SPOT

The Society of PET Owners and Trainers

EDITED BY HARRY SAAL

Traffic has been heavy through the revolving door at Commodore Business Machines lately. New faces have arrived as part of a restructuring of the U.S. consumer marketing operation. *Electronic News* reports that Commodore now has Tom Mitchell serving as general manager, Dennis Barnhart as vice president of marketing for consumer products, and Jim Kennedy as vice president of technology. Hugh Getty is vice president of computer marketing, with G.M. O'Neil serving as director of marketing and sales of personal computers. Also of note are the recent departures of three important members of the PET team: Chuck Peddle, father of the PET (and the 6502 microprocessor used in it), who is now with Apple Computers; Bob Skyles, in charge of all PET engineering; and Li-Chen Wang, in charge of the PET floppy disk project.

PET production is definitely up, with a new factory in Clearlake, Iowa, shipping machines at a ferocious pace, and one in England getting on the air shortly. All the same, it still appears that Commodore's marketing emphasis is overseas, where profit margins are substantially higher than stateside. Support seems superior there, too, with Commodore providing very interesting newsletters and bulletins in England, Canada, and Japan. PET optimists are hoping that the management shifts reported above will result in superior service and credibility in the U.S. arena.

On that note, we *did* receive a down payment on the long-awaited information due to each PET owner. Yes, Virginia, there is a Machine Language Monitor tape, with two BASIC programs on the flip side. SQUIGGLE is an example of graphic art on the PET, with BIGTIME displaying the time of day in giant numbers on the screen. A brief manual accompanies the tape. The package did not include the promised BASIC manual, which is certainly the most missed by a new PET owner. (Have you seen the documentation given out by Apple?) But there was a bonus manual entitled "PET Communication with the outside world." Those of you who want to learn more about the user port, memory expansion interface, the IEEE-488 bus, or about data file operations from BASIC will find a wealth of information in this manual. It is honest enough to describe some of the outstand-

Commodore's PET is a factory assembled personal computer based on a 6502 microprocessor. The $795 system includes a keyboard, cassette tape unit, built-in TV screen, some graphics, upper and lower case, and extended 8K BASIC, and 8K of user memory.

Our readers' enthusiastic response to the PET has resulted in "SPOT," one of the magazine's most popular regular features. The column was started, produced, and lovingly nourished by former People's Computers *editor Phyllis Cole. With this issue, she relinquishes the project to Dr. Harry Saal of Palo Alto, Calif.*

Twenty years ago, as a high school student in Brooklyn, the only way Harry could get his hands on a computer was to make a pest of himself at IBM's World Trade Headquarters and Watson Lab, getting five-minute shots on a 650, writing programs in biquinary. Today he has to negotiate machine access with his eight-year-old daughter and six-year-old son, who occasionally permit Dad to use the PET. Harry's been professionally involved in microprogramming and microcomputers since about 1970, as both a researcher and professor of computer science. He has spent the past few years working on the design of APL systems for IBM.

In Harry's view, the purpose of this column is to bring readers information on the PET that would be otherwise unavailable. He wants to hear about problems you haven't solved as well as those you have. So keep those notes and comments coming. — LB

ing bugs in this area, and some temporary fixes. Let's hope the BASIC manual is as complete as this one is!

Of course, a little survey showed that most of the PET owners I spoke to had not received these goodies yet. It seems that distribution is up to the dealer from whom you purchased your PET, so contact him or her. And if you bought it from Commodore directly, but didn't send in your warranty card (which is optional), your name isn't on the mailing list. By writing a letter to the dealer from whom you purchased your machine you can be sure to receive this mailing and future ones.

Also available from Commodore is the PET Service Kit, for $31.95. It is meant for the experienced electronic technician, and includes schematic diagrams and parts lists for the PET. It also contains a diagnostic jumper connector, which enables the built-in PET diagnostics. A cassette tape comes with a batch of programs used to verify ROM and RAM memory operations, tape cassettes, etc. Note that quite a bit of the PET must be working before you can even run (or load) these tests, and the Kit assumes that the service man can figure out what part needs replacing, once the general problem area has been narrowed down.

PET PROBLEMS

A number of readers seem a bit confused about the so-called "lost cursor fix." Of the PET's several common software problems, this is the only one for which Commodore has made a fix available in ROM. The problem occurs during editing of BASIC programs, when statements are being shuffled around in memory. The symptom is that after hitting RETURN, the cursor stops winking, and the only way to recover is to turn the PET off, then back on, losing memory contents in the process. Commodore (see your dealer again) will supply a new ROM to replace the old one for $15. The new part is called the 019 ROM, and replaces an 012 ROM in position H1 (rightmost ROM) on the circuit board. Because early PETs used 6540-type ROMs, and later ones use 2316B-type ROMs, which have different numbers of pins on the integrated circuit from each other, confusion has ensued.

Also keep in mind that many hardware problems can cause the same symptoms

as this software problem. Bad RAM, a flakey ROM, and who-knows-what could all leave you sitting with a PET which has stopped flashing its cursor. For example, Carl Bach of Garland, Texas, wrote to tell us that he traced many failures of his PET to line voltage transients in his power lines. He installed a power line filter (he used the J. W. Miller 5 section L/C filter Model C-509-L) and instead of losing his cursor three or four times a day, it now happens only every other week or so.

One problem that never goes away is the alignment of the cassette tape head. Eventually it will shift, and need adjustment. In a digital system it can't be ignored, as it can in audio usage. Readjusting it is a delicate job, but those of you with a mechanical inclination might prefer to try and do it yourself instead of sending your PET away to the vet for a few weeks. Many thanks to writer Grant Paul and editor Gene Beals, of *PET User Notes*, Box 371, Montgomeryville, PA 18936, for permission to reprint the following article:

HEAD ALIGNMENT FOR THE PET

The drive mechanism of the PET's tape unit is similar to those found in inexpensive audio cassette recorders and is not particularly noted for its ruggedness. This mechanism, including the tape heads, takes a lot of mechanical abuse from frequent starts, stops, rewinds, etc. After a period of time, it is possible for the record/play head to go out of alignment (particularly if the original adjustment was set marginally at the factory), causing read errors to develop. The alignment of the tape head is usually quite critical and normally requires the use of a test tape along with an oscilloscope (or meter); however, the technique described below can be used with excellent results and without the use of any specialized equipment (other than the PET itself).

First and foremost, make sure your tape heads and capstan are clean, and that the heads have been properly demagnetized. Second, load in a program (preferably a lengthy one) which was recorded on a quality cassette tape. After loading, PEEK at memory location 630, i.e. PRINT PEEK (630). The value returned by the PET divided by 2 gives the number of dropouts encountered in reading the tape. Ideally, this number is zero (and frequently is), but an occasional low number is probably all right. A consistently high number, on the other hand, is an indication of a problem. There are several possibilities for excessively high dropouts, which include using a defective or poor quality cassette (try loading programs from other tapes), mechanical slippage (make sure the drive belt, idler wheels, and capstan are clean), and faulty electronics; however, the chances are quite good that the record/play head is out of alignment.

To realign the head, first turn off the PET and remove the cassette recorder from the unit. Disassemble the top and bottom halves of the recorder's plastic case and remove the mechanism. The record/play head (which is located to the right of the erase head) is now fully accessible. Upon examination, you will note that this head is held down by two small screws. The screw to the left, which is spring loaded, is the alignment screw, and the one you will be adjusting.

The alignment procedure can be performed relatively easily using the following steps:

1. With a toothpick and some paint or nail polish, carefully mark one dot on the head of the alignment screw and another dot next to it. These markings serve as a reference point when turning the screw.

2. Connect the tape recorder cable to the main circuit board of the PET and turn the unit on.

3. Load in a program and PEEK at memory location 630. Note the number of dropouts.

4. Now, with a small non-magnetic screwdriver, carefully rotate the adjusting screw 1/16 of a turn.

5. Reload the program and note the number of dropouts. If the dropouts increased significantly, the adjusting screw was turned in the wrong direction.

6. Repeat steps 4 and 5 until the number of dropouts is reduced to zero (or to a low level). The final screw adjustment usually does not require more than 1/8 of a turn from the original position.

7. Before reassembling the unit, try loading programs from several other tapes to make sure everything is working properly.

The entire head alignment process for my PET's tape recorder took approximately 30 minutes, and I am once again able to read tapes with excellent reliability.

THE PET AND ITS COUSINS

You may not know that the PET is part of a large family of computers which use the same microprocessor chip. That means that software developed for one member of this family can usually be converted fairly easily to work on other similar machines. This includes the Apple II, MOS Technology's KIM-1, Synertek's SYM-1, products from Ohio Scientific (OSI), Rockwell, and even Atari. If you'd like to know about what people are doing with their 6502-based systems, one good source of information is *MICRO*, published bimonthly by The Computerist, Inc., P.O. Box 3, So. Chelmsford, MA 01824. A subscription is $6/year. It is in its second year of publication, and will soon publish *The Best of MICRO* for those who missed the early issues.

RENUMBERING PET BASIC PROGRAMS

A really excellent program for renumbering BASIC programs was developed by Bill Seiler of Palo Alto, Ca. It is written in machine language, and occupies only 384 bytes of memory at the high end of an 8K PET. It will renumber both the line numbers and all references to line numbers in a program. Bill's program will handle up to 512 line programs at most (have you written a bigger one?), and uses a clever trick to save on memory space needed. It uses the screen memory as a place to keep its table of correspon-

dence from old to new line numbers, thus avoiding the need for one thousand bytes of data area. Once you have loaded it in, and POKEd the appropriate pointers, it will stay in the machine until you turn it off. Copies of the program are available through *PET User Notes*, P.O. Box 371, Montgomeryville, PA 18936. Request a copy of PET RENUMBER by Bill Seiler, and include $2 for the copying service and tape.

ON READING PROGRAMS

With so many programs available for the PET, and so little documentation on PET BASIC and the various tricks that can be played with PEEKs and POKEs, take some time out to "read" your favorite PET program. It is often like archaeological field work—rummaging around in the ruins of a once elegant culture and discovering little tidbits that can be quite illuminating. If you want to learn about some of the more unusual statements in BASIC, or graphic animation, or space-saving tricks, really studying a program can teach you a lot. Once you feel comfortable "browsing" through someone else's program, go ahead and try to change it. Add a new option, or make it more fool-proof against incorrect inputs. Take a program that uses the screen as a teletype and animate it. The PET's screen editor makes the mechanics of modification simple, allowing you to concentrate on new features.
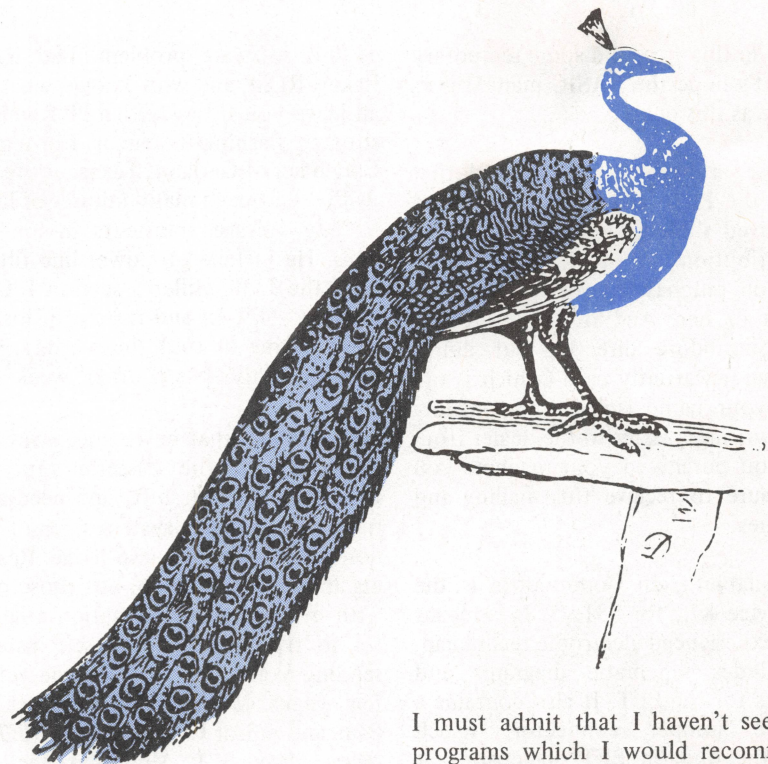
I must admit that I haven't seen many programs which I would recommend as models of programming "style," but would be happy to print some in this column. Send any candidates you have to the SPOT Editor.

PET TIPS

If you are editing a line on the screen, and are really fouled up . . . stuck in quote mode . . . just press SHIFT and RETURN. The cursor will go on to the next line WITHOUT having entered the changes so far. Now you can reLIST the line and start editing again.

NEVER use GET with a numeric argument, i.e. GET A. If the user types a non-numeric key a SYNTAX ERROR message appears and the program ends up in READY. Use GET A$, and then check A$ for legal characters. You can then convert to numeric form using VAL(A$), for example.

The PET keeps a buffer of keys that have been pressed but not read yet by a program. This can often give funny behavior when users type a RETURN that the program didn't expect, etc. A simple way to avoid some of these problems is to flush out any key depressions which are buffered up in the PET just prior to requesting input. One simple way to do it is by a loop like FOR XX=1 to 9: GET XX$: NEXT. A more obscure way for those who know the PET-innards is to simply POKE 525,0.

PET PRODUCTS

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THE CHANNEL DATA BOOK

An excellent reference book on PET product information is the *Channel Data Book*, just published by Channel Data Systems, 5960 Mandarin Avenue, Goleta, Ca 93017. Issued in three-ring binder format for easy insertion of new information and updates, it is the most extensive collection of PET-related product information available to date. The initial purchase price of $20 includes the *Data Book* and update service for one year. A major annual update will be published in the first quarter of each new year, with the supplement published at least quarterly. The book can help you find special purpose hardware attachments for your PET, programs of interest, and also has lists of PET-related publications, User Groups and even PET dealers.
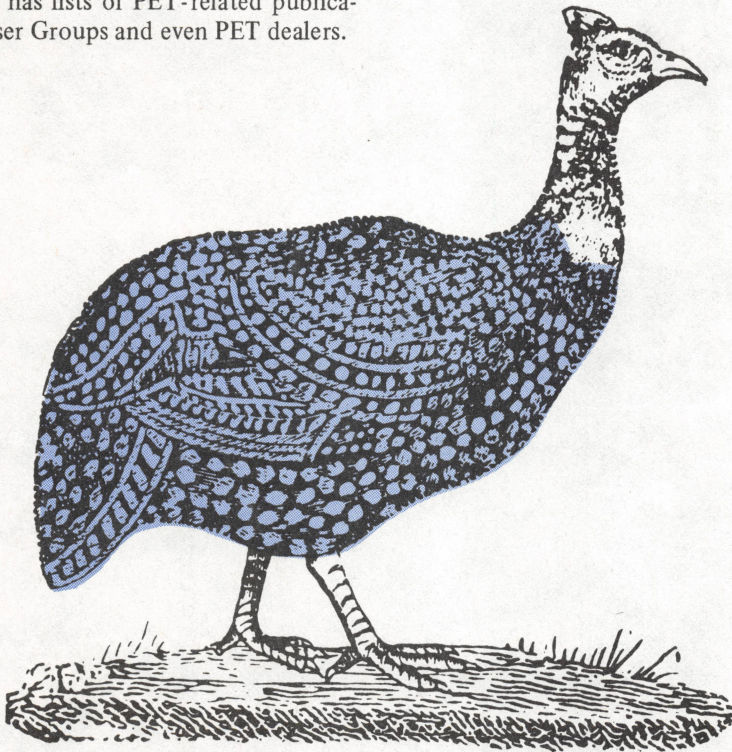
GRI PERK™ KEYBOARD

George Risk Industries, Inc., GRI Plaza, Kimball NB 69145, is now offering a full size typewriter-style alphanumeric keyboard for the PET. It is housed in its own steel enclosure, and operates in parallel with the built-in keyboard. It is assembled, and contains its own power supply and interface card. The introductory price is $229.95, with a 90-day warranty.

APPLICATIONS RESEARCH PRO-CAL-1

Applications Research Co., 13460 Robleda Rd., Los Altos Hills, CA 94022, has developed a reverse polish programmable scientific calculator program. It combines features of hand-held and desktop calculators such as the TI Programmer and HP 97. Calculations may be done in binary, octal, decimal or hexadecimal, and all conversions are available. Ten memory locations, five stack registers, and a record of the 14 most recent operations are displayed. Programs of up to 255 steps may be entered, and saved or loaded from cassette tapes. The program and documentation costs $26 from Applications Research.

COMPUTHINK DUAL MINIFLOPPY DISKS

Computhink, 701 Welsh Road, Palo Alto, CA 94304, has a dual minifloppy disk system for the PET. The system contains two diskette drives, each capable of adressing 100K bytes of storage at a time. It comes completely assembled and tested, and includes a disk controller which plugs into one of the peripheral expansion slots of the Expandapet memory expansion system, which is also available from Computhink. The system will support up to four diskette drives, and a parallel printer interfaced via the PET user port. The Operating System software is contained in ROM, and is included with the disk controller. The software provides an additional 16 commands to PET BASIC, such as $SAVE, $DIR, $OPEN, etc. The cost of the dual diskette system is $1295, in addition to the required Expandapet (from $425). A source listing of the Operating System code will be available for $20. Computhink also is offering a number of useful programs for the PET (with or without disks). They include a machine language assembler, editor and linker system, along with a useful guide to machine language programs running on the PET. (We'll try and get a review of the disk system and software for a future issue.)

NESTAR SYSTEMS, INC. CLUSTER/ONE™

Nestar Systems, Inc., 810 Garland Drive, Palo Alto, CA 94303, has used the PET as part of Cluster/One, a low-cost distributed processing alternative to BASIC timesharing, A Cluster/One system can be configured with up to 15 PETs (or Apple IIs) connected via a high speed parallel data bus (the Cluster/Bus ™) to a central PET. Each user has his own computer, and does not share the central processor, except for access to program file storage, or printer output. Programs are stored on two IBM-compatible eight-inch flexible disks, with up to 1.2 million bytes available on-line. Cluster/One was designed to be a highly reliable, simple system to use in the classroom or program development environment. Cluster/One prices begin at $7500, and vary with the particular configuration and options selected. (Note: *Recreational Computing* will have a report in the next issue on a symposium on "Personal Computers in Education"; the Cluster/One and other microcomputer offerings will be discussed in that article.) □

BLANK SPOT
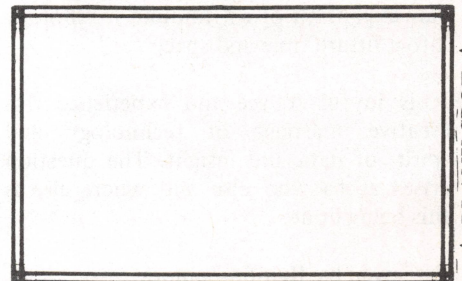
10 REM—Art Review

At times, computers are said to generate art (graphic forms, textile design patterns). At times, artists (engineering artists, design artists, software artists—yes, there is art involved) generate computers. Once in a while a quiet synthesis occurs when a person working in the area of the fine arts and information from a computer program are joined together.

A show called "Visions of Flight," installed from the end of October to mid-November in the Gallery House of Palo Alto, California, contained such a point of synthesis. Judith Wasserman (*RC*'s own Judith Wasserman) in her section of the show, subtitled "Voyage to Antares," displayed a series of relief etchings derived from the output of a computer program. The program, written by Robert Burt, generated the star configurations that would be observed if one were to travel along a line' from our sun to Antares.

For the show, points along this space path at 10, 50, 200 and 500 light years were selected. Haunting views, as seen from a spacecraft's window, fill each print. The cold blackness of space; the bright points of light that represent the stars; the faint yellows, oranges and reds of distant suns. And then, embossed in white across the surface of the prints, renderings of mythic creatures formed of star points and dark voids. *The Bearded Bull of Canopus*; *The Great Octopus of Antares* hang in space 500 light years from here. *The Horned Cats of Hadar*; *The Serpent of Spica* prowl the stars 50 light years away. In all there are fifteen creature/myths portrayed. In the words of the artist they represent "an expansion of earthbound mythology into a future time and space . . ."

It is joyful to see and experience this creative marriage of technology and spirit; of data and insight. The question arises as to who else and where else is this being done.

Reviewed by Ramon Zamora. □
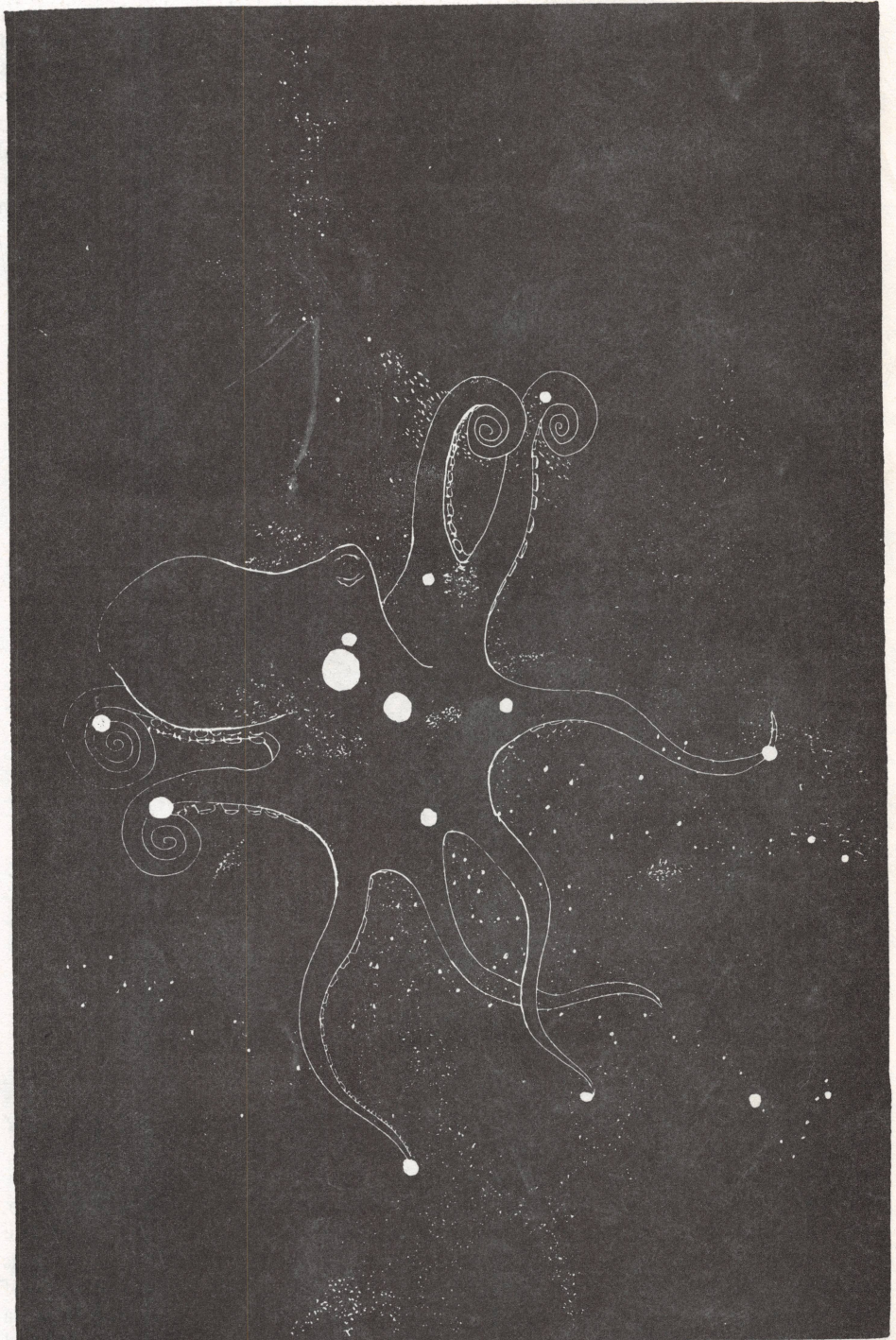
The Great Octopus of Antares ©Judith Wasserman 1978