

NOVEMBER, 1980
ISSUE NUMBER 28

PRICE \$3.00

THE ORIGINAL MAGAZINE FOR TRS-80™* OWNERS

H & E COMPUTRONICS INC.

*TRS-80™ IS A TRADEMARK OF TANDY CORPORATION

- PRACTICAL APPLICATIONS
- BUSINESS
- GAMBLING • GAMES
- EDUCATION
- PERSONAL FINANCE
- BEGINNER'S CORNER
- NEW PRODUCTS
- SOFTWARE EXCHANGE
- MARKET PLACE
- QUESTIONS AND ANSWERS
- PROGRAM PRINTOUTS
- HELPFUL HINTS
- AND MORE

- SIMULATED GOLF GAME
- ASSEMBLY LANGUAGE FOR BEGINNERS
- DISK FILES
- CRAZY EIGHTS
- TEST
- CUMULATIVE INDEX
- EXPLORING THE RAM





50 North Pascack Road
Spring Valley, N.Y. 10977
(914) 425-1535

NEWSLETTER INFORMATION

THE H&E COMPUTRONICS INC. MONTHLY NEWS MAGAZINE IS PUBLISHED BY H & E COMPUTRONICS INC.

THE H&E COMPUTRONICS INC. MONTHLY NEWS MAGAZINE IS NOT SPONSORED, NOR IN ANY WAY OFFICIALLY SANCTIONED BY RADIO SHACK.

THE PURPOSE OF THE H&E COMPUTRONICS INC. MONTHLY NEWS MAGAZINE IS TO PROVIDE AND EXCHANGE INFORMATION RELATED TO THE CARE, USE AND APPLICATION OF THE TRS-80 COMPUTER SYSTEM.

H & E COMPUTRONICS INC. DOES NOT TAKE FINANCIAL RESPONSIBILITY FOR ERRORS IN PUBLISHED PROGRAMS, USERS ARE ADVISED TO CAREFULLY EDIT VITAL PROGRAMS.

THE H&E COMPUTRONICS INC. MONTHLY NEWS MAGAZINE ENCOURAGES COMMENTS, QUESTIONS AND SUGGESTIONS. WE PUBLISH ARTICLES AND PROGRAMS WRITTEN BY OUR READERS. COMPUTRONICS, INC. WILL PAY CONTRIBUTORS FOR ARTICLES AND PROGRAMS PUBLISHED IN THE NEWS MAGAZINE.

SUBSCRIPTIONS ARE \$24 PER YEAR (\$30 PER YEAR—CANADA AND MEXICO, \$36 PER YEAR OUTSIDE OF THE UNITED STATES, CANADA AND MEXICO — AIR MAIL). BACK ISSUES ARE AVAILABLE (\$2 PER ISSUE).

HAVE ANY URGENT QUESTIONS? WE HAVE TELEPHONE HOURS — 9 A.M.—5 P.M. OTHER TIMES, LEAVE A MESSAGE ON OUR ANSWERING MACHINE. WE WILL PROMPTLY RETURN ALL CALLS (COLLECT).

***ADDITIONAL WORD PROCESSOR INSTRUCTIONS APPEAR IN THE APRIL, 1979 EDITION.

***ADDITIONAL MEMORY TEST INSTRUCTIONS APPEAR IN THE JULY, 1979 EDITION.

LOCAL TRS-80 CLUBS

THE COMPUTER CLUB OF ORLANDO (FLORIDA) — Contact M. Scott Adams — (305) 862-6917.

TRS-80 USER'S GROUP OF CHICAGO (ILLINOIS) — Contact John C. Longstreet, 1201 W. Chase Avenue, Chicago, Illinois 60626 or call 761-2742

THE SOLANO TRS-80 USER'S CLUB — Fairfield, California — Contact Dave or Steve Irwin — (707) 422-3347.

TRS-80 USER'S GROUP OF WALNUT CREEK (CALIFORNIA) — Contact John Snyder, 712-C Country Wood, Walnut Creek, California 94598 or call (415) 938-9669.

INLAND COMPUTER SOCIETY — Contact Sandy Sparks, 3359 Second Street, Riverside, California 92501 or call (714) 256-5319 or (714) 784-3499

TRS-80 USER'S GROUP OF SANTA ANA — Contact Arnold Vags, 3713 S. Parton Street, Santa Ana, California 92707 or call (714) 784-0456.

TRS-80 BUG INC. OF FLORIDA — Contact Larry J. Harrell, 2100 N. Atlantic Avenue-402, Cocoa Beach, Florida 32931 or call (305) 784-0456.

MONTEREY BAY USERS' GROUP FOR TRS-80 USERS — Contact William S. Pitt, P.O. Box GH, Pacific Grove, CA 93950.

ALABAMA TRS-80 USERS' GROUP — Contact Errol Kyzer, Phone 281-2107.

WYOMING VALLEY COMPUTER CLUB — Contact Art Prutzman, 302 Wyoming Avenue, Kingston, PA 18704 or call (717) 287-1014.

VENTURA COUNTY TRS-80 COMPUTER CLUB — Contact Nick Sharp, 2534 North Temple Avenue, Camarillo CA 93010.

CRESCENT CITY COMPUTER CLUB — write to P.O. Box 1097, University of New Orleans, New Orleans LA 70122.

WITCHITA VALLEY TRS-80 USERS GROUP, P.O. Box 1384, Witchita Falls TX 76307.

ADVERTISING RATES

\$300 PER PAGE	\$150 PER ½ PAGE	\$80 PER ¼ PAGE	\$50 PER ⅛ PAGE
----------------	------------------	-----------------	-----------------

Publisher	Howard Y. Gosman	Senior Writers	Amy Lara, Tim McGlynn
Editor	Hubert S. Howe J. Ph.D.	Advertising Director	Elaine Traum
Managing Editor	Martin Leffler	Art Director	Edmund Khaleel
Business Editor	Peter Shenkin, Ph.D.	Associate Editors	Harvey Cohen, Michelle Newman
Software Manager	Karen Rogers		
Technical Manager	Timothy McGlynn		

H & E COMPUTRONICS INC.

MATHEMATICAL APPLICATIONS SERVICE™

ISSUE NUMBER 28

TABLE OF CONTENTS

NOVEMBER 1980

REVIEW

- 851 PROGRAM PREVIEWS.....A. A. Wicks
 Microcomputer Flight Simulator by Dynacomp

PROGRAMS

- 854 Simulated Golf Game.....Andrew S. Braunstein
866 Test, Air, Planets, Crazy Eights.....Gordon Speer

REGULAR DEPARTMENTS

- 844 Bits and Pieces.....Howard Y. Gosman
 Publisher's Remarks
- 846 Letters to the Editor
 Readers tell us what's on their minds
- 849 The Crystal Ball.....Anonymous
 New products from Radio Shack and others
- 875 Getting it Together in Assembly.....Hubert S. Howe, Jr.
 Column #19: Disk Files, Part I
- 878 Helpful Hints
 Programming quickies
- 881 Beginner's Corner.....A. Douglas Werbeck
 Exploring the RAM
- 885 Questions and Answers.....Hubert S. Howe, Jr.
 Answers to questions posed by readers
- 887 Cumulative Index to Issues #13 - #24
 Table of Contents for Back Issues

YOUR SUBSCRIPTION HAS EXPIRED IF... THE NUMBER ABOVE YOUR NAME AFTER THE DASH ON YOUR MAILING LABEL IS 28 (OR LESS). THE NUMBER FOLLOWING THE DASH TELLS YOU THE LAST ISSUE THAT YOU WILL RECEIVE. For example, if your subscription number is 16429-28, your subscription expires with this issue (issue #28).

BITS AND PIECES

by

HOWARD Y. GOSMAN

THE NEW LOOK AT RADIO SHACK

We would like to encourage anyone who has not yet done so to look carefully at the August and September, 1980 issues (Volume 2, Issues 6 and 7) of Radio Shack's **TRS-80 Microcomputer NEWS**. If you have them, compare these to some of the earliest issues of the same Newsletter. What a change! Radio Shack is finally looking and sounding like a completely professional microcomputer company. It's about time, for they have become one of the largest in the United States!

From our perspective, the most significant change is in RS's attitude towards customers and software. Jon Shirley, Vice President of the Computer Division, goes to great lengths to refute the misconception that RS just wants to sell to you and forget about you. He also states that RS is now seeking software written by outside programmers and software houses. We believe that it is primarily because of this outside software that RS now enjoys such a commanding lead in the microcomputing field. Think about it: RS could never have developed such an extensive line of software, for every purpose from entertainment to business, on its own.

What RS did was to develop and mass-produce the least-expensive high quality microcomputer, supported with a good Basic programming language, that was purchased by all kinds of people who wanted to use it for all different kinds of applications. The users have written most of the software. The fact that RS wants to buy and market some of this software shows that their people are aware of its potential.

This will be tougher, but we think that RS should also take a similar position on some of the TRS-80-compatible hardware that is presently available from other companies. Why should it be impossible for somebody to use his brand-X printer with SCRIPSIT? There are many other peripherals that RS will probably never offer, because they won't have enough appeal to the broad customer base that RS wants. RS's own new hardware, including both computers and peripherals, is nevertheless very impressive. We think that the new Model III will be a real winner, and readers have already been writing letters to us in support of RS's new daisy wheel printer (see below in this issue).

According to a recent article in THE WALL STREET JOURNAL (September 24, 1980), the new computer line seeks to alter Radio Shack's image from that of a low-cost electronics store to a more flashy operation. John Roach, a Tandy Corporation vice president, is quoted as saying, "When we were small, we sold mostly 'me-too' products. Now we're looking to bring new technology from the laboratory to the living room." Experts quoted in the article

H & E COMPUTRONICSTM

MATHEMATICAL APPLICATIONS SERVICETM

INC.

believe that the Model III "will probably sell like hot cakes". In the future, you may see products ranging from cheaper types of electronic burglar alarms to affordable home-satellite receivers for television signals.

COPIES OF PROGRAMS PUBLISHED IN COMPUTRONICS

We are considering starting a service consisting of making copies of programs published in the magazine for readers who would rather not have to type them in. We would not aim to make a profit in this venture, but we would have to charge enough to pay for the cassette or diskette, the labor involved in copying, and postage -- perhaps \$3 for cassettes and \$6 for diskettes. We would be interested in hearing from readers about this possibility.

DISKETTE SALE CONTINUES

We are continuing our sale of **WABASH** diskettes at the price of \$29.95 for a box of 10. We have found these to be the most reliable diskettes on the market, and you can't beat this price. We can't be sure how much longer we can hold this price.

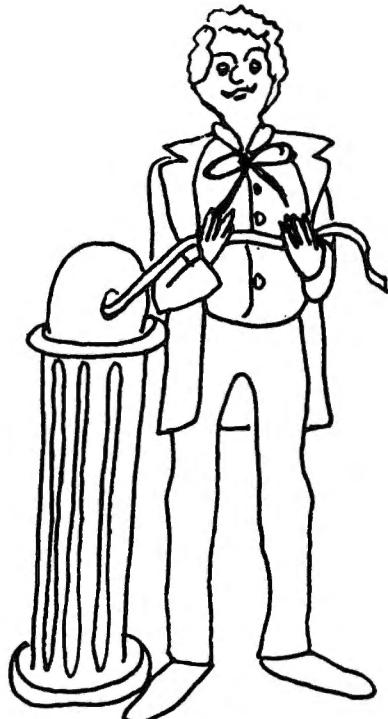
NO MORE GAMES

WHEN YOU'VE HAD YOUR FILL OF FUN AND GAMES,
WHY NOT USE YOUR TRS-80 TO MAKE SOME MONEY.

We supply historical data on minifloppy or cassette to test your ideas.

- All USA commodity data back to 1960
- Precious metals
- Currencies
- All London commodity data back to 1968
- Dow Jones industrials back to 1928
- Standard & Poors composite back to 1928
- More

Commodity contracts \$4.00 each (minimum 8 contract)



MONIRESEARCH CORPORATION
P.O. BOX 19146
PORTLAND, OREGON 97219
(503) 625-7282

Please send your free brochure describing data and prices.

Name _____ (PLEASE PRINT)

Address _____

City _____ State _____ Zip _____

Telephone _____

MONIRESEARCH CORPORATION

H & E COMPUTRONICS INC.

MATHEMATICAL APPLICATIONS SERVICE™

LETTERS TO THE EDITOR

RS's New Daisy Wheel Printer

Gentlemen:

I would like to let you know more about the Daisy Wheel Printer II. For the \$2000 price tag, I think that some sacrifices are in order. The print quality is excellent, and the daisy wheel (it comes with "Courier") supports many characters from foreign languages. The printer has underlining, but it cannot be supported by the ELECTRIC PENCIL. (The underline itself appears below the line it should print on.) Bold face is not supported, but then again, neither SCRIPSIT nor PENCIL (version 1) have that capability.

Features that I really enjoy are: 1) It has 10 pitch, 12 pitch, and proportional spacing, all hardware and software selectable. 2) It has a built-in self test that prints all the characters on the daisy wheel. This means that you don't have to boot up the system to test it. 3) It has a built-in optimizer that automatically increases throughout when printing tabular material by eliminating preceding blanks (i.e., it won't activate a carriage return to print any material with a greater tab on successive lines). 4) Reverse half and half line feeds are supported so that superscripts and subscripts are possible, but not with PENCIL I or SCRIPSIT.

According to a local RS Computer Center, the printer is made by Qume. It carries a full 90-day warranty and has an optional tractor feed attachment for \$289.95.

If you would like to know anything more, just drop me a letter and I'd be happy to answer any questions you might have.

Sincerely,

Marc Ausman
125 Arbor Court
Woodside, CA 94062

Praise for SCRIPSIT

Dear Sir:

It was with great interest that I read your review of Radio Shack's new word processor, "Scrapsit". While some of the comments you made were valid, some were a bum rap against this really remarkable program. Rest assured, by the way, that my only connection with the Shack is that I own a TRS-80.

The first comment that was really misleading was that one has to sit and listen to six hours of audio tapes before using the program. This is not so. The instructions say that it is "advisable" to spend about an hour per lesson, but that certainly is not mandatory. The tapes take about twenty minutes per side of actual listening time. The rest of the hour is spent loading the program, trying the exercises, and generally playing with the thing to get used to it. Getting through all the training sessions quickly can take as little as two hours, not the six you said were required. I certainly agree that the program would have been easier to learn if RS had provided a complete manual and thrown in the audio tapes as an embellishment.

COMPUTRONICSTM

MATHEMATICAL APPLICATIONS SERVICETM

You didn't mention that there is a pamphlet with the package, and it contains all the commands necessary to use the program. Frankly, anyone who has ever had even miniman contact with any sort of word processing needn't even use the audio tapes. I myself listened only to the first four sides and found that I could use the program to my satisfaction by referring to the pamphlet.

Another reason for not listening to all the audio tapes is that the last lessons have some very fancy formatting instructions (e.g., how to center everything on a title page and things like that) which I will probably never use. If I ever need that information, I know where I can find it. But till then....

Credit is due for many of the features of SCRIPSIT. How frustrating and time-wasting it is to have to go back and retype letters lost in the wraparound process! As opposed to some programs, SCRIPSIT does not drop letters. For this feature alone I think it is a good deal. The program is in assembly language. I type as fast as I possibly can, but I have never out-run the processing.

SCRIPSIT sells for \$69 (cassette) and \$99 (diskette) as opposed to \$250 or \$350. The program also requires less memory than others -- 16K for cassette and 32K for diskette (as opposed to some that require 48K for diskette and are not even available on cassette). With SCRIPSIT an expansion interface is not necessary, nor is a CP/M modification.

The commands are easy to remember, and most require simply holding down the control key and striking the required function key, while some

other word processing programs require as many as five keystrokes just to get into, say, the delete mode. It would have been nice for RS to add a menu, but with the pamphlet mentioned, one has everything needed anyway.

In short, the SCRIPSIT program is a honey, and while the half-manual, half-tape instructions are a partial pain, the program can be run very nicely, thank you, without the six hours of listening recommended.

By the way, Tandy-Claus arrived early at my house this year, and this letter is being run on my new Daisy Wheel Printer II from the Shack. It is really a beaut. [Agreed - Ed.] I'd be happy to supply a review of same, and some little tricks I accidentally discovered.

Yours,

Wm. Bauknecht
1641 Glen Road
Green Bay, WI 54304

Using a Selectric Printer

Gentlemen:

I wrote to you last May requesting your help in an effort to locate a program that would make my Selectric type printer work with the Radio Shack SCRIPSIT word processing program. You were kind enough to reply to my letter but were unable to help. In the June issue of COMPUTRONICS I see that I was not alone, and that many others are having similar problems with this program and a Selectric type printer.

You requested that if anyone knew of

H & E COMPUTRONICS INC.

MATHEMATICAL APPLICATIONS SERVICE™

a patch that would make the printer work to let you know. I am pleased to say that I was fortunate to locate

David Kjell
200 Timberlane Terras
Euless, TX 76039
1-817-267-3849

He had worked out a patch for his own needs and which, I am very pleased to say, works extremely well with my equipment.

Trusting that this information will be of some help to your readers, I remain,

Very truly yours,

David W. Casgrain
565 Victoria Avenue
Westmount, Quebec
Canada H3Y 2R7

H & E Computronics welcomes letters on any subject. If you wish a personal reply, please enclose a self-addressed, stamped envelope.

H & E Computronics also welcomes readers to submit programs, articles, and reviews for consideration for publication. Please address correspondence to **The Editor, H & E Computronics, 50 North Pascack Road, Spring Valley, NY 10977.** Please submit programs on media (cassettes or diskettes).

5 1/4" WABASH DISKETTES	\$29.95
5 1/4" 3M DISKETTES	\$29.95
8" WABASH DISKETTES	\$39.95

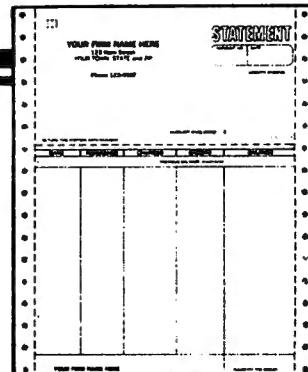
CALL OUTSIDE N.Y. STATE (800) 431-2818
TOLL FREE
INSIDE N.Y. STATE (914) 425-1535

TRS-80® Compatible "carbonless" Continuous Statements

**small
quantities,
low prices,
fast delivery**

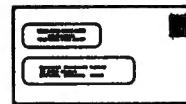
Order as few as 500 statements imprinted with your firm name and address.

Only \$**27.95**



NEBS 9062 Statements are software compatible with the TRS-80, Model 1, Level II, Accounts Receivable package #26-1555.

TRS-80 is a Trade Mark of the Radio Shack Co., Subsidiary of the Tandy Corp.



SPEED COLLECTIONS
Product 772 DU-O-VUE® Envelope
(3 1/2" x 6 1/2") eliminates envelope addressing.

Product 9062 — Size 6"x 8 1/2" detached. Prices include your firm name, address and phone in top section, plus your name only in lower section. Printed in black ink. Available in single (white) or duplicate (white, canary) continuous sets.

QUANTITY	SINGLE Product 9062-1	DUPLICATE Product 9062-2	Product 772 DU-O-VUE® Envelopes
10,000	\$192.00	\$355.00	\$138.00
6,000	128.00	228.00	92.00
4,000	99.00	169.00	64.50
2,000	59.00	99.00	36.25
1,000	38.75	61.00	20.75
500	27.95	39.95	12.25

ORDER TODAY! MONEY-BACK GUARANTEE.
FAST SERVICE BY MAIL or PHONE TOLL FREE 1+800-225-9550
(Mass. residents 1+800-922-8580). It is our policy to ship within 6 working days following our receipt of your order.

Please ship: Date 19 CODE 460

9062-1 STATEMENTS (Single)

9062-2 STATEMENTS (Duplicate)

772 DU-O-VUE® Envelopes

Information on continuous checks and other computer forms.

HEADING TO BE PRINTED ON FORMS: (Please type or print)

STREET

CITY and STATE ZIP

PHONE

AUTHORIZED SIGNATURE
If you wish us to BILL and SHIP differently from above please indicate.

Nebs Computer Forms

78 Hollis Street, Groton, Mass. 01450
A division of New England Business Service, Inc.



CRYSTAL BALL DEPARTMENT (NEW PRODUCTS OF INTEREST TO TRS-80™* OWNERS)

WARNING... THE INFORMATION FOUND IN OUR CRYSTAL BALL DEPARTMENT DOES NOT REPRESENT VERIFIABLE FACT. WHAT FOLLOWS ARE RUMORS FROM WHAT WE CONSIDER TO BE RELIABLE SOURCES (unless otherwise stated).

Did you read the latest **TRS-80 MICROCOMPUTER NEWS** (Volume 2 Issue 7 published by Radio Shack)? For those readers who missed it, here's what Jon Shirley of RS had to say about a certain publication:

"Last month I talked about misconceptions and this month I would like to go after rumors. About 99% of all the hot news published about us (RS) is simply not true. I often believe some magazines and user group publications feel that publishing garbage is the only way to keep up readership. There have been many rumors for many months about a TRS-90, the Model I being dropped, etc., etc. Next month we will show you our new product line but here is a quick look and you can compare the facts to the rumors.

First of all the Model I is not being dropped, it is in the 1981 Radio Shack Annual catalog and the price is unchanged..."

Well, its obvious that many of the rumors that Jon Shirley is referring to were originally published in the **H & E COMPUTRONICS, INC. NEWSMAGAZINE**. But how mad are our rumors? We stated that RS is no longer producing the **TRS-80 MODEL-I**. This is fact and not rumor. Yes, RS is still selling the Model-I, but it is no longer producing the Model-I. We did not see RS state this in their Newsletter. Secondly, yes we admit that RS did not come out with a **TRS-90**, but all of our information has been fairly accurate. The machine that we announced several months prior to the RS announcement has been released. It may not be called the TRS-90, but we did tell our readers about it a long time ago.

Why rumors? There is no other alternative. RS keeps all of its future projects top secret. Since RS does not keep the public informed of its new projects (neither does IBM, Hewlett Packard, Texas Instruments or any other similar company), rumors are bound to be spread. Where do we get our information? Indirectly from Radio Shack. It is impossible for RS to keep all of its projects top secret. The employees working on projects let their closest friends in on new projects. These people in turn tell their friends, and so on. We get many calls from "friends" of RS employees who call and volunteer information. When we hear the same rumor from many sources, we know that a product will soon be released.

Publishing "garbage." We don't think so. We own 12 Radio Shack computers. RS computers completely run the corporation (invoicing, inventory, general ledger payroll, etc.). Our employees are as eager to hear new rumors as are our readers. If RS wants all the rumors to stop, then RS should publish a

H & E COMPUTRONICS INC.

MATHEMATICAL APPLICATIONS SERVICE™

list of all of its future projects a make it a matter of general knowledge. We would certainly end our **CRYSTAL BALL DEPARTMENT** if RS agrees to publish a list of all of its planned new products for the upcoming year.

(1) Anyhow, we don't have too many new RS rumors this month. We stand by our rumors of last month: RS has a MODEL-IV and MODEL-V on the way.

(2) RS is working on a printer for its very popular **POCKET COMPUTER**. It should be available within 3-6 months.

(3) **MOD-II** owners should be very happy with the new 2.0 operating system. The system has many enhancements, including a spooler. We do suggest that present 1.2 owners not transfer their data and programs to 2.0 until they are sure that the 2.0 system is thoroughly debugged.

(4) **PANASONIC** has an extraordinary pocket computer. The computer is now available (but almost impossible to get). The new pocket computer will sell for \$400 to \$500. Unlike the **TRS-80 POCKET COMPUTER**, the **PANASONIC** version is closer to a full computer. The new pocket computer is about 2 inches longer than the RS version. It can be interfaced with a printer, cassette record, disk drives, TV, telephone modem, and just about anything else you can think of.

We believe that the new **PANASONIC POCKET COMPUTER** has the potential of becoming the biggest selling computer ever. It can be expanded to 72K (and possibly more). Although we haven't seen the official spec sheets, interested readers can read more about it in the November issue of **POPULAR SCIENCE**. By the way -- yes, the new **PANASONIC POCKET COMPUTER** can also be used as an ordinary calculator.

CONSULTANTS ACCOUNTANTS ATTORNEYS PROFESSIONAL TIME BILLING

- Complete Client File Maintenance
- Interactive Billing Data Entry
- Aged Trial Balance
- Up to 10 Variable Rates
- Invoice Printing
- Cash Receipts Entry & Journal

TRS 80 Model I 16k Level II

Send Check or Money Order To:

R. Data Systems
P.O. Box 362
Arlington, Ma 02174

H & E COMPUTRONICS INC.

MATHEMATICAL APPLICATIONS SERVICE™

PROGRAM PREVIEWS

By A. A. Wicks

How many times have you been tempted to purchase a program on cassette or on disk, yet hesitated, because you weren't sure that it would provide you with what you were seeking? Or, perhaps as I have been, you were wary because you have been disappointed or even stung outright? There are many programs advertised today that are outrageous deceptions; on the other hand, there are a great many that are extremely useful or entertaining, and which perform as well as or better than expected.

The purpose of this column will be to review factually some of the programs available from your -- the user's -- point of view. No attempt will be made to "dissect" a program (that's for the originators, or persons better qualified than I), but rather to provide information as to what the program claims to do, what it actually does, how well it loads and operates, and any other pertinent facts. In addition to reviewing tape and disk programs, programs appearing as listings in various publications (including this one) will be reviewed for you from time to time. Occasionally, hardware accessories (sound effects, light pens, etc.) which operate with software will be covered.

Any company that may wish to have their program offerings possibly reviewed in this column should contact me directly. But such reviews will be stringent, and tapes should be flawless -- I have a very obstinate CLOAD!

Microcomputer Flight Simulator

Dynacomp
P. O. Box 162
Rochester, NY 14580

Cassette
TRS-80 Level II BASIC, 16K
Price - \$17.50

For aviation enthusiasts, or for anyone who might get a kick out of piloting a simulated aircraft flight, in an aircraft of their choice, this program leaves little to be desired. It should be recognized that this is not a game program-- and there is no fun in crashes. The program is designed for the serious user who is interested in the theory of flight and would like to apply such theory through computer simulation. The program simulates these flights for any distance, direction and aircraft-qualified altitude. Banks, turns, ascent and descent are supported, with centrifugal forces having their normal effect on such actions. Complete cockpit report information is provided, including such alarm messages as "Stall", "Landing with Wheels UP", "Loss of Control", etc. Following a landing (good or ill), a complete summary of the preceding flight is provided on the screen.

The original treatise on the subject of flight simulation, and on which this program is based, appeared in BYTE, authored by F. R. Ruckdeschel, and is presently published in SIMULATION, Programming Techniques Volume 2, by the same publisher. (A copy of the article accompanies the cassette program.)

Advertising for the program states that the program is a "three-

H & E COMPUTRONICS INC.

MATHEMATICAL APPLICATIONS SERVICE™

"dimensional simulation", which led me to erroneously believe that it would be graphically third dimensional. This is not the case -- there are no graphics whatsoever, but the technical aspects more than compensate for this. In my case, I have mounted an FAA aeronautical chart beside the computer, and I move a small aircraft replica across this map as the flight progresses.

Initially, my attempts to load this tape were fruitless -- at any setting of the recorder. I finally gave up and wrote to Dynacomp. To their credit, I received another tape by return mail, with a letter encouraging me to contact them again if necessary and offering a full refund if I preferred. It was unnecessary. The tape loaded on the first try, and because it is a lengthy load I have now put it on disk.

Upon completion of loading, the display provides an option of taking-off and flying, or starting a flight in the air. If the flying-only option is selected, the flight initiates at an altitude of 15832 feet, and at a distance of 50 miles from the flight center. If the take-off option is selected, the flight commences from standstill at one end of a two-mile long runway-- a length that permits taking off and landing again within its length, if desired. Once airborne, your flight path is up to you. The display then queries you for certain flight characteristics after your choice of flight method. These aircraft specifications, should, of course, be based on some actual aircraft type: a light plane, helicopter, 747 jet, sailplane (glider). The choice is yours. The parameters requested are: aircraft mass (in tons, or fraction

of), fuel mass (also in tons), thrust (a decimal figure which means the push/pull characteristic as a fraction of the plane's mass). For instance, a one-ton aircraft having a thrust of 0.3 would have the push/pull of the propellor (or jet) action exerting a force of 300 pounds on the aircraft. The fourth parameter is the maximum aircraft speed in knots. The fifth entry is the glide angle in degrees, and the sixth input is the time increment in seconds. The latter is an interesting item. If the take-off option is chosen, then this input is the time increment occurring between your commands to the aircraft, but once airborne this time element may be changed to any period. It is not wise to make the time spacing too long, for between commands the aircraft will not necessarily continue exactly on the last command, any more than an actual aircraft would do so. Extraneous forces -- wind, gravity, fuel consumption altering weight, etc. will all change the flight dynamics, and an interval of three minutes may well find your next update showing a dangerous stall, for example.

Seven "cockpit control" letter entries may be given once the aircraft is in motion, only three of these being required during take-off. These provide control for Thrust (or throttle), Elevator, and Flaps. The remaining control functions are Continue (with previous command values), Bank (angle), Time increment, and Trim (angle).

Once these are entered, the computer calculates all factors plus the forces acting upon the plane and displays a cockpit report. This permits you to evaluate your flight situation and control the aircraft

H & COMPUTRONICS INC.

MATHEMATICAL APPLICATIONS SERVICE™

accordingly. A typical airbaorne display would show:

ALT: 15834 FEET
SPEED: 124 KNOTS
STALL SPEED: 62 KNOTS
ENGINE TEMP: 170 DEG
FUEL: 598 LBS
FLAPS: 0 DEGREES
TRIM: 10 DEGREES
THRUST: 0
BANK: 0 DEGREES
ATTACK ANGLE: 3 DEGREES
HORIZON: -3.3 DEGREES
HEADING OFF EAST: 45 DEGREES
LANDING GEAR: UP
FLIGHT TIME: 10.9 MIN.

Continuing, a "Control Tower Message" is displayed. This provides information as it would appear to an operator at the control center for the field that is "flight following" your aircraft. Typically:

RANGE: 38 MILES
DESCENT RATE: 20 FEET/SEC
POSITION OFF RUNWAY: 192 DEGREES
WIND DIRECTION: 42 DEGREES
WIND SPEED: 24 KNOTS

This brings us to the navigational aspects of the program. The runway is considered as running in a west-east direction, with the aircraft taking off toward 180 degrees from north (0). A runway such as this is quite common; however, it is somewhat confusing in this simulation, inasmuch as all heading information as subsequently provided relates to degrees "heading off east", and from the tower, degrees "off runway". Normally, an aircraft would use 0 degrees as a basic reference point, and the position off the runway would be a heading of 180 degrees in this instance. This concept of the program takes a little bit of

"getting used to".

The documentation accompanying the program is very good. In fact, I would rate it as "excellent", had it been better coordinated and produced. There is some temporary confusion likely, as the instructions and the cassette program appear to have been updated, but this is not always reflected in the text. The BYTE artdicle is also about a year old. There is a minor error in the instructions, where "T" is shown as a "trim angle" command. This should be "R", as "T" has already been used for "thrust".

A complete listing of the North Star Basic version of the program is provided. I feel that for the cost of this program, a TRS-80 listing should be available, although the program Lists easily enough. All of the documentation has been produced by xerographic process, and, because the type size has been reduced considerably, clarity has suffered -- especially in the listing and in the reproduced article. Program producers looking toward future sales would be advised to consider the very favorable reaction that a well-produced and printed document provides.

Recommendation: I recommend this program highly, as entertainment, yes, but more especially as a training aid. Many hours of enjoyment and education may be gained from its invaluable guidance.

A. A. Wicks
30646 Rigger Road
Agoura, CA 91301



SIMULATED GOLF GAME

by
ANDREW S. BRAUNSTEIN

This program simulates an 18-hole golf game. At the start, the computer will ask, "HOW MANY PLAYERS?" Answer the question with 1 to 4, depending on how many people are playing. Next it will ask for each player's name (up to 10 characters). After each name, type you choice for skill levels (0-2). The higher the skill level, the more hazards and the shorter the ranges of the clubs. Each player can have a different skill level, so that less experienced players can play against experienced players.

Play starts with hole #1 and continues through hole #18. There are seven different hole configurations alternated throughout the 18 holes. At the end of each hole, the number of strokes for a player is displayed. At the end of each round, the cumulative score for each player is displayed along with the cumulative par.

In the upper right corner of the screen, "CLUB?" is displayed. In order to hit the ball, type your club choice and press ENTER. The available clubs are as follows:

- '0' look at the list of available clubs.
- '1-14' clubs with which to hit the ball.
- '15' redraw the screen (if ruined by some factor).
- '99' resign from the game.

If you accidentally press ENTER without selecting a club, the list of clubs will automatically be displayed (instead of typing '0', you can just press ENTER to see the list). If the screen is destroyed for any reason, typing '15' as your club choice will restore the video display without affecting play. In order to resign, just type '99' as your club choice. When you resign, cumulative scores are given and you have the chance to play again.

There are five possible hazards: IN THE WATER, IN THE ROUGH, IN THE SAND TRAP, OUT OF BOUNDS, AND IN THE WOODS. The hazards are selected purely randomly. If the ball is hit in the water, there is a one stroke penalty. If the ball is hit in the woods or out of bounds, there is a two stroke penalty. If the ball is hit in the sand trap, it can remain there for several strokes without moving. (Note: due to memory restrictions, hazards are not graphically displayed on the screen. Out of bounds is displayed graphically and is caused when the ball is shot over the green. When the ball goes out of bounds, it is automatically placed within bounds.)

In order to simulate wind conditions (which are random in nature), the ball can be shot further than the preset ranges for headwinds. Similarly, the ball might not go as far as expected to simulate tailwinds. When the

H & COMPUTRONICS INC. MATHEMATICAL APPLICATIONS SERVICE™

ball is not hit as far as the predesignated range, the ball can be hit anywhere frm one yard to its upper limit in the range. These functions are totally random.

After the computer determines that the ball is on the green, it puttts the ball. The number of puttts it takes is determined by the distance to the hole. If the ball is not close enough to the hole, you must hit it again. If the ball is shot very close to the hole during normal play, the ball can be sunk -- that is, no puttts.

It is possible to get a hole in one, but as in a real golf game, the chance is very slim. In order to get a hole in one, you must hit the ball so that strong headwinds hit it into the cup and sink the shot.

The list of clubs (displayed by selecting club '0') uses up memory each time that it is used. Since this game uses a lot of memory, it is possible to use up all the memory if the game is played by four people and the list of clubs is used frequently by all players on all holes.

The game can be played in either of two ways: against par (against the computer), and against other players.

Golf is an exciting and fun game to play. I hope you have as much fun playing it as I have had in writing it.

```
70 CLEAR 40: RANDOM: DEFINT A-Z: DIM S(4),A(18),P(18),M(4,18),N(4),C$(14),
R(14),V(14),P$(4): T4=5: GOTO140
100 CLS: PRINT"YOUR CHOICE OF CLUBS--> CLUB 0 = LOOK AT LIST"
110 FOR O=1 TO 14: PRINT O;"FOR A ";C$(O);";: RANGE OF";R(O);";TO";R(O)+
V(O);";YARDS": NEXT O:G=0:GH=1: PRINT@992,"PRESS 'ENTER' TO CONTINUE";:
INPUT A$:PH=9: GOSUB 930
120 GOSUB 130:K=0: FOR W=15456 TO 15487: POKE W,128: NEXT :A3=0: PRINT @
91, "": INPUT "CLUB";A3: POKE 15513,191: POKE 15488,191: FOR W=15489 TO
15496: POKE W,176: NEXT : POKE 15497,191:G=1: IF A3=0 THEN 100
121 IF A3=15 THEN G=0:GH=1:PH=9: GOSUB 930
122 IF A3<0 THEN 120
123 IF A3=99 THEN J=18:MM=3: GOTO 670
124 IF A3>14 THEN 120
126 GOSUB 1040:G=0: RETURN
130 IF S=0 THEN PH=0: RETURN
132 IF PH=9 THEN PRINT @ 155,"DISTANCE TO THE PIN IS";C;"YARDS";
135 PH=0: RETURN
140 CLS : FOR X=1 TO 64: PRINT "=";: NEXT : PRINT TAB(12);
"S I M U L A T E D   G O L F   G A M E": FOR X=1 TO 64: PRINT "=";: NEXT :
PRINT
145 INPUT "HOW MANY PLAYERS (MAX.=4)";U:U=INT(U): IF U<1 THEN 145
151 IF U>4 THEN 145
160 FOR X=1 TO U: INPUT "PLAYER'S NAME";P$(X):IF P$(X)="" THEN 160
165 INPUT "SKILL LEVEL (0-NOVICE 1-INTERMEDIATE 2-EXPERT) ";S(X):
S(X)=INT(S(X)): IF S(X)>2 OR S(X)<0 THEN 165
```

COMPUTRONICSTM

MATHEMATICAL APPLICATIONS SERVICETM

```
180 NEXTX:DATA 360,4,585,5,400,4,295,3,415,4,375,4,319,3,450,4,370,4,395,4,63
0,5,330,4,610,5,440,4,365,3,405,4,595,5,325,3
210 FORR=1TO18:READ A(R):READ P(R):NEXTR:E=0:N(1)=0:N(2)=0:N(3)=0:N(4)=0:J=1
265 Q=1:GOSUB780
270 H=A(J):S=0:GOTO930
300 GOSUB3700:GOSUB120:A3=INT(A3):FORW=15514T015551:POKEW,128:NEXT:FORW=15578
T015615:POKEW,128:NEXT:FORW=15642T015679:POKEW,128:NEXT:FORW=15706T015743:POK
EW,128:NEXT
305 FORW=15624T015640:POKEW,128:NEXT:FORW=15689T015704:POKEW,128:NEXT
330 S=S+1:Y=1+(V(A3)*RND(0)+R(A3)):IFRND(0)<.07THEN350
340 IFRND(0)<.07THENY=Y+RND(0)*2*V(A3):GOTO360
345 GOTO360
350 Y=Y-RND(Y)+1
360 PRINT@155,"HIT IS";INT(Y);:"YARDS";:C=H-Y:Y=INT(Y):IFABS(C)<20THEN570
390 L=RND(100):C=ABS(H-Y):IFC<80THEN420
405 IF(H-Y)>0THEN420
410 PRINT" OVER THE GREEN";:C=30+RND(100):GOTO 530
420 IFL<3+S(Q)*2THEN440
425 IFL<6+2*S(Q)THEN510
430 IFL<9+2*S(Q)THEN530
435 IFL<13+2*S(Q)THEN520ELSE532
440 PRINT@219,"IN TRAP ** PIN IS ";C;"YARDS";
441 GOSUB 3700
445 L8=RND(3):T=INT(RND(0)*2*S(Q))
490 FORZ4=1T0L8+T:S=S+1:GOSUB120:FORW=15514T015551:POKEW,128:NEXTW:FORW=15578
T015615:POKEW,128:NEXTW:FORW=15642T015679:POKEW,128:NEXTW:FORW=15706T015743:P
0KEW,128:NEXTW:IFZ4<>L8+TTHENPRINT@155,"STILL IN TRAP";:NEXTZ4
491 Z=155:GOTO540
510 PRINT" IN ROUGH";:GOTO532
520 K=K+1:PRINT@219,"IN THE WOODS OUT OF BOUNDS";:PRINT@265,"IN THE WOODS";:S
=S+2:PRINT@330,"TWO STROKES";:GOTO 532
530 PRINT @265,"IN WATER";:S=S+1:PRINT@330,"ONE STROKE";
532 IFK=0THENZ=219
534 IFK=1THENZ=283
536 IFK=2THENZ=347
540 PRINT@Z,"DISTANCE TO PIN IS";C;"YARDS";:IFC<10THEN570
560 H=C:GOTO300
570 IFABS(C)<3-S(Q)THEN600
575 PRINT" ON THE GREEN";
577 IFS(Q)=0THEN585
580 L=RND(3):IFABS(C)>15-2*S(Q)THEN589
585 L=RND(2)
589 IFL=1:PRINTL;"PUTT";:M(Q,J)=S+L:GOTO620
590 PRINTL;"PUTTS";:M(Q,J)=S+L:GOTO620
600 IFS<>1THEN610ELSEPRINT@346," HOLE IN ONE!";
610 LETM(Q,J)=S:PRINT" YOU SUNK THE SHOT";
620 GOSUB3710:FORB=1T01500:NEXT:CLS:PRINT:PRINT"*****"
*****"
630 PRINT M(Q,J);:"STROKES FOR HOLE NUMBER";J;"FOR ";P$(Q)
```

COMPUTRONICSTM

MATHEMATICAL APPLICATIONS SERVICETM

```
640 PRINT"*****":T4=5:K4=1:I=0:D=5:PRINT:G
OSUB770
650 Q=Q+1:GOSUB780:IFQ>UTHEN670ELSE270
670 CLS:PRINT"***** SCORE FOR";J;"HOLES *****":E=P(J)+E:FORW=1TOU:N
(W)=N(W)+M(W,J):PRINTP$(W);" SHOT";N(W);" PAR IS";E:NEXTW
730 PRINT:PRINT:IFMM<>3GOSUB 770
740 J=J+1:IFJ>18THEN750ELSE265
750 PRINT"***** END OF GAME *****"
757 PRINT:INPUT"TO PLAY AGAIN TYPE '1' ELSE TYPE '0"';A:IFA=1THEN70ELSEEND
770 INPUT"PRESS 'ENTER' TO CONTINUE";S:RETURN
780 C$(1)="1 IRON ":R(1)=170-5*S(Q):V(1)=20
790 C$(2)="2 IRON ":R(2)=160-5*S(Q):V(2)=20
800 C$(3)="3 IRON ":R(3)=150-5*S(Q):V(3)=20
810 C$(4)="4 IRON ":R(4)=140-5*S(Q):V(4)=20
820 C$(5)="5 IRON ":R(5)=120-5*S(Q):V(5)=30
830 C$(6)="6 IRON ":R(6)=100-5*S(Q):V(6)=30
840 C$(7)="7 IRON ":R(7)=70-5*S(Q):V(7)=30
850 C$(8)="8 IRON ":R(8)=60-5*S(Q):V(8)=30
860 C$(9)="9 IRON ":R(9)=30-5*S(Q):V(9)=30
870 C$(10)="PUTTER":R(10)=1:V(10)=29
880 C$(11)="1 WOOD":R(11)=180-15*S(Q):V(11)=90
890 C$(12)="2 WOOD":R(12)=160-10*S(Q):V(12)=70
900 C$(13)="3 WOOD":R(13)=130-5*S(Q):V(13)=60
910 C$(14)="4 WOOD":R(14)=120-5*S(Q):V(14)=50
920 RETURN
930 CLS
940 POKE 15360,191:POKE 15424,191:POKE 15488,191
950 POKE 15369,191:POKE 15433,191:POKE 15497,191
960 FOR W=15361 TO 15368:POKE W,131:NEXT
970 FOR W=15489 TO 15496:POKE W,176:NEXT
980 FOR W=15552 TO 15576:POKE W,140:NEXT
990 FOR W=15385 TO 15705STEP 64:POKE W,191:NEXT
1000 FOR W=15744 TO 15807:POKE W,179:NEXT
1010 FOR W=15745TO15805STEP5:POKEW,187:NEXT
1020 PRINT@11,"HOLE:";J;
1030 PRINT@75,"DISTANCE:";A(J);
1040 PRINT@139,"PAR:";P(J);
1050 PRINT@256,"HAZARD:";
1060 PRINT@320,"PENALTY:";
1070 PRINT@27,"PLAYER: ";P$(Q);
1080 ON J GOSUB2000,2005,2010,2020,2025,2030,2035,2040,2045,2050,2055,2060,20
65,2070,2075,2080,2085,2090
1090 IFG=1:RETURN
1200 ONJGOTO3000,3400,3300,3500,3100,3000,3500,3400,3200,3200,3600,3000,3400,
3100,3200,3300,3600,3500
1205 IFGH=1:GH=0:RETURN
1210 GOTO300
2000 POKE15365,179:POKE 15493,179:POKE 15429,191:RETURN
2005 FOR W=15363 TO 15366:POKE W,179:NEXT:FOR W=15491 TO 15494:POKE W,179:NEXT
```

COMPUTRONICSTM

MATHEMATICAL APPLICATIONS SERVICETM

```

2006 POKE 15430,143:POKE 15429,140:POKE 15428,140:POKE 15427,188:RETURN
2010 FOR W=15363 TO 15366:POKEW,179:NEXT:FOR W=15491TO15494:POKEW,179:NEXT
2011 POKE 15430,191:FOR W=15427 TO 15429:POKE W,140:NEXT:RETURN
2020 POKE 15363,179:POKE 15366,179:POKE 15494,179
2021 POKE 15427,143:POKE 15428,140:POKE 15429,140:POKE 15430,191:RETURN
2025 FOR W=15363 TO 15366:POKE W,179:NEXT:FOR W=15491TO15494:POKEW,179:NEXT
2026 POKE 15430,188:POKE 15429,140:POKE 15428,140:POKE 15427,143:RETURN
2030 FOR W=15363TO15366:POKEW,179:NEXT:FORW=15491TO15494:POKEW,179:NEXT
2031 POKE 15430,188:POKE 15429,140:POKE 15428,140:POKE 15427,191:RETURN
2035 FOR W=15363TO15366:POKEW,179:NEXT:POKE 15494,179:POKE 15430,191:RETURN
2040 FORW=15363TO15366:POKEW,179:NEXT:FORW=15491TO15494:POKEW,179:NEXT
2041 POKE 15430,191:POKE 15429,140:POKE 15428,140:POKE 15427,191:RETURN
2045 FORW=15363TO15366:POKEW,179:NEXT:FORW=15491TO15494:POKEW,179:NEXT
2046 POKE 15430,191:POKE 15429,140:POKE 15428,140:POKE 15427,143:RETURN
2050 GOSUB 2095:FOR W=15364 TO 15367:POKE W,179:NEXT:FOR W=15492 TO 15495:POK
E W,179:NEXT
2051 POKE 15431,191:POKE 15428,191:RETURN
2055 POKE 15363,179:POKE 15365,179:POKE 15491,179:POKE 15493,179:POKE 15427,191
:POKE 15429,191:RETURN
2060 GOSUB2095:FORW=15364TO15367:POKEW,179:NEXT:FORW=15492TO15495:POKEW,179:N
EXT
2061 POKE 15431,143:POKE 15430,140:POKE 15429,140:POKE 15428,188:RETURN
2065 GOSUB2095:FORW=15364TO15367:POKEW,179:NEXT:FORW=15492TO15495:POKEW,179:N
EXT
2066 POKE 15431,191:POKE 15430,140:POKE 15429,140:POKE 15428,140:RETURN
2070 GOSUB2095:POKE 15364,179:POKE 15367,179:POKE 15495,179:POKE 15431,191:POKE 15
430,140:POKE 15429,140:POKE 15428,143:RETURN
2075 GOSUB2095:FORW=15364TO15367:POKEW,179:NEXT:FORW=15492TO15495:POKEW,179:N
EXT
2076 POKE 15431,188:POKE 15430,140:POKE 15429,140:POKE 15428,143:RETURN
2080 GOSUB2095:FORW=15364TO15367:POKEW,179:NEXT:FORW=15492TO15495:POKEW,179:N
EXT
2081 POKE 15428,191:POKE 15429,140:POKE 15430,140:POKE 15431,188:RETURN
2085 GOSUB2095:FORW=15364TO15367:POKEW,179:NEXT:POKE 15495,179:POKE 15431,191:R
ETURN
2090 GOSUB2095:FORW=15364TO15367:POKEW,179:NEXT:FORW=15492TO15495:POKEW,179:N
EXT
2091 POKE 15428,191:POKE 15429,140:POKE 15430,140:POKE 15431,191:RETURN
2095 POKE 15362,179:POKE 15426,191:POKE 15490,179:RETURN
3000 PRINT@448,"";:FORZ=1TO32:PRINT"* ";:NEXT
3001 PRINT@524,"";:FORZ=1TO26:PRINT"* ";:NEXT
3002 PRINT@596,"";:FORX=1TO22:PRINT"* ";:NEXT
3003 PRINT@688,"";:FORX=1TO8:PRINT"* ";:NEXT
3004 PRINT@752,"";:FORX=1TO8:PRINT"* ";:NEXT
3005 PRINT@816,"";:FORX=1TO8:PRINT"* ";:NEXT
3006 PRINT@768,"* * *";:PRINT@814,"";:FORX=1TO9:PRINT"* ";:NEXT
3007 PRINT@832,"";:FORX=1TO32:PRINT"* ";:NEXT
3008 PRINT@896,"";:FORX=1TO32:PRINT"* ";:NEXT
3009 PRINT@959,"";:FORX=1TO32:PRINT" *";:NEXT:PRINT@704,"*";:PRINT@640,"*";:P
RINT@576,"*";:PRINT@512,"*";

```



```
3010 FORY=24TO32:SET(3,Y):NEXT:FORX=4TO10:SET(X,24):NEXT:FORX=10TO19:SET(X,25)
):NEXT
3015 FORX=19TO23:SET(X,26):NEXT:FORX=23TO28:SET(X,27):NEXT:FORX=28TO32:SET(X,
28):NEXT:FORX=32TO37:SET(X,29):NEXT
3020 FORX=36TO41:SET(X,30):NEXT:FORX=40TO68:SET(X,31):NEXT:FORX=68TO76:SET(X,
30):NEXT:FORX=76TO81:SET(X,29):NEXT
3025 FORX=81TO89:SET(X,28):NEXT:FORX=88TO92:SET(X,27):NEXT:FORX=91TO94:SET(X,
26):NEXT:FORY=27TO34:SET(94,Y):NEXT
3030 SET(92,34):SET(93,34):FORX=89TO92:SET(X,35):NEXT:FORX=86TO89:SET(X,36):N
EXT:FORX=82TO87:SET(X,37):NEXT
3035 FORX=76TO83:SET(X,38):NEXT:FORX=71TO76:SET(X,39):NEXT:FORX=63TO71:SET(X,
40):NEXT:FORX=41TO63:SET(X,41):NEXT
3040 FORX=33TO41:SET(X,40):NEXT:FORX=28TO33:SET(X,39):NEXT:FORX=24TO28:SET(X,
38):NEXT:FORX=20TO24:SET(X,37):NEXT
3045 FORX=15TO20:SET(X,36):NEXT:FORX=11TO15:SET(X,35):NEXT:FORX=7TO11:SET(X,3
4):NEXT:FORX=4TO7:SET(X,33):NEXT
3050 U9=16064+INT(A(J)/11):RESET(92,27):GOSUB5000
3099 B7=95:GOTO1210
3100 PRINT@448,"";:FORX=1TO31:PRINT"* ";:NEXT
3101 PRINT@512,"";:FORX=1TO17:PRINT"* ";:NEXT
3102 PRINT@576,"";:FORX=1TO9:PRINT"* ";:NEXT
3103 PRINT@640,"";:FORX=1TO6:PRINT"* ";:NEXT
3104 PRINT@702,"**";:PRINT@506,"* * *";:PRINT@570,"* * *";:PRINT@634,"* * *";:
PRINT@698,"* * *";
3105 PRINT@736,"";:FORX=1TO16:PRINT"* ";:NEXT
3106 PRINT@794,"";:FORX=1TO19:PRINT"* ";:NEXT
3107 PRINT@852,"";:FORX=1TO23:PRINT"* ";:NEXT
3108 PRINT@902,"";:FORX=1TO29:PRINT"* ";:NEXT
3109 PRINT@957,"";:FORX=1TO33:PRINT" *";:NEXT:PRINT@704,"* *";:PRINT@768,"*";
:PRINT@832,"*";
3110 FORY=36TO44:SET(3,Y):NEXT:SET(4,36):SET(5,36):SET(6,36):FORX=6TO11:SET(X
,35):NEXT:FORX=10TO15:SET(X,34):NEXT
3120 FORX=15TO21:SET(X,33):NEXT:FORX=20TO27:SET(X,32):NEXT:FORX=27TO31:SET(X,
31):NEXT:FORX=30TO35:SET(X,30):NEXT
3130 FORX=34TO39:SET(X,29):NEXT:FORX=39TO45:SET(X,28):NEXT:FORX=44TO51:SET(X,
27):NEXT:FORX=50TO57:SET(X,26):NEXT
3140 FORX=56TO67:SET(X,25):NEXT:FORX=66TO75:SET(X,24):NEXT:FORX=74TO77:SET(X,
23):NEXT:FORX=76TO117:SET(X,22):NEXT
3150 FORY=23TO30:SET(117,Y):NEXT:FORX=78TO116:SET(X,30):NEXT:FORX=68TO79:SET(X,
31):NEXT:FORX=64TO69:SET(X,32):NEXT
3160 FORX=59TO65:SET(X,33):NEXT:FORX=56TO60:SET(X,34):NEXT:FORX=51TO57:SET(X,
35):NEXT:FORX=46TO52:SET(X,36):NEXT
3170 FORX=42TO47:SET(X,37):NEXT:FORX=36TO43:SET(X,38):NEXT:FORX=32TO37:SET(X,
39):NEXT:FORX=26TO33:SET(X,40):NEXT
3180 FORX=18TO27:SET(X,41):NEXT:FORX=12TO19:SET(X,42):NEXT:FORX=6TO13:SET(X,4
3):NEXT:FORX=3TO7:SET(X,44):NEXT
3190 U9=15875+INT(A(J)/11):GOSUB5000
3199 B7=118:GOTO1210
3200 PRINT@448,"";:FORX=1TO32:PRINT"* ";:NEXT
3201 PRINT@512,"";:FORX=1TO15:PRINT"* ";:NEXT:PRINT@558,"";:FORX=1TO9:PRINT"*
```

COMPUTRONICSTM

MATHEMATICAL APPLICATIONS SERVICETM

```

";:NEXT
3202 PRINT@576,"";:FORX=1TO14:PRINT"* ";:NEXT:PRINT@622,"";:FORX=1TO9:PRINT"*
";:NEXT
3203 PRINT@640,"";:FORX=1TO12:PRINT"* ";:NEXT:PRINT@686,"";:FORX=1TO9:PRINT"*
";:NEXT
3204 PRINT@704,"";:FORX=1TO11:PRINT"* ";:NEXT:PRINT@740,"";:FORX=1TO14:PRINT"*
";:NEXT
3205 PRINT@768,"*";:PRINT@800,"";:FORX=1TO16:PRINT"* ";:NEXT
3206 PRINT@832,"*";:PRINT@862,"";:FORX=1TO17:PRINT"* ";:NEXT
3207 PRINT@896,"*";:PRINT@922,"";:FORX=1TO19:PRINT"* ";:NEXT
3208 PRINT@959,"";:FORX=1TO32:PRINT" *";:NEXT
3210 FORY=36TO44:SET(3,Y):NEXT:FORX=4TO33:SET(X,36):NEXT:FORX=32TO43:SET(X,35)
):NEXT
3220 X=42:FORY=34TO23STEP-1:FORK=0TO3:SET(X+K,Y):NEXTK:X=X+2:NEXTY
3230 FORX=66TO90:SET(X,22):NEXT:FORY=22TO30:SET(91,Y):NEXT:FORX=76TO90:SET(X,
30):NEXT
3240 X=74:FORY=31TO43:FORK=0TO3:SET(X+K,Y):NEXTK:X=X-2:NEXTY:FORX=4TO51:SET(X
,44):NEXT:U9=15874+INT(A(J)/11):GOSUB5000
3299 B7=92:GOTO1210
3300 PRINT@448,"";:FORX=1TO32:PRINT"* ";:NEXT
3301 PRINT@512,"*";:PRINT@534,"";:FORX=1TO21:PRINT"* ";:NEXT
3302 PRINT@576,"*";:PRINT@602,"";:FORX=1TO6:PRINT"* ";:NEXT:PRINT@620,"";:FOR
X=1TO10:PRINT" *";:NEXT
3303 PRINT@640,"*";:PRINT@670,"* *";:PRINT@684,"";:FORX=1TO10:PRINT" *";:NEXT

3304 PRINT@704,"";:FORX=1TO10:PRINT" *";:NEXT:PRINT@748,"";:FORX=1TO10:PRINT"*
";:NEXT
3305 PRINT@768,"";:FORX=1TO11:PRINT" *";:NEXT:PRINT@812,"";:FORX=1TO10:PRINT"*
";:NEXT
3306 PRINT@832,"";:FORX=1TO12:PRINT" *";:NEXT:PRINT@874,"";:FORX=1TO11:PRINT"*
";:NEXT
3307 PRINT@896,"";:FORX=1TO14:PRINT" *";:NEXT:PRINT@934,"";:FORX=1TO13:PRINT"*
";:NEXT
3308 PRINT@959,"";:FORX=1TO32:PRINT" *";:NEXT
3310 FORY=24TO32:SET(3,Y):NEXT:SET(4,24):SET(5,24):FORX=5TO13:SET(X,23):NEXT:
FORX=12TO39:SET(X,22):NEXT
3320 X=38:FORY=23TO33:FORK=0TO3:SET(X+K,Y):NEXTK:X=X+2:NEXTY
3330 FORX=60TO66:SET(X,34):NEXT:X=65:FORY=33TO25STEP-1:FORK=0TO3:SET(X+K,Y):N
EXTK:X=X+1:NEXTY
3340 FORX=75TO85:SET(X,24):NEXT:FORY=24TO36:SET(86,Y):NEXT:SET(84,36):SET(85,
36)
3350 X=68:FORY=44TO37STEP-1:FORK=0TO3:SET(X+K,Y):NEXTK:X=X+2:NEXTY
3360 FORX=58TO69:SET(X,45):NEXT:X=32:FORY=32TO44:FORK=0TO3:SET(X+K,Y):NEXTK:X
=X+2:NEXTY
3370 FORX=8TO33:SET(X,31):NEXT:FORX=4TO9:SET(X,32):NEXT:U9=15940+INT(A(J)/11)
:GOSUB5000
3399 B7=87:GOTO1210
3400 PRINT@448,"";:FORX=1TO32:PRINT" *";:NEXT
3401 PRINT@512,"*";:PRINT@534,"";:FORX=1TO8:PRINT" *";:NEXT:PRINT@570,"* * *";

```

COMPUTRONICSTM

MATHEMATICAL APPLICATIONS SERVICE™

INC.

```
3402 PRINT@576,"*";:PRINT@602,"";:FORX=1TO4:PRINT"* ";:NEXT
3403 PRINT@640,"*";:PRINT@704,"";:FORX=1TO8:PRINT"* ";:NEXT
3404 PRINT@768,"";:FORX=1TO9:PRINT"* ";:NEXT:PRINT@808,"";:FORX=1TO76:PRINT"*
";:NEXT
3405 PRINT@959,"";:FORX=1TO32:PRINT" *";:NEXT:U9=15936+INT(A(J)/11):GOSUB5000

3410 FORY=22TO30:SET(3,Y):NEXT:FORX=4TO37:SET(X,22):NEXT:X=36:FORY=23TO29:FOR
K=0TO3:SET(X+K,Y):NEXTK:X=X+2:NEXTY
3420 FORX=50TO65:SET(X,30):NEXT:X=64:FORY=29TO23STEP-1:FORK=0TO3:SET(X+K,Y):N
EXTK:X=X+2:NEXTY:FORX=78TO109:SET(X,22):NEXT
3430 X=108:FORY=23TO26:FORK=0TO3:SET(X+K,Y):NEXTK:X=X+2:NEXTY:FORX=116TO124:S
ET(X,27):NEXT:FORY=27TO35:SET(125,Y):NEXT
3440 FORX=110TO124:SET(X,35):NEXT:FORX=108TO111:SET(X,34):NEXT:FORX=84TO109:S
ET(X,33):NEXT:X=82:FORY=34TO39:FORK=0TO3:SET(X+K,Y):NEXTK:X=X-2:NEXTY
3450 FORX=40TO73:SET(X,40):NEXT:X=38:FORY=39TO31STEP-1:FORK=0TO3:SET(X+K,Y):N
EXTK:X=X-2:NEXTY:FORX=4TO23:SET(X,30):NEXT
3499 B7=124:GOTO1210
3500 PRINT@448,"";:FORX=1TO64:PRINT" * ";:NEXT
3501 PRINT@576,"";:FORX=1TO14:PRINT" * ";:NEXT:PRINT@620,"";:FORX=1TO10:PRINT"*
";:NEXT
3502 PRINT@640,"";:FORX=1TO12:PRINT" * ";:NEXT:PRINT@684,"";:FORX=1TO10:PRINT"*
";:NEXT
3503 PRINT@704,"";:FORX=1TO12:PRINT" * ";:NEXT:PRINT@742,"";:FORX=1TO13:PRINT"*
";:NEXT
3504 PRINT@768,"";:FORX=1TO13:PRINT" * ";:NEXT:PRINT@810,"";:FORX=1TO11:PRINT"*
";:NEXT:PRINT@832,"*";:PRINT@874,"";:FORX=1TO11:PRINT" * ";:NEXT
3505 PRINT@896,"*";:PRINT@936,"";:FORX=1TO12:PRINT" * ";:NEXT
3506 PRINT@959,"";:FORX=1TO32:PRINT" * ";:NEXT:U9=15939+INT(A(J)/11)
3507 IFJ=18THENU9=16000+INT(A(J)/11)
3508 IFJ=4THENU9=16000+INT(A(J)/10.5)
3509 GOSUB5000
3510 FORY=39TO47:SET(3,Y):NEXT:FORX=4TO53:SET(X,39):NEXT:X=52:FORY=38TO33STEP
-1:FORK=0TO3:SET(X+K,Y):NEXTK:X=X-2:NEXTY
3520 X=44:FORY=32TO25STEP-1:FORK=0TO3:SET(X+K,Y):NEXTK:X=X+2:NEXTY:FORX=60TO8
6:SET(X,24):NEXT:FORY=24TO32:SET(87,Y):NEXT
3530 FORX=72TO86:SET(X,32):NEXT:X=70:FORY=33TO40:FORK=0TO3:SET(X+K,Y):NEXTK:X
=X+2:NEXTY:X=82:FORY=41TO46:FORK=0TO3:SET(X+K,Y):NEXTK:X=X-2:NEXTY:FORX=4TO73
:SET(X,47):NEXT
3599 B7=89:GOTO1210
3600 PRINT@448,"";:FORX=1TO64:PRINT" * ";:NEXT
3601 PRINT@576,"*";:PRINT@624,"";:FORX=1TO8:PRINT" * ";:NEXT
3602 PRINT@640,"*";:PRINT@690,"";:FORX=1TO7:PRINT" * ";:NEXT
3603 PRINT@704,"";:FORX=1TO19:PRINT" * ";:NEXT:PRINT@758,"";:FORX=1TO5:PRINT"*
";:NEXT
3604 PRINT@768,"";:FORX=1TO20:PRINT" * ";:NEXT:PRINT@824,"";:FORX=1TO4:PRINT"*
";:NEXT
3605 PRINT@832,"";:FORX=1TO23:PRINT" * ";:NEXT:PRINT@892,"* ";
3606 PRINT@896,"";:FORX=1TO24:PRINT" * ";:NEXT
3607 PRINT@959,"";:FORX=1TO32:PRINT" * ";:NEXT:U9=16256+INT(A(J)/11):GOSUB5000
```

M&E COMPUTRONICS INC.

MATHEMATICAL APPLICATIONS SERVICE™

```

3610 FORY=24T032:SET(3,Y):NEXT:FORX=4T087:SET(X,24):NEXT:X=86:FORY=25T043:FOR
K=0T03:SET(X+K,Y):NEXTK:X=X+2:NEXTY
3620 X=124:FORY=44T046:FORK=0T03:SET(X+K,Y):NEXTK:X=X-2:NEXTY:FORX=92T0121:SE
T(X,47):NEXT
3630 X=90:FORY=46T044STEP-1:FORK=0T03:SET(X+K,Y):NEXTK:X=X+2:NEXTY:X=92:FORY=
43T033STEP-1:FORK=0T03:SET(X+K,Y):NEXTK:X=X-2:NEXTY:FORX=4T073:SET(X,32):NEXT

3699 B7=124:GOTO1210
3700 IF T4=5 THEN GOSUB 3910:SET(T4,G):T4=T4+1:RETURN
3702 IF GH=1 THEN GOSUB 3910:SET(T4,G):GH=0:RETURN
3705 IF T4=6 THEN GOSUB 3910:RESET(T4-1,G)
3710 T4=T4+INT(Y/5.5)
3720 B4=T4-INT(Y/5.5)
3800 GOSUB 3850:FORD=B4TOT4STEPK4
3805 IF D>B7 THEN GOSUB 3910:WW=B7-5:SET(WW,G):T4=WW:PRINT@265,"OUT OF BOUNDS";:S
=S+2:PRINT@330,"TWO STROKES";:RETURN
3810 GOSUB 3910:GOSUB 3950:SET(D,G):RESET(D,G-1):RESET(D,G+1):RESET(D-1,G-1):RE
SET(D-1,G+1):RESET(D,G):NEXTD:SET(T4,G):RETURN
3850 K4=1:IF B4>INT(A(J)/5.5) THEN K4=-1:I4=T4-B4:T4=B4-I4
3860 RETURN
3910 ON J GOTO 04000,4400,4300,4500,4100,4000,4500,4400,4200,4200,4600,4000,4400,
4100,4200,4300,4600,4500
3950 IF D+10>=INT(A(J)/5.5) THEN POKE U9,128:POKE U9+1,128:POKE U9+64,128
3951 IF J=11 THEN SET(114,47):SET(115,47)
3952 IF J=17 THEN SET(108,47):SET(109,47)
3960 RETURN
4000 IF D<19 THEN G=28:RETURN
4010 IF D<24 THEN G=29:RETURN
4020 IF D<29 THEN G=30:RETURN
4030 IF D<33 THEN G=31:RETURN
4040 IF D<37 THEN G=32:RETURN
4050 IF D<50 THEN G=33:RETURN
4060 G=34:RETURN
4100 IF D<10 THEN G=40:RETURN
4105 IF D<14 THEN G=39:RETURN
4110 IF D<22 THEN G=38:RETURN
4115 IF D<30 THEN G=37:RETURN
4120 IF D<34 THEN G=36:RETURN
4125 IF D<38 THEN G=35:RETURN
4130 IF D<42 THEN G=34:RETURN
4135 IF D<46 THEN G=33:RETURN
4140 IF D<50 THEN G=32:RETURN
4145 IF D<54 THEN G=31:RETURN
4150 IF D<58 THEN G=30:RETURN
4155 IF D<62 THEN G=29:RETURN
4160 IF D<66 THEN G=28:RETURN
4165 IF D<72 THEN G=27:RETURN
4170 IF D<100 THEN G=26:RETURN
4175 G=25:RETURN
4200 IF D<45 THEN G=39:RETURN

```

Sigma Technical Press

the UK software publisher

— COME TO ENGLAND —
— WIDEN YOUR HORIZONS! —

SUCCESSFUL SOFTWARE FOR SMALL COMPUTERS, Graham Beech. At last — the definitive book for serious BASIC programmers. "A structured approach has been adopted using clear, easy-to-follow language. An excellent introduction to advanced programming techniques such as linked lists, other dynamic data structures, sorting, searching and simulation. Plenty of references CHOCK FULL OF EXAMPLES EXCELLENT VALUE" (UK National TRS-80 Users Group Newsletter). Approved by Tandy Corp. (Branch UK) for Model I, Level II.
Price \$8.95 TRS-80 Cassette of Programs \$10.50

COMPUTER PROGRAMS THAT WORK (3rd Edition), J.D. Lee, G. Beech, T.D. Lee. The UK market leader: 24 BASIC programs in maths, statistics, science and games. Sold by all UK Tandy dealers. "Well thought out — plenty of variety" (Micro Forecast)
Price \$6.95

LIVING WITH THE MICRO, Martin Banks. A leading UK journalist (editor of 'Microcomputer Analysis') writes on software, programming, business systems, viewdata and education. Lucid explanations of all of this and more. Great value! "A very brave effort. A managing director might read (this book) before spending half a million on the new technology" (Electrical and Radio Trading).
Price \$7.25

Prices include surface mail; add 20% for airmail.
SIGMA TECHNICAL PRESS (CT), 5 ALTON ROAD, WILMSLOW,
SK9 5DY, ENGLAND.

— Dealer Inquiries Welcome —

COMPUTRONICSTM

MATHEMATICAL APPLICATIONS SERVICETM

```
4205 IFD<49THENG=38:RETURN  
4210 IFD<51THENG=37:RETURN  
4215 IFD<53THENG=36:RETURN  
4220 IFD<55THENG=35:RETURN  
4225 IFD<57THENG=34:RETURN  
4230 IFD<59THENG=33:RETURN  
4235 IFD<61THENG=32:RETURN  
4240 IFD<63THENG=31:RETURN  
4245 IFD<65THENG=30:RETURN  
4250 IFD<67THENG=29:RETURN  
4255 IFD<69THENG=28:RETURN  
4260 IFD<76THENG=27:RETURN  
4265 IFD<80THENG=26:RETURN  
4270 G=25:RETURN  
4300 IFD<32THENG=27:RETURN  
4305 IFD<38THENG=28:RETURN  
4310 IFD<42THENG=29:RETURN  
4315 IFD<46THENG=30:RETURN  
4320 IFD<48THENG=31:RETURN  
4325 IFD<49THENG=32:RETURN  
4330 IFD<50THENG=33:RETURN  
4335 IFD<51THENG=34:RETURN  
4340 IFD<52THENG=35:RETURN  
4345 IFD<56THENG=36:RETURN  
4350 IFD<59THENG=37:RETURN  
4355 IFD<62THENG=38:RETURN  
4360 IFD<66THENG=39:RETURN  
4365 IFD<69THENG=38:RETURN  
4370 IFD<71THENG=37:RETURN  
4373 IFD<73THENG=36:RETURN  
4376 IFD<74THENG=35:RETURN  
4380 IFD<75THENG=34:RETURN  
4382 IFD<77THENG=33:RETURN  
4384 IFD<78THENG=32:RETURN  
4386 IFD<79THENG=31:RETURN  
4388 G=30:RETURN  
4400 IFD<25THENG=26:RETURN  
4405 IFD<32THENG=27:RETURN  
4410 IFD<36THENG=28:RETURN  
4415 IFD<37THENG=29:RETURN  
4420 IFD<38THENG=30:RETURN  
4425 IFD<42THENG=31:RETURN  
4430 IFD<44THENG=32:RETURN  
4435 IFD<46THENG=33:RETURN  
4440 IFD<68THENG=34:RETURN  
4445 IFD<72THENG=33:RETURN  
4450 IFD<74THENG=32:RETURN  
4455 IFD<76THENG=31:RETURN  
4460 IFD<78THENG=30:RETURN  
4465 IFD<82THENG=29:RETURN
```

SIMPLROOTS

ENABLES YOU TO BEGIN AND USE A GENEALOGY OF NAMES.

**GENEALOGY MAY BE PRINTED AND SAVED ON DISK OR TAPE.
100 NAMES WITH 16K LEVEL II
TO 500 NAMES WITH 48K DISK.
FOR TRS-80 MODEL I \$9.00.**

**SENT ON DIGITAL CASSETTE
RECORDED ON BOTH SIDES.**

**RETURN CASSETTE FOR FULL
REFUND IF UNSATISFIED.**

**THE SIMPLSOFT WARE COMPANY
RT. 4 BOX 216
SYLVANIA GEORGIA 30467**

**SPECIFY LEVEL II OR DISK.
VISA/MASTERCHARGE ACCEPTED.**

H & E COMPUTRONICS INC.

MATHEMATICAL APPLICATIONS SERVICE™

```
4470 G=28:RETURN  
4500 IFD<56THENG=43:RETURN  
4505 IFD<57THENG=42:RETURN  
4510 IFD<58THENG=41:RETURN  
4515 IFD<59THENG=40:RETURN  
4520 IFD<60THENG=39:RETURN  
4525 IFD<61THENG=38:RETURN  
4530 IFD<62THENG=37:RETURN  
4535 IFD<63THENG=36:RETURN  
4540 IFD<64THENG=35:RETURN  
4545 IFD<65THENG=34:RETURN  
4550 IFD<66THENG=33:RETURN  
4555 IFD<67THENG=32:RETURN  
4560 IFD<68THENG=31:RETURN  
4565 IFD<72THENG=30:RETURN  
4570 IFD<73THENG=29:RETURN  
4575 G=28:RETURN  
4600 IFD<74THENG=28:RETURN  
4605 IFD<78THENG=29:RETURN  
4610 IFD<82THENG=30:RETURN  
4615 IFD<86THENG=31:RETURN  
4620 IFD<88THENG=32:RETURN  
4630 IFD<90THENG=33:RETURN  
4635 IFD<92THENG=34:RETURN  
4640 IFD<94THENG=35:RETURN  
4645 IFD<96THENG=36:RETURN  
4650 IFD<98THENG=37:RETURN  
4655 IFD<100THENG=38:RETURN  
4660 IFD<102THENG=39:RETURN  
4665 IFD<106THENG=40:RETURN  
4670 IFD<109THENG=41:RETURN  
4675 IFD<110THENG=42:RETURN  
4680 G=43:RETURN  
5000 POKEU9,159:POKEU9+1,141:POKEU9+64,129:RETURN
```

NEW!
H & E COMPUTRONICS
announces
DECISION?MASTER

When DecisionMasterTM speaks everybody listens.

Let's face it. We all have to make decisions. Decisions that can change our lives. Decisions that can make us happy or unhappy. Decisions that could win us fame or fortune. Now, DecisionMaster can help you make the best decisions of your life.

Use Bayesian theory to peer into the future...even if you've never heard of the Bayes' Rule. Do a complete weighted factor analysis...without knowing what one is. Use discounted cash flow to compare investment alternatives without bothering with present value tables. These and other sophisticated theories that were once the exclusive domain of professors and top business executives are *built into* DecisionMaster's algorithms. so you can use them at the touch of a key!

DecisionMaster is easy to use. It features:

- A fully documented manual developed by an authority in the field.
- A unique program-controlled cross reference system.
- A powerful formatted-screen data entry system.

You'll use DecisionMaster in hundreds of routine decisions, as well as more important ones such as:
• Buying a house
• Changing jobs • Selecting investment • Evaluating insurance policies • Expanding product lines • Leasing vs. purchasing.

If you buy only one computer program this year make it DecisionMaster. And when it speaks, listen.



NEW TOLL-FREE
ORDER LINE
(OUTSIDE OF N.Y. STATE)
(800) 431-2818

Attention **BARGAIN HUNTERS**

Receive Hundreds of Classified Ads Like These Every Month

HARD DISK DRIVE Diablo Mod 31 1.2 MByte std. density. Includes power supp. and cable, rack mount slides, and manual. Excellent condition. \$450. Call 1601 Parker Rd., Ft. Lauderdale, FL 33312.

IMPACT PRINTER 165 CPS Serial and parallel interfaces-Eight Selectable character sizes-Single and double width characters-uses standard plain paper - same mechanism as the integral data system. 1 year old \$589.

HEATHKIT H-11/DEC LSI-11 system, 32K Byte storage, reader 1 punch, video terminal, complete software. Cost \$4500 assembled, \$3500 kit. Like new. Sell for \$2250. 305-962-6677. 2058 Griffin Rd., Ft. Lauderdale, FL 33312.

FOR SALE: Interdata (Perkin-Elmer) 7/16 Mini with 32KB core, front panel, 50A PWR supply. Includes HS tape reader, interfaces for LP, 2 (TTY), and RS-232 (Full duplex, programmable). Includes manuals and much SW (Basic, Fortran, OS etc.). \$800 - After 6 PM 60310.

COMPUTER AUTOMATION ALPHA 16; 16 k-word core memory, RTC PF-R. Modified Mod. ASR-33 TTY Manuals, utilities, assemblers and many option boards - 16 bit I/O Driver, 16 bit I/O, Asynch modem contr. 64 bit output, 10 bit A/D - D/A. Fairly complete documentation. Up and running in Fortran. Not much more than TTY at \$1000. Herb Sauer, 303-494-8724.

FOR SALE: Heath H9 video terminal, excellent condition, \$175 or best offer. You ship. [214] 962-4484

WANTED: DIGITAL Group 32K memory board without memory chips and Phi deck controller board (kit, assembled or not working).

PET COMPUTERS moving up to LSI-37. Pet business system priced to sell. PET 2001-16N Computer \$800; 2040 Dual Floppy 340K (holds more data than 6 TRS-80 disks) \$1,100. Digital cassettes (2) \$60 each. System complete with Text Editor, disk sort, database software, real estate software and more \$2,100. Call PAUL (313)971-8447

COMPUTER SHOPPER, the new buy, sell, and trade publication, is ready to help you with the latest information on personal, small business and large-system computers, accessories and software.

Each ad-packed issue is full of bargains you are looking for. Included are ads from individuals throughout the United States who are selling their good, pre-owned equipment just so they can trade-up to new equipment coming on the market.

But, COMPUTER SHOPPER'S bargains won't be yours unless you subscribe. This useful, money-saving publication can become your way to communicate with other buyers, sellers, and traders all over the nation.

Whether you are a hobbyist or a part-time user, COMPUTER SHOPPER will put you in touch with the nationwide computer marketplace in time for you to take advantage of bargain opportunities.

Have something to sell? A COMPUTER SHOPPER subscriber probably wants to buy it.

Looking for a part, component or even a complete system? A COMPUTER SHOPPER subscriber probably wants to sell it.

COMPUTER SHOPPER is THE marketplace for anything in computers and is read by thousands of people who are ready to buy.

COMPUTER SHOPPER offers a unique format in which classified ads are categorized for fast location of specific items. Combining this with low individual ad rates — 10 cents a word —



makes it the ideal place for buyers and sellers to communicate. And, its mix of individual, dealer, and manufacturer ads enable subscribers to find what they want at the best price possible.

COMPUTER SHOPPER will work for you in other ways, too. If you are just thinking about getting into computers, it can help you learn product availability and prices before you make a decision. And, through the timely ads, COMPUTER SHOPPER will keep you abreast of changes in the market which could create bargain opportunities for you.

BUT COMPUTER SHOPPER cannot work for you unless you subscribe.

Want to look us over first? We'll give you your first issue FREE and then bill you for the next 12. If you are not convinced COMPUTER SHOPPER suits your needs, just write "cancel" on the invoice and return it.

And, to let COMPUTER SHOPPER start working for you right now, with a paid subscription we'll also give you a FREE classified ad to sell your pre-owned equipment or to find equipment you want.

If you don't need to use the free classified ad now, use it anytime during your subscription.

Subscription: \$10/year, 12 issues plus your first free one. Bank cards accepted. Money back guarantee.

The Nationwide Marketplace for Computer Equipment
COMPUTER SHOPPER
P.O. Box 23 • Titusville, Florida 32780
Telephone 305-269-3211

MasterCharge or VISA orders only, call TOLL FREE 800-327-9920.



FOUR BASIC PROGRAMS

by
GORDON SPEER

TEST

There are two ways to use this program. A beginner, or one who does not have access to a printer, can read and answer the questions, which cover some of the basic points of BASIC. The entire program, when run on a system with a printer, produces a copy of the test with the questions in random order. Subsequent runs produce the same test with the questions in a different order. I use this method to produce two or three tests which are then duplicated and distributed alternately to the students in my computer programming class, to discourage cheating.

```
90 ' TEST
100 DIM C(25)
110 LPRINT" Computer Programming Test - Chapter 1
120 LPRINT STRING$(2,138)
130 GOTO 390
140 LPRINT"BASIC is a:
      a) computer
      b) language
      c) statement
      d) terminal":RETURN
150 LPRINT"To PRINT a title, you must enclose it in:
      a) parentheses
      b) apostrophes
      c) quotes
      d) brackets":RETURN
160 LPRINT"A BASIC program is executed in:
      a) statement order
      b) line number order
      c) chronological order
      d) alphabetical order":RETURN
170 LPRINT"Every line of a BASIC program must begin with:
      a) a quote
      b) a variable
      c) a space
      d) a positive integer":RETURN
180 LPRINT"Lines are numbered by tens:
      a) because it is required
      b) to separate data
      c) to prevent error statements
      d) to allow inserting more statements":RETURN
190 LPRINT"In BASIC, the product of A and B is written:
      a) AB
```

COMPUTRONICS

MATHEMATICAL APPLICATIONS SERVICE™

b) A x B

c) A*B

d) (A)(B)":RETURN

200 LPRINT"What command is used to assign a value to a variable?

a) GOTO

b) LET

c) PRINT

d) NEW":RETURN

210 LPRINT"Zones, or columns:

a) are all 10 spaces wide

b) are all 16 spaces wide

c) vary with different computers

d) may be changed to different widths":RETURN

220 LPRINT"Which of the following is performed before the others?

a) exponentiation

b) subtraction

c) multiplication

d) division":RETURN

230 LPRINT"A READ statement requires which of the following?

a) INPUT

b) DATA

c) LET

d) GOTO":RETURN

240 LPRINT"DATA, in a BASIC program:

a) must be at the beginning

b) must be after the READ statement

c) must be at the end

d) may be anywhere":RETURN

250 LPRINT"Large numbers, in a BASIC program:

a) must contain commas

b) may contain commas

c) must not contain commas

d) are forbidden":RETURN

260 LPRINT"To erase a previous program from the computer, you type:

a) NEW

b) CLEAR

c) RUN

d) ENTER":RETURN

270 LPRINT"To initialize all variables and begin program execution you type:

a) RUN

b) BEGIN

c) GOTO 1

d) START":RETURN

280 LPRINT"Which of these is NOT a valid BASIC variable?

a) Z2

b) X13

c) Q

d) G6":RETURN

290 LPRINT"When a computer encounters an INPUT statement it:

COMPUTRONICSTM

MATHEMATICAL APPLICATIONS SERVICETM

- a) prints an error message
 - b) reads a data statement
 - c) starts over
 - d) prints ? and stops":RETURN
- 300 LPRINT"How does a BASIC computer print six billion?
- a) 6000000000.0
 - b) 6,000,000,000
 - c) 6x10⁹
 - d) 6.000000E+9":RETURN
- 310 LPRINT"The BASIC statement: 40 LET N=N+1
- a) is invalid
 - b) will cause an error message
 - c) will increase the value of N by 1
 - d) doesn't do anything":RETURN
- 320 LPRINT"A comma, out of quotes, causes the next PRINT to occur:
- a) in the next zone (column)
 - b) on the next line
 - c) immediately following the last one
 - d) 8 spaces to the right":RETURN
- 330 LPRINT"Titles and column headings should be:
- a) written first
 - b) added after you get the program working
 - c) put at the end of the program
 - d) omitted":RETURN
- 340 LPRINT"A semicolon (;) out of quotes:
- a) causes a linefeed
 - b) prevents tab and linefeed
 - c) tabs to the next column (zone)
 - d) tabs over TWO columns":RETURN
- 350 LPRINT"Anything enclosed in quotes is printed as-is except:
- a) another quote
 - b) numerals
 - c) commas
 - d) data":RETURN
- 360 LPRINT"Multiplication in BASIC programming:
- a) requires the * sign (asterisk)
 - b) is understood between ()()
 - c) is done BEFORE division
 - d) is done AFTER division":RETURN
- 370 LPRINT"When your BASIC program runs out of DATA:
- a) an error message is printed
 - b) it goes back to the beginning
 - c) it stops
 - d) it goes on without it":RETURN
- 380 LPRINT"What BASIC statement branches to another point in the program?
- a) GOTO
 - b) LET
 - c) NEW
 - d) DATA":RETURN
- 390 FOR Q=1 TO 25

COMPUTRONICSTM

MATHEMATICAL APPLICATIONS SERVICETM

```
400 LET N=RND(25)
410 IF C(N)=1 THEN 400
420 LET C(N)=1
430 LPRINT USING"##";Q;
440 LPRINT") ";
450 ON N GOSUB 140 ,150 ,160 ,170 ,180 ,190
,200 ,210 ,220 ,230 ,240 ,250 ,260 ,270 ,280 ,290
,300 ,310 ,320 ,330 ,340 ,350 ,360 ,370 ,380
460 LPRINT
470 NEXT Q
480 'AN ORIGINAL PROGRAM USING
490 'LEVEL-II BASIC FOR TRS-80
500 'BY MR GORDON E. SPEER
510 ' 3304 WOODLAWN ROAD
520 ' STERLING, IL 61081
530 ' PHONE(815)625-5251
```

AIR

The atmosphere near the surface of the earth is a mixture of several different gases, most of which are elements. The most abundant element in the atmosphere is nitrogen (78%), with lesser amounts of oxygen (21%), argon (.95%), carbon dioxide (.04%), and traces of many others.

To visualize this mixture, this program prints a symbol of the elements on the screen to represent each air molecule using the random number generator to approximate the ratios of the gases that might be found in an actual sample of air.

```
100  'AIR
110 CLS                      'CLEAR SCREEN
120 PRINT CHR$(23)
130 FOR P=0 TO 1020 STEP 2   'POSITION
140 LET N=RND(10000)         'RANDOM NUMBER
150 LET E$="N"               'NITROGEN SYMBOL
160 IF N>7800 THEN LET E$="O" 'OXYGEN
170 IF N>9900 THEN LET E$="A" 'ARGON
180 IF N>9995 THEN LET E$="C" 'CARBON DIOXIDE
190 IF N=10000 THEN LET E$="T" 'TRACE ELEMENT
200 PRINT@P,E$;
210 NEXT P
220 GOTO 220                 'FREEZE THE DISPLAY
230 'AN ORIGINAL PROGRAM USING
240 'LEVEL-II BASIC FOR TRS-80
250 'BY: MR GORDON E. SPEER
260 ' 3304 WOODLAWN ROAD
270 ' STERLING, IL 61081
280 ' PHONE(815)625-5251
```

PLANETS

If you are into astrology, or astronomy, or even just star gazing, try this one. This program looks down on four of the planets of our solar system as they revolve around the sun. It starts with them lined up, and displays their positions month by month as they progress through their orbits. This would be an easy way to keep track of syzygy (one of my favorite words), or retrogressions.

```
100 ' PLANETS
110 LET PI=3.14159
120 FOR M=1 TO 100000      'MONTHS
130 LET R=7:NA$="EARTH":L=M*360/12:GOSUB 220
140 LET R=12:NA$="MARS":L=M*360/24:GOSUB 220
150 LET R=16:NA$="JUPITER":L=M*360/144:GOSUB 220
160 LET R=21:NA$="SATURN":L=M*360/354:GOSUB 220
170 ' R=RADIUS, NA$=NAME, L=LOCATION IN DEGREES FROM START
180 FOR D=1 TO 1000:NEXT    'DELAY
190 CLS
200 NEXT M
210 END
220 'SUBROUTINE TO PRINT AT L,R,NA$
230 PRINT@543,"(S)";          'SUN'S LOCATION
240 LET A=L*PI/180            'CHANGES DEGREES TO RADIANs
250 LET Y=25-SIN(A)*R         'VERTICAL POSITION
260 LET X=65+COS(A)*2.3*R     'HORIZONTAL POSITION
270 SET(X,Y)                  'PLANET'S LOCATION BLOCK
280 LET N=64*FIX(Y/3)+X/2+2   'LOCATION OF PLANET'S NAME
290 PRINT@N,NA$;
300 RETURN
310 'AN ORIGINAL PROGRAM USING
320 'LEVEL-II BASIC FOR TRS-80
330 'BY: MR GORDON E. SPEER
340 '    3304 WOODLAWN ROAD
350 '    STERLING, IL 61081
360 '    PHONE(815)625-5251
```

CRAZY EIGHTS

CRAZY EIGHTS is also called Swedish Rummy, but it is neither rummy nor Swedish. An ordinary pack of 52 cards is used. Each player is dealt seven cards. The remainder of the pack is placed face down to form the STOCK. The top card is turned over and placed beside the stock as the STARTER. This begins the TALON, or pile of played cards.

A player must lay on the talon a card of either the same rank or the same suit as the top card. If unable to do this, he must draw from the stock until he is able. (A player may draw from the stock even if he is able to play.) After the stock is exhausted, a player who is unable to play

COMPUTRONICS

MATHEMATICAL APPLICATIONS SERVICE™

passes. Play ends when either the stock is exhausted and neither hand can play.

All EIGHTS are WILD. The player of an eight designates a suit for it, any suit. The other player must then play a card of the designated suit (or another eight).

Scoring is done by counting points for the cards remaining in each hand when play ends. Each eight counts 50 points. Face cards count ten points each, and other cards their index value. The winner is the player with the lower count, and he receives the DIFFERENCE in count between the hands. The first player to reach a total of 100 or more points wins a GAME. He scores 100 for the game, plus the difference in the final point totals.

```
100 'CRAZY EIGHTS - SPEER
110 CLEAR 2000           'STRING SPACE
120 DEFINT I-N,T,W      'INT REQUIRES LESS MEMORY
130 DEFSTR C,R,S        'RANK AND SUIT NAMES
140 DIM C(52),R(13),P(13),CA(52),VA(52),L(52)
150 CLS:PRINT CHR$(23)   'CLEAR SCREEN-DOUBLE WIDE
160 FOR Z=1 TO 70
170 PRINT @RND(1020),"8";
180 PRINT@RND(1010),"    ";
190 NEXT
200 PRINT@450," C R A Z Y   E I G H T S   "
210 '
      DEFINE THE CARDS
220 LET S(1)="S":S(2)="H":S(3)="D":S(4)="C"  'SUITS
230 FOR I=1 TO 13          'RANKS
240 READ R(I),P(I)         'CARD RANK, POINTS
250 DATAA,1,2,2,3,3,4,4,5,5,6,6,7,7,8,50,9,9,10,10,J,10,Q,10,K,10
260 NEXT I
270 '
      GENERATE CARD NAMES AND POINT VALUES
280 FOR I=1 TO 4           'SUITS
290 FOR J=1 TO 13          'RANKS
300 LET CA((I-1)*13+J)=R(J)+S(I)  'CARD NAMES
310 LET VA((I-1)*13+J)=P(J)       'POINT VALUES
320 NEXT J,I
330 '
      DEAL THE CARDS
340 LET N=52                'CARDS IN THE STOCK =LOCATION #0
350 FOR I=1 TO 7            'DEAL SEVEN CARDS EACH
360 GOSUB 1480              'DEAL
370 LET L(D)=1               'PLAYER'S HAND      =LOCATION #1
380 GOSUB 1480              'DEAL
390 LET L(D)=2               'COMPUTER'S HAND    =LOCATION #2
400 IF D-13*FIX(D/13)=8 THEN LET N8=N8+1  'NO OF 8'S-COMPUTER
410 NEXT I
420 LET NP=7                 'NUMBER OF CARDS-PLAYER'S HAND
```

H & E COMPUTRONICS INC.
MATHEMATICAL APPLICATIONS SERVICE™

```

430 LET NC=7          'NUMBER OF CARDS-COMPUTER'S HAND
440 GOSUB 1480        'DEAL
450 LET L(D)=3         'THE DISCARD TALON =LOCATION #3
460 LET T=D             'TOP CARD NUMBER
470 LET C(0)="8-"      'TOP CARD NUMBER
480 '

```

DIRECTIONS

```

490 PRINT:PRINT"TO DRAW OR PASS: PRESS <ENTER>" 
500 FOR Z=1 TO 2000:NEXT Z      'DELAY
510 CLS:PRINT CHR$(23)          'CLEAR SCREEN-DOUBLE WIDE
520 PRINT@394,"S H U F F L I N G"
530 FOR Z=1 TO 1000:NEXT Z
540 CLS:PRINT CHR$(23)
550 PRINT@526,"D E A L I N G"
560 FOR Z=1 TO 1000:NEXT Z
570 CLS:PRINT CHR$(23)
580 '

```

PLAYER'S TURN

```

590 PRINT"THE TOP OF THE TALON IS THE "C(T);CA(T)
600 PRINT"YOUR HAND CONTAINS THESE CARDS:"
610 PRINT
620 FOR I=1 TO 52
630 IF L(I)=1 THEN PRINT CA(I);";";
640 NEXT I
650 PRINT                      'LINE RETURN
660 PRINT STRING$(31,134)        'DECORATION
670 LET P$=""
680 INPUT"YOUR PLAY";P$
690 IF P$>"" THEN 780
700 IF N=0 THEN B=B+1:PRINT"STOCK GONE - YOU PASS":IF B<2 THEN 1000 ELSE
1530
710 CLS:PRINT CHR$(23)          'CLEAR SCREEN
720 GOSUB 1480                  'DEAL
730 LET L(D)=1                   'PLAYER'S HAND
740 LET NP=NP+1                  'COUNT IT
750 PRINT"YOU DREW THE "CA(D) 'IDENTIFY THE CARD
760 PRINT
770 GOTO 590
780 FOR I=1 TO 52                'SCAN THE DECK
790 IF CA(I)=P$ THEN 820          'FIND CARD NUMBER
800 NEXT I
810 PRINT"* INVALID CARD NAME":GOTO 590
820 IF L(I)<>1 THEN PRINT"* YOU DON'T HAVE THAT CARD":GOTO 590
830 IF LEFT$(CA(I),1)="8" THEN 870
840 IF RIGHT$(CA(I),1)=RIGHT$(CA(T),1) THEN 910 'SAME SUIT
850 IF I-13*(FIX(I/13))=T-13*(FIX(T/13)) THEN 920 'SAME RANK
860 IF I-13*FIX((I-1)/13)<>8 THEN 900 'NOT AN 8
870 INPUT"DECLARE A SUIT FOR THE 8";CA(0)
880 LET T=0                         '8 INDICATOR
890 GOTO 930

```

H & E COMPUTRONICS INC.

MATHEMATICAL APPLICATIONS SERVICE™

```

900 PRINT"** INVALID PLAY":GOTO 670
910 LET CA(0)=""           'RESET DECLARED SUIT
920 LET T=I                 'TOP CARD NUMBER
930 LET L(I)=3              'MOVE CARD TO TALON
940 LET NP=NP-1              'NUMBER OF CARDS- PLAYER'S HAND
950 IF NP=0 THEN PRINT:PRINT">>> CONGRATULATIONS-YOU WIN! <<":PRINT:GOTO 1540

960 LET B=0                 'NO BLOCK
970 FOR Z=1 TO 1000:NEXT Z   'DELAY
980 CLS:PRINT CHR$(23)       'CLEAR SCREEN
990 '

        COMPUTER'S TURN
1000 FOR I=1 TO 52          'SCAN THE DECK
1010 IF L(I)<>2 THEN 1070    'NOT IN COMPUTER'S HAND
1020 IF I-13*(FIX(I/13))=8 THEN 1070 'DON'T PLAY 8 TILL NEEDED
1030 IF T=0 THEN 1060        '8 ON TOP OF TALON
1040 IF I-13*FIX(I/13)=T-13*FIX(T/13) THEN 1180 'SAME RANK
1050 IF RIGHT$(CA$(I),1)=RIGHT$(CA(T),1) THEN 1180 'SAME SUIT AS TOP CARD
1060 IF RIGHT$(CA(I),1)=CA(0) THEN 1170 'SAME SUIT AS DECLARED
1070 NEXT I
1080 IF N8=0 THEN 1100        'NO 8'S IN COMPUTER'S HAND
1090 GOTO 1210                'PLAY AN 8
1100 IF N>0 THEN GOSUB 1480 ELSE PRINT"STOCK IS GONE
COMPUTER PASSES":LET B=B+1:IF B<2 THEN 590 ELSE GOTO 1530
1110 PRINT"COMPUTER DRAWS A CARD"
1120 LET NC=NC+1              'COUNTS COMPUTER'S CARDS
1130 PRINT TAB(14-NC/2)STRING$(NC,138) 'SHOWS COMPUTER'S CARDS
1140 LET L(D)=2                'ASSIGN CARD TO COMPUTER'S HAND
1150 IF D-13*FIX(D/13)=8 THEN LET N8=N8+1
1160 GOTO 1000
1170 LET CA(0)=""           'RESET DECLARED SUIT
1180 LET T=I                 'TOP CARD NUMBER
1190 PRINT"THE COMPUTER PLAYS THE "CA(I)
1200 GOTO 1410
1210 FOR I=1 TO 4            'SUITS
1220 LET N(I)=0              'RESET SUIT COUNTER
1230 FOR J=1 TO 13           'RANKS
1240 IF L(J+13*(I-1))<>2 THEN 1260 'CARD NOT IN COMPUTER'S HAND
1250 LET N(I)=N(I)+1         'SUIT COUNTER
1260 NEXT J
1270 IF K>N(I) THEN 1300      'SMALL SUIT
1280 LET K=N(I)               'SET COMPARATOR UP
1290 LET W=I                  'WEALTHY SUIT
1300 NEXT I
1310 LET K=0                  'RESET SUIT COMPARATOR
1320 FOR I=8 TO 47 STEP 13     'FIND THE 8
1330 IF L(I)=2 THEN 1350      'HAS THAT EIGHT
1340 NEXT I
1350 PRINT "THE COMPUTER PLAYS THE "CA(I)
1360 PRINT "AND DECLARES IT THE 8"S(W)  *

```

H & E COMPUTRONICSTM INC.

MATHEMATICAL APPLICATIONS SERVICE™

```
1370 LET N8=N8-1          'NUMBER OF 8'S
1380 LET L(I)=3           'MOVE CARD TO TALON
1390 LET T=0              '8 INDICATOR
1400 LET CA(0)=S(W)      'DECLARED SUIT
1410 LET L(I)=3           'MOVE CARD TO TALON
1420 LET NC=NC-1          'COUNTS COMPUTER'S CARDS
1430 IF NC=0 THEN PRINT"COMPUTER IS OUT OF CARDS":GOTO 1550
1440 PRINT TAB(14-NC/2)STRING$(NC,138)    'SHOWS COMPUTER'S CARDS
1450 LET B=0              'RESET BLOCK COUNTER
1460 GOTO 600             'PLAYER'S TURN
1470 '
        DEAL A CARD - SUBROUTINE
1480 LET D=RND(52)          'DEAL A RANDOM CARD
1490 IF L(D)<>0 THEN 1480   'THAT CARD IS NOT IN THE STOCK
1500 LET N=N-1              'STOCK CARD COUNTER
1510 RETURN
1520 '
        END OF THE GAME
1530 PRINT"PLAY HAS BEEN BLOCKED"
1540 PRINT"COMPUTER HOLDS THE FOLLOWING:"
1550 FOR I=1 TO 52
1560 IF L(I)=1 THEN LET TP=TP+VA(I)    'PLAYER'S CARDS
1570 IF L(I)=2 THEN PRINT CA(I)" ";:LET TC=TC+VA(I) 'COMPUTER'S CARDS
1580 NEXT I
1590 PRINT:PRINT
1600 PRINT"POINTS: PLAYER"TP"- COMPUTER"TC:PRINT
1610 ON SGN(TP-TC)+2 GOTO 1620 ,1640 ,1660
1620 PRINT" SCORE: YOU GET"TC-TP"POINTS"
1630 GOTO 1670
1640 PRINT" TIE GAME - NO SCORE"
1650 GOTO 1670
1660 PRINT"SCORE: COMPUTER GETS"TP-TC"POINTS"
1670 FOR D=1 TO 5000:NEXT:RUN 'DELAY AND RESTART
1680 '
1690 'AN ORIGINAL PROGRAM USING
1700 'LEVEL-II BASIC FOR TRS-80
1710 'BY: MR GORDON E. SPEER
1720 ' 3304 WOODLAWN ROAD
1730 '  STERLING, IL 61081
1740 '  PHONE(815)625-5251
```



GETTING IT TOGETHER IN ASSEMBLY (ASSEMBLY LANGUAGE FOR BEGINNERS)

COLUMN #19: DISK FILES (PART I)

by

Dr. Hubert S. Howe, Jr.

Copyright © 1980 by Hubert S. Howe, Jr.

Copyright (c) 1980 by Hubert S. Howe, Jr.

The Disk Directory

The disk directory, normally placed on track 17 unless that track is locked out, is the key to understanding the entire file structure on the diskette. Unfortunately, Radio Shack has never released many details about these technical matters, but much useful information is contained in the documentation for Apparat's NEWDOS and NEWDOS80, and in H.C. Pennington's TRS-80 DISK & OTHER MYSTERIES.

The first two sectors of the directory track contain the Granule Allocation Table (GAT) and Hash Index Table (HIT). The remaining eight tracks contain directory entries, either primary entries ("FPDE" for "File Primary Directory Entry") or extension entries ("FXDE" for "File Extension Directory Entry"). Each entry is 32 bytes long. There is thus a maximum of eight entries per sector and 64 entries (which may mean less than 64 files) on the diskette. (Why the DOS allows a maximum of 50 files on a formatted diskette and 60 on a system diskette is unknown.) All of this data is quite straightforward to interpret if you know how.

The GAT Sector

The GAT sector contains two tables indicating the space available for files on the disk and whether any tracks are locked out. In addition, it contains the hash code for the diskette's password, the diskette name and date, and the AUTO command file that is to be called on power on or reset. All passwords are encoded in a "hash code" which will be explained in a later column.

The first 96 bytes of the GAT sector (bytes 00 to 5FH) contain the Granule Allocation Table itself. Since the Radio Shack disk drives use only 35 tracks, only the first 35 bytes (00 to 22H) are actually used, although the DOS contains provision for expansion up to 96 tracks on the disk. Each byte simply indicates whether one or both granules on the track is free or already allocated to a file, according to the following table:

H & COMPUTRONICS INC.

MATHEMATICAL APPLICATIONS SERVICE™

<u>binary</u>	<u>hexadecimal</u>	<u>meaning</u>
11111100	FC	both granules (sectors 0-9) free
11111101	FD	only first granule (sectors 0-4) allocated
11111110	FE	only second granule (sectors 5-9) allocated
11111111	FF	both granules (sectors 0-9) allocated

The next 96 bytes contain the Track Lock Out Table. This table is exactly the same as the GAT, only its function is to tell the DOS whether a track can be used at all. The purpose of these tables is to make it simple for the DOS to know how much space it has available and where the space is.

Why would a track be locked out? There are several reasons. It can be locked out because the track could not be verified during a FORMAT or BACKUP operation. You may also want to use special software, such as that described in our previous column, to write certain tracks and therefore not make them available for the DOS.

The final 64 bytes of the GAT sector contain a variety of miscellaneous information. The password hash code is in bytes CE-CFH. The diskette name and date are in bytes D0 to DF; each of these requires exactly eight bytes. Finally, the AUTO command file is in E0-FF, indicated simply as a command followed by a carriage return. The absence of a command is indicated by placing a carriage return in byte E0. The remaining bytes are filled with FF. A map of the entire GAT sector is shown below.

"GAT" Sector Map (Track 17, sector 0)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
<-----GRANULE ALLOCATION TABLE----->																
00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(unused)
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(unused)
50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(unused)
60	<	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-----TRACK LOCK OUT TABLE----->
70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(unused)
A0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(unused)
B0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(unused)
C0	<	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(UNKNOWN)><PSW>
D0	<	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-----DISKETTE NAME AND DATE----->
E0	<	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-----"AUTO" COMMAND FILE----->
F0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

COMPUTRONICS

MATHEMATICAL APPLICATIONS SERVICE™

The "HIT" Sector

The HIT sector (sector 1 of the directory track) contains information concerning each file name in the directory. Only the first eight bytes of each 32-byte segment of the sector are used. Each file name in the directory has a single byte of hash code in the table. The POSITION of the byte in the table relates to its address in the directory. The last hexadecimal digit (0-7) plus 2 gives the sector number in the directory track where the file entry is stored, and the first digit (only even values from 0 to E) times 16 gives the relative byte where the entry starts within the sector. The following map shows the correspondence between the HIT sector and the directory entries:

	0	1	2	3	4	5	6	7	+ 2 = sector (bytes 8-F unused)
00	200	300	400	500	600	700	800	900	
20	220	320	420	520	620	720	820	920	
40	240	340	440	540	640	740	840	940	
60	260	360	460	560	660	760	860	960	
80	280	380	480	580	680	780	880	980	
A0	2A0	3A0	4A0	5A0	6A0	7A0	8A0	9A0	
C0	2C0	3C0	4C0	5C0	6C0	7C0	8C0	9C0	
E0	2E0	3E0	4E0	5E0	6E0	7E0	8E0	9E0	

*16 = byte

In this map, a number like "280" means "sector 2, byte 80H" of the directory track. Each directory entry is 32 bytes long.

If you look at a listing of a HIT sector for a particular diskette, you may notice that some of the codes for different files are identical. This is perfectly normal, and simply means that the number produced must correspond to the code derived from the name of the file. It does not mean that all codes must be unique. The purpose of the HIT sector is to tell the DOS where active entries are located within the directory, and then to verify that these entries correspond to the files specified. A zero in the HIT byte means that no entry is stored in the directory.

EDUCATORS...Are You Using Microcomputers?

A major publishing company is seeking reviewers of CAI Software for grade levels K-12.

Reviewers should have experience with classroom use of one or more microcomputing systems (PET, Apple, TRS-80, etc.).

All serious inquiries acknowledged.

Write:
Dept. A
900 Sylvan Avenue
Englewood Cliffs, New Jersey 07632

CONVERT-A-DISK

Now you can convert your single sided 5 1/4" disks to use the other side in your single sided drive!

Double Your Capacity
User Tested & Proven
Great For Backup Data
Complete D-I-Y Kit

\$9.95

R.P.G.

1925 Seneca Street
Traverse City, MI 49684

HELPFUL HINTS

LINE FEEDS ON THE LINE PRINTER III

Here are some ways to get the Line Printer III to generate multiple line feeds and feed to the top of the next page: To make multiple line feeds, use this statement:

```
LPRINT STRING$(N,CHR$(10))
```

where N is the number of line feeds desired. N can be either a constant or a variable.

To generate a feed to the top of the next page, let the TRS-80 do the work for you. A sample program follows.

```
1 POKE 16425,0           'SET LINE COUNTER TO 0
2 POKE 16424,N           'N=NO. OF LINES TO THE PAGE
3                           'OMIT IF USING 11 INCH PAPER
5 LPRINT "YOUR PROGRAM"
6 LPRINT "YOUR NEXT LINE"
7                           'LOOPING YOUR PRINTING IS OK
8 I=PEEK(16424)-PEEK(16425) 'KEEP TRACK OF LINES LEFT TO FILL PAGE
9 C=C+1                   'INSERT THIS AFTER LPRINT STATEMENTS
12 IF PEEK(16425)=PEEK(16424) THEN LPRINT CHR$(10)
13                           'GENERATE TOP OF PAGE
14 IF C<>3 THEN 5
15 LPRINT STRING$(I,CHR$(10)) 'SURPRISE! THE TRS-80 KNOWS HOW MANY
16                           'LINES TO FEED
17 CI=CI+1
18 IF CI=4 THEN END ELSE GOTO 5
```

Line 9 shows how many times to go through the LPRINT routine. Line 15 is the top of page command, and line 17 counts the number of pages printed.

(Thanks to Paul Robinson, 1515 North 17th Street, Arlington, VA 22209.)

CHANGING ZEROS TO 0'S

The following routine in BASIC will change all zeros to letter 0's, so that the slashes in the zeros won't confuse the mail people. It makes mailing labels look super-neat:

```
990 LET PS$=""
1000 LET PR$= [whatever you are about to print]
1010 FOR C=1 TO LEN(PR$)
1020 LET CH$=MID$(PR$,C,1)
1030 IF CH$="0" THEN LET CH$="O"
1040 LET PS$=PS$+CH$
1050 NEXT C
1060 LPRINT PS$
```

COMPUTRONICSTM

MATHEMATICAL APPLICATIONS SERVICETM

(Since our printer doesn't print slashes through the zeros, let us just emphasize that in line 1030, the first CH\$ is set equal to zero and the second to letter 0.)

(Thanks to Gordon Speer, 3304 Woodlawn Road, Sterling, IL 61081.)

VARIABLE RECORD LENGTHS WITH TRSDOS

I have just been reading the current issue of COMPUTRONICS (issue #26), and I find on page 743 that you have published my tip on variable record lengths. You have also requested that someone, perhaps me, send you further documentation. I have just run across some very good documentation in the CINTUG newsletter, which I append with this note. The author has done a fine job of explaining the procedure, I feel. The article follows:

LOGICAL LENGTH RECORDS IN RADIO SHACK 2.2 DISK BASIC by Syd Kahn, CINTUG newsletter.

To use logical records answer the "FILES?" with "XX V". The space is mandatory, and the V tells Basic that you want to use variable record lengths.

1) OPEN procedure: to open a logical random access file, use OPEN "R", BUFFER#, FILENAME\$, LOGICALRECORDLENGTH. If this command generates a new file the file control block will show the LRL when you do a "DIR (A)". However, be warned that it does not pick up this value on subsequent OPENS. To get a LRL of 256 bytes, specify a length at open time of zero.

2) CLOSE procedure: to close a previously opened logical file, you must use CLOSE BUFFER#. If the buffer number is not specified you will get an internal error.

3) GET and PUT: to GET or PUT logical records, use:

```
GET BUFFER#, LR#
PUT BUFFER#, LR#
```

You must specify the LR# on all GETs and PUTs. Basic will not increment to the next logical record.

4) FIELDing: you don't FIELD normally, but since you are only FIELDing one buffer you don't have to calculate the relative sector and use a dummy field to get to the right place in the record. If you try to FIELD more space than the LRL you will get a field overflow error.

5) Disk space allocation: The DOS does not handle the last record properly. In fact, in some cases it does not write the last record at all. For instance, if you write logical record 100 and then close the file and attempt to read the record back you will get an internal error. To use the logical record properly try to do a PUT 1, MAX, MAX being one more than the largest number of records that you will use.



6) LOF(BUFFER#): This function works exactly as in TRSDOS, that is, it returns the length of the file in sectors, not the number of logical records. To approximate the length of the file, try: LOF(BUFER#)*256/LRL. This will give the maximum number of records the file will hold.

7) If the foregoing procedures are not strictly followed, you will get a lot of "internal errors". A program follows:

```
1 'PROGRAM TO DEMONSTRATE LOGICAL RECORD LENGTH RECORDS
5 CLEAR 2000
10 F$="TEST1"
20 LRL=213 'SET UP LRL
30 OPEN"R",1,F$,LRL
40 FIELD 1,(LRL)ASA$ 'SET UP FIELD
50 FOR I=19 TO 1 STEP -1 'MAKE SURE WE HAVE ENOUGH SPACE
55 GET 1,I 'MUST SPECIFY LR#
60 LSET A$=STRING$(LRL,CHR$(I+32)) ' GENERATE DATA
65 OUT 1,I 'MUST SPECIFY LR#
70 NEXT I
80 CLOSE 1 'MUST SPECIFY BUFFER#
90 OPEN"R",1,F$,LRL 'MUST SPECIFY THE SAME LRL
100 FIELD 1,(LRL)AS A$
110 FOR I=1 TO LOF(1)
120 GET 1,I 'MUST SPECIFY LR#
140 PRINT A$
150 INPUT Y$ 'PAUSE
160 NEXT I
170 CLOSE 1
180 END
```

Note: after running the program, print out the resulting data file from DOS to see the sector spanning. If you are writing to a file opened as a logical file and you write 20 records and then close the file, the highest record is not recoverable. This is probably the fault of the DOS-Basic interface. To overcome this problem, always make sure that the file is 1 record larger than you intend to use.

(Above thanks to Alan Abrahamson, Editor, Fairfield County TRS-80 User's Group, 10 Richlee Road, Norwalk, CT 06851.)

MOD II ADVENTURES
by SCOTT ADAMS
NOW AVAILABLE

BEGINNER'S CORNER

EXPLORING THE RAM

by

A. DOUGLAS WERBECK

Here we are at gathering #3, our Turkey Season Beginner's Corner! Last column we discussed the ROM and RAM memory contained in your keyboard. We studied the system used for numbering the individual byte locations. To refresh the human memory, we found the factory installed ROM bytes to reside in locations 0 to 16383. RAM memory locations start at 16384, but the first group of RAM bytes are reserved for use by the ROM as a workbench area for calculations and storage. Our user available RAM for program storage starts at location 17128.

For this issue we promised some serious RAM exploration and that you will get! RAM bytes are "empty" when the computer is turned on, and they wait for you, the user, to load in a number which will represent (in code) an instruction for the computer's microprocessor (called a Z-80). Ever wonder where the "80" came from in TRS (Tandy Radio Shack) 80? As mentioned in previous columns, all references will be to the TRS-80 Model I, Level II 16K systems since it is the most commonly owned system by readers.

In Level II BASIC we have a real nifty special function command (see page 8/5 of the BASIC Reference Manual) called "PEEK." PEEK allows you to name a specific byte location in memory and have the number being stored there displayed on the video screen. Since our program starts at location 17128 I have put together a short program that examines byte locations beginning at the first line of the program itself! Type in the following program and make sure to observe all the spacing and do not forget the comma at the end of line 40.

```
10 PRINT "HELLO!"  
20 A = 17128  
30 FOR B = 1 TO 16  
40 PRINT "LOCATION"; A;"HOLDS # ";PEEK(A),  
50 A = A + 1  
60 NEXT B  
70 END
```

Now you can RUN it. As you see, it simply begins by printing a HELLO! and then goes on to the memory exploration section. On the screen you see all the memory locations that are being used to store line 10 and only line 10. The same pattern we are about to study will be used over and over again by the computer to store each of the remaining lines of the program.

1st byte of RAM will always be the line introduction 0. I have also included in this display, the line introduction 0 for line 20 of the

H & E COMPUTRONICS! INC.

MATHEMATICAL APPLICATIONS SERVICE™

program, see it at 17143?

2nd and 3rd bytes of program line RAM.... these are a little tricky. This following explanation would apply to the beginning of any line of the program, starting with the first byte of a line, the 0. After the 0, the next two bytes, in the case of our program here, bytes 17129 and 17130, will contain a coded number that will point to where the following line of our program (line 20) begins, in our case, location 17144. To crack this far-out code, take the number stored at the 3rd byte position (66) and multiply it by the magic number 256. Then, go back and get the number stored at the 2nd byte position (248) and add it to the above. Worked out: $66 \times 256 = 16896 + 248$ which equals, PRESTO, 17144!

4th byte is current line number, here, 10.

5th byte is a 0 representing a space.

6th byte - take a look at the number.... if it is between 32 and 127 it will be a single keyboard character called an ASCII (as-key) character. At this point why not open your BASIC Reference Manual to page C/2 in the back of the book. Here you will see the ASCII code numbers and what they represent. If the 6th byte number is between 128 and 250 it is a shorthand command word which causes the computer to go do a task such as LIST, GOTO, LPRINT or COS (perform the mathematical calculation to determine an angle's cosine.)

7th byte and thereafter is the rest of the program line.

Let's take a look at how the program works:

1. Line 10 is encountered and the computer faithfully obeys and prints HELLO!

2. Line 20 sets the variable A to have the value of 17128.

3. Line 30 starts a programming technique called a loop. It is a very common programming practice consisting of two parts, each part being a separate program statement, generally each statement having its own line. And, most times you will find other program lines between the two loop lines. Line 30 is saying that B will equal numbers 1 to 16, starting with B = 1. The second part of the loop statement is a NEXT statement, here found on line 60. This 2nd line of the loop, NEXT B will bounce the computer back to the first line of the loop, line 30, for as many times as the first line of the loop specifies, in this case, 16 times. After the loop has executed lines, 30, 40, 50, 60 and back to 30 16 times the loop will "open" and allow the computer to go on to the next program line outside and following the loop, in this case line 70, which ENDS the program.

Each time the computer executes line 40 it will print our memory exploration instructions. This tells the computer, using the PEEK command,

COMPUTRONICSTM

MATHEMATICAL APPLICATIONS SERVICE™

to print whatever number is being stored at the location that A happens to stand for at that pass of the loop.

During the first loop the value of A is still 17128, as set by line number 20. After the first screen printout of location 17128, line 50 makes A equal to A + 1, or 17129. On the second pass of the loop A will equal 17130 and so on, all the way up until the loop exhausts itself, leaving A, at that time equal to 17143.

Ok, now let's take a look at the program's line 10 and what was found in the first 16 RAM addresses:

```
1 0 P R I N T " H E L L O ! "
```

We find that all the numbers held at addresses 17129 to 17142 are in the 32-127 range making them keyboard ASCII characters, except for location 17133 which holds the number 178 making it a shorthand command code. 178 stands for PRINT. These shorthand codes are stored in ROM locations 5712 to 6175. These shorthand command codes are not listed in the BASIC Reference Manual. If you would like to see the full set of shorthand codes held in the ROM, I have worked up a short program that will dig into the ROM of your keyboard and place the decoded information on your video. Of course, if you have a printer you can just change all the PRINT statements in the following program to LPRINT statements (lines 20, 60 and 70) and you will get a neat listing on paper.

```
10 C = 5712 : D = 128
20 PRINT "SHORTHAND CODE #";D" IS ";
30 E = PEEK(C)
40 IF E > 128 then L = E -128 ELSE L = E
50 IF PEEK (C+1) > 128 THEN 70
60 PRINT CHR$(L);"; : C = C + 1 : GOTO 30
70 PRINT CHR$(L) : D = D + 1 : IF D = 251 END ELSE C = C + 1 : GOTO 20
```

If you are not using a printer and the screen scrolling is making you crazy, don't forget about the little trick to freeze the screen described on page 2/6 of the Reference Manual.

If I have intrigued you in this RAM exploration why not take a step off on your own and change the loop counter in the first program to 25 or 50! Then the program will go on past line 10 and look at the remainder of itself, lines 20 through 70! Remember that storage pattern is repeated over and over, line begins with a 0 and then the coded next line location pointers and so on. To get the original program to output onto your printer (since if you increase the loop counter you will be reading more locations that the screen can hold) you can change line 40 to:

```
40 LPRINT "LOCATION ";A;"HOLDS # ";PEEK(A)
```

Note that we omitted the ending comma.

H & E COMPUTRONICSTM INC.

MATHEMATICAL APPLICATIONS SERVICE™

I ran out of space in this issue to get into "Keyboard Thunder and Lightning," but promise it for next issue.

A. Douglas Werbeck
P.O.B. 787
Ruskin, FL 33570

Marymac Industries Inc

Radio Shack® AUTHORIZED SALES CENTER

Save 10% 15%
OR MORE

DELIVERED TO YOUR DOOR

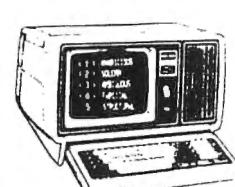
Owning and operated by Marymac Industries Inc. Warranties will be honored by all company owned Radio Shack® Stores and participating franchises and dealer authorized sales centers. Store open Mon.-Sat. 10-7. We pay freight and insurance. Save sales tax. Texas residents add only 5% sales tax. Brand new in factory sealed cartons. Reference: Katy National Bank. Call us for a customer reference in or near your city. Radio Shack® Authorized Sales Center, 21969 Katy Fwy, Katy, Houston Texas 77450.

Texas and information 1-713-392-0747
Order entry 1-800-231-3680
or 1-800-231-3681

TRS-80™
FOR BUSINESS,
LEARNING
AND
ENTERTAINMENT



Meet TRS-80's Big Brother!
The New TRS-80 Model II



We are located just 5 hours from the giant Tandy Computerware House in Ft. Worth, Texas.
Call Joe McManus Today

We've added a bigger, more powerful "brother" to the TRS-80 family. It's TRS-80 Model II — a completely new microcomputer for business applications

MASTER CHARGE

CHARGE IT

VISA

RADIO SHACK DEALER

QUESTIONS AND ANSWERS

Conducted by Hubert S. Howe, Jr.

QUESTION from Thomas A. Primosch, 11247 Park Street, Cerritos, CA 90701:
I have a 48K Level II system with one disk drive. I also have and occasionally use one of the earlier models of the CTR-80 cassette recorder. I am unable to "CLOAD" tapes using RS's DOS 2.3. The programs will load with the Expansion Interface on or off. I realize that the most critical concern is the volume setting on the cassette recorder. I have spent many hours experimenting with this setting and have concluded that the resolution to my problem is not the volume setting.

ANSWER

It sounds very much as if the problem is that you have forgotten to disable interrupts by the CMD "T" command, which must be done before you type CLOAD (or SYSTEM for machine language tapes). There is nothing else in the DOS that should interfere with the operation of the cassette.

QUESTION from John Wilson, c/o David Wilson, RR #1, Lindsay, Ontario K9V 4R1: I am looking for a way to find a random number and store it in the accumulator. This must all be done in machine language. The possible values of the random number do not matter.

ANSWER

There are two random number functions contained in the Level II ROM: the RND(0) function, where the result is a single precision number between 0 and 1, and the RND(J) function, where J is a nonzero integer between 1 (one) and J, inclusive.

To call the RND(0) function, CALL 14F0H (no input variable is necessary). The result (in single precision format) is stored in locations 4121H - 4124H.

To call the RND(J) function, load the value of J into the HL register pair. Then CALL 14CCH and CALL 0A7FH. The result (in integer format) is stored in both the HL register pair and in locations 4121H and 4122H. (The CALL to 0A7FH converts the single precision result to an integer.)

This and much more helpful information is contained in the book Inside Level II: A Programmer's Guide to the TRS-80 ROMS by John Blatner and Bryan Mumford, published by Mumford Micro Systems, Box 435, Summerland, CA 93067, telephone (805) 969-4557.

QUESTION from Russell Marzolf, 1012 Nutwood, Fullerton, CA 92631:
I read my latest issue of COMPUTRONICS (issue 25) and came across one of the "letters to the Editor" entitled USE OF TRSDOS. The letter was about embedding hidden "signatures" on a disk. Can you tell me what the code is

H & E COMPUTRONICS INC.

MATHEMATICAL APPLICATIONS SERVICE™

and how this is done? (a hint maybe?!). I have NEWDOS+ and a beginning knowledge of machine language -- both of which have gotten me nowhere!

ANSWER

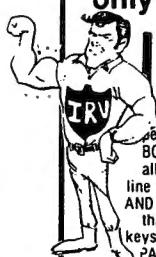
There are two kinds of hidden "signatures" on disks. (These are on system disks only, and would not exist on data disks unless you put them into your own files.) The first is in the "BOOT" file, where a copyright message will be displayed if you type the unlikely sequence "BOOT/SYS.WHO" and simultaneously hold down the "2" and "6" keys while waiting for it to be displayed. This must have been some kind of joke played on Radio Shack by Randolph Cook, the original author of TRSDOS, who put in a "secret" message that says that the system belongs to him rather than Radio Shack. This was the subject of the letter in the previous issue. For Radio Shack, it was fortunate that "Randy Cook" and "Tandy Corp" have the same number and so many of the same letters.

The other kind of hidden "signatures" occur at the beginnings of system files (those named "SYS1.SYS", etc.). These are simply copyright notices that are physically in the files but are not read into memory because they are preceded by a special code. You can see these messages by using the excellent SUPERZAP program on your NEWDOS+ diskette. Just look at the beginning of track 0, sector 5 and you'll see an example.

Got a question about the TRS-80? Send it to **QUESTIONS**, H & E COMPUTRONICS, 50 North Pascack Road, Spring Valley, New York 10977. If you wish a personal reply, please enclose a self-addressed, stamped envelope. Representative questions will be answered each month.

from The Programmers' Guild **action PROGRAMS**

Are you fed up with namby-pamby computer simulations that offer no challenge? Are you disgusted with utilities that have only limited applications? THE PROGRAMMERS' GUILD has the answer for you NOW.



IRV*
The most powerful keyboard utility program ever conceived for the S-80. Allows up to 255 characters per key to be programmed into ANY KEY ON THE KEYBOARD (including enter and break). Full cursor control allows awesome editing features including individual line renumber and block movement inside a basic listing. AND THAT'S ONLY FOR OPENERS! Full control of anything that appears on the video display means that with certain keystrokes a whole graphics display CAN BE SAVED AS PACKED STRINGS! And with the numbering of your choice! There are so many features in IRV that it is impossible to describe in a single paragraph.

Order #C-100 Tape \$25.00 Disk \$29.95

DEATH DREADNAUGHT

This mind chilling triller will freeze the blood in your veins. You are trapped aboard an ancient alien battlecruiser whose entire crew was murdered brutally. You are the scout team's only survivor. Your ship's been smashed, but one alien shuttlecraft remains intact. As you move about the wreck the danger increases. You must secure air, food, fuel and batteries. Now, as precious seconds of your life tick away you suddenly realize YOU ARE NOT ALONE! The creature that ripped this ship apart is ALIVE and waiting for you to make a mistake. CAN YOU ESCAPE? Or will YOU be the creature's next victim.

\$14.95 on tape \$19.95 on disk

DEALER INQUIRIES INVITED

The Programmers' Guild

P.O. BOX 66, PETERBOROUGH, NH 03458 (603) 924-8085
SEND CHECK OR M/O (SHIPMENT WITHIN FIVE DAYS OF RECEIPT) C.O.D. ACCEPTED

H & E COMPUTRONICS INC.
MATHEMATICAL APPLICATIONS SERVICE™

CUMULATIVE INDEX TO ISSUES #13 - #24

ISSUE #13 - July 1979

- 321 BITS AND PIECES.....Howard Y. Gosman
327 MEMORY TEST PROGRAM.....Dr. Hubert S. Howe, Jr.
341 GETTING IT TOGETHER IN ASSEMBLY.....Dr. Hubert S. Howe, Jr.
350 LABELS.....Harry A. Hopkins

ISSUE #14 - August 1979

- 353 BITS AND PIECES.....Howard Y. Gosman
354 SOME IMPORTANT TRS-80 ROM SUBROUTINES.....Dr. Hubert S. Howe, Jr.
357 TIME CLOCK.....Dr. Peter Shenkin
360 CHECK BOOK.....Carrie Leffler
362 ANNUITY COMPUTATIONS.....Dr. Peter Shenkin
366 CHASE.....Steven Wexler

ISSUE #15 - October 1979

- 378 BITS AND PIECES.....Howard Y. Gosman
381 CRYSTAL BALL DEPARTMENT.....Anonymous
383 NEW PRODUCTS
386 SOFTWARE REVIEW: DISK OPERATING SYSTEMS.....Dr. Hubert S. Howe, Jr.
387 READING AND PRINTING NUMBERS.....Dr. Hubert S. Howe, Jr.
390 LINE RENUMBERING IN LEVEL II BASIC.....Gerald Sabin
393 DATABASE MANAGEMENT SYSTEM.....Dr. Hubert S. Howe, Jr.

ISSUE #16 - November 1979

- 411 BITS AND PIECES.....Howard Y. Gosman



417 NEW PRODUCTS

- 421 CRYSTAL BALL DEPARTMENT.....Anonymous
422 MORE ABOUT MEMORY; QUESTIONS.....Dr. Hubert S. Howe, Jr.
425 MODEL I VS. MODEL II - A TIMING COMPARISON.....Dr. Peter Shenkin
426 STOCK PORTFOLIO PROGRAM.....James H. Sheats
427 CHECKERS.....Martin Freund
430 LINEAR REGRESSION WITH GRAPHICS.....Robert L. Bergen, Jr.
433 DISASSEMBLER PROGRAM.....Dick Chagnot

ISSUE #17 - December 1979

- 443 BITS AND PIECES.....Howard Y. Gosman
447 CRYSTAL BALL DEPARTMENT.....Anonymous
449 MOVING DATA.....Dr. Hubert S. Howe, Jr.
452 NEW PRODUCTS
454 SIMPLE STATISTICS.....Dr. Peter Shenkin
461 THE AMAZING BLACKJACK MACHINE.....Richard A. Ramm
469 LEVEL III BASIC: A REVIEW.....Robert Marsh

ISSUE #18 - January 1980

- 475 BITS AND PIECES.....Howard Y. Gosman
481 CRYSTAL BALL DEPARTMENT.....Anonymous
482 NEW PRODUCTS
485 CASSETTE INPUT/OUTPUT.....Dr. Hubert S. Howe, Jr.
492 DATA BITS.....Del Jones
496 WHAT TO DO AFTER YOU TURN IT ON.....Dr. Peter Shenkin
500 PAYMENTS, BAR GRAPH, DOMINOES, PARABOLA.....Gordon Speer

COMPUTRONICSTM

MATHEMATICAL APPLICATIONS SERVICETM

I N C.

ISSUE #19 - February 1980

- 507 BITS AND PIECES.....Howard Y. Gosman
513 CRYSTAL BALL DEPARTMENT.....Anonymous
516 ARITHMETIC OPERATIONS.....Dr. Hubert S. Howe, Jr.
522 INVOICING.....S. M. Zimmerman, Ph.D. and Leo M. Conrad
529 CAR EXPENSES, SKETCH, TRIPLES, ENGLISH-METRIC CONVERSIONS,
SQUARES, CLIFF.....Gordon Speer

ISSUE #20 - March 1980

- 539 BITS AND PIECES.....Andrew Hofer
541 CRYSTAL BALL DEPARTMENT.....Anonymous
542 NEW PRODUCTS
545 MORE ABOUT ARITHMETIC OPERATIONS.....Dr. Hubert S. Howe, Jr.
548 ON BUYING SOFTWARE: SOME RANDOM THOUGHTS.....Robert Sprung
550 BREAK-EVEN CHART.....S. M. Zimmerman, Ph.D. and Leo M. Conrad
554 SALVO BATTLESHIP.....Ken Brown
555 CLEANUP.....Doug Schiller
560 HISTOGRAM, LOGO, TRIANGLE, GOLD SCALE, TIMER, HOT TUB.....Gordon Speer

ISSUE #21 - April 1980

- 571 BITS AND PIECES.....Howard Y. Gosman
578 CRYSTAL BALL DEPARTMENT.....Anonymous
580 ZIPPER, CENSUS, CARPET, RADIATOR, TOSSEr AND DICE.....Gordon Speer
585 TEXT: A (NEW) BASIC TEXT EDITOR.....Dr. Hubert S. Howe, Jr.

ISSUE #22 - May 1980

- 603 BITS AND PIECES.....Howard Y. Gosman

M & E COMPUTRONICS INC.
MATHEMATICAL APPLICATIONS SERVICE™

- 608 UNDERSTANDING THE TRS-80'S KEYBOARD.....Dr. Hubert S. Howe, Jr.
615 SOFTWARE REVIEW: CP/M.....Dr. Hubert S. Howe, Jr.
621 DISK PROGRAM INDEXES.....Harry A. Hopkins
623 ROMPEEK, WINDCHILL, POWER, MESSAGES, WATERFLO, RESISTOR....Gordon Speer

ISSUE #23 - June 1980

- 635 BITS AND PIECES.....Howard Y. Gosman
644 CRYSTAL BALL DEPARTMENT.....Anonymous
646 LOGICAL AND BIT OPERATIONS.....Dr. Hubert S. Howe, Jr.
652 FOCUS ON FORM.....David Ames
657 INFLATION, CIRCLE, ELECTRON, TREE, DISCOUNT.....Gordon Speer

ISSUE #24 - July 1980

- 667 BITS AND PIECES.....Howard Y. Gosman
671 CRYSTAL BALL DEPARTMENT.....Anonymous
677 USR SUBROUTINES IN BASIC PROGRAMS, PART I.....Dr. Hubert S. Howe, Jr.
682 CODER, DECODER, MILEAGE, INFORMATION, ELASTIC.....Gordon Speer
685 BREAK EVEN.....Thomas C. Bogden and Tim Rowe
688 SS-51 SCIENTIFIC CALCULATOR SIMULATION, PART I.....Ken Brown

H & E COMPUTRONICS INC.

...EVERYTHING FOR YOUR TRS-80™...

* TRS-80 is a trademark of the Radio Shack Division of Tandy Corporation

NEW.....

ENLARGED 1981 EDITION

CONTENTS

PAGE
NO.

- 7 INTRODUCTION - "Prepare Income Taxes!"
- 9 MICROS & YOUR TAXES
- 14 PROGRAMMING TIPS

GRANULES TAX FORM NUMBER & DESCRIPTION

PAGE II		
19	4	1040A The Short Form
21	5	1040 - Page 1 - The Long Form
23	-	"PRINT" Only - for 1040A, 1040 P.1 & 2
24	4	1040 - Page 2
26	3	Schedule TC - Tax Computation
28	4	Schedule A - Itemized Deductions
30	5	Schedule B - Interest & Dividends
32	5	Schedule C - P.1 - Business or Profession
34	5	Schedule C - P.2 - Business or Profession
36	3	Schedule D - P.1 - Capital Gains or Losses
39	4	Schedule D - P.2 - Capital Gains or Losses
41	7	Schedule E - P.1 - Supplemental Income Schedule
44	4	Schedule E - P.2 - Supplemental Income Schedule
46	5	Schedule F - P.1 - Farm Income & Expenses
48	8	Schedule F - P.2 - Farm Income & Expenses
51	5	Schedule G - P.1 - Income Averaging
54	4	Schedule G - P.2 - Income Averaging
56	4	Schedule R and RP Credit For The Elderly
58	3	Schedule SE - Social Security Taxes
60	3	Form 2106 - P.1 - Employee Business Expense
62	6	Form 2106 - P.2 - Employee Business Expense
64	4	Form 2119 - P.1 - Sale of Personal Residence
67	3	Form 2210 - P.1 - Underpayment of Est. Taxes
69	5	Form 2210 - P.2 - Underpayment of Est. Taxes
72	4	Form 2441 - Credit For Child & Dependent Care
74	4	Form 3468 - Investment Credit
76	2	Form 3903 - Moving Expense
77	2	Form 4562 - Depreciation
78	3	Form 4625 - Minimum Tax
79	5	Form 4726 - Maximum Tax
82	5	Form 4797 - P.1 - Supplemental Sch. of Gains/Losses
85	8	Form 4797 - P.2 - Supplemental Sch. of Gains/Losses
88	3	Form 4798 - Capital Loss Carryover
89	3	Form 4972 - P.1 - Special 10-year Averaging
90	3	Form 4972 - P.2 - Special 10-year Averaging
92	2	Form 5213 - Election To Postpone
93	3	Form 5695 - Energy Credits
94	2	NEW 6251 - Worksheet Only
96	3	STOR 1040/FIL - File to Store 1040 Data
98	4	LP 1040/STR - Receives STOR1040/fil Data, and LPRINTS

- ★ All orders processed within 24-Hours
- ★ 30-Day money back guarantee on all Software
- ★ Add \$2.00 for shipping in UPS Areas
- ★ Add \$3.00 for C.O.D. or NON-UPS Areas
- ★ Add \$4.00 outside U.S.A., Canada & Mexico

INCOME TAX

For The TRS-80*

A LEARNER'S MANUAL

PROGRAMMING TIPS

ON TAXES

ON PROGRAMMING

40 TAX PROGRAMS
The '80 and YOUR Taxes



NEW AUTOMATIC TAX
CALCULATION PROGRAM
(Eliminates Tax Tables)

COMPUTRONICS
MATHEMATICAL APPLICATIONS SERVICE

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

PLEASE SEND ME:

INCOME TAX FOR THE TRS-80™ \$16.95

NEW TOLL-FREE
ORDER LINE
(OUTSIDE OF N.Y. STATE)
(800) 431-2818



24

HOUR
ORDER
LINE
(914) 425-1535



CREDIT CARD NUMBER _____

EXP. DATE _____

SIGNATURE _____

NAME _____

ADDRESS _____

STATE _____

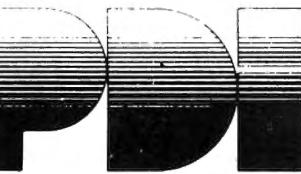
ZIP _____

*** ADD \$6/YEAR (CANADA, MEXICO) - ADD \$12/YEAR AIR MAIL - OUTSIDE OF U.S.A., CANADA & MEXICO ***

COMPUTRONICS^{INC.}

...EVERYTHING FOR YOUR TRS-80™...

TRS-80 is a trademark of the Radio Shack Division of Tandy Corporation



TURN YOUR TRS-80* INTO A TEACHING MACHINE

- ★ All orders processed within 24-Hours
- ★ 30-Day money back guarantee on all Software
- ★ Add \$2.00 for shipping in UPS Areas
- ★ Add \$3.00 for C.O.D. or NON-UPS Areas
- ★ Add \$4.00 outside U.S.A., Canada & Mexico

STUDY SKILLS

IQ BUILDER Junior high up

A group of 4 courses that prepare a high school student for the College Boards or adult for aptitude tests.

VOCABULARY BUILDER 1: BEGINNING 11 programs include a set of graded vocabulary questions on synonyms and antonyms (the most common type of vocabulary question on an IQ test). The last lesson is a test on vocabulary. Total of 400 questions, 2000 words in course. **\$14.95**

VOCABULARY BUILDER 2: ADVANCED 11 programs like those in Vocabulary 1, but using a more advanced word list. **\$14.95**

NUMBER SERIES Contains 8 programs that provide practice in a common math problem type. The first lesson teaches how to approach number series and how to analyze their patterns. Later lessons provide practice with increasingly difficult problems, giving clues if you have difficulty with the problem. Final lesson is a test of abilities. **\$14.95**

ANALOGIES Contains 6 programs that teach what an analogy is and what the common types are, provide a method for analyzing analogies and provide practice in handling all types of analogies. Final lesson is an analogies test. **\$14.95**

LANGUAGE ARTS

READING COMPREHENSION:

WHAT'S DIFFERENT? Ages 8 up

5 reading comprehension programs which present logical problems where the student picks the one word in four which doesn't belong with the rest. Builds analytical skills essential for understanding what you read. **\$14.95**

PRESCHOOL IQ BUILDER Ages 3-6

Teaches vital cognitive skills that children must learn in order to do well in school. In Part 1, Same and Different, the child discriminates between two forms. In Part 2, Letter Builder, the child matches a letter on the TV monitor to one on the keyboard. Accompanying Parent's Guide gives instruction. **\$14.95**

SPELLING BUILDER Junior high up

8 programs plus an audio cassette teach important spelling rules and skills. Helps students and adults overcome spelling difficulties. Not just spelling drill, this course teaches a method for approaching difficult words. Ideal for the student or adult who has mastered basic spelling but has trouble deciding if it's "supersede" or "supercede", "combustable" or "combustible". Final test of 25, ten-word lists. **\$18.95**

COMPUTER PROGRAMMING

STEP BY STEP Ages junior high to adult **\$49.95**
32 programs and a 64-page workbook teach programming in BASIC for the beginner. Introduces all important BASIC commands and programming logic, including simple string logic and one-dimensional arrays. Lessons are interactive, presented in a question-and-answer format on the computer screen. The Workbook adds extra information. Through instruction, structured practice, and frequent skills testing, the user learns how to write BASIC programs. 3 tapes, Workbook, vinyl binder.

EDUCATIONAL GAMES

MEMORY BUILDER: CONCENTRATION Ages 6 up **\$14.95**
A series of educational games to improve memory, attention span and concentration. Letters and 3-letter words are used. Player has three options: play against the computer, play against him or herself, play against another player. Especially good for parent and child to play together.

STORY BUILDER/WORD MASTER Ages 9 up **\$14.95**
Series of partially completed verses that the child completes. Teaches grammar skills in an enjoyable way. Word Master is a logic game where the child tries to guess a 3-letter word generated by the computer. Teaches reasoning and vocabulary.

GRAPH BUILDER Ages 10 up **\$14.95**
11 teaching programs and games teach students to read graphs. Covers x and y coordinates, and representation of numerical data on graphs. Starts with simplest concepts and works up to complicated grid game.

CODE BREAKER Ages 10 to adult **\$14.95**
3 scrambled message games of increasing difficulty that build basic word handling skills needed for good writing. First game scrambles letters within the words in the message; next 2 games scramble letters and also word order. The last game gives the hardest messages. Messages are made up by the computer from an extensive word list.

MINICROSSWORD All ages **\$14.95**
4 programs that consist of 2 minicrosswords and 2 codeword games. Crossword programs invent their own crossword puzzles - hundreds of completely different puzzles are possible - and score how well you do each puzzle. When used in conjunction with the codeword programs, which are word-guessing games, the course provides a vocabulary and spelling development system.

ASTRO WORD SEARCH: GEOGRAPHY Junior high to adult **\$14.95**
Search for hidden geographical place names in a pattern of letters generated by the computer. Words can be hidden across, down or diagonally as in the popular word-search puzzles. Hundreds of different puzzles can be formed by the puzzle in 3 programs. Computer scores you on how well you do.

ASTRO WORD SEARCH: SPANISH High school to adult **\$14.95**
As in Astro Word Search: Geography, the computer generates hundreds of different puzzles, but this time the hidden words are common Spanish words. Helps improve Spanish vocabulary. Computer scores you. 3 programs.

ASTRO WORD SEARCH: FRENCH High school to adult **\$14.95**
Like Astro Search: Spanish, except this time it's French vocabulary words.

ASTRO QUOTES: High school to adult **\$14.95**
Fascinating game in which you guess vocabulary words from clues and the computer takes each letter from the words and puts it where it belongs in a famous quotation. As soon as you can, you guess the quotation. If it takes you too many tries to guess the quote, you lose the game. 3 versions: easy, medium, hard.

COMPUTRONICS^{INC.}

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977



24 HOUR
ORDER
LINE

(914) 425-1535



NEW TOLL-FREE
ORDER LINE
(OUTSIDE OF N.Y. STATE)
(800) 431-2818

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

★ All orders processed within 24-Hours
★ 30-Day money back guarantee on all Software
★ Add \$2.00 for shipping in UPS Areas
★ Add \$3.00 for C.O.D. or Non-UPS Areas
★ Add \$4.00 outside U.S.A., Canada & Mexico

• • **EVERYTHING FOR YOUR TRS-80® • •**

* TRS-80 is a trademark of the Radio Shack Division of Tandy Corporation

INFORMATION SYSTEM.....

HARDWARE REQUIREMENTS: Cassette Based, 16K Level II, Disk Based, 32K and one (1) Disk Drive

SOFTWARE REQUIREMENTS: If disk, TRSDOS 2.2 or 2.3

SUPPORTS: Printer (parallel or serial), Disk Drives, Memory to 48K

PURPOSE: Data base manager in-memory Similar to automatic rolodex files with high speed sorts

USES: Small mailing lists, small inventories (i.e. books, articles, records, program reference file) Can be used for anything that you would use rolodex or index card files for

FEATURES:

- 1 Up to ten user defined fields or categories
- 2 Up to 40 characters per field
- 3 Up to 200 characters total per record
- 4 Handles disk or cassette files
- 5 Programmable printouts for rolodex cards, mailing labels, etc.
- 6 Will identify all records that contain a group of characters you've entered even if that group is in the middle of a line
- 7 Sort data base by any field

INFORMATION SYSTEM (TAPE) \$39.50

INFORMATION SYSTEM (DISK) \$49.95

DATA MANAGER

HARDWARE REQUIREMENTS: 32K and one (1) Disk Drive

SOFTWARE REQUIREMENTS: TRSDOS 2.3

SUPPORTS: Printer (parallel or serial), up to four (4) Disk Drives, 48K of memory

PURPOSE: Data base manager (disk based) Similar to Information System

USES: Medium sized mail list, inventories, personnel records, sale prospects, etc.

FEATURES:

- 1 Uses up to four disk drives on line as memory, or as much as 320K of memory storage.
- 2 Up to ten user defined fields
- 3 Up to 40 characters per field
- 4 Up to 255 characters total per record.
- 5 Programmable printouts for rolodex cards, etc.
- 6 Will identify all records that contain a group of characters you've entered even if that group is in the middle of a line
- 7 Sort data base by any field
- 8 Maintain up to 5 changeable presorted "key" files.
- 9 Accepts Information System files
- 10 Variable length random records, the smaller the record you define, the more records you can store.

DATA MANAGER \$74.95

BUSINESS MAIL SYSTEM

HARDWARE REQUIREMENTS: 32K and two (2) Disk Drives

SOFTWARE REQUIREMENTS: TRSDOS 2.2 or 2.3

SUPPORTS: Printer (parallel or serial), two (2) Disk Drives, 48K

PURPOSE: To handle large mailing lists, (up to 150,000 names)

FEATURES:

- 1 Supports 3 or 4 line addresses
- 2 Alternate Last Name/First Name with Company/Attention by pressing shift/@.
- 3 29 characters for each Name field and Address line, 11 characters for City, 6 for State or Country, 9 for ZIP Code, 10 for Phone Number
- 4 Three (3) Numeric code fields of 4 digits each and one Alpha code field of 3 characters.
- 5 Files automatically in zip code order, alphabetical within zip code. Only sort mode available (in machine language).
- 6 Handles up to 150,000 names by bumping and moving files to new data disks. For instance, using two (2) disk drives, you may have one file with 30 diskettes.
- 7 Programmable label formatting for 1 to 4 up labels with input for spaces between labels.
- 8 Printout of records selectable by any of ten simultaneous search parameters.
- 9 Supports abbreviated or full listing printouts of data file or a screen summary listing.
- 10 List editing enabling you to predefine up to 99 items for editing in one session.
- 11 Supports quick disk location of single or multiple names.
- 12 Program has been designed with the aid of a professional mailing list company. Meets all industry standards.

BUSINESS MAIL SYSTEM \$150.00

TEXT MERGE

HARDWARE REQUIREMENTS: 32K, one (1) Disk Drive and printer

SOFTWARE REQUIREMENTS: TRSDOS 2.2 or 2.3, Electric Pencil and Data Manager, Info System or Business Mail System. Program will support Radio Shack's word processing program when available

SUPPORTS: 48K, four (4) Disk Drives, Line or Serial Printer

PURPOSE: Merge data files from Information System, Data Manager or Business Mail System with files created by the Electric Pencil from Michael Shrayer.

USES: Creates large number of personalized "form" letters, contracts, statements, etc. automatically

FEATURES:

- 1 Define in your Electric Pencil File where you want data to be inserted
- 2 Coding of text is simple. Just enter the field name with a shift/up arrow before and after and data from that field will be inserted in its place
- 3 Search for every occurrence of a group of characters (even within a line)
- 4 Multiple parameters of search. You can find all the people with the name "Smith" within a certain zip code range and having phone numbers beginning with numbers between 993 and 995
- 5 Set left, top, and bottom margins, number of characters per line, number of spaces between line, right justification, block indentation
- 6 Paging operations include ability to place page number anywhere on page with note attached, such as "XYZ REPORT-1"
- 7 Review your paging configuration anytime
- 8 Save and reuse the printout configuration you create

TEXT MERGE \$49.50

ANALYSIS PAD

HARDWARE REQUIREMENTS: 48K and one (1) Disk Drive

SOFTWARE REQUIREMENTS: TRSDOS 2.2 or 2.3

SUPPORTS: Printer (parallel or serial), four (4) Disk Drives

PURPOSE: Columnar Calculator

USES: Financial Analysis, Line Item Budgeting, Cost Analysis, Sales Analysis, almost any financial function and some statistical functions

FEATURES:

- 1 Create matrices of 29x39
- 2 Enter your own labels for columns and rows
- 3 Enter the number of decimal points, (0-4)
- 4 Make all your entries at one time either by row or column
- 5 Add, delete, move or swap columns or rows
- 6 Edit any data from full screen display
- 7 Add, subtract, multiply and divide one column by another and put results in designated column Up to six calculations can be made and placed in designated column
- 8 Define columns as constants and avoid repetitive entries
- 9 Define all calculations in advance and save them on disk
- 10 Three levels of subtotals are supported
- 11 Zero out meaningless totals for columns that are constants, percentages, etc
- 12 Strip out relevant data from previous pads to create new pads, i.e. labels, row totals, column totals
- 13 Resulting pads can be printed out in four column segments producing excellent looking reports

ANALYSIS PADS \$99.95

CHECK REGISTER ACCOUNTING SYSTEM

HARDWARE REQUIREMENTS: 32K, two (2) Disk Drives, and printer

SOFTWARE REQUIREMENTS: TRSDOS 2.2 or 2.3

SUPPORTS: 48K of memory, Printer (parallel or serial).

PURPOSE: Check Register Accounting

FEATURES:

- 1 Set and define up to 60 accounts with as many income accounts as you choose
- 2 Complete checkbook balancing and reconciliation
- 3 Single entry input where transaction can be dispersed over several accounts
- 4 Enables user to make a 64-character note on each transaction.
- 5 Print out your own checks after data entry.
- 6 Printed monthly summaries of each account with month and year-to-date totals
- 7 Create a suspense file to remind you of coming expenses

REPORTS GENERATED:

- 1 Check Register for any month
- 2 Notes to Check Register
- 3 Income/Expense Distribution report.
- 4 Statement of Selected Accounts.
- 5 Bank Reconcile Statement.
- 6 Suspense File
- 7 Full Account Distribution Statement.

CHECK REGISTER ACCOUNTING SYSTEM \$74.95

CHECKBOOK II

HARDWARE REQUIREMENTS: Cassette Based, 16K Level II, Disk Based, 32K and one (1) Disk Drive

SOFTWARE REQUIREMENTS: For Disk, TRSDOS 2.2 or 2.3

SUPPORTS: Parallel Printer, Disk files on tape version

PURPOSE: Checkbook balancing and reconciliation

- FEATURES:**
- 1 Five column keyboard input with 5 characters for check number, 16 for payee, 4 for code and will handle amounts up to \$100,000.
 - 2 Complete editing mode allowing changes in any or all columns plus a deletion module.
 - 3 Graphic listing of all checks in memory starting at any given check number.
 - 4 Checkbook balancing with balance brought forward always in memory and saved to tape

★ All orders processed within 24-Hours
★ 30-Day money back guarantee on all Software
★ Add \$2.00 for shipping in UPS Areas
★ Add \$3.00 for C.O.D. or Non-UPS Areas
★ Add \$4.00 outside U.S.A., Canada & Mexico

from



THE BOTTOM SHELF

Note:

THE BOTTOM SHELF HAS REMOVED ALL SECURITY FROM DISK PROGRAMS. NOW YOU CAN LIST AND BACKUP ALL BOTTOM SHELF PROGRAMS.

LIBRARY 100

HARDWARE REQUIREMENTS: 4K Level II cassette

SUPPORTS: 16K (some programs require this memory)

PURPOSE: To provide a basic computer library of 100 programs on a broad range of topics

USES: Finance, Education, Graphics, Home Use, Games

PROGRAMS INCLUDED:

- 1 FINANCE Present Value of Future Sum, Simple Interest for Days Future Value of Present Sum, Amortization Schedule Interest Rate-Installment Loan, Days Between Dates, Term of Installment Loan, Present Value of Series of Payments, Real Estate Investment Analysis, Nominal-Effective Interest, Internal Rate of Return, Future Value of Regular Deposits, Regular Deposits for Future Value, Depreciation (Amount, Rate Salvage Value, Schedule), Bond Present Value, Bond Yield to Maturity, Safe-Cost-Margin-Day of Week, Moving Average
- 2 EDUCATION Multiplication & Division, Addition, Subtraction, Fraction & Decimal, States & Capitals, States and Order of Entry States and Date of Entry, States and Abbreviations, Inventors and Inventions, World Capitals & Countries, Urban Areas and Population, Authors & Books, Presidents and Order, States & Largest City, Base Numbers Tiny Pilot
- 3 GRAPHICS Front Cover, Weird, Rat Race Random Ad, Fireside, Left-Right Ad, Blocks, Herring, Launch, Blinker, Snoopy, Snow Step Ad, Step Ad Two, Graphic Words, War Games
- 4 HOME Bartender, Nutrition, Conversion, Perpetual Calendar, Base Conversion, Calculator, Vacation Check-off List, Expense Account, Babysitter, Drunkometer, Remember, Christmas List, Mileage, Telecode
- 5 GAMES Jumble, Search, Memory Quiz Letters, Sting Ray, Russian Roulette, Wheel of Fortune, Towers, Decision, Memory Quiz Numbers, Domesday, Star Trek, Sketch, Flapper, Life, Fifteen, Speedy, Count, Road Race, Stars, Odd One, Spy Ship, Horse Race Scissors, Craps, Star Blazer, Tiger Shark, Unjumble, Mind Reader, Roach Race, Jumble, 2, Gypsy

LIBRARY 100

\$49.50

DISK DRIVE HEAD CLEANER

Disk Drive Heads like tape heads need to be cleaned to ensure reliability. The DISK HEAD CLEANER offers a simple method without fuss. Designed in the shape of a diskette, the cleaning card is inserted in the drive and the head is systematically moved over the card through the use of a program provided. Three cards and cleaning solution are provided. Avoid costly maintenance and increase reliability of your disk drives with the DISK HEAD CLEANER

DISK DRIVE HEAD CLEANER \$18.95

DATA SEPARATOR

Rarely does a new product come along that we can recommend so thoroughly as a product called the DATA SEPARATOR. We recommend it so completely that we do not feel a business application should be run without one being installed. This device eliminates most disk 10 errors. The manufacturer of the controller chip used in the expansion interface recommends data separation whenever reliability is important. The Data Separator is a board that is plugged into the computer (installation time about 5 minutes by a total novice). The Data Separator turns the personal computer into a reliable business computer

DATA SEPARATOR

\$29.95

NEW TOLL-FREE

ORDER LINE

(OUTSIDE OF N.Y. STATE)

(800) 431-2818



24 HOUR ORDER LINE

(914) 425-1535



BASIC TOOLKIT (TAPE) \$19.95
BASIC TOOLKIT (DISK) \$29.95

COMPUTRONICSTM INC.

...EVERYTHING FOR YOUR TRS-80™...

* TRS-80™ is a trademark of the Radio Shack Division of Tandy Corporation

Currently Available

MOD-II PROGRAMS

ALL SOFTWARE

LISTED HERE

WORKS WITH

TRS-DOS*

ALL PROGRAMS

LISTED HERE

REQUIRE CP/M*

(1) ELECTRIC PENCIL (Michael Shrayer Software)...Complete word processor with extensive editing and printer formatting features...\$325 (STANDARD TRSDOS VERSION)...\$350 (DIABLO, NEC or QUME TRSDOS VERSION).

(2) GENERAL LEDGER, ACCOUNTS RECEIVABLE, ACCOUNTS PAYABLE, INVENTORY CONTROL, INVOICING AND PAYROLL (Small Business Systems Group)...an extensive business system for the serious user...can be used one module at a time or as a coordinated system...\$225...per module...\$1299 for the complete system.

(3) GENERAL LEDGER, ACCOUNTS RECEIVABLE, ACCOUNTS PAYABLE, INVENTORY CONTROL AND PAYROLL (Compumax)...a complete user oriented business system...can be used one module at a time or as a coordinated system...\$140 per module...\$995 for the complete system.

(4) MOD-II UTILITY PACKAGE (Racet Computers)...adds important utilities to TRSDOS...copy files selectively...faster and more accurate file copying...repair bad directories...displays sorted directory of all files on 1 to 4 disk drives...SUPERZAP...change disk ID...and more...\$150.

(5) ADVENTURE #1-#9 (Scott Adams - Adventure International)...a series of games formally only available on the large computers...your goal is to work your way through a maze of obstacles in order to recover a secret treasure or complete a mission...the package includes all 9 Adventures written by Scott Adams...\$99.95.

(6) GSF (Racet Computers)...Generalized Subroutine Facility...a series of super fast machine language utilities that can be called from a BASIC program (no machine language knowledge required)...sorts 1000 items in under 5 seconds...allows PEEK and POKE statements...move data blocks...compress and uncompress data...works under TRSDOS...\$50.

(7) DSM (Racet Computers)...Disk Sort Merge...sorts and merges large multiple diskette files on a 1 to 4 drive system...NOT IN MEMORY SORT...can actually alphabetize (or any other type of sort) 4 disk drives worth of data...sorts one complete disk of information in 10 minutes...information is provided to use DSM with the RS MAILING PROGRAM...works under TRSDOS...\$150.

(8) RSM (Small Systems Software)...a machine language monitor and disassembler...can be used to see and modify memory or disk sectors...contains all the commands found on the Model-I version plus some additional commands for the MOD-II...works under TRSDOS...\$39.95.

(9) BLINK BASIC LINK FACILITY (Racet Computers)...Link from one BASIC program to another saving all variables...chain programs without losing variables...\$50.

(10) BASIC CROSS REFERENCE UTILITY (Racet Computers)...lists all variables and strings used in a program (with the line numbers in which they appear)...lists all GOTO's and GOSUB's (with the line numbers in which they appear)...searches for any specific variables or strings (with the line number in which they appear)...\$50.

(11) DEVELOPMENT PACKAGE (Racet Computers)...SUPERZAP (to see, print or change any byte on a diskette)...Disassembler and MOD-II interface to the

MICROSOFT EDITOR ASSEMBLER PLUS including uploading services and patches for Disk I/O...assemble directly into memory...save all or portions of source to disk...dynamic debug facility (ZBUG)...extended editor commands...\$125.

(12) HARD/SOFT DISK SYSTEM (Racet Computers)...The software essential to interface any of the popular large hard disk drives...completely compatible with your existing software and files...allows up to 20 megabytes of storage (and larger)...directory expandable to handle thousands of files...\$400.

(13) CAMEO HARD DISK DRIVE CONTROLLER...coming soon (November 1?).

(14) HARD DISK DRIVES...coming soon (Nov. 1?).

(15) H & E COMPUTRONICS, INC. SHARE-A-PROGRAM DISKETTE #1...works under TRSDOS...a collection of programs written by MOD-II owners...programs include data base management...a word processor...mail system...mortgage calculations...checkbook register...and many others...\$8 (add \$3 postage outside of the United States, Canada and Mexico)...FREE if you send us a diskette containing a program that can be added to the SHARE-A-PRO-GRAM DISKETTE.

(16) WABASH CERTIFIED DISKETTES...\$39.95 (per box of 10).

(17) FLIP SORT DISKETTE STORAGE TRAY...Stores 50 diskettes...comes complete with index-dividers, tilt plates and adjustable spacing...\$44.95.

(18) MASTER PAC 100...100 essential programs...BUSINESS...PERSONAL FINANCE...STATISTICS...MATH...GAMBLING...GAMES...includes 125 page manual and 2 diskettes...\$99.95.

(19) BUSINESS PAC 100...100 essential business programs...INVENTORY CONTROL...PAYROLL...BOOKKEEPING SYSTEM...STOCK CALCULATIONS...CHECKBOOK MAINTENANCE...ACCOUNTS RECEIVABLE...ACCOUNTS PAYABLE...includes 125 page manual and two diskettes...\$149.95.

(20) EDITOR ASSEMBLER (Galactic Software Ltd.)...the first user oriented Editor Assembler for the MODEL II and was designed to utilize all the features of the MODEL II. Includes innovative features for ease of coding and debugging and complete documentation (over 120 pages)...works under TRSDOS...\$229.00.

(21) BASIC COMPILER (Microsoft)...changes your source programs into machine language...increases program execution by 3-10 times...\$395.

(22) MAIL/FILE SYSTEM from Galactic Software Ltd. stores 2,500 names per disk. No sorting time is required since the file is automatically sorted by first and last name plus Zip Code on input. Retrieve by any combination of 19 user codes. Supports an 11 digit alphanumeric Zip. Supports a message line. Comes complete with user-oriented documentation (100-page manual). Allows for company name and individual of a company and complete phone number (and extension)...works under TRSDOS...\$199.00.

(23) INCOME TAX PAC...Professional income tax package...most forms and schedules...output to video or line printer...automatic memory storage of all information...data can be loaded from diskette, changed and edited...built in error checking...\$199.95.

(24) COMPUTER GAMES (SSBG)...Mean Checker Machine, Star-Trek III, Concentration, Treasure Hunt, Banco, Dog Star Adventure...\$74.95.

* All orders processed within 24-Hours

* 30-Day money back guarantee on all TRSDOS Software

* Add \$2.00 for shipping in UPS Areas

* Add \$3.00 for C.O.D. or NON-UPS Areas

* Add \$4.00 outside U.S.A., Canada & Mexico

* We will match any bona fide advertised price in any of the Major Computer Magazines

COMPUTRONICSTM
MATHEMATICAL APPLICATIONS SERVICE

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977



24 HOUR
ORDER
LINE
(914) 425-1535



NEW TOLL-FREE
ORDER LINE
(OUTSIDE OF N.Y. STATE)
(800) 431-2818

* (CP/M IS A REGISTERED TRADEMARK
OF DIGITAL RESEARCH)

NEW!!!
MOD-II NEWSLETTER
\$12/year (or 12 issues)

THE ORIGINAL MAGAZINE FOR OWNERS OF THE TRS-80™* MICROCOMPUTER

SOFTWARE
FOR TRS-80™
OWNERS

COMPUTRONICS

MONTHLY
NEWSMAGAZINE
FOR TRS-80™
OWNERS

MONTHLY NEWSMAGAZINE Practical Support For Model I, II & III

- PRACTICAL APPLICATIONS
- BUSINESS
- GAMBLING • GAMES
- EDUCATION
- PERSONAL FINANCE
- BEGINNER'S CORNER
- NEW PRODUCTS
- SOFTWARE EXCHANGE
- MARKET PLACE
- QUESTIONS AND ANSWERS
- PROGRAM PRINTOUTS
- ... AND MORE

FREE*

WORD PROCESSING PROGRAM For writing letters, text, mailing lists, etc., with each new subscription or renewal.

LEVEL II RAM TEST Checks random access memory to ensure that all memory locations are working properly.

DATA MANAGEMENT SYSTEM Complete file management for your TRS-80™.

CLEANUP Fast action Maze Game.

ADVENTURE Adventure #0 by Scott Adams (From Adventureland International).

* All programs are supplied on cassette (add \$3 for Diskette Version - add \$5 for modified Mod-II Version).

* TRS-80™ IS A TRADEMARK OF TANDY CORP.

FREE

PROGRAMS AND ARTICLES PUBLISHED IN OUR FIRST 12 ISSUES INCLUDE THE FOLLOWING:

- A COMPLETE INCOME TAX PROGRAM (LONG AND SHORT FORM)
- INVENTORY CONTROL
- STOCK MARKET ANALYSIS
- WORD PROCESSING PROGRAM (FOR DISK OR CASSETTE)
- LOWER CASE MODIFICATION FOR YOUR VIDEO MONITOR OR PRINTER
- PAYROLL (FEDERAL TAX WITHHOLDING PROGRAM)
- EXTEND 16-DIGIT ACCURACY TO TRS-80™ FUNCTIONS (SUCH AS SQUARE ROOTS AND TRIGONOMETRIC FUNCTIONS)
- NEW DISK DRIVES FOR YOUR TRS-80™
- PRINTER OPTIONS AVAILABLE FOR YOUR TRS-80™
- A HORSE SELECTION SYSTEM***ARITHMETIC TEACHER
- COMPLETE MAILING LIST PROGRAMS (BOTH FOR DISK OR CASSETTE SEQUENTIAL AND RANDOM ACCESS)
- RANDOM SAMPLING***BAR GRAPH
- CHECKBOOK MAINTENANCE PROGRAM
- LEVEL II UPDATES***LEVEL II INDEX
- CREDIT CARD INFORMATION STORAGE FILE
- BEGINNER'S GUIDE TO MACHINE LANGUAGE AND ASSEMBLY LANGUAGE
- LINE RENUMBERING
- AND CASSETTE TIPS, PROGRAM HINTS, LATEST PRODUCTS COMING SOON (GENERAL LEDGER, ACCOUNTS PAYABLE AND RECEIVABLE, FORTRAN-80, FINANCIAL APPLICATIONS PACKAGE, PROGRAMS FOR HOMEOWNERS, MERGE TWO PROGRAMS, STATISTICAL AND MATHEMATICAL PROGRAMS (BOTH ELEMENTARY AND ADVANCED) . . . AND

SEND FOR OUR NEW 48 PAGE SOFTWARE CATALOG (INCLUDING LISTINGS OF HUNDREDS OF TRS-80™ PROGRAMS AVAILABLE ON CASSETTE AND DISKETTE). \$2.00 OR FREE WITH EACH SUBSCRIPTIONS OR SAMPLE ISSUE.

COMPUTRONICS
MATHEMATICAL APPLICATIONS SERVICE™

50 N. PASACK ROAD
SPRING VALLEY, NEW YORK 10977

ONE YEAR SUBSCRIPTION \$24

TWO YEAR SUBSCRIPTION \$48

SAMPLE OF LATEST ISSUE \$4

START MY SUBSCRIPTION WITH ISSUE

(#1 - July 1978 • #7 - January 1979 • #12 - June 1979 • #18 - January 1980)

NEW SUBSCRIPTION RENEWAL



24 HOUR
ORDER
LINE



(914) 425-1535

NEW TOLL-FREE
ORDER LINE
(OUTSIDE OF N.Y. STATE)
(800) 431-2818

CREDIT CARD NUMBER _____ EXP. DATE _____

SIGNATURE _____

NAME _____

ADDRESS _____ CITY _____ STATE _____ ZIP _____

*** ADD \$6/YEAR (CANADA, MEXICO) - ADD \$12/YEAR AIR MAIL - OUTSIDE OF U.S.A., CANADA & MEXICO ***

COMPUTRONICS
MATHEMATICAL APPLICATIONS SERVICE

50 N. PASCACK ROAD
SPRING VALLEY, NEW YORK 10977

U.S. POSTAGE
STANDARD
BULK RATE
Permit #58
New City, N.Y. 10956

FORWARDING POSTAGE
GUARANTEED

RETURN POSTAGE
GUARANTEED

If you're serious about the stock market, you need

Tickertec™



**Watch 48 to 400 of your favorite stocks
without a 15 minute delay.**

Tickertec™ is a computer program that displays the NYSE or AMEX tickertape on your TRS-80™ Model I or both exchanges as an option on the Model II. You see every trade as it is reported by the exchange and track the last ten trades, tickertape reported volume, and high and low limits on the stocks you are watching. Tickertec prices start at \$1,000.00 with many optional features available including hard copy and portfolio management systems. Programs may be purchased for cash (i.e., hard dollars) or payment can be arranged in the form of discounted brokerage commissions (i.e., Soft Dollar Software™). Exchange fees are extra. Call for FREE brochure TOLL-FREE at (800) 223-6642; in New York call (212) 687-0705; or mail the coupon today.

Max Ule & Company Inc.

6 East 43rd Street, N.Y., N.Y. 10017

| Name _____

| Address _____

| City _____ State _____ Zip _____

| Bus. Phone _____

| Pers.Computer? Y N Model _____

| ©1980, Max Ule & Company Inc.