

\$2

Washington Apple Pi



Member # 1338

Bernie Benson

Superscribes does
80 column?

Volume 4

March 1982

Number 3

Highlights

APPLESOFT INPUT (Quotes, etc.)
 WHAT IS A 16K RAM CARD IN SLOT 0?
 LETTER QUALITY PRINTING AT
 REASONABLE PRICES
 COMPUTER MUSIC SYSTEMS

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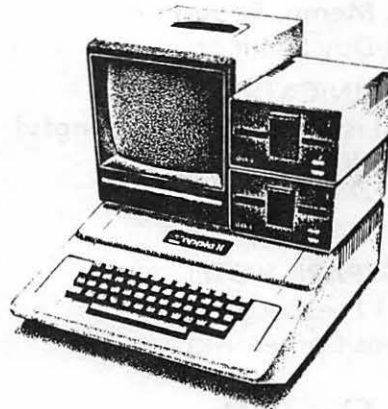
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ABBS (301) 983-9317

Apple user groups may reprint without prior permission any portion of the contents herein, provided proper author, title and publication credits are given.

Membership dues for Washington Apple Pi are \$18.00 per year, beginning in the month joined. If you would like to join, please call the club phone and leave your name and address, or write to the PO Box above. A membership application will be mailed to you.

Subscriptions to the Washington Apple Pi Newsletter are not available. The newsletter is distributed as a benefit of membership.

Members who would like to sign onto the Washington Apple Pi ABBS system should call the club phone and leave your name (first and last), WAP number and phone number. You will be assigned a password and John Moon will take care of signing you on.

CLASSIFIEDS

TUTORING SERVICES OFFERED: Will tutor in your home. Have teaching, programming and electrical engineering background. \$15/hr. Southern P.G. County, \$20/hr other areas. C. Sturm, (301) 372-6058.

TUTOR WANTED: Experienced APPLE II instructor to come to our McLean home. Help us master Basic, Applesoft and CP/M. Excellent hourly rates offered. Helga Fagg (703) 356-9533.

The crocuses are blooming, the days are getting longer, and Spring can't be too far behind! After a long winter of shoveling snow and ice from the driveway, tis a welcome thought. Things have a way of looking up this time of year, so let's all celebrate the last full month of winter.

This month we have a "whole passel" of articles, many of them short and sweet. There is something for all levels of APPLE users, and we hope you enjoy them.

We have had several letters this month, from "out of towners", with many good things to say about our newsletter, and we want to pass that on to you, our writers. We are very proud of the articles that we have been publishing.

Along about the first of every month, we get a sinking feeling that no articles are coming in (leading to the recurring nightmare, "The Empty Newsletter"). But somehow, the articles start rolling in and everything works out, thanks to you. Keep it up, all you old contributors, and give it a try, all you who haven't written for the Newsletter yet. ☺

EVENT QUEUE

Washington Apple Pi meets on the 4th Saturday of each month at the Uniformed Services University of the Health Sciences (USUHS), Building B, 4301 Jones Bridge Road, Bethesda, MD, on the campus of the National Naval Medical Center. Sales, library transactions, newsletter pickup, etc. are from 8:30 - 10:00 AM. The meeting starts promptly at 10:00 AM, at which time all sales and services close so that those volunteers can attend the meeting.

Following are the meeting dates for the next two months, with their topics and speakers.

March 27 - Assembly Language contd.
 Bill Schultheis
 April 24 - Telecommunications
 DC Hayes, Novation Cat
 Ben Acton and John Moon

The Executive Board meets on the 2nd Wednesday evening of each month. All members are welcome to attend. Details will be on the club phone and ABBS. ☺

FOR SALE: Koyo 9" black and white monitor, \$125. APPLE Parallel Printer Interface Card, \$100. Both in excellent condition, but superfluous because of upgrading my equipment. M.W. McFadden, (703) 255-2356.

Contd. on pg 5

PRESIDENT'S CORNER

by David Morganstein

The sleet fell, covering roads and car windows with ice. The radio announcers warned of the hazardous driving conditions. The worst ice storm in years had hit the D.C. area. My little troop of three left our house early, assuming that 10-20 MPH would be the maximum speed the dangerous conditions would permit.

When I looked up at 150 faces, I couldn't believe my eyes!! The USUHS auditorium was half-filled with WAP members (and that was at the beginning of the meeting). I felt like giving out purple hearts to all those who had braved the weather to make the meeting. APPLE owners are sure a hardy breed...

•••••

I just have to tell you about my new APPLE peripheral. A new product, recently released. A one of a kind expansion unit guaranteed to keep you off your machine, especially in the wee hours of the night...her name is Emily and she was born on January 25. At 9 pounds, 21 inches, she is the pride and joy of the computer room in our home. Now I have an excuse to get that new arcade game I saw, just so she can use it. Hmmm...

•••••

Two things are on my mind: tutorials and job placement. On the first subject I am pleased to announce two more tutorials for members. The first, on VisiCalc, will be given by Dr. Ernie Forman, Professor at GWU. This tutorial will be a single 3-hour session. Ernie will describe the program and the manual and then will discuss several applications, including IRA computations. The session will be

given on April 3 at USUHS and promises to be an excellent one. On a more extensive note, Dr. Tom Woteki will be presenting a very detailed series on Pascal. Tom will teach four 3-hour sessions, covering the UCSD system and the Pascal language. This course will be given in May, also at USUHS.

Both tutorials will be held on Saturday mornings and both will offer two registration fees: one for attendees bringing an APPLE and a slightly higher one for those unable to do so. A registration form for each session is found in this issue. If you are interested, please send it in promptly. We may have to turn now some applicants to maintain a balance of two attendees per APPLE.

I express the appreciation of the Pi to Tom and Ernie for their willingness to conduct these programs. It is a real service to the WAP. Thank you, both.

•••••

In the last issue, our Editor discussed a new Pi column dedicated to job placement. I hope that prospective employees and employers will take advantage of this opportunity to find each other. Terry Prudden has expressed an interest in organizing members interested in the job placement program. He will have details in an upcoming issue of the Pi. One thing that is clear, people seeking a position can find a great deal of support and guidance from one another. Employers needing qualified staff will be well advised to advertise their needs and examine the brief resumes of members seeking new positions.

PROGRESS REPORT: Home-Built

Paddles Workbook

by Tom Riley 340-9432

We are making good progress in preparing a publication on home-built paddles for the APPLE. I have completed 30 drawings and a rough draft of most of the text. The workbook will have the same layout and be about the length of an issue of "Washington Apple Pi".

The workbook will include the following paddle designs, with drawings, electrical schematics, and construction hints:

1. Rebuilding factory paddles
2. Joystick adaptation for any value pot
3. Super Stick, a spaceship control stick
4. Airplane steering wheel
5. Foot pedals for airplanes or racing cars

6. Sketch pad for drawing Hi-Res graphics
7. Multiple connector sockets for use of more than one paddle
8. Annunciator panel for 5 flashing L.E.D.s
9. Professional box for engineering programs
10. A.C. control paddle for A.C. appliances

Also included are instructions and plans for:

11. Switched outlet box with separate desktop switch
12. Computer worktable/desk made from hollow-core door and file cabinets
13. Bridge to hold monitor, disk drives, and fan

contd.

Each of these devices has been built and tested. I am also supplying a tutorial for electronic assembly, hints on buying materials, a parts list for each project, and software for testing them.

The following additional paddles are in the design stage; some have been partially constructed. Several of these might be included in the workbook if users express an interest in a particular design and if there is time for development:

1. Exercise paddle - builds muscles while you play games
2. Arcade sounds generator - generates four of almost any sound effect (very loudly)
3. Sound push buttons (respond to loud noises)
4. Light push buttons (sees light beam)
5. Touch push buttons
6. Burglar alarm - up to 24 sensors
7. Radio control link for toys and robots
8. Thermometers - two types
9. Carrying case for the APPLE
10. disk storage box
11. Cassette storage box
12. Printer cart

The problem now is to work out the role which Washington Apple Pi will play in this project. WAP might publish the workbook as a commercial venture, or might assist me in finding a publisher. If WAP publishes it, the organization will have to take on several small business functions like bookkeeping and handling orders. It would be difficult to do this sort of thing with volunteer labor. Input from club members with business experience on similar "for profit" club projects is needed.

Anyone who might like to help with the project and can get to Rockville (my foot is tied to my drafting table there), please give me a call.

MINUTES

EXECUTIVE BOARD MEETING

Washington Apple Pi Executive Board met on January 18, 1982, at the home of Bernie Urban. A motion was defeated to charge more for library disks bought on the spot at the meetings. Upcoming Pascal and VisiCalc classes were announced. Consignment sales will be phased out. Need for documentation of club library disks was discussed. A motion passed that the Board send a letter to Apple Inc. opposing their prohibition of phone and mail orders by Apple dealers.

GENERAL MONTHLY MEETING

Washington Apple Pi met on January 23, 1982 at USUHS. The meeting was called to order at 10 AM by President David Morganstein, with 150 people present. Meeting time for the future was changed to 10 AM (to begin promptly). Softalk will give WAP group rates. Pascal and VisiCalc

tutorials will be held. New ABBS passwords are being assigned. Holes will continue to be punched in the Newsletter. Volunteers are needed to help the Treasurer and to answer questions on printers through the WAP Hotline. SIG announcements were made. The presentation was made by Bernie Benson on music synthesizers.

SIG-NEWS

SIGAMES is the special interest group of computer hobbyists interested in using their APPLES for entertainment. They meet immediately following the monthly meeting of Washington Apple Pi.

This month's newsletter features the regular SIGAMES NEWS column by John Alden. This column presents the agenda for the current month's SIGAMES meeting, the next month's agenda, a synopsis of the prior month's meeting and a review of one or two new games.

PIG, the Pascal Interest Group, meets on the third Thursday of each month at 7:30PM at the Uniformed Services University of the Health Sciences, Bldg. A, Room A2054 (2nd floor), on the campus of the National Naval Medical Center at 4301 Jones Bridge Road, Bethesda, MD.

EDSIG will meet immediately after the regular meeting of Washington Apple Pi.

NEWSIG will meet just after the regular Washington Apple Pi meeting. The meeting seems to best help the new members by answering their questions, and telling them what to do to get their system up and running. We also tell them something about WAP, how to order the disks, what's on the disks, etc.

The following members have agreed to answer questions over the phone when someone gets stuck and needs help between meetings:

Bob Chesley	560-0121
Paul Hoffman	831-7433
Sara Lavilla	926-6355
Boris Levine	229-5730
John H. Smith	439-4388
Steve Sondag	281-5392

Classifieds contd. from pg 3

FOR SALE: CPS Multifunction Card from Mountain Computer, \$175. Videx Keyboard and Display Enhancer, Rev. 6 or below, \$100. Sheel Raj. (H) 638-0862, (O) 984-1989.

FOR SALE: Smarterm 80-column board, \$230. Hal Balaban, 384-7875, evenings.

QUESTIONS, QUESTIONS, QUESTIONS

by Mark L. Crosby

Please accept my apologies for the sudden disappearance of this column last month! We are just not getting enough questions to support a monthly column so we'll do this maybe every other month instead. Of course, you could change that by submitting some "grist for the mill".

Q. I have just discovered that it is possible to WRITE directly to a TEXT file (one that exists already on a disk) without first OPENing it. Is this normal? What gives?

A. Thanks to Henry Roberts of Call A.P.P.L.E for this one. DOS first checks to see if there is already a file buffer opened for the file and if there is not it opens the file! This is fine for sequential files but if you try it with a RANDOM access file DOS will open it as a sequential file. This is not a bug but intentional on Apple's part.

Q. After using a Hi-Res character generator (I use the Applesoft Tool Kit) from within a program I would like to be able to run another program on the same disk but without using the generator. How is this done?

A. The generators all use the Page Zero "HOOKS" which form a link between the Disk Operating System, Applesoft, and the Generator. The accepted format of disconnecting follows:

```
100 PRINT CHR$(4)"PR# 0"  
110 PRINT CHR$(4)"IN# 0"  
120 TEXT
```

Another method:

```
100 PR# 0 (DISCONNECTS DOS  
110 IN# 0 AND THE GENERATOR)  
120 CALL 1002 (CONNECTS DOS)  
130 TEXT (SWITCH TO TEXT SCREEN)
```

Lines #100 and 110 in the first method disconnect the generator without disconnecting DOS.

Q. When I boot my Language Card system with the DOS 3.3 System Master, Integer BASIC is loaded into the card. However, if I boot another disk (without turning off the power), it seems to forget that I had previously loaded the Card with Integer BASIC. Is it erased or what? How can I avoid having to reboot the System Master every time?

A. In DOS 3.3 the boot process changes one byte on the card but the remainder of Integer BASIC is usually still there. Changing that one byte should restore Integer BASIC. After booting the new disk, enter the following at the keyboard:

```
CALL -151 (GO INTO MONITOR)
```

```
C083 (ENABLE  
C083 WRITE TO CARD)  
E000:20 (CHANGE FIRST BYTE  
C080 (WRITE PROTECT CARD  
3DOG (RETURN TO BASIC)
```

This could be put into an EXEC file to save some typing and time.

Q. What is the matter with Applesoft? When I use IF statements on a line the remaining statements on that line do not always work?

A. There is a significant difference between Integer BASIC and Applesoft in that regard. In Integer BASIC your entire line would execute. In Applesoft the remaining statements after the IF only execute if the "IF" condition is "TRUE". If the "IF" statement is false, control is passed to the next line number. In effect this gives you a pseudo "ELSE" capability. For example:

(APPLESOFT)

```
10 FOR I = 1 TO 10  
20 IF I/2 = INT (I/2)  
THEN PRINT "EVEN NUMBER="I: GOTO 40  
(ELSE)  
30 PRINT "ODD NUMBER="I  
40 NEXT I  
50 END
```

NOTICES

NOTIFY US WHEN YOU CHANGE ADDRESS

Please notify us promptly when you change address. Our newsletter is sent by bulk mail and IS NOT forwarded. If you miss issues because of failure to notify us promptly, we will have to charge you for those issues, plus postage and handling.

RENEWALS AND MEMBERSHIP CARDS

For all of you who have recently renewed, we will try to get new membership cards to you as soon as possible. Also, we are still somewhat behind in membership cards for new members, but are working hard at that.

CHANGE IN MONTHLY MEETING TIME

There has been a slight change in the time of the monthly meeting. Beginning with February, sales and service will be from 8:30 - 10:00 AM. This includes general sales, library sales and pickup, newsletter pickup, new memberships, etc. The main meeting will begin PROMPTLY at 10:00 AM, at which time sales and services will close so that the volunteers working there can attend the meeting.

GROUP PURCHASE POWER by

Rich Wasserstrom

*
At long last WAP is able to offer a low cost, high quality disk drive at a reasonable price. Micro-Sci recently released its A2, 35-track drive which is completely compatible with your APPLE II and will boot all software designed to run on our favorite computer. The A2 will plug right into your Disk II controller card and will serve as drive 1 or 2. Micro-Sci also offers a controller card. All you need to add is your own operating system - DOS 3.2 or 3.3, Pascal, CP/M, etc.

WAP will also offer Micro-Sci's A40 and A70 drives which increase storage capacity to, respectively, 164K and 286K per diskette. These drives utilize 40- and 70-track formats, a modified DOS (conversion utility supplied by Micro-Sci), and require special Micro-Sci controllers. You may, however, mix these drives with Disk II's or A2's which use their own controller. The A40 and A70 will read many 35-track disks, but the Disk II and A2 will not read the last 5 tracks of a 40-track disk and cannot read any of a 70-track diskette.

All Micro-Sci drives use high quality Shugart mechanisms, unlike our favorite computer company's recent drives. See me at the meeting or call for pricing.

Joysticks

The club store has a limited stock of TG Products joysticks at very favorable prices. These devices are the best around and feature high quality components, linear tracking, trim controls, oversize dual pushbuttons, and defeatable self-centering. If members exhibit sufficient interest, we will offer TG's paddles and switchable gameport extender.

The Accountant

Ernie Forman has graciously offered his excellent double entry accounting program and the companion tax package for group purchase. See the recent reviews of The Accountant in the WAP magazine and in Softalk. Call me for pricing information.

Printers and Monitors M# 1338

We will continue current group purchases of the Zenith 12" green screen monitor, which has proven very popular and cost effective. Epson MX-70/80/100, NEC 8023, and C.Itoh Prowriter printers are also available, as are Grappler and Pkaso "smart" parallel interfaces.

Stock Items

The club store stocks Microsoft Z80 and 16K Ramcards, Mountain Hardware CPS multi-function cards, the "Visi" family of software and LKJ Letter Perfect - an excellent word processor. This is the last of them, folks, so hurry if you want to catch a bargain.

TID-BITS from NEWSIG

by Bernie Benson

Here are three quick reminders this month.

(1) Never plug or unplug anything into the peripheral boards, expansion slots, or the main circuit board of the APPLE while it is turned on - not even the game paddles - unless the device specifically says you can. Doing so can permanently damage chips on the cards and the main board.

(2) The air is very dry this time of year in Washington and static electricity is common. This can be very harmful to your APPLE. To avoid any problems, simply ground yourself by touching the large case of the power supply before touching any other component in the computer. Care must also be taken when carrying peripheral cards, etc. across a carpeted floor.

(3) Looking for an inexpensive stand for your Epson or similar size printer? Try a two dollar Parsons table. The printer sits on it nicely and a box of 8 1/2 by 11 fanfold paper fits under it. If you want the printer on a larger desk top but have no way to feed the paper, set it on just the top of the Parsons table. Cut one side panel out of the top and about 2 inches of paper will feed from under the top nicely.

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WAP HOTLINE

Have a problem? The following club members have agreed to help. PLEASE, respect all telephone restrictions, where listed, and no calls after 10:00 PM.

General

Ben Acton	972-1533
Robert Fretwell	971-2621
Dave Harvey	527-2704
Tom Jones	460-8773
Robert Martin	498-6074

Operating Systems

APPLE DOS	Richard Untied	241-8678
	(weekends only)	
CP/M	Robert Fretwell	971-2621

Languages (A=Applesoft, I=Integer, P=Pascal, M=Machine)

A, I	Jeff Dillon	422-6458
A, I	Tom Jones	460-8773
A	Mark Pankin	370-9219
A, I, P, M	Bill Schultheis	538-4575
	(except Tue., Thurs.)	

A, I, M P	Richard Untied	241-8678
	Robert Fretwell	971-2621
DB Master	Dave Einhorn	593-8420
Printers	Walt Francis	966-5742
Word Processors	Walt Francis	966-5742
	Ben Acton	972-1533
VisiCalc	Ben Acton	972-1533
	Walt Francis	966-5742
Time-Sharing	Chuck Reinbrecht	299-6810
	Dave Harvey	527-2704
Graphics	Bill Schultheis	538-4575
	(except Tue., Thurs.)	
Games	Jim Eatherly	232-6046
Mem. Expansion	Fred Schulz	223-1397
Other Disk Drives	Fred Schulz	223-1397

SUPERSCRIBE II FOR THE PI

Beginning with the March issue, the "official" word processor of the Washington Apple Pi Newsletter will be SUPERSCRIBE II. So, if you have access to it, please submit your articles on a Superscribe disk, for printing here on our Qume. (We can still handle Easywriter and Apple Writer, and of course hard copy.)

Touch Technology

TECO-GX 12" Green Screen Monitor	1200 line resolution	\$ 129
NEC 12" Green Screen Monitor		180
NEC 12" Color Monitor		319
Amdek 13" Color Monitor		339
TECO RGB 12" Color Monitor	(For Apple III, IBM, NEC)	535
Epson MX-100 with cable & interface		875
Epson MX-80 F/T with graphics, cable, & interface		770
Legend 64k add-on (see WAP articles, December 1981)		299
Disk emulator		45
Legend 128k add-on (includes Disk emulator)		650
Touch Sensitive 12" color monitor with cable & interface		1500

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4. PSEUDO-DISK for CP/M®
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A PAGE FROM THE STACK

by Jill & Vance Giboney

There are two new disks for the library this month:

Disk 110 - Personal/Education
Disk 111 - Games C

Disk 110 - Personal/Education is a collection of programs that are suitable for home and/or school use. It contains the following programs:

ALEX'S CALENDAR PART I - A perpetual calendar program using Hi-Res graphics. Options also include such things as calculating the number of days between dates.

CLASS GRADES - A gradebook program designed for teacher record-keeping. Could also be used by parents (and students) to keep track of grades. Files must first be initialized by running CLASS GRADES INIT.

FRACTION DRILL PROGRAM - An education program on (1) reducing fractions, (2) converting improper fractions to mixed numbers, and (3) doing arithmetic with fractions and mixed numbers.

HOME INVENTORY - Records and organizes a home inventory, useful for insurance purposes.

HOME MESSAGE CENTER - Saves and retrieves short messages (5 lines or less) for individuals.

HUMAN PHYSIOLOGICAL PARAMETERS - Analyzes your weight and calculates proper weight, percentage of body fat, body surface area, etc.

LIFE MANAGEMENT AND FINANCES - Keeps track of various personal/household accounts such as insurance, food, firewood, etc.

LIFE TIME - Determines life expectancy.

LOAN CALCULATOR - Calculates periodical payments for loans, and breaks the payment down into principal and interest.

MATHEMATICAL DESIGNS - Simply a lighter interlude...

MINI-PILOT II - A simple implementation of PILOT in Applesoft. Commands available are: RUN, EDIT, LIST, NEW, REPLACE, DSAVE, DLOAD. Sample program: APPLE BLOSSOMS.

OPTICAL ILLUSION - ... Another (briefer) interlude...

PERPETUAL CALENDAR - Displays a calendar for the year selected. (January 81 Washington Apple Pi.)

PERPETUAL JULIAN CALENDAR - Same as PERPETUAL CALENDAR except that it also displays the Julian date and is set up to print ONLY to a printer! (January 82

Washington Apple Pi.)

SIMPLE TEXT PROCESSOR - A simple line-based text processor for short texts. A <CR> at the beginning of a line will terminate entry mode.

TEXT ORGANIZER - Creates an outline, with either sequential or random access.

VICTORY DRILL - A spelling drill program, with timed display, and an optional typing response. Four sample lists of words are included.

Disk 111 - Games C features the text adventure games: EARTHQUEST and SPENCERVILLE MANOR 2, and consists of the following programs:

APPLESTAR 1990 - Integer. Lo-Res. Duel enemy spaceships using keyboard commands.

BOWLING - Integer. Lo-Res. Use a paddle in a game of bowling.


CAESAR'S WATCH - Applesoft. Lo-Res display of a waterclock.

EARTHQUEST - Integer. Text. You are the captain of a starship surveying the galaxy for the lost home of mankind.

INTERSTELLAR - Integer. Text. Civilization has been destroyed and you are on a starship dueling enemies.

MAGIC SQUARE - Applesoft. Lo-Res. Given 9 boxes, get checks in the outside boxes while the inside boxes are empty.

SKI RACER - Applesoft. Lo-Res. Use a paddle to control the skier down the slope and through the Slalom gates.

SPENCERVILLE MANOR 2 - Applesoft. Text. Mr. Spencer has died and left his wealth to whomever finds and opens his safe. 

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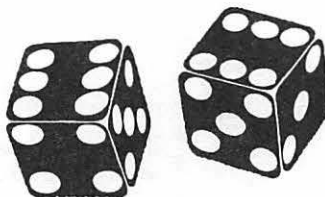
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SIGAMES NEWS

by John Alden

The January meeting featured one of the year's most outstanding ice storms. My regrets that I was unable to attend the meeting.

Steve Stern will present the February program.

Do you have a game you would like demonstrated or explained? Let's hear from you. This is your meeting and we want to help people make educated decisions when purchasing game software.

For the benefit of those members who could not attend last month, the second version of Wizardry corrects several minor flaws in the first version. Your old version can be updated by a utility option on the new version. There is a risk, however. You may lose one or more characters. There is a safeguard. Copy your old characters onto a backup disk before you update. If you lose any characters Sir-Tech will recreate them for you.

If you wish to update the original disk of your version to the new one, I will be happy to do it for you at the February 27th meeting. I will be available with my computer from 10:00 AM to 11:30 AM in the small cafeteria room where the SIGAMES will meet. You must make a backup copy of your characters before I will update your version. If you do not know how to backup your characters, bring a blank DOS 3.3 initialized disk. Also bring a second DOS 3.3 initialized disk and I will make a copy of your scenario (this is now possible with the new versions). The copy of the scenario is used to store extra characters. It requires two drives to update old versions or to create extra scenarios.

Please note that I cannot be responsible for any lost characters, so make sure that you have a current backup copy of your characters.

The new utility functions are: Recover lost characters without any aging penalty; upgrade previous versions to the current version; and make additional scenario disks.

The errors eliminated are: The fourth level room where you are teleported now has a door so you can leave; the same error on the eighth level has been eliminated; the latumofis potions will now work only once; and the low level of encounters on the seventh, eighth and ninth levels has been changed. The layouts of each floor have not been changed.

RECENTLY RELEASED SOFTWARE

From Adventure International: Eliminator and Morton's Fork.

From Broderbund: David's Midnight Magic and Track Attack.

From Crystalware: Glamis Castle.

From Dakin5: Worm Hole.

From Datamost: Missing Ring.

From Gebelli: Russki Duck and Horizon V.

From Micro Lab: Roach Hotel.

From Piccadilly Software: Warp Destroyer and Suicide.

From Sirius Software: Snake Byte, Borg, Twerps, and Computer Foolsball.

From Voyager Software: Starship Commander.

RECENTLY REVISED SOFTWARE

From Micro Lab: Dog Fight II.

THE DEMONSTRATIONS

A new feature is a list of the various games planned for a demonstration at the next meeting of SIGAMES.

For February:

Track Attack
Horizon V
Photar
Twerps
Voyager
and
Snake Byte

THE CATEGORIES

A highly recommended purchase. This software is outstanding. You play it many times and it still is interesting and fun.

A recommended purchase. An outstanding program but has a few flaws. A very fine line exists between this and "a highly recommended purchase".

A suggested purchase. Better than average but I wouldn't go out my way to buy it.

Average. Speaks for itself.

Poor. Avoid any programs which received this category.

contd.

THE REVIEWS

'Snake Byte' is an addictive arcade game. When I first tried it, I did not like it. After my skill increased I began to enjoy the game. This reviewer prefers games which he can win. In Snake Byte you control a snake running around a room. You must eat the apples before either time runs out or you collide with the flying plums, the wall or yourself. Control is by keyboard only. There are 13 apples to be eaten (one at a time) at the first level. If your time runs out, five more apples appear in the room to eat. A highly recommended purchase. From Sirius for \$29.95.

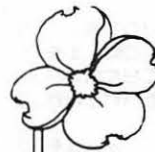
'Track Attack' is an unusual game. The setting is a small railroad yard somewhere between Elizabeth, New Jersey and Johannesburg. Gold is being loaded on the Broderbund Express (their plug, not mine!!) for shipment to San Rafael, California. At this point I began to doubt my interest in the game. After all, it is a long time between Johannesburg and California (traveling time as well as conceptual time). The railroad yard is large and patrolled only by the old phantom watchman in his 1952 DeSoto. You are driving a souped up Pierce Apple (their pun, not mine, regrettably!) with special gear rigged to the front which allows you to bash your way through the sides of box cars and disappear with their contents on the other side. Your mission, should you accept the game, is to steal the gold, jump the train, commandeer the engine, pick up the stolen gold and cart it away. There are at least three levels. In level one, your objective is to steal the gold and jump the train. This is a typical arcade display - top down in 2nd. Level two is when you are on the train and jumping from car to car in order to commandeer the engine. The graphics are more exciting. A realistic figure is running across each car and jumping at your command. If you falter, you will fall (beneath the wheels, of course). Level three is when you control the train. From here, you're on your own - whooo, whoooo. A highly recommended purchase. From Broderbund for \$29.95.

'David's Midnight Magic' is a spectacular improvement upon Bill Budge's Raster Blaster. Even the graphics are superior to Raster Blaster. Not only does 'David's Midnight Magic' have all the features of Raster Blaster, but it includes such features as: Magic-save magnets to save any ball about to be lost down one of the side columns; multiple ball play; and you may save high scores to disk by cutting a notch in your disk. Note that this will void your warranty. If you would like unusual sound effects, you may toggle the sound (with Control-S) to the cassette output port and run the sound through your cassette player. A highly recommended purchase. From Broderbund for \$34.95.

'Twerps' was recently released after being renamed from 'You are a Twerp'. I thought the old name was great. In fact, I was

going to get several copies to give to some friends. Oh well! 'Twerps' is another of the outstanding releases during February. A spaceship of Twerps has crashed on an asteroid and you must rescue them. You must shoot through the orbiters, land the craft (similar to 'Lunar Lander'), and run from crater to crater to rescue the Twerps. You must avoid the Glingas and Gleepnoks (What??? You never heard of Gleepnoks??? or Glingas???). Then, you must take off and fight your way through another group of orbiters to get back to your ship. A highly recommended purchase. From Sirius Software for \$29.95.

'Horizon V' is another Nasir without equal. This is a 'Battlezone' in space where you are fighting the nasty G-bellians. They believe that you have kidnapped one of their most prized performers, Paulette the G-belly dancer. They attack you and you must defend your planetoid. Using radar and plasma weapons you destroy first the ships and then the G-bellians themselves before you run out of fuel. To refuel, you must go through a time warp and destroy any G-bellians who follow you into the time warp. Then on to the next planetoid and more G-bellians. (High scores may be saved to disk.) A highly recommended purchase from Gebelli Software for \$34.95.



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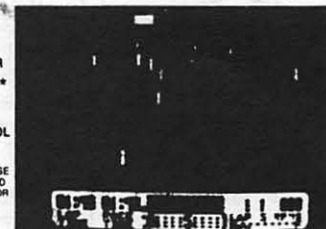
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APPLESOFT INPUT (Quotes, Commas, Colons and Spaces)

by R.A. Untied

The Applesoft INPUT command can be pretty aggravating if you are trying to enter strings from keyboard or disk that contain quotes, commas, colons or leading spaces. If you attempt to enter a comma or colon, you are greeted with the rather cavalier message EXTRA IGNORED. Leading spaces are simply discarded. What happens to the quote depends on where it appears. So, what can be done? Let's look at some alternatives.....

A. QUOTE METHOD

During text entry, you can precede each input response with a quote character. A closing quote is optional. Applesoft will remove the quote(s). For example:

```
100 INPUT I$
```

If you respond with
" 1, 2, BUTTON MY SHOE
then I\$ will contain
< 1, 2, BUTTON MY SHOE>
after Applesoft removes the quote.
The advantage of this method is simplicity, and the APPLE cursor edit functions can be used during keyboard text entry.

Drawbacks are that you must remember to start input lines with a quote, at least those with colons, commas or leading spaces that you wish to preserve. Also, the effect of a quote varies with its position in the line. If a quote is the first character of input it is discarded along with an ending quote, if any. If you start with a quote and another is entered before the end of the input line, the ubiquitous ?REENTER appears! Otherwise, if a quote appears within the input line, it will be accepted. Lastly, if text lines containing commas, colons or leading spaces are to be retrieved from disk text files, they must be prefixed or bracketed with quotes when they are initially written to the file.

B. GET-APPEND METHOD

A GET-APPEND loop can be used to construct a string one character at a time from the input text, for example:

```
100 I$ = ""
110 GET J$ : PRINT J$; :
    IF J$ <> CHR$(13) THEN
        I$ = I$ + J$ : GOTO 110
```

Line 100 clears the input string.
Line 110 GETs each

character, then echoes it to the screen with a PRINT. If the character is not a RETURN, it is appended to the string, and the next character is read.

The advantage of this method is its straightforward approach. All keypresses are faithfully passed into the string.

Disadvantages of this method are several. Cursor control features are lost, so you cannot correct mistakes before pressing return. In fact, cursor control characters and escape sequences wind up in your string. Also, garbage collection will occur much more often because of all the single character appends. The computer can seem to go dead for long periods of time if garbage collection is performed on a large number of non-contiguous strings. I have timed it at 70 seconds to pack 750 strings of 20 bytes each! Luckily, once packed, the next "collection" is much faster (less than a tenth second for the same 750 strings), so we add the following line to make life bearable:

```
120 X = FRE (X)
```

This forces garbage collection at the end of each text line entered.

C. MONITOR INPUT METHOD

The APPLE monitor input routines can be called from Applesoft programs to enter text strings from keyboard or disk text files. The following program demonstrates the technique:

```
10 REM
20 PROMPT = 128
30 HOME : PRINT "ENTER ANYTHING YOU WANT, WITH LEADING SPACES COMMAS SEMICOLONS AND QUOTES, AND USING THE EDIT KEYS AS DESIRED.": PRINT
40 GOSUB 1000 : PRINT : PRINT "HERE'S YOUR STRING...." : PRINT
50 PRINT I$: END

1000 IF IA = 0 THEN GOSUB 10000
1010 POKE 51,PROMPT :
    CALL FETCH :
    POKE IA,PEEK(60) :
    POKE IA+1,0 :
    POKE IA+2,2 :
    I$ = I$ + " " :
    RETURN
```

```
10000 I$ = STR$(PEEK(131) + 256 *
PEEK(132)): IA = VAL(I$)
10010 FETCH = 959 : REM = $3BF,
BELOW THE DOS VECTORS
```

contd.


```

10020 FOR I = 0 TO 16 :
      READ X :
      POKE FETCH+I,X :
      NEXT I
10030 DATA 32,106,253,134,60,169,
          127,61,255,1,157,255,1,202,
          208,245,96
10040 RETURN

```

How it works:

Lines 20-40 are a demo. Line 20 sets the prompt character to 128, which is invisible, though any prompt character may be used.

Lines 1000-1010 are the input routine. Line 1000 can be removed if lines 10000-10030 are included in your initialization section. Line 1000 makes sure this step is not skipped. Line 1010 first sets the prompt. The FETCH routine calls the monitor input routine, saves the byte count in location \$3B, and removes the high order bit from each byte to make it compatible with Applesoft. After calling the FETCH routine, the length information and keyboard buffer pointers are placed in the I\$ string pointer (more on this later). An empty string is then appended to I\$ to move it from the keyboard buffer into string storage.

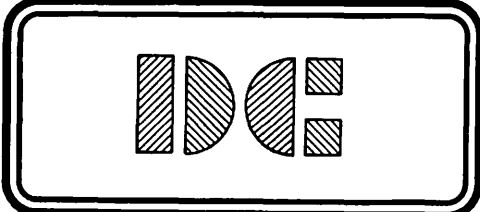
Lines 10000-10040 are executed once, to locate the variable I\$ and to poke the driver into memory.

Applesoft sets locations 131 and 132 to point to the length byte of I\$ in line 10000, and this address is saved in IA. Line 10010 sets the memory location of the FETCH machine code routine. As the routine is not address dependant, it may be placed anywhere. Line 10020 reads the data statements in line 10030 and pokes the FETCH routine into memory. (POKE FETCH,32 : POKE FETCH+1,106 : etc. may be substituted for these lines if desired).

The advantages: Retains full cursor edit capability. Does not contribute to garbage buildup. Allows up to 255 characters per input vice Applesoft's 239 limit. And, all commas, colons, quotes and leading spaces are cheerfully accepted.

A disadvantage (compared to method B) is that escape sequences cannot be entered as text, because the monitor input routine strips them off.

One of these three methods should work for common applications. Of course, there are other possible approaches, such as an AMPER-INPUT using the Applesoft ampersand vector, to get really fancy. These are left to the reader.



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What is a 16K RAM Card and Why is it in My Slot 0?

by Walt Mills

The intention of this article is to describe (in very simple terms) the various uses of the 16K RAM card in the APPLE II. If you are currently using a 16K RAM card (or Language Card) THEN GOTO the next article; you may be able to tell me a thing or two.

WHAT IS A 16K RAM CARD?

First, a 16K RAM card by any manufacturer may use the same software as the original APPLE 'Language Card'; the only difference among these various cards is price and some minor hardware configurations. The 16K RAM card is simply a printed circuit card with 16,384 bytes of additional addressable RAM. (What?) OK, first a couple of definitions: RAM - Random Access Memory - the changeable memory portion of your computer where programs are stored; Byte - A collection of points in RAM used to store a single number (from 0 to 255). Note: When you POKE or PEEK to memory, you are looking at one byte. If you have a 48K (RAM) machine, you can add a 16K RAM card and increase your memory size to 64K (now we're talking). But alas, Woz didn't design it that way, so first let's look at how our memory is laid out.

The first location in the APPLE is called Location Zero (0) - (how about that!) - and the first 256 bytes (\$100 Hex) are called Page Zero. "Pages" of APPLE memory are divided at every 256 bytes or \$100 in Hexadecimal. You can actually poke a value into location zero with the command POKE 0,65. You can read what is there with the command PRINT PEEK (0). Most locations in Page Zero are called "reserved" - that is, Applesoft uses these bytes to store items it wants to remember. You can use any RAM location, but you will probably bomb something if you POKE around in a reserved space.

Page One is reserved for the system stack; Page Two is the input (typing) buffer. Most of Page Three (locations 768 to 1023) is reserved for DOS. Pages Four, Five, Six and Seven are where the APPLE stores the characters to be displayed on the screen. The space between 2049 to 40191 is for the Applesoft or Integer program (8192 to 24575 houses the Hires pages too). The actual Disk Operating System (DOS) is located from 40192 to 49151. BOOM! The top of a 48K machine.

The locations from 49152 to 53247 may be used (and are above 48K), but these bytes are generally divided among the 8 expansion slots in your APPLE and used for storage by the cards. Locations 53248 to 57343 are called the Monitor (Autostart in APPLE II+). Locations 57344 to 65535 are used to hold Applesoft or Integer Basic. In an APPLE II+, the Applesoft ROM Basic (Read Only Memory) resides at this location. When you insert the 16K RAM card into slot Zero, it will fall in line

at 53248 to 65535. (Excuse me, but 53248 subtracted from 65535 is 12287 or about 12K, not 16K.) Right, the first 4K of the 16K RAM Card can be exchanged with a second 4K on the card as needed (more about that later). With the 16K RAM card in place you have actually duplicated the space from 53248 to 65535 and with the aid of DOS you may choose which area of memory you want to use. Normally, this is accomplished with the command INT and FP.

NOW SOMETHING USEFUL

If you have one, you will have to remove your Integer/Applesoft card from slot zero, lay it gently on the shelf and insert the 16K RAM card (follow MFG directions). The first useful thing you can do with the 16K card is load the missing language (Integer will be assumed) to the card. Like the "soft switches" for the screen display (see APPLE II Reference Manual, page 12) the 16K card has switches to control what may happen to it. If you PEEK/POKE to location -16255 you will write-enable the card (like removing the little tab from the disk). If you then BLOAD a program at location 53248 (Hex \$D000) it will await your "Call" (pun intended). Believe it or not, Integer (and Applesoft) is nothing but a big binary program!! If you write-enable the card and type BLOAD INTBASIC, A\$D000 you will have a machine with Integer Basic. (Quick, check the shelf, the old card is still up there - Magic!) Actually the DOS 3.3 HELLO program will check to see if you have a 16K RAM card and do this load for you on boot-up. If you did not previously have Integer/Applesoft you can see the obvious advantages. Non-Integer owners will now have the Programmer's Aid #1 (step, trace, renumber, etc.). If you previously had an Integer Card, you will also note that the ESC I,J,K,M work as in Applesoft - this is because the Binary INTBASIC has an image of the new Autostart ROM.

OTHER LANGUAGES

If one secures a disk copy of APPLE Pascal or Fortran then it is a simple matter of loading and running these languages much like Basic (...and now Dr. Who?).

MOVING DOS

Our user's library has a program that will allow you to actually move DOS up to the 16K RAM card and allow you to regain the use of the 10K now used by DOS in high memory. Other commercial sources have DOS movers that allow you to run both DOS 3.2 and 3.3.

NEAT STUFF

A company called Omega Software Products (a WAP advertiser) has a program called "THE INSPECTOR" that may be overlaid on

contd.

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on the INTBASIC program at location 55296 (\$D800) which is unused by Integer Basic. When called by CALL -10240, a very powerful disk inspector is evoked. The beauty of this type of overlay is that it is totally transparent to other machine internals and remains ready to be called as needed. I have a short program (to be donated to the library) which will allow you to hide the Lawrence Hall of Sciences Catalog Program in this manner. If you BSAVE the memory locations from 53248 (\$D0000 to 65535 (\$FFFF)) you will have a copy of INTBASIC with your new program neatly "hidden". I have other programs that I would like to overlay, but I'm having trouble relocating the data portions - any machine language buffs interested??

THE SECOND FOUR KILOBYTES

By again flipping some softswitches you may turn off the first bank 4K of the 16K RAM card and turn on the second bank of 4K

in its place. This gives us some interesting possibilities; if we write a clever binary program at location 768 (the first portion of Page Three that is unused) we can actually exchange the 4K of RAM and bring a previously stored program online at location 53248 (\$D000) to 57343 (\$DFFF). A company called Telephone Software Connection has developed a rather unique approach to this concept by actually changing the jump location and syntax of the DOS "CHAIN" command to "CNVRT" which will exchange the 4K and put you into a neat Hex to Dec to Hex converter without clobbering DOS, Basic or variables. This means that at any point while entering a program (FP or INT) you may type CNVRT to jump to the converter!

DON'T THROW THE INTEGER CARD AWAY

Finally, remember to keep that old Integer/Applesoft ROM card around. I understand that you can pull the existing chips and replace them with up to 8 custom PROM's - obviously another article.

COMPANY	WARRANTY	FEATURES	REFERENCE	LIST.
Computer Stop CS-16K card	180 days	---	NIBBLE 2/8 P56	\$195.00
MICROSOFT 16K card	90 days	LEDS	NIBBLE 1/8 P110	\$195.00
R.H. ELECTRONICS Super RAM II	1 year	ROM socket	SOFTALK 12/81 P164	\$160.00
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ANDROMEDA 16K card	1 year	Reset to mon.	SOFTALK 2/8 P86	\$120.00
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* Legend 128K Card avg. \$93.75/16K

LETTER QUALITY PRINTING AT REASONABLE PRICES

by Dennis J. Reeder

From the first time I used my Apple with a real, honest-to-goodness, daisy wheel printer, I knew that I had to have one for my very own. My wife would be much more accepting of the output for her research papers, my clients would be happier with better quality printout, and I could send more readable letters to my family and friends. The problem, however, was the staggering cost of such a machine. It somehow bothered me to have to spend nearly three times the price of the Apple to have a decent printer. Besides that, there was the problem of squeezing that kind of funding out of my modest budget for computerization.

Enter a newcomer to the microcomputer peripheral scene (although they have been in the terminal business for a long time): the Anderson-Jacobson people, to be called AJ from here on out. I found out about AJ in November from a colleague while we were standing in line at the Credit Union. He had performed some comparisons and suggested that I investigate further into the AJ. Perhaps you have seen the back cover of Washington Apple Pi starting with the January 1982 issue. There, in all it's 90 lb. finery is the AJ daisy wheel printer terminal. The advertisement contains no hype.

The AJ is a refurbished, attractive, keyboard-type terminal, once used in communications, having a built-in RS-232 interface plus assorted switches for changing type pitch and for selecting communications parameters. The mechanism is of the Qume manufacture, sturdy and solid. Refurbishing makes it look brand new. It runs at 30 characters per second (cps), although one can upgrade to 45cps for a few hundred dollars more. Also, for a few hundred dollars extra, one can purchase a tractor feed, or extra buffer...although the buffer may not be necessary, as I will explain later. I found that spare ribbon cartridges and assorted type-face printwheels are very easy to obtain through catalog sales from a variety of sources.

I decided to take advantage of the special sale that started at the end of December.

I paid my money and took my newly-found friend home in the back seat of my car on Christmas Eve. It sat under the tree and looked great. I found that I could print some elementary graphics and make some interesting patterns by using the codes in the well-documented booklet that came with the terminal. I would switch the terminal on and type out little phrases like "Now is the time...etc.", but I wasn't able to have the Apple drive the machine. At this point it was a nice typewriter. I didn't have a serial RS-232 interface card for the Apple.

Now came the fun part. I didn't want to buy a serial interface card to put into slot #2. I already had a parallel card driving my relatively fast (120 cps) Anadex DP-8000, and software was geared to slot #1. I didn't want to give up the speed and convenience of the old standby Anadex (even though it doesn't do graphics and doesn't have true descenders, it has served faithfully for two years). I didn't want to have to convert the Anadex to serial mode by buying a new serial card and then trying to sell the parallel card. Neither did I want the problem of changing cables anytime I wanted to print on the AJ. The dilemma was solved for me as I discovered an advertisement in the November issue of Creative Computing.

Enter the MicroCue from Microcompatible, Atlanta, GA. This device solved a number of problems. It has a Z-80 chip and 16K of memory to act as a buffer. It takes a parallel input (or serial input) and directs the output through either of two switch-selectable output ports. One is parallel, the other serial. One cable goes to the AJ, the other to the Anadex. Voila!! Now there is no need to purchase a serial interface card. Furthermore, there is now the delightful experience of dumping 8 to 10 pages of text into the MicroCue, watching the output fly by on the screen and having it finished by the time the printer has reached the end of the first paragraph. I go about my other computing business while the printer does its job for the next 10 minutes or so. Thus, the need for extra buffer in the terminal has been eliminated.

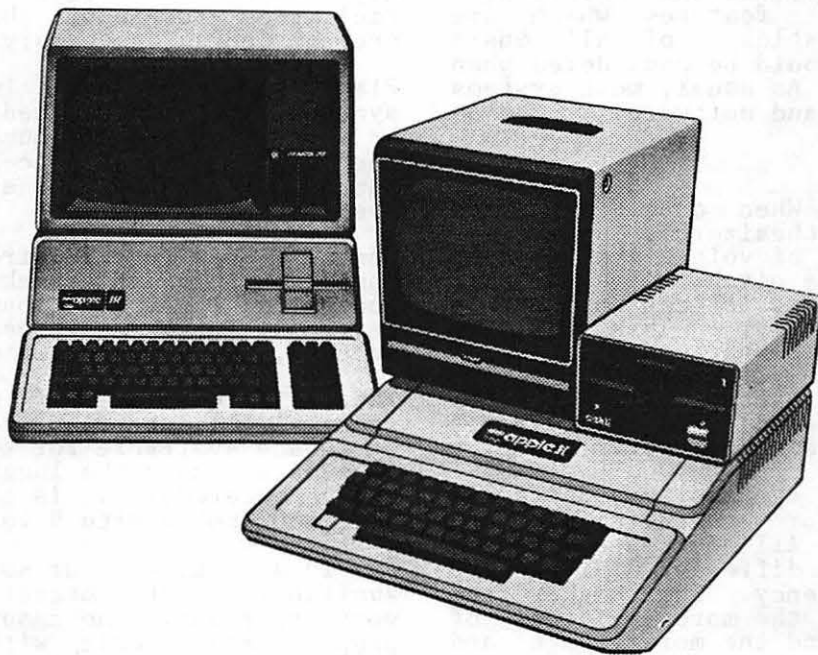
Contd. on pg 23

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COMPUTER MUSIC SYSTEMS

by Paula & Bernie Benson

What does Haydn's Symphony No. 94 and VisiCalc have in common? They were both demonstrated at the WAP January monthly meeting. We gave a brief presentation on computer music synthesizers and played part of the symphony and a few other selections on an ALF MCI 9 voice system. We think it is important to understand the extreme versatility of your APPLE II computer. We hope your imagination and creativity can be captured by this machine and you can see that the applications are limitless. The following notes are from the talk, for anyone who could not be present because of the weather or other sane reason.

Who uses computer music? You could! Computer music is used for entertainment, education, and by professional composers working with new sounds and theories. There are certain features which are general characteristics of all music synthesizers and should be considered when comparing systems. As usual, most systems come with hardware and software.

HARDWARE:

NUMBER OF VOICES: When considering the purchase of a synthesizer, a user must consider the number of voices available. A voice is a unique pitch. If a synthesizer has 9 voices, it can produce 9 pitches simultaneously. This capacity provides a fuller sound. Most synthesizers have 2 - 16 voices. For stereo synthesizers, the user must consider whether there is control over which voices are played through each speaker.

CLOCK RATE: In most synthesizers there is a master oscillator generating a continuous frequency. All notes produced by the synthesizer are different divisions of that master frequency. The higher the sampling frequency, the more divisions of that frequency, and the more range and accuracy the synthesizer has.

ENVELOPE CONTROL: The envelope determines the type of sound for the note being played. The more control the synthesizer has over the envelope, the more variations of tone, and the more realistic the sounds. Certain standard components of envelope include: attack, decay, sustain, release, loudness, gap and volume. These provide the unique variations which make a tone sound like a particular instrument.

RANGE OF OCTAVES: Another important characteristic is the number of octaves capable of being generated. A good synthesizer should play 5 or more octaves. The standard piano keyboard has a range of 7 octaves.

VOLUME CONTROL: Crescendo and decrescendos aid in developing musical realism. Control of volume gives the ability to play parts of songs loudly, while other

parts more softly. This control also enhances the mood and excitement or melodrama of a song.

Certain synthesizers may advertise other characteristics, but these seem to be common to most.

SOFTWARE:

When looking at software controlling the synthesizer, several features should be noted. These include the ability to enter and edit music, playback songs, and utilize other support functions.

The music editor should make the entering of notes as natural as possible; most employ graphics for this function. The level of sophistication of the music which may be entered should be considered. Facilities for input, change and delete are, of course, necessary.

Playback display is important if the synthesizer is to be used in an education or entertainment environment. What is on the screen while music is being played back could enhance the enjoyment of the system.

Some synthesizers require that songs be compiled before playback, which is time consuming. Also, consider the delay between entry and hearing what was entered, which may be extensive.

The efficient use of memory and mass storage will determine the maximum amount of space available for storage of songs (the more memory the longer the song that can be entered). It is not overly long to have 6000 notes with 9 voice songs.

As in any hardware or software purchase, availability of professional support is very important. The amount of compatible preprogrammed music with a synthesizer will provide the user with immediate enjoyment as well as samples of techniques of envelope control and arrangement.

AVAILABLE SYSTEMS:

Three of the manufacturers of music synthesizers compatible with the APPLE are Mountain Hardware, MMI, and ALF Products Inc. Mountain Hardware has a 16 voice system; MMI has 4. ALF markets a 9 voice and a 3 voice synthesizer. Prices range from \$200 to \$500.

In our opinion, for the price (\$200), the ALF MCI is a nice music synthesizer for amateur musicians such as we. It satisfies all above listed characteristics and addresses the above criteria quite adequately.

ALF MUSIC SYSTEM:

The hardware needed includes 1 synthesizer

contd.

board which plugs into any peripheral slot (except 0). The user must provide a stereo amplifier, speakers and paddles or joy stick. Connecting to the amplifier is simple, and the cable is included. The board generates 1 - 9 voices in stereo; 3 right, 3 left, and 3 center, with user control of mixing. The board generates pitches over a 6 octave range. The volume control is quite adequate - 28db at 16 levels. The ALF MC16 system is more expensive and has fewer voices, but produces higher fidelity sound.

The software and songs can be loaded from tape or disk. It runs under Applesoft or Integer Basic, requiring 32K or more RAM. The system includes 2 major programs and several utilities. One program is ENTRY. This controls complete music entry and editing of songs by means of a menu of standard notes and rest symbols being placed onto the familiar staff. The PLAY program plays songs in memory loaded from tape or disk, and provides screen display. Utilities allow for special song listings, continuous play functions and envelope experimentation. Programs and songs are copyable and callable from standard Basic programs. No compilation is required. Maximum song length depends on memory size. With 48K RAM, the APPLE can sing almost 6000 notes.

ALF provides very good support of its products through a telephone hotline, newsletter, and user groups. Products available include preprogrammed music and additional utilities distributed in part by Creative Computing. A wide range of songs are available including classical, show tunes, and Christmas songs for about \$15 an album.

REFERENCES:

Articles on music synthesizers can be found regularly in Creative Computing - see January '81, February '81, June '81 and July '81. Other resources include Byte Magazine, "Musical Applications of Microprocessors" by Hal Chamberlain (Hayden Book Co.) and annual music festival reviews.

F C C D C E F

Letter Quality Printing contd. from pg 20

Although there are 16K buffer cards that plug into the Apple, I found that the MicroCue was just what I wanted in order to meet my particular needs. It has other capabilities that I have not used, such as acting as a buffer to take in text from a modem at 1200 baud, and dump to a disk at 9600 baud, always being ahead of things, eliminating lost messages. It can also be configured for other purposes, and can be expanded to 32K, depending upon the model purchased. It is chock full of interesting surprises, but mostly I was impressed that it was so simple to plug in and have operating in such a short time.

Therefore, with the AJ for \$1295, and the MicroCue for \$395, I have the same letter quality printing for \$1800 (tax included) as some people have for twice the price. Besides that, I can now print rough drafts at fast speed, make corrections, and with a simple flick of a switch, get typewriter-quality printing on bond paper without software modification and without cable switching. I like it!

To add frosting to the cake, I have been in contact with the very savvy people at SmartWare (advertiser in WAP, January 1982) who are now configuring the software called Graf Pak for the AJ. If you look at the advertisement and the capabilities offered, you will see that the \$39.95 represents a lot of value. I never thought that I could get graphics for such reasonable costs. In fact, I never thought I would have text-quality capabilities so soon. I have every thing I need...almost. Hmmm. Let's see now, I wonder if someone clever has a refurbished 5 megabyte Winchester drive for \$1295?

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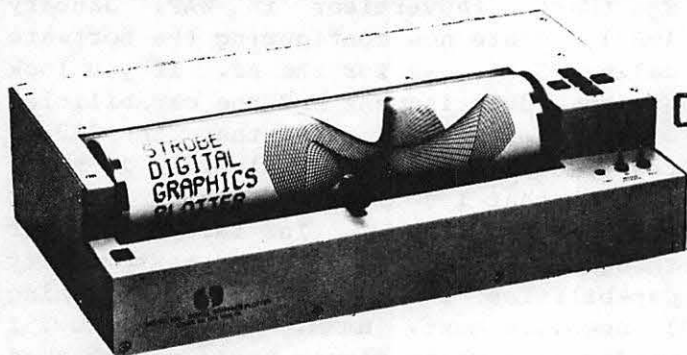
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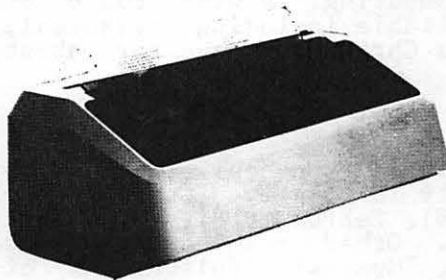
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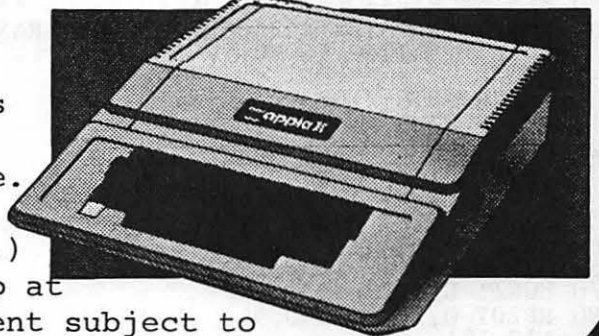
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180 HPL0T 128 + X2,96 - Y2
190 HPL0T 128 + X4,96 - Y4
200 NEXT X
210 GET A\$
220 GOTO 10

Appleseeds is a group of kids who meet during the monthly WAP meeting. Our meetings consist of a speaker (first 30 minutes), presentations, and discussions of general points of interest. February's speaker will be discussing 6502. If you have special knowledge in a topic relating to the APPLE and would like to give a presentation for Appleseeds, please contact David Stern at 881-2543.

LIBRARY

The Appleseeds library is growing rapidly. We now have a total of six programs! One of the newest, PARABOLA, is reviewed this month.

REVIEW OF PARBOLA

A parabola is a special curve that represents many things in nature. For instance, the orbits of some comets around the sun are represented by different parabolas. David Stern's program allows the user to input a vertex (X,Y) and a rotation. The computer then generates a parabola using the formula:

$$Y = X^2 / 100$$

This formula can be changed by simply changing one line. Then the computer plots the parabola in beautiful Hi-Res graphics. I rate this program as an "A".

-- Mike Forman

LIST

```
0 REM ** PARABOLA 1 BY DAVID STERN **
1 REM **ROTATES PARABOLA BEFORE TRANS-
  LATING TO XV,YV **
2 REM
5 ONERR GOTO 210
10 TEXT: HOME
20 PRINT "THE PARABOLA"
30 PRINT: INPUT "STEPPING?";N
40 INPUT "VERTEX (X)?" ;XV
50 INPUT "VERTEX (Y)?" ;YV
60 INPUT "ROTATION (DEGREES)?" ;P
61 LET PH = - P / 57.295
70 HGR2: HCOLOR = 3
80 HPL0T 0,96 TO 250,96: HPL0T 128,0 TO
  128,191
90 FOR X = 1 TO 120 STEP N
100 LET Y = X ^ 2 / 100
110 LET Y1 = Y
120 LET X1 = X
130 LET X2 = X1 * COS (PH) + Y1 * SIN (PH)
140 LET Y2 = Y1 * COS (PH) - X1 * SIN (PH)
150 LET X3 = -X
160 LET X4 = X3 * COS (PH) + Y1 * SIN (PH)
170 LET Y4 = Y1 * COS (PH) - X3 * SIN (PH)
175 LET X2 = X2 + XV
176 LET X4 = X4 + XV
177 LET Y2 = Y2 + YV
178 LET Y4 = Y4 + YV
```

HOW TO MASTER THE VIDEO GAMES A BOOK REVIEW BY DAVID STERN

If you are the kind of person who visits the local arcade at least once a month, then you might have noticed a definite change in the type of games there. Seven years ago, the arcades were filled with pinball machines and maybe one or two "PONG" video games. Since the introduction of SPACE INVADERS in 1978, the arcades have not been the same.

Author Tom Hirschfeld traveled from arcade to arcade, collecting information and strategies for these new video games. He put them together into a book entitled "HOW TO MASTER THE VIDEO GAMES". The book contains logical gaming strategies for the 30 most popular video games. I will give an example of how these video games are explained.

SPACE INVADERS PART II

The SPACE INVADERS section of this book contains a drawing of the game's display, sections describing the controls, scoring, dangers, observations (object), and strategies. For instance, did you know that shooting a 10-point invader (first two rows) last out of all 55 will give you a beautiful rainbow explosion? Did you know that if you shoot the bottom row invader after shooting the other four in the column on the left, you will receive a bonus of 1000 points? Also, in order to excel in this game, you must develop a move-stop-shoot rhythm. These and other video game strategies are explained in this book.

Other video games that are explained are: ASTRO FIGHTER, SPACE INVADERS, ASTRO BLASTER, GORF, CENTIPEDE, PHOENIX, GALAXIAN, PLEIADES, ASTEROIDS, ASTEROIDS DELUXE, DEFENDER, SCRAMBLE, STAR CASTLE, SPACE FURY, SPACE ODYSSEY, MOON CRESTA, PAC-MAN, BERZERK, TARG, WIZARD OF WOR, VENTURE, RALLY-X, ARMOR ATTACK, MONACO GP, SKY RAIDER, SPACE ZAP, CRAZY CLIMBER, BATTLEZONE, and MISSILE COMMAND. Overall, the book is well worth its cost (\$2.95). I highly recommend this book if you play arcade games frequently.

Appleseeds Editor's Note: Appleseeds would like to start a collection of hints for APPLE games. (See two strategies in this issue).

Contd. on pg 27

THE APPLE SPELLER: a review

by Nick Santelli

In the Dark Ages of word processing with the APPLE II (about two years ago), if you wanted the computer to check your spelling, you were out of luck. AND THEN CAME SPELLGUARD. Of course, to use Spellguard you needed a CP/M word processor like WordStar, a Z-80 card, an 80 column board, a monitor, and something over \$200 to spare. Now, however, in the rapidly maturing APPLE software environment, spelling verification programs which operate under DOS 3.3 are beginning to proliferate. I decided to try the Apple Speller by Sensible Software, and after using the program for three weeks, I am more than pleased with the performance.

The Apple Speller will run on any 48K APPLE. The latest version will work with one disk drive, but two drives are highly recommended. It is compatible with word processors which generate either DOS 3.3 text or binary files, such as AppleWriter, Apple P.I.E., Magic Window, SuperScribe II, Letter Perfect and Executive Secretary. The current version is NOT compatible with Super Text II; however, a Super Text version will be out by the time you read this article.

The Apple Speller consists of two disks: a copy protected program disk and an unprotected dictionary disk containing over 31,000 words. The user may add approximately 6000 of his own words. (As far as I have been able to determine, this is the largest dictionary of any non-CP/M spelling program currently on the market.) After booting the program disk, you place the dictionary disk in drive 2 and your document disk in drive 1. You answer a few questions as to which options you wish to employ and, of course, supply the name of your document file. The program then collects the words into unique groups and displays the number of unique words in your document, as well as the total number of words. Then each unique word is "looked up" in the dictionary. An alphabetical list of words not found and the number of times each appears in the document is output to the screen or to your printer. At this point you may flag all the unknown words by replacing the last letter of the word with a hat (or any other symbol you may choose), going to a verification process, or using the Apple Speller dictionary to look up the correct spelling of the unknown words. Verification, which is recommended for the beginner, shows you each unknown word in context and allows you to ignore the word, flag it, or save it for later inclusion into the dictionary. The numerical position of the unknown word in the text is also shown.

While the above procedure may sound time consuming, it goes quite rapidly once you get the hang of it. I timed the Apple Speller on an 1100 word document with 500 unique words. It took approximately 45

seconds to output and verify the 9 unknowns. According to Sensible Software, checking times for longer documents do not increase proportionately, and a 10,000 word document will take less than 3 minutes. Note: As with any such program, not all unknown words are misspelled. Only two words in my "test" document were actually misspelled. The others were proper names or technical terms that had not yet been added to the dictionary.

One additional option that deserves mention, is the ability to list in alphabetical order the unique words in a document and the number of times they appear. While few will take advantage of this option on a regular basis, it may be of particular interest to the professional writer.

The Apple Speller package has a list price of \$75. The accompanying documentation is well written and very well organized. If you return the warranty registration card with \$7.50, you will receive a backup copy of the program disk. (I sent in my card on a Monday and received my backup disk the following Friday.)

Considering the many options this program provides, the large and easily expanded dictionary, the user friendliness of both the program and the documentation, and the reasonable price, the Apple Speller is a best buy for those who use their APPLE II for serious word processing.

Appleseeds contd. from pg 26

STRATEGIES

MISSILE DEFENSE

Whenever a missile is coming, try to pick up its pattern (diagonal) and get about 1 inch below it. Then shoot. Try to kill all the missiles near the top, thus lowering the chance of their MIRVing lower down. In later waves with smart bombs, try to get about 1 cm below them and shoot. When only one city remains, it will always be placed right next to one of your missile bases. Use that base only when necessary. WARNING: DO NOT USE UP ALL YOUR MISSILES AT THE START OF A ROUND.

FALCONS

Only use shield at the last possible moment; otherwise it might disappear when you least expect it to. If a warbird goes under the screen, try to keep an eye on him. On the 3rd and 4th round, try to shoot the dots before they turn into eagles. You won't get as many points, but it is a lot safer. On the mothership, DON'T shoot all the warbirds above it. Leave about 1 or 2. If you don't, you will get a whole new set. Use shield during all attacks.

A SPELLING EXERCISE PROGRAM

by Paul Ternlund

When I received my 48K APPLE II Plus system in July 1981, I already had a list of applications (excuses for its purchase). One application area that could not be denied in my family was education for my three grammar school aged children. I theorized that if just one of my kids took a genuine interest in any aspect of computers because of an experience with the APPLE, the cost of the machine was justified.

SYNOPSIS - Everyone knows that computers are great at doing repetitious jobs. As often as once a week for most weeks during the school year, my kids each receive a spelling word list to study at home. Each list generally makes it home early in the week for a test in school on Friday. The enclosed Applesoft program was written to permit a student to obtain a measure of his or her spelling progress by using the APPLE rather than Mom or Dad. It relieves us parents of the tedium of asking each child to spell each word "n" times during the week. More often than not, when one of the kids gets the urge to be tested on progress with a word list, we parents are preoccupied with other things. This program allows the children to practice their spelling at any time, and in addition it makes this homework more fun.

DESCRIPTION - The Spelling Exercise program needs one disk drive - to store and retrieve word lists for each child on diskette; a cassette recorder with a tape for each child - to record a spelling test, much the way a teacher gives spelling tests; and a printer - to list at the close of a session, a profile of errors the child made during the session.

A word list of up to 50 words is entered by me via the APPLE keyboard. Then the program stores the words on disk using the child's first initial as the name of a text file. (The file name can be any name legal to DOS, however.) Next, I record a test on the child's own cassette tape following the same word sequence as entered at the keyboard above. There is an opportunity to include a little fun here by making a recording customized for the child that the tape is being created for. For example, my daughter Debbie has a fondness for sweets. One of the words on her list was "candy". So I tape recorded the sequence: "candy,...the stuff you can't get enough of,...candy". Later, I heard her giggling as she came across that word while working on the APPLE.

Now you as the parent are finished, and the kids can take over any time. Even Stevie, the first grader, handles the whole process on his own. He boots the disk with the Spelling Exercise program, enters his initial when required in order to call in his word list, places his cassette in the recorder and rewinds it, and finally plays the cassette and enters

each word into the APPLE as called out from the cassette recorder. After he goes through his words one or more times, he turns on the printer to receive a listing of his results (errors per word per try).

A listing (see sample) is later used by either my wife or me to review those words that have given a child trouble.

When the program is testing the student, the monitor screen displays three digital counters at the top. These are: "WORDS TO GO", "WORDS CORRECT", and "ERROR COUNT" (this word). Below the left counter is displayed a line of dots where the correct letters will be placed on entry. As the cassette recorder calls for a word, a letter at a time is entered by the student at the APPLE keyboard. A correct letter entry is placed on the line of dots and simultaneously, a high-pitched "happy" sound comes from the APPLE's speaker. An incorrect letter entry is displayed below the line of dots and a lower-pitched sound is emitted. The <RETURN> key is never needed because all letter entries are input from "GET"s. Three incorrect letter entries at a given position in a word results in the APPLE displaying the correct letter using inverse printing. Nine incorrect entries for a word causes the APPLE to display the entire word correctly spelled.

At the end of the session, a special sound treat rewards the student if no errors were entered for that round of words.

ASSESSMENT - The kids have caught on very well to this bit of automation. Normally, the cassette recorder plays straight through rather than start/stop for each word. The program has had a lot of use since October - not as much as FALCONS or GOBBLER, but all work and no play....

My wife and I both feel that the children's spelling test grades have shown definite improvement with the help of this program and the APPLE. We hope that the Spelling Exercise program may be useful to other parents as well.

Following is a sample output list profile of words for 6th grader son, John:

SPELLING WORD ERROR COUNTS FOR EACH TRY

```
-----  
COMEDIAN.....0 0  
COMEDY.....0 0  
ORIGINAL.....0 0  
ORIGIN.....0 0  
MELODIOUS...3 0  
MELODY.....0 0  
IMAGINATION..0 0  
IMAGE.....0 0  
MIGRATE.....0 0  
MIGRATORY...3 1  
POLITICAL...0 0  
POLITICS....0 0  
REMEDIAL.....1 0  
REMEDY.....0 0
```

contd.

JLIST

```

100 MAXTRYS = 25
110 DIM WL$(50),ERR(50,MAXTRYS)
120 REM      PGM=SPELL 26OCT81
130 REM PAUL A TERNLUND
140 REM 1723 TRURO ROAD
150 REM CROFTON, MD 21114
160 REM ---WAF #743
170 REM PGM TO GIVE SPELLING EXERCISE
180 REM ::::::::::::::::::::::::::::::::::::
190 HOME
200 PRINT "S P E L L I N G  EXERCISE"
210 PRINT "-----"
220 CD$ = CHR$(4)
230 CG$ = CHR$(7)
240 ZERO$ = "0000"
250 US$ = "....."
260 TEST = 1
270 REM ***** M A I N *****
280 GOSUB 2620: REM POKE SOUND ROUTINE
290 GOSUB 570: REM INPUT WORD LIST
300 GOSUB 810: REM LIST WORDS
310 GOSUB 900: REM EDIT WORD LIST
320 IF EDIT = 0 THEN GOTO 350
330 HOME : PRINT "DO YOU WISH TO STORE YOUR WORDS ON DISK? (Y/N) ": GET C
    $: PRINT C$: IF C$ < > "Y" THEN 350
340 GOSUB 1010: REM SAVE WORDS ON DISK
350 GOSUB 1920: REM SET UP SCREEN
360 FOR WRDNO = 1 TO QUAN
370 GOSUB 2010: REM SUBR TO UPDATE SCREEN COUNTS
380 GOSUB 1140: REM ASK NEXT WORD
390 GOSUB 1220: REM GET STUDENT SPELLING OF ASKED WORD
400 NEXT WRDNO
410 GOSUB 2010: REM UPDATE SCREEN COUNTERS
420 PRINT : VTAB 22: HTAB 8: PRINT "ENTER A SPACE TO CONTINUE:";: GET C$:
    PRINT
430 GOSUB 1520: REM GIVE STATISTICS
440 IF OK = 0 THEN GOSUB 2510: REM GIFT SOUND
450 OK = 0
460 PRINT "TRY AGAIN? (Y/N): "
470 REM %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
480 GET C$: IF C$ = "Y" THEN GOTO 530
490 IF C$ < > "N" THEN 480
500 GOSUB 1620: REM PRINT FINAL STATISTICS
510 POKE 34,0
520 END
530 IF TEST = MAXTRYS THEN GOTO 500
540 TEST = TEST + 1
550 GOTO 350
560 REM ::::::::::SUBROUTINES::::::::::::::::::
570 REM INPUT WORD LIST
580 PRINT
590 PRINT "ENTER 'D' IF YOUR WORD LIST IS ON DISK"
600 PRINT : PRINT
610 PRINT "ENTER 'K' TO ENTER A NEW LIST ON THE KEYBOARD"
620 GET C$
630 IF C$ = "K" THEN GOTO 670
640 IF C$ < > "D" THEN GOTO 620
650 GOSUB 2700
660 RETURN
670 HOME
680 EDIT = 1

```

contd.


```

2510 REM SUBR TO GEN PRIZE SOUND FOR 0 ERRS
2520 D = 1:TIMES = 1
2530 PRINT : PRINT
2540 HTAB 10: FLASH : PRINT "Z E R O";: NORMAL : PRINT " ERRORS!"
2550 FOR F = 1 TO 255
2560 GOSUB 2370
2570 NEXT F
2580 PRINT : HTAB 10: PRINT "RIGHT ON!"
2590 PRINT : PRINT
2600 RETURN
2610 REM %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
2620 REM SUBR TO POKE SOUND ROUTINE
2630 FOR I = 770 TO 795
2640 READ M
2650 POKE I,M
2660 NEXT I
2670 RETURN
2680 DATA 172,1,3,174,1,3,169,4,32,168,252,173,48,192,232,208,253,136,208
,239,206,0,3,208,231,96
2690 REM %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
2700 REM **SUBR TO GET WORDS *
2710 PRINT
2720 INPUT "ENTER YOUR FIRST INITIAL: ";C$
2730 PRINT CD$;"OPENWORDS.";C$
2740 PRINT CD$;"READ WORDS.";C$
2750 INPUT QUAN
2760 FOR I = 1 TO QUAN
2770 INPUT WL$(I)
2780 NEXT I
2790 PRINT CD$;"CLOSEWORDS.";C$
2800 RETURN
2810 REM %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

```

CHANGE SRTDIR TO PAKDIR!

by Walt Mills

Have you ever wondered why you couldn't find a newly saved file, only to see that it was saved way up at the top of the directory? The reason for this is that DOS doesn't really delete a file or name from the VTOC (Volume Table of Contents). What actually happens is that the first byte of the directory reference is changed to reflect a "deleted" file. When you save a new name to the directory, DOS will put that new name in the deleted spot and when you type CATALOG the new name appears in place of the old.

Some of us would like to have the directory listing nice and neat without any gaping "holes" to trap new names. If you have already entered the code for SRTDIR then you are now ready to make the needed changes for PAKDIR (Pack DIRectory). If you haven't entered the code for SRTDIR, then dig out the November 1981 issue of Washington Apple Pi, or call up the ABBS and rustle one up.

After loading the code for SRTDIR, get into the Monitor with a CALL -151 and type the following code as listed:

```

*7007:234
*7008:234
*7009:234

```

Next, type a 3DOG to re-enter Basic and BSAVE PAKDIR,A\$7000,L\$178.

To run PAKDIR, simply BRUN it from the disk and your directory will be tightened as you like it. An alternate method (for either PAKDIR or STRDIR) is to BLOAD the program, insert the proper disk in drive 1 and then CALL 28672 from Basic (*7000G from the Monitor).

A word of caution! SRTDIR has trouble handling any drive errors, therefore I strongly recommend that you first CATALOG the disk to be sorted or packed before doing your CALL. For the avid user, I recommend that you write a short Basic program to do this work for you. Last, but not least, TRY YOUR NEW PROGRAM ON A BACK-UP COPY TO ENSURE THAT THE CODE IS CORRECT.

APPLE SIDER

by Jay Thal

What does one do when their 12" monitor squeezes the disk drive from the top of the APPLE? When the monitor is in place how can you get conveniently to the game socket? Then again, where can one conveniently store the joystick and game paddles? What if you are dissatisfied with the sound that comes from APPLE's lilliputian speaker? And on top of all that, where can you place your numeric keypad?

My answer to all those questions evolved into the project which I call: APPLE SIDER.

Designed to sit either on the right or the left of the APPLE (lefties might appreciate that feature), my prototype was built of clear plexiglas; cut and heat bent to the correct shape; and drilled, tapped and countersunk so that it can be put together. A four-inch speaker was placed on the front panel (not Hi-Fi, but what an improved sound!), and six switchable sockets (two 16-pin dips and four heavy-duty Jones) with LEDs were placed just above the speaker on a depressed panel. The disk drive is held onto the hinged top by a Velcroed 24" nylon strap so that it may be tilted up to reach the storage area (remember the joystick and paddles). The tilt of the top is limited by a desk-top support.

Power for the switches and speaker is brought to them by a ribbon cable wired to sockets on the back, and protected by a wiring shield. From there cables connect the SIDER to the game socket and speaker. The only internal APPLE rewiring is for the speaker connection.

The dimensions in the diagram, which are based on a 0 (zero) thickness material, will have to be adjusted depending on the materials used. As noted previously, my prototype was made of plexiglas and could have been assembled with cement rather than machine screws. The width of the SIDER must be at least 6" to accommodate the disk drive, and 6 3/4" between the sides (bends on the front panels) for The Keyboard Company's keypad.

The diagram provided, unlike the prototype, allows for a 3" speaker (still twice as large as the APPLE's) and instead of six sockets--three (an alternative would be a zero insertion force socket). This design also allows for a Hex-Dex encoder (such as a JE600) or a numeric keypad to be built into the front panel. The baffle is designed to prevent items in the storage area from sliding forward and possibly shorting out the switches.

Mint Juleps may be the favored drink below the Mason-Dixon Line but, as for myself, I love my APPLE SIDER.

contd.

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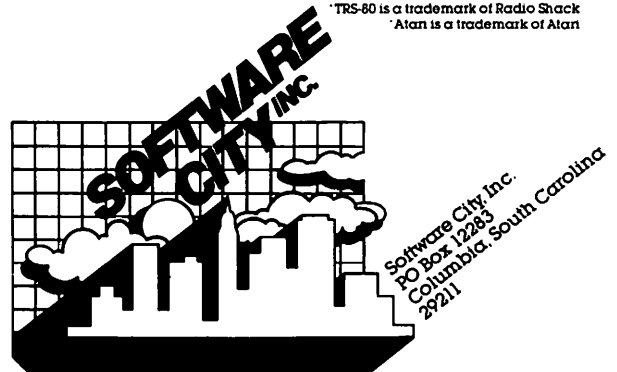


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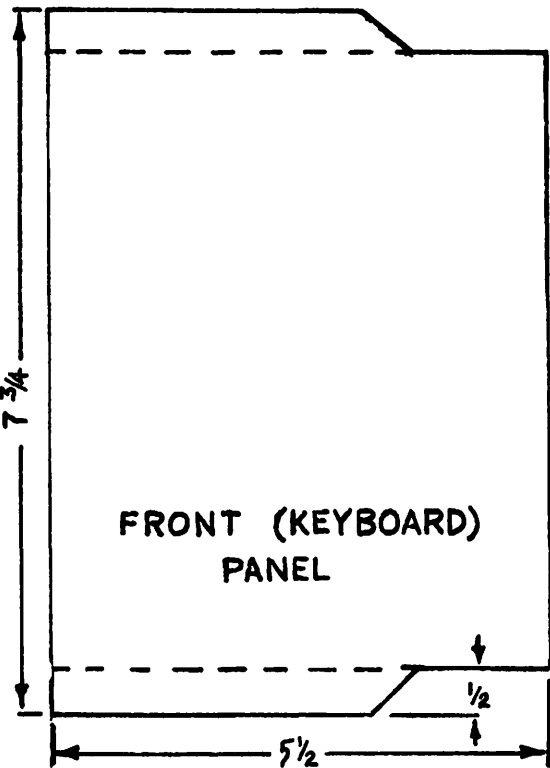
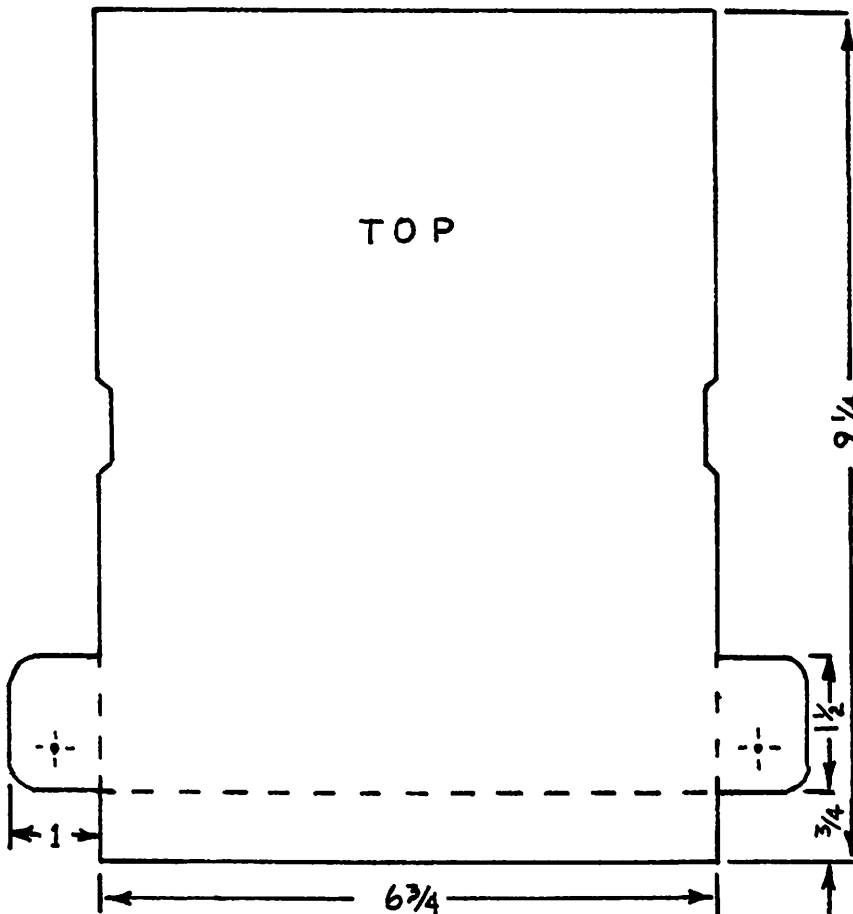
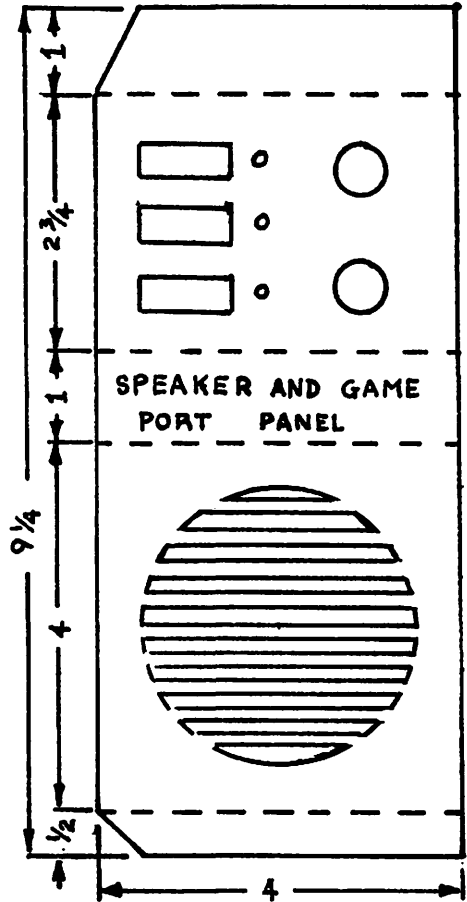
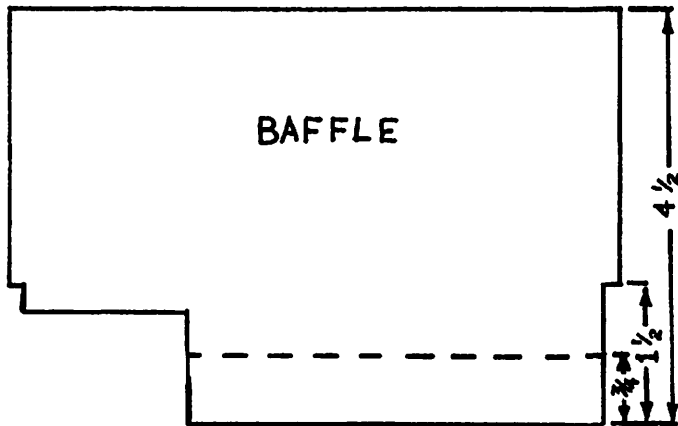
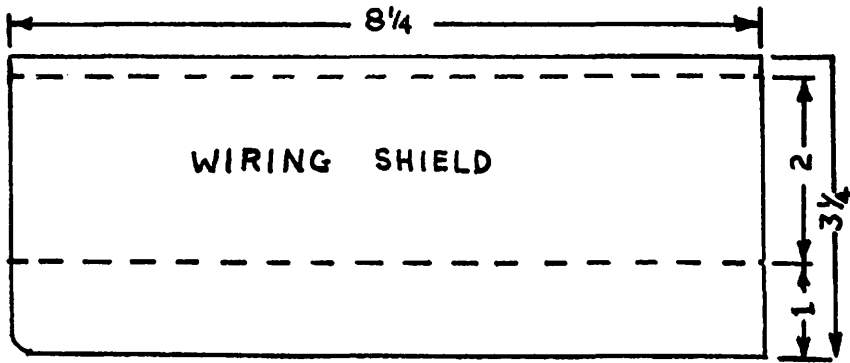
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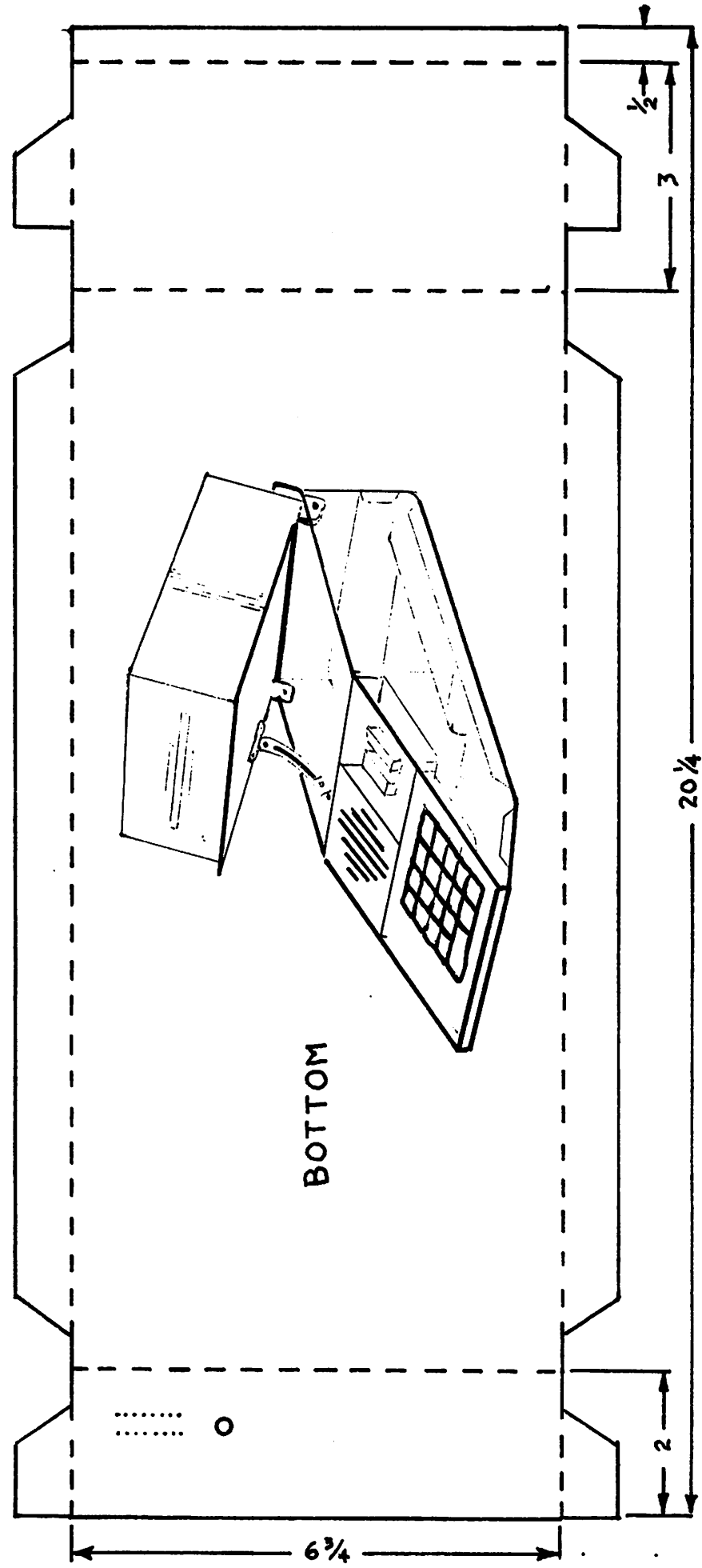
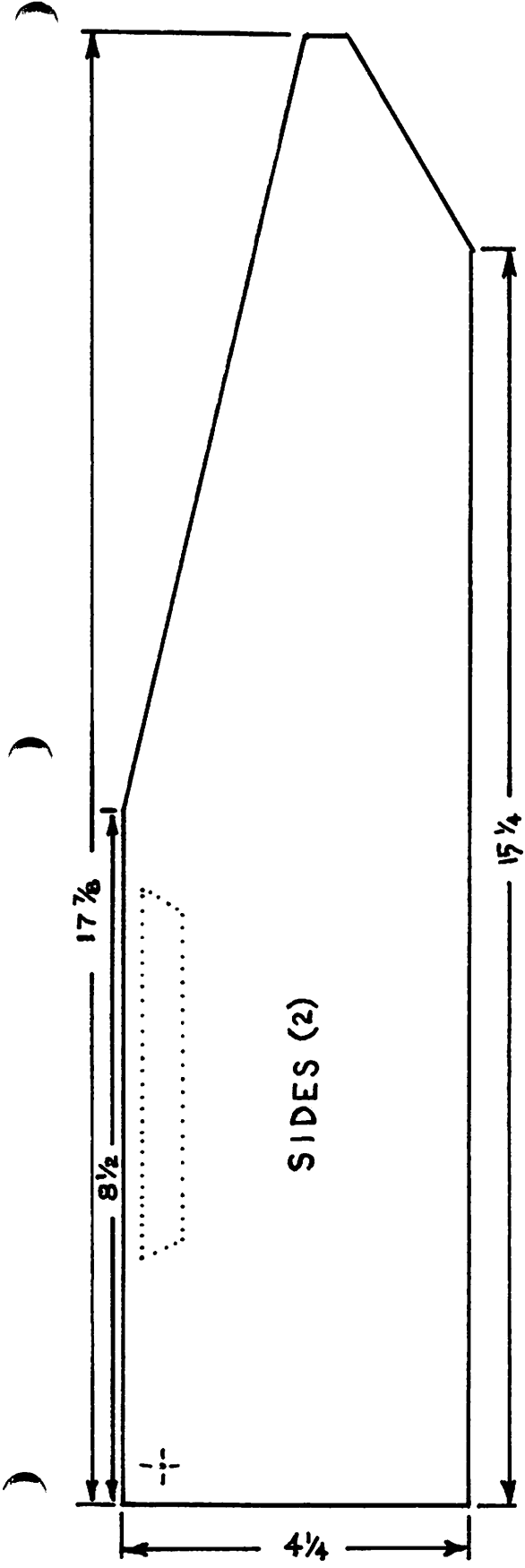


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Many of our newer members have been asking about the contents of past issues of our newsletter. To help them and others who may have just learned about us we hereby print the table of contents of the 1981 issues of the WAP, from which have been deleted standard and time-dependent items such as notices, classifieds, editorials, minutes etc. For those of you wishing to purchase back issues, see the order form near the end of this newsletter. Note: February and March issues are no longer available.

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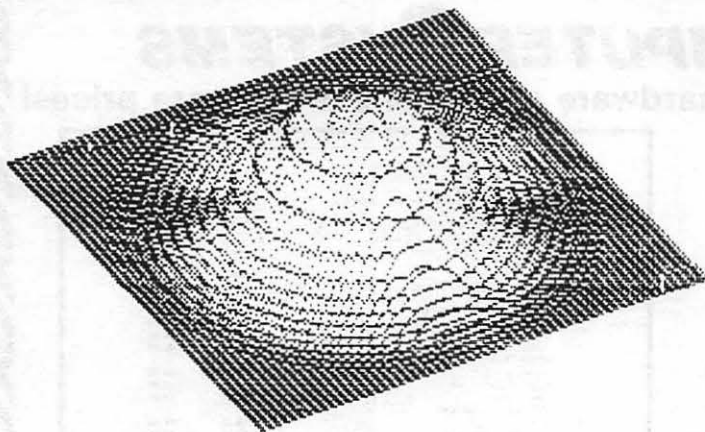
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LETTER TO THE EDITOR

Howard W. Mitchell
408 Jackson Avenue
Lexington, Virginia 24450

February 18, 1982



Dear Bernie and Genevieve,

Ah ! I have at last had the Supreme Delight of messing up a diskette !! Now, that's odd, isn't it, to be pleased with shattering a disk into bits ???

Well, I have always wanted to see the recorded image, but not \$3.00 - \$5.00 worth, so a couple tiny scratches gave me the OUT.

I simply poured a bit of Magna-See liquid (a commercial suspension of magnetic particles in an inert, rapid-dry fluid) onto the exposed disk, and then stripped the developed image off with transparent tape. I thought you might find it interesting. (you'll need a strong magnifier (e.g. 10x, or low-power microscope) to see the details, but it is rather rewarding, I think.)

I am continually delighted with the WAP magazine ! You keep your standards very high, but not so high that us beginners don't have a chance to offer what we can. I love you for that.

Best,

Howard

 WASHINGTON APPLE PI
 MAIL ORDER FORM

Washington Apple Pi has a program library, and disks are available for purchase by anyone. The price to members is \$5.00 per disk and \$8.00 to non-members. These disks are full of exceptional programs - the utilities are especially useful. The games are some of the best - not just simple and uninteresting ones. You may pick them up at any meeting or have them mailed for \$2.00 per disk additional. (If you order five or more the additional charge will be \$10.00 total.)

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WAP TUTORIAL REGISTRATION

A WAP tutorial on VisiCalc will be taught by Dr. Ernie Forman, who is a Professor at George Washington University. It will be held on Saturday April 3, 1982, 9:00 AM to 12:30 PM, in Room 2017A, at USUHS on Jones Bridge Road (on the campus of the National Naval Medical Center) in Bethesda, MD. Check the ABBS and club phone for any changes in details. An outline of the session is shown below.

- 9:00 - 9:15 Set up computer
- 9:15 - 10:45 VisiCalc instructions, manual and data interchange format
- 10:45 - 11:00 Non-maskable interrupt
- 11:00 - 12:30 Specific applications, overlays and iterative solutions

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WAP TUTORIAL REGISTRATION

A WAP tutorial on Pascal will be taught by Dr. Thomas Woteki (Dr. Wo). This tutorial will be similar to the one given by him at George Washington University. It will be held from 9:00 AM to 12:00 Noon on four Saturdays in May, 1982, in Room 2017A, at USUHS on Jones Bridge Road (on the campus of the National Naval Medical Center) in Bethesda, MD. Check the ABBS and club phone for any changes in details. An outline of the sessions is shown below.

- May 1 - Introduction to UCSD System Filer, Editor and Compiler
- May 8 - Structure of a program, introduction to Pascal, comparison with Basic
- May 15 - Data types: Boolean, integer, real and strings, writing an elementary program with input and output
- May 29 - Procedures, their use and advantages, using the System library

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