COMPUTER SOURCES

By Leslie Solomon
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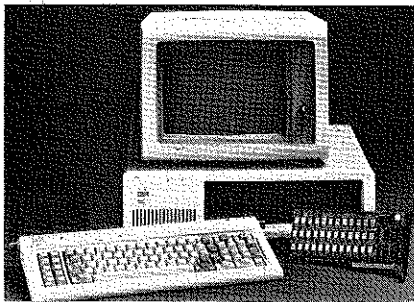
Hardware

IBM PC Expansion. These memory expansion boards for the IBM Personal Computer range in size from 64K-bytes to 256K-bytes and feature socketed high-speed dynamic RAM, single board for 256K in any single slot, only seven ICs for control logic, parity checking and error reporting, switch-selectable addressing on any 64K boundary, ability to run IBM diagnostics, compatibility with all

IBM hardware and software, and IBM-like documentations. $395 for 64K, $620 for 128K, $845 for 192K, and $1075 for 256K. There is a 64K expansion kit for $225 which boosts boards already in the field. **Address:** Personal Systems Technology, Inc., 22957 La Cadena, Laguna Hills, CA 92653 (Tel: 714-859-8871).

Green Screen Monitors. The PI-1 is a 9″ (44 sq. inches) green-screen video monitor that can support 64 characters by 16 lines (80 characters by 24 in some applications). $249. The PI-2 is a 12″ (75 sq inches) green-screen video monitor that can support an 80 character by 24 line text display. $275. Both units have 20 MHz bandwidth, with horizontal rate 15.6 kHz. Connection is via SO-239 or RCA phone jack. Both have anti-reflection screen. **Address:** USI International, 71 Park Lane, Brisbane, CA 94005 (Tel: 415-468-4900).

Z80 Board. The PRO/80 is a Z80 based single-board computer featuring the S-100 bus, two parallel ports, cassette interface, 1K of RAM expandable on the board to 2K, 1K of EPROM holding the monitor, hex keypad with 8 extra keys, and six 7-segment displays. Requires external 8-volt, 1-ampere power supply. $169.95. **Address:** ETCO Electronics Corp., Plattsburgh, NY 12901 (Tel: 514-342-1555).

Apple RAM. The DSI 16K RAM Card for the Apple computer is currently available for $99. **Address:** Davong Systems Inc., 1061 Terra Bella Ave., Mountain View, CA 94043. (Tel: 415-965-7130).

CP/M-80 for IBM PC. Baby Blue CPU Plus is a combination of hardware and software that enables IBM Personal Computers to run virtually any software that is CP/M-80 compatible and written for the 8080/Z80 microprocessor. It plugs into an existing slot, adds 64K-bytes of memory to the system, making it a computer within a computer. Baby Blue runs the programs, and passes the task of communicating with the outside world to the IBM machine. $600. **Address:** Xedex Corp., 645 Madison Ave, New York, NY 10022 (Tel: 212-247-1400).

RAM Disk. Designed for the S-100 system or a TRS-80 Model 2 using CP/M 2.2, or the IBM Personal Computer, the SemiDisk is a high capacity memory board that "looks" like a disk drive to the system, except that it is much faster. It does not require extended addressing or bank switching and all data goes through four I/O ports that can be re-addressed to any of 64 locations. Software is supplied on 8″ single-density floppies, 8″ double-density TRS-80, 8″ NorthStar double density, and IBM 5″ formats. 512K-byte SemiDisk is $1995, 1-megabyte SemiDisk is $2995. **Address:** SemiDisk Systems, POB GG, Beaverton, OR 97075 (Tel: 503-642-3100).

Software

French Programs. If French is your language, you should know that there is now a series of French software programs for the Apple computer. The 24 programs include strategic simulations, interactive fantasies, educational programs, etc. Catalog available from Computerre, C.P. 782, St. Laurent, Quebec, Canada H4L 4W2 (Tel: 514-747-9130).

WP Utility. Super Text allows an Apple II to display an 80 column screen with the use of a Videx Board, insert page headers and footers, multi-file search-and-replace, display of disk space avail-

able, user defined keys, and the ability to count occurrences of specified words or phrases. It also supports an enhanced math mode, split screen option, advanced block operations, and Autolink of multiple files. $175. **Address:** Muse Software, 347 N. Charles St., Baltimore, MD 21201 (Tel: 301-659-7212).

MAIL Utility. Mail-Base is an inquiry/mailing list that keeps track of up to 32,000 customer records composed of name and address data plus 15 user-defined flags and room for comments. Each customer record is indexed by zip code and user-selectable name key. Each record can be selected by partial or full declaration of any combination of 23 information fields. Selected records may be printed as mailing labels, index and Rolodex cards, user-defined forms, or merged into form letters. For Televideo, Zenith, or any CP/M-based CPU with Zenith Z19 terminal. $199.95 for Microsoft BASIC, $299.95 for compiled version. **Address:** XtraSoft, Inc., 4910 Roman Drive, Louisville, KY 40291 (Tel: 502-499-1533).

VIC20 Software. VICMORSE allows the VIC20 to be used as a cw keyboard keyer and automatic code reader and requires 5K, interface, and I/O connector. $19.95. VICRTTY requires 3K memory expander and is used for radioteletype ham activities. $24.95. The firm also carries numerous game and utility software for the VIC20. **Address:** RAK Electronics, P.O. Box 1585, Orange Park, FL 32073 (Tel: 904-264-0756).

CP/M Utilities. The Disk Utility Package for CP/M works with any single user CP/M 2.x system with any diskette size and format and many hard disks. The menu-driven utilities include DDUMP to examine and patch any byte on any sector, DTEST to test a disk for bad spots which are locked out and reported to printer/terminal, DUSER enables access from one user area to program and/or files stored on other user areas without keeping duplicate copies of disk files, DDUP duplicates disks and is independent of controller, drive, disk size, and format. It will also replace bad sectors on source disk with blank sectors on destination disk. The last utility UNERA recovers from accidentally ERAsed files. $29.95 each or all five $125. Specify format (8″ SS/SD, 5″ HS Heath/Zenith). Include $8 handling/shipping. **Address:** Elektrokonsult AS, Konnerudgaten 3, N-3000, Drammen, Norway.

Apple Adventure. The Adventure game for the Apple II uses hi-res graphics which are compressed, and drawn using over 100 colors. It also uses the Votrax Type'N Talk voice synthesizer, producing both pictures and sound. The game wanders through an enchanted world seeking 13 lost treasures, encountering wild animals, magical beings, and other perils and puzzles. $29.95. **Address:** Adventure International, Dept. G., Box 3435, Longwood, FL 32750 (Tel: 1-800-327-7172).

PROGRAMMER'S NOTEBOOK

By Jim Keogh

Keeping Time

FREQUENTLY, microcomputer software requires the on-screen display of text and/or graphics for specific periods of time. For example, the programmer may want to display a logo, followed by the title of the program, the programmer's name, and the copyright identification, for some short interval. Let's take a look at how display time can be controlled, and then examine a few other interesting BASIC subroutines.

Since there is no way that software, even heavily "bugged," can damage the hardware, the reader can experiment with these programs (or any program) to "see what happens." The worst that can happen is an error message being displayed.

The most common way to control how long an image appears on screen is by using a simple timing loop. Such a loop instructs the computer to perform a series of calculations, without printing the results of the calculations. The following programs, which can be run on a TRS-80 and Apple II, respectively, will illustrate the timing loop. These computers were

TRS-80

```
10  REM TIMING LOOP
20  CLS
30  PRINT "TIMING LOOP HAS
    STARTED"
40  FOR A = 1 to 500
50  B = A+1
60  NEXT A
70  CLS
80  PRINT "TIMING LOOP HAS ENDED"
```

APPLE II

```
10  REM TIMING LOOP
20  CALL-936
30  PRINT "TIMING LOOP HAS
    STARTED"
40  FOR A = 1 TO 500
50  B=A+1
60  NEXT A
70  CALL-936
80  PRINT "TIMING LOOP HAS ENDED"
```

selected because they are two of the most popular machines. However, the programs will run on all computers equipped for BASIC.

Let's examine the timing loop a little closer. Line 20 in both programs clears the screen. Clearing the screen is purely a cosmetic event and is not required for proper operation. Line 30 is the statement which we would like to have displayed on the screen for the duration of the selected timing interval.

The length of time which the statement will be displayed is controlled by line 40, which begins the timing loop. Line 50 instructs the computer to add 1 to the value of "A." Line 50 is not essential and is shown here to illustrate that the computer can "do something" during the timing interval (e.g., print a statement). After the computer completes the "B" calculation, it moves on to the next "A." The loop then cycles around lines 40, 50 and 60 until the value of the 500th "A" is used. If the upper-end value of "A" used in line 40 is relatively low (e.g., 500), the "padding" represented by step 50 is easily accommodated. But when line 40 is re-stated as "FOR A = 1 TO (any very large number)," line 50 may be omitted.

Note that we told the computer to calculate the value for "B." This allows us to keep just the statement we want displayed on the screen without the computer printing the values for "B."

The length of time it takes for the computer to complete the timing loop will de-

After the value for the 500th "B" is calculated, the program moves to line 70, which clears the screen. Line 80 then prints "TIMING LOOP HAS ENDED."

The following table can be used to create timing loop programs for six different

	Final Value of A	
Seconds	TRS-80	Apple II
5	625	1250
10	1250	2500
15	1875	3750
20	2500	5000
25	3125	6250
30	3750	7500

time duratons. Simply change the final value of A in line 40 of the previous programs to the value needed to create the desired timing period. For example, make line 40 read: "FOR A = 1 TO 3750" for a 30-second delay with a TRS-80.

If you require a longer or shorter time interval than those shown, the program below can be used to determine the final value of A (number of approximate calculations to be made). Note that line 40 of this new program shows screen clearing for both the TRS-80 and the Apple. Select the correct version of line 40 depending on the machine you are using.

```
10  REM THIS PROGRAM DETERMINES THE NUMBER OF CALCULATIONS
20  REM REQUIRED BY A TIMING LOOP FOR A CORRESPONDING
30  REM AMOUNT OF TIME FOR WHICH A STATEMENT WILL BE DISPLAYED
40  (TRS-80) CLS
40  (Apple II) CALL -936
50  PRINT "HOW MANY SECONDS WILL YOUR DISPLAY REQUIRE?"
60  INPUT A
70  (TRS-80) B = A* 125
70  (Apple II) B = A*250
80  (clear screen, see line 40)
90  PRINT "THE NUMBER OF CALCULATIONS YOU NEED IS";B
```

pend upon the BASIC used, the computer "clock" speed, and the number of calculation (iterations) the computer has to perform. In the examples shown, we asked the computer to perform 500 calculations. Due to differences in clock speed, this will take about four seconds for the TRS-80 and approximately two seconds for the Apple II.

A key factor is introduced at line 70, where the desired number of seconds (A) is multiplied by a constant. There are two different constants involved, one for the Z80 CPU used in the TRS-80, and one for the 6502 CPU used in the Apple. That's because these CPUs operate at different clock rates. Again, select the line that matches your machine. ◇