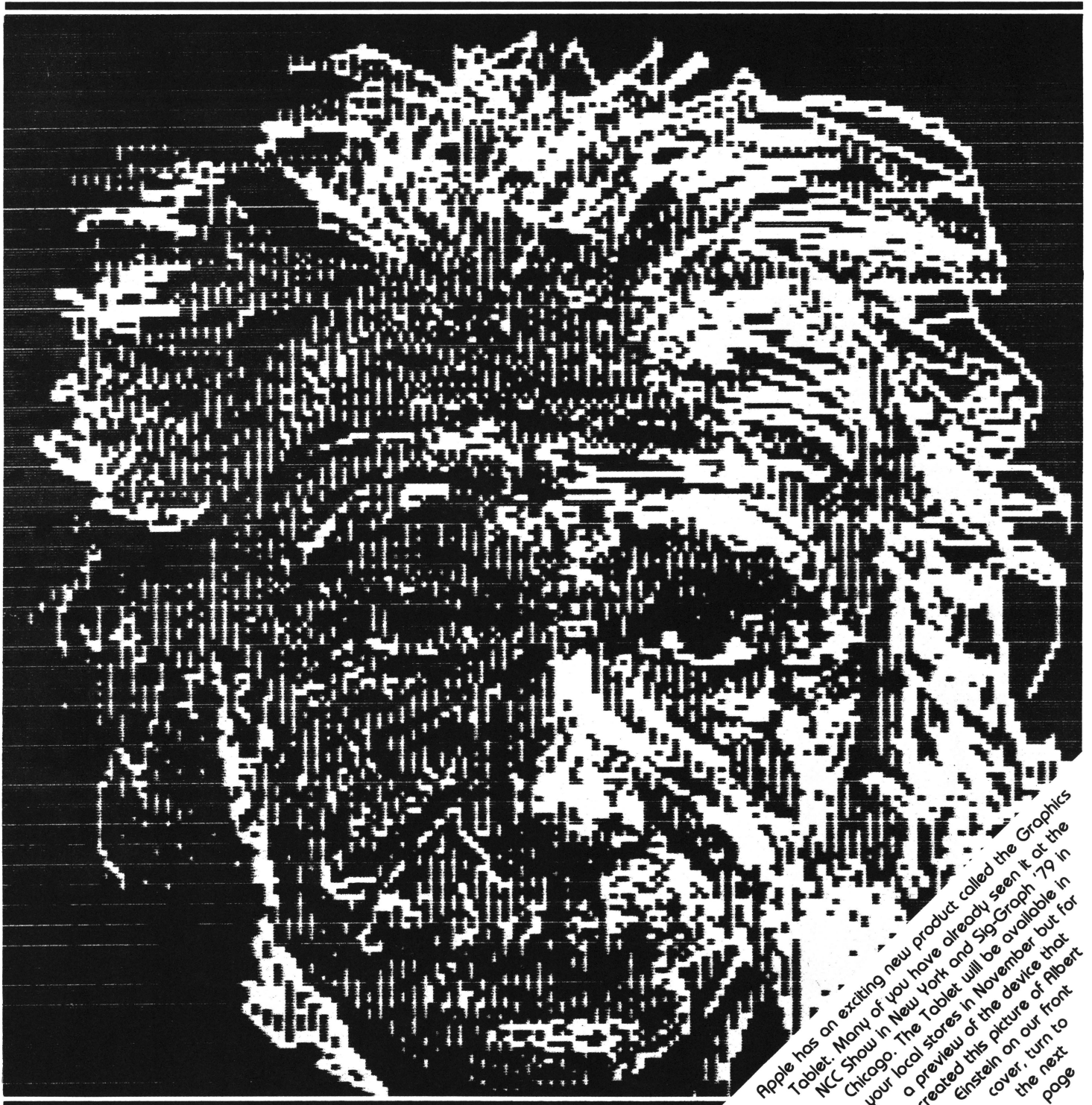# CONTACT 6

the user group newsletter for october 1979 apple computer inc.

Apple has an exciting new product called the Graphics Tablet. Many of you have already seen it at the NCC Show in New York and Sig-Graph '79 in Chicago. The Tablet will be available in your local stores in November but for a preview of the device that created this picture of Albert Einstein on our front cover, turn to the next page

WHAT'S NEW, APPLE?

APPLE COMPUTER GRAPHICS TABLET

The Graphics Tablet allows the user to convert graphic data into digital information that may be processed by the Apple computer system. Shapes traced or drawn freehand on the tablet surface are instantly displayed on the system monitor. Once created, an image may be stored on the system disk for later retrieval and modification. Block diagrams, architectural renderings, logic diagrams, schematics, mechanical shapes and fine art are a few of the applications of the Graphics Tablet.

The Tablet system consists of 15-1/2 inch by 15-1/2 inch tablet (11 inch by 11 inch active surface area), a mylar overlay stylus, diskette software interface and documentation. Unlike other tablet systems, the electronics and power supply for the Apple Graphics Tablet are integrated with the Apple computer. This results in a low pro-file tablet, fewer boxes to contend with, easier hook up, and higher reliability.

The software support package is composed of a small assembly language fast draw routine and the master control software written in Applesoft BASIC. The fast draw routine is normally transparent to the user. It is activated by a call from the basic program and places the x-y coordinate pairs received from the interface into the data array specified by the calling program. Because this routine is written in assembly language, the system can process up to 120 coordinate pairs per second. This means that unlike other systems, the Apple Graphics Tablet will keep up with the fastest hand motion.

The primary user interface is provided by the Applesoft BASIC utility program. Macro functions, selected by pressing the pen on the designated square on the tablet overlay, provide the user with a variety of utilities designed to decrease the amount of time required to complete the job.

Apple recognizes that these standard routines may not be optimum for every application. Since the standard software is written in BASIC the user may easily replace these functions with those written specifically for the intended application. The standard software package serves as an example of the way to expand or change the menu available on the tablet surface. A new mylar overlay is easily integrated into the tablet system using the menu alignment routine supplied with the system.

The interface provides the first level of support for the tablet. It relieves the user of many of the mundane calculations often necessary with less sophisticated systems. Cursor following (marking the position of the pen when it is proximate to the tablet surface with a cross hair cursor on the display), 0,0 coordinate origin positioning and scaling are all done with single commands to the interface. Only when the interface signals pen down is any action required of the host software.

Specifications

Digitizing area
— 11 × 11 inches (280 mm × 280 mm)

Overall size
— 15.5 × 15.5 × 1 inches (395 mm × 395 mm × 25 mm)

Controller card size
— 7 × 2.75 × .5 inches (178 mm × 70 mm × 13 mm)

Pen size
— 6 inches (152 mm) with 6 ft cable (1.8m)

Data rate
— up to 120 coordinate pairs per second

Coordinate system
— absolute cartesian with selectable origin

Output format
— sixteen-bit binary coordinate pairs

Interface levels
— TTL—provided by Apple interface

Scaling
— user selectable

Operating Modes —
Selectable from tablet menu:

Tablet modes
— RESET
— CLEAR
— WINDOW
— BG COLOR
— DELTA
— SOFT RESET
— VIEWPORT
— CALIBRATE
— REDUCER

Pen modes
— PEN COLOR
— DRAW
— LINES
— DOTS
— FRAME
— BOX

Command functions
— CATALOG
— LOAD
— SAVE
— SEPARATE
— SLIDE
— AREA
— DISTANCE

Power requirements (supplied from Apple power supply)
— 230 mA + 5 VDC
— 40 mA + 12 VDC
— 20 mA − 5 VDC
— 40 mA − 12 VDC

Software/firmware
— Control program in Applesoft BASIC
— Quick draw routine in assembly language
— Interface firmware in ROM

Minimum hardware requirements
— A2S1048 48K Apple II Plus or A2S0048 Apple II with A2B0009 Applesoft II firmware card
— A2M0004 disc drive with controller
— Black and white or color monitor order information
— A2M0029 from your local dealer

EDITORIAL

**By Roger Cutler
Education Specialist**

FOR EDUCATORS...

The big news this issue is the establishment of the Apple Education Foundation, a not-for-profit corporation established by Apple Computer Inc. to further the development of education through microcomputer technology. The foundation has just reviewed the first group of applications for special project grants, and will be announcing the awards shortly.

The next deadline for submitting applications is December 10th. Projects that emphasize the development of new instructional computing materials will receive priority consideration. Further details on the funding procedures may be obtained from:

Carolyn Stauffer, Administrator
Apple Education Foundation
20605 Lazaneo Drive
Cupertino, CA 95014

EPIC, the Education Program Information Center, is a special department of the Foundation that reviews and disseminates programs for the education community. Details can be obtained by writing Dr. Richard Ballard, EPIC Director, at the Foundation's address above.
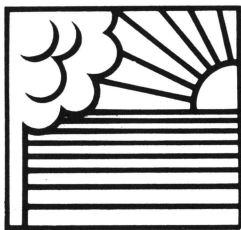
OUTSIDE THE ORCHARD

(This column is written as a service to Apple customers, and contains information on products that we feel to be of interest to the user community. Apple Computer does not in any way recommend these products or warrant their suitability for use with Apple II or Apple II Plus Computers.)

10 MEGABYTES FOR YOUR APPLE

Remember when you got your disk? Finally, no more stacks of cassette tapes everywhere, no more waiting and waiting for tapes to load. But, since you have a disk you've thought of a dozen new uses for your Apple, so now you have stacks of little disks everywhere.

Well, there is a solution to your storage problem. No, it is not a disk filing system, although that might help. Corvus Systems has a 10 Megabyte fixed disk for the Apple. The system is compact, and you can attach four of them to your system.

The price is $5390 for one, and $3390 for an add-on disk.

Corvus Systems, Inc.
900 S. Winchester Blvd.
San Jose, CA 95128
(408) 725-0920

SUPERTALKER

SuperTalker is a peripheral system for the APPLE II that allows you to digitize speech, then output high quality speech through a loudspeaker under program control.

SuperTalker consists of three major components: the SuperTalker peripheral card, a microphone, and a loudspeaker.

Price is $279, assembled and tested, FOB, Santa Cruz, CA.

For more information, please write or call:

Mountain Hardware, Inc.
300 Harvey West Blvd.
Santa Cruz, CA 95060
(408) 429-8600

HOME CONTROL

A new foreground/background system for home control called Apple Butler gives the APPLE II the capability of running two programs concurrently; one for the monitor and control of systems in your home, and one for any other task you care to do.

The Butler provides up to 16 analog inputs for temperature, light, moisture, or any other input data. Up to 32 switch inputs are provided for security or fire sensors, push buttons, magnetic reed switches, or on/off inputs or status indicators from controlled devices. Up to 32 output latches are available for control of output devices.

Several control modules will be available for the Apple Butler system. The first will be a system to control a solar water heater, a solar-assisted home heating system, a water-heating fireplace, or a combination of the three. Other systems are planned for control of automatic swimming pool equipment, sprinkler systems, home or commercial greenhouses.

The Apple Butler costs $595 from your local APPLE dealer or from Home Computer Center, Inc., 2927 Virginia Beach, Virginia Beach, VA 23452, (804) 340-1977.

WRAPPLE YOUR APPLE

Protect your APPLE from dust, coffee spills and idle fingers with a WRAPPLE: a heavy duty, beige colored, vinyl dust cover. Or get the WRAPPLE II, a dust cover that will cover both the computer and one or two disk drives set on top of the computer. The WRAPPLE is $8.95 and the WRAPPLE II is $9.95.

To order, send check or money order to:

Henwood Enterprises, Inc.
1833 E. Crabtree Dr.
Arlington Heights, IL 60004

Or call toll-free (800) 323-7360 and use your Master Charge, VISA or American Express credit card.

APPLE-80

Dann McCreary has announced APPLE-80, an 8080 simulator and debug package for the APPLE II. Now any 16K or larger APPLE II can run programs written for the 8080.

APPLE-80 executes all valid 8080 opcodes and provides single-step, trace and run modes. All 8080 registers are displayed on the APPLE screen and can easily be modified. 8080 I/O port addresses are arranged in a table for ease of modification. Up to eight break-points may be set to facilitate program debugging. 6502 subroutines may be called directly from 8080 programs and 6502 routines may be embedded in 6502 programs. Vectored interrupts are also simulated.

The complete APPLE-80 package includes APPLE-80, APPLE-80 Manual, an 8080 demo program, and an APPLE-80 Reference Card. Priced at $20.00 + $1.50 shipping and handling, APPLE-80 may be ordered from:

Dann McCreary
Box 16435 — WA
San Diego, CA 92116

California residents add 6% sales tax.

SUPERCHIP

SUPERCHIP is a firmware ROM that plugs directly into socket D0 on your APPLE II to provide enhanced I/O.

With Superchip, your APPLE can display:

— Graphics and text freely mixed anywhere on the screen
— Full ASCII character set including lower-case letters
— 31 additional non-ASCII characters
— Reversed video on both input and output
— Rotated characters for vertical and upside-down printing
— Any character you can create in an 8 × 7 dot grid

When entering program statements or data, Superchip adds single keystroke editing capabilities to the APPLE:

— Move cursor up or down
— Clear the screen and home the cursor
— And more!

Superchip requires a minimum of 16K RAM (32K if you plan to also use Disk II) and supports the following functions:

— Integer BASIC
— Applesoft ROM card (RAM Applesoft is not supported)
— Printing through either the Serial or Parallel Interface Card
— A Character Editor, Disk II Interface and Text Editor are also available.

Prices are:

Superchip	$99.95
Character Edit Cassette	$19.95
Disk Interface Cassette	$19.95
Word Processor Cassette	$19.95

Shipping Charge (each) $ .75

From:

Eclectic Corp.
2830 Walnut Hill Lane
Dallas, TX 75229

CARD READER

Now, all you need is a standard #2 pencil, a card, and the new MR-500 mark sense card reader to quickly and easily enter data into your APPLE.

Here's all you have to do. One—program the card by marking with the pencil. Two—feed the card into the reader slot. Three—the reader automatically turns on, the card is fed through, and data is entered into memory.

The MR-500 is lightweight, compact, and plugs right in to your APPLE.

Price is $750. For details, write or phone:

Chatsworth Data Corp.
20710 Lassen Street
Chatsworth, CA 91311
(213) 341-9200

EDITOR/ASSEMBLER

Software Concepts has announced an Editor/Assembler for the APPLE II.

The editor can create and modify integer BASIC, APPLESOFT, and assembler programs. Edit features include string search replacement, tabbing, block line moves, simple macros, and search windows.

The two-pass assembler can assemble up to ten disk-based source files and create a program listing and standard APPLE DISK II binary files. It uses eight character symbols, all standard 6502 opcode mnemonics, and has six additional pseudo opcodes. Operands may contain numeric parameters, symbols, and arithmetic expressions.

The price is $55.00 from your local dealer or:

Software Concepts
P.O. Box 1112
Cupertino, CA 95015

LOWER-CASE FOR YOUR APPLE

Both Integer BASIC and Applesoft II can manipulate the ASCII codes for lower-case letters in string variables, but until now there has been no efficient way to display the results on the screen. The Lower Case Adapter (LCA) solves this problem. Its features include:

— Plugs in with no modifications to the APPLE. Easily removed if warranty service is needed for either the APPLE or the LCA
— Displays lower-case letters with descenders
— Sample software included for use with either BASIC
— No memory overhead as with firmware and software methods that utilize APPLE's HI-RES graphics
— Fully compatible with Disk-II DOS
— Compatible with text editors from Applecations Unlimited and Programma
— Compatible with most printers that have lower-case

The Lower Case Adapter does not interfere with any existing features of the APPLE or any of the standard software or firmware.

Price is $49.95. For more information, or to order write:

Dan Paymar
P.O. Box A-133
S.C. 6800
Costa Mesa, CA 92627
or phone (714) 645-1411 after 6:30 p.m.

DISKETTE STORAGE

The SRW library cases provide minidiskette users with convenient and efficient access to floppies in envelopes. It is an excellent archival storage system with optimum protection against environmental conditions such as temperature, excessive humidity, moisture condensation and contaminants. The library case is an excellent safeguard for recorded information during shipping and storage.

For more information, see your local APPLE dealer or contact:

SRW Computer Components Company
18009-D ky Park Blvd.
Irvine, CA 92714
(714) 557-7060

SELECTRIC INTERFACE

Looking for high-quality printing for your Apple? Then the Escon Interface System may be just what you need. By choosing one of the four available models, you can interface any Selectric to any micro or minicomputer.
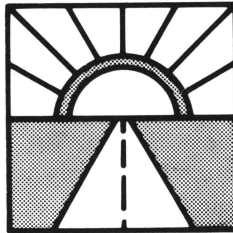
There are no permanent modifications to make to your Selectric and it can still be used as a typewriter.

Prices are:

S100	$496.00
Parallel	$525.00
RS232	$549.00
IEEE-488	$560.00

For more information, call or write:

Escon Products, Inc.
171 Mayhew Way, Suite 204
Pleasant Hill, CA 94523
(415) 935-4590

LOOKING AHEAD

Electronic Messages

It seems that the age of telephone communications has reached microcomputers. ABBS (Apple Bulletin Board Systems) are springing up all over. If your Apple has communication capability (a modem, etc.) then give one of these numbers a yell. If you have an ABBS, or know of one not listed here, drop us a note so that we can list it.

A.E.C.S.
Ft. Lauderdale, FL
(305) 566-0805

AKRON DIGITAL GROUP
Akron, OH
(216) 745-7855

COMPUTER COMPONENTS, INC.
Lawndale, CA
(213) 370-3160

COMPUTER COMPONENTS, INC.
Westminster, CA
(714) 989-1984

COMPUTER MERCHANT
San Diego, CA
(714) 582-9557

COMPUTER MART
Springfield, MO
(417) 862-7852

FORT WALTON BEACH
Destin, FL
(904) 243-1257

HAWTHORNE
Hawthorne, CA
(213) 675-8803

HOUSTON
Houston, TX
(713) 977-7019

KORSMEYER ELECTRONICS
Huntington Beach, CA
(714) 964-4346

MARINA DEL REY
Marina Del Rey, CA
(213) 821-7369

MIAMI
Miami, FL
(305) 821-7369

NEW YORK
Long Island, NY
(212) 448-6576

PEOPLES' MESSAGE SYSTEM
Santee, CA
(714) 449-5689

PERIPHERALS UNLIMITED, INC.
Signal Hill, CA
(213) 424-3506

PERSONAL COMPUTERS OF CHICAGO
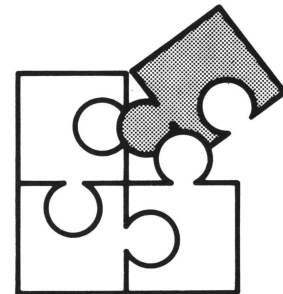Chicago, IL
(312) 337-6631

SAN ANTONIO
San Antonio, TX
(512) 657-0779

SAN FERNANDO VALLEY
Canoga Park, CA
(213) 340-0135

**SAN FRANCISCO**
San Francisco, CA
(415) 668-4246

BITS AND PIECES

INVISIBLE WRITING

Some programs using HIRES graphics require the ability to plot on one page of graphics while displaying the other. This really isn't hard, in fact just a POKE will do it for you. (Note that before this will work you must use a HGR or an HGR2 command to initialize HIRES.)

To change the page HPLOTted to, POKE 230,32 for page 1, and POKE 230,64 for page 2. This has no effect on which page is displayed, but changing that is just as simple. POKE −16300,0 to display page 1, or POKE −16299,0 to display page 2.
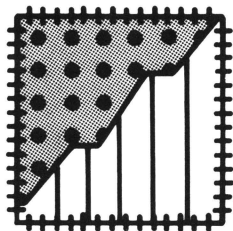
PATCHES AND PROGRESS

DOS Update for Dual Drive Users

DOS 3.2 has been shipping for some time now and, we are happy to report, has been remarkably bug-free. However, DOS users with two DISK II's on a single controller have reported problems. These problems usually manifested themselves as seemingly random "DISK I/O ERRORS." Often the copy program would fail outright or create a diskette that was unreadable. Since this was a sporadic problem, it was very difficult to track down.

What was found was that the read/write head was not always where DOS thought it was. Although DOS deselects a drive before seeking on the other drive, and the deselect is supposed to shut down the drive electronics, a filter capacitor on the drive has the effect of keeping the drive enabled for about 100 milliseconds after deselect. Thus, when reading and writing alternately to both drives, the head of the previously accessed drive can sometimes step itself as much as half a track off, while the other drive is stepping normally. When the drive is reselected to operate on the same track, DOS still trusts the head to be where it was, and this leads to the I/O errors. The solution we implemented was to wait 100 milliseconds before seeking, when the drive is powered up. Since powerup and seek time is substantial compared to the 100 millisecond delay, there is no loss in performance. Additionally, the copy program has been changed to verify that each track is properly duplicated (this makes it slower but more reliable).

Congratulations to the lab engineers who found this elusive problem. Now comes the most important part, getting this correction out to you.

To do this, we have created a revision of DOS 3.2 entitled, appropriately enough, DOS 3.2.1. Your local Apple Level 1 Service Center now has a copy of this new release which works with both the Standard (Integer) and Plus (Applesoft) versions. It contains revised versions of the following:

1. DOS 3.2.1
2. Update 3.2.1
3. Copy

We suggest that Apple users operating two disks on the same controller obtain this version. For users with one disk, or with disks on separate controllers, there is no problem, and therefore, no need to get the change.

To get your current DOS 3.2 Diskette updated to 3.2.1, simply bring it to your local Level 1 Service Center (Note: you must bring the original master diskette, the one with the Apple DOS Label on it.) The Dealer will process your diskette, updating it with the versions listed above, and return it to you. Every effort will be made to do this within 24 hours of the time you bring it in. That's all there is to it. In the event that there is no convenient way for you to get your diskette to your Dealer's Service Center, you may mail it (be sure to pack it securely) to our Cupertino Service Facility. The address is:

Apple Computer Service,
20605 Lazaneo Drive,
Cupertino, California 95014,
Attention: DOS Update.

The updated disk will be mailed back as soon as possible.

Note: Nothing in this revision changes the documentation in the DOS 3.2 — Do's and Don'ts of DOS manual (A2L0012). It's still current and will remain current for any 3.2 series DOS release.

ERRATA

In CONTACT 4 we gave you an incorrect telephone number for Interactive Structures, Inc., the people who make an analog input card for the APPLE II. The correct number is (215) 382-8296.
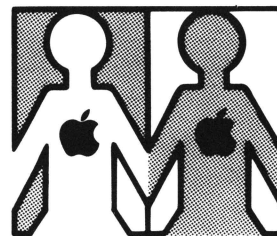
A couple of the Local User Groups listed in CONTACT 5 were wrong. They should be:

MARYLAND APPLE II USERS GROUP
Computer Unlimited, Inc.
907 York Road
Towson, MD 21204
Kevin Parks
(301) 321-1553

WISCONSIN APPLE USERS
c/o Cybernetic Mechanism
P.O. Box 11463
Milwaukee, WI 53211
Ken Blochowiak
(414) 964-6645

LOCAL USER GROUPS

Here is the new list of latest APPLE II User Groups. If we still don't have your group in our files, write or call us.

BRITISH COLUMBIA

APPLE BRITISH COLUMBIA
Ralph Dawson
2922 East 25 Ave.
Vancouver, B.C.

CALIFORNIA

APPLE USERS GROUP
c/o Computerland
1815 Ygnacio Valley Rd.
Walnut Creek, CA 94596

BYTE SHOP
4 West Mission St.
Santa Barbara, CA 93101
(805) 966-2638

CAROLINA

CAROLINA APPLE CORE
Wilbur Andrews
5212 Inglewood Ln.
Raleigh, NC 27609
(919) 787-3509

CONNECTICUT

APPLELIST
55 Pardee Place
New Haven, CN 06515
Marc Goldfarb
(203) 562-4907 (work)
(203) 397-1407 (home)

FLORIDA

MIAMI APPLE USERS GROUP
c/o David Hall, Sec.
2300 N.W. 135th St.
Miami, FL 33167

THE APPLE COMPUTER
ENJOYMENT SOCIETY
671 NE 56th Street
Fort Lauderdale, FL 33334
(305) 772-4768

KANSAS

APPLEBUTTER
10049 Santa Fe Dr.
Overland Park, KS 66212
(Last Wed. each month)

LOUISIANA

The B.R.A.N.C.H.
(BATON ROUGE APPLE NETWORK
OF COMPUTER HOBBYISTS)
4661 Tupello St.
Baton Rouge, LA 70808
(504) 924-0636
Allen Simpson

MICHIGAN

THE MICHIGAN APPLE
Computer Club
32905 W. 12 Mile Rd. Suite 320
Farmington Hills, MI 48018
(313) 979-5298

MISSOURI

APPLE JACKS
c/o Odel Small
P.O. 24202
St. Louis, MO 63130

MICRO & PERSONAL COMPUTER
CLUB OF ST. LOUIS
Futureworld, Inc.
12304 Manchester Rd.
St. Louis, MO 63131
(314) 965-4540

NEW YORK

THE MID HUDSON APPLE CORE
ASD Office Systems
Rt. 55 — Vanwyck Plaza
Poughkeepsie, NY 12603

APPLE BYTER'S CORP.
Buffalo Saving Bank
Sheridan-Harlem Branch,
Community Room
3980 Sheridan Dr.
Amherst, NY 14226
(3rd Fri. each month)

NEW JERSEY

APPLE USERS GROUP
c/o Computer Encounter
2 Nassau St.
Princeton, NJ 08540
(609) 924-8757

OHIO

DAYTON AREA APPLE USERS GROUP
c/o Computer Solutions
1932 Brown Street
Dayton, OH 45409

PENNSYLVANIA

THE COMPUTER HOUSE
1000 Greentree Rd.
Pittsburgh, PA 15220
(412) 921-1333

VIRGINIA

S.E. VIRGINIA APPLE ORCHARD
George Guild Jr.
117 Cardinal Drive
Hampton, VA 23664
(804) 850-0626 (home)
(804) 764-7081 (work)

WISCONSIN

ADAM & EVE, APPLE II USERS' GROUP
11 S. Handcock St.
Madison, WI 53703
(608) 256-5306

WHAT'S NEW, APPLE? (cont'd)

APPLE WRITER: A New Way to Write from Apple Computer Inc.

Discover Apple Computer's new way to be more creative and efficient at practically anything you write. The Apple Writer uses all the advantages of the Apple computer and that saves you time. This new product accomplishes typographical error correction, file editing and document revisions quickly with minimal effort. That's important to any creative thinker.

By entering text on the keyboard of the Apple Computer, you see it displayed on the monitor. Easy retrieval of your files from the diskettes, allows for effortless text corrections or revisions.

Features

Character-oriented rather than line-oriented text editing permits easier editing.

Editing feature permits three methods of deletion of text (character, word and paragraph) and two methods of insertion of text (character and file). Cursor Control Mode allows easy movement throughout the text. Moves blocks of text within a document, two easy ways.

Stores documents easily on floppy disks with up to 95 pages of text per diskette. Any length document can be printed using the load and continue printing feature.

Allows partial documents to be saved to separate disk files, and recalled later for insertion into other documents.

Printer Commands include: left or right justify, fill-justify or centering. Also sets left, right, top and bottom margins; line length of page, line spacing, page numbering and page heading. Many of these commands may be embedded on your text allowing dynamic formatting.

Recovers automatically from system errors to protect documents.

Permits check of length of unused working file space (document in memory).

Permits use of DOS commands from editor, allowing you to catalog or delete files stored on diskette.

Has Global search and replace, allowing replacement of any characters or words throughout a document.

Displays up to 24 lines of 40 characters of text, with upper case shown as inverse characters.

Minimum Hardware Requirements

Apple II or Apple II Plus with 48K RAM
One Disk II required (second drive optional)
Monitor or TV Screen

Apple Writer has too many features to explain here. Ask your dealer for a demonstration. Suggested Retail Price is $75.00.

HOW TO

Dollars and Cents

This program (and the subroutine at lines 2000 through 2060) will format your numeric output into a "Dollars and Cents" format. It's simple and fairly fast. An advantage to using this subroutine is that it does very little string manipulation. This means that the dreaded "garbage collection" will occur less often than with other methods!

```
]LIST

100    REM         PRINT USING
110    REM
120    REM           SIMULATOR
130    REM
140    REM             AUG 79
150    REM
160    REM         J. CROSSLEY
170    REM


180    LET N = 2: REM SET NUMBER
190    REM               OF DECIMALS
200    LET S = 5: REM SET FIELD
210    REM               WIDTH
220    HOME
230    FOR X =  - 5 TO 5 STEP .501
240    PRINT X, "$";
250    GOSUB 2000
260    PRINT
270    NEXT X
280    PRINT
290    PRINT "UNFORMATTED      FORMA
       TTED"
300    END
1000   REM THIS IS THE FORMATTING
1010   REM SUBROUTINE.  THE INPUT
1020   REM IS 'X', 'N', AND 'S'
1030   REM X IS THE NUMBER TO BE
1040   REM    BE PRINTED
1050   REM N IS THE NUMBER OF
1060   REM    DIGITS RIGHT OF '.'
1070   REM S IS THE WIDTH OF THE
1080   REM    RIGHT JUSTIFIED
1090   REM    PRINTING FIELD
1100   REM
2000 X$ = " " + STR$ ( INT (X *
       10 ^ N + .5))
```

```
2010 Q =   LEN (X$) - ( VAL (X$) <
       0)
2020   PRINT SPC( S - Q * (Q > N +
       1) - (N + 2) * (Q < = N + 1
       ));
2030   PRINT MID$ (X$,1 + ( VAL (
       X$) < 0),(Q < = N) + (Q - N
       ) * (Q > N));
2040   PRINT MID$ ("0.00",1 + ((N
       + 1) < Q),1 + (N - Q + 2) *
       (Q < N + 2));
2050   PRINT RIGHT$ (X$,N * (Q >
       N) + (Q - 1) * (Q < = N));
2060   RETURN

]
```

Literal Input

Here is another GC (garbage collection) forestaller with some nice additional benefits. It allows you to enter commas, quotes and colons into Applesoft without getting an "EXTRA IGNORED" error for your efforts and works just as well for either keyboard or disk input. Here's what it does.

— Line 100 defines a string variable at a known memory location. (This name can be anything you wish. We just happened to use IN$.)

— Lines 220-290 poke a short machine language routine into page 3 of your Apple's memory. This routine changes the pointer to the string in memory to point at the Input Buffer ($200).

— Line 350 calls the new input routine and the MID$ function moves a copy of the new string into main memory so that it isn't overwritten by the next input.

Here's a cute trick for using this routine with random access disk files. Say your program is reading a file for the third field in each record. Using this routine, the syntax for that would be:

CALL 768: CALL 768: CALL 768: IN$ = MID$(IN$,1)

The first two calls are dummy INPUTs but, unlike the normal DOS "INPUT IN$" command, perform no string operations.

Try it. You'll like it.

```
]LIST

100    LET IN$ = "X"
110    TEXT : HOME
120    REM
130    REM THE FIRST VARIABLE
140    REM DEFINED MUST BE A STRING

150    REM THIS STRING WILL REC'VE
160    REM INPUT FROM THE CALL
170    REM
```

```
180  REM THIS POKES THE INPUT
190  REM SIMULATOR ROUTINE
200  REM INTO MEMORY...
210  REM
220  FOR J = 768 TO 788
230  READ I
240  POKE J, I
250  NEXT J
260  DATA 162, 0, 32, 117, 253, 160, 2
270  DATA 138, 145, 105, 200, 169, 0
280  DATA 145, 105, 200, 169, 2, 145
290  DATA 105, 96
300  REM
310  REM NOW TO USE IT!
320  REM
330  PRINT "TYPE IN ANY CHARACTER
     S YOU WISH: "
340  PRINT
350  CALL 768: IN$ =   MID$ (IN$, 1)

360  REM
370  REM THIS IS AN "INPUT IN$"
380  REM BUT IGNORES "," & ":"
390  REM
400  PRINT
410  PRINT "AND HERE'S WHAT YOU T
     YPED IN: "
420  PRINT : PRINT IN$
430  PRINT
440  PRINT "NOTE THAT EVEN QUOTES
     , COMMAS AND"
450  PRINT "COLONS GET THROUGH UN
     SCATHED. "
460  PRINT : PRINT "NOW LET'S WRI
     TE IT TO THE DISK. "
470  PRINT   CHR$ (4)"OPEN TEMP"
480  PRINT   CHR$ (4)"WRITE TEMP"
490  PRINT IN$
500  PRINT   CHR$ (4)"CLOSE"
510  PRINT : PRINT "AND READ IT B
     ACK IN. . . "
520  LET IN$ = " "
530  PRINT   CHR$ (4)"OPEN TEMP"
540  PRINT   CHR$ (4)"READ TEMP"
550  CALL 768: IN$ =   MID$ (IN$, 1)

560  PRINT   CHR$ (4)"CLOSE"
570  PRINT : PRINT IN$
580  PRINT : PRINT "TA-DAA!!": END


]
```

Restore to Line Number

We've had some questions from people asking how to do a RESTORE statement to a particular line number. It's really not too difficult. The next program is a quick demonstration of how to do this.

```
]LIST

0   DATA ZERO
1   DATA ONE
2   DATA TWO
3   DATA THREE
4   DATA FOUR
5   DATA FIVE
6   DATA SIX
7   DATA SEVEN
8   DATA EIGHT
9   DATA NINE
10  REM
11  REM THESE ARE THE DATA LINES
12  REM
1000  REM THESE POKES ENTER THE
1010  REM RESTORE PROGRAM INTO
1020  REM MEMORY
1025  REM
1030  POKE 768, 201: POKE 769, 82: POKE
      770, 208: POKE 771, 38: POKE 7
      72, 32: POKE 773, 177: POKE 77
      4, 0: POKE 775, 32: POKE 776, 1
      03:
1040  POKE 777, 221: POKE 778, 32: POKE
      779, 82: POKE 780, 231: POKE 7
      81, 32: POKE 782, 26: POKE 783
      , 214: POKE 784, 144: POKE 785
      , 8:
1050  POKE 786, 160: POKE 787, 4: POKE
      788, 177: POKE 789, 155: POKE
      790, 201: POKE 791, 131: POKE
      792, 240: POKE 793, 3: POKE 79
      4, 76:
1060  POKE 795, 124: POKE 796, 217:
      POKE 797, 165: POKE 798, 155:
      POKE 799, 164: POKE 800, 156:
      POKE 801, 56: POKE 802, 233: POKE
      803, 1:
1070  POKE 804, 32: POKE 805, 80: POKE
      806, 216: POKE 807, 76: POKE 8
      08, 166: POKE 809, 217: POKE 8
      10, 96
1075  REM
1076  REM THESE POKES SET '&' TO
1077  REM JUMP TO THE RESTORE
1078  REM PROGRAM
1079  REM
1080  POKE 1013, 76: POKE 1014, 0: POKE
      1015, 3
1084  REM
1085  REM THESE POKES ENTER THE
1086  REM ONERR FIX FROM PAGE 82
1087  REM INTO MEMORY
1088  REM
1090  POKE 810, 104: POKE 811, 168:
      POKE 812, 104: POKE 813, 166:
      POKE 814, 223: POKE 815, 154:
      POKE 816, 72: POKE 817, 72: POKE
```

```
               818,152: POKE 819,72: POKE 8
               20,96
2000    REM
2010    REM SET UP ONERR AND START
2020    REM THE MAIN PROGRAM
2030    REM
2040    ONERR  GOTO 3030
2050    LIST 0 - 9
2060    INPUT "WHICH LINE DO YOU WA
        NT ?";LN
2070    & : RLN
2080    REM
2090    REM   LINE 1130 IS DOES A
2100    REM 'RESTORE TO LINE LN'
2110    REM
2120    READ A$
2130    PRINT
2140    PRINT "AND THE DATA IS... "
        ;A$
2150    PRINT
2160    GOTO 2050: REM DO IT AGAIN
3000    REM
3010    REM ERROR HANDLER
3011    REM
3012    REM '&' ALONE EXECUTES THE
3013    REM ONERR FIX
3020    REM
3030    IF PEEK (222) = 90 THEN PRINT
        : PRINT "THAT'S NOT A DATA L
        INE!"; CHR$ (7): & : GOTO 20
        50
3040    REM
3050    REM THIS IS FOR
3060    REM UNDEFINED STATEMENT
3070    REM
3080    IF PEEK (222) = 254 THEN PRINT
        : PRINT "TRY TYPING A NUMBER
        !"; CHR$ (7): & : GOTO 2050
3090    REM
3100    REM THIS IS FOR
3110    REM BAD RESPONSE TO INPUT
3120    REM
3130    REM IF NOT ONE OF THE
3140    REM ABOVE ERRORS THEN END
3150    END

]
```

What's In This System, Anyway?

This last program (CONFIG), does a quick look at the machine language code, if any, located in your Apple's I/O slots. Since this code is different for each peripheral, it's possible to tell just what interface card is in a particular slot.

The bytes being read are $Cn05 and $Cn07, where n is the slot number. For instance, these bytes both contain $48 (72 decimal) for an Apple Parallel Printer Interface.

```
]LIST

100    REM THIS PROGRAM FIGURES
110    REM OUT WHAT CARDS YOUR
120    REM APPLE HAS IN WHICH
130    REM PERPHERIAL SLOT.
140    REM
150    REM THIS IS DONE BY THE
160    REM PROGRAM LOOKING AT
170    REM THE CODE IN AN ON-
180    REM BOARD ROM AND DOING
190    REM A QUICK CHECK ON A
200    REM FEW BYTES
210    REM
220    TEXT : HOME : PRINT : PRINT
       "     SYSTEM CONFIGURATION (
       CONFIG)": PRINT
230    DIM S5(4),S7(4):DISK = 1:COM
       = 2:SERIAL = 3:PTR = 4
240    DATA  3,60,24,56,56,24,72,72
250    FOR I = DISK TO PTR: READ S5
       (I),S7(I): NEXT
260    DIM NA$(4)
270    LET NA$(DISK) = "DISK CONTRO
       LLER"
280    LET NA$(COM) = "COMMUNICATIONS"
290    LET NA$(SERIAL) = "H. S. SER
       IAL"
300    LET NA$(PTR) = "PARALLEL PRI
       NTER"
310    DIM CS(2)
320    LET C100 = 49408
330    LET C700 = 50944
340    FOR S = C100 TO C700 STEP 256
350    FOR K = 0 TO 2
360    LET CS(K) = 0
370    FOR I = 0 TO 255 STEP 8
380    LET CS(K) = CS(K) +  PEEK (S
       + I)
390    NEXT : NEXT
400    IF CS(0) <  > CS(1) OR CS(1)
       <  > CS(2) OR CS(2) < 256 OR
       CS(0) < 256 OR CS(1) < 256 THEN
       470
410    PRINT "SLOT NO. "(S - 49152)
       / 256" HAS A";
420    FOR I = DISK TO PTR
430    IF  PEEK (S + 5) = S5(I) AND
        PEEK (S + 7) = S7(I) THEN PRINT
       " "NA$(I);: I = 99
440    NEXT I
450    IF I = 5 THEN  PRINT "N UNKN
       OWN";
460    PRINT " CARD": GOTO 480
470    PRINT "SLOT NO. "(S - 49152)
       / 256" IS EMPTY"
480    NEXT : END

]
```