET 2001-16K GRAPHICS MODEL, A PET 2040 DUAL DRIVE FLOPPY DISK, AND A KSR-33 TELETYPE INTERFACED WITH A GPA IEEE-488 TO 20 MA..
THE PET IS WORKING FINE. THE DUAL DRIVE IS ALSO FINE. THERE ARE TWO AREAS THAT I AM HAVING A PROBLEM WITH. MY FIRST PROBLEM IS WHEN I AM USING THE FLOPPYS FOR A MAILING LIST PROGRAM THAT I HAVE DEVELOPED. THE AREA WHERE I AM HAVING DIFFICULTIES IS WHEN I CREATE A FILE OF DATA ON THE DISK AND WISH TO NAME IT, SAY CHRISTMAS LIST. THE STATEMENT I WOULD USE TO OPEN THE DISK FOR A DATA FILE IS 10 OPEN 2,8,2,"@0: MAILING LIST- CHRISTMAS,S,W". THIS WILL CREATE A FILE HEADER CALLED "MAILING LIST-CHRISTMAS,S,W". NOW IF I TRY TO CREATE A DIFFERENT LIST SAY, FRIENDS, I WOULD HAVE TO CHANGE LINE #10 IN MY PROGRAM. I HAVE NOT BEEN ABLE TO FIND OUT HOW TO HAVE THE NAME OF THE FILE BE EQUAL TO A STRING, SAY A$ WHERE I CAN NAME A$ IN THE PROGRAM THRU KEYBOARD ENTRIES. WHEN USING THE CASSETTES IT CAN BE DONE VERY EASILY. IS THERE NO WAY TO DO THIS? IT WOULD BE A GROSS DEFECIENCY IF THERE WERE NONE SINCE I WOULD HAVE TO USE A DIFFERENT PROGRAM FOR EACH LIST I WANTED. PLEASE HELP!
MY OTHER PROBLEM IS NOT REALLY ANYTHING TO DO WITH YOUR PRODUCT BUT I AM HOPING THAT YOU MIGHT HAVE SOME SUGGESTIONS AS TO WHAT IS CAUSING MY PROBLEM. THE GPA INTERFACE THAT ALLOWS ME TO ATTACH MY TELETYPE HAS THE IEEE-488 PET PORT BROUGHT OUT ON A SECTION OF THE BOARD THE SAME TIME. THE GPA INTERFACE IS SUPPOSED TO BE DEVICE #5 AS RECOGNIZED BY PET.

WHAT HAPPENS IN REALITY IS THAT WHEN THE DISK IS SENDING INFORMATION TO PET THE PRINTER IS PICKING IT UP AND DISTORTING IT SOMEHOW. IT SEEMS TO TAKE THE DISK OUTPUT SLOW IT DOWN TO THE 110 BAUD, AND THEN LET PET SEE IT IN A GARBLED FORM. ANY IDEAS?

A Follow the example given below to open a disk file with a variable name. You can construct the name of the file, which is what appears between the quote marks in an open statement as a variable. You should open with A$.

In answer to your second inquiry, the IEEE-488 to RS232 interface that you have is always listening on the bus (IEEE-488). That is, anything sent over the bus will be printed on the printer. There are other interface boxes which do not have this problem, i.e., the Network RS232 interface, which is avaialable from Neeco, 679 Highland Avenue, Needham, MA 02192.

```
10 INPUT"DRIVE";D$
20 INPUT"FILE NAME";N$
30 F$=D$+":"+N$+",S,R"
40 PRINT F$
50 OPEN2,8,2,F$
READY
```

CBM NEWS

Introducing The New 2001—8N Pet

It is really here - YES - A large keyboard 8N PET (8K words memory) with the same operating system as the 16N and 32N PETS. The new 8N incorporates all the improved features of the PET line: green phosphorus screen, full sized graphic keyboard, machine language monitor and BASIC language enhancements.

The case of the new PET is constructed of heavy duty structural foam instead of metal which allows for greater durability and uniformity. Tap on it. It even sounds like metal. The base of all PETs remains black metal.

The 8N is the same color and appears identical to it's predessor. Color tint is incorporated into the foam, so the color will not chip.

This new PET is offered at the same price as its predecessor. The cassette is external to make room for the keyboard. As with the 16N and 32N, the cassette is an option. Of course, the new 8N operates with the disk without retrofit ROMs. This new entry fills out the PET line and provides the marketplace with the most complete and cost effective computer line available today.

2001—8N

Computer Town USA

By M. Cator

Seven years ago Bob Albrecht, renowned author in the computer literacy field with "My Computer Likes Me", had a brainstorm to enhance computer awareness in our society and to educate the public about computers. Last March, People's Computer Company, a non-profit organization, of which Bob Albrecht is a member of the Board of Trustees, together with the Menlo Park Public Library and Commodore Business Machines launched a weekly computer program. Since the day that Larry Perry dropped the PET computers off, the program has skyrocketed to success.

Every Wednesday, classes were held during the summer at the Menlo Libray and have been packed ever since. Kids, who overwhelmingly outnumber the adults attending, work with three PET computers granted by Commodore. The PET computer is the original educational computer system offered by Commodore and is said by many Educators to be the most popular unit used in education today. In the early stages, kids are taught various games they may play, but very quickly they progress beyond this point. Some kids are, in fact, learning to program the computers.

"Fantastic" is just one response the children have voiced about the program. While their numbers were small in the beginning, the kids now can't wait to play with the computers. Through evening training sessions 300-400 kids have earned their "MY COMPUTER LIKES ME" pins which gives them use of the library computers.

Parents are also encouraged to participate in the program. It is the first time in an educational environment where the students teach their parents and they both love it.

It was PCC's initial goal to be a community resource and with the help of Commodore's PET computer that goal has been attained. It is believed that this is a program which no other public library system in the U.S. has at this time and judging by the current community enthusiasm and support, Computer Town USA is here to stay.
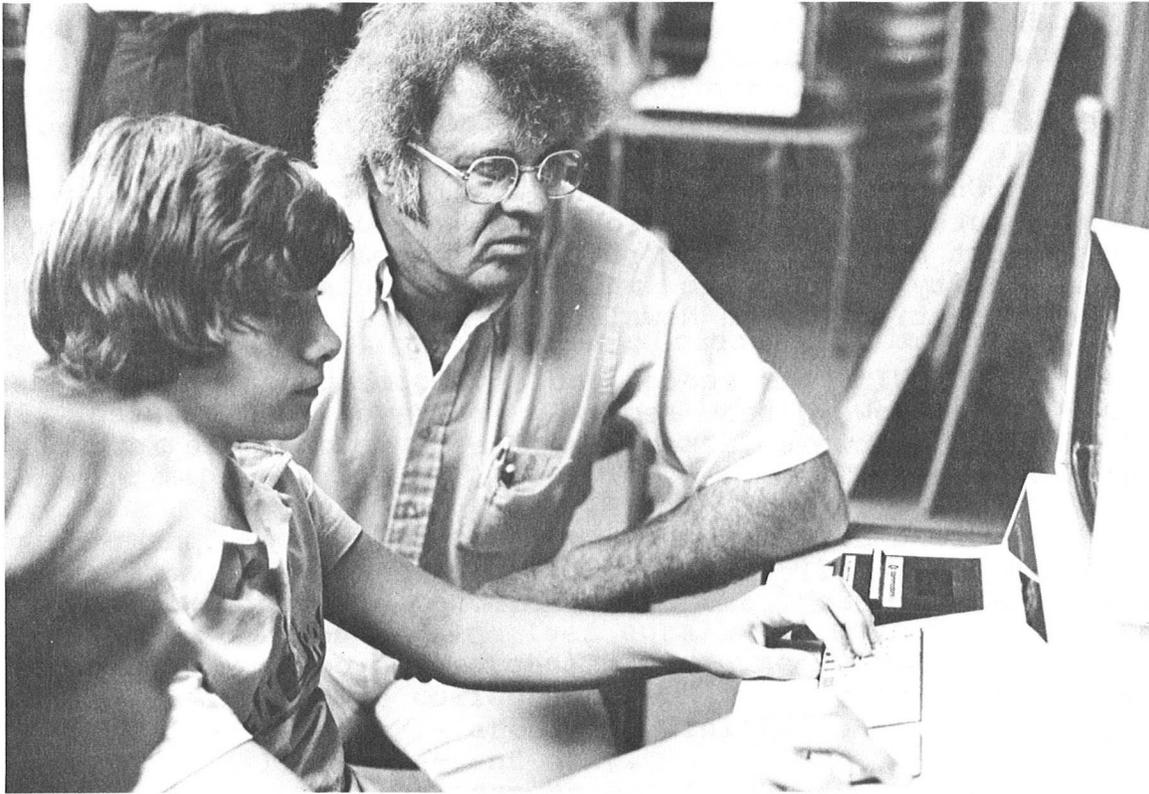
Bob Albrecht and friends

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SOFTWARE

Educational Software

One of the most beneficial applications of the microcomputer is in the field of education. Unfortunately, the largest barrier to instructional computing is the lack of high quality curriculum materials. This month in the SOFTWARE section of the Newsletter, we will be highlighting programs.

CONDUIT, a research and development center based in Iowa City, Iowa, has recently reviewed and tested 11 educational software packages available in cassette form for the Commodore PET.

MICROPHYS, an educational software development firm also has an excellent selection of PET/CBM programs. A description of each Educational package follows:

Conduit

ECOLOGICAL MODELING

A Package by Wm. Reiners, Wm. Glanz and S. Cornish, Dartmouth College

The process of computer modeling and simulation can be useful tools in the analysis of ecosystems to test hypotheses and predict results from manipulating environmental factors. Because of the computer's capacity for handling large quantities of data and performing numerous arithmetic operations with speed, it is a powerful analytical tool, and it is particularly appropriate for exploring the complex problems of ecology.

The Ecological Modeling package introduces the student to some techniques for modeling ecological systems and processes on the computer. By controlling certain parameters, such as initial population size, growth rate, time length of simulation, and others, the student experientially tests hypotheses and predicts results from ecosystems. The package is designed for use in an introductory ecology course.

There is a sequence of increasing complexity in the textual presentation of the programs. Population growth is first considered as unlimited growth of a single species in the programs Epop and Expop. Each of these traces exponential growth of a population, but differs in the method of computation: Epop uses an analytical solution for the differential equation; Expop uses difference equations for incrementing growth.

In succeeding programs, additional environmental factors which the student may manipulate are introduced: environmental carrying capacity; random environmental factors; and competitive interaction between species. Each program builds in complexity to the final program presented in the student manual, Tundra, which simulates the growth and interactions of trophic levels within an arctic ecosystem.

LINKOVER

A Package by P.J. Murphy, Chelsea Science Simulation Project

Genetics is a part of biology in which it is sometimes difficult to arrange adequate practical work. Genetic mapping, for example, involves the breeding of large numbers of organisms, which puts the practical teaching of this topic beyond the resources of most biology departments. But the understanding of genetic mapping can only be assured if the student can construct a map from breeding data. Breeding experiments themselves entail too much time and the maintenance of too many organisms for more than a trivial amount of data to be collected. On the other hand, data derived from literature are deterministic and involve the student to a limited extent only.

These problems can be overcome by simulating mapping experiments on a computer. Linkover has been designed to allow students to plan and execute a program of experiments so that an accurate genetic map of a single chromosome can be drawn.

The material is designed for use by students who have a knowledge of the principles of Mendelian inheritance and the theory of linkage and genetic mapping. The author recommends the program be used in two separate terminal sessions. In the first session the student would select the gene combinations either alphabetically or otherwise until the sequence of the genes in the linkage group is established. In the second session the student would select adjacent genes so that the distances separating the gene can be accurately calculated. Using two open-ended sessions allows time to plan strategy between sessions and to discuss results afterward. In the final class, the student's genetic and cytological maps can be compared, leading to a discussion of end and centromere inteference. Concurrent experiments with living subjects to reinforce some of the principles involved are desirable.

An important part of this simulation is the challenge it affords students in planning the genetic crosses themselves. This provides a good opportunity for the class to operate as a team or several teams with the teacher available to offer help only when it is required.

COEXIST

A Package by P.J. Murphy, Chelsea Science Simulation Project

Population dynamics is the study of changes that occur in the size of populations over time and the factors that influence these changes. It is not a topic that can easily be taught experimentally since it entails the maintenance of large numbers of organisms over many generations. Also, these changes are caused by complex, and not always apparent, interaction of environmental and other influences.

Coexist is an attempt to overcome these problems by providing students with a facility to simulate two biological situations. In the first, up to three populations are modeled to grow independently on identical limited food resources. The student is able to investigate the situation in which organisms compete only with members of their own species. When the outcome of such competition is familar to the students, Coexist can then be used to simulate two populations in competition with each other for the same limited resources. In each of the simulations, the student controls a number of parameters which might influence the outcome of competition by systematically choosing values for the number of offspring, generation times, initial and saturation problems, and inhibiting factors. Investigations can also be performed to determine the relative effects of altering these parameters.

The objectives of the unit are to:

.Demonstrate to the student that an apparently straightforwars biological situation, such as the interaction between two species and their environment, is in fact quite complex.

.Demonstrate that this complexity can be overcome by considering the problem in its component parts, each of which can be analyzed separately.

.Provide for students an exercise in planning experiments to test hypotheses and interpreting results without the technicalities and calculations of science predominating in their minds.

.Illustrate that mathematical models can be used to describe biological situations and can be an aid in their investigation.

COMPETE

A Package by M.E. Leveridge, Chelsea Science Simulation Project

The study of interactions between flowering plants is an important aspect of ecology, and a considerable amount of experimental work has been carried out in recent years to investigate the factors that are involved. However, experimental work with real plants often takes a long time, and such projects are not always suitable for student use. The computer simulation of plant growth presented in Compete enables students to plan an investigation and carry it out without the long delay usually associated with growth experiments. The Students' Notes for Compete describe investigations with both real and simulated plants, together with other data in the form of graphs, tables and descriptions. The six investigations presented in the Students' Notes are summarized below.

Simulated Growth-Mixture gives students an opportunity to plan an investigation to study the interaction of any two of four kinds of plants (barley, oats, tall peas, dwarf peas) at different planting densities using a computer simulation.

Interaction Below the Ground presents the work of Stern and Donald on the interaction of subterranean clover and rye-grass to show the student how conditions in the soil can affect the balance between two species.

Direct Plant Interaction presents an investigaion to show that competition for limited resources is not the only way in which plants interact. Many plants produce chemical substances which affect plants of other species growing nearby.

Effects of Crowding on Plant Growth includes an introductory experiement (actual lab) designed to show that plants do affect one another's growth when they are crowded together.

Measurement of Growth introduces the student to the quantitative measurements of plant growth which are used in most of the investigations. The measurements show that the pattern of growth which is obtained depends upon how growth is measured.

Simulated Growth (Monoculture) experiments familiarize the student with the use of a computer to simulate plant growth. They also provide control data for comparison with the simulated growth mixtures of different kinds of plants in a later investigation.

Interaction Between Clover Varieties includes a real experiment based on one by the Nuffield Advanced Biological Science Project, and takes about two months to obtain results. The section also presents data from an investigation by Black using a different species of clover.

ENZKIN

A Package by M.T. Heydeman, Chelsea Science Simulation Project

A piece of experimental research requires at least three kinds of work: planning of experiments, performance of the experiments, and interpretation of the results. Only the middle stage involves laboratory work, and it is on this stage that traditional biochemical teaching concentrates. Of course, performing experiments is important, but there is a danger that planning and interpretation may be neglected as time and resources do not permit enough laboratory work to support them.

Interpretation can be practiced with data and instructions from books, but practice in planning cannot be undertaken without the performance of many experiments. Enzkin permits the student to obtain realistic results rapidly, using a computer program to simulate the enzyme-catalyzed reactions. Enzkin allows many cycles of planning, experimentation and interpretation over a short time. The educational objective of this unit are:

.To enable students to answer for themselves some of the fundamental questions of enzyme kinetics.

.To give students experience in dealing with an initially unknown system.

.To provide experience in the plotting of graphs and in other forms of data interpretation. The results from the investigations they have planned seem more real than tables of data from a book, and the need to use the results in planning the next investigation encourages students to extract the meaning quickly.

.To introduce students to more complex situations in enzyme kinetics, such as substrate inhibition, cooperativity, and the influence of a cofactor, by using a modified version of the program.

The Students' Notes describe some of the features of enzyme-catalyzed reactions. Students are asked to plot progress curves and calculate initial velocities of reactions. Six enzymes with different properties are simulated in the computer program. Some of the enzymes may not correspond to any real phosphatase. but the principles of investigation are the same. The enzymes can easily be replaced by ones with different values by changing some of the data statements in the program.

INTERP

A Package by J. Harris, Chelsea Science Simulation Project

This unit on wave superposition is designed to improve students' understanding of the use of models in physics. The unit focuses on the wave theory of light and how effective the theory is in explaining observed phenomena.

The Students' Notes guide the student through three investigations of interference and diffraction phenomena using the program. The simple model in the program calculates the intensity due to the superposition of radiation from two sources, or two slits, each having two secondary sources. The complex model allows students to investigate the effects of the direction and distance factors, and the effects of the number of secondary sources in each slit.

This unit is not intended to replace the usual teaching of interference and diffraction phenomena. It cannot in any way replace actual observation of these patterns, which are, after all, easily enough seen using simple laboratory equipment. The aim is to focus students' attention on the physical model used to "explain" the observations in a way that, because of the mathematics involved, is not simple to do without a computer. The work is intended to encourage a more critical attitude to the use of models in physics in general, by emphasizing and investigating some of the assumptions (nearly always made but hardly ever mentioned) in this one example. It is hoped that the package will make the student aware of this aspect of physics along with learning the particular lessons about physical optics.

SCATTER

A Package by J. Harris, Chelsea Science Simulation Project

Physics has to do with the real world, but in some cases an actual experiment is impossible to carry out in the real world. One example deals with nuclear scattering, an experiment which reveals the shape and size of an object which cannot be seen. Since there are experimental difficulties in performing certain scattering investigations, models of a number of experimental situations have been programmed for the computer simulations in Scatter. By working with these models, the student will be able to gain considerable insight into these scattering experiments which are so important in physics.

These models can also be used to introduce students to the notion that by bombarding an object with particles, one can learn something of its nature from the scattering it produces; to increase students' understanding of the use of models in physics; and to give some appreciation of the achievement of Rutherford, Geiger and Marsden.

There are three programs in the Scatter package which simulate various systems. The first two give students experience in deducing the size, shape and force law of a single scattering center from the scattering pattern it produces. The last program simulates the scattering of alpha particles by a metal foil. Furthermore, by creating a simple physical model, or perhaps a variety of models, in the computer program and letting the student investigate the

behavior predicted by the models under the different conditions, it is possible to focus the student's attention on this essential aspect of physics as model building.

Each program is designed to be used with the students' previous knowledge of the topic together with information provided in the Students' Notes. The notes also guide students in formulating problems to be tackled at the terminal. Students then must interpret the "simulated experimental" results and finally compare predictions of a simple model with laboratory results. This unit is intended as a supplemental learning resource and is sufficiently flexible to be integrated into existing courses.

NEWTON

A Package by J. Harris, Chelsea Science Simulation Project

Newton suggested that a stone thrown with sufficient speed from the top of a mountain would go into orbit around the earth. While students are unable to attempt this experiment, a computer can be used to work out what would happen if this experiment were performed.

The computer program on which this unit is based enables students to investigate how the path depends on the height of the mountain and the initial speed. The student is directed to find the intial velocity needed for the minimum (circular) orbit, and to compare the period and shape of orbits of different sizes with data for earth satellites. The questions in the Students' Notes lead students to think about the relationship between models (in this case, Newton's Law of Gravitation and his Second Law of Motion) and the physical phenomena these models "explain."

The concepts presented in Newton could be extended in many ways. Students could be asked to check how well their results conform to Kepler's Laws of Planetary Motion. Or to question the basic assumption in the iterative method used in the program - the fact that the satellite moves in a series of straight-lined segments and that the velocity remains constant in any one of them. With minor modification to the program, the student could investigate what the orbit would look like if the gravitational force did not follow an inverse square law, but varied in some other way with distance; how real orbits are modified by drag; or the effect of increasing the velocity while the satellite is in orbit (buming a second stage rocket).

RKINET

A Package by A.W.B. Aylmer-Kelly, Chelsea Science Simulation Project

The laboratory can be used for a few experiments in reaction kinetics, but some especially interesting reactions often have to be omitted for reasons of time or complexity. The Rkinet simulation has been written with the aim of fulfilling two basic objectives: (1) to extend students' laboratory experience and understanding of reaction kinetics by enabling them to carry out a wider range of investigations without taking up an excessive amount of time; and (2) to help students understand the relationship between a mathematical model and reality.

The mathematical model in Rkinet represents the ways in which various factors influence the rate of a chemical reaction. The model, which is based on data from real experiments, will broaden the students' knowledge of first- and second-order reactions, rate constants, concentrations, and the effect of variation of temperature on reaction rate.

The student first carries out a simple exercise in mathematical modeling, comparing computer-derived results with his or her own experimental ones. The student then uses the computer model to simulate other experiments, choosing suitble values for parameters which represent experimental conditions. This gives the student valuable experience in designing experiments and a practial knowledge of characteristics of chemical systems which might not be obtained in any other way.

The use of the simulation also provides experience in selecting investigations which produce meaningful results. However, it is not intended in any way to replace existing laboratory experiments, but rather to complement and extend this work.

HABER

A Package by R. Edens and K. Shaw, Chelsea Science Simulation Project

The production of ammonia by the Haber process is an important process in chemical indusry, and yet one not easily performed by students in conventional laboratory investigations. The Haber computer simulation provides students with the opportunity to study the Haber process and how the various conditions (temperature, pressure, catalyst and reactant concentration ratios) influence the course of the reaction (i.e., the time required to reach equilibrium and the equilibrium yield of ammonia). Specifically, the authors state that the objectives of the unit are to enhance students' understanding of:

.The Haber process.

.The effects on the equilibrium yield of changing temperature, pressure, and the initial hydrogen-to-nitrogen molar ratio.

.The effects on the reaction rate of changing temperature and pressure.

.The effects on the reaction rate of using various catalysts.

.Some of the considerations outside chemistry which have to be taken into account in the design of chemical plants for the industrial production of ammonia. The interpretation of results predicted in a model for conditions which the students are unable to create in the laboratory.

.The use of a mathematical model.

Even though the computer simulation is interactive, it does not stand alone. The Students' Notes provide the essential framework and direction for the students' studies. The Notes provide a brief restatement of the equilibrium law, Le Chatelier's Principle of Equilibrium, the rate law from kinetics, the ammonia synthesis mechanism, the effect of temperature on the rate constant. and the effects of catalysts. Before using the program, students should be introduced to these concepts through lectures and textbook readings.

In the first investigation in the Students' Notes - Properties of a System at Equilibrium - the student specifies the constant molar ratio, the initial temperature, the increase in temperature, and the constant pressure, and selects to vary the pressure. temperature, or initial hydrogen-to-nitrogen ratio. The program then calculates and displays the percentage yield of ammonia against the varying parameters for the conditions chosen by the student.

In the second investigation - The Haber Process - the student specifies which catalyst to use (none, osmium, tungsten, molybdenum, iron or manganesse dioxide), and then chooses a temperature and pressure. At time intervals set by the student, the program calculates the amount of ammonia formed, expressed as a percentage of ammonia in the equilibrium mixture. The hydrogen-to-nitrogen ratio is set at 3:1 in the simulation.

Each investigation is followed by questions to bring out the important points of the chemistry. Each investigation requires thirty to forty minutes at the terminal.

EVOLT

A Package by S. McCormick, Chelsea Science Simulation Project

Evolut is an introductory unit in evolution and population genetics, intended to teach: (1) mechanisms generating variation and the selective process leading to adaptations; (2) adaptation to environmental conditions in relation to survival value; (3) manipulation of models of

selection acting on populations; and (4) investigation of the power of selection in producing certain frequencies of alleles in a given environment and relation of adaptation to survival. An elementary knowledge of genetics is required for effective student use. The computer program allows the student to test the hypothesis that inherited variations showing a small positive survival value are sufficient for micro-evolution. Students select various parameters in the model, including zygote type, percent of selection, size of population, initial percent of green alleles, and number of generations, and they observe the simulated process of natural selection and evolution.

ORDERING INFORMATION

All these programs, with the exception of ECOLOGICAL MODELING ($60.00) are $30.00 and are available by ordering from:

CONDUIT
P.O. Box 388
Iowa City, Iowa 52240

MICROPHYS PROGRAMS also has an excellent selection of Educational Programs specially designed to be used with the PET. They are as follows:

Math Cassettes - Senior High School
701. Quadratic Equations
702. Trigonometry I
703. Simultaneous Equations (2x2)
704. Simultaneous Equations (3x3)
705. Geometrical Areas
706. Trigonometry II
707. Verbal Problems I - Numbers
708. Verbal Problems II - Coins
709. Verbal Problems III - Ages
710. Verbal Problems IV - Interest
711. Verbal Problems V - Mixtures
712. Verbal Problems VI - Geometry
713. Verbal Problems VII - Rates
714. Verbal Problems VIII - Digits
715. Verbal Problems IX - Work
716. Arithmetic Progressions I
717. Arithmetic Progressions II
718. Geometric Progressions I
719. Geometric Progressions II
720. Types of Variation
721. Linear Equations
722. Formula Evaluation
723. Coordinate Geometry I
724. Exponents and Logarithms
725. Verbal Problems - General

Math Cassettes - Junior High School
801. Magic Squares
802. Multiplication
803. Division
804. Modular Arithemtic
805. Proportion Problems
806. Percent Problems
807. Addition of Fractions
808. Subtraction of Fractions
809. Multiplication of Fractions
810. Division of Fractions
811. Mode, Median, and Mean
812. Bar Graph Analysis
813. Decimals I
814. Decimals II
815. Verbal Problems I

Utility Cassettes
301. Vector Analysis I
302. Vector Analysis II
303. Gas Law Analysis
304. Optics Analysis

305. Projectile Analysis
306. Calorimetry Analysis
307. Chemistry I Analysis
308. Chemistry II Analysis
309. Stoichiometry Analysis

Chemistry and Physics Cassettes
1. Linear Kinematics
2. Projectile Motion
3. Momentum and Energy
4. Energy and the Inclined Plane
5. Inelastic Collisions
6. Centripetal Force
7. Pulley Systems - Machines
8. Specific Heat Capcity
9. Calorimetry
10.Heats of Fusion/Vaporization
11.Specific Gas Laws
12.General Gas Law
13.Thermodynamics I
14.Thermodynamics II
15.Transverse Standing Waves
16.Longitudinal Standing Waves
17.Lenses and Mirrors*
18.Refraction of light
19.Series Circuit Analysis
20.Parallel Circuit Analysis I
21.Parallel Circuit Analysis II
22.Faraday's Law
23.Gram-Molecular Mass
24.The Mole Concept*
25.The Molarity Concept*
26.The Normality Conept
27.The Molality Concept
28.Stoichiometry:Mass/Mass
29.Stoichiometry:Mass/Volume
30.Stoichiometry:Volume/Volume
31.Stoichiometry:General*
32.Percent Concentration
33.pH Concept
34.EMF of Electrochemical Cells
35.Electric Field Analysis
36.Photoelectric Effect
37.Symbols and Valence Drill
38.Naming Compounds Drill*
39.Formulas of Compounds Drill*
40.Total Internal Reflection
     *These programs are available directly from Commodore.

Volcabulary Cassettes

401. 12th Grade I	406. 11th Grade I
402. 12th Grade II	407. 11th Grade II
403. 12th Grade III	408. 11th Grade III
404. 12th Grade IV	409. 11th Grade IV
405. 12th Grade V	410. 11th Grade V

411.	10th Grade I	416.	9th Grade I
412.	10th Grade II	417.	9th Grade II
413.	10th Grade III	418.	9th Grade III
414.	10th Grade IV	419.	9th Grade IV
415.	10th Grade V	420.	9th Grade V
421.	8th Grade I	426.	7th Grade I
422.	8th Grade II	427.	7th Grade II
423.	8th Grade III	428.	7th Grade III
424.	8th Grade IV	429.	7th Grade IV
425.	8th Grade V	430.	7th Grade V

Each program is available on cassette for $20.00 for either the 2001-8K or 2001-16/32N or B model computers.

Additionally, these programs are also available on diskette for use with the CBM Model 2040 Dual Drive Floppy Disk. The price of each diskette is $180.00.

1. P1: Physics I Disk - contains the following 14 Microphys programs: 1,2,3,4,5,6,7,8,9,10,301,302,305,306.

2. P2: Physics II Disk - contains the following 17 Microphys programs: 11,12,13,14,15,16,17,18,19,20,20A,21,35,36,40,303,304.

3. C1: Chemistry I Disk - contains the following 13 Microphys programs: 8,9,10,11,12,22,23,24,37,38,39,303,306.

4. C2: Chemistry II Disk - contains the following 13 Microphys programs: 25,26,27,28,29,30,31,32,33,34,307,308,309.

5. M1: Senior High Math I Disk - contains the following 13 Microphys programs: 701-713.

6. M2: Senior High Math II Disk - contains the following 12 Microphys programs: 714-725.

7. M3: Junior High Math Disk - contains the following 15 Microphys programs: 801-815.

8. V1: Senior High Vocabulary Disk - contains the following 15 Microphys programs: 401-415.

9. V2: Junior High Vocabulary Disk - contains the following 15 Microphys programs: 416-430.

All of these programs are available from:

MICROPHYS PROGRAMS
2048 Ford Street
Brooklyn, New York 11229

Business Software

by CMS Software Systems

Structured around the time tested and reliability proven series of business software systems developed by Osborne and Associates, these programs have been designed to fill the need of a comprehensive accounting package for the new Commodore PET/CBM microcomputer system. Each program can either stand alone, or be integrated with the others in a total software system.

Designed with the first time user in mind, these programs lead the operator through step by step, verified data entry. It is impossible to "crash" a program due to operator error or invalid data input. Design consistency has been maintained from program to program to greatly increase operator familiarity and confidence.

Documentation, normally a problem for small systems users, is provided by the comprehensive series of Osborne and Associates user manuals. These three manuals together total over 800 pages of detailed step by step instructions written at three levels for DP Department Managers, Data Entry Operators, and Programmers. You don't have to worry about getting "promises" instead of documentation because the documentation was written before the programs were developed. A second set of manuals details any change required during conversion. Each program is provided on disk with complete documentation, and is packaged in a handsome three ring binder with pockets and twelve monthly dividers for convenient storage of reports.

GENERAL LEDGER

- holds up to 300 accounts
- accepts up to 3000 transactions per month
- cash disbursements journal, cash receipts journal, and petty cash journal for simplified data entry
- maintains account balances for present month, present quarter, present year, three previous quarters, and previous year
- complete financial reports including trial balance, balance sheet, profit & loss statement, cash receipts journal, cash disbursements journal, petty cash journal and more
- accepts postings from external sources such as accounts payable, accounts receivable, payroll, etc.
  ....$295.00

ACCOUNTS PAYABLE

- interactive data entry with verified input and complete operator prompting
- automatic application of credit and debit memos
- maintains complete purchase records for up to 200 vendors
- invoice file accepts up to 400 invoices
- random access file organization allows fast individual record updating
- multiple reports provide a complete audit trial
- check printing with full invoice detail
- full invoice aging
- automatic posting to general ledger
  ....$195.00

ACCOUNTS RECEIVABLE

- maintains invoice file for up to 300 invoices
- accomodates full or partial invoice payments
- customer file maintains purchase information for up to 1000 customers
- allows for automatic progress billing
- provides for credit and debit memos as well as invoices
- prints individualized customer statements
- interactive data entry with full operator prompting
- complete data input verification and formating
- automatic posting to general ledger
  ....$195.00

PAYROLL

- maintains monthly, quarterly and yearly cumulative totals for each employee
- payroll check printing with full deduction and pay detail
- sixteen different reports including W2 and 941
- interactive data entry with easy correction of entry errors
- automatic data verification
- complete job costing option with cumulative totals and overhead calculations
- random access file organization for fast updating of individual records.
- automatic posting to general ledger
  ....$295.00

See your nearest Commodore dealer for a demonstration of this outstanding business software system, or contact:

        CMS Software Systems
        5115 Menefee Drive
        Dallas, Texas 75227

Next issue we will be reviewing a comprehensive Instruction Management Education package. For advanced information on this fully documented package contact:

ENI
Thunderbird Plaza
7500 East Butherus Dr.
Suite P
Scottsdale, Arizona 85260

We will also review a Small Business package in the next issue. This package is comprised of General Ledger, Accounts Receivable, Accounts Payable, Inventory, and Payroll. You may wish to contact COMPUMAX prior to receiving your next issue at:

COMPUMAX
505 Hamilton Ave.
Palo Alto, CA 94301

The Pet Machine Language Guide

A REVIEW
by ARNIE LEE

In an effort to assist programmers in using the PET to its fullest extent by programming in 6502 machine language, we are reviewing many different publications.

The PET Machine Language Guide published by Abachus Software (P.O. Box 7211, Grand Rapids, Michigan 49510) is a 50 page manual that discusses the operation of many routines that are available in the PET. The Guide shows the user the reference addresses for both the 16K/32K PETs. The book, therefore, is applicable to any of the PET/CBM computers. The topics covered in the book are:

1. Projection (placement) of machine language programs.
2. Clocks and timers.
3. Screen display and cursor positioning.
4. User function.
5. Number representation and arithmetic.
6. Number conversion.

This manual is not intended as a primer on 6502 machine language. It is intended to aid the programmer who is already versed in the 6502 language to program the PET Microcomputer System.

This manual, along with the MOS Technology Programming Manual and other 6500 Machine Language Guides, will be valuable to the novice programmer starting out in programming the PET's Microprocessor.

The only thing missing in this manual is a discussion of the PET's communication interfaces with the IEEE-488 Bus and the User Port.

The discussion of communication would take another book of equal size and of greater complexity; therefore I do not wish to be harsh on the author for not covering this topic.

This manual would be a valuable addition to the PET owner's library and I heartily recommend it.

The PET Machine Language Guide is available from Abacus Software, P.O. Box 7211, Grand Rapids, Michigan 49510 by direct mail for $6.95 plus .75 postage.

APPLICATION

Pet Sprouts Wings

The following PET tribute is from Mr. Ken C. Barroll of Seattle, WA.

Dear PET Users Club,

I really enjoy my PET and only wish I had gotten it sooner.

I am an airline pilot by profession and have written tapes that have all the information about the aircraft I fly. Thus before each checkride every six months I can have a quick review! In conjunction with this it also can figure out the value from pay point of view of the different trips I fly, and keep track of my flight-times.

Here is what I use it for: As a ham radio operator I use it with my M-65 Interface on morse code and teletype circuits - it copies flawlessly at speeds no human can comprehend - 90+ words per minute!

In the family it can do everything from balance checkbooks to teach my kids to read and write - my two-year old has learned the alphabet from it and my 4-year old plays all kinds of simple spelling games with it.

Primarily I use it for fun though, and thoroughly enjoy everything from a serious game of chess (PET shows no mercy) to some of the zany and whacky games from Cursor. (Box 550, Goleta California 93017) which is a tape-service every PET owner should subscribe to - if only to see what unbelievably skillful programming combined with a PET can produce.

I am finding the PET quite a teaching tool too - and feel about a 50% mastery of BASIC at this stage (6 months ownership). Someday I hope to get into machine language/assembly etc.

        Very sincerely yours,

        Ken C. Barroll
        Seattle, WA

PROGRAMMING

Display Track and Sector

By James C. Parsons

When writing programs with the 2040 Disk Drive, the ability to examine any Data Block on the disk can significantly speed up the debugging process. The program which follows, in this issue of the newletter, will display any Data Block from the 2040.

A Data Block is 256 characters stored on a diskette. The Block has a 2 character pointer, to link the blocks of a file together, then 254 characters of data. All PRG, SEQ, and USR files use this format. The Data Block is addressed on the diskette by Track & Sector. The Track is one ring on the magnetic surface of the diskette. The 2040 has 35 Tracks, numbered 1 to 35. The Sector is one 255 character Data Block. The Tracks do not all have the same number of sectors.

TRACK NUMBER	SECTOR RANGE	TOTAL BLOCKS
1 to 17	0 to 20	21
18 to 24	0 to 19	20
25 to 30	0 to 17	18
31 to 35	0 to 16	17

The program will ask for the Data Block by Track and Sector, and then display it to the screen in the following format:
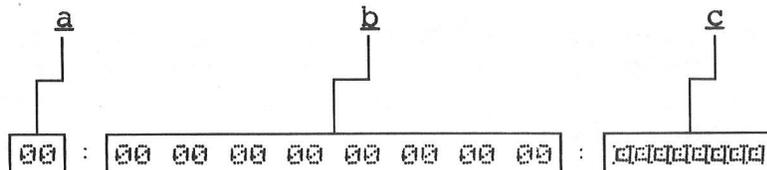
a   The starting character in the disk buffer, in Hexadecimal notation.

b   The contents of 8 bytes of data from the buffer in Hexadecimal.

c   The contents of 8 bytes of data from the buffer in ASCII.

The 2040 disk has one system file that it maintains for its own use on Track 18: this includes the Block Availability Map (BAM), the diskette name and id, and the File Directory. The BAM, on Sector 0, first 128 Bytes, is

used by the disk to keep the available locations on the
diskette. The last 128 bytes hold the diskette name and id.
The File Directory starts on Sector 1.

```
         a         b        c          d         e         f

 TRACK 18   SECTOR 1
 00 :  00 FF 81 11 00 54 45 53 : ......TES
 08 :  54 20 44 41 54 41 20 46 : T DATA F
 10 :  49 4C 45 A0 A0 00 00 00 : ILE ....
 18 :  00 00 00 00 00 00 01 00 : ..........
 20 :  00 00 82 11 01 54 45 53 : .....TES
 28 :  54 20 50 52 47 4D 20 46 : T PRGM F
 30 :  49 4C 45 A0 A0 00 00 00 : ILE ....
 38 :  00 00 00 00 00 00 01 00 : ..........
 40 :  00 00 00 00 00 00 00 00 : ........
 48 :  00 00 00 00 00 00 00 00 : ........
 50 :  00 00 00 00 00 00 00 00 : ........
 58 :  00 00 00 00 00 00 00 00 : ........
 60 :  00 00 00 00 00 00 00 00 : ........
 68 :  00 00 00 00 00 00 00 00 : ........
 70 :  00 00 00 00 00 00 00 00 : ........
 78 :  00 00 00 00 00 00 00 00 : ........
 Continue(y/n)
 NEXT TRACK & SECTOR  0   255
 DO YOU WANT NEXT TRACK & SECTOR
```

a   The first two bytes are the
    Pointer, in Hex, to the next
    Directory Block.
b   The File Type. 00 = Del, 81 =
    SEQ, 82 = USR, 83 = PRG
c   The Pointer to the starting Data
    Block of the file
d   The name of the file.
e   Used by the REPLACE command to
    hold the pointer to the
    starting Data Block of the new
    File.
f   The number of blocks used by the
    file.

        The other bytes in the
    Directory are not used at this
    time by the Disk.

     The format of a file created by the user is very
simple. The first two bytes of the disk buffer are used to
point to the next Track and Sector used by the file. The Disk
will try to optimize the the delay time so the next Sector
will not be one more than the current sector.

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The data in a Disk Block for a program file will be in CBM Memory form so the user may have some difficulty reading the output. The data file form will tell the user much about the disk program by seeing exactly how the data is written to the diskette.

It is hoped the this program will increase your understanding of the operating characteristic of the CBM 2040 Dual Drive Floppy Disk.

Example of Program File

```
TRACK 17   SECTOR 1
00 : 00 68 01 04 28 04 0A 00 :
08 : 81 20 49 20 B2 20 32 20 :    I   2
10 : A4 20 32 35 34 20 3A 41 :  _ 254 :A
18 : 24 20 B2 20 41 24 20 AA :  $   A$
20 : 20 C7 28 49 29 20 3A 82 :   (I) :
28 : 20 49 00 4B 04 14 00 9F :   I
30 : 20 32 2C 38 2C 32 2C 22 :   2,8,2,"
38 : 31 3A 54 45 53 54 20 44 :  1:TEST D
40 : 41 54 41 20 46 49 4C 45 :  ATA FILE
48 : 2C 53 2C 57 22 00 56 04 :  ,S,W"
50 : 1E 00 98 32 2C 41 24 3B :     2,A$;
58 : 00 5E 04 28 00 A0 20 32 :         2
60 : 00 64 04 32 00 60 00 00 :
68 : 00 53 20 46 52 45 45 2E :  S FREE.
70 : 20 20 20 20 20 20 20 20 :
78 : 20 20 20 20 20 00 00 00 :
TRACK 17   SECTOR 1
80 : 80 81 82 83 84 85 86 87 :
88 : 88 89 8A 8B 8C 8D 8E 8F :
90 : 90 91 92 93 94 95 96 97 :
98 : 98 99 9A 9B 9C 9D 9E 9F :
A0 : A0 A1 A2 A3 A4 A5 A6 A7 :
A8 : A8 A9 AA AB AC AD AE AF :
B0 : B0 B1 B2 B3 B4 B5 B6 B7 :
B8 : B8 B9 BA BB BC BD BE BF :
C0 : C0 C1 C2 C3 C4 C5 C6 C7 :
C8 : C8 C9 CA CB CC CD CE CF :
D0 : D0 D1 D2 D3 D4 D5 D6 D7 :
D8 : D8 D9 DA DB DC DD DE DF :
E0 : E0 E1 E2 E3 E4 E5 E6 E7 :
E8 : E8 E9 EA EB EC ED EE EF :
F0 : F0 F1 F2 F3 F4 F5 F6 F7 :
F8 : F8 F9 FA FB FC FD FE FF :
NEXT TRACK & SECTOR   0   104
DO YOU WANT NEXT TRACK & SECTOR
```

Example of Data File

```
TRACK 17   SECTOR 0
00 :  00 FE 02 03 04 05 06 07  :  ▓ ▒▓▒▓▒▓
08 :  08 09 0A 0B 0C 0D 0E 0F  :  ▓▒▓▒▓▒▓▒
10 :  10 11 12 13 14 15 16 17  :  ▒▓▒▓▒▓▒▓
18 :  18 19 1A 1B 1C 1D 1E 1F  :  ▓▒▓▒▓▒▓▒
20 :  20 21 22 23 24 25 26 27  :   !"#$%&'
28 :  28 29 2A 2B 2C 2D 2E 2F  :  ()*+,-./
30 :  30 31 32 33 34 35 36 37  :  01234567
38 :  38 39 3A 3B 3C 3D 3E 3F  :  89:;<=>?
40 :  40 41 42 43 44 45 46 47  :  @ABCDEFG
48 :  48 49 4A 4B 4C 4D 4E 4F  :  HIJKLMNO
50 :  50 51 52 53 54 55 56 57  :  PQRSTUVW
58 :  58 59 5A 5B 5C 5D 5E 5F  :  XYZ[\]↑←
60 :  60 61 62 63 64 65 66 67  :   !"#$%&'
68 :  68 69 6A 6B 6C 6D 6E 6F  :  ()*+,-./
70 :  70 71 72 73 74 75 76 77  :  01234567
78 :  78 79 7A 7B 7C 7D 7E 7F  :  89:;<=>?
continue(y/n)
TRACK 17   SECTOR 0
80 :  80 81 82 83 84 85 86 87  :  ▓▒▓▒▓▒▓▒
88 :  88 89 8A 8B 8C 8D 8E 8F  :  ▓▒▓▒▓▒▓▒
90 :  90 91 92 93 94 95 96 97  :  ▓▒▓▒▓▒▓▒
98 :  98 99 9A 9B 9C 9D 9E 9F  :  ▓▒▓▒▓▒▓▒
A0 :  A0 A1 A2 A3 A4 A5 A6 A7  :   ▐▗▖⌐▌▨▐
A8 :  A8 A9 AA AB AC AD AE AF  :  ▞╱╟┠▞┗▄
B0 :  B0 B1 B2 B3 B4 B5 B6 B7  :  ┗┷┤║│┌
B8 :  B8 B9 BA BB BC BD BE BF  :  ▀┘▄└▀▀▄
C0 :  C0 C1 C2 C3 C4 C5 C6 C7  :  ─◆│─┌─┘
C8 :  C8 C9 CA CB CC CD CE CF  :  ╰◡╲◡╱
D0 :  D0 D1 D2 D3 D4 D5 D6 D7  :  ┐▉▄◆│ ╱╲○
D8 :  D8 D9 DA DB DC DD DE DF  :  ◈ ▶◈▩ │π◥
E0 :  E0 E1 E2 E3 E4 E5 E6 E7  :   ▐▗▖⌐▌▨▐
E8 :  E8 E9 EA EB EC ED EE EF  :  ▞╱╟┠▞┗▄
F0 :  F0 F1 F2 F3 F4 F5 F6 F7  :  ┗┷┤║│┌
F8 :  F8 F9 FA FB FC FD FE FF  :  ▀┘▄└▀▀ π
NEXT TRACK & SECTOR   0   254
DO YOU WANT NEXT TRACK & SECTOR
```

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Glossary of Definitions

Through the courtesy of SYBEX Inc., CBM has been granted permission to excerpt portions of their MICROPROCESSOR LEXICON for publication in the PET Users Club Newsletter over the next year or so. The Lexicon is available at some computer stores, although it can be purchased directly from SYBEX in Berkeley, California at the following address - 2020 Milvia Street, Berkeley, CA 94704; in Europe at this address - 313 rue Lecourbe, 75015-Paris, France. The MICROPROCESSOR LEXICON sells for $2.95.

The Editor feels that these acronyms and definitiions will be of value to PET/CBM users and will help you understand some of the jargon that is encountered in the microcomputer industry.

A   Accumulator

A   Address line

A   Hexadecimal symbol for "1010"

A   Ånström = $1.0*E-9$ meter

abort   The process of halting the program in an orderly fashion and returning control to the operator or operating system.

absolute loader   Program to load a program at specified numerical addresses

A-bus   Primary internal source-bus to the ALU in any processor

AC   Alternating current

AC   Accumulator

access time   The time required to fetch a word from memory

accumulator   A special-purpose register in which the results of an Arithmetic Logic Unit operation are placed. There may be more than one accumulator in a central processor

ACIA   Asychronous Communications Interface Adapter

ACK   Acknowledge

acknowledge   A control signal used to complete a hand-shaking sequence. The ACK signal indicated that the information has been accepted

acoustical coupler   Device for connecting the telephone handset to be computer input port

ACT   Tempory accumulator (in 8080)

A/D   Analog to digital. Conversion from sensor's analog voltages and currents to the digital representation used by computer systems. This ia so computers can sense the "real world"

ADC   Analog to Digital Converter

ADCCP   Advanced Data Communication Control Procedures

adder   Unit that performs binary arithmetic in a processor

add-on   Circuitry or system that can be attached to a computer to increase memory or performance

address   Number indicating the position of a word in the memory. Typical addresses range from 0 tp 64K

address mark   Special "8-bit" code (in fact, 8 bits for clock, 8 bits for data) used at the beginning of specific fields on a disk track such as: index, ID, data, deleted data

ALGOL   Algorithmic Programming Language. A high level language. Has a structure which is known as "context free"

algorithm   Step-by-step specification of the solution to a problem (must terminate in a finite time). A problem is stated, an algorithm is devised for its solution. The algorithm is then represented by a flow-chart.

Bits & Pieces

Hex to Decimal Conversion

by Roger Lynn

Here is a short basic routine that allows you to input numbers into the PET in hexadecimal format:
The routine is 8000-81600 when it returns the variable NS has the decimal equivalent of C$.


```
100 INPUTC$:LS=LEN(C$):GOSUB8000:PRINTNS:GOTO100
8000 REM C$ HAS HEX STRING & LS IS ITS LENGTH
8100 NS=0
8120 FORIS=0TOLS-1
8130 AS=ASC(MID$(C$,LS-IS,1))-48
8140 NS=NS+(16 IS)*(AS+7*(AS>9))
8150 NEXTIS
8160 RETURN:REM RETURNS WITH NS= DECIMAL EQUIVALENT
     OF C$
READY
```


The subroutine can be used to aid assembly language programs in inputting data and programs into the PET.

PERIPHERALS AND ATTACHMENTS

Basic Programming Tool Kit

An open letter to PET Owners from Harry J. Saal, President of Palo Alto ICs:

I love my PET as much as you love yours. But don't you sometimes find it frustrating to create or modify programs?

I've owned my PET for over a year; I'm impressed with its features and its power. Yet when I program I find a great deal of difficulty in modifying, polishing, simplifying and adding new features.

But now, with the BASIC PROGRAMMER'S TOOLKIT that I and my associates have created, I'm having more fun, making far fewer errors and I'm completing programs much faster.

I'd like to share my discovery with you.

The BASIC PROGRAMMER'S TOOLKIT has two kilobytes of ROM firmware on a single chip and contains a collection of machine language programs available from the time you turn on your PET to the time you shut it off. Your PET will now have a significant set of additional commands-programmer's tools to enhance your ability to create new programs, to modify old programs, to discover how programs work . . . to enjoy your PET even more. And to do it all so much faster and so much more accurately.

There are no tapes to load or to interfere with any running programs. And it installs in minutes, without tools.

Once you have your BASIC PROGRAMMER'S TOOLKIT in place, you'll know how much more pleasure your programming can give you. I know: I've been using the TOOLKIT for almost two months. I think I love it as much as I love my PET.

The Tools in the Basic Programmer's Tool Kit

VERY SPECIAL COMMANDS. Power up your PET, execute the command SYS with the appropriate address and your new PET is off and running with these commands:

<u>AUTO</u> This command is followed by a series of optional parameters specifying where you want to enter lines and how far apart you want them. Your PET will automatically respond with a line number prompt. You won't have to enter the line numbers; you won't have to worry about errors of screen editing.

<u>DELETE</u> Like LIST, this command is followed by a range of line numbers . . . and every one of the lines within the range of numbers will be removed instantly from your program. No longer will you have to type a line number, press RETURN, type the next line number, RETURN, next line . . .

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RENUMBER Now you can change all line numbers-- and all references to those numbers-- instantly, as, for instance by evenly spaced increments of 100 or 25 or 10. . .

HELP How many times have you wanted to scream "HELP!" when your PET couldn't interpret your program and all it would say was: ?SYNTAX ERROR? Fret no longer: Now just type in HELP. The line on which the error occurs will be shown and the erroneous portion of the line will be indicated in reverse video on the screen. Truly a great help in any learning or school situation.

TRACE Now you can see precisely the order and sequence in which your program is being executed. You can also stop the program at any point and record the sequence. Type in this command and your PET will keep a record of the line numbers of the last six statements executed. These last six statement numbers will appear in a small rectangular window in the upper right hand corner of your screen.

STEP Again your line numbers are displayed in the upper right hand corner of the screen in this version of TRACE. But now your PET executes just one statement and pauses until you press SHIFT. Then it proceeds to the next statement.

OFF This command will stop either TRACE or STEP.

APPEND You've already worked hard to develop a number of programs and, of course, you've saved them on tape. You're working on a program that's now in memory. Just type in APPEND "program name" and all statements in that program will now follow the program in memory. No need to retype; no opportunity for errors. Save any set of statements or subroutines onto a tape, using the normal SAVE command; then recall them with the APPEND command and add them permanently to your program.

DUMP During or after running a program, this command will display the names and values of all variables used in the execution of your program. You'll know at once what simple variables, arrays and strings you've used and what values you've assigned to each.

FIND Like LIST, this command will show a set of lines. But the FIND command is followed by specifying a character string. Those lines, and only those lines, containing a desired character string will be listed on your PET's screen. If you were to type FIND A$, 100-500 your PET's screen would display all lines between line numbers 100 and 500 that contains A$.

Packaging

Two KB of ROM firmware on a single chip. For PET 2001-8, the 8K RAM PET, a printed circuit board is provided with connectors to the memory expansion interface at the right side of your PET and to the second cassette interface located at the rear right of your PET.

Memory addresses in ROM from $9800 to $9FFF and addresses in RAM from $03E0 to $03FF are used by the TOOLKIT.

For the 16K and 32K PET, the BASIC PROGRAMMER'S TOOLKIT consists of the ROM firmware chip which is to be installed in the right-most empty socket inside the PET. If this socket is already being used (i.e., the CBM WORDPRO Software ROM) then you will also need a device similiar to the SPACE MAKER which is offered at $27.00 by SMALL SYSTEM SERVICE INC., 900 Spring Garden Street, Greensboro, NC 27403.

The TOOLKIT is custom designed to interface, at your request, with either the Skyles or Expand-a-Pet memory expansion systems. The TOOLKIT may also be ordered for interfacing with the 8K PET but without connectors. Please indicate when ordering.

A comprehensive user's manual (38 pages) is supplied at no additional charge.

Ordering Information

The TOOLKIT is available for both old and new ROM styled PETs as well as for Memory Expansion Systems:

    Large Keyboard PET/CBM   49.95
    8K PET(or expanded 8K PET) 79.95

Order from your local authorized Commodore Dealer. If he is not aware of this product, then write to:

        Palo Alto ICs
        810 Garland Drive
        Palo Alto, CA 94303

USERS DIRECTORY & ANNOUNCEMENTS

Future Newsletter Additions

In future issues of the newsletter we hope to include two new sections - USER CLUB EXCHANGE and EDUCATIONAL EXCHANGE. These new sections will be designed to open channels of communication between PET USER CLUB members. Members will now be able to communicate to each other via the newsletter. We welcome your response regarding these additions. Please address your letters to the EDITOR.

Correction to CBM 16K/32K User Manual Pg. 48

We found that the expression used to compute the value of arc sine and arc cosine as a function of arc tangent was given in radians. The following expression is in degrees:

```
ARC SIN(X) = ATN(X)SQR(-X*X+1))
ARC COS(X) = ATN(X)SQR(-X*X+1))+1.5708
```

Services Offered

One of the major advantages in being a member of the PET USER'S CLUB is the ability to get hold of PET related Software and ideas. Although our Master Library of programs is now growing, we get frequent Software inquiries for a wide range of applications.

In this issue, we have included the current USER'S DIRECTORY, containing lists of people writing Software, publishing literature or starting local PET Groups. If you would like to use your PET for fun and profit, why not offer personal tutoring in PET programming to new PET owners. Alternatively, if you require a program to be written for you, ask for contacts via the USER'S DIRECTORY. The possibilities are endless. Please write to the EDITOR, U.S. PET USER'S CLUB, at our current address below.

To include your name in the USER'S DIRECTORY, please complete the following form:

TO: THE EDITOR, U.S. PET USER'S CLUB,
      COMMODORE BUSINESS MACHINES
      3330 SCOTT BLVD.
      SANTA CLARA, CA 95051

NAME:

ADDRESS:

SERVICES OFFERED/SPECIAL AREA OF INTEREST:

To include as many contacts as possible, we must restrict each USER to only one line of description.

COMMODORE reserves the right to edit or withdraw any entry.

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LISTED BELOW ARE PET USERS WHO HAVE RECENTLY SUBMITTED THEIR SPECIALTY OR AREA OF INTEREST TO FURTHER COMMUNICATION WITH PET OWNERS THROUGHOUT THE UNITED STATES. IF YOU WOULD LIKE TO OFFER YOUR SRVICES TO OTHERS, PLEASE FILL OUT THE "USER DIRECTORY" FORM ON THE PREVIOUS PAGE.

NAME AND ADDRESS	SERVICES OFFERED/SPECIALTIES
Eastern House Software 3239 Linda Dr. Winston-Salem, N.C. 27106	Assembler, Text Editor, Compiler and Business Software
James A. Gray 3955 Bentley Ave. Culver City, CA 90230	Hardware interface for special applicatins
Industrial Engineering Services Computer Software Division Waldstrasse 0033,6943 Birkenau, Germany	Industiral Engineering CAD-CAM, Solad and Process Control Software
J.Michael Jacob 101-B Michael Golden Lab Purdue Univ.,W.Lafayeete, IN 47907	Industrial Data Acquisition reduction and Systems Control
Katherine Mays Box 865 Sweeney, TX 77480	High School Physics Programs
PET LIBRARY (Jacksonville Area PET Society) 401 Monument Rd.#123 Jacksonville, FL 32211	PET Software Sales
The HONDERS INC.(Computer Emporium) Kennel Road Cuddlesackville, NY 12729	Factory Trained Service for Commodore Products. We offer a complete AC Controller for PET CBM
"190" Club(Nancy Marchese) S. U. NY Lupton Hall New York	Engineering, Engineering Lab

User Clubs

Association of Personal Computer Users
5014 Rodman Rd.   Bethesda, MD   20016

Amateur Computer Group of New Jersey
18 Alpine Drive   Wayne, N.J.   07470

Bambug
1450 53rd St   Emeryville, CA   94608

JAPS-Jacksonville Area PET Society
401 Monument Road #177   Jacksonville, Fl   32211

Lawrence Hall of Science, UC Berkeley
Computer Project,Room 254,   Berkeley, CA   94720

Las Vegas PET Users
4884 Iron Ave.   Las Vegas, NV   89110

Lincoln Computer Club
750 E. Yosemite   Manteca, CA   95336

Long Island PET Society
Harborfields High School,
Taylor Ave.   Greenlawn, N.Y.   11740

Madison PET Users
1400 East Washington Ave Rm 187   Madison, WI   53703

Northern New England Computer Society
P.O. Box 69   Berlin, NH   03570

North Orange County Computer Club
3030 Topaz, Apt A   Fullerton, CA   92361

NW PET Users Group
2134 NE 45th Ave   Portland, ORE   97213

Northwest PET User Group
P.O. Box 482   Vashon, WA   98070

PACs PET User Group
La Salle College,
20th & Olnes Sts.,   Philadelphia, PA   19144

PET User Club (CAPE)
2054 Eakins C7   Reston, VA   22091

PET User Club
c/o Mich (Michigan Computer Hackers)
2235 Lakeshore Drive   Muskegon, MI   49441

PET User Group c/o Meyer
35 Barker Ave.   White Plains, NY   10610

PET User Group
Texas A & M Microcomputer Club,   Tex A & M Tex.

PET User Group
P.O. Box 371   Montgomeryville, PA 18936

PET User Group
2323 Washington Blvd.   Ogden, Utah   84401

PET User Group of Hypot
P.O. Box 69   Berlin, N.H.   03570

PUG
7170 S.W. 11th   West Hollywood, Fla 33023

PUG of Silicon Valley
22355 Rancho Ventura Blvd.   Cupertino, CA   95014

Sacramento PET Workshop
P.O. Box 26314   Sacramento, CA   95826

SCOPE
1020 Summit Circle   Carrollton, TX   75006

Sewpus
c/o Theodore J. Polozynski
P.O. Box 21851   Milwaukee, WI   53221

Southeast Connecticut PET User Club
c/o Paul W. Sparks
13 Lincoln Dr.   Gales Ferry, Ct   06335

Sphinx
314 10th Ave.   Oakland, CA   94606

St. Louis Club
40 Westwood Court   St. Louis, MO   63131

The Human Society--United PET Users
1929 Northport Dr. #6   Madison, WI   53704

Valley Computer Club
P.O. Box 6545   Burbank, CA   91510

Valley Computer Club
1913 Boothe Road   Ceres, California   95307

Walnut Creek Pet Users Club
1815 Ygnacio Valley Rd.   Walnut Creek, CA   94596