Using the PET microcomputer

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This paper describes advantages and disadvantages of the PET microcomputer for use by behavioral scientists. User groups and second-source hardware-software vendors are noted. It is emphasized that the large production volume of the PET is apt to lead to a proliferation of second-source add ons at modest prices.

Late in 1977, Commodore began delivery of the Personal Electronic Transactor (PET) Model 2001-8 microcomputer system. This was the first of the self-contained microcomputer system for use in the home or laboratory. Commodore originally announced 4K and 8K random-access memory (RAM) versions of the PET, but at least to the present, has mainly delivered the 8K system. Because the PET is self-contained (CRT, keyboard, cassette reader/recorder, and memory in one case) and is expandable, it has great potential for use in behavioral science settings and schools or businesses for health testing and records storage. The low price of the PET (\$795 for the 8K version and \$595 for the 4K version) makes it even more attractive.

The current production rate of the PET is about 1,000 units/month, and Commodore has projected an eventual production level of many more units. This implies that sales are expected to approach consumer electronics levels during the next several years. Large-scale production should result in a reasonably extensive service network and many second sources for peripherals. Indeed, Commodore claims that the PET will eventually be serviced by local TV repairmen.

Early production model PETs have a reputation for arriving in poor repair; for example, my PET arrived with the TV monitor not functioning. This problem was repaired by opening the chassis and placing a plug-in connector back into its socket. My own experience and reports from other users indicate flexibility and accommodation on the part of Commodore in repairing or giving instructions on how to repair the PET. Failures reported to date seem mainly to involve bad chips and bad plug connections that are usually easy to repair without having to return the PET to the vendor.

The original Commodore instruction book is very short and quite insufficient to the needs of both the beginner and the experienced programmer. However, an experienced BASIC programmer can understand enough of the instructions to begin programming, and the simple diagnostic steps cited in the book do define the most common electronic bugs that I have experienced. A more complete instruction manual and

introductory tape are scheduled to be available shortly.

The greatest aids to learning to use the PET are the user groups. Two of the most widely known are PUG¹ (PET User Group) and the PET Paper.² At this time, PUG seems the most professional and represents a bargain. The PET Paper began more recently and offers an additional source of information that is especially valuable to the serious user. The PUG newsletter, the *PET User Notes*, offers listings of programs that subscribers submit, software exchange and purchase notices, hardware notes, advertisements for both software and hardware peripherals, plus commentary about PET faults, shortcomings, and unadvertized interesting features built into the PET.

The PET, because of its potential for mass-market penetration, has attracted a number of second sources for peripherals and software. This is true even though the PET has been in private hands for less than 1 year. In fact, the second-source market is considerably ahead of Commodore in offering peripherals and software at a competitive price. However, there is little to guide purchasers, as most of the items must be mail ordered.

SOFTWARE

My personal experience with software suppliers (Personal Software³ and Smith Business Service⁴) has been very good. There is one caution about purchased software programs that are supplied on cassettes: The PET mode of tape read and write does not lend itself well to mass commercial audio reproduction techniques. One can expect to receive a significant percentage of mass-produced tapes that are unreadable on any given PET. Even interchange of singly produced tapes between PETs is difficult, but with enough patience it is possible. Sometimes several attempts are necessary before a good "read" is completed. I have made it a practice to write such hard-to-obtain programs to another tape. (Rewriting it over the old tape is hazardous because of the potential of writing beyond the end of one program and destroying the following program.) Hopefully, as quality control improves, tape interchangeability will also improve. The PET does employ self-checking of data and has a

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"VERIFY" command that will compare the program in memory to the version on the tape.

Some of the software programs available for the PET are: the common computer games, teaching aids such as mathematics programs for children, electronic timer, inventory control, a machine language monitor, graphics packages, and a monitor with dump capabilities. I am not familiar with any programs specifically designed for psychological laboratories.

The number of software packages available is increasing rapidly from both independents and Commodore itself. Commodore has set up a royalty program for independent software writers.⁵ My observation has been that Commodore's prices are higher than the independents for similar programs, but none of the programs have really used the very powerful PET graphics capability.

HARDWARE

The PET is a "maverick" system that uses the IEEE 488 standard interface instead of the RS-232 interface or the S-100 bus used in other hobby computers. It also has a parallel user port, second cassette interface, and a memory expansion connector. Commodore is currently offering a second cassette recorder (for true file management) for \$99.95, and an impact printer (80-character lines) for \$595. A floppy-disk system is planned to be available late in 1978.⁶

Commodore's independent competitors have been much more active in the development of peripherals. Convenience Living Systems⁷ sells the EXPANDAPET for \$435 assembled and tested. This unit includes on-board power supply, 16K RAM, sockets for 4K EPROM, two parallel I/O ports with handshake, slots for three option cards, and all cables and brackets. Several option cards are also available. Forethought Products⁸ manufactures the PETS PET, an S-100 interface/motherboard. The board is \$105 for the kit (\$160 assembled) and includes four slots, a dynamic memory controller, and sockets for an 8K 2716 EPROM. Excel Company⁹ offers an ASCII keyboard/PET interface for \$65 (\$75 for the upper- and lowercase version). The Net Works¹⁰ manufactures an IEEE to RS-232 board with dual ports and power supplies for \$160 (assembled and tested). Connecticut Microcomputer¹¹ sells an RS-232 adapter (IEEE 488 to

RS-232 conversion) that permits the PET to communicate with a standard RS-232 printer. The price of this equipment is \$169 for an assembled package (board, power supply, and connectors).

This list of second-source equipment makes apparent the rapidly expanding availability of inexpensive peripherals that can increase the flexibility of the PET. These competitors should tend to keep Commodore competitively priced with its own peripherals. Obviously, the PET has great capability to run hardware. There is the likely potential for additional add-ons that will be of use to behavioral scientists.

The PET offers a quantum leap in computer technology with a memory capability and speed at a cost an order of magnitude lower than systems available only several years ago. Its mass-market appeal and direction should insure a wide range of software and hardware at low prices. It has its faults, as does any new complex product, but on balance, it is a very impressive performer and is in the forefront of what promises to be an important change in computing equipment available for use by the behavioral scientists.

NOTES

1. The Pet User Group has an annual membership fee of \$5. It is located at P.O. Box 371, Montgomeryville, Pennsylvania 18936.

2. The PET Paper has an annual fee of \$15. It is located at P.O. Box 43, Audubon, Pennsylvania 19407.

3. Personal Software, P.O. Box 136-B3, Cambridge, Massachusetts 02138.

4. Smith Business Service, P.O. Box 1125, Reseda, California 91335.

5. Further information about this paper is available at Commodore Systems, 901 California Avenue, Palo Alto, California 94303, telephone (415) 326-4000.

6. Buyers should be aware that Commodore has a history of being late in delivering systems and hardware.

7. Convenience Living Systems, 648 Sheraton Drive, Sunnyvale, California 94087.

8. Forethought Products, P.O. Box 386-E, Coburg, Oregon 94401.

9. Excel Company, 2241 Tamaltais, El Cerrito, California 94401.

10. Net Works, 5014 Narragansett, No. 6, San Diego, California 92107.

11. Connecticut Microcomputer, 150 Pocono Road, Brookfield, Connecticut 06804.

(Received for publication June 18, 1978;
accepted July 5, 1978.)