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nibble

THE REFERENCE FOR PERSONAL COMPUTING

TWO DOLLARS
JANUARY/FEBRUARY
1980



**APPLE "TRAC"
OR HOW
TO MANAGE
HOUSEHOLD EXPENSES**

PLUS

- ☐ **SPACE MAZE**
Sound, Music and Mysterious Forces
Pulling Your Ship To Doom!
- ☐ **GOOF-PROOF YOUR INPUT**
Definition And Solution To Ten
Common Problems.
- ☐ **SORT 'EM OUT**
Sorting Explained, With Examples
- ☐ **SIX HIGH RES COLORS FOR YOUR APPLE**

SUPER-TEXT™

STANDARD FEATURES

- single key cursor control
- automatic word overflow
- character, word and line insertion
- forward and backward scrolling
- automatic on screen tabbing
- single key for entering "the"
- auto paragraph indentation
- character, word and line deletion
- ditto key
- multiple text windows
- block copy, save and delete
- advanced file handling
- global (multi-file) search and replace
- on screen math and column totals
- column decimal alignment
- chapter relative page numbering
- complete printer tab control
- line centering
- superscripting and subscripting
- two color printing
- underscoring and boldface
- user defined special functions
- displays UPPER and lower case on the screen with Dan Paymar's Lower Case Adapter

FAST EDITING

Super-Text was designed by a professional writer for simple, efficient operation. A full floating cursor and multiple text screens facilitate editing one section of text while referencing another. Super-Text's advanced features actually make it easier to operate, allowing you to concentrate on writing rather than remembering complicated key sequences.

FLOATING POINT CALCULATOR

A built in 15 digit calculator performs on-screen calculations, column totals and verifies numeric data in statistical documents.

EXCLUSIVE AUTOLINK

Easily link an unlimited number of on-line files on one disk or from disk to disk. Autolink allows you to search or print all on-line files with a single command. Typical files of items that can be stored in this way include personnel files, prospect files, maintenance records, training records and medical histories.

SUPER-TEXT, requires 48K (\$99.95)
Available TODAY at Computer Stores
nationwide. Dealer inquiries welcome. For more
information write:

The Professional Word Processor

for the Apple II
and the Apple II plus

MUSE™

THE LEADER IN QUALITY SOFTWARE

ADVANCED FILE HANDLING

Single key file manipulation and complete block operations allow the user to quickly piece together stored paragraphs and phrases. Text files are listed in a directory with a corresponding index for fast and accurate text retrieval.

PRINTER CONTROLS

Super-Text is compatible with any printer that interfaces with an Apple. Print single or multiple copies of your text files or link files and they will be automatically printed in the specified order. User defined control characters can activate most special printer functions.

MODULAR DESIGN

This is a modularly designed system with the flexibility for meeting your future word processing needs. The first add-on module will be a form letter generator for matching mailing lists with Super-Text form letters. The form letter module will be available in the first quarter of 1980.

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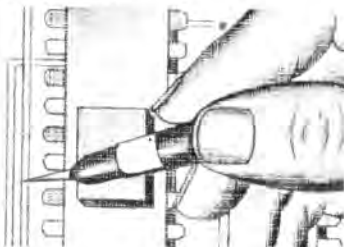
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☐ WIRING DIAGRAM AND DIRECTIONS



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APPLE TRAC

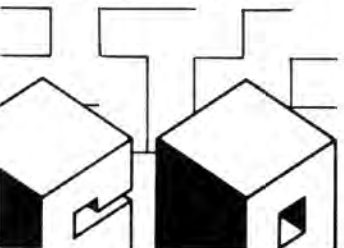
The TRAC System to Report, Analyze, and Control Expenses.
☐ HOW TO USE TRAC
☐ HOW TO CUSTOMIZE TRAC TO YOUR INDIVIDUAL NEEDS.
☐ SPENDING ANALYSIS PROFILE AND HOW TO USE IT.
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nibble

JANUARY
FEBRUARY
1980

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INTRODUCING . . . NIBBLE™ THE REFERENCE FOR APPLE COMPUTING

**NIBBLE IS:**

A SOFTWARE GUIDE for high quality Applications Programs for your Home and Business.

NIBBLE IS:

A REFERENCE GUIDE to new Programming Methods.

NIBBLE IS:

A BUYERS GUIDE for making purchase decisions on new products.

NIBBLE IS:

A CONSTRUCTION PROJECT COOKBOOK for adding function and value to the system you already own.

NIBBLE IS:

A COMMUNICATIONS CLEARING HOUSE for users, vendors, and associations.

Each issue of NIBBLE features at least one significant new application program of commercial quality. The programs in NIBBLE are surrounded with articles which show how to USE the programming methods in your OWN programs.

Examples of upcoming articles:

- ☐ Modeling and Forecasting Your Business ☐ Build a Two-Tape Controller for \$12
☐ Arcade Shooting Gallery — Save Your Quarters! ☐ Data Base Management
System I, II, III

And many many more! NIBBLE will literally “Nibble Away” at the mysteries of your system to help you USE IT MORE. In 1980, the principal featured system is the Apple II.

Try a NIBBLE

nibble

BOX 325 Lincoln, Mass. 01773

I'll try nibble !

Enclosed is my \$15 for 8 issues.

☐ **check** ☐ **money order**

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A New Year! A New Decade! A New Face on the personal computing scene! NIBBLE!

NIBBLE is a reference for the personal and small business computer enthusiast. It is a continuing "Software Source" of high quality new applications programs which can be used "as-is", or easily "customized" for different individual needs. It is a continuing "Reference Guide" of systems and applications programming techniques to strengthen the programming skills of its readers. It is a "Buyers Guide" to new hardware and software products entering the market. It is a "Cookbook" for the hobbyist/tinkerer to build and expand his system. Finally, NIBBLE is a "Communications Clearing House" for news and views between readers.

NIBBLE's objective is to help you learn more about your computer, to do that in "Nibbles" which keep the information manageable, and to help you apply what you've learned to your own programs. We will do this with an array of significant, commercial-grade programs, hardware articles, tips, techniques, games, and reviews to help you unleash the full potential of your home system.

Consider for a moment where we stand in personal computing today. Compare it to the state of the industry 10 years ago. Ten years ago, our industry did not exist! Large Scale Integration (LSI) was a laboratory curiosity. The very smallest computers cost well over \$100,000 in 1970. Electronic calculators were just coming on the scene. They were big, bulky, and cost more than \$400 (for a simple four-function calculator). For those of us who remember even farther back (into the '60's), you'll recall that very large companies ran their entire accounting systems on 4-8K memory systems, often only using punched cards for storing information.

In the 60's, we lived in a data processing industry dominated by IBM hardware. At that time the concept and idea of inexpensive computers for the home was pure fantasy. Today, it is REAL!

Today, for less than the price of a good television set, you can buy a 4K starter system. For the price of a motorcycle, you're up to a full-scale disk/printer system with 32-48,000 memory positions!

Today, there are more than 150,000 systems installed in homes and small business offices with projections of more than 1,000,000 installations by the mid 80's. Within the next few years, personal computers will be a multi-billion dollar market. In sheer numbers, personal computers will overtake, and then surpass the world population of all other computers.

Simply stated, the world of computer hardware is going the way of the electronic calculator. The distinction between the hardware of various manufacturers is growing increasingly fuzzy. Our kids are being taught programming in Grade School. They consider computers as nothing more than new home appliances.

"We have barely scratched the surface in productively using the power of electronic technology to enhance and help our day-to-day personal and business activities"

All of these things lead to a central point. It is this: we have barely scratched the surface in productively using the power of electronic technology to enhance and help our day-to-day personal and business activities. The key which will drive the further growth of our industry in the 80's is SOFTWARE! It is Software that will give distinction between systems. It is Software that will give computer manufacturers their profit margins. It is Software that will open up whole new vistas of applications which, today, are untapped.

It is with this conviction, that NIBBLE enters the scene. NIBBLE is not just another magazine. It is a "Software Source". It is a programming "Reference Guide". It is a "Buyers Guide" to new products. It is a "Construction Project Cookbook". It is a "Communications Clearing House" for news and views between readers.

There is no monopoly on creativity. Nor is there a monopoly of need. If you'll examine the index of selected articles published in other magazines during the past year, they touch on everything from stock analysis to diet/weight control to weather-watching. The software applications are limitless.

Whether you are a newcomer to personal computers who is still playing "Breakout" and "Pong", or an oldtimer experimenting with Data Base Management, NIBBLE will have the breadth and scope to tickle your interest and spark your curiosity about the new things you can do with your system.

Our emphasis will be on quality, creativity, and value! The programs published in NIBBLE can be used "as-is", to enhance your library, or, with the help of surrounding articles, you will be able to modify them to suit your own unique purposes. Your personal programming skills will

probably grow stronger with NIBBLE, as you test and examine the techniques used to write the published programs. I expect you'll have some fun along the way too! We will feature a regular "Games" department to expand that part of your library.

While we are zeroing-in on software, we will certainly not neglect hardware. NIBBLE will help with your buying decisions through periodic product reviews. In addition, we will regularly feature "Construction Projects" to help you increase the utility value of your system.

As NIBBLE grows, we will depend increasingly on the articles, programs, and ideas of our readers to expand the horizon of applications to its full potential. Your articles are going to be tremendously important, so by all means send them!

The featured theme of this first issue of NIBBLE is "TRAC", a system for personal expense Trend Reporting, Analysis, and Control. The TRAC system has been tested in productive use for more than a year. You'll find that it is readily adaptable to your own custom needs. Even if you choose not to use the TRAC system in its entirety, you'll discover that the programming methods used in it are applicable to a great many programs you may have in mind for your own home.

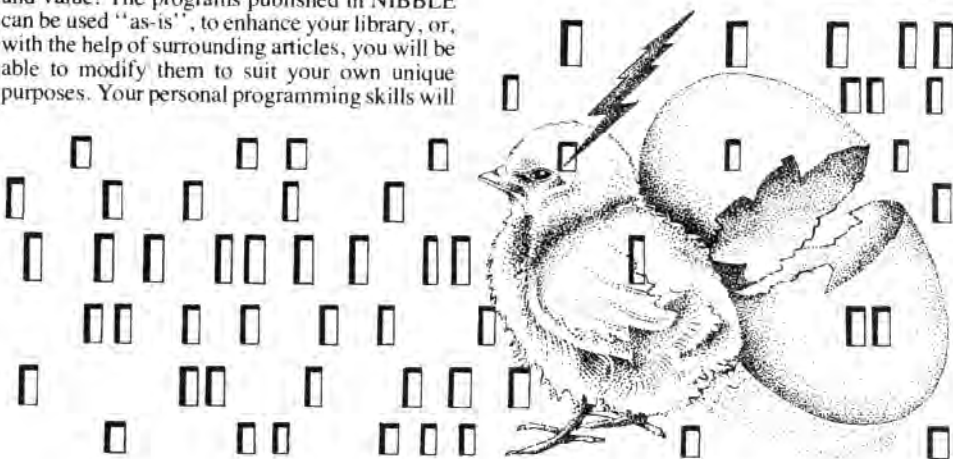
The "Games" section of this first issue contains a NIBBLE version of Space Maze, a challenging test of dexterity, skill and patience in high resolution graphics.

Additional articles probe into the Human Factors that affect quality software and define the methods which are open to you to create programs of lasting value. Our "Letters" section is empty in this first issue, and we have left it OPEN to graphically request your letters, comments and questions.

We want NIBBLE to be fun, educational, and provocative. In future issues, we will be featuring Data Base Management, Pascal Programming, Simulation, and many more features and departments.

Our aim is to be of service to you! There are hundreds of uses for personal computers. Ideas are created and new methods are discovered and developed daily. Together, we will nibble away at the "mysteries" and "wonders" which lie ahead.

Mike Harvey



PROGRAM EPROMS WITH YOUR APPLE

NEW FROM MOUNTAIN HARDWARE ROMWRITER™

FASTER THAN A SPEEDING DISK!

Firmware in ROM is as fast as your software in RAM, but in ROM it frees up RAM memory space for companion programs. And, there never needs to be a LOAD from disk! Create firmware for your Apple* by programming EPROMs with RomWriter.

FIRMWARE NOT SOFTWARE.

Many frequently used programs really ought to be installed as firmware. ROM-based firmware permits a "power up and go" configuration. Use RomWriter to create firmware for peripherals such as printers or create program cards. By installing EPROMs that you have programmed on Mountain Hardware's ROM-PLUS+™ board, program cards of up to 12K in length may be created.

FEATURES.

Programs 2716 EPROMs (5V). All 2K or part of the EPROM can be programmed. Installs in a peripheral slot. EPROMs mount in a zero insertion force socket. A switch turns power off to the socket so EPROMs can be inserted or removed without powering-down your computer. A Write Protect switch is provided for programmed EPROMs while running. A \$CFFF OFF switch to suppress this command during programming or RUNNING. EPROMs can be RUN on RomWriter, or ROMPLUS+™ when creating firmware systems.

SOFTWARE

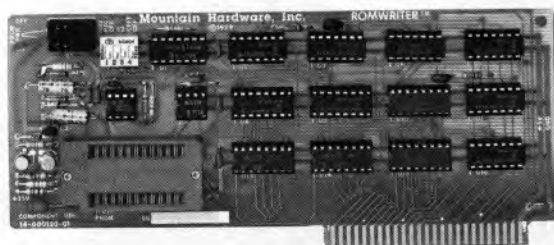
Virtually foolproof programming. Specify a Start and End address in the EPROM and either a Disk File name or a starting address in memory. Desired code will be BURNed followed by a VERIFY. Additionally, existing EPROM code can be merged with desired changes to facilitate EPROM debugging. Easy data entry and high reliability are designed into RomWriter. Programmed EPROMs can be RUN while residing on RomWriter or can be transferred to Mountain Hardware's ROMPLUS+ board.

THE RIGHT PRICE.

\$159 including complete software package, or purchase together with ROMPLUS+ as a Firmware Development System for \$300. (ROMPLUS+ usually \$149 separately).

See for yourself how firmware can enhance the power of your Apple system. Drop by your local computer store for a demonstration. RomWriter and Mountain Hardware's full line of computer products are available at dealers worldwide.

*Apple is a trademark of Apple Computer, Inc.



Available through dealers worldwide



Mountain Hardware, Inc.

LEADERSHIP IN COMPUTER PERIPHERALS
300 Harvey West Blvd., Santa Cruz, CA 95060
(408) 429-8600

- Fast Firmware?
- Send me all the details on RomWriter.

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Address _____

City _____ State _____ Zip _____

Phone _____

Dear NIBBLE Readers

THIS SPACE IS FOR YOU! NIBBLE is for you! Please let us know what you think . . . What you'd like to see in NIBBLE. We'll print your letters, questions, and comments regularly in this column. But this letter is to all of you.

The March issue of NIBBLE focuses on Games! Advanced Assembly Language use in Gaming! Game theory. How to Write Games that Last! And a whole bunch of other things. We'd like to see your best game as an article. Or let us know what tricks you've discovered for firing shells, throwing footballs, or whatever.

Issue number 3 in May will treat Text Processing as its main focus. We will publish a powerful line-oriented Text Processor in its entirety! How about sending us your best articles and supporting programs? A sort/MERGE (with emphasis on the Merge) would be of interest. Or Human Factors in Text Management? Its a rich and expansive subject and our readers would like to share your experiences.

NIBBLE number 4 in June will feature SIMULATION as the main theme. If you think about it, simulation touches all of us at home, at work, and at recreation. We would bet that you have a particular idea, method, or program which would fit beautifully in the context of the SIMULATION theme. It can have a Game format, or Mathematical Modeling, or it can simulate a physical Process! We'll be pleased to review your work for publication.

Remember, in 1980 we're concentrating principally on the Apple II!

When you combine games, simulation, data base management, and Apples . . . that's a lot to "Nibble Away" at! Let's do it together.

Mike Harvey



INTRODUCES
ELECTRONIC DESIGN FOR THE APPLE

It's been a long time coming, but it's finally here!
Free yourself from the tedious and time consuming calculator calculations
involved with the design of electronic circuits.
The following are a list of the calculations supported in the package.

High-Resolution graphics representations of all the filter circuits are shown

OHM'S Law Formulas (find any variable)
DC Power Formulas (find any variable)
Kirchhoff's Voltage Law
Kirchhoff's Current Law
Total Resistance (up to 10 resistors)
Total Capacitance (up to 10 capacitors)
Charge Stored in a Capacitor
Energy Stored in a Capacitor
For Voltage Across Series Capacitors
Total Inductance (up to 10 inductors)
Voltage Regulation

Capacitive Reactance
Inductive Reactance
Impedance and Phase Angle for Resistance & Inductance in Series
Impedance and Phase Angle for Resistance & Capacitance in Series
Impedance and Phase Angle for Inductance & Capacitance in Series
Impedance and Phase Angle for Resistance & Inductance in Parallel
Impedance and Phase Angle for Resistance & Capacitance in Parallel
Impedance and Phase Angle for Resistance, Inductance, &
Capacitance in Series
Impedance and Phase Angle for Inductance & Capacitance in Parallel
Impedance and Phase Angle for Resistance, Inductance &
Capacitance in Parallel
Impedance and Phase Angle for Inductance & Series Resistance in
Parallel with Resistance
Impedance and Phase Angle for Inductance & Series Resistance in
Parallel with Capacitance
Impedance and Phase Angle for Capacitance & Series Resistance in
Parallel with Inductance & Series Resistance

Mutual Inductance
Coupled Inductance of Inductance in Parallel (with Fields Aiding)
Coupled Inductance of Inductance in Parallel (with Fields Opposing)
Coupled Inductance of Inductance in Series (with Fields Aiding)
Coupled Inductance of Inductance in Series (with Fields Opposing)
Coupling Coefficient for 2 Inductively Coupled Coils
Energy Stored in an Inductor
Q of a Coil where Resistance & Inductance are in Series
Q of a Capacitor where Resistance & Capacitance are in Series
Q of a Capacitor where Resistance & Capacitance are in Parallel
Resonance
Admittance of a Series Circuit
Susceptance of a Series Circuit
Power Factor
Average, RMS, Peak, & Peak-Peak Conversions
Time Constants (on charge or discharge)
Transformer Formulas

Constant - K Lowpass T - Section Filter
Constant - K Lowpass L - Section Filter

Constant - K Lowpass PI - Section Filter
Constant - K Highpass T - Section Filter
Constant - K Highpass L - Section Filter
Constant - K Highpass PI - Section Filter
Constant - K Bandpass Filter
Constant - K Bandreject Filter
Series M - Derived Lowpass T - Section Filter
Series M - Derived Lowpass L - Section Filter
Series M - Derived Lowpass PI - Section Filter
Series M - Derived Highpass T - Section Filter
Series M - Derived Highpass L - Section Filter
Series M - Derived Highpass PI - Section Filter
Shunt M - Derived Lowpass T - Section Filter
Shunt M - Derived Lowpass L - Section Filter
Shunt M - Derived Lowpass PI - Section Filter
Shunt M - Derived Highpass T - Section Filter
Shunt M - Derived Highpass L - Section Filter
Shunt M - Derived Highpass PI - Section Filter

(VACUUM TUBE FORMULAS)

Amplification Factor
AC (Dynamic) Plate Resistance
Mutual Conductance (Transconductance)
Gain of an Amplifier Stage

(TRANSISTOR FORMULAS)

Input Resistance
Current Gain
Voltage Gain
Output Resistance
Power Gain
Alpha (Current Gain of the Common-Base Configuration)
Beta (Current Gain of the Common-Emitter Configuration)
To find (Alpha) with Beta given, or to find (Beta) with Alpha given

Impedance of a Coaxial Line
Attenuation of a Coaxial Line
Impedance of a Parallel Conductor
Percent of Amplitude Modulation
Side Band Power of an A-M Carrier
Total Radiated Power
Percent of Modulation in an F-M Carrier
Modulation Index of an F-M Carrier
Number of Decibels corresponding to a given power ratio
Number of Decibels corresponding to a given voltage or current when the
impedances across which the signals are being measured are equal.
Number of Decibels corresponding to a given voltage or current when the
impedances across which the signals are being measured are unequal.

APPLESOFT IN ROM AND 48K RAM REQUIRED

KORSMEYER ELECTRONIC DESIGN
9612 Chevy Chase
Huntington Beach, California 92646

PRICE: \$99.95

GRAPHICS

A Contest! Write The Graphics Option!!



The TRAC System in this issue is complete except for one intentional "Gap", the **graphics** option in the report writer. If you attempt to use the Graphics Option you'll discover we have a **CONTEST** running to **WRITE ONE**.

We're looking for an original and creative way to enhance the value and useability of the information you capture on personal spending.

First prize is a **FULL RANGE JOYSTICK** and an **EXPANDA-PORT** from Programma International.

Second prize is a choice of **EITHER** the **JOYSTICK** OR the **EXPANDA-PORT**.

If you already have these things, you'll have an option to take cold hard cash... **\$100 First Prize** and **\$50 Second Prize**.

Entries must be received by Nibble no later than March 31, 1980.

Here are a few tips to get you going.

First, the program should reside in a sub-routine beginning with line 4400.

Second, the routines which read the data files operate this way:

TO READ THE 'CARD #' FILE

1. SET F# = "CARD #"
2. SET SW = 1 AND GOSUB 2000
3. CURRENT CARD DATA IS NOW IN W\$(R,N), WHERE 'R' IS THE NO. OF RECORDS, AND 'N' IS THE NO. OF FIELDS (1-6).

TO READ THE 'CHECK #' FILE, SET F# = "CHECK #" AND REPEAT THE STEPS ABOVE.

TO READ THE YEAR-TO-DATE BALANCES

1. SET SW = 1 AND GOSUB 2250
2. THE YEAR-TO-DATE DATA WILL NOW RESIDE IN BAL (X,N) WHERE 'X' IS 1-24 ACCOUNT NUMBERS AND 'N' IS 1-12 MONTHS.

The fields of data are allocated as follows:

- 1 = ACCOUNT NUMBER
- 2 = CREDIT CARD/CHECK #
- 3 = MONTH
- 4 = DAY
- 5 = AMOUNT
- 6 = DESCRIPTION

You may want to start looking for ideas by checking some of the Graphics articles indexed in "From The Library" in this issue.

HAVE FUN!!

Hi-Resolution Multi Color Kaleidoscope

Here are two programs which demonstrate 4, 6, and many more HI-RES colors using the circuit described in the "SIX HI-RES COLORS" article.

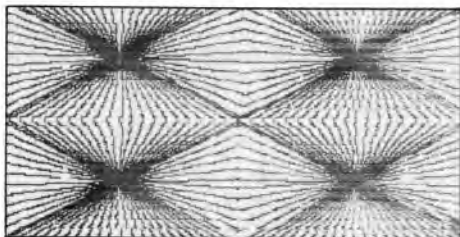
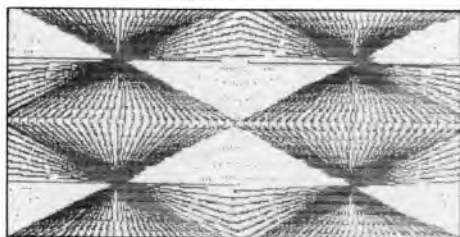
For the first demo, load your Hi-Res routines and Hi-Res Demo program. Then select the program that sums two sine waves. When the program asks for the frequencies, type in 63 and 64 (as Allen Watson suggests in his article in the June 1979 issue of BYTE) and presto! You're looking at BLUE, GREEN, and GOLD (depending on how your T.V. is tuned). Try other frequencies... with frequencies 90 and 91 (and using the added-colors circuit) I got PURPLE, GOLD, AQUA, GREEN, WHITE, and of course, BLACK.

A second, short-but-sweet, program (below) will display many more than 6 colors using the principles in Allen Watson's article. RED, YELLOW, BLUE, AQUA, BROWN, ORANGE, GREY, GOLD, PINK, PURPLE, GREEN, and on and on. It's a Hi-Res Kaleidoscope for fun and relaxation.

The program follows:

```
10 HGR
20 HCOLOR = INT(RND(1)*8)
30 X = INT(RND(1)*8)
40 FOR A = 0 TO 139 STEP X+2
50 HPLOT A,0 TO 139-A,79
60 HPLOT 279-A,0 TO 140+A,79
70 HPLOT A,159 TO 139-A,80
80 HPLOT 279-A,159 TO 140+A,80
90 NEXT A
100 FOR B=0 TO 79 STEP X+2
110 HPLOT 0,79-B TO 139,B
120 HPLOT 140,B TO 279,79-B
130 HPLOT 0,80+B TO 139,159-B
140 HPLOT 279,80+B TO 140,159-B
150 NEXT B
160 FOR Z = 1 TO 1500: NEXT Z
170 GOTO 20
```

This will produce unusual and quite spectacular patterns and shapes.



TIPS AND TECHNIQUES

Sort 'Em Out

Sorting is one of the more powerful tools which you bought when you brought home your Apple II. Working with a simple list (or 'set') of data, the Sort lets you look at it in a whole variety of ways, and adds extra uses too. Consider the TRAC (Trend Reporting, Analysis, Control) system on page 13 of this issue. Using the Sort, you can make Credit Card reconciliation a snap by sorting your bills into credit card sequence. The same goes for your Check reconciliation. Or, to see clearly how your monthly expenses compare to each other, sort them by Dollar Amount and they will line up in a list ranging from the smallest to the largest expense, for easy review.

There are many algorithms for sorting. Most of them depend on "Comparing" items in a list and then "Swapping" pairs of those items. But, depending on how the comparison and swapping is done, your sort can run a long long time, or very quickly.

John P. Grillo's article on the subject (in "Creative Computing", November 1976) used the Shell-Metzner Sort and stated major speed advantages. According to the article, a hypothetical sort of 10,000,000 items would take 93 years using a "Bubble Sort" method (not recommended here). The same sort, using Shell-Metzner, would take only two and a half days. Big difference!

The Shell-Metzner Sort routine is contained in lines 10-97 of the TRAC System program in this issue. The flow diagram is as shown on Figure One.

In the flow diagram, Figure One we are sorting R (#) of Records. We are sorting on Field "SR" as the "SORT KEY". Finally, we are sorting the first 5 fields of each record (which are NUMERIC), and then the 6th (or last field . . . which is ALPHABETIC) in order to SWAP EACH FIELD in each PAIR of Records.

The temporary variables 'TK' and 'TS' are needed to save 'WK(H,F)' because it is "written over" by the Statement WK(H,F)=WK(V,F).

WK(V,F) is then assigned the value formerly held by WK(H,F), and the SWAP has been completed. This is expressed in the following Swap Table:

PROGRAM	TK	H	V
10 WK(H,F)=5	-	5	-
15 WK(V,F)=3	-	5	3
20 TK=WK(H,F)	5	5	3
25 WK(H,F)=WK(V,F)	5	3	3
30 WK(V,F)=TK	5	3	5 SWAPPED

The "Setup" for Sorting takes place in the program lines 3000-3025 of TRAC. The program asks for input 'SR' to identify the Field being sorted on. The Record itself has six fields.

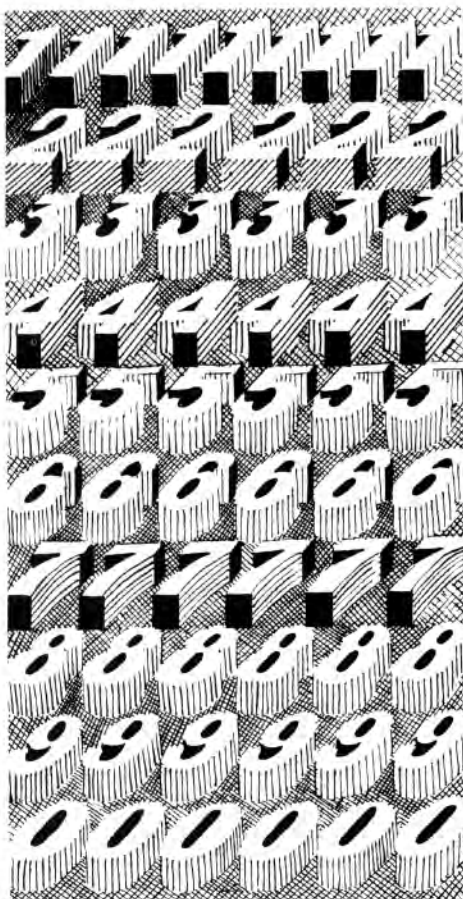
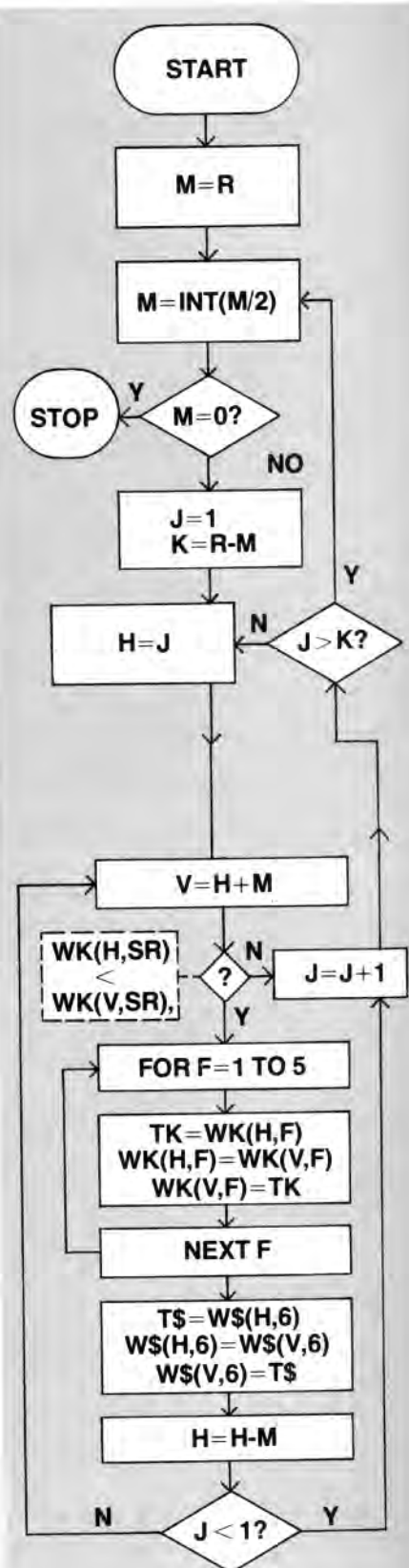
Once having identified the field, you can go to the sort subroutine and return with a completely sorted list. Sometimes, you will have a list of ALPHA STRINGS you want to sort in NUMERIC sequence (as we have done in TRAC). In that case, do a quick convert to digits (as we have done in line 3032) and then turn over your list to the Sort routine for processing.

Remember, the 'H' and the 'V' in the record WK(H,F) and WK(V,F) signify the RECORD NO. while the 'F' signifies the FIELD NO. in the record.

A word about ALPHABETIC vs. NUMERIC Sorting. Numeric Sorts work with TRUE values; i.e. the field '123' is recognized as LARGER THAN the field '24'. In Alphabetic Sorts, the High-Order Character dominates the sort ranking, (just as the field 'BC' is recognized as Higher than the field 'ABC'), and an "alpha" field '24' would be sorted higher than another "alpha" field '123'. This will explain the strange things which happen if you ever forget to convert Strings of Numbers into TRUE NUMBERS before comparing them.

It's a good idea, when sorting, to give yourself the option to decide whether to save the sorted records on disk BEFORE you actually start WRITING to disk. This is accomplished in lines 3045 and 3050 in TRAC. It gives you the chance to change your mind about writing over your old file with the new list.

One final word on Sorting Performance. We discovered the real impact of placing variables and subroutines 'Up Front' in a programs when it comes to sorting. By placing the TRAC variables up front in line 10002, and the routine itself from lines 10-97, the performance was increased by nearly 50 PERCENT over the previous version.



DOS 3.1 Vs. 3.2

One of the most notable differences between the Disk Operating System Version 3.2 and Version 3.1 is in the APPEND instruction.

In DOS 3.2 there is no APPEND instruction with fixed length "Random Access" records. There is no need for it. Once you have defined the record length with the 'L' in PRINT D\$;" OPEN FILE, L40", for example, you can randomly READ and WRITE the file without using APPEND. DOS 3.2 will automatically put Record 2 after Record 1 and Record R after Record R-1. There is, in other words, Automatic Pidgeon-Holing by Record #.

If you have any DOS 3.1 programs that use APPEND, it would be a good idea to change them. One of these days, you'll be using an "old" program. It will error halt on APPEND, you'll "jury-rig" a fix, and potentially wipe out your file.

Random access file handling is illustrated in lines 1050-1095, and lines 2010-2050 of TRAC (in this issue).

Program Control Differences Centronics 779 Vs. IDS 440

The TRAC System was written for the I.D.S. 440 "Paper Tiger" printer. To convert the print routines to run the Centronics 779 printer, change the statements in lines 810, 4224, and 4337

FROM:

```
PRINT CHR$(2); CHR$(30)
```

TO:

```
PRINT "IcK" : REM CONTROL I K
```

The I.D.S. printer has variable character sizes under program control whereas the Centronics 779 must be adjusted with the potentiometer at the rear of the cabinet (to accommodate the 130 character-wide line in program line 4339).

Footnote The Graphics option on the I.D.S. 440 is outstanding! The accompanying picture to the "More Colors" article was printed with this option and a special Graphics Print Program soon to be published in NIBBLE.

Programming NIBBLE... Switches

Often, in writing a program, you'll write a long, "in-line" section . . . usually a Print, or Editing, or Disk routine . . . and later wish you had made it a Subroutine (rather than In-line code. No problem. Install a SWITCH!

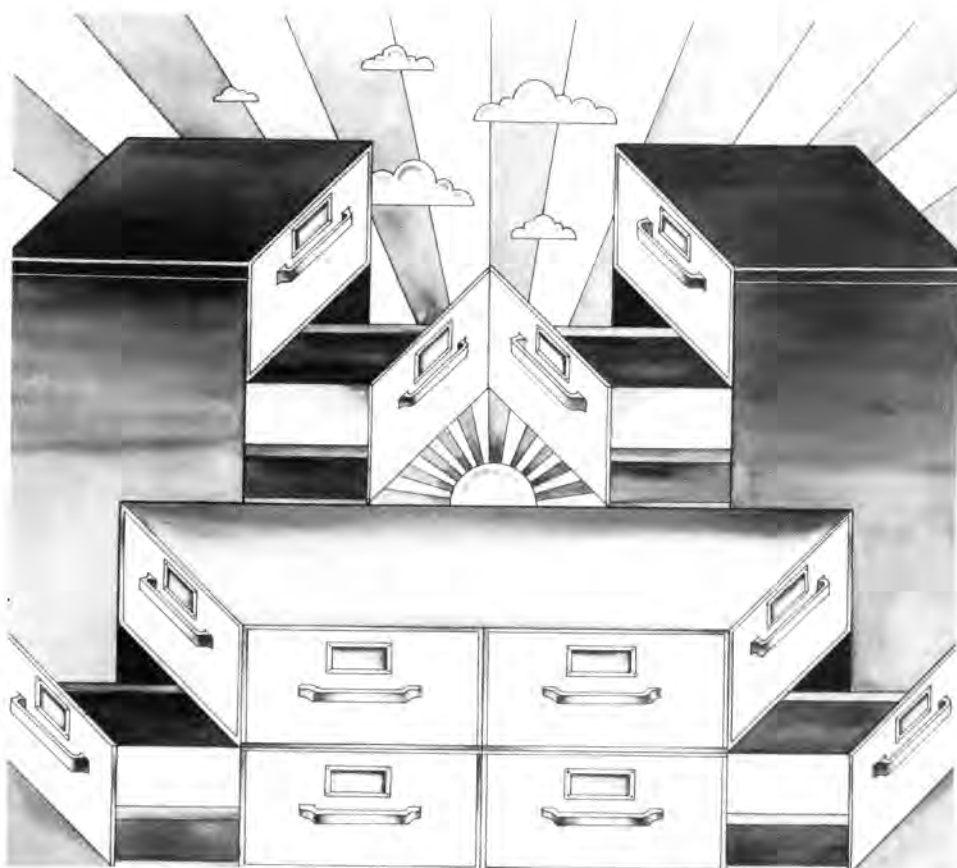
In the new "Add-on" segment of your program, that wants to USE your previous routine, write:

```
1000 SW=1: GOSUB 100: SW=0
```

Then, at the END of your previous program segment (assumed to be in lines 100-200 with an END in line 200), write:

```
195 IF SW=1 THEN RETURN
```

It's a simple way to make your routines do double-duty as you think of new ways to use them.



Initialize New Files Automatically With ONERR GOTO

All of the Apple documentation, and most of the programs you'll find in magazines will suggest putting a "Header Label" on your disk files. This "Header" records key data about your file . . . usually the "Number of Records" stored . . . so that you know how many "Reads" to put into the disk reading subroutine. The "Header" is usually stored on "R0" (the Zero record), and each time you run the program, you must read the "Header" before reading the file. All well and good! but! What about the very FIRST time you use the file? The "Header" is NOT THERE! You haven't written it yet.

Conventional programming would have you prompt yourself with a question: "IS THIS THE FIRST TIME RUN?" And if it is, then go to a separate handling routine to set the record "Pointer" to "1", SKIP the reading of the Header, and proceed. This works. BUT it gets annoying to have to tell the program that it is NOT the first run . . . every time you run it thereafter.

What it all boils down to is that a "One-Shot" need forces repeated and unnecessary keying. AND! If you should ever forget what you're doing and mistakenly type in a response that says YES . . . it IS the first run, you'll risk wiping out your files (by re-initializing and writing over them).

That's the problem. The solution is simple. Let the Apple Do It! The ONERR GOTO or the ONERR GOSUB instructions will handle it.

Here's HOW to do it.

First, put an ONERR GOTO XXXX at the very beginning of your Read routine. Put the

XXXX routine in some out of the way place in your program.

Second, recognize that you're trying to disable the "DISK END OF DATA" error, and no others . . . so use PEEK (222) to get the type of error (for DISK END OF DATA, this is error code 5).

Third, Reset the error condition by a simple POKE 216,0 . . . and now having captured the error in a variable 'ER', for example, go to an exception routine if it is OTHER THAN a 5 (see example below).

Fourth, CLOSE THE FILE that caused the error in order to have a clean re-entry back into the program.

Finally, set your "Record Counter/Pointer" to 0 and then skip over the "Read Header" routine and enter your keyboard input program routine.

This is illustrated as follows:

```
1005 ONERR GOTO 1950
    ** READ ROUTINE **
1040 I=R: GOSUB 200: REM KEYBOARD INPUT
    *
    *
1950 ER= PEEK(222): POKE216,0
1951 IF ER <> 5 THEN 1998
1955 PRINT#I: "CLOSE MYFILE"
1960 R=0: GOTO 1040
1998 PRINT "CHECK APPLESOFT MANUAL": END
```

Remember to use the ONERR BEFORE you actually expect to have the error. Now you can let the system go ahead and try to read a disk file that isn't there, recognize it, and automatically correct itself and go on without interruption. In subsequent runs, it will read a file that IS there, and proceed accordingly.

The ONERR file method is illustrated in TRAC in lines 1005 and 1950-1998, and in 2255 and 2500-2515. Have at it!

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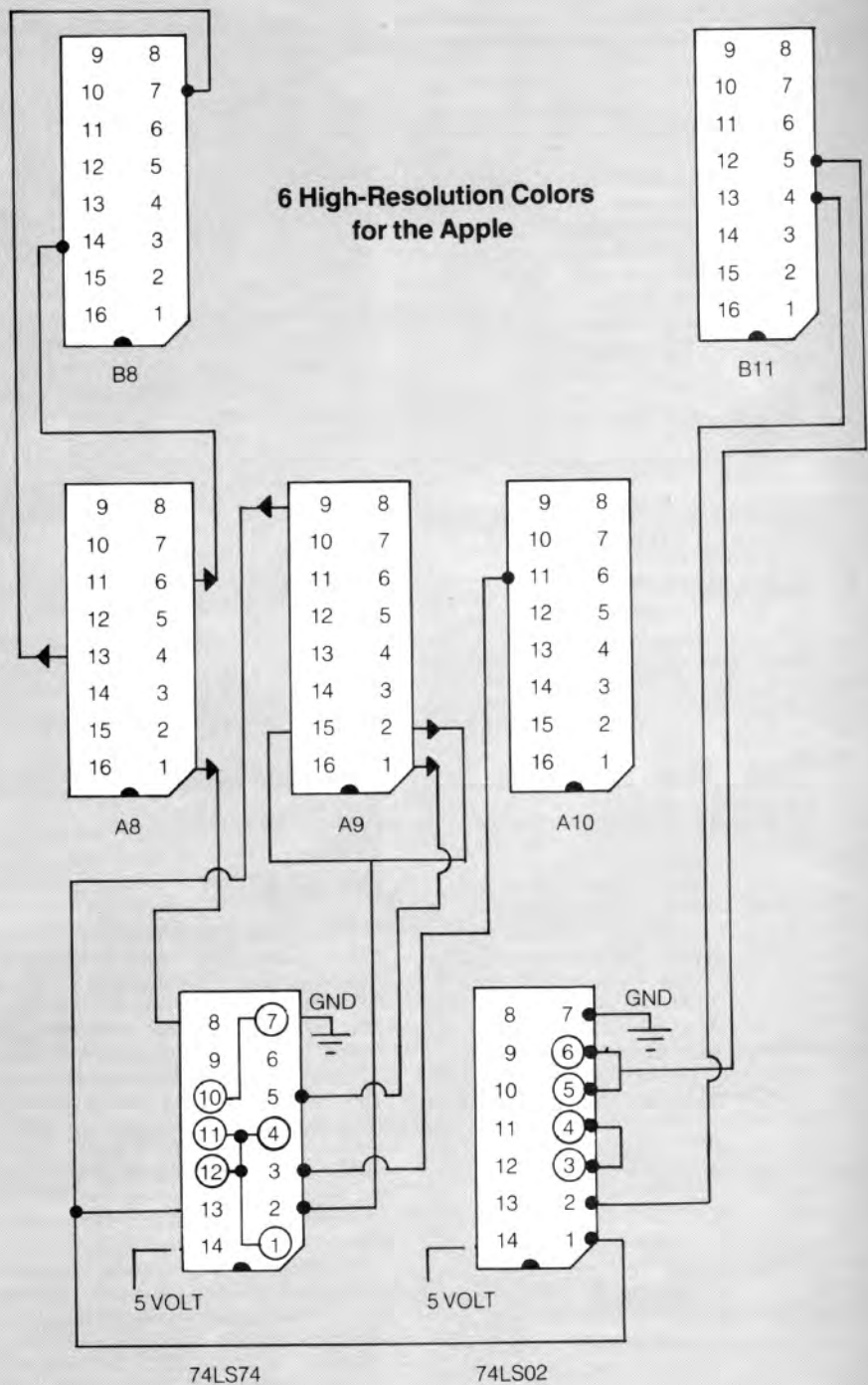
"Highest rated games are the Adventure games".
Robert Purser Edition 7 CCR
Declared a true "Classic".
Computer Cassettes Review, Fall '79
"Adams' Adventure is exquisite. It is a true
tour-de-force . . ."
Recreational Computing Sep/Oct '79
Out of 50 programs reviewed Adventure was
rated No. 1! "Highly Recommended".
80 Software Critique Issue No. 1
"I highly recommend these programs".
80-US Journal, Sept/Oct '79

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6 High-Resolution Colors for the Apple



TOP VIEW



(TOWARD KEYBOARD)

NOTE: → INDICATES A PIN THAT IS LIFTED FROM
ITS SOCKET AND BENT SO THAT IT IS
← NOT RETURNED TO ITS SOCKET

⑥ INDICATES PINS CONNECTED TOGETHER
⑤ ON THE SAME I.C.

CONSTRUCTION PROJECT

Six Hi-Res Colors For Your Apple Easy And Safe Custom Circuit Wiring

For less than \$7.00 worth of parts, you can add TWO MORE COLORS to your Hi-Res graphics! There are indeed, more colors locked up in your APPLE and an hour or so of time breaks them free.

The June 1979 issue of BYTE contains an article by Allen Watson III and a "Step-by-Step" set of instructions by Steve Wozniak for how to convert to SIX COLORS!

I have converted the WOZ schematic into a wiring diagram which, with the wiring approach I am going to suggest, makes the conversion both easy and safe.

If you're like I am... basically chicken when it comes to fiddling around inside my APPLE... here's a tip that may help your courage. After studying the instructions and after deciding to follow them carefully, buy 5 WIRE-WRAP SOCKETS when you go to get your chips (shown below). Then, when you sit down to disassemble your APPLE, *don't cut, solder, or do anything on your main board. Do all your wiring "Off-Line" using your wire-wrap sockets.* When you have the whole circuit wired, (using the wire-wrap sockets in place of the I.C.'s on the board), you can gently remove the APPLE I.C.'s from the Board, plug them into your PRE-WIRED sockets, and then plug the whole circuit into your APPLE.

I use this method for all custom wiring in the APPLE. The wire-wrap sockets give plenty of space for soldering, and they're easy to handle when it comes to plugging them into the board. In this manner, if I make a mistake somewhere, I can get "back to where I was" without having made irreparable alterations to the APPLE board.

The additional colors derive from the bit positioning on the screen, and the original APPLE II's don't make use of the High-Order bit of the color bytes. The little circuit activates the High-Order bit and adds BLUE and ORANGE to the basic repertoire of VIOLET, GREEN, WHITE, and BLACK.

Remember: Adding this circuit voids your warranty so don't do it until you've had your APPLE at least 90 days.

I've used "The Wire Wrap Method" to build and install a "Home-Made Numeric Keypad", "Double Joysticks", and a few other things. It works!

Instructions For Wiring Two More APPLE Hi-Res Colors!

The wiring diagram (on left) shows specifically how to build the "More Colors" circuit. The five I.C.'s at the top are already on your APPLE printed circuit board. The two NEW I.C.'s are 74LS74 and 74LS02. (Remember: Adding this circuit voids your 90-day warranty).

A TOP VIEW of the board shows the "APPLE I.C.'s by their location on the main printed circuit board. These locations are B8, B11, and A8-10. They are clearly marked on the APPLE board. Using the "Wire-Wrap Socket Method" of wiring, all you will have to do is remove the APPLE BASE from its cabinet. The steps for doing this are:

1. Remove the ten screws securing the plastic cabinet to the metal bottom plate. Six of these screws are around the perimeter and Four are along the Front lip of the computer.

2. Carefully lift the cabinet from its base. Be very careful to DISCONNECT THE RIBBON CABLE CONNECTING THE BASE TO THE KEYBOARD, while you remove the cabinet.

3. Disconnect the Power Supply from the printed circuit board.

Now wire the circuit using 5 Wire Wrap sockets for the APPLE I.C.'s. When you have finished wiring the circuit, making all of the solder connections to the pins of the sockets, you can simply remove (gently) the APPLE I.C.'s from the printed circuit board, plug them into their designated sockets, and then plug the sockets back into the printed circuit board.

The two NEW I.C.'s can be mounted on a small piece of Perf Board and bolted to the base in the empty space at the rear, right-hand area of the base.

VERY IMPORTANT: Note that six of the APPLE I.C. pins have small "Arrow" designations. These are pins which are to be lifted from their sockets and bent so that they are not returned to their sockets. This is to establish a NEW CONNECTION, and it is greatly simplified by simply bending the pins on the Wire-Wrap sockets before inserting them in the printed circuit board. These pins are as follows: I.C. A8: PINS 1, 6, and 13/I.C. A9: PINS 1, 2, and 9.

With this method, the degree of disassembly of your APPLE is minimal. You never touch the board with your soldering iron or a knife. And the only handling of the APPLE I.C.'s is to gently remove them and replace them in the "already-wired sockets" of your circuit.

When you have finished, re-attach the keyboard ribbon cable and the power cable and bolt the cabinet back to its base and you're finished. You have now increased your High Resolution Color capability by 50% and now you have VIOLET, GREEN, WHITE, BLUE, ORANGE, and BLACK! The Parts list for this circuit follows. All part numbers are from Radio Shack.

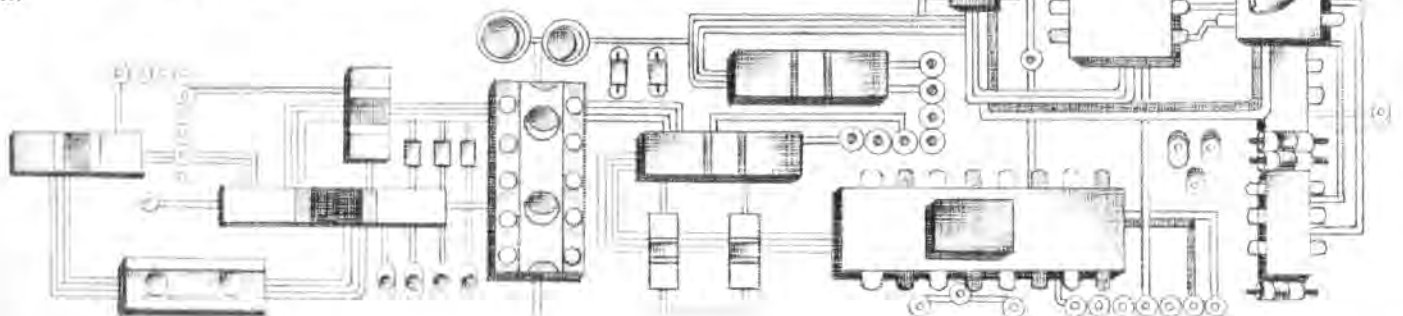
3 Packages
16-pin Wire Wrap Sockets part # 276-1944

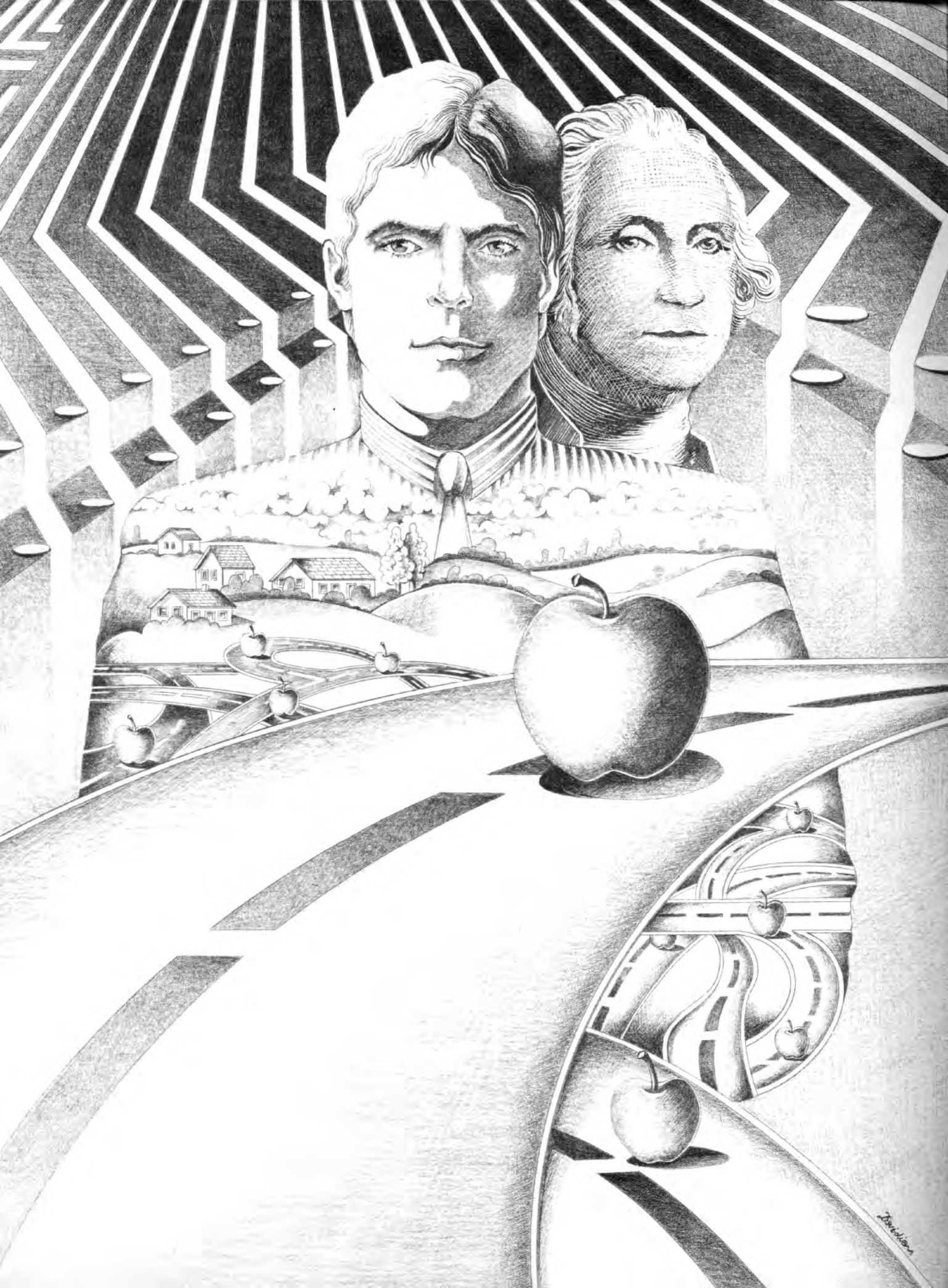
1 package
14-pin Regular Sockets part # 276-1999

1 I.C.
74LS74 part #276-1919

1 I.C.
74LS02 part # 276-1902

The total parts list should cost less than \$7.00.





Davidson

APPLE "TRAC"

(TREND REPORTING, ANALYSIS AND CONTROL)



APPLE TRAC is an *easy-to-use*, adaptable system for analyzing and printing "Where your money goes!" A number of articles in this issue describe the programming methods used in TRAC; and these techniques have a wide range of application to other programs you write for use in your home. *Sorting, Error Recognition and Correction, Simplified File Management, and Report Formatting* are handled comprehensively with tips on *HOW TO USE THEM* in your own programs.

TRAC, accepts input about your credit cards, checks, and cash expenses, and then, *ON COMMAND*, it delivers Three different report formats and Ten different reports for *managing your household expenses*.

This article will describe

- (1) How To Use TRAC
- (2) How To Customize TRAC
- (3) How To Use the Information TRAC produces.

* If you choose not to type in the TRAC program yourself, it is available on DISKETTE for an introductory price of \$12.95 plus \$1.50 for shipping from MICRO-S.P.A.R.C., P.O. Box 325, Lincoln, MA 01773.

*APPLE is a registered trademark of APPLE COMPUTER COMPANY

continued on next page

HOW TO USE TRAC

The first screen format which appears when you type RUN is:

```

=====
APPLE T.R.A.C. SYSTEM
=====
THIS IS YOUR PERSONAL SYSTEM FOR MANAG-
ING CREDIT CARDS, CHECKS, AND OVERALL
HOME FINANCES.

YOU'LL BE ASKED TO SELECT FROM THESE
OPTIONS:
ADD
DELETE
SORT
REPORT/LIST
END OF SESSION

THEN YOU'LL BE ASKED WHETHER TO USE...
CREDIT CARDS
CHECKS
YEAR-TO-DATE DATA

FROM THAT POINT, SIMPLY FOLLOW THE
INSTRUCTIONS FROM THE SCREEN.

HIT RETURN TO CONTINUE.

```

After hitting RETURN, the screen will then display:

```

*****
ENTER THE NUMBER OF THE OPTION YOU WANT
TO USE:
1 = ADD RECORDS
2 = DELETE RECORDS
3 = SORT RECORDS
4 = REPORT/LIST OPTIONS
5 = END THE SESSION

ENTER YOUR SELECTION: 1

```

In this case, since it is the first session, we have chosen to ADD records. The screen will then add to the existing display:

```

NOW ENTER THE NUMBER FOR SELECTING THE
FILE TO BE USED.
1 = CREDIT CARDS
2 = CHECKS
3 = YEAR-TO-DATE DATA

ENTER YOUR SELECTION: 1

```

Here, we are choosing to begin by creating the Credit Card File. Now the system will request:

```

NOW ENTER THE DATE.. MO, DAY, YR: 1, 30, 80

```

We entered the date ** Remember to put a COMMA in between EACH part of the date. Then you'll be asked to HIT RETURN TO CONTINUE. The system will respond with a screen-full of Budget Accounts and instructions as follows:

```

1. AUTO EXPENSE      13. HOME-GAS
2. BOOKS/MAGS.       14. HOME-MAINT'
3. BUSINESS EXP.     15. INSURANCE
4. CLOTHES ADULT     16. INVESTMENTS
5. CLOTHES KIDS      17. LIQ/CIGS
6. DONATIONS         18. MORTGAGE
7. ELECTRICITY       19. TELEPHONE
8. ENTERTAINMENT     20. TAX-LOCAL
9. FOOD              21. TAX-STATE
10. GIFTS             22. TAX-FEDERAL
11. HOBBY-ADULT      23. VACATION
12. HOBBY-KIDS       24. WATER

*****
1=MC 2=VSA 3=AMEX 4=GAS 5=OTHER
TYPE 'END' TO END.,OR 'REDO' TO REENTER
*****
SEQ # 1
ACCOUNT #
CARD #          MONTH, DAY
PAID TO:        AMOUNT

```

You'll notice that the "Account Numbers" are arranged alphabetically to make it easier to attach numbers to the names.

The credit card entries are prompted with:

```

1 = MASTERCARGE
2 = VISA
3 = AMERICAN EXPRESS
4 = GAS
5 = OTHER.

```

You can change them to fit your own needs by changing lines 140 and 11030 in the Program.

The entries for Account # and the other fields do not appear all at one time. They appear as prompts only when the APPLE requests data for each one of them. When the complete record (every field) has been entered, the screen window is erased and the sequence is repeated.

The system will step through each of the entries, prompting and asking for input. If you make an error, it will prompt and ask for the correct response (see the article on Goof-Proofing Input, which deals with this). After entering complete information about a record, TRAC will display "Previous Record" information on the ACCOUNT NUMBER, MONTH, and AMOUNT (as a reference).

If, at any point, you want to RE-ENTER a previous record, Type 'REDO' when the system asks for "Account Number". You'll see the system DECREASE the 'SEQ #' by 1 and set up for you to re-enter the record.

When you have finished entering data, simply type 'END' (in response to 'ACCOUNT #') and TRAC will create a Disk File and store the data on the disk. In each subsequent session, the procedure is the same... only TRAC will then ADD records to the ones which already exist on the disk.

This procedure is identical for CREDIT CARDS or CHECKS. The system automatically sets up and maintains the files.

SUGGESTION: For handling CASH transactions, use the 'OTHER' CATEGORY in the Credit Card file, or use a constant Check Number of 999 to Flag a cash transaction.

For SORTING, you'll follow the prompts and select which file to sort. Then, after having entered the date, the screen will display:

```

*****
WHICH FIELD DO YOU WANT TO SORT ON?
1 = ACCOUNT NUMBER
2 = CR CARD/CHECK NUMBER
3 = MONTH
4 = DOLLAR AMOUNT

ENTER YOUR SELECTION: 3

```

Here, we have elected to sort by Month. The system will then get the file and indicate when the sort has begun, and when it has ended. After it is completed, the screen will display:

```

PRINT SORTED LIST ON THE PRINTER?
ENTER 'Y' OR 'N'

```

If you want a printed copy, simply hit Y and RETURN. After printing (or no printing), the system will display:

```

SAVE SORTED LIST ON THE DISK?
ENTER 'Y' OR 'N'

```

Again, if you want the records saved on the disk in the new sequence, a simple 'Y' will do it.

When you have been through this sequence, TRAC will automatically clear all the variables and return to the OPTIONS MENU for the next job.

For PRINTING REPORTS, the process is again, quite simple. Having selected the REPORT/LIST OPTIONS entry and the appropriate file, the screen will display:

```

*****
REPORT OPTIONS
1 = LIST AND TOTAL CURRENT FILE
2 = TREND ANALYSIS & AVERAGE MONTH
3 = YEAR-TO-DATE SPENDING PROFILE
4 = GRAPHICS (CONTEST MESSAGE)

ENTER SELECTION: 1

```

Here, we have elected to print and total the current Credit Card File. (Recall that we selected the Credit Card File in the initial system options menu). TRAC will format a report showing all of the current data and automatically print it. The report option is useful for verifying the Sequence that you have used in storing information on the disk. Examples of this and the other report formats are shown in Illustrations 1, 2, and 3.

Finally, let's talk about DELETING data from files. TRAC makes it a snap. When you ask for this option, the screen displays:

```

DELETING A RECORD WILL AUTOMATICALLY
ADD IT TO THE BALANCES BEING CARRIED
FORWARD FOR TREND REPORTING.

WHICH RECORD # DO YOU WANT TO DELETE?
ENTER RECORD # OR TYPE 'END':

```

It is important to understand that you are deleting each record BY ITS RECORD # or SEQUENCE # in the file. When you enter a specific record #, TRAC will display the NAME and AMOUNT in that particular record as a verification of your choice.

USER TIPS: For monthly updating of the Credit Card file, sort the credit cards into CARD # SEQUENCE and then PRINT and STORE THEM ON DISK in that sequence. The update process is then a simple checking off of the credit card slips as you receive them from the Bank. In similar fashion, keep your Checks in Check #, Sequence for updating cancelled checks.

When you delete records, several things happen. First, the deleted record is removed from the current list. Second, the current list is automatically COMPRESSED to fill in the gap (in sequence) created by the deletion. Finally, the Dollar Amount is automatically "Pigeon-Holed" into the proper slot in the Year-To-Date Balances. Finally, a new printed listing is automatically generated.

HOW TO CUSTOMIZE TRAC

The Key places you'll probably want to customize TRAC for your own use are: (1) Credit Card Names; (2) Account Names; and (3) The Number of Accounts (although 24 IS a lot). Let's take them in sequence.

CREDIT CARD NAME: In line 140, simply change the names to suit your purpose. Do the same in line 11030 by changing the DATA Statement to reflect your choices (and by using the same format as shown in line 11030... in order to have the credit card summaries print properly).

ACCOUNT NAMES: Simply changing the DATA Statements in lines 11000-11010 will rename the accounts to ones of your own choosing.

THE NUMBER OF ACCOUNTS: This one is a little longer. First, write your list of accounts

names and format them into DATA Statements which replace lines 11000-11010.

Next, go through the TRAC Program listing and change each of the following lines:

FROM:
FOR X = 1 TO 24

TO:
FOR X = 1 TO VV

where 'VV' is the number of accounts you want in the system. The lines to be changed are: 2270, 2330, 4215, 4217, 4220, 4236, 4352, 4354, and 10996. In addition, you will have to change lines 110 and 120 to allow your list to be printed side-by-side on the screen.

Finally change the DIM statements which contain "24" as a dimension, in Lines 10500 and 10510.

That's all there is to it. You may, of course, want to design your own Reports using the data in the files. If you'll read the article titled "A CONTEST! WRITE THE TRAC GRAPHICS OPTION", it will define the fields for you to use and will tell how to get at them.



TRAC SPENDING ANALYSIS PROFILE

The Spending Analysis Profile (Right), will give a complete "Spread" of month-by-month spending throughout the year. The months of Jan-Mar are shown to illustrate the report and some of its uses.

Here are examples of its uses:

- ☐ Examine SEASONALITY of expenses.
- ☐ Consolidate small expenses into BIG Totals to see how things "Add Up".
- ☐ Examine TRENDS... such as Gas prices for their effect on home spending.
- ☐ Check the FREQUENCY of discretionary purchases... clothes, gifts, etc.
- ☐ Timing investment decisions to low spending months.
- ☐ Highlight the value of regular savings deposits for vacations and other big purchase commitments.
- ☐ Automatically maintain a "Running Profile" of donations and other deductibles.
- ☐ Keep track of the Cash Float in Business expenses... Credit card "Commitments" vs. actual "Cash Paid".

And more. The best way to Budget is to know "Where The Money Goes". This will help you manage spending, even if you don't have... and have NEVER HAD a budget.

YEAR-TO-DATE SPENDING PROFILE

TODAY'S DATE: 3/30/80

EXPENSE DESCR'	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP	OCT	NOV	DEC
1. AUTO EXPENSE	14.95	21.25	44									24.95
2. BOOKS/HAGS.	34.95	14.98	14.95									
3. BUSINESS EXP	17.85	25.75	209.47									
4. CLOTHES ADULT	95.44	27.45										
5. CLOTHES KIDS	49.95	17.35	63.2									
6. DONATIONS	45.45	25.95	150.96									
7. ELECTRICITY	85.85		45.75									
8. ENTERTAINMENT	35.95	25.75										
9. FOOD	325.11		234.44									
10. GIFTS	24.95		129.8									
11. HOBBY-ADULT	17.95		24.95									
12. HOBBY-KIDS	27.45											
13. HOME-GAS	75.25	55.55	47.47									
14. HOME-MAINT'	65.75	44.55	122.67									
15. INSURANCE	175.25	175.25	546.2									
16. INVESTMENTS	175.25		225.55									
17. LIQ/CIG'S		32.95	25.75									
18. MORTGAGE	625.25	622.22	618.95									
19. TELEPHONE	52.85	47.75	57.45									
20. TAX-LOCAL			95.25									
21. TAX-STATE			175.25									
22. TAX-FEDERAL												
23. VACATION	25.17	20.75	32.25									
24. WATER		125.25	125.22									
** TOTALS **	1970.62	1282.75	2989.53	0	0	0	0	0	0	0	0	24.95

continued on next page

USING TRAC CREDIT CARD AND CHECKS SUMMARIES

For Credit Cards, after each session of entering information:

1. Do whatever sorting and reporting you may choose (By Account #, By Card #, By Month, or By Dollar Amount).
2. Then Sort the Card # File By CREDIT CARD # ...PRINT it... and SAVE it on disk. Then, each month, you can simply check off the SEQ #'s of the Bills Paid... and use your Summary List for deleting those items from the active file.

For Checks, do whatever reports you wish, (the same as Above), and then SORT and

SAVE your Check # File in Check # sequence. It will make the updating of your cancelled checks much, much easier.

ADDED NOTE: Notice that the CARD # SUMMARY REPORT gives a "Recap" of all the outstanding credit card purchases BY the specific credit card used. This is a useful tool for checking whether you're approaching your CREDIT LIMIT with any of the cards. If you are, you have the option of putting away that card (and avoiding embarrassment in a restaurant or store), and shifting to the use of the other cards until you have cleared/paid the outstanding balance.

ONE MORE: Don't overlook the value of giving yourself Reports of expenses sorted by Account # or by Dollar Amount. These can be useful for tracking back to the SPECIFIC TRANSACTION that threw the current month out of kilter with last month, or with your running averages. A periodic list By Dollar Amount is particularly interesting in "eyeballing" the ranking of your expenses. You may discover some surprises!

CARD # SUMMARY REPORT SORTED BY CARD/CHECK NUMBER TODAY'S DATE 3/30/80

SEQ	** PAID TO **	ACCT	CARD #	MO	DAY	AMOUNT
1	CONCORD BOOKS	2	1	1	22	34.95
2	OLDE GIFT SHOPPE	10	1	3	25	34.55
3	NORTH SKI LODGE	24	1	2	25	125.25
4	AAA DRUGSTORE	14	2	3	28	27.45
5	B&B PACKAGE STORE	17	2	3	17	25.75
6	L&M OFFICE SUPPLY	3	3	3	11	54.22
7	SHERATON INNS	3	3	2	14	25.75
8	BOYSCOUTS	6	5	3	27	50.95
9	SUPER SHOPPES	9	5	3	20	234.44

*** TOTAL ***

613.31

MASTERCARGE = \$ 194.75
VISA CARD = \$ 53.2
AM EXPRESS = \$ 79.97

GASOLINE = \$ 0
OTHER CARDS = \$ 285.39

CHECK # SUMMARY REPORT SORTED BY DOLLAR AMOUNT TODAY'S DATE 3/30/80

SEQ	** PAID TO **	ACCT	CHECK #	MO	DAY	AMOUNT
1	ABC BOOKS	2	15	12	1	24.95
2	COMPUTER STORE	11	220	3	28	24.95
3	L&N SHOES	5	222	3	28	35.75
4	AAA HARDWARE	14	5	1	28	65.75
5	AAA TREE SURGEON	14	221	3	28	95.22
6	A&R JEWELLERS	10	224	3	17	95.25
7	U.S. UNIVERSITY	6	219	3	26	100.01
8	NORTH FISHING CO.	24	223	3	29	125.22
9	J. DOE ATTORNEY	3	219	3	25	155.25
10	U.S. CAR INSURANCE	15	217	3	15	250.95
11	OLDE INSURERS	15	225	3	29	295.25

*** TOTAL ***

1268.55

USING THE TRAC TREND ANALYSIS

If you're like most people, Budgeting is for others, not yourself. After all, you might say, "If I had to worry about Budgeting, I wouldn't have an expensive Home Computer!" We won't argue. At the same time, however, it is really a help to know Where the Money Goes, and to have a perspective on whether a given month's expenses are "O.K." and in line with the PATTERNS OF THE PAST. Do you know, for example, What percentage of your total expense goes for the mortgage? For running the car? For the telephone? Do you know what your average spending is in these and the other major categories each month? And how does THIS MONTH compare with LAST MONTH? Better or worse? And how does this month compare with your AVERAGE EXPENSE each month? Was this month ABOVE or BELOW average?

It may seem boring now, but it gets mighty interesting when it's your OWN expenses you're looking at! TRAC will give you these insights as a BY-PRODUCT of the information you enter each month. No extra work is involved. TRAC will use the current month (you enter at the start of a session) to go all the way back to the beginning of the year and update a "Rolling Average" of monthly expenses by account (category)... as well as all of the other key information.

You can look at "Auto Expense", in the example, and see that although the current month is "ABOVE AVERAGE" and "ABOVE LAST MONTH", the dollar amount is not significant. On the other hand, if you look at "Business Expense", it took a big jump IN ALL CATEGORIES OF COMPARISON! "Donations" also took a big jump during the month and that \$150.96 was 5% of the Total Spending during the month. In this example, between 1% and 2% of total expenses were for "Telephone"!

"Hobbies" have been pretty well under control... or more specifically, LOW. But that probably means this family may be more oriented to "Outside Warm Weather Hobbies" which don't appear during the winter months... Watch Out for unforeseen expenses coming!

Zero expense was recorded for "Entertainment" during the month. Something being neglected here? "Under" as well as "Over" spending can be a key flag for doing something that might have slipped-by unnoticed without TRAC.

And look at "Gifts"! Was this a rash of birthday parties or one big gift for someone special? It's also interesting to note that 18% of the expense goes to "Insurance" (in this example). 18%! Are you "over-insured", and paying more than you should?

Finally, take notice of the totals... The Current Month is more than DOUBLE Last Month, and up ALMOST 50% over the Average Month. "Insurance", "Taxes", "Investment", "Gifts", and "Business Expense" are the principal culprits.

The emphasis in the "Categories/Accounts" is on DISCRETIONARY EXPENSES... ones that you can do something about. So even without budgeting, a month-to-month critique of your "Trend Analysis" will uncover the areas to watch!

TREND ANALYSIS FOR THE MONTH OF MARCH

ACCOUNT DESCR'	CURR MO % TOT		LAST MO % TOT		AVG MO % TOT		CUR VS. AVG
1. AUTO EXPENSE	44	1%	21.25	1%	26.73	1%	ABOVE AVG
2. BOOKS/MAGS.	14.95	0%	14.98	1%	21.63	1%	BELOW AVG
3. BUSINESS EXP	209.47	7%	25.75	2%	84.36	4%	ABOVE AVG
4. CLOTHES ADULT			27.45	2%	40.96	1%	BELOW AVG
5. CLOTHES KIDS	63.2	2%	17.35	1%	43.5	2%	ABOVE AVG
6. DONATIONS	150.96	5%	25.95	2%	74.12	3%	ABOVE AVG
7. ELECTRICITY	45.75	1%			43.87	2%	ABOVE AVG
8. ENTERTAINMENT			25.75	2%	20.57	0%	BELOW AVG
9. FOOD	234.44	7%			186.52	8%	ABOVE AVG
10. GIFTS	129.8	4%			51.58	2%	ABOVE AVG
11. HOBBY-ADULT	24.95	0%			14.3	0%	ABOVE AVG
12. HOBBY-KIDS					9.15	0%	BELOW AVG
13. HOME-GAS	47.47	1%	55.55	4%	59.42	2%	BELOW AVG
14. HOME-MAINT'	122.67	4%	44.55	3%	77.66	3%	ABOVE AVG
15. INSURANCE	546.2	18%	175.25	13%	298.9	14%	ABOVE AVG
16. INVESTMENTS	225.55	7%			133.6	6%	ABOVE AVG
17. LIQ/CIG'S	25.75	0%	32.95	2%	19.57	0%	ABOVE AVG
18. MORTGAGE	618.95	20%	622.22	48%	622.14	29%	BELOW AVG
19. TELEPHONE	57.45	1%	47.75	3%	52.68	2%	ABOVE AVG
20. TAX-LOCAL	95.25	3%			31.75	1%	ABOVE AVG
21. TAX-STATE	175.25	5%			58.42	2%	ABOVE AVG
22. TAX-FEDERAL							
23. VACATION	32.25	1%	20.75	1%	26.06	1%	ABOVE AVG
24. WATER	125.22	4%	125.25	9%	83.49	4%	ABOVE AVG
** TOTALS **			1282.75		2080.98		

TRAC PROGRAM LISTING

LIST (APPLESOFT II, 48K DISK SYSTEM.)

```

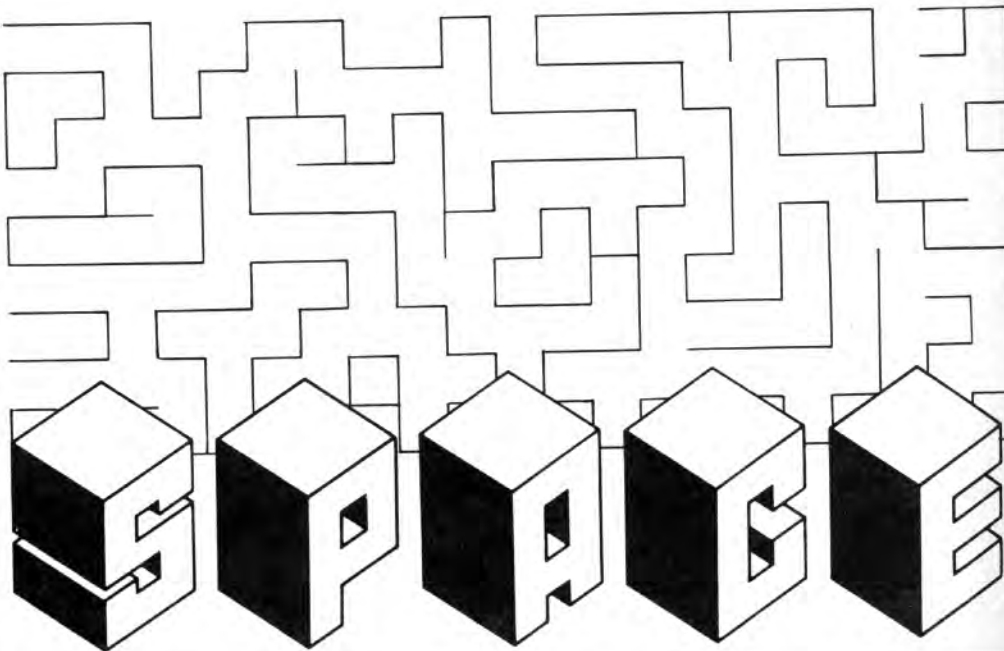
1 PRINT ""
2 REM *****
3 REM ** APPLE T.R.A.C.      **
4 REM ** MICRO-SPARC        **
5 REM ** P.O. BOX 325        **
6 REM ** LINCOLN MASS 01773 **
7 REM ** COPYRIGHT © 1980    **
8 REM *****
9 GOTO 10000: REM ** HEADER ROUTINE **
10 M = R: REM ** SORT ROUTINE **
12 M = INT (M / 2): IF M = 0 THEN 95
20 J = 1: K = R - M
25 H = J
30 V = H + M: CM = CM + 1
40 IF WK(H,SR) < WK(V,SR) THEN 87
50 FOR F = 1 TO 5
55 TK = WK(H,F): WK(H,F) = WK(V,F): WK(V,F) = TK
70 NEXT F

```

continued on page 31



HIGH RESOLUTION



You're the Captain of the land-cruiser **Orien**, on the final leg of your mission to capture a cache of **Dilitium** crystals for **Starfleet Command**.

Your sensor scan shows a map of the final Maze to reach the crystals, and the sensors will track your progress through the maze. If you elect the more difficult version of the game, mysterious and invisible forces will attempt to pull you off your course and make you crash!* You will also crash if you run out of fuel before you reach the crystals.

Space Maze will allow you movement in all directions using the joystick (paddle) control. You are in competition with the previous attempts to run the maze, so don't waste time or **FUEL!** And watch out for the **Magnetic Monsters!**

Space Maze gives you several interesting program routines. When you first run the program, you'll notice your very own **Star Wars** theme comes up. By experimenting with the values of "M1" and "M2" in Subroutine 500, you can make up your own tunes! The Assembly Language is "Poked" into memory in statements 15-25. Statement 700 reads in the Note and Duration and causes the music to play.

Statements 100-175 keep track of the permissible boundaries of your ship. Don't go outside them or you'll crash!

If you're not wired for joysticks, and are using the Apple-supplied paddles, they are probably assigned paddle #'s '0' and '1'. If that is the case, change statements 210 and 220 to read PDL (0) and you'll be in business.

HAVE FUN!!

*After one successful venture through the Maze, the program will automatically switch to the more difficult version (whether or not you have selected it).

LIST (APPLESOFT II, 16K SYSTEM)

```

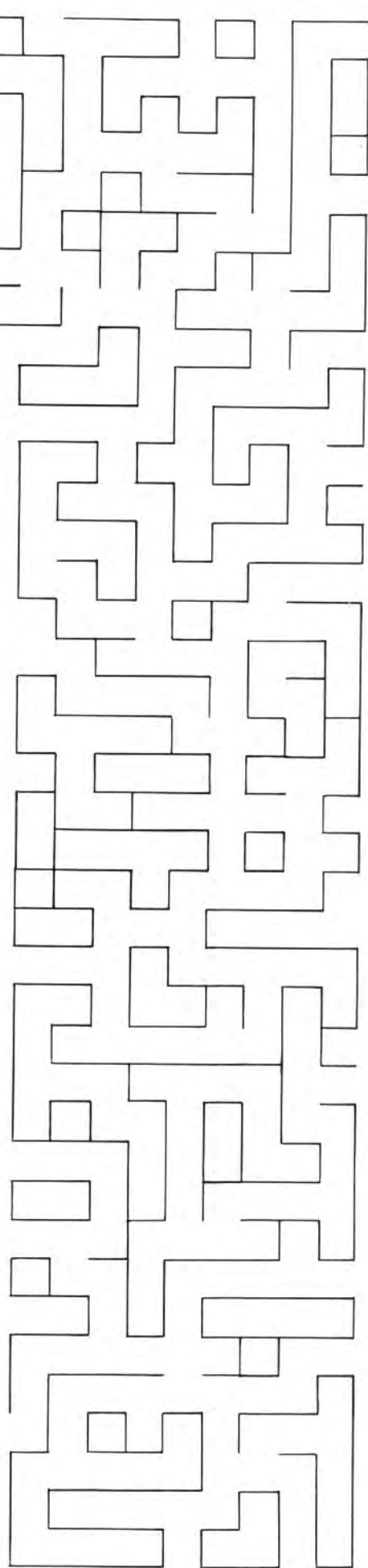
2  PRINT ""
3  REM *****
4  REM ** SPACE MAZE          **
5  REM ** MICRO-SPARC        **
6  REM ** P.O. BOX 325       **
7  REM ** LINCOLN MASS 01773 **
8  REM ** COPYRIGHT © 1980   **
9  REM *****
12 REM THE FOLLOWING SUBROUTINE GOES INTO MEMORY BL
    OCK HEX $30E (782). THE TONES RESPOND TO POKE 0
    TO 255
13 REM PITCH= POKE780,P    DURATION=POKE781,D
15 POKE 782,173: POKE 783,48: POKE 784,192: POKE 785
    ,136: POKE 786,208: POKE 787,5: POKE 788,206: POKE
    789,13: POKE 790,3
20 POKE 791,240: POKE 792,9: POKE 793,202: POKE 794,
    208: POKE 795,245: POKE 796,174: POKE 797,12: POKE
    798,3: POKE 799,76
25 POKE 800,14: POKE 801,3: POKE 802,96
27 CALL - 936
30 VTAB 7: INVERSE : HTAB 10: PRINT "** SPACE MAZE *
    *": VTAB 23: HTAB 4: PRINT "COPYRIGHT 1980..MICR
    O-SPARC INC.": NORMAL
31 VTAB 9: PRINT "YOU WILL PILOT A SPACE CRUISER THR
    U THE": PRINT "STAR MAZE TO REACH THE PRIZE DILI
    THUM": PRINT "CRYSTALS AT THE CENTER OF THE MAZ
    E": INVERSE : PRINT
32 PRINT "BE CAREFUL! IN THE HARD VERSION OF THE": PRINT
    "GAME YOUR SHIP IS PULLED BY HOSTILE ": PRINT "
    MAGNETIC FORCES.. SO TAKE CARE      "
33 PRINT "NOT TO CRASH!!!!!!!!!!!!!!!!!!!!!!!!!!!!!"
34 NORMAL : PRINT "DO YOU WANT YOUR SHIP SIGNAL SOUN
    DS? ": INPUT "TYPE Y OR N":NS$: INPUT "EASY OR H
    ARD GAME? TYPE 'E' OR 'H'":HD$

```


M P Z E L

```
38 GOSUB 500: PRINT "DO YOU WANT STARWARS MUSIC EACH
   GAME?": INPUT "Y OR N ";M$
40 HGR : GOSUB 2000
45 IF M$ < > "N" THEN GOSUB 500
50 GOTO 200
97 REM THE FOLLOWING SUBROUTINE TESTS WHETHER X AND
   Y ARE CONTAINED IN THE SERIES OF 11 RECTANGLES
   MAKING UP THE MAZE
98 REM IF X AND Y ARE SENSED, THEN Z IS SET THE NUM
   BER OF THE RECTANGLE, AT THE END OF THE TEST, Z
   IS TESTED. IF Z IS GREATER THAN
99 REM ZERO IT MEANS X AND Y ARE IN BOUNDS. IF Z=0
   THEN NO X AND Y HAVE BEEN SENSED IN BOUNDS AND T
   HE PROGRAM GOES TO THE CRASH SUBRTNE.
100 IF (X > = 10 AND X < = 80) AND (Y > = 80 AND
   Y < = 100) THEN Z = 1
110 IF (X > = 60 AND X < = 100) AND (Y > = 100 AND
   Y < = 120) THEN Z = 2
120 IF (X > = 80 AND X < = 100) AND (Y > = 120 AND
   Y < = 158) THEN Z = 3
125 IF (X > = 100 AND X < = 140) AND (Y > = 140 AND
   Y < = 158) THEN Z = 4
130 IF (X > = 120 AND X < = 180) AND (Y > = 120 AND
   Y < = 140) THEN Z = 5
135 IF (X > = 160 AND X < = 220) AND (Y > = 140 AND
   Y < = 158) THEN Z = 6
137 IF (X > = 200 AND X < = 220) AND (Y > = 110 AND
   Y < = 140) THEN Z = 6
138 IF (X > = 220 AND X < = 265) AND (Y > = 110 AND
   Y < = 130) THEN Z = 6
139 IF (X > = 245 AND X < = 265) AND (Y > = 40 AND
   Y < = 110) THEN Z = 6
140 IF (X > = 215 AND X < = 245) AND (Y > = 40 AND
   Y < = 60) THEN Z = 6
141 IF (X > = 215 AND X < = 235) AND (Y > = 60 AND
   Y < = 100) THEN Z = 6
```

continued on next page



SPACE MAZE

```

142 IF (X > = 180 AND X < = 235) AND (Y > = 80 AND
    Y < = 100) THEN Z = 6
145 IF (X > = 180 AND X < = 200) AND (Y > = 60 AND
    Y < = 100) THEN Z = 8
150 IF (X > = 140 AND X < = 180) AND (Y > = 60 AND
    Y < = 80) THEN Z = 9
160 IF (X > = 100 AND X < = 160) AND (Y > = 40 AND
    Y < = 60) THEN Z = 10
162 IF (X > = 100 AND X < = 120) AND (Y > = 60 AND
    Y < = 80) THEN Z = 11
165 IF (X > = 106 AND X < = 114) AND (Y > = 66 AND
    Y < = 74) THEN 3000: REM BRANCH TO WIN
170 IF Z < = 0 THEN 4000: REM BRANCH TO CRASH...NO
    FLAGS WERE SET TO INDICATE PRESENCE IN THE MAZE
    ...THEREFORE MUST BE OUTSIDE.
175 Z = 0: RETURN: REM RESET Z EACH TEST
200 X = 15:Y = 90:HV = 0:VV = 0:TH = 600:X0 = 15:Y0 =
    90: CALL - 936
210 IF PDL (2) > = 150 THEN HV = HV + 1
220 IF PDL (2) < = 75 THEN HV = HV - 1
230 IF PDL (1) > = 150 THEN VV = VV + 1
231 IF HD$ = "E" THEN 240
232 IF RND (1) < .05 THEN HV = HV + 1
233 IF RND (1) > .95 THEN VV = VV + 1
240 IF PDL (1) < = 75 THEN VV = VV - 1
242 X = X0 + HV:Y = Y0 + VV
243 TH = TH - 1: VTAB 21: PRINT TAB( 10)"FUEL LEFT=
    ";TH: IF TH < 100 THEN VTAB 21: CALL - 868: PRINT
    TAB( 10)"FUEL LEFT= ";TH
245 VTAB 22: CALL - 868: PRINT "HORIZ =";HV: PRINT
    TAB( 25)"VERTICAL =";VV
260 HCOLOR= 3: HPLLOT X,Y: IF PT = 0 THEN 267
265 VTAB 23: PRINT TAB( 4)"PREVIOUS RECORD SCORE IS
    ";PT
267 IF TH < = 0 THEN CALL - 936: FLASH: PRINT TAB(
    10)"OUT OF FUEL";: PRINT TAB( 10)" ": GOTO 4001

270 IF X = X0 AND Y = Y0 THEN 300
280 HCOLOR= 0: HPLLOT X0,Y0: IF NS$ = "N" THEN 300
285 POKE 780,150: POKE 781,10: CALL 782
300 X0 = X:Y0 = Y: GOSUB 100: GOTO 210
498 REM THE 500 SUBRTNE SETS UP THE MUSIC. M1=PITCH
    , M2=DURATION. 700 PLAYS IT.
500 M1 = 255:M2 = 250: GOSUB 700:M1 = 170:M2 = 250: GOSUB
    700:M1 = 190:M2 = 75: GOSUB 700:M1 = 203:M2 = 72
    : GOSUB 700
505 M1 = 230:M2 = 75: GOSUB 700:M1 = 126:M2 = 250: GOSUB
    700:M1 = 170:M2 = 250: GOSUB 700:M1 = 190:M2 = 7
    5: GOSUB 700
510 M1 = 203:M2 = 75: GOSUB 700:M1 = 230:M2 = 75: GOSUB
    700:M1 = 126:M2 = 250: GOSUB 700:M1 = 170:M2 = 2
    50: GOSUB 700

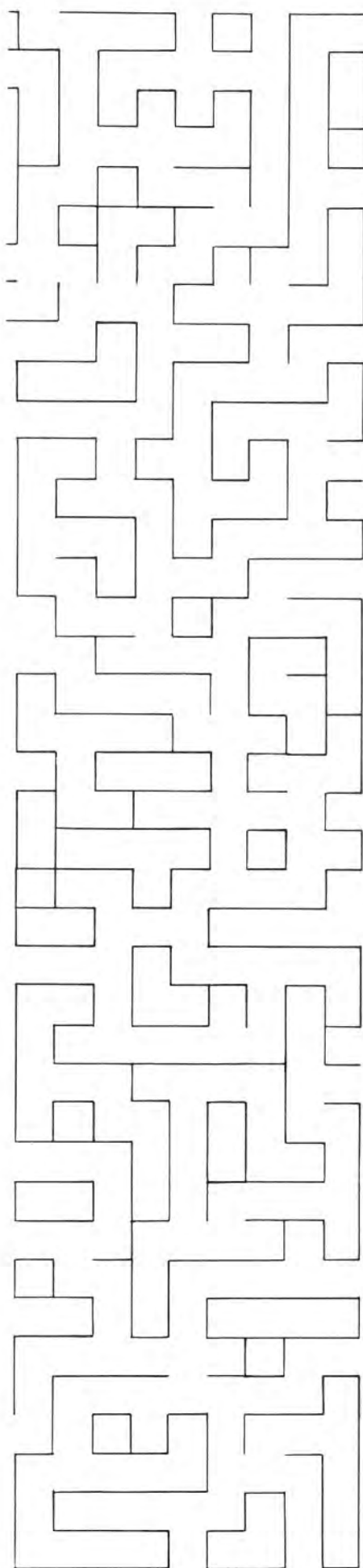
```

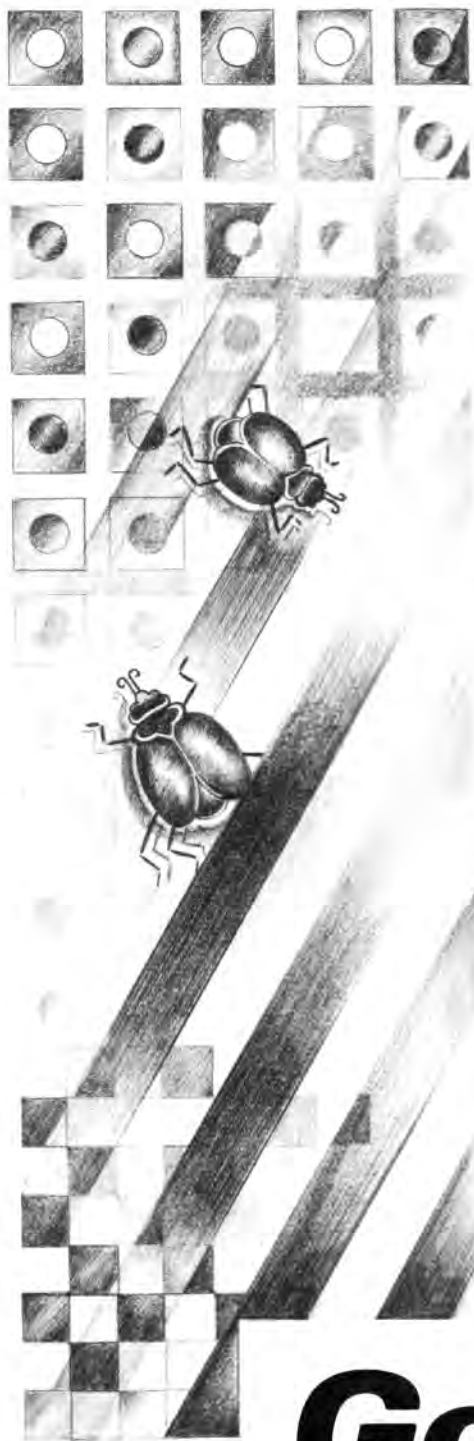
EASY MAZE

```

515 M1 = 190:M2 = 100: GOSUB 700:M1 = 203:M2 = 100: GOSUB
    700:M1 = 190:M2 = 100: GOSUB 700:M1 = 230:M2 = 2
    50: GOSUB 700: RETURN
700 POKE 780,M1: POKE 781,M2: CALL 782: RETURN
2000 HCOLOR= 3: HPLLOT 0,0 TO 279,0 TO 279,159 TO 0,1
    59 TO 0,0
2001 HPLLOT 70,10 TO 60,10 TO 60,20 TO 70,20 TO 70,30
    TO 60,30: HPLLOT 75,30 TO 75,10 TO 85,10 TO 85,2
    0 TO 75,20: HPLLOT 90,30 TO 90,10 TO 100,10 TO 10
    0,30: HPLLOT 90,20 TO 100,20
2002 HPLLOT 115,10 TO 105,10 TO 105,30 TO 115,30: HPLLOT
    130,10 TO 120,10 TO 120,30 TO 130,30: HPLLOT 120,
    20 TO 125,20: HPLLOT 140,30 TO 140,10 TO 146,20 TO
    152,10 TO 152,30
2003 HPLLOT 158,30 TO 158,10 TO 168,10 TO 168,30: HPLLOT
    158,20 TO 168,20: HPLLOT 173,10 TO 183,10 TO 173,
    30 TO 183,30: HPLLOT 198,10 TO 188,10 TO 188,30 TO
    198,30: HPLLOT 188,20 TO 193,20
2005 HPLLOT 10,80 TO 80,80 TO 80,100 TO 100,100 TO 10
    0,140 TO 120,140 TO 120,120 TO 180,120
2010 HPLLOT 180,120 TO 180,140 TO 200,140 TO 200,110 TO
    245,110 TO 245,60 TO 235,60 TO 235,100 TO 180,10
    0 TO 180,80 TO 140,80 TO 140,60 TO 120,60 TO 120
    ,80 TO 100,80
2015 HPLLOT 100,80 TO 100,40 TO 160,40 TO 160,60 TO 2
    00,60 TO 200,80 TO 215,80 TO 215,40 TO 265,40 TO
    265,130 TO 220,130 TO 220,158 TO 160,158
2020 HPLLOT 220,158 TO 160,158 TO 160,140 TO 140,140 TO
    140,158 TO 80,158 TO 80,120 TO 60,120 TO 60,100 TO
    10,100
2030 HCOLOR= 3: HPLLOT 106,66 TO 114,66 TO 114,74 TO
    106,74 TO 106,66
2033 HPLLOT 108,68 TO 112,72: HPLLOT 108,72 TO 112,68:
    RETURN
3000 POP : TEXT : FOR NN = 250 TO 0 STEP - 15: PRINT
    "** WINNER **": POKE 780,NN: POKE 781,10
3005 CALL 782: NEXT NN: FOR N = 1 TO 500: NEXT N: PRINT
    : PRINT
3010 IF TM > PT THEN HOME : VTAB 10: FLASH : PRINT
    "CONGRATULATIONS!": NORMAL : PRINT "YOU'VE BEATE
    N THE PREVIOUS HIGH SCORE ": PRINT "OF ";PT;" WI
    TH YOUR SCORE OF ";TM
3011 GC = GC + 1: IF GC = 1 THEN PRINT : PRINT "IF Y
    OU'VE BEEN PLAYING THE EASY GAME": PRINT "YOU'RE
    A WINNER! NOW WE'LL ADVANCE TO": PRINT "THE HA
    RD GAME":HD$ = "H"
3012 IF TM > PT THEN PT = TM
3015 GOTO 4007
4000 POP : TEXT : FLASH : FOR NN = 1 TO 100: PRINT "
    ** CRASH **": NEXT NN: NORMAL
4005 FOR NN = 1 TO 250 STEP 50: POKE 780,NN: POKE 78
    1,50: CALL 782: NEXT NN
4006 FOR NN = 1 TO 2000: NEXT NN: CALL - 936
4007 INPUT "ANOTHER MISSION? HIT RETURN":A$: HGR : GOTO 40

```





For newcomers to computers, there's a term to describe what computers do with incorrect information . . . GI-GO. It stands for "Garbage In - Garbage Out". This is a particular danger with personal computers . . . although the very largest systems still depend on accurate input. In Applications for the Home, any one of a number of people may be putting information into the system and, with the tips in this article, you can substantially reduce the errors they make, and the ones you may make yourself.

Some of the more common pitfalls are:

- ☐ Wrong code in selecting Options Menu.
- ☐ Deleting a Non-existent Record Number.
- ☐ Entering too much data to be printed in a final report field.
- ☐ Entering a Month larger than 12, or a Day larger than 31.
- ☐ Mistakenly trying to access a Master File and subsequently destroying it.
- ☐ Entering Alphabetic information in a Numeric field.
- ☐ Capturing one kind of error which Creates another kind of error.
- ☐ Allowing "Default" (fall-through) in a program to destroy a file.
- ☐ Programming errors . . . How to handle Applesoft's 17 Error Traps.

Goof Proofing Your Input

Let's begin.

The Trend Reporting, Analysis and Control (TRAC) System in this issue contains a number of "Menus" or lists of options from which to select records and reports. After each "INPUT" statement, a "Range Check" is made to assure that the number just entered is valid. If your option list has 5 CHOICES the test is as follows:

```
100 INPUT "SELECT OPTION"; OP
105 GOSUB 270: REM ERASE ERROR MSG
110 IF OP < 0 OR OP > 5 THEN GOSUB 280:
    GOTO 100: REM ERROR MESSAGE
*
270 VTAB 23: CALL-868: RETURN
280 VTAB 23: PRINT "INVALID ENTRY...
    PLEASE TRY AGAIN.": RETURN
```

In this manner, each time an error is entered into the system, you are notified, and the system rejects the error and resets your program back to the INPUT statement. The subroutine at 280 prints the "Error Message" out of the way at the bottom of the screen. The subroutine at 270 Erases the "Error Message" when you've successfully entered a valid number.

Deleting Records from a file can be a nasty and potentially dangerous job . . . There you sit, deleting "cancelled checks" or old "credit card slips" and all of a sudden, the system hangs up . . . or worse, it continues accepting your input until later, when it tries to process, it discovers you've entered a record # that DOESN'T EXIST.

The solution lies in the Record Count which you keep in the Header Record of your disk. When you read in a file (from the last session), use the Record Count not only to read, but also to "Range Test" the record numbers you are entering. Again, using the "GREATER THAN", and "LESS THAN" instructions you can keep yourself "Goof Proof" on this. In this case, you may want to add an expanded error message such as "NO SUCH RECORD EXISTS IN THE FILE . . . PLEASE REENTER" If "R" is the number of records stored in the file, the routine would read as follows:

```
100 VTAB 20: INPUT "RECORD # TO DELETE"; RN
105 VTAB 23: CALL-868: VTAB 21: REM ERASE
110 IF R < RN THEN VTAB 23: PRINT "NO
    SUCH RECORD EXISTS IN THE FILE...
    PLEASE REENTER. ": GOTO 100:
    REM FLAG
```

In this case, we used "In-Line" program statements rather than a subroutine to deal with a specialized error condition. This error-catching routine is used in TRAC line 2073.

Entering Alphabetic Information in a Numeric field CAN happen! You're speeding along, picking up the rhythm of entering information and you can wind up trying to put a NAME into the AMOUNT field. The Apple will catch it if you're trying to enter STRING data into a NUMERIC VARIABLE and will give a TYPE-MISMATCH error. But what if you are using STRING VARIABLES for ALL input (as we do in TRAC — to simplify processing)? The following illustration handles it.

```
100 VTAB 20: INPUT "AMOUNT"; A$
105 VTAB 23: CALL-868: VTAB 21: REM ERASE
110 IF ASC (A$) < 48 OR ASC (A$) > 57
    THEN VTAB 23: PRINT "NOT A NUMBER..
    PLEASE REENTER": GOTO 100: REM FLAG
```


You have just tested the first character of your Amount field to make sure it lies within the limits of 0-9 ASCII Digits. A string "0" is equivalent to ASCII decimal 48 and "9" is equivalent to ASCII decimal 57. If you wanted to test EACH CHARACTER in the field, you could do it with a loop:

```
100 VTAB 20: INPUT "AMOUNT"; A$
105 VTAB 23: CALL -868: VTAB 21:
    REM ERASE
110 FOR X= 1 TO LEN(A$)
115 X$= MID$(A$,X,1)
120 IF (ASC(X$) < 48 OR ASC(X$) > 57)
    AND ASC(X$) <> 46 THEN VTAB 23:
    PRINT "NOT A NUMBER OR DECIMAL..
    PLEASE REENTER."; FLAG =1:
    REM FLAG ERROR
125 NEXT X
130 IF FLAG =1 THEN 100:
    REM ERROR CORRECT
```

In this case, you used the MID\$ instruction to extract EACH character of the field for testing. Line 120 tests if the character is a NON-NUMBER and if it IS, it tests if it is a DECIMAL POINT. The character must be a Number or a Decimal in order to pass the test. Notice also, that we used a "Flag" or "Switch" to wait until the end of the loop to reset back to the Input statement. You don't want to directly branch out of a loop that is in process. It gives strange and unpredictable errors later on.

In TRAC, we assume that the test of the first character is sufficient for checking the amount field. The way the program is structured, "Amount" follows "Name" and if you're out of synchronization, the first character should trigger the error message. This routine is handled in line 242 of TRAC.

There is hardly a person who has worked with computers who hasn't destroyed a Master File at one time or another. In TRAC, the Master File contains all of the year-to-date balances for your home expenses. If you had kept the printed reports of the current checks and credit cards, as well as the most recent report of the year-to-date summaries, you could reconstruct it. But there's no need. The easiest way to protect the Master File is to PREVENT DIRECT ADDITIONS OR DELETIONS to it. In TRAC the Options List on the screen will look like this:

ENTER THE NUMBER OF THE OPTION YOU WANT TO USE.

- 1 = ADD RECORDS
- 2 = DELETE RECORDS
- 3 = SORT RECORDS
- 4 = REPORT/LIST OPTIONS
- 5 = END THE SESSION

ENTER YOUR SELECTION : 2

NOW ENTER THE NUMBER FOR SELECTING THE FILE TO BE USED.

- 1 = CREDIT CARDS
- 2 = CHECKS
- 3 = YEAR-TO-DATE DATA

ENTER YOUR SELECTION : 3

It looks as if you're about to Delete the Master File . . . right? Wrong. The system will respond with:

YEAR-TO-DATE FILES ARE ONLY ACCESSIBLE FOR REPORTS.. PLEASE REENTER

Here, we used a "Combination Check" to only allow access to the Master File IF the REPORT option has been selected from the first menu. Assigning "OM" to the Option Menu, and "FL" to the File selection, the test is:

```
10082 IF OM <> 4 AND FL = 3 THEN PRINT
    "YEAR TO DATE FILES ARE ONLY
    ACCESSIBLE"; PRINT "FOR REPORTS..
    PLEASE REENTER ."; GOTO 100
```

As a matter of fact, the only way a Year-to-Date file can be affected is by Deleting "Valid" Records (cancelled checks and credit card slips) which updates the Master File. In other words, the Master File is NOT TOTALLY ACCESSIBLE BY THE USER. You might correctly ask, "Why put Year-To-Date Data in the Options List if it's a "dummy" selection?". Good question! The answer is "HUMAN FACTORS". It makes the program easier to USE!

This is a brief digression. A month from now, when you sit down to use the system, you may want Year-to-Date Summary reports. When you get to the "File Selection" entry, all you would see is the option to select "Credit Cards" OR "Checks" . . . and you want BOTH! If the Year-to-Date Data option had been omitted, you might be left scratching your head trying to figure out how to read the Year-to-Date file. Including it in the options list solves the problem.

Next question: "Why not just skip over that entry whenever the 'Report Option' is chosen?" Answer: There are VALID Reports which require selecting either the Credit Card or Checks File (for example, to do a LISTING of the current outstanding records).

So, to summarize this point, you have protected the Master File, kept your options open, and provided proper "Human Factors" i.e. ease of use, to keep the integrity of your files.

Capturing One Kind Of Error Can Sometimes create Another Kind Of Error. In TRAC the 2nd field in each record contains either a Credit Card # or a Check #. If you do a "Range Check" which locks out invalid credit card numbers (any numbers greater than 5), and then try to enter check # 200, you may discover that you're trapped. Successful error-checking for one use may lock you out of entering data for another use.

The solution is, again, a "Combination Test" which uses information from the original "Options Menu". Using the data from the menu example above, if the File (FL) selected is "2" (indicating that Checks are being used), then you want to permit a large number to be entered. If variable FL does not equal 2 (indicating that Credit Cards are being used), then you want any number IN EXCESS OF 5 to give an error message. The program statement which handles this is:

```
100 VTAB 20: INPUT "CARD/CHECK #"; CC
105 IF FL <> 2 AND CC > 5 THEN 100
```

In this example, we also showed another "Short Method" for responding to an error. Simply REFUSE TO ACCEPT THE ENTRY. This is quicker and easier when the error is an obvious one and no error message is needed. This routine is illustrated in line 227 of TRAC.

Allowing a "Default" (fall-through) in a program can be a disaster if it happens in the wrong spot. A "non-critical" example in lines 3050-3053 of TRAC is used to illustrate ACTIVE vs. PASSIVE (Fall-through) control. This routine occurs at the end of the Sort routine when the system asks whether to "WRITE THE SORTED LIST TO DISK"? With a 'Y' or 'N' answer requested. Any time you're going to WRITE DISK it's a good idea to demand a positive test of 'Y' BEFORE writing. This is in the statements:

```
100 INPUT "WRITE TO DISK?
    'Y' OR 'N'"; X$
110 IF X$ = "Y" THEN GOSUB 800: REM DO
    THE DISK WRITE
```

At this point, you could either allow the program to continue on any "Non- Y" or you could do a Positive Test on "N". This is done by adding a statement: 120 IF X <> "N" THEN PRINT "ERROR . . . Enter Y OR N": GOTO 100. This can be very important if you originally tried to type in "Y" and somehow goofed and typed in some other character. In that case, you would NOT want the program to continue merrily on it's way. 'Nuff said.

The use of the instructions ONERR GOTO and ONERR GOSUB are discussed in this issue in the article "INITIALIZE NEW FILES". In the article, these "Error Detection" instructions are used to automatically initialize new data files on disk. When they are used in that way, they will usually disable the Normal Applesoft "Programming Error Messages" and you'll get whatever resides in your error handling routine. It's a good idea, therefore, to Re-Enable the programming error messages with the following statements:

```
1998 PRINT "CHECK APPLESOFT MANUAL
    PG. 136 FOR ERROR"; PRINT "THE
    ERROR CODE IS "; PEEK(222); " AND";
    PRINT "IT OCCURS IN LINE #"; PEEK
    (218) + PEEK(219) * 256
```

The Error Codes are listed on Page 81, and again on Page 136 of the Applesoft Manual. The Line Number in which the error occurred is stored in memory locations 218 (low order byte) and 219 (high order byte).

Using this approach, and the one in the "ONERR" article, you can allow "Correctable" errors to be "Processed", and "Hard" errors to stop the system with an appropriate message. In "Enabling" the code messages, you could even build your own "Message Table" to print out "Custom Error Messages" with some suggestion (to your user or yourself) of what to do when an error is encountered.

One final note: Good Human factors suggests using INVERSE Prompts for Input requests. In that manner, every time the system prints black characters on a white background, the user knows that he or she must enter data or take some other action.

All of this may seem like a big nuisance, not to mention the "Extra" programming involved. It may be an irritation at the moment, but a few months from now, when you have months and months of data accumulated in your files, you'll be glad that you **Goof-Proofed Your Input!**

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INSIDE APPLICATIONS

Error Correction Made Simple

Correct and accurate Data Entry is the Keystone to good programming. Here are a few tips to help.

First, Keep track of a few key fields of the PREVIOUS record (just entered), by printing them in a "protected" area of the screen. It can be enormously helpful to have a visual reminder of what you have just entered for "Account Number", "Date", and "Amount", for example.

Second, print the "Sequence" or "Record" No. currently being entered, again, in a protected area of the screen. It will be confidence-inspiring to SEE your Record No. decrease by 1, when you "back up" to make a correction to the previous record.

Third, give yourself the option to BACKUP and RE-DO the previous record just entered. One suggestion, is to make your first field entered (in each record), an Alphabetic String (even if it is a Numeric Account No.) Consider the following program:

```
200 I= I+1
210 INPUT "ACCOUNT NO.,";
    W$(I,1)
220 IF W$(I,1)= "END"
    THEN RETURN
230 IF W$(I,1)= "REDO"
    THEN I=I-1:
        GOTO 210
240 W= VAL(W$(I,1)):
    IF W>24 THEN 210
```

By using an Alphabetic field, you don't have to try to remember whether it is Account No. 99 or 999 or 9999 that signals the end of your data entry. For checking whether your "Just Entered" Account No. is in the proper "Range" of acceptable numbers (In TRAC, this range is 1-24 acceptable Account Numbers), just do a quick conversion to Numeric and check its range. (Note: If you DON'T convert the alphanumeric string to its numeric equivalent before range-check you'll get some strange results. Your program will accept '1234' as valid i.e. within the range of 1-24, but will reject '3' as invalid. See the article on "Sort 'Em Out" in this issue. The article explains the effect of comparing Alpha and Numeric fields.)

These methods are illustrated in lines 200-225 in TRAC in this issue.

Squinch Lists After "Delete"

When you are updating a List by DELETING items from it (such as Cancelled Checks etc.), you will want to get rid of them and produce a NEW List, properly sequenced, of the items that remain. Here's a useful way to do it.

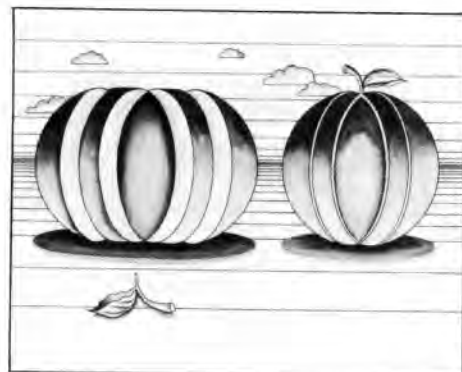
First, as you are deleting each item, MARK IT by setting one or more of its fields to a "Blank". Then, when you've finished with all of the "Delete Entries", use the following routine:

```
200 N=0 : S=0
210 S= S+1
220 N= N+1
230 IF N>R THEN RETURN
240 IF W$(N,1)= " "
    AND W$(N,2)= " "
    THEN 220
250 FOR X= 1 TO 6:
    W$(S,X)= W$(N,X):
NEXT X
260 GOTO 210
```

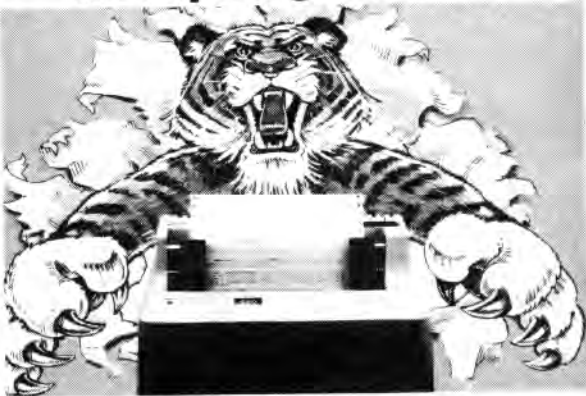
This will have the effect of scanning through your OLD list while making a properly sequenced NEW list. Whenever a MARKED RECORD is encountered in the old list, it will be SKIPPED OVER. When 'N' exceeds the number of records in the OLD list, you will have finished and can therefore RETURN to the main program.

Whenever a record from the OLD list is NOT marked, it is copied into the new list. In the example above, six fields are copied for each record (in line 250).

This routine is used in lines 2085-2202 of TRAC.



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"Autostart Rom" Considerations

Before you buy the AUTOSTART ROM... DON'T. That is, don't buy it if you ever plan to purchase PASCAL and the APPLE Language System. The AUTOSTART ROM comes as a standard feature of the Language System card.

What IS AUTOSTART? I had to buy it to find out, since my local friendly computer store said simply, "It has some easier editing, and it'll boot your disk when you turn on the system." This was not too far off the mark and I followed their advice to cool it. Now, having installed PASCAL (with AUTOSTART included), I can tell you what it does.

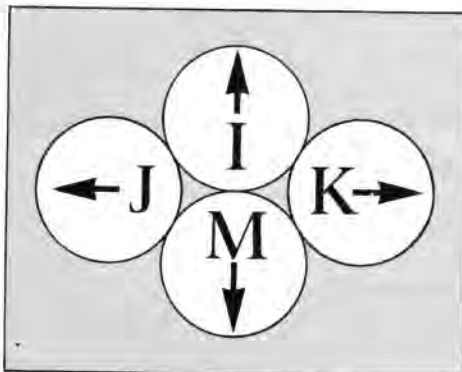
First, it does indeed attempt to boot the disk when the system is turned on. EXCEPT that it won't boot just ANY disk. It needs to boot EITHER a Pascal Disk or a SPECIAL 'BASICS' Disk supplied with the Language System. It won't boot a regular DOS disk without FIRST loading the special BASICS Disk. Unless you have two disks installed, you'll do a lot of disk swapping that you didn't used to do.

Second, I haven't been able to figure out how to load the Boot Routines (from the BASICS Disk), on to a regular DOS disk, to make it do Double-duty. This would be a super convenience for 1-Drive owners and **NIBBLE will pay a \$50 prize for the reader who comes up with the answer.**

So much for the bad news. Autostart does indeed, make editing easier. By pressing the ESC Key, the I, J, K, M Keys give you FULL CURSOR CONTROL. Consider the layout of the keys:

You can now move the cursor indefinitely with one press of ESC. Furthermore, once the cursor is positioned over that part of a program line needing an insertion or a DELETION, the J and K Keys will do the job quickly and simply.

One of the excellent features of AUTOSTART is its "Soft Reset". This is an excellent fail soft in the fact that pressing the Reset Key returns the system to the particular BASIC in use and does so WITHOUT DESTROYING THE PROGRAM WHICH IS CURRENTLY IN MEMORY. If you've ever had a program error in the middle of a Print routine you know that under those conditions, your program destroys itself. SOFT RESET prevents that from happening. There are special "Call" routines which can disable SOFT RESET if you're switching back and forth between BASIC and the Monitor, but for the most part, you will probably leave it operational and be glad it's there! (It also leaves your program variables intact.)

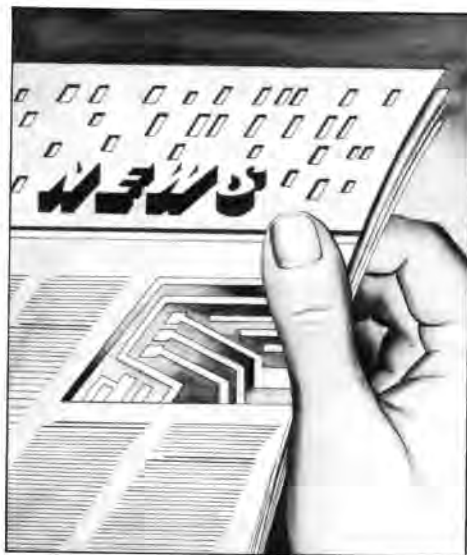


Finally, AUTOSTART gives the Apple a STOP and RESUME LISTING capability. Hitting CTL S stops a LIST in progress. Hitting CTL S again resumes the LIST.

There you have it. The people at the local computer store were not too far off the mark in their recommendation. Again, an ability to COPY the BASICS Boot Routines on to a regular DOS disk would be a big convenience. The \$50 NIBBLE AWARD is waiting for the first solution!

Micro-Verter UHF RF Interface Modulator

ATV Research has announced the Micro-Verter to interface the Apple II (and other microcomputers) to color or black-and-white television sets. Because the Micro-Verter operates in the UHF channels above Channel 14 (beyond the range of switching harmonics), it can be expected to deliver substantially better clarity and resolution than standard RF modulators. It comes with video cable and radio frequency output coupler and generally requires no direct connection to the antenna terminals of your television set. It is priced at \$35. For more information, contact ATV Research, 13th and Broadway, Dakota City NE 68731.



S-C Software Announces APPLE Dos 3.2 Assembler Upgrade

S-C Software is delivering an inexpensive upgrade package for the S-C Assembler II. Priced at \$12.95, the package upgrades the Assembler II to Apple's DOS Version 3.2 and adds Key new features:

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The S-C Assembler II includes additional directives and instructions which make Assembly Language programming almost as easy as BASIC. It includes arithmetic expressions in the operand field, a fast RENUMBER command, BASIC-like text editing, and access to all of the Assembler and DOS utilities.

For current Assembler II owners, the Upgrade Kit is available for \$12.50 on Diskette with an 11-page manual supplement. The full version of the Assembler II is priced at \$35 with a 40-page reference manual. For more information, write S-C Software, P.O. Box 5537, Richardson, TX 75080.

New Applesoft II Development Aids

A new set of 3 programs is available to assist in the development and documentation of Applesoft II programs.

VARDOC lists every variable used in an Applesoft program, along with the line in which the variable is used.

LINEDOC lists every line called by a GOTO, GOSUB, etc. and also lists the line doing the calling.

REPLACE lets the user rename any or all occurrences of a variable. It also allows replacement of constants or referenced line numbers throughout the program.

The package of three programs is available on cassette for \$9.95, or on Diskette for \$13.95 from Southwestern Data Systems, P.O. Box 582, Santee, CA 92071.

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<input type="checkbox"/> TOTALS BY ROW		X		X	
<input type="checkbox"/> AVERAGES BY COLUMN	X				
<input type="checkbox"/> EACH LINE ITEM % OF TOTAL	X				
<input type="checkbox"/> SUBTOTALS AND GRAND TOTALS	X		X		X
<input type="checkbox"/> MULTIPLY TWO COLUMNS	X				
<input type="checkbox"/> TOTALS BY ROW AND COLUMN	X	X		X	
<input type="checkbox"/> TOTALS AND MULTIPLY TWO COLS.	X		X		
<input type="checkbox"/> COL SUBTOTALS & TOTALS BY ROW	X		X	X	X

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Periodically, NIBBLE will cross-index the more "interesting" articles which have appeared in the principle magazines on the subject of the current issue. This month, the Index lists the more useful articles which have appeared on Home Applications of computers. They are not all exclusively about the Apple, but most of the programs are readily adaptable to your system.

The magazine "KEYS" are:
P.C. = Personal Computing;
B. = BYTE
K.M. = Kilobaud Microcomputing;
I.A. = Interface Age.

In particular, you may want to examine the Graphics articles for ideas on the TRAC contest!



Index To Selected Home Applications Articles

SUBJECT:	TITLE	MAG: MO:
ART	APPLE II... ARTIST EXTRAORDINAIRE	P.C. APR
BUDGET	PERSONAL FINANCES — A MODEL FOR PLANNING	C.C. JUL
BUDGET	TRACKING PRICES AT THE STORE	P.C. MAY
BUDGET	SIMPLER INTEREST (MORTGAGE CALCULATIONS)	K.M. FEB
EDUCATION	APPLES... COMPUTERS... AND TEACHERS	I.A. OCT
FINANCE	PERSONAL FINANCE SYSTEM PART 1	K.M. JUN
FINANCE	PERSONAL FINANCE SYSTEM PART 2	K.M. JUL
FINANCE	MICROCOMPUTER ANALYSIS OF RETURN ON INVESTMENT	I.A. MAY
FINANCE	PERSONAL FINANCE SYSTEM PART 3	K.M. AUG
FINANCE	A SIMPLE FINANCIAL REPORT WRITER	I.A. FEB
GRAPHICS	APPLE II HIGH-RESOLUTION GRAPHICS	K.M. SEP
GRAPHICS	ULTRA BANNER (BIG PRINTING)	K.M. MAR
GRAPHICS	MORE COLORS FOR YOUR APPLE	B. JUN
GRAPHICS	VISUAL AIDS FOR BUSINESS/HOME/SCHOOL	P.C. AUG
GRAPHICS	DRAWING THREE DIMENSIONAL OBJECTS	P.C. NOV
GRAPHICS	APPLE KALEIDOSCOPE (LO RES- HI SPEED)	B. JUL
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GRAPHICS	VERTICAL GRAPHS AND BAR CHARTS	C.C. APR
HARDWARE	LOWER CASE FOR YOUR APPLE II- PART 1	K.M. NOV
HARDWARE	APPLE CIPHERS	K.M. AUG
HARDWARE	DOUBLING SPACE ON SINGLE-SIDED DISKS	P.C. JUN
HARDWARE	THE APPLE SPEAKS... SOFTLY	K.M. FEB
HEALTH	HOME POISON CONTROL	I.A. JUN
HEALTH	YOUR FAMILY HEALTH PLAN (PROGRAM)	P.C. MAY
HEALTH	ADULT CALORIC REQUIREMENTS	K.M. SEP
HOBBY	LET'S GO FLYING! (FLYING FLIGHT PLANS)	K.M. APR
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HOME CARE	WATERING YOUR LAWN BY COMPUTER	P.C. MAY
HOME CARE	PLANTMAN (HOUSEPLANT PLANNING AND CARE)	P.C. FEB
HOME CARE	MENU PLANNING (COMPREHENSIVE)	P.C. FEB
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INVESTMENT	VIEWING REAL ESTATE INVESTMENTS	P.C. OCT
INVESTMENT	THE APPLE GOES TO MARKET	K.M. NOV
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SORTING	QUICKSORT! (NEW FASTER TECHNIQUE)	K.M. APR
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TAX	TAX BASE (INCOME TAX DATA BASE)	P.C. APR
WEATHER	HURRICANE! (WEATHER TRACKING SYSTEM)	K.M. OCT
WEATHER	WEATHERMAN... A PROGRAM FOR ALL SEASONS	P.C. JAN
WORD PROC	ADDRESS LIST EDITOR	K.M. JAN
WORD PROC	A TEXT FORMATTER IN BASIC	K.M. MAY
WORD PROC	NAMELIST—A FORMATTED NAME LISTING ROUTINE	I.A. MAY
WORD PROC	CREATIVE TABULATION (MARGIN JUSTIFICATION)	K.M. JUN

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ISO-2

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TRAC

PROGRAM LISTING

```
72 T$ = W$(H,6):W$(H,6) = W$(V,6):W$(V,6) = T$
75 H = H - M
80 IF H < 1 THEN 87
85 GOTO 30
87 J = J + 1
89 IF J > K THEN 12
91 GOTO 25
95 FLASH : PRINT "SORT COMPLETED": NORMAL
97 RETURN
100 REM ** WRITE ACCOUNTS ON SCREEN **
105 CALL - 936: FOR N = 0 TO 39: PRINT "*";: NEXT N
110 FOR N = 1 TO 12: PRINT N$(N);
120 HTAB 20: PRINT N$(N + 12)
130 NEXT N
135 FOR N = 0 TO 39: PRINT "*";: NEXT N
140 INVERSE : PRINT "1=MC 2=VSA 3=AMEX 4=GAS 5=OTHER"
145 PRINT "TYPE 'END' TO END,,OR 'REDO' TO REENTER": NORMAL
150 FOR N = 0 TO 39: PRINT "*";: NEXT N
160 POKE 34, PEEK (37): RETURN
175 RETURN
200 REM ** INPUT DATA **
202 GOSUB 100
203 I = I + 1: NORMAL
204 VTAB 19: CALL - 868: PRINT "SEQ #";I
205 VTAB 20: CALL - 868: INVERSE : INPUT "ACCOUNT # ";W$(I,1)
207 GOSUB 270
210 IF W$(I,1) = "END" THEN NORMAL : I = I - 1: RETURN
215 IF W$(I,1) = "REDO" THEN I = I - 1: GOTO 204
220 W = VAL (W$(I,1)): IF W > 24 THEN GOSUB 280: GOTO 205
225 VTAB 21: CALL - 868: PRINT F$;: INPUT W$(I,2)
226 GOSUB 270
227 W = VAL (W$(I,2)): IF FL < > 2 AND W > 5 THEN GOSUB 280: GOTO 225
230 VTAB 21: HTAB 25: CALL - 868: INPUT "MONTH,DAY:";W$(I,3),W$(I,4)
231 GOSUB 270
232 WM = VAL (W$(I,3)):WD = VAL (W$(I,4)): IF WM > 12 OR WD > 31 THEN GOSUB 280: GOTO
230
235 VTAB 22: CALL - 868: INPUT "PAID TO:";W$(I,6)
236 GOSUB 270
237 IF LEN (W$(I,6)) > 14 THEN VTAB 23: PRINT "MAX 14 CHARS ALLOWED..PLEASE REENTER":
GOTO 235
240 VTAB 22: HTAB 25: CALL - 868: INPUT "AMOUNT:";W$(I,5)
241 GOSUB 270
242 IF ASC (W$(I,5)) < 48 OR ASC (W$(I,5)) > 57 THEN VTAB 23: PRINT "NOT A NUMBER..P
LEASE REENTER": GOTO 240
250 HOME : PRINT "LAST ACCT=";W$(I,1); " MONTH=";W$(I,3); " AMT= $";W$(I,5)
255 GOTO 203
270 VTAB 23: CALL - 868: RETURN
280 VTAB 23: PRINT "INVALID ENTRY,, PLEASE REENTER": RETURN
800 REM ** PRINT SUMMARY **
805 POKE 54,0: POKE 55,193
810 PRINT CHR$ (2); CHR$ (30)
815 PRINT "": REM CTRL I 100N
820 PRINT TAB( 25)F$; " SUMMARY REPORT"
825 PRINT TAB( 27)"TODAY'S DATE ";MT;"/";D;"/";Y
827 IF OM = 3 THEN PRINT TAB( 27)"SORTED ";A$
```

continued on next page

STOCK MARKET ANALYSIS PROGRAM DJI WEEKLY AVERAGE 1897-1980

ANA1* (ANALYSIS 1) is a set of BASIC Programs which enables the user to perform analyses on the Dow Jones Industrial weekly average data. From 6 months to 5 years of user selected DJI data can be plotted on the entire screen in one of 5 colors using Apples' High Resolution capabilities. The DJI data can be transformed into different colored graphic representations called transforms. They are: user specified moving averages; a least squares linear fit (best straight line); filters for time, magnitude, or percentage changes; and user created relationships between the DJI data, a transform, or a constant using +, -, x, / operators. Colored lines can be drawn between graphic points. Graphic data values or their dates of occurrence can be displayed in text on the screen. Any graph or text can be outputted to a users printer. The Grid Scale is automatically set to the range of the graphs or can be user changed. As many colored graphs as wanted can be plotted on the screen and cleared at any time. The user can code routines to operate on the DJI/transform data or create his own disk file data base. ANA1 commands can be used with his routines or data base. An Update program allows the user to easily update the DJI file with current DJI weekly data.

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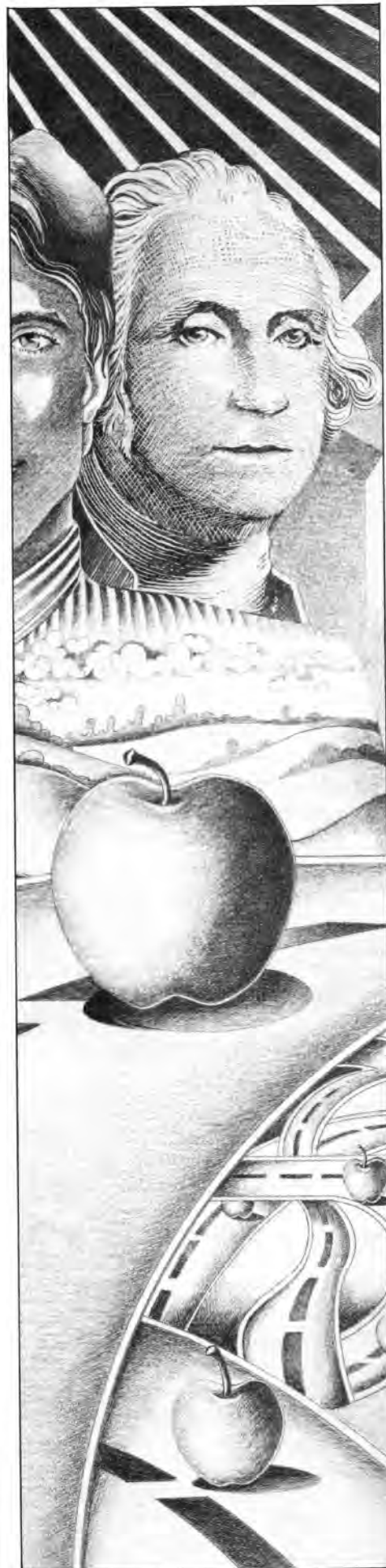
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TRAC

PROGRAM LISTING

```

830 PRINT : POKE 36,1: PRINT "SEQ";: POKE 36,12: PRINT "** PAID TO **";: POKE 36,28: PRINT
    "ACCT";: POKE 36,36: PRINT F$;: POKE 36,44: PRINT "MO";: POKE 36,50: PRINT "DAY";
832 POKE 36,56: PRINT "AMOUNT"
835 FOR X = 1 TO 70: PRINT "=";: NEXT X: PRINT
840 FOR X = 1 TO I
845 POKE 36,1: PRINT X;
850 POKE 36,9: PRINT W$(X,6);
855 POKE 36,(31 - LEN (W$(X,1))): PRINT W$(X,1);
860 POKE 36,(41 - LEN (W$(X,2))): PRINT W$(X,2);
865 POKE 36,(46 - LEN (W$(X,3))): PRINT W$(X,3);
870 POKE 36,(52 - LEN (W$(X,4))): PRINT W$(X,4);
875 W = VAL (W$(X,5))
876 T = T + W: IF FL = 1 THEN CC = VAL (W$(X,2)):CC(CC) = CC(CC) + W: REM ** GRAND TOT
    AL AND CR CD TOTALS"
880 P = W: GOSUB 980
885 POKE 36,(52 + B - C - 1): PRINT W
890 NEXT X
892 FOR X = 1 TO 70: PRINT "-";: NEXT X: PRINT
895 P = T: GOSUB 980
900 POKE 36,1: PRINT " *** TOTAL ***";: POKE 36,(52 + B - C - 1): PRINT T
905 IF FL < > 1 THEN 990: REM ** SKIP CR CD SUMMARY **
907 PRINT : PRINT
910 FOR X = 1 TO 5:P = CC(X): GOSUB 980: PRINT CD$(X);: POKE 36,(15 + B - C - 1): PRINT
    CC(X): NEXT X
960 GOTO 990
980 B = 9:C = (P > 10) + (P > 100) + (P > 1000) + (P > 10000): RETURN
990 PRINT "": REM CTRL I 40M
995 POKE 54,240: POKE 55,253
998 IF SW = 1 THEN RETURN
999 CLEAR :BU = 1: GOTO 10002: REM ** RETURN TO MENU **
1000 REM ** ADD TO CURRENT FILE **
1005 ONERR GOTO 1950
1010 PRINT D$;"OPEN";F$;"",L40"
1020 PRINT D$;"READ";F$;"",R0"
1025 INPUT R
1035 PRINT D$;"CLOSE";F$
1040 I = R: GOSUB 200: REM **INPUT**
1045 TEXT
1050 PRINT D$;"OPEN";F$;"",L40"
1060 PRINT D$;"WRITE";F$;"",R0"
1065 PRINT I
1070 FOR X = R + 1 TO I
1080 PRINT D$;"WRITE";F$;"",R";X
1085 PRINT W$(X,1): PRINT W$(X,2): PRINT W$(X,3): PRINT W$(X,4): PRINT W$(X,5): PRINT W
    $(X,6)
1090 NEXT X
1095 PRINT D$;"CLOSE";F$
1100 IF SW = 1 THEN RETURN
1105 CLEAR :BU = 1: GOTO 10002: REM ** RETURN TO MENU **
1950 ER = PEEK (222): POKE 216,0: IF ER < > 5 THEN 1998
1955 PRINT D$;"CLOSE";F$
1960 R = 0: GOTO 1040
1998 PRINT "CHECK APPLESOFT MANUAL PG. 136 FOR ERR": PRINT "THE ERROR IS #"; PEEK (222)
    : PRINT "LOCATED IN LINE #"; PEEK (218) + PEEK (219) * 256
1999 END

```

continued on next page

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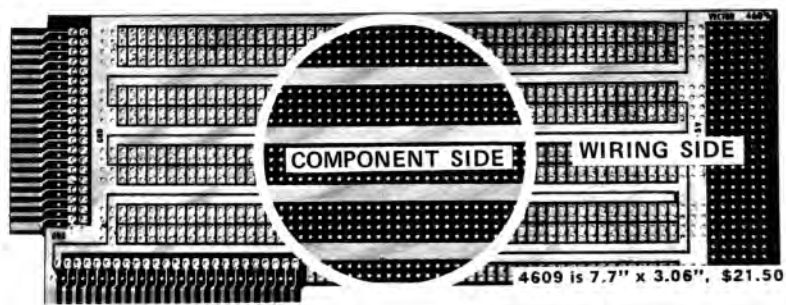
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TRAC

PROGRAM LISTING

```

2000 REM ** DELETE RECORDS **
2005 FLASH : PRINT "READING "F$;" FILE": NORMAL
2010 PRINT D$;"OPEN" F$;"L40"
2020 PRINT D$;"READ" F$;"R0"
2025 INPUT R
2030 FOR X = 1 TO R
2035 PRINT D$;"READ" F$;"R" X
2040 INPUT W$(X,1),W$(X,2),W$(X,3),W$(X,4),W$(X,5),W$(X,6)
2045 NEXT X
2050 PRINT D$;"CLOSE" F$
2055 IF SW = 1 THEN RETURN
2060 CALL - 936
2065 VTAB 10: PRINT "DELETING A RECORD WILL AUTOMATICALLY"; PRINT "ADD IT TO THE BALANC
ES BEING CARRIED"; PRINT "FORWARD FOR TREND REPORTING"
2070 VTAB 15: PRINT "WHICH RECORD # DO YOU WANT TO DELETE?"; CALL - 868: INVERSE : INPUT
"ENTER RECORD # OR TYPE 'END'"; DL$
2072 IF DL$ = "END" THEN NORMAL : GOTO 2085
2073 DL = VAL (DL$): DL$ = " ": IF DL > R THEN PRINT "NO SUCH RECORD. HIGHEST RECORD IS
"R: GOTO 2070
2075 VTAB 17: CALL - 868: PRINT "DELETING :"; W$(DL,6); VTAB 18: CALL - 868: PRINT "AM
OUNT :"; W$(DL,5)
2080 Z = Z + 1: FOR X = 1 TO 5: W(Z,X) = VAL (W$(DL,X)): NEXT X: REM ** TRANSFER TO WOR
K AREA **
2081 W$(DL,1) = " ": W$(DL,2) = " ": REM ** FLAG FOR LATER COMPRESSING **
2083 GOTO 2070
2085 REM ** COMPRESS FILE **
2087 N = 0: S = 0
2088 S = S + 1
2090 N = N + 1
2094 IF N > R THEN 2205
2095 IF W$(N,1) = " " AND W$(N,2) = " " THEN 2090
2200 FOR X = 1 TO 6: W$(S,X) = W$(N,X): NEXT X
2202 GOTO 2088
2205 REM ** WRITE COMPRESSED FILE TO DISK **
2210 I = S - 1: R = 0: SW1 = 1: GOSUB 1050: SW = 0
2250 REM ** READ YTD BALANCES **
2255 ONERR GOTO 2500
2257 FLASH : PRINT "READING YEAR-TO-DATE FILES": NORMAL
2260 PRINT D$;"OPEN BALANCES"
2265 PRINT D$;"READ BALANCES"
2270 FOR X = 1 TO 24: FOR N = 1 TO 12
2275 INPUT BAL(X,N)
2280 NEXT N,X
2285 PRINT D$;"CLOSE BALANCES"
2290 IF SW = 1 THEN RETURN
2300 REM ** UPDATE YTD BALANCES **
2305 FOR X = 1 TO Z: BAL(W(X,1),W(X,3)) = BAL(W(X,1),W(X,3)) + W(X,5)
2310 NEXT X
2320 PRINT D$;"OPEN BALANCES"
2325 PRINT D$;"WRITE BALANCES"
2330 FOR X = 1 TO 24: FOR N = 1 TO 12
2335 PRINT BAL(X,N)
2340 NEXT N,X
2345 PRINT D$;"CLOSE BALANCES"
2400 GOTO 800: REM ** PRINT **

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continued on next page

TRAC PROGRAM LISTING

```

2500 REM ** INITIAL RECORD **
2505 ER = PEEK (222): POKE 216,0: IF ER < > 5 THEN 1998
2510 PRINT D$;"CLOSE BALANCES"
2515 GOTO 2300
3000 REM ** SORT SETUP **
3005 SW = 1: GOSUB 2000:SW = 0: REM ** READ FILE **
3010 CALL - 936: FOR X = 0 TO 39: PRINT "*";: NEXT X
3015 PRINT : PRINT "WHICH FIELD DO YOU WANT TO SORT ON?"
3020 HTAB 10: PRINT "1 = ACCOUNT NUMBER": HTAB 10: PRINT "2 = CR CARD/CHECK NUMBER": HTAB
10: PRINT "3 = MONTH": HTAB 10: PRINT "4 = DOLLAR AMOUNT"
3025 PRINT : INVERSE : INPUT "ENTER YOUR SELECTION: ";SR: NORMAL
3026 IF SR = 1 THEN A$ = "BY ACCOUNT NUMBER"
3027 IF SR = 2 THEN A$ = "BY CARD/CHECK NUMBER"
3028 IF SR = 3 THEN A$ = "BY MONTH"
3029 IF SR = 4 THEN A$ = "BY DOLLAR AMOUNT":SR = 5
3030 IF SR > 5 THEN 3010
3032 FOR X = 1 TO R: FOR N = 1 TO 5:WK(X,N) = VAL (W$(X,N)): NEXT N,X: REM ** CONVERT
STRINGS TO DIGITS **
3035 FLASH : PRINT "SORT IN PROGRESS": NORMAL : GOSUB 10
3040 FOR X = 1 TO R: FOR N = 1 TO 5:W$(X,N) = STR$(WK(X,N)): NEXT N,X
3045 I = R: PRINT "PRINT SORTED LIST ON THE PRINTER?": INVERSE : INPUT "ENTER 'Y' OR 'N'
: ";X$: NORMAL : IF X$ = "Y" THEN SW = 1: GOSUB 800:SW = 0
3047 R = 0
3048 VTAB 13
3050 PRINT "SAVE SORTED LIST ON THE DISK?": INVERSE : INPUT "ENTER 'Y' OR 'N' : ";X$: NORMAL
: IF X$ = "Y" THEN SW = 1: GOSUB 1050:SW = 0
3051 GOSUB 270
3052 IF X$ = "Y" OR X$ = "N" THEN 3055
3053 GOSUB 280: GOTO 3048
3055 CLEAR :BU = 1: GOTO 10002: REM ** RETURN TO MENU **
4000 REM ** REPORT OPTIONS **
4002 TEXT : HOME
4005 FOR X = 1 TO 39: PRINT "*";: NEXT X
4010 HTAB 12: PRINT "** REPORT OPTIONS **"
4015 PRINT : PRINT "1 = LIST AND TOTAL CURRENT FILE"
4020 PRINT "2 = TREND ANALYSIS & AVERAGE MONTH"
4025 PRINT "3 = YEAR TO DATE SPENDING PROFILE": PRINT "4 = BAR GRAPH OF SPENDING PROFIL
E"
4030 VTAB 15: INVERSE : INPUT "ENTER SELECTION :";RP: NORMAL
4032 GOSUB 270
4035 IF RP > 4 THEN GOSUB 280: GOTO 4030
4040 ON RP GOTO 4100,4200,4300,4400
4100 REM ** LIST FILE **
4105 SW = 1: GOSUB 2000:SW = 0: REM ** READ FILE **
4110 I = R:SW = 1: GOSUB 800: CLEAR :BU = 1: GOTO 10002: REM ** RETURN TO MENU **
4200 REM ** TREND ANALYSIS **
4202 SW = 1: GOSUB 2250: REM ** READ YTD FILE **
4204 F$ = "CARD #": GOSUB 2000: REM ** READ CARD FILE **
4206 GOSUB 4390: REM ** ADD CR CDS TO BALANCES **
4208 F$ = "CHECK #": GOSUB 2000: REM ** READ CHECK FILE **
4210 GOSUB 4390: REM ** ADD CHECKS TO BALANCES **
4212 SW = 0: REM ** SHUT OFF SWITCH **
4215 FOR X = 1 TO 24: FOR N = 1 TO MT:AV(X) = AV(X) + BAL(X,N):TL(N) = TL(N) + BAL(X,N)
: NEXT N,X: REM ** CROSSFOOT & SUM **

```

```

4217 FOR X = 1 TO 24:AV(X) = AV(X) / MT:AV(X) = INT (AV(X) * 100 + .5) / 100:TA = TA +
    AV(X):PC(X,1) = INT ((BAL(X,MT) * 100) / TL(MT)):PC(X,2) = INT ((BAL(X,MT - 1) *
    100) / TL(MT - 1))
4218 NEXT X
4219 FOR X = 1 TO 24:PC(X,3) = INT ((AV(X) * 100) / TA): NEXT X
4220 FOR X = 1 TO 24:NH(X) = N(X): NEXT X
4222 POKE 54,0: POKE 55,193
4224 PRINT CHR$(2); CHR$(30)
4226 PRINT "": REM CTRL I 90N
4228 POKE 36,24: PRINT "TREND ANALYSIS FOR THE MONTH OF ** ";MO$(MT);" **": PRINT
4229 XM = 4:XP = 2
4230 PRINT "ACCOUNT DESCR'": PRINT TAB(8)"CURR MO": PRINT TAB(XP)"% TOT": PRINT
    TAB(XM)"LAST MO": PRINT TAB(XP)"% TOT": PRINT TAB(XM)"AVG MO": PRINT TAB(
    XP)"% TOT":
4232 PRINT TAB(XM)"CUR VS. AVG"
4234 FOR X = 1 TO 85: PRINT "="; NEXT X: PRINT
4236 FOR X = 1 TO 24
4238 PRINT NH(X);
4239 IF BAL(X,MT) = 0 THEN 4247
4240 P = BAL(X,MT): GOSUB 4295:B = 5
4242 POKE 36,(20 + B - C - 1): PRINT BAL(X,MT);
4244 P = PC(X,1): GOSUB 4295:B = 3
4246 POKE 36,(30 + B - C - 1): PRINT PC(X,1);"%";
4247 IF BAL(X,MT - 1) = 0 THEN 4255
4248 P = BAL(X,MT - 1): GOSUB 4295:B = 5
4250 POKE 36,(36 + B - C - 1): PRINT BAL(X,MT - 1);
4252 P = PC(X,2): GOSUB 4295:B = 3
4254 POKE 36,(46 + B - C - 1): PRINT PC(X,2);"%";
4255 IF AV(X) = 0 THEN PRINT : GOTO 4270
4256 P = AV(X): GOSUB 4295:B = 5
4258 POKE 36,(51 + B - C - 1): PRINT AV(X);
4260 P = PC(X,3): GOSUB 4295:B = 3
4262 POKE 36,(61 + B - C - 1): PRINT PC(X,3);"%";
4264 IF BAL(X,MT) > AV(X) THEN X$ = "ABOVE AVG"
4266 IF BAL(X,MT) < AV(X) THEN X$ = "BELOW AVG"
4268 IF BAL(X,MT) = AV(X) THEN X$ = "EQUALS AVG"
4269 POKE 36,70: PRINT X$
4270 NEXT X
4272 FOR X = 1 TO 85: PRINT "-": NEXT X: PRINT
4274 PRINT "** TOTALS **";
4276 P = TL(MT): GOSUB 4295:B = 5: POKE 36,20 + B - C - 1: PRINT TL(MT);
4278 P = TL(MT - 1): GOSUB 4295:B = 5: POKE 36,36 + B - C - 1: PRINT TL(MT - 1);
4280 P = TA: GOSUB 4295:B = 5: POKE 36,51 + B - C - 1: PRINT TA
4294 GOTO 4395: REM SHUT OFF PRINTER
4295 C = (P > = 10) + (P > = 100) + (P > = 1000) + (P > = 10000): RETURN
4300 REM ** YEAR TO DATE SPENDING **
4305 SW = 1: GOSUB 2250: REM ** READ YTD FILE **
4310 F$ = "CARD #": GOSUB 2000: REM ** READ CARD FILE **
4314 REM ** ADD CURRENT CARDS TO BALANCE **
4315 GOSUB 4390
4325 F$ = "CHECK #": GOSUB 2000: REM ** READ CHECK FILE"
4330 GOSUB 4390
4332 SW = 0: REM ** SHUT OFF SWITCH **
4335 POKE 54,0: POKE 55,193
4337 PRINT CHR$(2); CHR$(31)

```

continued on next page

TRAC PROGRAM LISTING

```

4339 PRINT "": REM CTL I 130N
4340 POKE 36,50: PRINT "YEAR-TO-DATE SPENDING ANALYSIS": POKE 36,55: PRINT "TODAY'S DAT
E: ";M;"/";D;"/";Y
4344 XN = 7:XJ = 10
4346 PRINT TAB( 1)"EXPENSE DESCR'";: PRINT TAB( XJ)MO$(1);: PRINT TAB( XN)MO$(2);: PRINT
TAB( XN)MO$(3);: PRINT TAB( XN)MO$(4);: PRINT TAB( XN)MO$(5);: PRINT TAB( XN)MO
$(6);
4348 PRINT TAB( XN)MO$(7);: PRINT TAB( XN)MO$(8);: PRINT TAB( XN)MO$(9);: PRINT TAB(
XN)MO$(10);: PRINT TAB( XN)MO$(11);: PRINT TAB( XN)MO$(12)
4350 FOR X = 1 TO 130: PRINT "=";: NEXT X
4351 PRINT :L = 0
4352 FOR X = 1 TO 24:NM$(X) = N$(X): NEXT X
4354 FOR X = 1 TO 24: PRINT NM$(X);
4356 FOR N = 1 TO 12: IF BAL(X,N) = 0 THEN 4362
4358 P = BAL(X,N): GOSUB 4295
4360 B = 14: POKE 36,((N * 9) + B - C - 1): PRINT BAL(X,N);
4361 TL(N) = TL(N) + BAL(X,N)
4362 NEXT N: PRINT
4364 NEXT X
4366 FOR X = 1 TO 130: PRINT "-";: NEXT X: PRINT
4368 PRINT "** TOTALS ** ";
4370 FOR X = 1 TO 12
4372 P = TL(X): GOSUB 4295
4374 B = 14: POKE 36,((X * 9) + B - C - 1): PRINT TL(X);
4376 NEXT X: PRINT
4389 GOTO 4395
4390 FOR X = 1 TO R:WK(X,1) = VAL (W$(X,1)):WK(X,2) = VAL (W$(X,3)):WK(X,3) = VAL (W
$(X,5))
4392 BAL(WK(X,1),WK(X,2)) = BAL(WK(X,1),WK(X,2)) + WK(X,3): NEXT X: RETURN
4395 PRINT "": REM CTRL I 40N
4397 POKE 54,240: POKE 55,253
4398 CLEAR :BU = 1: GOTO 10002: REM ** RETURN TO MENU
4400 CALL - 936: PRINT "THIS IS THE UNWRITTEN GRAPHICS OPTION": PRINT "FOR TRAC,": PRINT
: PRINT "YOU CAN WIN A PROGRAMMA JOYSTICK AND AN"
4405 PRINT "EXPANDA-PORT FOR THE BEST PROGRAM,": PRINT : PRINT "SEND YOUR ENTRIES TO:":
PRINT TAB( 10)"MICRO-SPARC": PRINT TAB( 10)"P.O. BOX 325"
4410 PRINT TAB( 10)"LINCOLN, MASS. 01773"
4415 PRINT : INPUT "HIT RETURN TO RETURN TO MENU OF OPTIONS":X$
4420 CLEAR :BU = 1: GOTO 10002
10000 CALL - 936
10002 H = 0:K = 0:J = 0:V = 0:R = 0:CM = 0:F = 0: DIM WK(150,5): REM ** SORT VARIABLES
**
10003 IF BU = 1 THEN 10050
10005 HTAB 7: PRINT "HOME FINANCE MANAGEMENT"
10010 FOR I = 0 TO 39: PRINT "=";: NEXT I
10015 PRINT "THIS IS YOUR PERSONAL SYSTEM FOR MANAG-": PRINT "ING CREDIT CARDS, CHECKS,
AND OVERALL": PRINT "HOME FINANCES."
10020 PRINT : PRINT "YOU'LL BE ASKED TO SELECT FROM THESE": PRINT "OPTIONS:"
10025 HTAB 10: PRINT "ADD": HTAB 10: PRINT "DELETE": HTAB 10: PRINT "SORT": HTAB 10: PRINT
"REPORT/LIST": HTAB 10: PRINT "END THE SESSION": PRINT : PRINT "THEN YOU'LL BE ASKE
D WHETHER TO USE..."
10030 HTAB 10: PRINT "CREDIT CARDS": HTAB 10: PRINT "CHECKS"
10035 HTAB 10: PRINT "YEAR-TO-DATE DATA"
10040 PRINT : PRINT "FROM THAT POINT, SIMPLY FOLLOW THE ": PRINT "INSTRUCTIONS FROM THE
SCREEN": PRINT

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10045 INVERSE : INPUT "HIT RETURN TO CONTINUE ";X$: NORMAL
10050 CALL - 936: FOR I = 1 TO 39: PRINT "*";: NEXT I: PRINT
10055 PRINT "ENTER THE NUMBER OF THE OPTION YOU WANT": PRINT "TO USE.": HTAB 10: PRINT
      "1 = ADD RECORDS": HTAB 10: PRINT "2 = DELETE RECORDS"
10060 HTAB 10: PRINT "3 = SORT RECORDS": HTAB 10: PRINT "4 = REPORT/LIST OPTIONS": HTAB
      10: PRINT "5 = END THE SESSION"
10062 VTAB 10
10065 PRINT : INVERSE : INPUT "ENTER YOUR SELECTION :";OM: NORMAL
10066 GOSUB 270
10067 IF OM = 4 THEN 10070
10068 IF OM = 5 THEN PRINT "ALL DONE": END
10069 IF OM > 5 THEN GOSUB 280: GOTO 10062
10070 VTAB 13
10072 PRINT "NOW ENTER THE NUMBER FOR SELECTING THE": PRINT "FILE TO BE USED.": HTAB 10
      : PRINT "1 = CREDIT CARDS": HTAB 10: PRINT "2 = CHECKS"
10075 HTAB 10: PRINT "3 = YEAR-TO-DATE DATA"
10080 INVERSE : INPUT "ENTER YOUR SELECTION :";FL: NORMAL
10082 IF FL = 3 AND OM < > 4 THEN PRINT "YEAR TO DATE FILES ARE ONLY ACCESSIBLE": PRINT
      "FOR REPORTS .. PLEASE REENTER.": GOTO 10070
10083 GOSUB 270
10085 IF FL > 3 THEN GOSUB 280: GOTO 10070
10088 VTAB 18
10090 PRINT : INVERSE : INPUT "NOW ENTER THE DATE..MO,DAY,YR:":MT,D,Y: NORMAL
10091 GOSUB 270
10092 IF MT > 12 OR D > 31 THEN GOSUB 280: GOTO 10088
10100 IF FL = 1 THEN F$ = "CARD #"
10105 IF FL = 2 THEN F$ = "CHECK #"
10500 DIM N$(24),BAL(24,12)
10505 D$ = "": REM CTL D
10506 PRINT D$;"NOMONI,0,C"
10510 DIM W$(100,6),W(24,13),TL(12),NM$(24),AV(24),PC(24,3),MO$(13):I = 0
10995 CALL - 868: INVERSE : INPUT "HIT RETURN TO CONTINUE":X$: NORMAL
10996 FOR X = 1 TO 24: READ N$(X): NEXT X
10997 FOR X = 1 TO 12: READ MO$(X): NEXT X
10998 PRINT D$;"NOMONI,0,C"
10999 FOR X = 1 TO 5: READ CD$(X): NEXT X: ON OM GOTO 1000,2000,3000,4000
11000 DATA 1. AUTO EXPENSE,2. BOOKS/MAGS.,3. BUSINESS EXP,4. CLOTHES ADULT,5. CLOT
      HES KIDS,6. DONATIONS,7. ELECTRICITY,8. ENTERTAINMENT
11005 DATA 9. FOOD,10. GIFTS,11. HOBBY-ADULT,12. HOBBY-KIDS,13. HOME-GAS,14. HOME-MAIN
      T',15. INSURANCE,16. INVESTMENTS,17. LIQ/CIG'S,18. MORTGAGE
11010 DATA 19. TELEPHONE,20. TAX-LOCAL,21. TAX-STATE,22. TAX-FEDERAL,23. VACATION,24. W
      ATER
11020 DATA JAN,FEB,MAR,APR,MAY,JUN,JLY,AUG,SEP,OCT,NOV,DEC
11030 DATA MASTERCHARGE = $,VISA CARD = $,AM EXPRESS = $,GASOLINE = $,OTHER CA
      RDS = $
11040 PRINT **: REM ** CTRL I 40N **
11050 GOTO 1998

```



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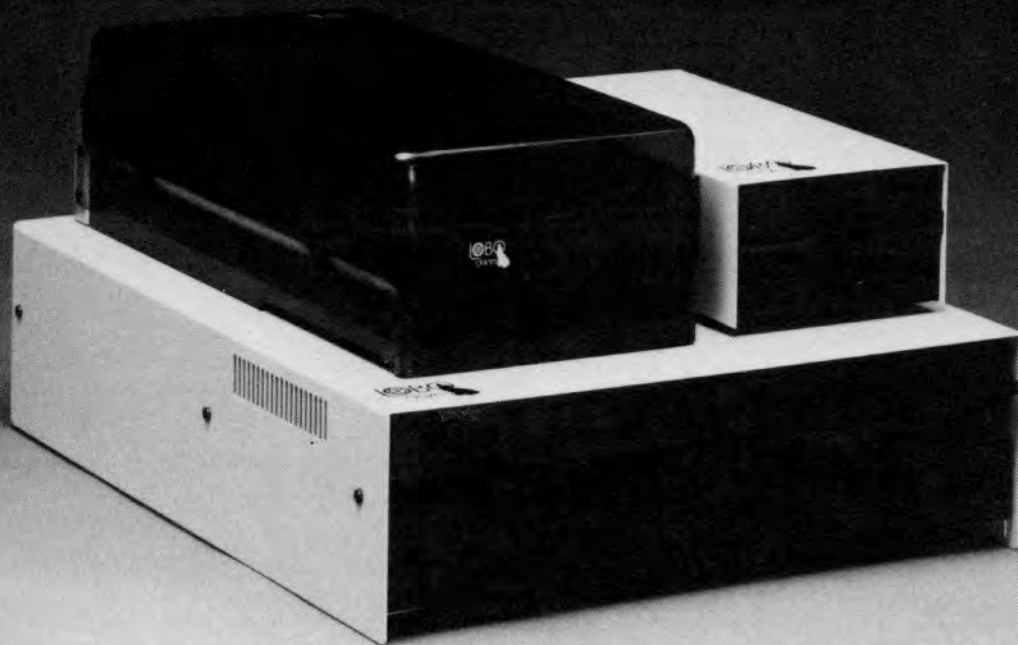
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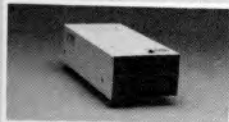


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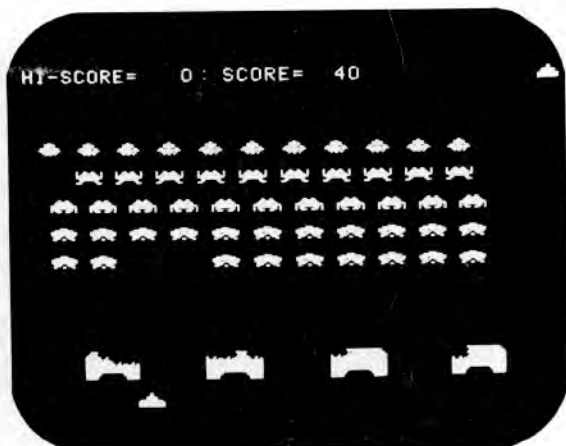
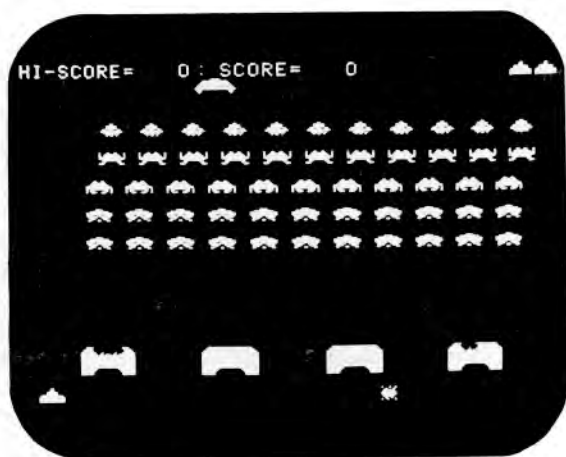
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