


CONTACT 2

the user group newsletter for june 1978  apple computer inc.



INTRODUCING
DISK II

DISK II

\$495.

This special introductory offer price is in effect until July 31, 1978, to show our appreciation to the existing owners who helped us get started.

The Disk II Floppy Disk Subsystem consists of an intelligent interface card, a powerful Disk Operating System (DOS), and one or two mini-floppy drives. (The computer will handle up to seven interface cards and fourteen drives, for control of nearly 1.6 megabytes of data). The combination of ROM-based bootstrap loader and an operating system in RAM provides complete disk handling capability.

FEATURES

- Powerful Disk Operating Software:
 - LOAD and STORE files by name (Up to 35 Char/Name)
 - BASIC Program Chaining
 - Random or Sequential File Access
- Fast Access Time – 600 msec (Max.) Across 35 Tracks
- Individual File Write-Protection
- Full Disk Capability in Systems with as Little as 16K RAM
- Data Transfer Rates of 156K Bits/sec
- Storage Capacity of 116 Kilo-bytes/Diskette
- High-Efficiency Subsystem Powered Directly from the APPLE II (Up to 14 Drives)
- Completely Assembled and Tested – Not a Kit
- Packaged in Heavy-Duty, Color-Coordinated Steel Cabinet

SPECIFICATIONS:

Commands:

OPEN, CLOSE, READ, WRITE, LOAD, SAVE, EXEC, RUN, APPEND, LOCK, CHAIN, UNLOCK, DELETE, MONITOR, NOMONITOR, MAXFILES, IN#, PR#, INIT, BLOAD, BSAVE

Access Method:

Random or Sequential – arbitrary record length

Bootstrap Loader Method:

By means of Loader routine in two 256 x 8 PROMs, on-card.

Disk Drive:

Shugart 5¼" floppy disk.

Track Access Time:

Varies with number of tracks crossed. 200 msec (avg.), 600 msec (max. across 35 tracks)

Disk Speed and Latency:

300 rpm, 100 msec avg. latency

Disk Capacity:

116K bytes (formatted), soft-sectored

Data Transfer Rate:

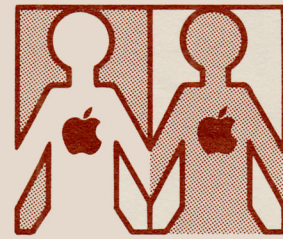
156 bits per second

Physical Dimensions:

Card – 4.5" x 2.75" (not including connector finger): fits inside the APPLE II. Drive – 6.1" x 8.75" x 3.8" (WDH)

Controller Capacity:

Up to two drives per controller. Multiple controllers can be used.



LOCAL USER GROUPS

Apple's still springing up

New local APPLE II user groups continue to form. Again, we remind you that we can list your group only if we know of its existence. If there is no APPLE group in your area and you wish to start one, talk to your APPLE dealer – he'll be able to help.

Here are the new groups we've learned about since Contact #1:

Alabama –

APPLE CORPS
Computer Center, Inc.
433 Valley Avenue Plaza
Birmingham, AL 35209
Terry Woodward
(205) 942-8567

California –

Video Games & Computers
301 Balboa
San Francisco, CA 94118
(415) 221-8500

SILICON APPLE PROGRAMMING SOCIETY

2485 Rossotto Drive
San Jose, CA 95130
Jim Hoyt
(408) 374-3680

Connecticut –

APPLE USER GROUP
ComputerLand of Fairfield
2475 Blackbrook Turnpike
Fairfield, CT 06430
Glen Brennan
(208) 374-2227

Maryland —

MARYLAND APPLE CORPS
Computers Etc.
13A Allegheny Avenue
Towson, MC 21264
Kevin Parks
(301) 296-0520

New Jersey —

Computer Lab of New Jersey
141 Route 46
Budd Lake, NJ 07828
Dan Fischler
(201) 691-1984

Pennsylvania —

APPLE USERS GROUP
Philadelphia Area Computer Society
29 S. New Ardmore Avenue
Broomall, PA 19008
Neil Lipson
(215) 825-3800, x278 (work)
(215) 356-6183 (home)

Texas —

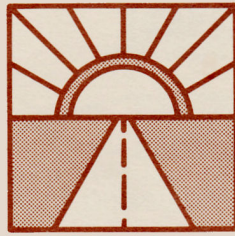
APPLE CORPS
ComputerLand of Austin
3300 Anderson Land
Austin, TX 78757
(412) 452-5701

THE APPLE CORPS
Greenhill School
Fulton Building
14255 Midway Road
Dallas, TX 75240
Bobbie Ferrell
(214) 661-1211 (work)
(214) 243-6347 (home)

And here are two people who'd like to form groups:

Earl Keyser
22 Clover Lane
Mason City, IA 50428

R. V. Collins
12502 Bexley
Houston, TX 77099



LOOKING AHEAD

...to how your Apple will grow

DISK II — If you've read this far, you know the news. Get 'em while they're hot!

APPLESOFT II — The new APPLESOFT has arrived. It's an expanded version of Microsoft's floating-point BASIC, with 9-digit arithmetic and a large function library that makes it ideal for business and scientific programs. Easy to use and powerful, APPLESOFT II's capabilities include high-resolution graphics routines; DATA STORE/RECALL statements that allow saving variables to tape; IN# and PR# statements to simplify peripheral use; and an ONERRGOTO command to allow user-specified error-handling routines.

The tape version (P/N A2T0004) costs \$20, and is available now at your APPLE dealer. A ROM card version (P/N A2B0009), which plugs into slot 0, has hardware and software switching to select either Integer or APPLESOFT BASIC. It frees up 10K of RAM space for your programs. Available in July, the APPLESOFT ROM card's regular price is \$200; but through July 31 only, it will be introductory-priced at \$100 — a genuine bargain.

MACRO ASSEMBLER/EDITOR — Just a note to let you know that we are working on a powerful, multi-pass Macro Assembler and Editor. This new APPLE II package will run with either tape or disk storage. We plan to release it in September, so look for more details in the August issue of CONTACT.

PERIPHERALS — As a convenience to APPLE users, starting in July we will offer a cassette recorder, a 9-inch B/W video monitor, and two matrix printers — the Centronics 779 and the MICROPRINTER-PI. We'd also like to remind you that we already stock the Heuristics Speechlab™ voice recognition unit (P/N A2M0015, \$189), and Mountain Hardware's Intro™ a.c. master control unit (P/N A2M0012), and a.c. remote controller (P/N A2M0013, \$329).

NEW SOFTWARE — A host of new software is now available from the Apple Software Bank. Watch for description information in CONTACT No. 3.

APPLE COMPUTER PRODUCTS

These programs are now available from your Apple dealer:

REQ'D MEMORY

- 16K Checkbook Cassette
..... A2T0001/\$20.00
- 16K Startrek/Starwars Cassette
..... A2T0002/\$15.00
- 4K Color Demo/Breakout Cassette
..... A2T0003/\$7.50
- 16K Applesoft II/F.P. Demo (w/Manual) Cassette
..... A2T0004/\$20.00
- 16K Hi Res Graphics/Hi Res Shapes Cassette
..... A2T0005/\$7.50
- 4K RAM Test Cassette
..... A2T0006/\$7.50
- 4K Color Math Demo/Hangman
..... A2T0007/\$7.50
- 8K Blackjack/Slot Machine Cassette
..... A2T0008/\$7.50
- 4K Biorhythm/Mastermind Cassette
..... A2T0009/\$7.50
- 48K Apple II Capabiliti Cassette
..... A2T0010/\$20.00
- 16K Finance I — 2 Cass Package
..... A2T0011/\$20.00
- 8K Datamover/Telepon Cassette
..... A2T0012/\$10.00

- 16K Wari/Othello/Dragon Maze
 A2T0013/\$7.50
 24K Chess
 A2T0014/\$15.00

APPLE-USER CONTRIBUTED PROGRAMS

These programs are the start of an extensive list to be released over the remainder of the year. We have received nearly 300 programs, most without documentation of any sort. As we evaluate and document them, you'll read about them here. We should be ready to supply programs from the Bank by September.

GAMES

- Life (Hi-Res Version)
 4K Bagels — A Number Guessing Game
 16K Applevision — An Audio/Visual Hi-Res Demo
 4K Johann S. Apple — Makes Apple a Musical Instrument
 4K Catch — A Ball-and-Paddle Game
 4K 23 Bricks — A NIM-like Game of Strategy

EDUCATION

- 16K Nations and Capitals — Multiple-Choice Quiz
 16K Differential Equation Solver
 8K Classifier — For Building Decision Trees

UTILITIES

- 24K Tax — A Guide to 1977 Forms 1040 and A
 16K Base Conversion — For Hex/Decimal Conversions

MISCELLANEOUS

- 24K Rotation — A 3D Cube Rotates With True Perspective

NEW SERVICES — Be sure to watch CONTACT No. 3 for announcement of an industry first — an exciting new service that allows Apple users to get current stock quotes, financial news, and other information over the phone, through the new Communications Interface Card.

EDITORIAL



by Phil Roybal, Marketing Mgr.

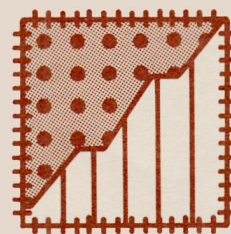
And now it's your turn

Writing this second issue of CONTACT, I'm reminded of my favorite way to start a lecture — with an analogy. You see, a newsletter (and a lecture) is like a well in the center of a village, a well from which all the villagers draw their water. All who pass the well have an equal chance for the water. And for that chance, all pay the same fee — the journey to the well. But while the fee is the same for all, each leaves the well with a different amount of water. Some get nothing for their trouble, and some merely a cupful. But some leave with a full bucket.

At the well of information, the buckets are questions. And this brings me to the point of this editorial. CONTACT is *your* newsletter. Its purpose is to expand your enjoyment and use of your computer, and to that end CONTACT will feature applications and introduce products of interest to you.

Now, we've done the first two issues of CONTACT by the seat of our pants because the time's been too short to get your feedback. But from now on it's up to you. For CONTACT to grow into a healthy and useful tool it needs your feedback: questions . . . suggestions . . . criticism. With such guidance, CONTACT cannot help but succeed.

On the other hand, if your trip to the well leaves you still thirsty, perhaps it's because you bring only a cup, not a bucket. The moral? If you don't see what you want here — ask for it! (But please, *please*, when you write us, put your full address on your letter, not just the envelope; and if you call, give us your area code. That way, we'll make contact.)



PATCHES AND PROGRESS

... wherein program bugs are stomped upon

Had some printer card problems? Here's why, and the fix.

The original printer-card firmware uses the screen window width as the controlling parameter to set the margin for BASIC listings and TAB functions. This means that when your printer's line length is set at 132 columns, for example, the system display is set at 132 characters/line. We didn't think that this would cause a problem, because printer margins greater than 40 characters and screen displays are not allowed to co-exist.

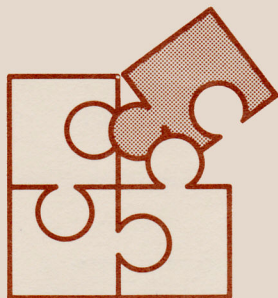
But there's a catch when any screen clear functions are executed. The system uses window width to bound the clearing operations, which is a direct command not detectable by the printer card. But the keyboard input routine executes a "clear to end of line" when it gets a carriage return. Since the window width can be at well beyond the 40 columns, memory from the current cursor position to well past the normal boundary will be set to "space" (\$A0). If the cursor is at the bottom of the screen, this can cause addresses from \$800-up to be set to \$A0. Simply setting the printer width on the keyboard with IC132 N (CR), with the cursor at the bottom of the screen will cause these locations to be bombed because the window width gets set before the (CR) is executed. Since APPLESOFT starts at \$800 and Integer BASIC variables start at \$800, bad things will happen for sure.

So . . . to reduce the possibility of problems with APPLE's Parallel Printer card, do these things:

- 1— Home the cursor (ESC @, or CALL -936, in BASIC) prior to typing printer control sequences that set the column width past 40 columns.
- 2— Do not use any screen or line clear operations when using the printer with the column width set past 40 columns. Then be sure to return the line length to 40 columns before turning off the printer card with PR#0.

If you're using the revised printer card with PROM P1-02, add this:

- 3— To perform the vertical tab in Integer or APPLESOFT BASIC on the printer, the command
POKE 36, (Tab distance)
should be used in place of the TAB or VTAB command.



BITS AND PIECES

... things about Apple,
handy to know

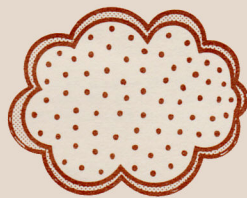
The good earth

APPLE II *must* be grounded — either via its three-wire power cord inserted into a properly grounded three-wire outlet, or by a wire inserted between APPLE's metal base plate and one of the plate's mounting screws. In the latter case, you must run the ground wire to a (preferably very close) ground — a long, long metal rod driven into the

earth, and connected to APPLE via a heavy wire, or a wire connection to the cold-water system (but make sure you have metal piping). Grounding eliminates any possibility of the existence of a floating potential, which can be detrimental to you, to APPLE, and to proper tape cassette operation.

Get your head straight

Cassette tape recorders — whether expensive or inexpensive — often suffer a misalignment of their playback head during shipping and other handling. Such misalignment causes azimuth error, which is death to the high-frequency response (particularly on units without a tone control) so necessary to accurately transfer data. But any audio shop technician can readjust the azimuth alignment; a skilled ear alone is often sufficient to do the job. Your original APPLE pre-recorded tapes are excellent alignment references, because they are recorded with professional equipment maintained to the highest professional standards.



OUT OF THE MIST....

... clearing up things
thought already clear

Errata for the errata

Okay, okay — so we've got the correct our corrections. The errors we're talking about show up in our memo of April 17, 1978, "APPLESOFT II", on pages 5 and 8.

Page 5 of the memo discusses commands for APPLE II's HIRIS graphics video mode. The items to be corrected concern themselves with the commands HGR and HGR2, and their descriptions.

The HGR command must be used *only* with ROM. Why? You'll find out when we finish the sentence we left unfinished in HGR's descriptive paragraph. The third sentence should read, "DO NOT use this command with cassette tape (RAM) version of APPLESOFT as it **will wipe out APPLESOFT itself, which resides in page 1 of HIRIS graphics between 8K and 16K.** Besides finishing the third sentence, make it the last one in the HGR paragraph by deleting, "Example 20 sets . . . bottom of screen."

As for the HGR2 command — it *is* for use with the RAM version. Our error? To the beginning of the last sentence of HGR2's descriptive paragraph we cleverly added two simple words that reversed our meaning — "DO NOT. . .". Please delete these words; the last sentence should read, "Use this command with cassette tape (RAM) version."

Finally, on the last page (page 8) of the memo, the opening sentence of Section IV reads, ". . . depress 'RETURN' key — or you have accidentally depressed the 'RETURN' key, then type:" Well, if you do what that sentence tells you to do, nothing will happen. "RESET" is the word intended; simply delete both "RETURNS", replace each with "RESET", and the corrections to the memo are finished.

P.S. If you haven't got a copy of the memo in question — please write and we'll send you one (with corrections, of course).



HOW TO ...things your manual never told you

LISTINGS – A LITTLE AT A TIME

There is a way to stop APPLE II's LIST operation. You must go into the MONITOR and enter the following bytes of hex:

```

3DA:A9 E3 85 36 A9 03 85 37
2E3 60 RETURN
:48 AD 01 C0 10 08 AD 11 C0
AD RETURN
3FD:01 C0 10 FB AD 11 C0 68 4C
F0 RETURN
407:FD 4C DA 03 RETURN

```

After loading the hex code, press CONTROL Y to activate this StopList routine.

Now we try listing memory by entering 0.FFF RETURN. Let some lines go by, then press any key. If you've done everything correctly, the scrolling will halt. Now press any other key and the lines will again scroll. This routine will still work when you go back into BASIC. But if for any reason you press RESET, you must reactivate the routine by going back into the MONITOR and pressing CONTROL Y.

How does it work? Well, to print a character on the screen, APPLE II uses a routine located in MONITOR. APPLE goes to the routine by finding its address in locations 54 and 55 (36 and 37 in hex). But entering a CONTROL Y replaces this address with the address of the Stop List routine. You catch APPLE because it always checks for a Stop List command before printing any character. Software engineers call such a feature a hook, and use it to make program-ming just a bit more handy.

Tony Hughes
THE APPLE CORE
San Francisco, Calif.

AN APPLESOFT CONVERT PROGRAM

Programs written in APPLESOFT BASIC and saved on tape cannot be LOADED and RUN with APPLESOFT II. But there is a way to use them without retyping – by means of our CONVERT program, which we list below.

The CONVERT program runs in Integer BASIC, accepts a tape in APPLESOFT BASIC, and produces a new tape in APPLESOFT II BASIC. To use CONVERT, LOAD the CONVERT tape. It will ask you if the old program (written in APPLESOFT BASIC) used OPTION 1 or OPTION 2.

- OPTION 1 was GRAPHICS COMMANDS WITHOUT LET OR REM STATEMENTS
- OPTION 2 was LET OR STATEMENTS, BUT NO GRAPHICS

After you answer you will be prompted to play the old program tape. After CONVERT has finished reading and processing the old tape, it will ask you to record a second tape. This second tape will be your original program converted into APPLESOFT II. If any errors are discovered during the conversion process, you will be given self-explanatory messages.

CONVERT

```

0 TEXT : CALL -936: VTAB 3: PRINT "APPLESOFT CONVERSION PROGRAM:"
1 PRINT "
2 CONVERTS OLD APPLESOFT PROGRAMS TO": PRINT "APPLESOFT II FORMAT"
3 PRINT "
4 PRINT "
5 COPYRIGHT 1978 APPLE COMPUTER, INC.
"
6 PRINT "
7 INPUT "OPTION #",O: IF O<>1 AND O<>2 THEN 7
8 PRINT "OPTION 1: GRAPHICS COMMANDS WITHOUT"
9 PRINT "LET OR REM STATEMENTS": PRINT "
10 PRINT "OPTION 2: LET AND REM STATEMENTS BUT NO"
11 PRINT "GRAPHICS"
12 INPUT "PRESS THE PLAY BUTTON, THEN HIT RETURN",A$: CALL -259
13 IF PEEK (1)<128 THEN 30: PRINT "
14 TAPE READ ERROR!": PRINT "TRY RE-ADJUSTING VOLUME CONTROLS ON"
15 PRINT "TAPEPLAYER, THEN RE-RUN THIS PROGRAM"
16 POKE 60,Z: POKE 61,16:E= PEEK (Z)+ PEEK (1)*256-6657: POKE 62,E MOD 256: POKE 63,E/256: CALL
17 -259
18 CALL -936: PRINT "
19 CONVERTING... "
20 IF B>=E THEN 1000:A= PEEK (B)+F MOD 256: POKE B,A MOD 256: POKE B+1, PEEK (B+1)+F/256+(A>
21 255)
22 FOR B=B+4 TO B+999:T= PEEK (B): IF T<133 THEN 250: IF T<>135 AND T<>142 OR O=2 THEN 200:
23 C=B
24 IF T<>142 THEN 60:T=137: GOTO 250
25 C=C+1:U= PEEK (C): IF U=32 THEN 60: IF U=67 OR U=71 OR U=72 OR U=80 OR U=86 THEN GOTO U:
26 PRINT "BAD STATEMENT IN PROGRAM": GOTO 250
27 T=160: GOTO 90
28 T=136: GOTO 90
29 T=142: GOTO 87
30 T=141: GOTO 90
31 T=143
32 CC=Z: D=B
33 D=D+1: IF PEEK (D)<>44 AND PEEK (D)<>58 AND PEEK (D) THEN 88: IF PEEK (D)=44 THEN 89: PRINT
34 "BAD STATEMENT IN PROGRAM!": GOTO 250
35 CC=CC+1: IF CC=1 THEN 88: POKE D,197
36 POKE C,32: GOTO 250
37 REM :MAP OLD TOKENS TO NEW
38 IF T>195 THEN 250:T=T+1+(T>134)*34+(T>139)+(T>160)+(T>177)*2
39 POKE B,T: IF B/500*500=B THEN PRINT "STILL CONVERTING!"
40 IF T<>0 THEN NEXT B:B=B+1: GOTO 40
41 CC=Z: D=C
42 CALL -936: POKE 60,Z: POKE 61,Z: POKE 62,2: POKE 63,Z: PRINT "DONE!"
43 INPUT "START RECORDING,
44 THEN HIT 'RETURN'",A$
45 POKE E-2,Z: POKE E-1,Z: POKE E,Z
46 D=E-4096: POKE Z,D MOD 256: POKE 1,D/256: POKE 2,Z: CALL -307
47 POKE 60,Z: POKE 61,16: POKE 62,E MOD 256: POKE 63,E/256: CALL -307
48 PRINT "D.K.
49 PRINT "THE TAPE JUST RECORDED CAN NOW BE LOADED INTO APPLESOFT II.": END

```


HOW TO SET LOMEM WITHOUT HARDLY TRYING

LOMEM is the start of the variables storehouse; HIMEM marks the top of the program store. Between the two is your working space. Entering BASIC with BC will set LOMEM to 2048, the normal default value. But there are times (when using the Heuristics Speechlab™ for instance) when LOMEM must be set to a different value. The pro will incorporate such an operation right into his programs, rather than leaving it to chance.

Well, then, is there an easy way to reset LOMEM inside a program? The answer is yes, and we guarantee that your life will be simpler as a result. The few statements shown below will set a new LOMEM within an existing BASIC program. Of course, doing so will destroy existing variables, so do it before any are defined in the program. You can, in fact, insert this little routine at the start of your program so that it conveniently does the whole job for you. Actually, POKE statements 30 and 40 are the ones that do the work, the rest of the program is shown as an example, and figures out what data to POKE.

```

0 REM HOW TO SET LOMEM INSIDE A BASIC PROGRAM (THIS DESTROYS ANY VARIABLE DEFINITIONS)
10 INPUT "NEW LOMEM";A
20 B=A/256:C=A MOD 256: REM SEPARATE NEW LOMEM INTO LOW AND HIGH BYTES.
30 POKE 204,C: POKE 205,B: REM RESET POINTER FOR VARIABLE TABLE
40 POKE 74,C: POKE 75,B: REM RESET LOMEM POINTER
50 PRINT "LOMEM RESET": END

```

STRING + STRING = CONCATENATION

A string is a series of characters, zero to 255 characters in length. To symbolize that it is a string being

operated upon, a string-variable name ends with the \$ symbol. APPLE can operate on string variables, in whole or in part, just as it operates on numeric variables. And this ability to manipulate strings — to reformat them, etc. — is a powerful tool.

Concatenation is an important facet of string manipulations. To concatenate strings means to append one to another, to “series connect” hitherto independent character sets in order to operate upon them as a single entity. The concatenation function does exist in APPLESOFT and APPLESOFT II BASICs but, unfortunately, not in Integer BASIC.

There is, however, a simple routine that will let you concatenate strings with Integer BASIC. It’s listed below, and operates by defining each string, finding the length of the first, and telling APPLE to tack the start of the second string to the end of the first string, and so on down the line. The example shown here is for two strings only; the maximum length of any concatenated string is, of course, limited to 255 characters.

```

0 REM EXAMPLE OF STRING CONCATENATION IN INTEGER BASIC
10 DIM A$(40),B$(40)
20 A$="ABCDEF": REM BUILD A$
30 B$="GHIJKL": REM BUILD B$
40 PRINT "A$=";A$,"B$=";B$
50 L=LEN(A$): REM FIND LENGTH OF CONTENTS OF A$
60 A$(L+1)=B$: REM ADD B$ ON AFTER LAST CHAR IN A$
70 PRINT "A$=";A$,"B$=";B$: END

```

HOW TO GIVE A NUMBER SOME CHARACTER

Both APPLESOFT and APPLESOFT II contain the functions ASC and CHR\$. These are opposites — complementary functions, if you will — in that ASC returns the decimal ASCII number equivalent of its designated string-variable

argument, while CHR\$ returns a single character equivalent of its designated decimal-ASCII number argument.

Examples: Say, M\$="M" is some string variable of interest to us in APPLESOFT. When you tell APPLE to PRINT ASC (M\$), APPLE responds with a “77” on its screen. (Remember, first character only; decimal 77 in ASCII corresponds to the letter “M”.) On the other hand, tell APPLE to PRINT CHR\$ (77), and you get the letter “M”.

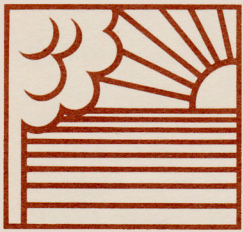
A rather simpleminded example of the use of this pair of functions could be to associate them with the RaNDom function in a program to generate random alphanumeric sequences.

Except that you cannot do it in Integer BASIC, because, alas, Integer contains only the ASC function. But don’t despair, for all is not lost. Below we give you a very short routine that gives Integer BASIC the equivalent of a CHR\$ function. *Insert it in your programs wherever you wish to and — presto! — you can convert decimal numbers to their ASCII character equivalents.*

```

0 REM CREATING A 'CHR#' FUNCTION, WHICH CONVERTS A NUMBER INTO ITS ASCII CHAR. EQUIVALENT
10 A$="": REM MAKES A$ THE FIRST VARIABLE DEFINED IN THE PROGRAM, SO WE KNOW WHERE IT IS
20 INPUT B: REM GETS THE NUMBER TO BE CONVERTED. PRINTING CHARACTERS ARE 161 AND UP
30 POKE 2053,B: REM INSERTS NUMBER INTO THE STRING VARIABLE 'A$', SO IT CAN BE PRINTED AS A CHARACTER
40 PRINT B;" CORRESPONDS TO '" ;A$;"'"
50 GOTO 20: END

```

OUTSIDE THE ORCHARD

NEW PRODUCTS

... of interest to
Apple users

FROM VIDEO TO UHF — Another modulator unit, this one from ATV Research, is available to transform APPLE II's video output to a video-modulated UHF signal. For B/W or color, the unit — called the Micro-Verter model MVX-500 — outputs a signal tunable to one of four channels above television channel 14. It does not require direct connection to your television receiver's antenna terminals, and it is powered by four AA cells, which the manufacturer claims will last in excess of 1000 hours. Suggested price: \$35, from dealers or factory direct. ATV Research, 13th and Broadway, Dakota City, NE 68731; (402) 987-3771.

HARD-COPY GRAPHICS

TERMINAL — The Panographic-84 is a precision x-y plotter with 100-step resolution in both directions; it is driven by zero-drift, adjustment-free stepping motors. Plotter programs can be written in BASIC or machine-language. Interface to APPLE is via our Parallel Printer card. Soon to be available is a chart reader that will allow you to use the plotter as an input device. The assembled plotter, with computer-operated pen lifter and molded cover, sells for \$1400 (delivery 60 days ARO); as a kit, without lifter and cover (\$995 (90-days delivery)); the pen lifter kit is \$85; the cover, also \$85. Pan Dynamics, Inc., 2950 Nebraska Ave., Santa Monica, CA 90404; (213) 829-2332.

CO-RESIDENT ASSEMBLER —

Microproducts has introduced a co-resident Assembler claimed to be much more powerful than MOS Technology's Assembler for the 6502 MPU, and thus better able to exploit APPLE II's advanced features. The new Assembler has two-pass implementation, and incorporates a ten-command text editor, and a Microproducts printer driver for which the company makes an APPLE II/PR-40 printer interface. One of the features of the Assembler is that it permits the text file to be

saved or loaded from tape. Microproducts, 1024 17th Street, Hermosa Beach, CA 90254; (213) 374-1673.

TAPE RECORDER CONTROL — ROR and Candex Pacific have announced a relay activator to start and stop audio tape recorders via the REMOTE jack. The activator plugs into the GAME I/O connector on the Apple II, and is controlled with PEEK and POKE commands. Its connector allows the game controls to plug into it so that both devices can be used simultaneously.

Retail price is \$24.95, and quantity discounts are available. Delivery is 30 days ARO. Technical questions should be addressed to Candex Pacific, 693 Veterans Blvd., Redwood City, CA 94063; (415) 364-8427.