

TRS-80[®]

Volume 5, Issue 11

November, 1983

\$1.50

Microcomputer News

- The Model 4P
- Model 100 ROM Routines
- The Videotex Information System



Fort Worth Scene



AND THIS MONTH'S NEW COMPUTER IS . . .

Although a new computer is not in reality introduced every month, lately it seems to be a regular occurrence. And since we seem to be on a roll, the versatile, transportable Model 4P is described in this issue.

THE VIDEOTEX AND OFFICE INFORMATION SYSTEM (VIS)

You'll notice that we've devoted several pages to the new VIS system. This is a tremendous data base system that can be set up and customized to fit information storage, retrieval, and distribution needs. It is a most impressive and forgiving system. It will even accept misspelled words, evaluate them phonetically and return what the user actually meant to ask for in the first place. VIS is a very sophisticated system which demonstrates forcibly the strength of today's TRS-80 microcomputer.

THE BUSINESS GRAPHICS ANALYSIS PAK

The Business Graphics Analysis Pak for the Models II, 12, and 16 (in Model II mode) and Models III and 4 (in the Model III mode) offers very high resolution printouts. Graphs and charts can now be printed using the Bit Image Mode on the Radio Shack dot matrix printers which include this capability. The article on this package includes some stunning and highly detailed printouts created using this piece of software.

MUSIC MAESTRO!

Musical Notes is a new column that we're introducing this month. It comes to us from Bryan Eggers of Software Affair, Ltd. Bryan will be discussing the capabilities of a musical option for your 16K Model III or Model 4—Orchestra 90. This package can change your computer into a music synthesizer capable of playing more complicated music than is "humanly" possible. You can compose or transcribe with the powerful music programming language, and you don't even have to be a musician to do all this (although it helps).

AND SO MUCH MORE

From the education group comes a review on two new packages—Corplan and the Illustrated Computer. Corplan lets you play the corporate game to test and hone your survival skills. Corplan is intended as a supplement to busi-

ness instruction at the college level or advanced secondary level. The Illustrated Computer can help secondary and college students "... learn the fundamentals of machine language programming" on a 32K Color Computer with Extended Color BASIC and disk.

Customer Services sets up some ground rules and game rules for solving a system integration problem in a hypothetical situation. Ivan Sygoda is back with his twelfth article in his series of how to Profile articles. CompuServe and AgriStar also return this issue with timely information on using their services. Al and Dru Simon respond to frequently asked questions about Bulletin Boards in their column, Communications Corner.

From our readers we have several items of interest including Yorrick's Escape which is a game for the Model III, instructions for moving data between the Model 100 and the Model III, and a tutorial on using SVCs on the Model II.

For Model 100 users we're publishing Model 100 ROM locations in as complete a form as we've been able to get them.

MAGAZINES

Below are five magazines of special interest to TRS-80 owners that we believe have editorial content of high quality and will be of use to our customers.

Basic Computing—The TRS-80
User Journal (Name change for
80 US Journal—covers all TRS-80's)
3838 South Warner Street
Tacoma, WA 98409
(206)475-2219

Color Computer Magazine
Highland Hill
Camden, ME 04843
(207)236-9621

Color Computer Weekly
P.O. Box 1355
Boston, MA 02205

Rainbow (Covers the TRS-80 Color Computer)
P.O. Box 209
Prospect KY 40059
(502)228-4492

two/sixteen magazine
P.O. Box 1216
Lancaster, PA 17603
(717)397-3364

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The subscription rate for renewals and other interested persons with U.S., APO or FPO addresses is twelve dollars (\$12.00) per year, check or money order. Single copies of the Microcomputer News may be purchased from Radio Shack Computer Centers or Computer Departments for \$1.50 suggested retail each.

The subscription rate for renewals and other interested persons with Canadian addresses is Fifteen dollars (\$15.00) per year, check or money order in U.S. funds. All correspondence related to subscriptions should be sent to: Microcomputer News, P.O. Box 2910, Fort Worth, Texas 76113-2910.

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The TRS-80 Newsletter welcomes the receipt of computer programs, or other material which you would like to make available to users of TRS-80 Microcomputer systems. In order for us to reprint your submission, you must specifically request that your material be considered for reprinting in the newsletter and provide no notice that you retain copyrights or other exclusive rights in the material. This assures that our readers may be permitted to recopy and use your material without creating any legal hassles.

Material for publication should be submitted on magnetic media (tape, disk, or CompuServe). If you submit material on tape or disk, and it is accepted for publication, we will send you two cassettes or diskettes for each one you sent us. Cassettes will come from our box of mixed blank cassettes. If you submit material on CompuServe, and we think we may use the material, we will extend your Microcomputer News subscription by six months for each article accepted. If you are submitting material over CompuServe, please include your name and address or your subscription number so we can find you. If the material is very short, send it to us in E-Mail. If you have more than a few lines, you need to place the material in the ACCESS area of CompuServe and then let us know it is there by leaving a message on E-Mail.

Material may be submitted by mail to P.O. Box 2910, Fort Worth, Texas 76113-2910, or through CompuServe. The Microcomputer News' CompuServe user ID number is 70007.535.

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- Service® Dow Jones & Co., Inc.
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- XENIX™ Microsoft
- Program Pak™ Tandy Corporation
- SCRIPSTIT™ Tandy Corporation
- TRSDOS™ Tandy Corporation
- TRS-80® Tandy Corporation

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Profile Users' Mailbag

The Small Computer Company
P.O. Box 2910

Fort Worth, TX 76113-2910

By Ivan Sygoda, Director, Pentacle

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Readers have been writing in steadily to describe their experiences with Profile and ask questions about what the program can and can't do. Their uses have been incredibly diverse, from compilations of marriage records to jewelry store billing; from real estate tax bills to automobile maintenance records. Most users have been more than pleased with Profile's power and flexibility, but a few have encountered frustrations. This month we'll focus on one particularly interesting letter and review some of the principal sources of his confusion.

READ THE MANUAL

Many problems could be avoided if only everyone would study the manual beforehand. I understand fully, from personal experience, that this is much easier said than done. You're impatient to get started, and then, computer manuals will never win Nobel prizes for literature. But Profile is an efficient and well-organized structure designed to accomplish certain tasks. Its various parts relate to each other and work together. This means that decisions you make when you define files will have an impact on what you can and can't do when the time comes to print labels and reports. If there are special ways you want to use output, these must be considered when you define your files. And so you have to plan ahead in very specific ways.

Using Profile involves two kinds of activities. One kind is already familiar to you, and involves your normal business procedures—looking up information, writing reports, doing mailings, and so forth—all of which Profile lets you carry out efficiently. But in order to accomplish these routine tasks, you first must complete an unusual, unfamiliar procedure: creating your data base. Since this is not a routine activity, a special effort is required to do it well.

Actually, defining files is not difficult at all. Or more precisely, the *mechanics* of defining files is quite easy, and it goes quickly. However, the *choice* of fields is completely dependent upon your own unique application. Only you can know exactly what you want. Here's a parallel: a word processing program makes it easy to manipulate words on a screen. The manual is an effective guide, showing you what to do. But no one at Radio Shack can tell you what to say in your letter or how to phrase it. The same thing in this case: the Profile manual and these articles give you hints and tips, suggest uses for special fields, enumerate tricks of the trade and warn against common mistakes. But only you know your data fields and the way they relate to each other. Profile gives you almost infinite possibilities. This is not always an easy situation with which to deal.

TAKEN TO TASK

The user who criticized Profile III Plus most severely was Mr. Henry H. Herrdegen of Windsor, Ontario: "First off, lots of little things I found annoying and confusing: Some prompts require **(KEY)** and **(ENTER)**, others only **(KEY)**. Some commands (selections) switch to 'cap', some not, [with] no indication if lower case or capital [is necessary]. When working on a file and switching between CM (Creation Menu) and RM (Runtime Menu), or any menu choice, one has to enter the filename X times and stare at the software company advert for endless seconds. More serious is the fact that the 'Define Files' [program] has no edit feature other than killing everything [after the field you want to change], and no way to change length of segments. It is so darn easy to make an error in the design of the field lengths! Generally, the paperwork required to come up with a functioning screen and file is too involved without having the opportunity to try it on the computer."

To begin with, I'd like to thank Mr. Herrdegen for writing such a detailed and thoughtful letter, of which this is just an excerpt. I too have puzzled over the points he raises, and I'd like to discuss each of them.

Any applications program that's written for a particular computer uses that computer's operating system as a base. Profile (as well as SCRIPSIT, VisiCalc, and the other programs you buy at Radio Shack) uses TRSDOS, the Tandy Radio Shack Disk Operating System. Indeed, if such standardized operating systems did not exist, programmers would be forced to write their own driver routines for disk access, screen display, input/output, and all the rest. As a result, you'd have to pay at least two or three times as much for each program, and worse, there would be chaos.

GIVE AND TAKE

As always in life, you win a little and you lose a little. In this case, you gain a great deal of power and flexibility at low cost, but unfortunately, you must endure the peculiarities of your computer's operating system. TRSDOS, for instance, insists that all commands be in upper case letters only. Thus, certain information that you pass to Profile, such as file names and passwords, must be in caps because Profile then passes this information on to TRSDOS for processing. On the other hand, data that Profile itself processes, such as search strings, can be in upper or lower case.

Not all commands are of equal length. File names, for instance, can be anywhere from one to eight characters long. And so TRSDOS needs to be told that the user has completed the keyboard entry. The most common way of doing this is to

press the **(ENTER)** key. However, many Profile selections (such as screen number) are of fixed length; for convenience and speed of operation, the authors have, in most instances, removed the need to also hit **(ENTER)**. What appears to be an inconsistency is really logical and efficient. You just have to get used to it.

Yes, it is a major nuisance to keep entering your file name when moving among the various components of the Profile system. But there is a good reason for this and a good solution. The Profile creation and runtime programs are capable of supporting as many different data bases as you care to create—within the limits of disk space, of course. Profile needs to know which one you're working with or switching to. You can avoid typing and retyping the file name by creating user menus that pass these keystrokes to Profile automatically. (Profile III Plus user menus were discussed in this column in the December, 1982, *Microcomputer News*. If you don't have access to a copy, send us a note and we'll be happy to send you a reprint.) User menus also make the copyright notice go away quickly. The notice is required to protect the rights of the program's authors; it is not an advertisement.

No, Profile as you purchase it from Radio Shack does not allow you to shuffle your fields extensively after you've finished defining them and entered data. One solution is to leave extra bytes in each segment, especially the key segment, for later additions. More radical reshuffling of fields can be accomplished in BASIC. A sample program was part of the August 1983 column. Again, send us a note if you need a reprint.

BACK TO SQUARE ONE

Mr. Herrdegen's last point brings me back to my first one. You are simply not likely to design the most useful and flexible data base for your application unless you do the planning and paperwork beforehand. I cannot stress the importance of planning extensively—it's worth all the time and trouble. Read the sections on reports, labels, math formulas, user indexes, and user menus in the manual carefully before you define your fields.

Studying the descriptions of these functions does two things: (1) It enables you to anticipate any restrictions (the lengths of report lines, for example) so that you can work around them; and (2) it makes you aware of opportunities that you can take advantage of. Here's one small example: The "date of last update" field can be very useful. You can use it to isolate recent customers, update only those index or Rolodex cards which require revision, or check entries made by office temps. But, if you don't study the manual, you won't know that such a resource is available to you. Previous *Microcomputer News* columns are full of similar suggestions. A list of the first year's articles can be found below. Try your local Radio Shack for back issues. If that doesn't work, again, we'll be glad to send you reprints.

IN CONCLUSION

In my opinion, planning your whole Profile system out on paper (fields, field lengths, screen, report and label formats) is a prerequisite if you want satisfying results. When you've devised a satisfactory data base, you should then test it with a dozen or two dozen sample records. Try out the various sort and select options and your screen and printer formats. Enter

extreme numbers to put your math formulas through their paces. Sleep on it; a brilliant formatting idea may come to you in the middle of the night. Let any colleagues who will use the system or its output have a chance to react to its design. Then, when you're sure you have the system you want, go ahead and enter your hundreds or thousands of records. And for the sanity of everyone concerned, keep good backups!

PREVIOUS PROFILE ARTICLES

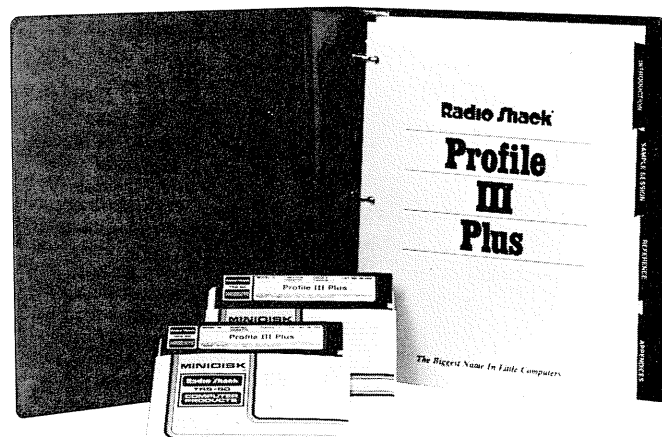
Thousands of people buy Radio Shack computers and Profile each month, so there are many new users and readers who don't have access to the (ahem!) wisdom we've been sharing for over a year. Until Tandy publishes the yearly *Microcomputer News* reprints collection, we'll be glad to send you reprints of whichever of the following articles you might find useful. Add a note about which version you are using and what you are using it for. If you want to describe a problem you're having, send a listing of your fields, any math formulas, and a sample page of output.

- Oct. '82: "Profile III +, the Flexible Data Base Management System"
- Nov. '82: "Optimizing Storage Capacity"
- Dec. '82: "User Menus and Build Files"
- Jan. '83: "Designing Codes"
- Feb. '83: "Math Appeal"
- Mar. '83: "Profile III + and Your Printer"
- Apr. '83: "The Nature of Associated Fields"
- Jun. '83: "At Home with Profile"
- Jul. '83: "Accessing Profile Data from BASIC"
- Aug. '83: "Restructuring Profile Data Bases"
- Sep. '83: "Prosort: A New Profile Enhancement"
- Oct. '83: "Profile and the Model 100"

Upcoming articles will focus on interfacing Profile and VisiCalc/Multiplan and merging Profile with SCRIPSIT documents.

PROFILE Editor's Note: This is Mr. Sygoda's thirteenth article in a series of 'how-to' Profile articles. Other articles in the series will be published over the next few issues in this column. We hope that you enjoy this feature, and we look forward to your comments and questions on Profile.

Pentacle is a New York City-based non-profit service organization specializing in administrative services for performing art groups.



Corplan Means Business

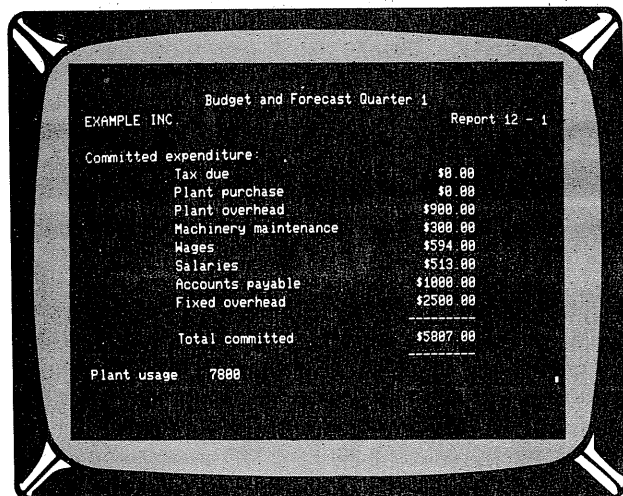
by Patrick Dryden

Radio Shack's new Corplan courseware package is designed to supplement business instruction at the college and advanced secondary level. Corplan puts the player or a role-playing management team in charge of an imaginary corporation for up to 12 quarters, unless bankruptcy comes first. The player or team of players must plan overall business strategy and apply the quarterly decisions for production, sales, investments, and finance needed to make the corporation succeed. This educational program is so realistic that it's bound to appear as often on the TRS-80 screens of business people, armchair entrepreneurs, and those who enjoy business gaming.

COMPUTER SIMULATION

Corplan is a complex mathematical model that simulates the operations of a corporation on the TRS-80 Model III or Model 4 (in Model III mode). Because this simulation is so thorough, a minimum of 48K memory is required for Corplan's data files and programs: CORGAME, the actual simulation program, and CORAID, an auxiliary planning program. Although Corplan assumes some familiarity with basic business concepts, no computer experience is needed to run the simulation. Corplan's menu-driven programs provide information and planning aids whenever needed. Best of all, Corplan performs the simulation's tedious calculations and maintains each quarter's accounts.

Reports can be selected from the menu to provide the necessary planning information: the parameters of the world in which the corporation operates; quarterly rates, prices, and market factors; the current condition of the corporation; and financial and operational forecasts. Figure 1, for example, shows a forecast of committed expenditures for the next



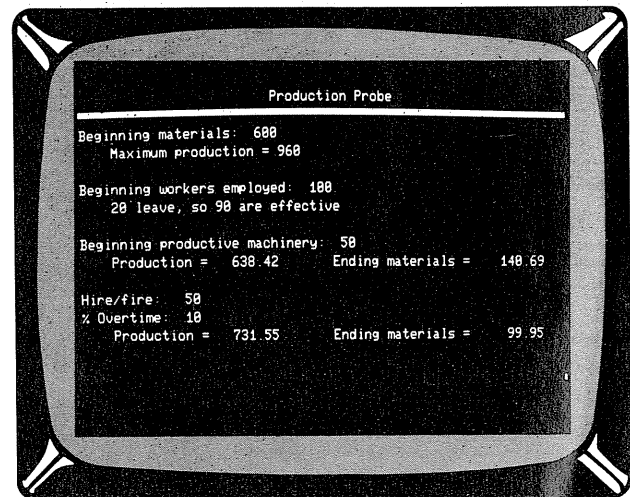
Budget and Forecast Quarter 1
EXAMPLE INC Report 12 - 1

| | |
|------------------------|------------------|
| Committed expenditure: | |
| Tax due | \$0.00 |
| Plant purchase | \$0.00 |
| Plant overhead | \$900.00 |
| Machinery maintenance | \$300.00 |
| Wages | \$594.00 |
| Salaries | \$513.00 |
| Accounts payable | \$1000.00 |
| Fixed overhead | \$2500.00 |
| Total committed | \$5807.00 |
| Plant usage | 7880 |

Figure 1.

quarter and the amount of space currently in use at the manufacturing plant.

Many options for use in planning are included. These options use player responses to provide both immediate and long-range projections for production and sales. As an example, Figure 2 shows a screen from the Production Probe. Given a set of beginning production values, this option calculates the quarter's output and the effect on it of decisions to hire or fire workers and pay overtime.



Production Probe

| | | |
|------------------------------------|--------------------|--------|
| Beginning materials: 600 | | |
| Maximum production = 960 | | |
| Beginning workers employed: 100 | | |
| 28 leave, so 90 are effective | | |
| Beginning productive machinery: 50 | | |
| Production = 638.42 | Ending materials = | 148.69 |
| Hire/fire: 50 | | |
| % Overtime: 10 | | |
| Production = 731.55 | Ending materials = | 99.95 |

Figure 2.

When planning is complete, the player enters 12 decisions to complete the next quarter. Corplan then quickly calculates and displays summarized results of these decisions for the player's approval, as shown in Figure 3. Then the status of the corporation is updated and itemized in a series of accounts and an income statement, a closing balance sheet (Figure 4, for example), and reports of ending values for the quarter.

THE CORPLAN CORPORATION

At the beginning of play, the player or team has just taken over a corporation that makes and sells "Widgets." The firm has one 10,000 square-foot plant, 50 productive machines with 15 machines on order, 600 units of raw material, 100 workers, 50 salespeople, and \$1000 worth of advertising. An opening balance sheet shows the firm's assets and liabilities, and the resulting value of shareholders' equity.

In Corplan, as in the real business world, profit is the objective. The management must plan wisely to make the enterprise profitable—for its stockholders and for its own solvency. Therefore, most Corplan managers start out to maximize profit within the 12-quarter time limit. But this long-

range objective will give way to survival planning if bad decisions weaken the corporation. Success depends on a thorough understanding of the Corplan model and good planning rather than good luck.

| EXAMPLE INC | | | | | | Quarter 1 |
|--------------------|----------|--------------------|-------------|-------------|-------|-----------|
| Machines | Plant | Securities | Dividend | Bonds | Stock | |
| 10 | 1 | 500 | 0 | 5055 | -1000 | |
| Workers | Overtime | Materials | Salespeople | Advertising | Price | |
| 50 | 10 | 400 | 0 | 92 | 9.35 | |
| SUMMARIZED RESULTS | | | | | | |
| Produced | Sold | Delivered | Net Profit | Return | | |
| 731.55 | 731.70 | 731.55 | \$706.75 | 7.60% | | |
| | | Stock market price | \$0.947 | | | |

Figure 3.

Running a Corplan corporation requires quarterly decisions in four areas of corporate management: production, marketing, investments, and finance.

| EXAMPLE INC | | Closing Balance Sheet | | Quarter 1 |
|---------------------|---------|-----------------------|---------|-----------|
| ASSETS | | LIABILITIES | | |
| Cash | \$0 | Bank loan | \$0 | |
| Receivables | 8279 | Accounts payable | 1702 | |
| Inventories | 720 | Accrued tax | 471 | |
| Securities | 500 | | | |
| Current assets | 19499 | Current liabilities | 2173 | |
| Plant | 3000 | Bonds payable | 5055 | |
| Productive machines | 2520 | Total liabilities | 7228 | |
| Ordered machines | 1216 | | | |
| Net fixed assets | 6736 | Stockholders' equity | 9007 | |
| TOTAL | \$16235 | TOTAL | \$16235 | |

Figure 4.

PRODUCTION AND SALES

Each quarter, the corporation must supply Widgets for its consumers according to the management's production plan and Corplan's production constraints. Sufficient raw materials must be purchased to meet the next quarter's target output without wastage of excess inventory. Workers must be hired to replace those lost to turnover and to increase the productivity of the work force; however, new employees are only half as effective as trained employees. A percentage of the basic workers' payroll can be paid as overtime to increase productivity without hiring additional workers.

The corporation must create demand for its output in a market that can be partially controlled through pricing and advertising. For example, Figure 5 shows a screen from the Demand Tabulation option in the CORAID program. This

long-range planning feature calculates and displays the level of demand resulting from a proposed range of advertising and price combinations. Supply and demand should be matched as closely as possible to avoid either shrinkage of finished goods inventory or cancellation of unfulfilled orders. Even so, a surplus could result from not having an adequate force of effective salespeople to deliver on the demand created.

| Price | Quantity of Demand For Quarter 1 | | | | | | | | |
|--------|----------------------------------|------|------|------|------|------|------|------|------|
| | Advertising | | | | | | | | |
| | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 |
| 8.000 | 896 | 1047 | 1191 | 1328 | 1461 | 1589 | 1712 | 1832 | 1948 |
| 8.300 | 795 | 941 | 1080 | 1214 | 1342 | 1466 | 1586 | 1703 | 1816 |
| 8.600 | 694 | 835 | 970 | 1099 | 1224 | 1344 | 1461 | 1574 | 1684 |
| 8.900 | 593 | 729 | 859 | 984 | 1105 | 1222 | 1335 | 1445 | 1552 |
| 9.200 | 493 | 623 | 749 | 870 | 986 | 1099 | 1209 | 1316 | 1420 |
| 9.500 | 392 | 518 | 638 | 755 | 868 | 977 | 1083 | 1187 | 1288 |
| 9.800 | 291 | 412 | 528 | 640 | 749 | 855 | 958 | 1058 | 1156 |
| 10.100 | 190 | 306 | 417 | 525 | 630 | 732 | 832 | 929 | 1024 |
| 10.400 | 90 | 200 | 307 | 411 | 512 | 610 | 706 | 800 | 891 |
| 10.700 | 0 | 94 | 197 | 296 | 393 | 488 | 580 | 671 | 759 |
| 11.000 | 0 | 0 | 86 | 181 | 274 | 365 | 455 | 542 | 627 |

Figure 5.

Two more constraints can affect both production and sales. Crowding too many resources into the available plant space causes an increase in employee turnover, decreasing the quarter's anticipated output and deliveries. Insufficient funding causes a cutback in the firm's expenditures for new employees and raw materials, decreasing the quarter's anticipated output and deliveries and limiting the next quarter's production target.

INVESTMENTS AND FINANCE

Acquiring more plant space and new machines, two of Corplan's three investment decisions, require careful scheduling and budgeting. A new plant won't become operational until the third quarter after it is ordered; at that time it must be paid for in full. Machines, on the other hand, must be paid for when purchased, even though there is a one-quarter delay between purchase and receipt. The new machines are put on order, and then only a few of these ordered machines are received. In the meantime, productive machines continue to deteriorate at a rate of 10% each quarter. When planning for expenditures, surplus funds can be invested in securities. A securities investment will yield additional income for the corporation, and securities can be sold whenever cash is needed.

Investments and operational expenses must be carefully budgeted. Funds can be raised by issuing bonds and additional stock shares, or through an emergency bank loan if necessary. Cash can be spent to repay long-term loans and buy back issued stock shares. And, sometime in the simulation, dividends must be paid to the stockholders. The quarterly stock price is generated by a formula simulating the real market, based on past and expected profits and dividends, value of assets, and a "good will" valuation of orders and management.

MANAGEMENT DECISIONS

Based on the corporation's current condition, its overall business plan, and the Corplan parameters and factors, the following 12 decisions must be planned and implemented for each quarter:

1. Purchase additional machinery
2. Order a new plant
3. Buy or sell securities
4. Pay a dividend to the stockholders
5. Issue or retire bonds
6. Issue or buy back stock shares
7. Hire or fire workers
8. Pay overtime to workers
9. Purchase additional raw materials
10. Hire or fire salespeople
11. Increase advertising
12. Set the price for Widgets

After the first six of these 12 decisions are entered, the program calculates the firm's financial status to check for bankruptcy. First the committed expenditures for the quarter are subtracted from the current cash sources—cash at the bank and accounts receivable—to yield the amount of cash free to spend. Then the total cost of the spending decisions is subtracted from the sum of the funds raised and cash free to spend. The corporation passes the bankruptcy test if it still has cash remaining. Even if it is operating at a deficit at this point, a bank loan is drawn upon to keep the firm afloat and allow completion of the quarter.

Bankruptcy is the worst thing that can happen in Corplan. If the operating deficit after the first six decisions can't be covered by the maximum bank loan for the quarter, the simulation stops, and the deficit is explained. In Corplan, however, there is no need to jump out the window if the business fails. New funding can be attempted for the quarter, or, if the corporation is too far gone, the simulation starts again from Quarter 0. Novice players are even allowed to go back to an earlier quarter and replay it to avoid bankruptcy.

CORPLAN MODIFICATION

To make Corplan even more dynamic, the model for the simulation can be altered. A hidden menu (Figure 6) allows

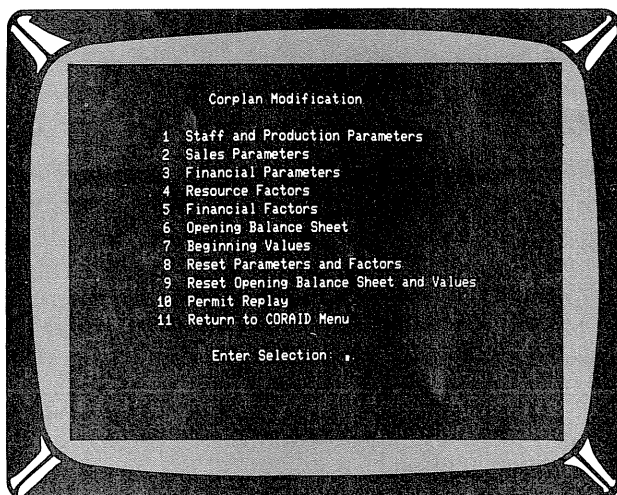


Figure 6.

change of the values assigned to two kinds of Corplan variables: (1) the parameters and quarterly factors affecting all corporations, and (2) the balance sheet and opening values affecting only new corporations.

Instructors can design a particular business environment or business condition for a demonstration or for classroom use. After introducing and playing Corplan in its original form, they can alter the simulation's parameters and starting values before using it for student evaluation. They can even make modifications before the students reload Corplan to continue their simulations. For example, the instructor could raise or lower the parameters for taxes and interest rates, or remove the students' ability to replay previous quarters. Advanced users can answer their own "what if" questions by applying their Corplan strategy under different conditions for production, sales, and finance.

Such modifications aren't irreversible. Corplan's variables can be altered at any time, or easily reset to the original values. Then new students can follow the manual's demonstration of a sample quarter and the explanations of Corplan using the original values for the model.

PROVEN EDUCATIONAL VALUE

Corplan has a successful history of use in universities and businesses in England. The model was developed in an academic environment by Martin Mitchell and Patrick Shackleton and directed at management students and business executives in training courses. During the '70s it was used extensively by players at terminals connected to mainframe computers.

Mitchell and Shackleton adapted Corplan to the TRS-80 Model I in 1978 for their firm, Understanding Ltd. Freed from the restrictions of the mainframe computer, Corplan's use spread rapidly. Microcomputer versions of Corplan have been adopted for classes in economics, finance, and business management, and for the management training programs of several British corporations. In fact, teams from schools and businesses compete in frequent Corplan competitions sponsored by colleges and institutions.

Radio Shack's version has been carefully revised so that the Corplan model represents the operation of an American corporation. Differences in the two countries' practices of taxation and depreciation, for example, have been eliminated, and American business terminology and monetary units are used throughout.

The Corplan package includes the programs CORGAME and CORAID, a user's manual that demonstrates a sample quarter and explains the model's calculations and situations, and planning forms that can be copied for use by each player or team of players. Corplan (Cat. No. 26-2619) is available for \$49.95 from your local Radio Shack Computer Center, store or dealer (prices may vary at individual stores or dealers).

Make a sound business decision and invest in Corplan, whether you're preparing for the business world or sharpening your planning skills.

System Integration

If you were forced to enter all your computer data twice over, it would represent an unwanted investment in machine time, operator time, and therefore money. If you find that part of your normal daily data operation involves typing the same piece of data in two or more places, then you have perceived the need for System Integration.

System integration can be summarized as the act of combining a set of processes or procedures which result in the entry of data which can be used by subsequent processes. Subsequent processes can capture the data already entered, avoiding duplication of data-entry.

For example, many of the Radio Shack packages are designed to run as stand-alone programs, or run interactively. The 26-46xx and 26-62xx series of COBOL based Accounting packages for Models II/12/16 interface with each other in certain places by sharing data-files. Scripsit and Profile interact (in the merge process), by virtue of the fact that Profile can write a special data-file which Scripsit can read. However, the Accounting packages are not designed to interface with either Scripsit or Profile. But can they be integrated into one system? The answer is "Probably yes."

For the purposes of this article, we will look upon the question of system integration as a sport. We will discuss the COBOL/SCRIPSIT/Profile game later, but we first need to establish two sets of rules. The first set we will call the ground rules—there are four of them and strictly speaking they are questions rather than rules. The second set we will call the game rules—there are seven of them. After establishing the rules, we will look at a game-plan!

THE GROUND RULES

What OUTPUT is needed?

What INPUT is needed?

What SYSTEM is to be used?

What PROCESSES will turn our input into desired output?

The four considerations above form the basis of our ground rules. The four questions will need to be kept in mind, even in our discussion of the more complex system integration questions which will be our seven-point game rules.

THE GAME RULES

The game, as played here, has seven major categories of rules. Obviously, in other system-integration leagues, they categorize a little differently to suit their local requirements. If you don't like these rules, then adapt them to suit your needs, or join another league.

1) Seek Direction.

A preliminary investigation should be held to define the nature of the problem, clarify the aim of the exercise, generate an approach to the solution, and make some kind of determination of the feasibility of the approach.

2) Prepare Study.

A fact finding mission should be set up to examine the present system and investigate the constraints involved. Constraints will be real or perceived and will be organizational, financial, technical, or operational in nature. As more facts are gathered, more constraints should become apparent, including those problems which will be created (or become more critical) as a result of any possible solution."

3) Analyze Findings.

Sort out the facts, get answers to the unknowns, estimate the imponderables. Check the feasibility again, in the light of the sorted facts.

4) Formulate Ideas.

Examine all possible solutions; hold a "brainstorming" session. Look closely at the tools and resources available now (or that are likely to be available) and examine their effectiveness in all of the possible solutions.

5) Finalize Ideas.

Consideration of all formulated ideas should be undertaken on a cost justification basis. Look at the "one off" costs of implementation, the running costs, the defined advantages of each, (savings in time, money, productivity, etc), and the possible "spin off" effects (future benefit).

6) Formulate Solution.

Formulating the solution is just like choosing your "starting line-up," picking over the ideas until your preferred solution becomes a system outline. This is also the point to find out whether you are meeting the system constraints as previously defined. If so then the decision is made. (If not then go back one or more steps).

7) Verify Solution.

Find out whether the solution as defined solves the problems as defined and fulfills the aims of the exercise. Are the resources deemed to be needed, actually tested under the circumstances of your use, or do you need a "practice game" to be certain. This will also be a cross-check on the availability of any tool or resource not currently in your possession. If the solution is not the only one under active consideration at this moment, then your task is made all the more difficult. It is probably better to go back one or more steps and arrive back here with only one solution to be verified at a time.

THE GAME PLAN

So, having all the rules in place, we only need to plan the game. To do this, consider the following as checks or stages in the planning and implementation process of our integrated system.

Is the data-entry procedure in place?

Is the programming (if any) currently underway?

Are file conversion or transfer procedures prepared?

Are all other hardware, software, and organizational aspects covered?

Is the implementation timing secure?

Is the testing complete?
Is the operation manual completed?
Are the operators trained?

If we're ready to go, then we'll play the game now!

Review the scoreboard—how did we do?

Of course being so well prepared, we won the game, but we have a whole season in front of us; what lessons have we learned for the future?

A WORKED EXAMPLE

Don't forget the four ground rules; they are implicit throughout this brief example. Don't confuse "preference" with "need" when you work your own system integration question through the "rule-book" either.

We will put our COBOL/SCRIPSIT/Profile through the seven point rule-book.

1) Seek Direction. The problem is that, our six or seven salesmen seem to be good at getting their foot in the door, so to speak, and they are very good with the big customers and problem accounts and so on, but we seem to be missing the undoubted opportunities we should have, in getting our middle of the road customer up to be a big customer or preventing them from becoming problem customers. We ought to be able to provide our salesmen with the right type of information, soon enough, and conveniently enough, to increase our sales substantially.

2) Prepare Study. Our salesmen are spread over two or three states, and they do some fine work with Mod II Profile to help them keep track of qualifying prospects. They seem not to have the time to update Profile from the Accounts Receivable (Mod II + HD) reports that we give them every so often at the sales meetings here at Head Office. It's a miracle if they track any more than their ten best and ten worst accounts. Their secretaries in the local offices do a good job with SCRIPSIT/Profile merge for these cases, and for prospective customers, but they are so busy on the telephone that they don't have time to type in the sales details for a good 90% of their customers. Not until we get our sales up substantially can we afford much in the way of more staff, but a few thousand dollars isn't going to hurt us, if we can see it'll get us somewhere. See the problem? Nobody has the time to get the information to the place where it will be of most use, because, as we're set up, nobody has the time to type all that stuff in again.

3) Analyze Findings. The fact is that we have a Head Office Order Entry/Accounts Receivable database, and it has no pre-defined means of interfacing with the sales offices Profile databases. In any case, they are at different locations. We check a few more facts here and there, and yes, it should be feasible to get the relevant data from here to there without adding any more data entry clerks. Watch out for one thing though. As we grow, we may need to get a little more organized here at Head Office, which is the only place we do the telephone Order Entry and Accounts Receivable. It should be OK if we watch it carefully.

4) Formulate Ideas. At various meetings, with various people, the following ideas are thrown into the arena:

Get the local offices a Telephone link to hook into Head Office's database.

Get the Sales Analysis program.

Get AR/OE source code and write (or have written) some custom programs.

Upgrade to TRS-Xenix multi-user operating system.

Get each office to run its own AR, etc.

Get a mini-computer that will allow on line use of ten or so terminals.

Modify the sales bonus scheme.

Hold regular sales meetings.

Get the Profile Plus program—more features.

Get the needed information to the salesmen on disk and look at ways to dump that data to the salesmen's databases.

No violent objections to this last suggestion, even from our Accountant.

5) Finalize Ideas. The telephone link, the mini computer, and everyone on Xenix are presently discarded as options because of the cost/benefit ratio, and some of the other options get dropped for other reasons, such as "throwing away the baby with the bath water," or we will lose a great deal of our present efficiency in the process of change.

6) Formulate Solution. The system outline we end up with?

With the help of the AR source code and the COBOL compiler, a custom program will go into AR's files, select the information required, and spin it off to disk files (say one for each salesman).

FCOPY from HD to one floppy for each salesman.

Hand out the floppies at sales meetings each 1st and 3rd Friday of the month.

Write a BASIC program to be run by each salesman on his own machine.

Get hard copy with "warning flags" and dump data into Profile at the same time.

Profile can search for flags and spin off data for SCRIPSIT/Profile merge.

Personalized letters get written to the appropriate customers, and a pretty well up to date database is available for everyone.

It all looks good! We seem to have a solution which meets the constraints.

7) Verification. We believe we have solved the problem, and fulfilled the aims of the exercise. Is it the only solution to the problem? Not quite. The Xenix alternate is very attractive still, so we decide to go that way when we have the secure customer base and increased sales that we want, making as certain as we can that everything we do now will be possible under Xenix. A two stage implementation plan in other words.

Resources? The Software is now on order and having delegated some of my responsibilities, I have the time (and fortunately the expertise) to get the programming done. Our machine at the head office is not very often used before 11:00 in the morning anyway; disk space is there, so we are away!

CONCLUSIONS

If an amateur sport is worth planning for, then for certain, your system integration needs are worth planning too. But neither confuse needs with preferences nor forget to include intangibles into the cost/benefit calculations if you can. Your present system may not have any duplication of data-entry, but some desired enhancement to your system may have been discarded from your consideration unwittingly because of a (quite natural) fear that you might have to type in all that data twice.

If it needs to be done, it can be done. It is only a matter of deciding by what means and at what price.

THE SYSTEM INTEGRATION CATALOG

There are sports equipment catalogs, and the concluding paragraph here is a small and incomplete catalog of ideas for you to pursue. It is without prices and catalog numbers, and without sufficient examples, and only intended to give you a sense of the great number and variety of tools and resources available.

Computer to Computer communications—hard wired, telephone modems, async, bisync, diskette files, tape files, communication packages.

Terminal to Computer communications—hardware terminals, terminal utilities, terminal emulator packages, modems.

Inter-Program communication—interactive packages, custom software, in-house programming, contract programming, source codes, file/data transfer utilities.

Peripheral communications—Card Readers, Bar Code Readers, plotters, multiplexers, "black box" emulators.

Inter-Language communications—machine language, file compatibility, pure ASCII data files, language packages, JCL & TRS-Xenix shell, DO files.

Hard-Copy communication—multi-part paper/forms, multi copy programs, spooling to disk files, merge letters.

And of course, temporary (to become permanent?) data-entry clerks, to duplicate, or triplicate, all that data.

Computer Customer Service Address and Phone Numbers

8AM to 5PM Central Time
Computer Customer Services
400 Atrium, One Tandy Center
Fort Worth, Texas 76102

Model I/III/4 Business Group (817) 390-3939
Model II/12/16 Business Group (817) 390-3935
Languages and Compilers (817) 390-3946
Color/Model 100/Pocket Computer Group (817) 390-3944
Hardware and Communications Group ... (817) 390-2140
Educational Software (817) 390-3302
Games, Books, and New Products (817) 390-2133
Newsletter Subscription Problems (817) 870-0407



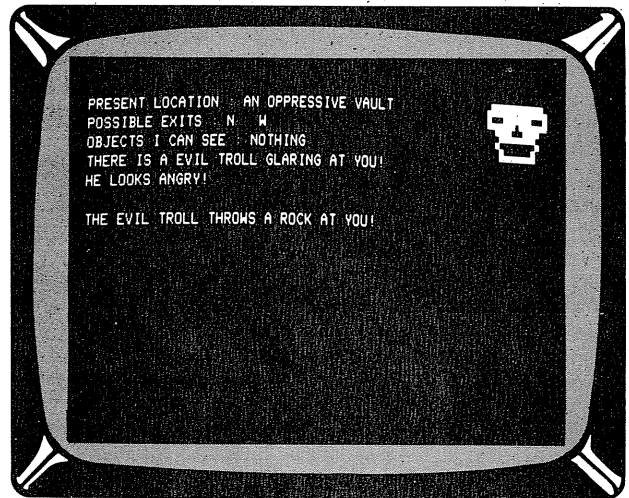
Yorrick's Escape

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You awaken in the dreaded Dungeons of Amleth. Nearby, a disembodied skull begins chattering at you, offer-

ing to help you escape. You pick up Yorrick and set off through the catacombs, in search of a means of escape . . .

Yorrick's Escape is a BASIC language adventure-type computer game which takes up 170 lines and requires approximately 13,000 bytes of random access memory. Yorrick was developed out of the author's frustration with the rapid habituation to which many superficially complex adventure games are susceptible. For example, many adventure games will take place in a complicated dungeon, ship, mansion, etc. However, once you have worked your way through the game's domain, you quickly develop a map and determine how to locate and use the object(s) required to escape. Soon after the problem-solving challenge of the adventure has dissipated, the adventure degenerates into an exercise in typing speed.



Yorrick provides an interesting alternative. The scenario is initially similar to the typical adventure game. Yorrick describes objects that he sees, your current location, possible exits, etc. The player moves about by entering compass directions (N, S, E, W) and uses one- or two-word commands to acquire objects or to interact with the environment. Five levels of difficulty provide varying levels of challenge. The dungeon seems to be relatively simple the first time you play the game; there are nine interconnecting chambers, with various dungeon-sounding descriptions (e.g., "dark, damp passageway"). And, of course, the chattering skull in the upper right corner of the screen is Yorrick.

However, suppose you trip and fall into a pit of suck-erworms (an unfortunate possibility); or, suppose you are killed in a battle with a blood-thirsty snotgurgle. If you dust yourself off and begin the game again, you will find that the descriptions of the chambers have changed, the arrangement of the chambers has altered, different objects are present, new monsters confront you. All of these attributes are randomly determined with each start of the game. There are sixteen different chamber configurations, 100 different room descriptions, and nine different rooms in which you might first awaken. The monsters which lurk in the various chambers, the objects which you might pick up, and the attributes of some of those objects are all different with each play of Yorrick.

A further twist built into Yorrick is that there is more than one end-game scenario. Each end-game scenario lets you escape the dungeon proper, only to thwart you with a problem which requires creative and analytic consideration. Only by solving this problem with the resources you have at hand, can you attain the safety of the Forest. One of the end-game scenarios will occur with considerable regularity; another will occur only rarely. All of these scenarios will demand the utmost of you and Yorrick. Being able to clobber the mandatory swarthy dwarf is necessary, but not sufficient, to escape from the Dungeons of Amleth.

```

10 CLEAR 1000
   : DIMI$(20), A$(9), B$(9), C$(9), D$(9), PL(9),
   : AR$(9), AM$(10), F$(9), AN$(9), N$(10), MD$(9),
   : M$(9), OD$(9), O$(9), IN$(200), S$(10), R$(10),
   : MS(9), W$(9), WA$(9), MC$(7), MV$(6)
20 CLS
   : PRINT "          YORRICK'S ESCAPE
   : BRIAN MULLEN"
   : FOR U=1 TO 250
   : NEXT U
30 PRINT
   : PRINT
   : INPUT "ENTER LEVEL OF DIFFICULTY (1=EASY
   : 5=DIFFICULT)"; DF
40 PRINT
   : INPUT "DO YOU WANT INSTRUCTIONS (Y/N)"; I$
50 IF I$="Y" THEN GOTO 60
   : ELSE GOTO 140
60 CLS
   : PRINT "WELCOME TO THE DREADED DUNGEONS OF
   : AMLETH.          YOU MUST HAVE
   : DONE SOMETHING TERRIBLE TO HAVE          BEEN
   : SENT HERE!":
70 PRINT ""
80 PRINT "HELLO. MY NAME IS YORRICK. I WAS BANISHED
   : TO          THESE DUNGEONS
   : AGES AGO BY THE BALEFUL WITCH          THELMA.
   : I LONG TO BE FREE, TO REST IN
   : PEACE          . . . AS YOU CAN SEE, I DID NOT
   : SURVIVE LONG"
90 PRINT "ENOUGH TO ESCAPE FROM THIS HELL-HOLE. BUT
   : I DID LEARN MUCH
   : ABOUT THE DANGERS (AND THE          TREASURES)
   : HIDDEN IN THE CATACOMBS. IF YOU          CARRY
   : ME WITH YOU, I MAY BE ABLE TO HELP."
   : J=25
   : GOSUB 1590
100 PRINT
   : INPUT "(ENTER TO CONTINUE)"; E$
   : IF E$="" GOTO 110
110 CLS
   : PRINT "I CAN GIVE YOU STATUS REPORTS, TELL YOU
   : WHAT YOU'RE
   : CARRYING, WARN YOU OF DANGERS,
   : IDENTIFY VALUABLE OBJECTS, AND SO ON."
120 PRINT "ARE YOU READY?"
   : J=5
   : GOSUB 1590
   : PRINT
   : PRINT "(ENTER TO CONTINUE)"
   : J=1
   : GOSUB 1590
   : INPUT E$
   : IF E$="" GOTO 130
130 PRINT "ALRIGHT. JUST BE CAREFUL . . .
   : . . . AND WATCH OUT
   : FOR THE SUCKER WORMS!!!"
   : J=8
   : GOSUB 1590
140 MC$(1)="R"
   : MC$(2)="S"

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   : MC$(3)="K"
   : MC$(4)="H"
   : MC$(5)="T"
   : MC$(6)="X"
   : MC$(7)="Z"
150 MV$(1)="A"
   : MV$(2)="E"
   : MV$(3)="I"
   : MV$(4)="O"
   : MV$(5)="U"
   : MV$(6)="Y"
160 PW$=MC$(RND(7))+ MV$(RND(6))+ MC$(RND(5))+
   : MC$(RND(5))+ MV$(RND(6))+ MC$(RND(7))
170 W$(1)="FLAMING SWORD"
   : W$(2)="MAGIC LANCE"
   : W$(3)="BROADSWORD"
   : W$(4)="MACE"
   : W$(5)="BATTLEAXE"
   : W$(6)="CUDGEL"
   : W$(7)="CLUB"
   : W$(8)="BATTLEAXE"
   : W$(9)="MAGIC WAND"
180 OD$(1)="GOLD COINS"
   : OD$(2)="DIAMONDS"
   : OD$(3)="A GOLD RING"
   : OD$(4)="RUBIES"
   : OD$(5)="FOOD"
   : OD$(6)="FOOD"
   : OD$(7)="EMERALDS"
   : OD$(8)="SILVER COINS"
   : OD$(9)="A BAG OF PEARLS"
   : IN$=""
190 MD$(1)="SWARTHY DWARF"
   : MD$(2)="GOBLIN"
   : MD$(3)="HIDEOUS GHOUL"
   : MD$(4)="EVIL TROLL"
   : MD$(5)="BLOOD-THIRSTY SNOTGURGLE"
   : MD$(6)="MIGHTY MADNESS"
   : MD$(7)="HELL-HAG"
   : MD$(8)="GHASTLY TROLL"
   : MD$(9)="DWARF"
200 S$(1)="HALLWAY"
   : S$(2)="ROOM"
   : S$(3)="PASSAGEWAY"
   : S$(4)="CHAMBER"
   : S$(5)="CRYPT"
   : S$(6)="ROOM"
   : S$(7)="GALLERY"
   : S$(8)="VAULT"
   : S$(9)="TOMB"
   : S$(10)="PIT"
210 R$(1)="A LONG, COLD"
   : R$(2)="A DARK, DAMP"
   : R$(3)="A MUSTY"
   : R$(4)="AN ERIE, GREEN"
   : R$(5)="AN OPPRESSIVE"
   : R$(6)="A LARGE"
   : R$(7)="A SMALL"
   : R$(8)="A FOUL-SMELLING"
   : R$(9)="A NARROW, BLACK"
   : R$(10)="A SLANTED"
220 SS=10
   : FS=10
   : SC=SC+FS+SS
   : WL$=""
   : C=0
230 A$(4)="N"
   : A$(6)="N"
   : A$(7)="N"
   : A$(8)="N"
   : Q=RND(2)
   : IF Q=1 THEN A$(1)="N" ELSE A$(2)="N"
   : Q=RND(2)
   : IF Q=1 THEN A$(5)="N"
240 B$(3)="S"
   : B$(7)="S"

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: B$(8)="S"
: B$(9)="S"
: IF A$(5)="N" THEN B$(6)="S"
: Q=RND(2)
: IF Q=1 THEN B$(1)="S" ELSE B$(2)="S"
250 C$(2)="E"
: C$(5)="E"
: IF A$(5)="N" THEN Q=RND(2)
: IF Q=1 THEN C$(1)="E"
260 IF A$(5)<>"N" THEN C$(1)="E"
270 D$(3)="W"
: D$(4)="W"
: IF C$(1)="E" THEN D$(2)="W"
280 FOR PL=1 TO 9
: AR$(PL)=R$(RND(10))
: NEXT PL
290 FOR PL=1 TO 9
: AN$(PL)=S$(RND(10))
: NEXT PL
300 Y=RND(3)
: FOR X=1 TO 3
: IF X=Y THEN M$(X)=MD$(Y) ELSE M$(X)=" "
: NEXT X
310 Y=RND(6)
: IF Y<4 THEN GOTO 310
320 FOR X=4 TO 6
: IF X=Y THEN M$(X)=MD$(Y) ELSE M$(X)=" "
: NEXT X
330 Y=RND(9)
: IF Y<7 THEN GOTO 330
340 FOR X=7 TO 9
: IF X=Y THEN M$(X)=MD$(Y) ELSE M$(X)=" "
: NEXT X
350 X=RND(9)
: LS$(X)="MAGIC SCROLL"
360 Y=RND(5)
: FOR X=1 TO 5
: IF X=Y THEN O$(X)=OD$(Y) ELSE O$(X)=" "
: NEXT X
370 Y=RND(9)
: IF Y<6 THEN GOTO 370
380 FOR X=6 TO 9
: IF X=Y THEN O$(X)=OD$(Y) ELSE O$(X)=" "
: NEXT X
390 Y=RND(8)
: FOR X=1 TO 8
: IF X=Y THEN WA$(X)=W$(Y) ELSE WA$(X)=" "
: NEXT X
400 Y=RND(9)
: WA$(Y)=W$(9)
410 PL=RND(9)
: DL=RND(9)
420 FS=FS+.6311
: SS=SS-(DF/7.5)
430 CLS
: PRINT "PRESENT LOCATION : "; AR$(PL); " ";
AN$(PL)
440 PRINT "POSSIBLE EXITS : "; A$(PL); " "; B$(PL); "
"; C$(PL); " " D$(PL)
450 PRINT "OBJECTS I CAN SEE : "; WA$(PL); " ";
O$(PL); " "; LS$(PL)
: IF WA$(PL)=" " AND O$(PL)=" " AND LS$(PL)=" "
THEN PRINT @148, "NOTHING"
: J=4
: GOSUB 1590
460 J=4
: GOSUB 1590
470 IF PL=DL THEN PRINT "THERE IS A MASSIVE DOOR ON
THIS WALL"
: J=7
: GOSUB 1590
480 IF SS<=3 THEN PRINT "YOU'RE GETTING WEAK! YOU
NEED SOME FOOD OR SOME REST!"
490 IF SS<1 GOTO 870
500 IF M$(PL)=" " THEN GOTO 510 ELSE PRINT "THERE IS A
"; M$(PL); " GLARING AT YOU!"
: GOTO 980
510 PRINT
: INPUT "COMMAND"; I$
520 IF LEFT$(I$, 3)="GET" OR LEFT$(I$, 3)="TAK" PRINT
"OK"
: J=3
: GOSUB 1590
: GOTO 880
530 IF LEFT$(I$, 3)="ATT" OR LEFT$(I$, 3)="KIL" OR
LEFT$(I$, 3)="HIT" OR LEFT$(I$, 3)="FIG" PRINT
"OK"
: J=3
: GOSUB 1590
540 IF M$(PL)<>" " AND I$="TALK" OR M$(PL)<>" " AND
I$="ASK" OR M$(PL)<>" " AND I$="SPEAK" OR
M$(PL)<>" " AND I$="SAY" THEN PRINT "THE ";
M$(PL); " GRUMBLES AT YOU."
: PRINT "I DON'T THINK HE LIKES YOU!"
: J=10
: GOSUB 1590
: GOTO 420
550 IF I$="TALK" OR I$="SPEAK" OR I$="SAY" OR
I$="ASK" THEN PRINT "THERE IS NO ONE HERE EXCEPT
YOU AND I."
: J=10
: GOSUB 1590
: GOTO 420
560 IF I$="READ" AND ST=1 THEN PRINT "ON THE MAGIC
SCROLL IS WRITTEN THE WORD "; PW$; ". "
: J=11
: GOSUB 1590
: GOTO 420
570 IF I$=PW$ OR RIGHT$(I$, 6)=PW$ THEN PRINT
"NOTHING HAPPENS."
: J=5
: GOSUB 1590
: GOTO 420
580 IF (I$="WAVE" OR I$="WAVE WAND") AND PL=DL AND
WT=1 THEN PRINT "THE MASSIVE DOOR SLOWLY SWINGS
OPEN!"
: J=10
: GOSUB 1590
: GOTO 1160
590 IF (I$="WAVE" OR I$="WAVE WAND") THEN PRINT
"NOTHING HAPPENS."
: J=3
: GOSUB 1590
: GOTO 420
600 IF LEFT$(I$, 3)="LOO" PRINT "OK"
: J=3
: GOSUB 1590
: GOTO 420
610 IF LEFT$(I$, 3)="STA" PRINT "OK"
: J=3
: GOSUB 1590
: GOTO 1140
620 IF LEFT$(I$, 3)="INV" PRINT "OK"
: J=3
: GOSUB 1590
: GOTO 1120
630 IF I$="N" AND PL=1 AND A$(1)="N" THEN PL=7
: GOTO 420
640 IF I$="N" AND PL=2 AND A$(2)="N" THEN PL=7
: GOTO 420
650 IF I$="N" AND PL=4 THEN PL=3
: GOTO 420
660 IF I$="N" AND PL=6 AND B$(1)="S" THEN PL=1
: GOTO 420
670 IF I$="N" AND PL=7 THEN PL=8
: GOTO 420
680 IF I$="N" AND PL=8 THEN PL=9
: GOTO 420
690 IF I$="S" AND PL=1 AND B$(1)="S" THEN PL=6
: GOTO 420

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700 IF I$="S" AND PL=2 AND B$(2)="S" THEN PL=6
   : GOTO 420
710 IF I$="S" AND PL=3 THEN PL=4
   : GOTO 420
720 IF I$="S" AND PL=6 AND A$(5)="N" THEN PL=5
   : GOTO 420
730 IF I$="S" AND PL=9 THEN PL=8
   : GOTO 420
740 IF I$="S" AND PL=8 THEN PL=7
   : GOTO 420
750 IF I$="S" AND PL=7 AND A$(1)="N" THEN PL=1
   : GOTO 420
760 IF I$="S" AND PL=7 AND A$(2)="N" THEN PL=2
   : GOTO 420
770 IF I$="E" AND PL=1 AND C$(1)="E" THEN PL=2
   : GOTO 420
780 IF I$="E" AND PL=2 THEN PL=3
   : GOTO 420
790 IF I$="E" AND PL=5 THEN PL=4
   : GOTO 420
800 IF I$="W" AND PL=2 AND D$(2)="W" THEN PL=1
   : GOTO 420
810 IF I$="W" AND PL=3 THEN PL=2
   : GOTO 420
820 IF I$="W" AND PL=4 THEN PL=5
   : GOTO 420
830 IF I$="N" AND PL=6 AND B$(2)="S" THEN PL=2
   : GOTO 420
840 IF I$="N" AND PL=5 AND A$(5)="N" THEN PL=6
   : GOTO 420
850 IF I$="N" OR I$="S" OR I$="E" OR I$="W" THEN
   PRINT "THERE IS NO EXIT IN THAT DIRECTION!"
   : J=10
   : SS=SS-.5
   : GOSUB 1590
860 PRINT "DON'T BE RIDICULOUS!"
   : J=5
   : GOSUB 1590
870 IF RND(10)<8 THEN PRINT "YOU FOOL!"
   : PRINT "YOU HAVE JUST STUMBLERD INTO A PIT OF
   SUCKER WORMS!"
   : PRINT "ARRRRGGHHHHH!!!"
   : J=11
   : GOSUB 1590
   : GOTO 1670
   : ELSE GOTO 420
880 IF O$(PL)="" AND WA$(PL)="" AND LS$(PL)="" THEN
   PRINT "THERE IS NOTHING HERE TO GET!"
   : J=8
   : GOSUB 1590 ELSE PRINT "YOU NOW HAVE THE ";
   O$(PL); " "; WA$(PL); " "; LS$(PL)
   : J=7
   : GOSUB 1590
   : IN$=IN$+" "+O$(PL)+" "+WA$(PL)+" "+LS$(PL)
890 IF WA$(PL)<>"" THEN GOSUB 1150
900 IF WA$(PL)=W$(9) THEN WT=1
910 IF O$(PL)=OD$(5) OR O$(PL)=OD$(6) THEN SS=SS+3
920 IF O$(PL)<>"" THEN SC=SC+5
930 IF LS$(PL)<>"" THEN ST=1
940 O$(PL)=""
   : LS$(PL)=""
950 IF WA$(PL)=W$(1) OR WA$(PL)=W$(2) OR
   WA$(PL)=W$(3) OR WA$(PL)=W$(4 ) THEN FS=FS+3
960 FS=FS+1
970 WA$(PL)=""
   : GOTO 420
980 IF RND(5)<3 THEN PRINT "HE LOOKS ANGRY!"
   : J=6
   : GOSUB 1590
990 IF RND(5)=1 THEN PRINT
   : PRINT "THE "; M$(PL); " THROWS A ROCK AT YOU!"
   : J=10
   : GOSUB 1590
1000 GOTO 510
1010 IF M$(PL)="" THEN PRINT "THERE IS NO ONE HERE
   EXCEPT YOU AND I,                AND I CAN'T FIGHT
   WITH YOU!"
   : J=28
   : GOSUB 1590
   : GOTO 420
1020 FOR X=1 TO 6
1030 MS(X)=RND(16)+DF
   : IF MS(X)<10 GOTO 1030
1040 NEXT X
1050 IF FS>MS(PL) PRINT "YOU HAVE KILLED THE ";
   M$(PL); "!!!"
   : J=10
   : GOSUB 1590
   : M$(PL)=""
   : FS=FS+(1/1.3*DF)
   : GOT 0420
1060 IF FS=MS(PL) OR FS>=(MS(PL)-1) PRINT "YOU HIT
   THE "; M$(PL); "!!!"
   : PRINT "BUT HE'S NOT DEAD YET!"
   : FS=FS+(1/1.3*DF)
   : J=8
   : GOSUB 1590
   : GOTO 420
1070 IF FS<(MS(PL)-1) THEN PRINT "YOU SWING AT THE ";
   M$(PL); " BUT YOU MISS!"
   : PRINT "THE "; M$(PL); " SWINGS AT YOU!"
   : J=8
   : GOSUB 1590
1080 Y=RND(10)
   : IF Y>=5 AND FS<(MS(PL)-1) THEN PRINT "AND HE
   HITS YOU!!!"
   : J=4
   : GOSUB 1590
   : FS=FS-2
1090 IF Y<5 AND FS<(MS(PL)-1) THEN PRINT "BUT HE
   MISSES!"
   : J=4
   : GOSUB 1590
1100 IF Y>=8 AND FS<(MS(PL)-1) THEN PRINT "YOU ARE
   DEAD!!!"
   : FS=FS-10
   : J=4
   : GOSUB 1590
   : GOTO 1670
1110 GOTO 420
1120 IF IN$="" THEN PRINT "YOU AREN'T CARRYING
   ANYTHING RIGHT NOW."
   : J=10
   : GOSUB 1590
   : GOTO 420
1130 PRINT "YOU ARE CURRENTLY HOLDING "; IN$
   : J=10
   : GOSUB 1590
   : GOTO 420
1140 CLS
   : PRINT "* * * CURRENT STATUS * * *"
   : PRINT "FIGHTING STRENGTH : "; FS
   : PRINT "SURVIVAL STRENGTH : "; SS
   : J=15
   : GOSUB 1590
   : GOTO 420
1150 WL$=WA$(PL)
   : RETURN
1160 PRINT "WELL! I THINK WE MADE IT!"
   : J=5
   : GOSUB 1590
   : C=0
1170 CLS
   : PRINT "THIS IS THE TUNNEL LEADING OUT OF THE
   DUNGEON AND INTO THE FOREST."
   : J=10
   : GOSUB 1590
1180 CH=RND(10)
   : IF CH>3 GOTO 1200
1190 IF CH>1 GOTO 1350 ELSE GOTO 1490
1200 CLS
   : PRINT "UH OH! THERE'S A GIANT

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SUCKER WORM BLOCKING THE WAY!"
: J=8
: GOSUB 1590
: PRINT
: INPUT "COMMAND"; I$
1210 IF I$="HIT" OR I$="KILL" OR I$="ATTACK" OR
I$="FIGHT" THEN PRINT "YOU SWING AT THE GIANT
SUCKER WORM!"
: PRINT "BUT HE'S JUST TOO BIG!"
: C=C+1
: J=10
: GOSUB 1590
: IF C<3 GOTO 1200
1220 IF C=3 THEN PRINT "I THINK HE JUST LAUGHED AT
YOU!"
: J=9
: GOSUB 1590
: GOTO 1200
1230 IF C=4 THEN PRINT "I TOLD YOU HE IS JUST TOO
BIG!"
: PRINT "THE GIANT SUCKER WORM HAS YOU BY THE
WAIST!"
: J=9
: GOSUB 1590
: GOTO 1670
1240 IF I$="N" OR I$="S" OR I$="W" OR I$="E" THEN
PRINT "THERE IS NO EXIT IN THAT DIRECTION.
BESIDES, THERE'S NO TURNING BACK NOW!"
: J=6
: GOSUB 1590
: GOTO 1200
1250 IF I$="LOOK" GOTO 1200
1260 IF I$="WAVE" OR I$="WAVE WAND" THEN PRINT
"NOTHING HAPPENS"
: J=4
: GOSUB 1590
: GOTO 1200
1270 IF LEFT$(I$, 3)="INV" AND IN$=" " OR LEFT$(I$,
3)="INV" AND IN$=" " OR LEFT$(I$, 3)="INV" AND
IN$=" " OR LEFT$(I$, 3)="INV" AND IN$=" "
THEN PRINT "YOU ARE NOT CARRYING ANYTHING RIGHT
NOW."
: J=10
: GOSUB 1590
: GOTO 1200
1280 IF LEFT$(I$, 3)="INV" THEN PRINT "YOU ARE
CURRENTLY HOLDING "; IN$
: J=10
: GOSUB 1590
: GOTO 1200
1290 IF I$="STATUS" OR I$="STA" THEN CLS
: PRINT "* * * CURRENT STATUS * * *"
: PRINT "CURRENT LOCATION : EXIT TUNNEL"
: PRINT "FIGHTING STRENGTH : "; FS
: PRINT "SURVIVAL STRENGTH : "; SS
: J=15
: GOSUB 1590
: GOTO 1200
1300 IF I$="SAY" OR I$="TALK" OR I$="SPEAK" THEN
PRINT "WHAT CAN YOU SAY TO A 230 FOOT WORM?"
: J=10
: GOSUB 1590
: GOTO 1200
1310 IF I$="READ" AND ST=0 THEN PRINT "THERE IS
NOTHING HERE TO READ"
: J=5
: GOSUB 1590
: GOTO 1200
1320 IF I$="READ" AND ST=1 THEN PRINT "ON THE MAGIC
SCROLL IS PRINTED THE WORD "; PW$; "'."
: J=11
: GOSUB 1590
: GOTO 1200
1330 IF I$=PW$ OR RIGHT$(I$, 6) PW$ THEN PRINT "THE
SPELL HAS WORKED!"
: PRINT "THE SUCKER WORM HAS VANISHED!!"
: J=10
: GOSUB 1590
: GOTO 1660
1340 PRINT "I DON'T UNDERSTAND YOU."
: J=9
: GOSUB 1590
: GOTO 1200
1350 CLS
: PRINT "THE PASSAGEWAY HAS BECOME A DEAD-END."
: J=5
: GOSUB 1590
: GOTO 1360
1360 CLS
: PRINT "THE ENTIRE WALL HERE
IS A LARGE MIRROR."
: J=10
: GOSUB 1590
: PRINT
: INPUT "COMMAND"; I$
1370 IF I$="WAVE" OR I$="WAVE WAND" THEN PRINT
"NOTHING HAPPENS"
: J=3
: GOSUB 1590
: GOTO 1360
1380 IF I$="N" OR I$="S" OR I$="E" OR I$="W" THEN
PRINT "THERE IS NO TURNING BACK NOW!
GET US OUT OF HERE!"
: J=8
: GOSUB 1590
: GOTO 1360
1390 IF I$="HIT" OR I$="ATTACK" OR I$="TOUCH" OR
I$="OPEN" THEN PRINT "THAT DOESN'T SEEM TO DO
ANY GOOD."
: J=5
: GOSUB 1590
: GOTO 1360
1400 IF LEFT$(I$, 3)="INV" THEN PRINT "YOU ARE
CURRENTLY CARRYING "; IN$
: J=10
: GOSUB 1590
: GOTO 1360
1410 IF LEFT$(I$, 3)="STA" THEN CLS
: PRINT "* * * CURRENT STATUS * * *"
: PRINT "CURRENT LOCATION : EXIT TUNNEL"
: PRINT "FIGHTING STRENGTH : "; FS
: PRINT "SURVIVAL STRENGTH : "; SS
: J=15
: GOSUB 1590
: GOTO 1360
1420 IF I$="SAY" OR I$="SPEAK" OR I$="TALK" THEN
PRINT "WHAT WOULD YOU LIKE TO SAY?"
: J=6
: GOSUB 1590
: GOTO 1360
1430 IF RIGHT$(I$, 6)=PW$ THEN PRINT "THE MIRROR
SHIMMERS SLIGHTLY . . . BUT
NOTHING HAPPENS . . ."
: J=12
: GOSUB 1590
: GOTO 1360
1440 IF (I$="READ" OR I$="SCROLL") AND ST=1 THEN
PRINT "ON THE MAGIC SCROLL IS WRITTEN THE WORD
"; PW$; "'."
: J=10
: GOSUB 1590
: GOTO 1360
1450 PR$=MID$(PW$, 6, 1)+MID$(PW$, 5, 1)+MID$(PW$, 4,
1)+MID$(PW$, 3, 1)+MID$(PW$, 2, 1)+MID$(PW$, 1,
1)
1460 IF I$=PR$ THEN PRINT "THE MIRROR SHIMMERS, THEN
DISAPPEARS! LOOK . . . THERE IS
THE FOREST!"
: J=12
: GOSUB 1590
: GOTO 1660
1470 IF I$="LOOK" THEN PRINT "OK"

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: J=3
: GOSUB 1590
: GOTO 1360
1480 PRINT "I DON'T UNDERSTAND YOU."
: J=5
: GOSUB 1590
: GOTO 1360
1490 CLS
: PRINT "UH OH . . . UH OH . . ."
: PRINT "AN ABYSS YAWNS BEFORE US . . . BEFORE
US . . ."
: PRINT "THIS IS THE DREADED CHAMBER
OF ECHOES . . . OF ECHOES . . ."
: J=18
: GOSUB 1590
: PRINT
: INPUT "COMMAND"; I$
1500 IF I$="N" OR I$="S" OR I$="E" OR I$="W" PRINT
"THERE IS NO WAY TO GO IN THAT DIRECTION . . .
DIRECTION . . ."
: PRINT "BESIDES, THERE'S NO TURNING BACK NOW .
. .
BACK NOW . . ."
: J=16
: GOSUB 1590
: GOTO 1490
1510 IF I$="HIT" OR I$="ATTACK" OR I$="KILL" PRINT
"THERE IS NO ONE HERE BUT ME . . . HERE BUT ME .
. ."
: PRINT "AND I CAN'T FIGHT WITH YOU . . . FIGHT
WITH YOU"
: J=14
: GOSUB 1590
: GOTO 1490
1520 IF I$="SAY" OR I$="SPEAK" OR I$="TALK" PRINT
"WHAT WOULD YOU LIKE TO SAY . . . LIKE TO SAY .
. .?"
: J=10
: GOSUB 1590
: GOTO 1490
1530 IF I$="PW$ PRINT "THE GROUND BENEATH US RUMBLES .
. . RUMBLES . . ."
: PRINT "BUT NOTHING ELSE HAPPENS . . . ELSE
HAPPENS . . ."
: J=16
: GOSUB 1590
: GOTO 1490
1540 IF LEFT$(I$, 6)=PW$ AND RIGHT$(I$, 6)=PW$ PRINT
"LOOK!"
: PRINT "THE ABYSS HAS CLOSED . . . HAS CLOSED .
. ."
: PRINT "AND A DOORWAY OUT OF THE DUNGEON AND
INTO THE FOREST HAS APPEARED . . .
HAS APPEARED . . ."
: J=18
: GOSUB 1590
: GOTO 1660
1550 IF I$="LOOK" OR I$="SEARCH" PRINT "OK"
: J=3
: GOSUB 1590
: GOTO 1490
1560 IF I$="WAVE" PRINT "NOTHING HAPPENS"
: J=5
: GOSUB 1590
: GOTO 1490
1570 IF (LEFT$(I$, 4)="READ" OR I$="SCROLL") AND ST=1
PRINT "THE WORD "; PW$; " IS PRINTED ON THE
SCROLL . . . ON THE SCROLL . . ."
: J=15
: GOSUB 1590
: GOTO 1490
1580 PRINT "I DON'T UNDERSTAND YOU . . . YOU . . ."
: J=9
: GOSUB 1590
: GOTO 1490
1590 POKE 15410, 158
: POKE 15411, 143
: POKE 15412, 191
: POKE 15413, 191
: POKE 15414, 191
: POKE 15415, 159
: POKE 15416, 143
: POKE 15417, 148
1600 POKE 15474, 131
: POKE 15475, 175
: POKE 15476, 191
: POKE 15477, 177
: POKE 15478, 187
: POKE 15479, 191
: POKE 15480, 135
: POKE 15481, 129
1610 POKE 15539, 137
: POKE 15540, 140
: POKE 15541, 140
: POKE 15542, 140
: POKE 15543, 140
: POKE 15544, 129
1620 FOR A=1 TO RND(100)
: NEXT A
1630 IF J<=0 THEN RETURN
1640 POKE 15539, 169
: POKE 15540, 176
: POKE 15541, 176
: POKE 15542, 176
: POKE 15543, 184
: POKE 15544, 129
1650 FOR A=1 TO RND(50)
: NEXT A
: J=J-1
: GOTO 1610
1660 CLS
: PRINT "YOU DID IT!!"
: PRINT "WE'VE ESCAPED!!"
: J=11
: GOSUB 1590
: PRINT "YOU TAKE WITH YOU : "
: PRINT
: PRINT IN$
: PRINT "AND ME, OF COURSE!"
: PRINT "FINAL SCORE ="; (SC+FS+SS)*DF
: END
1670 CLS
: PRINT "WE'RE DONE FOR!"
: PRINT "NOW WE ARE BOTH DOOMED
TO STAY IN THIS HELL-HOLE FOREVER!"
1680 J=15
: GOSUB 1590
: POKE 15730, 158
: POKE 15731, 143
: POKE 15732, 191
: POKE 15733, 191
: POKE 15734, 191
: POKE 15735, 159
: POKE 15736, 143
: POKE 15737, 148
1690 POKE 15794, 131
: POKE 15795, 175
: POKE 15796, 191
: POKE 15797, 177
: POKE 15798, 187
: POKE 15799, 191
: POKE 15800, 135
: POKE 15801, 129
1700 POKE 15859, 137
: POKE 15860, 140
: POKE 15861, 140
: POKE 15861, 140
: POKE 15862, 140
: POKE 15863, 140
: POKE 15864, 129
: FOR A=1 TO RND(100)
: NEXT A
: IF A=0 THEN END

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Illustrated Machine Language Programming

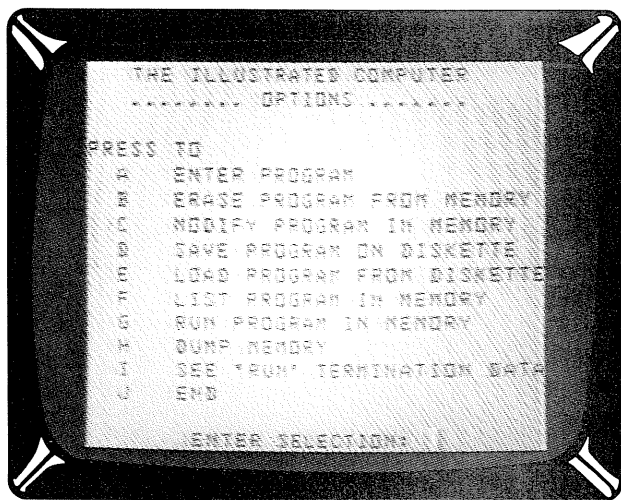
Secondary and college students will be able to learn fundamentals of machine language programming using Radio Shack's new Illustrated Computer package for the TRS-80 32K Color Computer disk system with Disk Extended Color BASIC.

The computer program illustrates a simplified computer which students program using a simplified machine language. This simplified "Illustrated Computer" has representations of the major components of a real computer: a memory, an accumulator, an instruction address register, an input unit, an output unit, and a control unit. Students give input to the Illustrated Computer by typing on the Color Computer keyboard. Output is shown on an illustrated output unit, displayed on the Color Computer screen. (If you have a line printer attached to the Color Computer, output can also be printed. This use of a printer is optional, for teachers who want their students to hand in program listings, memory dumps, and program output for grading.)

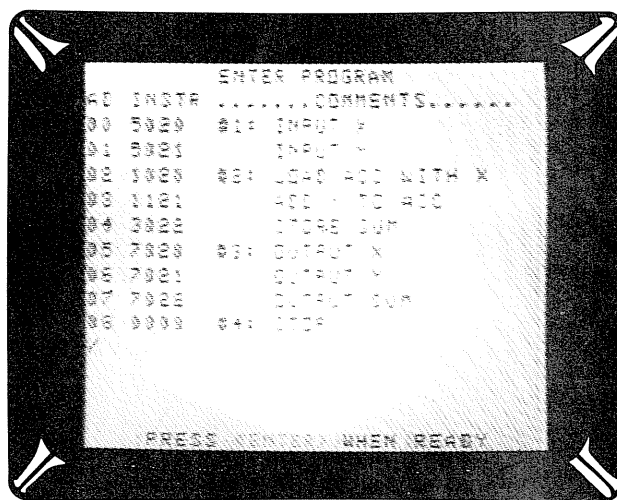
Seven chapters of tutorial text and exercises in the user's manual provide all the information needed to program the Illustrated Computer. Fourteen instructions are available; these allow students to gain hands-on practice with typical machine language operations: LOAD and STORE, arithmetic, INPUT and OUTPUT, shifting, and branching. An important feature of the Illustrated Computer is that it uses a base-ten (decimal) number system. Students can concentrate on programming concepts without having to work with binary, octal, or hexadecimal number systems.

USING THE PROGRAM

Once you (or a student) has loaded the courseware program into the Color Computer, a list of options appears on the screen:



You begin by entering a program (written in the Illustrated Computer's machine language) into the Illustrated Computer's "memory." Option [A] lets you "ENTER PROGRAM." The program on the screen below contains a series of instructions to add two numbers. The program accepts each number as input, displays each number and the sum as output, and finally ends. This is just one example of an almost infinite number of different student programs that may be written using the Illustrated Computer's set of instructions.

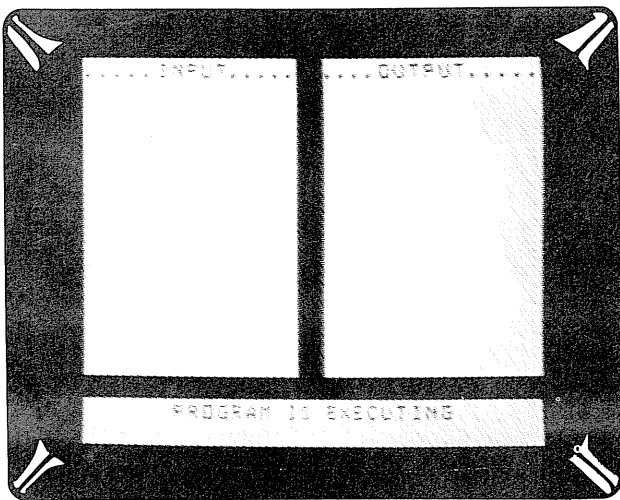


Notice that each line of the program has three parts: an address, an instruction, and a comment. The "address" is the memory location where the instruction is stored while in the Illustrated Computer's memory. The "instruction" consists of two pairs of numbers—generally an instruction and an address. For example, 5020 in the first line of this program first tells the Illustrated Computer to accept input ("50" is the instruction for "input"), and then gives the memory location where the input should be stored (at address "20" in the Illustrated Computer's memory).

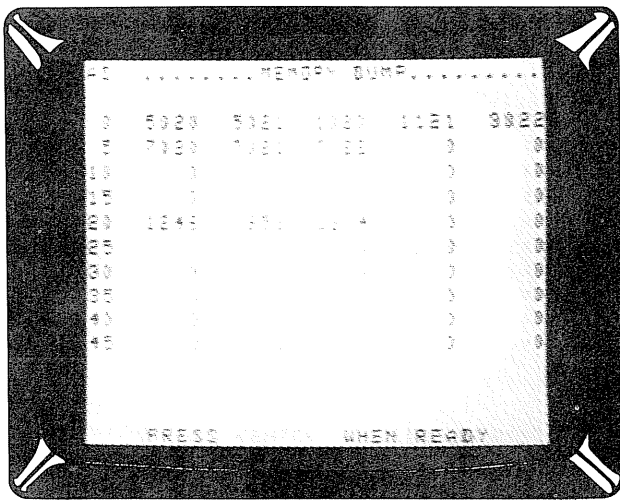
To encourage the development of good documentation habits, the Illustrated Computer requires a "comment" for each program line.

Once the program is in the Illustrated Computer's memory, you can return to the options list and select option [G] to "RUN PROGRAM IN MEMORY." A screen display appears, asking you to select video output only or video and printer output. When you respond, the Illustrated Computer's input and output units appear on the screen. The flashing cursor on

the input unit indicates that the Illustrated Computer is ready to accept the first of the two numbers to be added.



As an example, let's suppose that you enter 1246 for the first number. 1246 is displayed on the screen as input, and the cursor moves to the next line. Next, you enter the number 958. In a second, three numbers are displayed on the output unit: 1246, 958, and the sum 2204. The box with status information at the bottom of the screen tells you that the program has ended because a "STOP" instruction was encountered in the program.

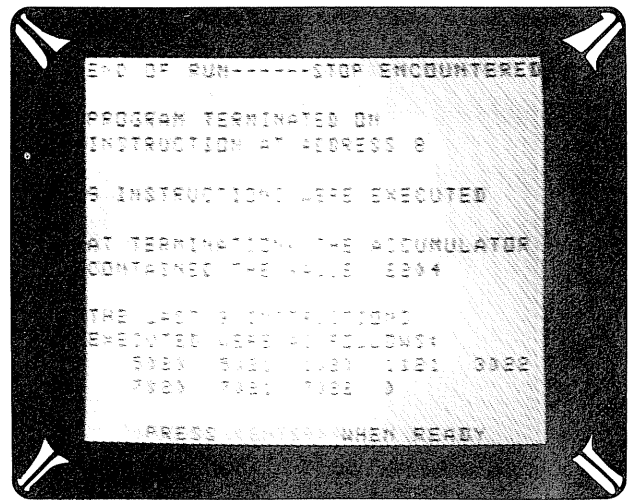


If you press **ENTER** at this point, the options list will reappear.

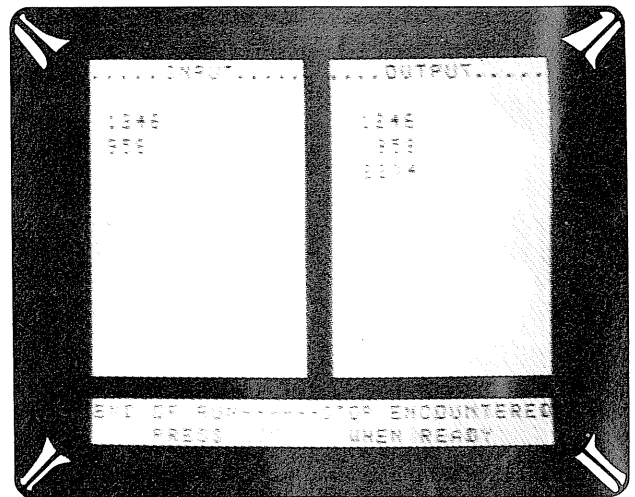
You can use option [C] to make changes in the student program, or use option [F] to list the program on the screen or on the line printer.

Option [D] lets you save a student program on diskette for future use. Option [B] erases the student program from memory so that a new program can be entered (using option [A]) or so that a previously saved student program can be loaded into the computer from diskette (using option [E]).

Since the program has been run, option [I] is available. This option displays the sequence of the last instructions executed and gives more information on the ending status of the program.



Option [H] displays all 100 of the Illustrated Computer's memory locations, 50 locations at a time. If a student program is in memory when option [H] is selected, the program instructions and any input or output will be shown in their memory locations.



The Illustrated Computer is a versatile classroom tool for introducing students to machine language programming concepts. Once the student has learned the basics of working with the Illustrated Computer, the task of transferring the knowledge for use with any computer architecture should be relatively easy.

The Illustrated Computer (Cat. No. 26-2670) will be available soon through your local Radio Shack store or Computer Center. Or contact your local Radio Shack Regional Educational Coordinator. The Radio Shack Education Division has a nationwide network of 25 Regional Educational Coordinators ready to help schools and districts meet their educational computing needs. A complete list of these coordinators, their phone numbers, and their addresses, is published every few months in the education pages of the *TRS-80 Microcomputer News*.

New Tool For Midwestern Farmers

by Thomas D. Deffke

Several Midwest corn and soybean farmers have discovered a new tool to conserve a scarce and valuable commodity—time.

The new tool is AgriStar, a dial-up electronic agricultural business information network.

Farmers who use AgriStar rate market reports, marketing recommendations, and local weather information as the most important information received from the AgriStar service.

They value AgriStar for its ability to put all of this information at their fingertips. They only receive what they need, when they need it. No need to camp out next to the radio or television to get the information necessary to make sound marketing judgments.

USE OF TIMELY INFORMATION DETERMINES PROFIT

Receiving timely information and reacting properly can make the difference between a profit and loss. Take the example of a 700-acre Iowa corn farmer. In 1981, he could have sold his crop—with average yields—in a range from \$217,000 to \$285,600. In Iowa, it cost him about \$252,000 to produce the crop. So, his net could have been a serious loss of \$35,000 or a profit of \$33,600 . . . or anything in between.

How would an Iowa corn and soybean farmer use AgriStar?

Let's look back to July of 1983. The Midwest was in the middle of a heat wave with less than adequate precipitation. The markets on the Chicago Board of Trade were extremely bullish—prices were rising rapidly.

By accessing corn and soybean reports from the Chicago Board of Trade, that Iowa farmer can view the daily price trends. These reports are revised every 10 minutes while the market is open. By typing: "Run CNS7 CNS9", price reports were displayed immediately on AgriStar.

For example:

| CORN FUTURES PRICES | | CNS7 | | |
|---------------------|---------|---------|---------|----------|
| 07/22/83 12:45 p.m. | | | | |
| | High | Low | Last | Change |
| SEP | 327 1/2 | 321 1/2 | 325 1/2 | up 4 |
| DEC | 330 3/4 | 325 1/4 | 330 3/4 | up 8 1/4 |
| MAR | 340 | 335 | 340 | up 7 1/2 |
| MAY | 346 | 342 | 346 | up 7 1/4 |
| JLY | 348 | 343 3/4 | 348 | up 7 3/4 |
| SEP | 337 | 331 | 334 1/2 | up 2 |

| GBT SOYBEANS FUTURES PRICES | | CNS9 | | |
|-----------------------------|---------|---------|---------|-----------|
| 07/22/83 12:45 p.m. | | | | |
| | High | Low | Last | Change |
| AUG | 717 | 706 | 717 | up 16 1/2 |
| SEP | 727 | 715 1/2 | 727 | up 17 1/2 |
| NOV | 744 1/2 | 733 | 744 1/2 | up 16 |
| JAN | 759 1/2 | 747 1/2 | 759 1/2 | up 16 |
| MAR | 774 | 762 | 773 | up 15 3/4 |
| MAY | 782 | 772 | 782 | up 15 |

| | | | | |
|-----|-----|-----|-----|-------|
| JLY | 792 | 779 | 788 | up 13 |
| AUG | 780 | 774 | 780 | up 15 |

ADVISORY SERVICES ASSIST MARKETING EFFORTS

Once that farmer has determined which direction prices are headed, he must determine how to market his crops. AgriStar provides marketing recommendations from advisory services such as Top Farmer and Doane's. Here are examples of the report he would have received last July.

TOP FARMER CORN STRATEGY TFS7
07/22/83 04:08 p.m.

Corn prices again made near limit gains.

Chart Guide: Friday's rally showed that Thursday's choppy trading was not a reversal or sign of a tip. But prices remain very overbought with the relative strength index well over 80 (70 is considered overbought). Considering this along with all of the exhaustion gaps the charts are almost predicting rain. But until a reversal occurs the situation remains bullish. Downward correction objectives fall at each of the bullish gaps left by the rally. A 50% correction would move the December contract to \$3.00.

Outlook: We are maintaining a bullish outlook near-term for both old and new crop. However, prices are very overbought and free stocks are not nearly so tight, now that the trigger has been hit. Stocks will increase to over a billion bushels if the \$3.25 1982 trigger is hit. So the 1984 crop supply/demand picture shows large carry over and adequate, if not burdensome, free stocks. Unless the weather situation continues very dry for several weeks, we feel that the December futures will fall to the mid-\$2.00 area. So do not fight the uptrend by turning bearish too early but remain aware of the bearish potential.

Strategy: Because it is dangerous to fight a bullish weather market by selling futures too early, and since bearish reversals have not yet occurred, it is best to wait to advance sales. We recommend that all producers delay making sales in either futures or cash markets unless you have a large percentage of your crops unpriced and are heavily leveraged. Remember that prices are at profitable levels, so it is a good time to have at least part of your crop sold. Forward contract and pure hedge pricing should be 60% and up to 80% complete for all crop to be sold at harvest. Old crop is 70% to 100% priced.

TOP FARMER SOYBEAN STRATEGY TFS8
07/22/83 04:08 P.M.

Soybeans made strong rallies and closed higher but prices closed off the highs as profit taking took place ahead of the weekend. Dry weather remains the major bullish factor.

Chart Guide: The soybean situation remains very bullish as price gains continue. But the many gaps and a relative strength index over 80 (above 70 is considered overbought) indicates that prices are

extremely overbought. So we have to feel that prices are in an exhaustion phase.

Outlook: We feel that the current rally is very overdone in anticipation of continued dry weather, rather than on current crop conditions. It is likely that rains will occur before the corn crop is significantly affected and before beans enter the critical flowering stage. So the odds are the rally will quickly end and prices typically fall faster than they rally.

Strategy: Wait for further rallies and/or bearish signals before selectively hedging new crop and advancing forward contract and pure hedge pricing for new crop. Also, wait for bearish signals to complete pricing of old crop.

WEATHER REPORTS TOO

Price and marketing information are invaluable to the corn and soybean farmer. But, another key service of AgriStar is weather reports.

Weather reports and forecasts are available for local counties, major cities, and even foreign countries. The Iowa farmer, for example, can obtain local reports on growing degree days, precipitation, and two-day weather forecasts.

These weather services can help determine planting, harvesting, and tilling schedules.

AGRICULTURAL NEWS STORIES

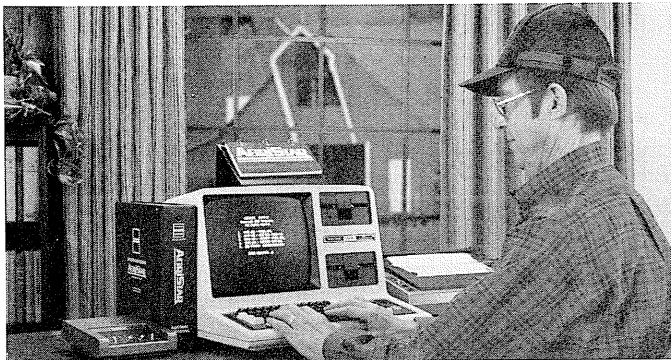
But several factors besides weather can influence prices. News stories which impact on prices are also available on AgriStar. Samples of market impacting news items include: USDA Reports, government trade talks and other announcements.

World-wide agricultural news stories are currently gathered and updated throughout the day by these three sources: AgriData News Service (ANS), Commodity News Service (CNS), and Des Moines Register. Other wire services are being added.

To obtain news on specific subjects, the user only needs to enter keywords. For example, the Iowa farmer could punch the following keywords, "SNEWS.IOWA". He would then be shown a menu of stories that he can choose from. By entering the appropriate code number, he could then review stories of major interest to him.

AgriStar is available at Radio Shack Computer Stores. Interested farmers may stop by their local Radio Shack Computer Center for a free demonstration.

AgriStar, besides being useful to the farmer, serves many important needs of other agribusinesses such as grain elevators, ag banks, ag economists, equipment, chemical and seed dealers, and many others.



PC-2 Diagnostic Tests

The following diagnostic tests are included in this issue for use in checking out the PC-2. Next month we'll continue with the PC-2 Assembly Language Series.

16K SYSTEM ROM CHECKSUM

This test will take approximately fifteen minutes to run. If you are not using a printer, change the LPRINT statements to PRINT.

```
10 C=0
20 A=&C000
30 B=PEEK A
40 C=C+B
50 IF A=&FFFF THEN 80
60 A=A+1
70 GOTO 30
80 IF C=2011609 THEN 110
90 LPRINT "CHECKSUM BAD"
100 END
110 LPRINT "CHECKSUM GOOD"
120 END
```

8K PRINTER ROM CHECKSUM

This test will take approximately nine minutes to run and can only be done if you are using a printer.

```
10 C=0
20 A=&A000
30 B=PEEK A
40 C=C+B
50 IF A=&BFFF THEN 80
60 A=A+1
70 GOTO 30
80 IF C=1020020 THEN 110
90 LPRINT "CHECKSUM BAD"
100 END
110 LPRINT "CHECKSUM GOOD"
120 END
```

2K USER RAM TEST (STANDARD)

This test will take approximately two minutes to run. If you are not using a printer, change the LPRINT statements to PRINT.

```
10 C=0
20 A=&4000
30 POKE A,90
40 B=PEEK A
50 IF B=90 THEN 70
60 C=C+1
70 IF A=&40C3 THEN 100
80 A=A+1
90 GOTO 30
100 A=&41BD
110 POKE A,165
120 B=PEEK A
130 IF B=165 THEN 150
140 C=C+1
150 IF A=&47FF THEN 180
160 A=A+1
170 GOTO 110
180 IF C=0 THEN LPRINT "USER RAM GOOD"
190 IF C>0 THEN LPRINT "USER RAM BAD"
200 END
```

TEST FOR STRING FIXED MEMORIES

This test will take approximately one minute to run. If you are not using a printer, change the LPRINT statements to PRINT.

(Continued on page 32)

Communications Corner

by Al and Dru Simon

Hello, and welcome back to our corner. Since we've gotten so many comments and letters having to do with Bulletin Boards we've decided to devote another column to some of the most frequently asked questions we've received about this fascinating communications medium.

If you've never yet called one, (this seems almost impossible these days!) let's review for a moment what Bulletin Board Services (or BBS as they're often called) are and their most common functions and options.

A BBS is usually operated by an individual microcomputer owner and is a small system which has been created for public access via computer terminal. It generally consists of a large number of programs which perform various functions such as MESSAGE CREATION, DOWNLOADING and UPLOADING, GAME-PLAYING, and the like.

The "heart" of each BBS is called the HOST program. This is a program which will allow the BBS computer to accept operating commands from a terminal at a remote location through use of a MODEM. (See the article about MODEMS in the August issue of *Microcomputer News*). When you enter a command option such as (M) for MESSAGES to the BBS you have called, what you are doing is telling the HOST program to call up the particular program that OPERATES the Message section of that bulletin board.

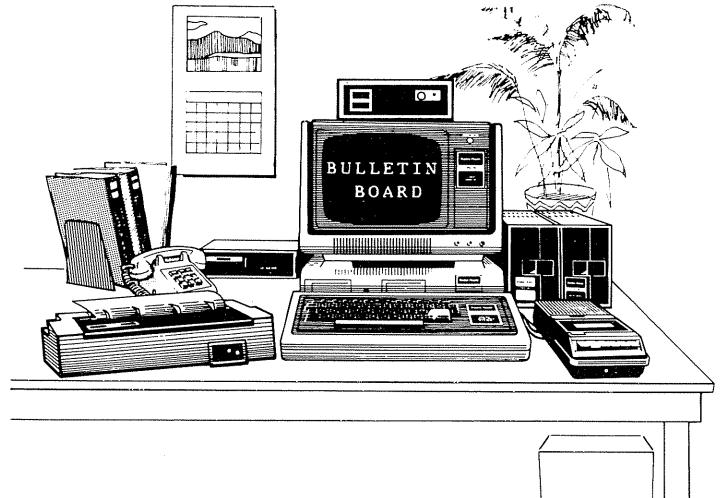
The internal workings of Bulletin Boards consist of several OPERATING programs. These are basically the "cogs and wheels" of the system, allowing your commands (called "remote input") to cause programs to be put into motion and tying together each program with the HOST program. Each Bulletin Board network accomplishes this "tying together" in a different way, but essentially all the systems function in the same basic manner.

Other programs within a BBS can be data files, which might be programs for downloading, lists of other BBS numbers, lists of people who have called that board, and so forth. They might be adventure games which the caller can play while online, sales catalogues, general interest bulletins, or any kind of data which the particular system operator decides to include in his/her service.

Well, all that seems to be quite a lot of programs to stuff into one little microcomputer! How much space does all this take up? That depends entirely on the intent of the system operator (also called sysop (pronounced SIS-op)). Some run their boards using one or two 40 track disk drives, and some use multi-megabyte hard drives for storage! The memory capabilities of a board depend entirely on the whim (and pocketbook!) of the person running it. It can be as small or as large as the sysop desires.

Many people seem to have an interesting picture in their minds of what a BBS setup looks like. Some think of a huge

room full of whirring, clacking machinery, and others of an ominous "Demon Seed" sort of setup.



Essentially, what makes up a bulletin board system is the computer (of course), disk drives, and a printer on which is stored various information about each caller. The information which each BBS stores on paper (called HARD COPY) also depends on the sysop. (You'll find that almost every aspect of every BBS depends on what each particular sysop wishes to do). Some keep records only of the names of each caller, some keep caller addresses for mailing list purposes, and so on.

DRUCOM keeps hard copy not only of each caller and the time of his/her call, but of each activity the caller indulges in, and the duration of the visit. In this way, we can monitor the interest each section of our board holds and thus can eliminate any section which is not used. We also keep records of any messages which are left and who left them, in case we come across some kind of problem in reference to any particular message. We also keep record of the caller number and highest message number in our system, as a protection against system failure and resultant loss of messages.

Just for interest's sake, we have duplicated a sample section of our hard copy log, although we have "borrowed" the name of the caller.

```
R.S. Tandy Fort Worth Tx. Clr#34698 Msg#2608
I am in Videotex using the 64 character mode
I entered Arcade at 08/08/83 10:45:22
I played Cia/Gam at 08/08/83 10:45:30
I Paged you at 08/08/83 10:57:02
I answered R.S. Tandy's page
I entered FXFER at 08/08/83 11:07:30
I entered Color Computer download at 08/08/83 11:07:40
I Standard Downloaded Direccc/ccc: Time 1 Minute 23 Seconds
I Standard Downloaded Dskscrtcc/ccc: Time 2 Minutes 4 Seconds
I entered Messages at 08/08/83 11:12:01
2608 INFO PLEASE To: DRU SIMON (Private Message)
Online 0 Hours 42 minutes 19 seconds, off at 11:22 Am.
```


The first line of the log entry is the caller's name, city, and state, plus the number that the next message to be left will be assigned, and lastly, what number caller his is. (In the two plus years that DRUCOM has been online, we have received close to 35,000 calls!). The next lines indicated that he has called using Videotex in the 64 character mode. We are then informed that the caller entered the game-playing section of the board and used a file called "Cia/Gam." This tells us that he played a certain game in that section, and the hour he began to play. Most boards limit the time that games may be played, for it is far too easy for a player to lose track of time while on a BBS!

Next, we're told that the caller paged the sysop, and that I answered his call. We obviously chatted for a few moments, and then he went to the File Transfer section. It is noted by the Filename assigned to it in the operating system, which in the case of DRUCOM is called FXFER. He then entered the Color Computer download section and took two public access programs, both of which are named, so that we can tell which programs are generating interest and remove those that are not.

Next we can see that the caller entered the message section of the board and left a private message to Dru Simon with the title of "INFO PLEASE." As indicated on the top line, that message was assigned the number 2608. The message number on the first line of the next caller's log would of course be 2609.

Lastly, we see that this caller logged off the board after visiting for 42 minutes and 19 seconds, showing us the time of his departure. In this manner we can closely follow the activity of our BBS and keep abreast of our callers' wishes and needs. Different sysops will keep different records of each caller, depending on what that sysop feels is most valuable to his particular BBS. We keep our hard copy log for future reference and also keep hard copy of the messages left in each of our message bases, in case anyone needs to see them for some reason.

Now, you know basically what a BBS consists of and a little bit about its inner workings. Let's talk about some of the questions we've received about how you operate one once you've connected your terminal to it.

HOW DO I LOG ONTO A BOARD?

Most boards require you to identify yourself in some manner. Some ask for your name; some establish specific account numbers with you, by which you are recognized as yourself; and others carry "Logon codes." These are codes which can be set up any way the sysop likes, and are kept in a separate file on disk. They are much like account numbers, and can be used either for specific security clearances or merely to speed the entry of the caller onto the BBS.

WHAT DO YOU MEAN BY "COMMAND"?

Once your name has been entered into the computer, you are generally offered a "menu" of options you can perform during your visit. These are the commands we spoke of earlier; the "orders" you give the BBS to take you to the Message base, or the Game area, or the Sales catalogue. If you are unfamiliar with the list of commands of the BBS you are connected to, these lists can be pretty intimidating!

SOMETIMES THE BBS DOESN'T PRINT OUT THE WHOLE LIST OF COMMANDS. WHAT DO I DO THEN?

If you have called the board more than once, chances are the HOST program will assume you are familiar with all the command options, and present an abbreviated form of the menu for you, which usually is just a list of the first letters of each of the commands available to you. Don't despair however; for most BBSs offer you the option of printing out the entire command list, sometimes by entering a **(?) (H) (E)** (for HELP) and sometimes just pressing the **(ENTER)** key will do it. Most BBSs also offer a section specifically devoted to instructions on how to operate the system you're calling. We heartily recommend that you read them!

WHY DOES THE USER LOG SOMETIMES FORGET MY NAME?

The user log is the list of callers that have used the BBS. On many boards, this list is limited in size, and often the name of the newest caller is written OVER the name of the oldest caller. When you log onto a system, the program looks over the user log, trying to match your name with any of those already on the list. Thus, if you misspell your name, or use your nickname instead of your full name, you will not be recognized, since most BBS programs cannot extrapolate full names from nicknames, or figure out that "Mkie" should have been "Mike."

If you have not called in a long while, chances are that your name might have been written over. On DRUCOM, it only takes four days for your name to be eliminated! Don't worry, however. Just because your name may not be recognized, it does not mean that any messages for you will have been erased. The message control programs and the user log programs are two entirely separate things!

AHA, MESSAGES! HOW CAN I BE SURE THAT A PRIVATE MESSAGE WILL: 1) REMAIN PRIVATE AND 2) BE RECEIVED BY THE PROPER PERSON?

Good news and bad news. First, the way a message is kept private is this: when you specify a message to be private, a "flag" is placed on it which will allow it to be read only by the person whose name EXACTLY matches the addressee. There is an exception. On some systems, nobody can read a private message except the addressee, but on others, the sysop also has access to it, giving rise to the expression, "If you can't trust your sysop, who can you trust?" (Oh, you haven't heard that expression?)

Also, on some systems, the person leaving the private message can read it during the same call in which he left it. If he were to hang up and call again, he would no longer be able to read that message.

The only way to ensure that the proper recipient receives the private message is to make sure you SPELL HIS/HER NAME CORRECTLY! You must be extremely careful in this. On some boards you must include a person's ACCOUNT number in the address. You must address your message to the recipient in EXACTLY the same way he logs onto the board! If you know that the recipient uses two different forms of his name on two different boards, be very certain that you are leaving it to the proper form for the particular board you are calling, or the recipient will never be able to access the

message! Computer BBS programs are still not sophisticated enough to extrapolate the way people are. (Give them another year or two!)

WHY DO I HAVE SO MUCH TROUBLE GETTING THE SYSOP TO ANSWER THE "CHAT" SUMMONS?

This is a very common complaint. We're told very often that it is almost impossible to get the sysop to actually get online and chat, and even though we do try to answer the summons on DRUCOM, we can't always. The answer is simple. Sometimes the sysop is not home; many have outside jobs and simply are not around often enough. Others turn off the summons when they have visitors, or are too busy with some other activity. Admittedly, sometimes sysops just don't feel like answering, and while on the surface this might seem selfish and rude, it would be wise to remember that many people call boards, and many page the sysop. It's simply not feasible for us to sit at home all the time and wait for the summons, and after chatting with five or six people in a row, a sysop can really need a break! (Wait, I have to stop writing this article, my **[P]**age summons is buzzing!)

WHY DO I SOMETIMES GET GARBAGE WITH MY TRANSMISSIONS?

Several things can cause those funny little characters which you know you aren't sending deliberately. One of these can be a problem we discussed in the August issue, called Carbon Packing, where the carbon in the telephone microphone gets packed too tightly and causes trouble in the clarity of the signal transmitted through the acoustic modem. Another cause of garbage can be poor phone connections, improperly set parameters, or interference from bad weather. When in doubt, check your parameters first and your acoustic modem second.

WHEN I TRY TO CALL, FIRST I'LL GET A BUSY SIGNAL, THEN WHEN I CALL BACK IN TWO MINUTES IT WILL RING AND RING AND NOT PICK UP. WHY?

Most BBS are very busy places and receive many calls. When a caller terminates his connection, the BBS programs recycle themselves, resetting variables and going back to their "wait for call" modes. This recycling can sometimes take 30 seconds or more, and this is why the modem does not seem to answer. If you connect to a BBS just at the moment when the previous caller hangs up, you may have to wait until the program finishes recycling.

Another reason that the modem may not answer is that the sysop might be on the system him/herself, updating files, doing daily maintenance, and answering mail. Sometimes, during a busy day, the sysop will just turn off the modem to avoid interruption, and this too may be a reason you cannot get the machine to answer.

There is always a third reason, however. The system may legitimately be out of service for some reason. If you have called a board several times and not gotten the machine to respond, perhaps it might be time to call the sysop's voice line (if you know it) and bring the matter to his/her attention.

SOMETIMES IN THE MIDDLE OF MY BBS VISIT MY CONNECTION WILL SUDDENLY BE LOST. WHY?

This sudden termination can often be caused by weather or the "Call-Waiting" options which are available through Bell

Telephone. This might also be caused if the BBS local phone switching station has older equipment which is not capable of handling too many call attempts on any single line. Momentary power failure or power surge on either end of the connection may also have such an effect.

WHAT DOES IT COST ME TO VISIT A BBS?

While there is a fee for services like CompuServe, usually there is no charge for a visit to a privately run BBS. Some do require membership fees, and some sell various items to support the costs of running the board, but for the most part, the only thing you pay for is the telephone call, which of course, the sysops do not get any percentage of.

WHAT ARE THE COSTS OF RUNNING A BBS?

Generally speaking, aside from the obvious price of the hardware needed to run a BBS, the costs are minimal. The monthly costs are mainly the phone bill, (which is minimal indeed if the phone is not used for outgoing calls), the disks themselves, which must be replaced monthly because of general wear and tear due to constant use, the paper for the hard copy, and the sysop's time. What the latter is worth is a variable thing, but it usually is the commodity that the BBS uses the most of! Computers use very little electricity, so little that it can hardly be considered a serious cost of running a BBS.

DO YOU HAVE TO BE A PROGRAMMER TO RUN A BBS?

No, but we must admit that it helps! While there are various BBS software packages available already programmed, most sysops like to "customize" theirs, to make it somewhat unique. Also, various factors may cause errors in some of the programs, and it is wise to be able to "troubleshoot" these on your own, without having to call the headquarters of the network you belong to and spend a lot of phone time repairing any trouble you might come across.

WHAT DOES IT TAKE TO MAINTAIN A BBS?

A lot of time. Daily maintenance on a BBS ranges from 15 minutes to two hours or more, depending on the type of work that needs to be done. A sysop must not only answer the mail that he/she gets but must also maintain the files, update any changeable data (other BBS numbers, price lists etc), keep working backup disks, correct errors, and rotate changeable menu items (download files for example). Sometimes parity errors occur and will cause the system to "lock up," and these errors too must be located and corrected. These cost more in time than anything else, and along with time, the sysop must also have a lot of patience!

WHAT MAKES A PERSON DECIDE TO BE A SYSOP?

After reading the above paragraph, we're no longer sure . . .

NO, SERIOUSLY, WHAT DOES A SYSOP GET OUT RUNNING A BBS?

A variety of things. Some sell hardware and software over their boards, and thus supplement their income. Some run them for the express purpose of meeting other people. Others run them for Special Interest Groups of various types and keep the members of their groups informed as to club

activities etc over their BBS. Some sysops just plain enjoy being the person who is able to read all the messages!

We started DRUCOM over two years ago simply because we were tired of having such a huge phone bill from calling other boards! Gradually our board grew until it is in its present state, and we learned that there is one more benefit that a sysop gleans from a board: FUN!

It's fun to have a lot of people come visit you and leave messages to each other and yourself. It's entertaining to be able to speak to many people across the country and get to know something about them, and it's an interesting way to accumulate public domain programs; as sometimes callers upload programs in return for those the BBS provides them for free downloading.

WHAT DO I NEED TO START A BBS?

A whole lot of patience, quite seriously. Beside the computer, disk drives, modem, printer and phone line one needs a whole lot of patience and dedication.

Running and maintaining a system (which by nature uses the intermingling of a number of fairly complicated programs both in BASIC and Machine Language) takes a very large amount of time, energy, and caring. Maintenance must be done every day, and if the sysop is involved in other things, (work, social life, sleep) he/she can find a BBS to be a demanding and interfering burden. The "glory" of being a sysop can be a very alluring thing, but in reality it takes just as much time, energy and effort as any other profession. We usually try to discourage inexperienced people from starting up a BBS, especially if they are not experienced programmers, because we feel that they will become disillusioned very quickly. Our recommendation is that if you are interested in Bulletin Boards—visit them! They're a wonderful place to go!

If you have any other questions that we have not answered in the above article, please feel free to write to us, and we will be very pleased to respond to you!

That will wrap it up for this month. Since this article has been devoted entirely to answering questions about Bulletin Boards, we will omit this month's Corner Mailbox and hope to hear from you soon with any further questions you may have.

Happy Communicating!

Converting Programs from Model III Disk BASIC to Model 4 Disk BASIC

By Randy Rife

TRS-80 Model III programs will run without modifications on the new TRS-80 Model 4. However, when we do so, the Model 4 works just like a Model III and our old programs cannot use the 80-character screen width, sound, MEMDISK, and other features unique to the Model 4. TRSDOS 6.0 has a convert utility that will transfer any disk file (including a BASIC program) from TRSDOS 1.3, but there is a catch.

BASIC programs are normally stored in compressed format on the diskette with BASIC keywords reduced to a single byte (these are often called tokens). When TRSDOS 6.0 converts a file from TRSDOS 1.3, it copies the bytes in the file as opposed to the keywords. The problem with this process is that TRSDOS 6.0 BASIC uses different tokens for storing keywords; e.g., when converted, REM is stored as LIST, GOSUB is stored as PRINT, etc.

To overcome this problem, BASIC programs must be stored in ASCII format before using the convert utility in TRSDOS 6.0.

Here is a sample session to convert a BASIC program (named TEST) to TRSDOS 6.0 Disk BASIC.

Save the program on the TRSDOS 1.3 diskette in ASCII format by entering:

```
SAVE"TEST/ASC",A
```

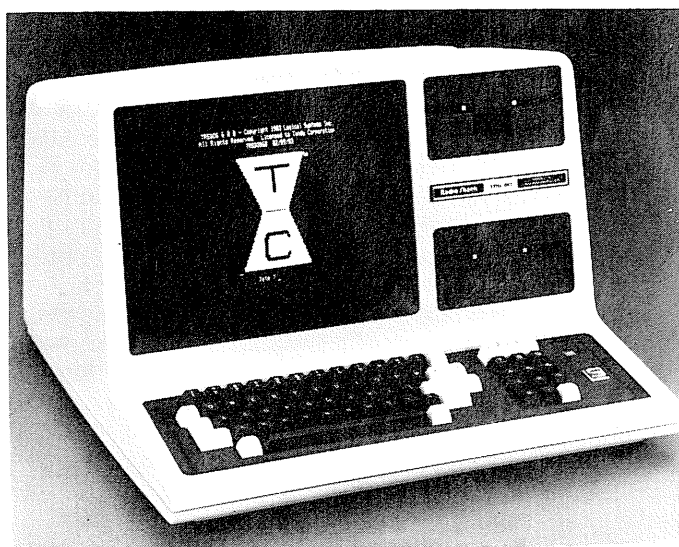
Next, put that TRSDOS 1.3 diskette into Drive 1, put a TRSDOS 6.0 diskette into Drive 0 and press **RESET**. At TRSDOS Ready, enter

```
CONV TEST/ASC:1 :0
```

When that is finished, enter BASIC and then enter LOAD "TEST/ASC". List, edit, and run the program as needed. When satisfied with the program, save it back onto the diskette and kill TEST/ASC.

The convert process will only create a loadable BASIC program; it does not correct any syntax or logical errors. Keep in mind that TRSDOS 6.0 Disk BASIC requires spaces after keywords; e.g., GOSUB100 will not work. Some functions have been replaced; e.g., CMD"D:0" is now SYSTEM"DIR :0", and other statements have been eliminated; e.g., SET and RESET do not exist in TRSDOS 6.0 Disk BASIC.

This conversion process should only be done on programs written by yourself and after you have a good understanding of TRSDOS 6.0 Disk BASIC.



Transferring Data between the Model 100 and the Model III

You may transfer data between the Model 100 and the Model III using VIDEOTEX PLUS on the Model III and the TELCOM program on the Model 100. Model 100 programs must be stored in ASCII format (files with a .DO extension—either Text files or else BASIC program files SAVED with the A option).

First, make the preliminary hardware and software connections by following these steps:

1. Connect the two computers via an RS-232C Cable (26-4403) and a Null Modem Adapter (26-1496).
2. Insert a VIDEOTEX PLUS Diskette into the Model III. Press RESET then type VIDTEX. Upon doing so, the message "DATA CARRIER LOST" will appear on the screen.
3. Simultaneously, hold down the (SHIFT), (I), and (M) keys to reach the TERMINAL MENU. Type (Q) to check the status. The following values should be entered for the Model III status:
BAUD: 55
UART: 6D
DUPLEX: H(ALF)
XON/XOFF: Y(ES)
4. To get to the TERMINAL Mode, press (ENTER). The message DATA CARRIER RESTORED will appear on the screen. (This message will not appear, however, unless the Model 100 is in TELCOM set up to the RS232 in TERM Mode.)
5. On the Model 100, move the Menu Cursor to the word TELCOM and press (ENTER). The TELCOM prompt will appear. Press STAT ((F3)) and type: (3)(8)(N)(1)(D) (ENTER). This sets the Model 100 communication parameters to match the parameters you previously set on the Model III.
6. Enter the Model 100 Terminal Mode by pressing TERM ((F4)). Now that the Computers are connected and have matching communication parameters, you may transmit files to and from the two machines.

DOWNLOADING FILES FROM THE MODEL III TO THE MODEL 100

To download a Model III file to the Model 100, follow these steps:

1. On the Model III, simultaneously press the (SHIFT), (I), and the (M) keys to reach the TERMINAL MENU. Once in the menu, press (L) to load the RAM buffer.
2. Once again go into the TERMINAL MENU on the Model III and press (V) to transmit data.
3. On the Model 100, press DOWN ((F2)). TELCOM will prompt you for a file name. Enter the name of the new file, using the .DO extension (TELCOM will add this extension if you don't supply it), then press

(ENTER). The label DOWN will appear in reverse video.

4. When all of the data has been transmitted, press (FB) on the Model 100 to exit the Terminal Mode. When prompted DISCONNECT?, press (Y), then (ENTER).

The Model III file is now stored in the Model 100's memory under the file name you specified.

UPLOADING MODEL 100 FILES TO THE MODEL III

To transmit a Model 100 file to a Model III, follow these steps:

1. Enter the TERMINAL MENU on the Model III by simultaneously pressing the (SHIFT), (I), and the (M) keys. Open the RAM buffer by pressing (O).
2. Again enter the TERMINAL MENU and zero the RAM buffer by pressing (Z).
3. On the Model 100, press UPLOAD ((F3)).
4. TELCOM will then prompt you for width. This refers to the maximum number of characters transmitted before transmitting a carriage return. Enter an appropriate value, then press (ENTER). Remember that the Display on the Model 100 is 40 characters wide. If you want to send the file "as is," simply press (ENTER).
5. As the file is transferred, the Up label appears in reverse video and the transmitted data appears on the Model III Screen.
6. When the transmission is complete, the Up label returns to normal video.
7. On the Model III, simultaneously press (SHIFT), (I) and (M) to return to the TERMINAL MENU. Now press (C) to close the RAM buffer. To save the file, return to the TERMINAL MENU and press (S). Type the file name and press (ENTER). To exit the Terminal mode, enter the TERMINAL MENU ((SHIFT) (I) (M)) and press (X) to exit.
8. To exit the TELCOM program on the Model 100, press (FB) to exit the Terminal Mode. When prompted DISCONNECT?, press (Y) and (ENTER). Now press (FB) again to return to the Main Menu.

The Model 100 file is now stored on your Model III disk, under the specified file name.



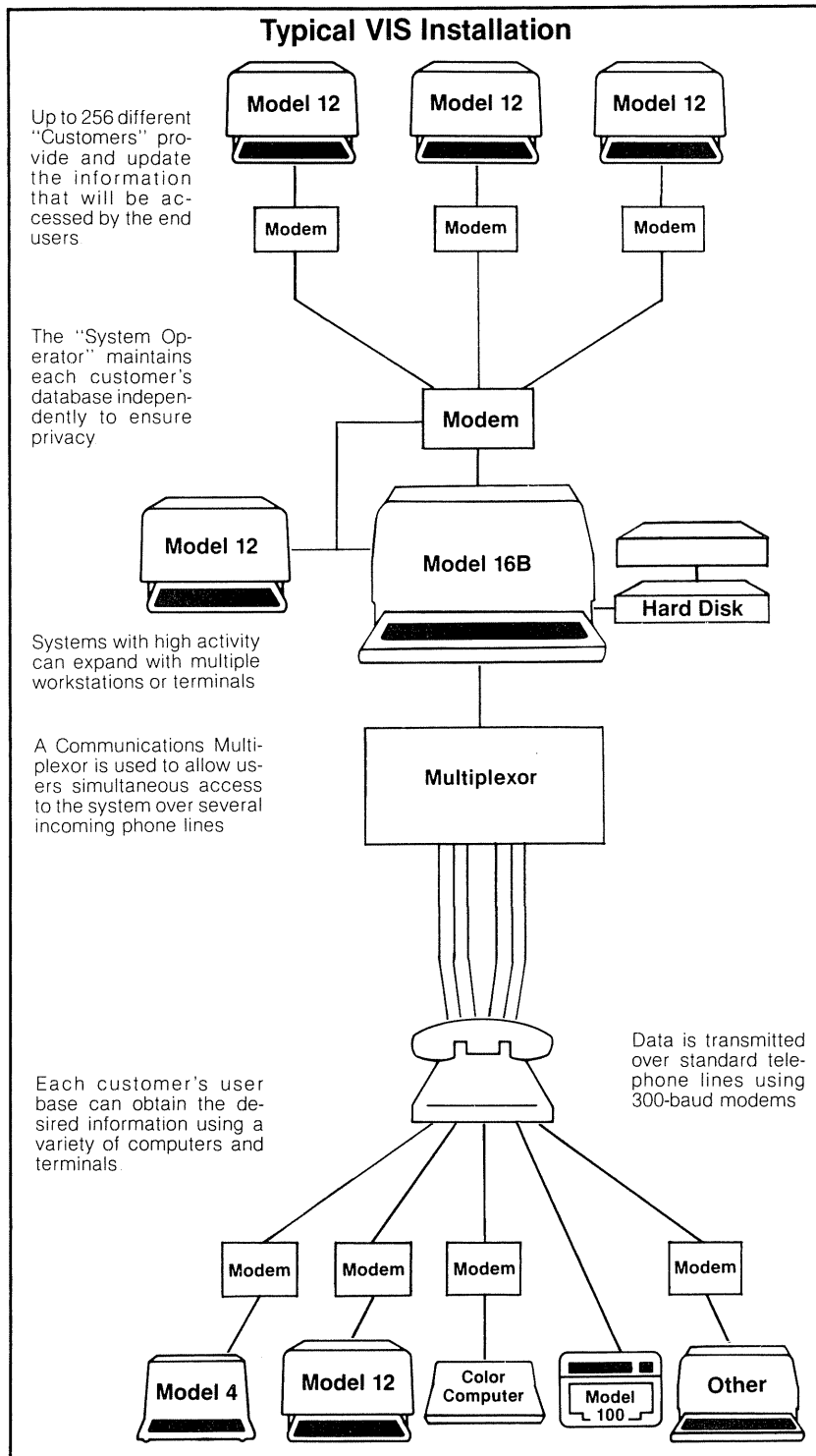
VIS—Videotex and Office Information System

You've been going through the arduous and sometimes disheartening task of finding a new home without much success. After long hours of discussion, you've finally agreed on the type of home you want, the area that you want to live in, and how much you are willing to pay. Armed with this information, you return to your realtor's office where you expect to spend another afternoon sifting through a dog-eared Multiple Listing Service book in the hope of finding something suitable. Instead of handing you the book though, she surprises you by asking you to fill in a short form that requests the pertinent information on the kind of house you want to purchase. You indicate the following features and financial information on the form.

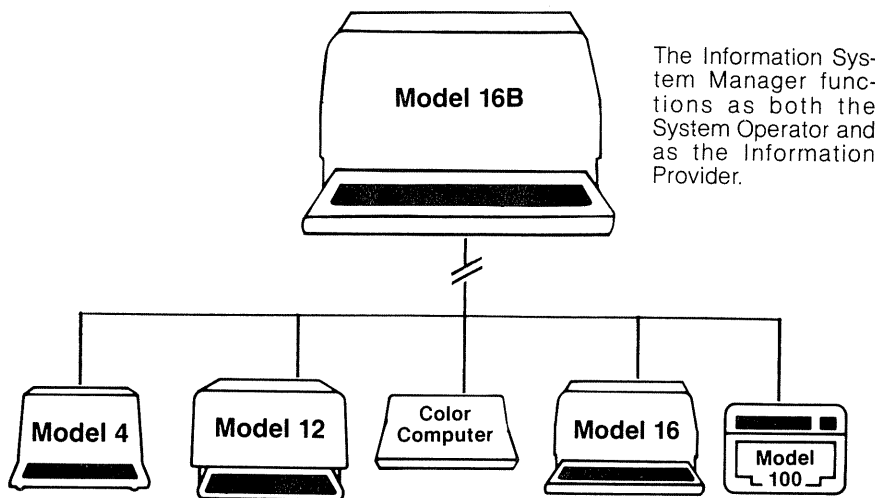
1. Three bedroom house, two bathrooms and a two car garage.
2. Ranch style home
3. Located in the Bedford, Texas area
4. Built before 1980
5. Cost of 75 to 80 thousand dollars on a long term loan.
6. Have accumulated \$10,000 toward a down-payment.
7. Specifically, you want an all electric home with built-in kitchen appliances on an island. You would prefer bay windows, a fire place, and a separate family room.

Your realtor uses her TRS-80 computer to call the central VIS network which contains all the homes in her marketing area. Within a few short minutes she has a cross referenced list of homes that meet your requirements. You look over the list and choose two different homes that interest you. She then enters some more information on her TRS-80. When she finishes, she provides you with the complete information about the two homes including floor plans drawn to scale, front views of the houses, and complete payment schedules based on your initial down-payment of \$10,000 with a payback period of fifteen or twenty years. You note that the payment schedules are derived from the current lending rates of local lending institutions in your community.

Before ever actually seeing the homes, you have a more complete profile of them and also what your financial obligations are. What a pleasant surprise. What you expected to take all afternoon has only taken a few minutes.

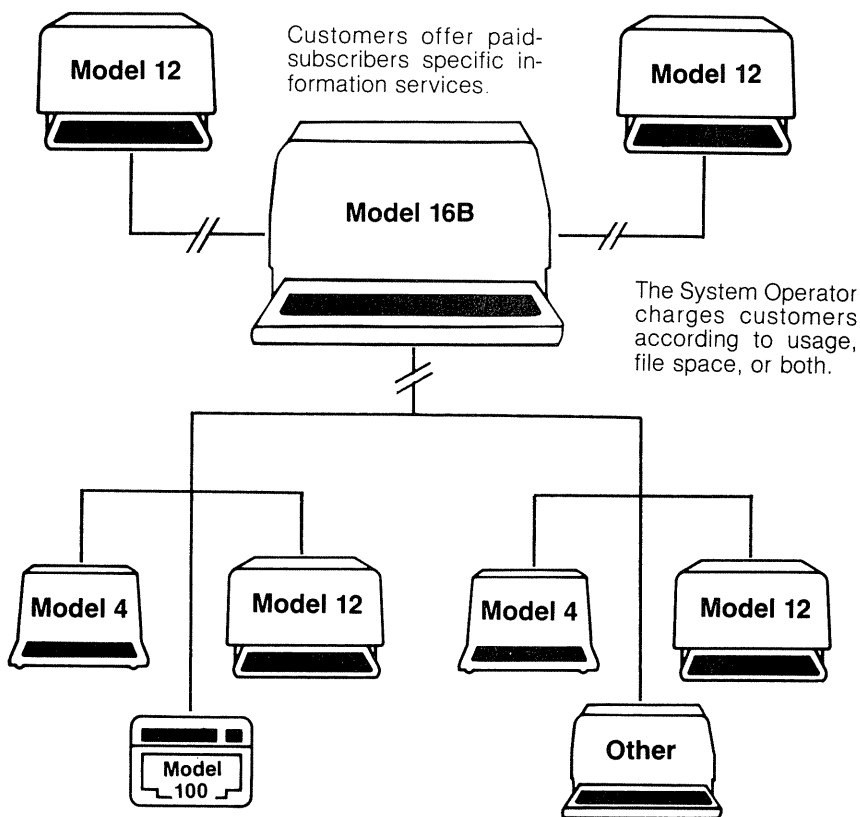


Private Internal Videotex System



This configuration is an ideal office information system. "Tiering" restricts certain users from accessing confidential information.

Mass Market System



Subscribers deal directly with the appropriate Customer—the System Operator is effectively "user transparent".

Welcome to the world of Videotex Information Service (VIS)! The information provided by the realtor wasn't difficult for her to obtain from the central VIS system either. She used "Topical Reference Words" that meant something to her and you alike: 3-2-2, ranch, all electric, Bedford, 75K, 80K, 1980. This, then, is the marvel of VIS. Words combined in a logical manner returned to the realtor information quickly and efficiently. She didn't have to be a computer specialist to use VIS either.

Real Estate as one example of the utilization of VIS can be duplicated for many equivalent applications. One of the many powers of VIS is its flexibility. Whether you want a graphics delivery system, a software distribution center, or a text retrieval system, you can tailor VIS to your needs.

PRESENTING RADIO SHACK'S VIS

The Videotex and Office Information System (VIS) is designed for storing, retrieving, and distributing information. It offers state of the art technology at prices that are a fraction of the comparable systems. In fact, some of the features of VIS, such as multiple keywords/synonym access, are not available on any other system at any price.

AN UNDERSTANDING OF VIDEOTEX

VIS, as with all videotex systems, is a two way interactive system that transmits electronic information directly to information consumers, or "users." With VIS, users may be a select group, the general public, or both. Any terminal or computer with terminal capability may be used to receive and display text and, if compatible, graphics and computer programs. Establishing and organizing the data are the information providers, or "customers." Customers define their user population, sell or provide information and information updates, and establish any security access rules.

At the heart of VIS is the information service manager or "system operator." The system operator maintains the computer hardware and VIS software for either a single customer or for multiple customers. The system maintains complete independence between customers, ensuring information privacy.

A LOOK AT THE TECHNOLOGY

Radio Shack's involvement with Videotex began in 1977 when our TRS-80 Videotex technology was selected for use in the government's "Project Green Thumb" program. This system provided farmers with the up-to-date agricultural information they required to stay ahead in such a volatile industry.

Today, Radio Shack's VIS couples extremely user-friendly software with our state-of-the-art TRS-80 Model 16B microcomputer.

Utilizing both MC68000 and Z-80 microprocessors, the Model 16B accepts 16-bit data and processes it internally as 32-bit "words." Along with our TRS-80 Communications Multiplexor and over 45 megabytes of hard disk storage, the TRS-80 Model 16B becomes the hub of the most cost-effective videotex system ever developed.

Using VIS to Your Advantage

VIS can be used within your business or within your business environment.

OFFICE INFORMATION SYSTEM

As a Private Internal Videotex System (PIVIS), VIS can meet the requirements of an information storage and delivery system within your company's internal operations. Using a computer in your office, or a portable terminal from thousands of miles away, VIS could let you check factory orders against usable inventory, corporate sales figures and production capacity, client or patient reports, and much, much more.

MASS MARKET SYSTEM

As a Mass Market System (MMS), VIS can be used as a "public" data base in which paid subscribers are allowed access to data such as news, weather, and stock reports. Airline schedules, real estate multiple listing directories, and credit bureau information are just a few of the many services possible with VIS.

In both configurations, tiering permits the customer to charge each user by the specific services requested. It is important for both MMS billing purposes and for PIVS inter-departmental charges.

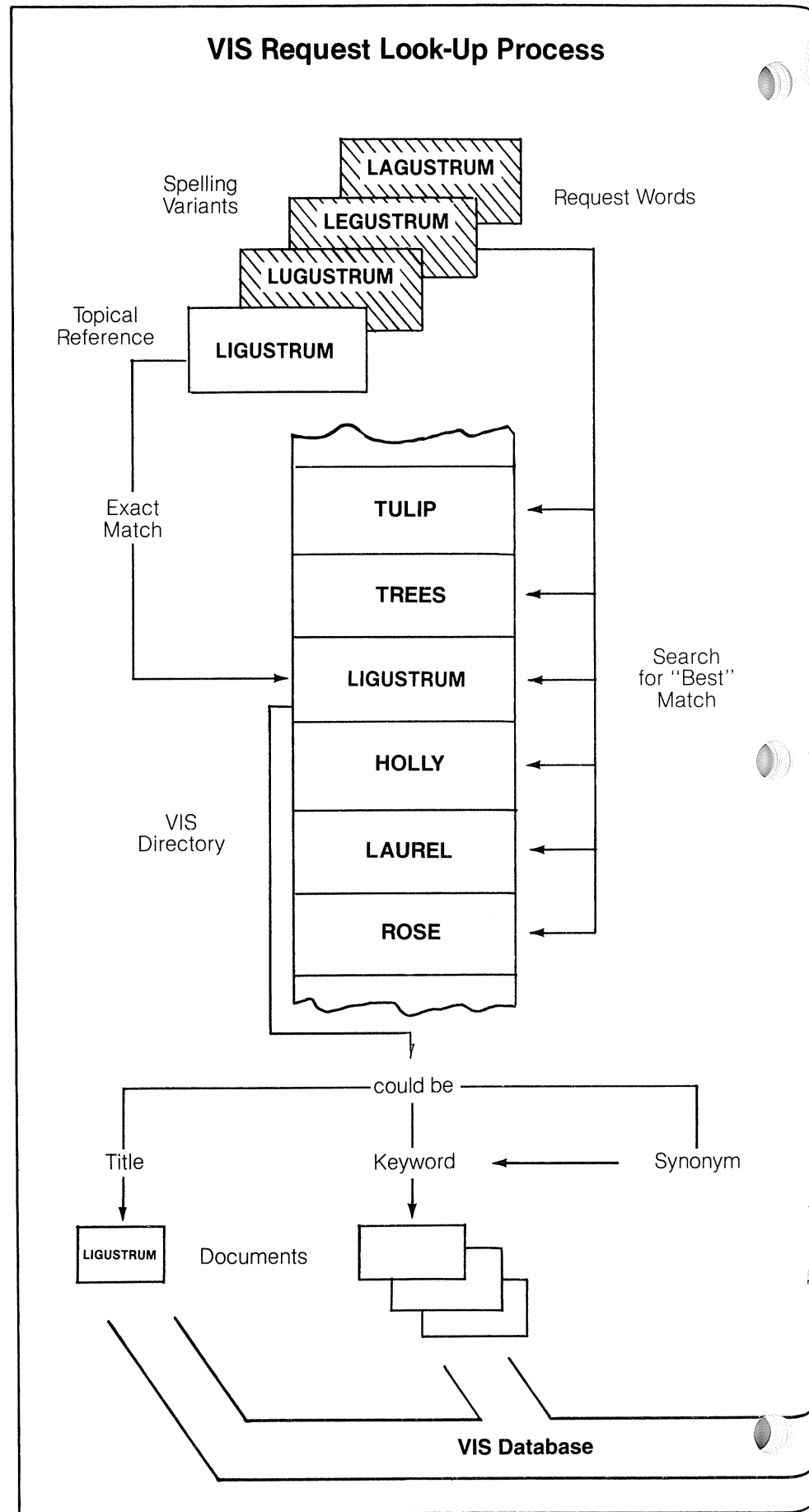
Typical VIS Applications

ARCHIVAL/INFORMATION RETRIEVAL SERVICES

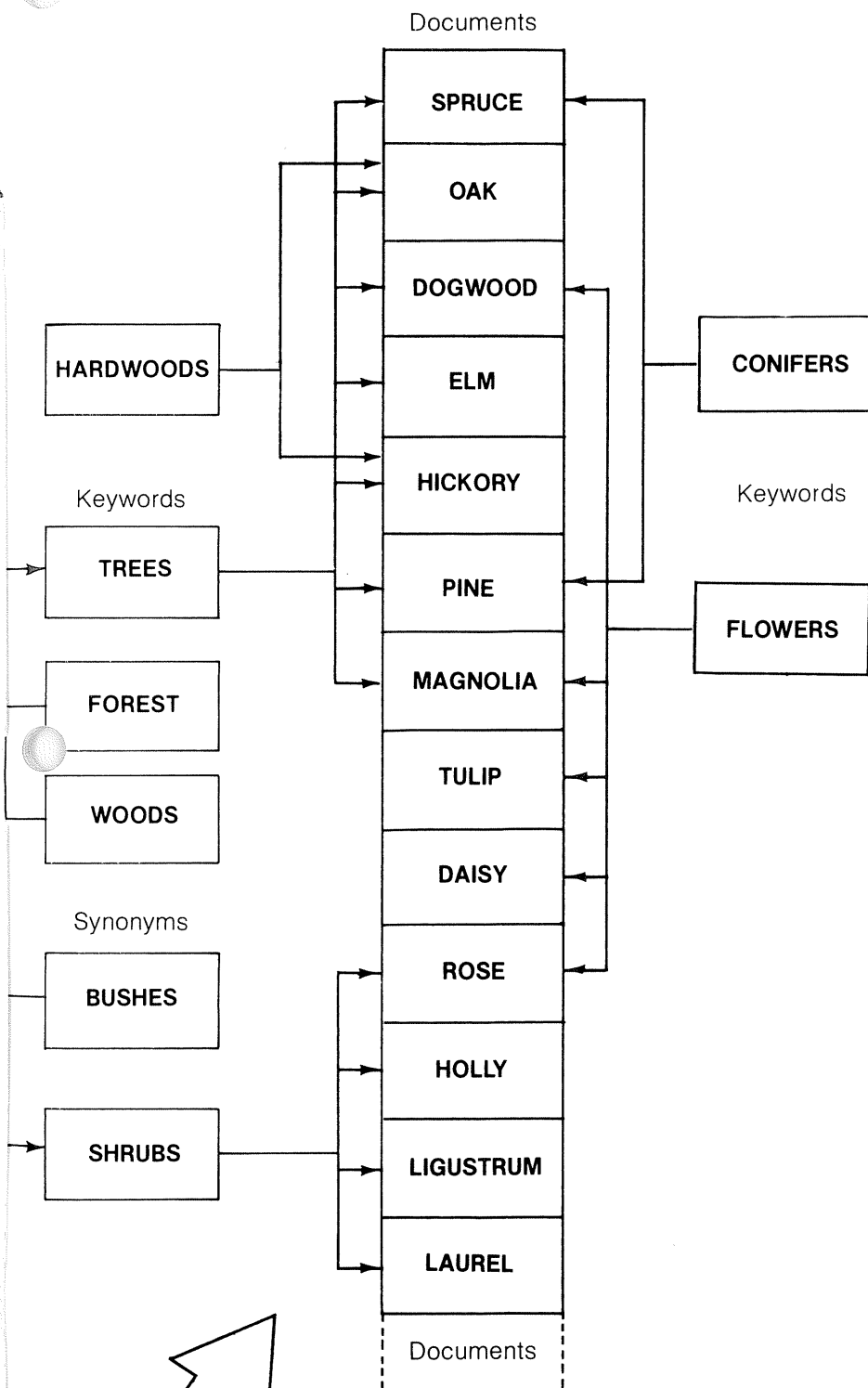
Legal Information—case searches
 Pharmacological Data Base—drugs, medicines, herbs, vitamins, etc.
 Insurance—policy searches, client data
 Library Card Catalogs
 "Encyclopedia" Research Data Bases
 Inventory/Catalog Lists
 Telephone Directories—with cross listings and consumer advertising

CONTINUOUSLY UPDATED SERVICES

Educational Records—Rolls, Class Schedules, Student Records
 Agricultural Data Services
 Periodicals—newspapers, magazines, etc.



Title, Keyword and Synonym Relationships



VIS will attempt to process the user's request for information on ligustrums whether spelled correctly or not. The document is displayed because "Ligustrum" is the actual document's title. If the keyword "shrub" or its synonym "bushes" had been used, ligustrum would have been displayed along with related documents.

Mailing Lists
Classified Advertising
Financial Services—Banking, Stocks

SPECIALIZED SERVICES

Computer Program and Arcade Systems, Maps, Surveys, Charts, and other Graphics, Government Data Bases—voter and tax rolls, auto license/title, etc.

Retrieving Information with VIS

Because VIS performs all terminal interactions and data retrieval capabilities, anyone can carry out sophisticated computer data base applications with no prior experience.

The process begins when the user enters a request on a TRS-80 desktop computer, TRS-80 portable computer, or TRS-80 terminal. VIS receives the request, retrieves the desired data and formats it according to the user's computer or terminal. Finally, the data is transmitted to the user where it is displayed one screen at a time.

VIS RE-DEFINES "USER FRIENDLY"

VIS is incredibly easy to use. But, beyond simple operation, VIS actually helps the user through the system. It is tolerant of user mistakes to the point that it will accept misspelled words or retrieve alternatives based on phonetic similarities!

This feature is illustrated in the VIS Request Look-Up Process chart, but it is first necessary to define some of the concepts used in VIS operation.

A "document" is a unit of information stored in VIS by a specific name or "title." Related documents can be grouped into categories called "topical references."

A user may request a document by entering the title, or by using a "keyword," which is merely a word used as a cross reference.

It is important to point out that a user does not have to know either the title or a correct keyword to access a particular document. For example, a user could enter "woods" and because it is a "synonym" for the keyword "forest," gain access to documents pertaining to trees.

MULTIPLE REFERENCE REQUESTS

VIS features logical operators that add an incredible degree of flexibility in requesting information. A user requesting information on two topical references, such as "trees flowers," could possibly receive more information than is needed. Logical operators (and, or, exclusive or) permit the user to target in on exactly those documents required—quickly and easily.

Data Base Organization

The extremely simple operation that is experienced by the information consumer is extended to the information provider, as well. Indeed, a customer can rely on relatively untrained computer personnel to maintain the data base.

AS EASY AS WORD PROCESSING

The customer prepares the text of each document with a text editor or word processor such as Radio Shack's SCRIPSIT. Anyone who can use a text editor—from editors to clerks to new personnel who can be self-taught in a matter of days can create your data base.

After a document is prepared by supplying simple items such as the document title, keywords and synonyms, the VIS Edit/Maintain program is used to insert documents into the VIS data base.

For security or billing purposes, documents can be assigned a specific access level and price. Thus, Level 1 users will only be able to access level 1 documents, while Level 2 users can access both Level 1 and Level 2 documents, and so on.

THE MENU FOR SUCCESS

Unlike many systems, customers can setup VIS to include concurrent menu/key word document access. Menus offer "user friendly" operation to those who have little or no experience with data base systems. However, menus can also be viewed as time-consuming obstacles by experienced users. That's why VIS permits one user to access a document by utilizing menus while another user accesses the same document directly—using keywords and synonyms.

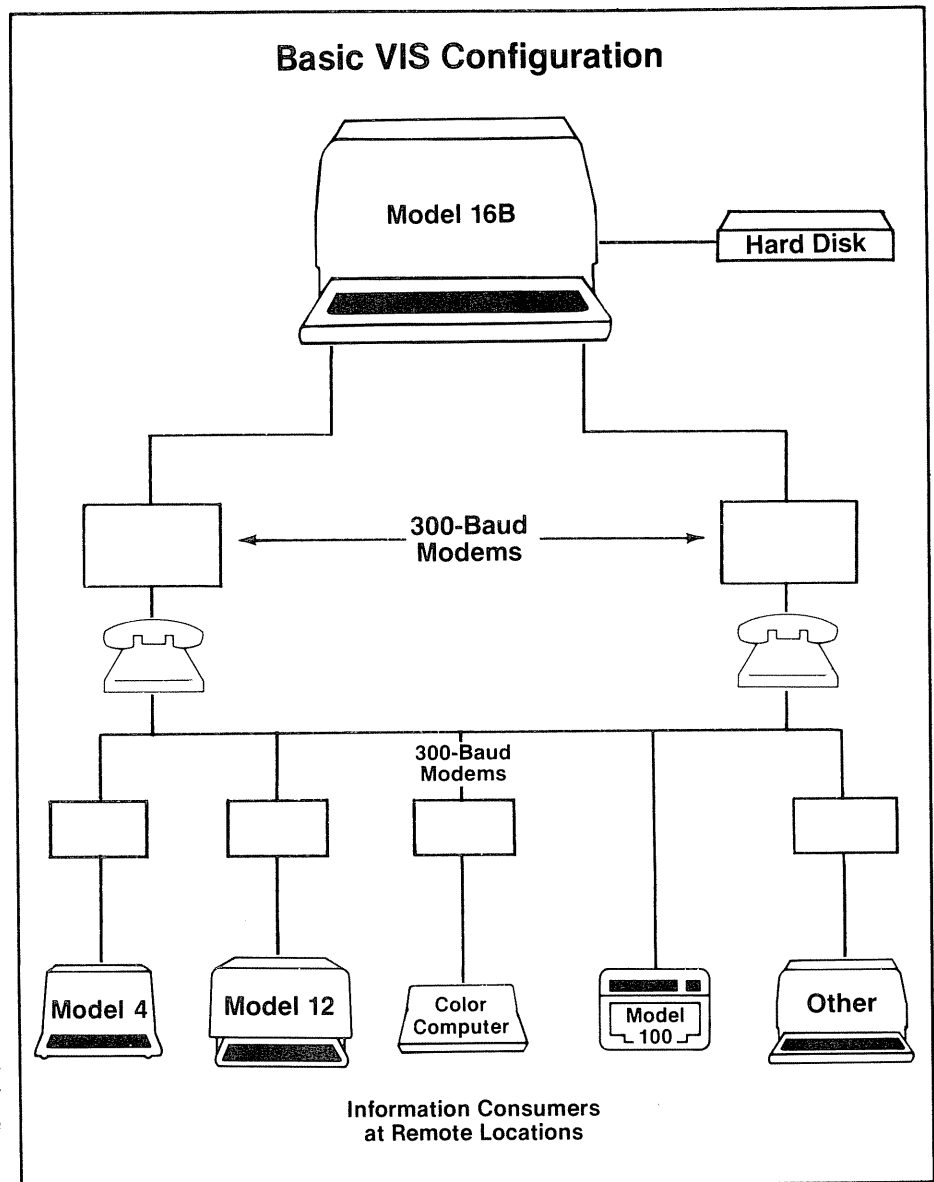
VIS also features such important functions as full logging of user responses, graphics capabilities, and the ability to send and receive computer programs, as well as text.

Managing System Information

VIS provides all of the "tools" that a system operator needs to establish and maintain an efficient VIS data service for every customer. These include data base structural analysis and management tools as well as a data log maintained for billing purposes.

VIS DOESN'T TIE UP YOUR RESOURCES

All that is required to set up a basic VIS system is Radio Shack's 2-disk TRS-80 Model 16B with 384K RAM, a 12-megabyte hard disk system, two modems, and VIS software. This configuration is ideal for a Private Internal Videotex System because data is entered through the Model 16B itself. While this is an incredibly affordable system, it should be noted that it can



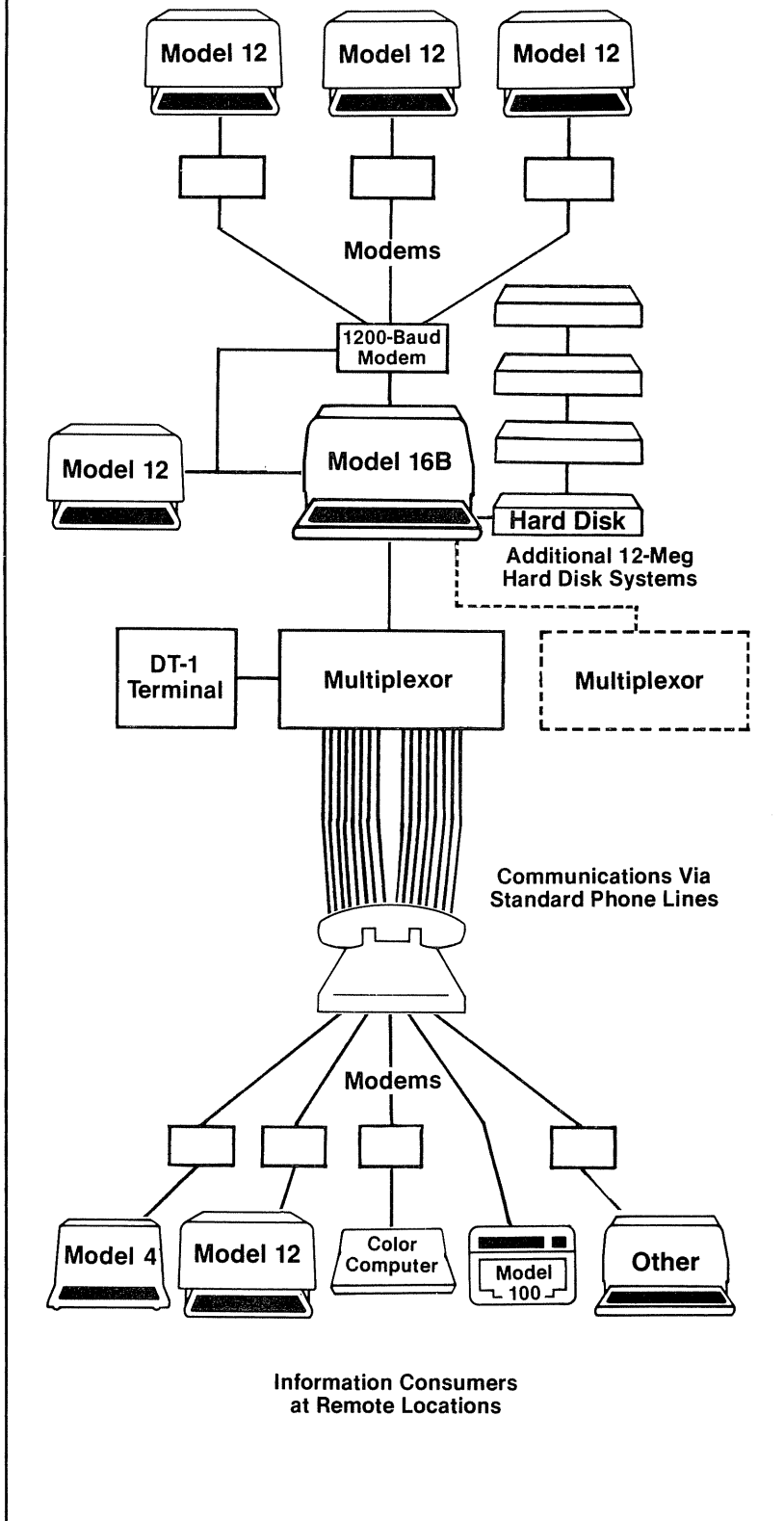
handle up to 200 incoming calls a day (assuming each call averages between five and ten minutes each over a 24-hour period).

From this basic configuration, a system can expand as necessary. Ultimately, the system operator can provide service to as many as 256 Information Providers (customers) per system. Additional hard disks, each storing about 24,000 frames of 512 bytes each, can be added until the system could store all of the information contained in a complete set of encyclopedias. The TRS-80 Communications Multiplexor with either 8 or 16 ports could be added to handle more incoming calls—approximately 100 calls (5-10 minutes each) per port daily. A total of four multiplexors can be used to handle even more incoming calls.

GRAPHICS AND PROGRAM DOWNLOADING

VIS supports alpha-mosaic and alpha-geometric graphics protocols concurrently. Furthermore, various error detection techniques (as defined by the system operator) allow for the dissemination of computer programs. This flexibility makes a broad base of applications and services available to computer and terminal users.

Super VIS Configuration



ON THE THRESHOLD OF TOMORROW

Radio Shack will continually enhance the performance features of VIS. System operators will be able to add increased functionality as it is developed. In most cases, enhancements will require no further hardware investment. Electronic mail, electronic shopping, catalog sales, bulletin boards, and financial analysis services—all are examples of what the VIS system operator can look forward to.

Videotex Office and Information System-Technical Overview

VIS SOFTWARE

VIS was developed in highly modular form in the "C" programming language and features an advanced Back-Up and Recovery system. It is designed to be a continuously evolving product, with software enhancements made available to all system operators.

The fundamental unit of storage in VIS is the document, which also controls delivery to the users. Documents have no maximum size restriction, and may contain text, graphics, or computer object program. ASCII text is compressed, and stored on disk in 128-byte units (one page of single-spaced text would equal about 10 units). The compression technique used for ASCII data yields from 25% to 33% more disk storage space. Thus, Radio Shack's 12-mega-byte hard disk systems can effectively store 16 megabytes of text.

Graphics and computer object programs are not compressed and are stored in a separate file from text documents (as are titles, keywords, and synonyms).

COMMUNICATIONS MULTIPLEXOR

The TRS-80 Communications Multiplexor is available in two versions. The 8-port version accepts eight incoming phone lines, while the 16-port version accepts 16 lines. Thus, each multiplexor in a VIS system (a total of four can be used) can service up to sixteen users simultaneously.

Each multiplexor features 8 or 16 built-in auto-answer modems, a 50-pin RJ21X telephone jack, and two RS-232C serial ports.

HOST COMPUTER

VIS is designed for use with the Radio Shack TRS-80 Model 16B microcomputer and the TRS-XENIX multi-user operating system. TRS-XENIX is derived from the powerful UNIX operating system developed by Bell Laboratories.

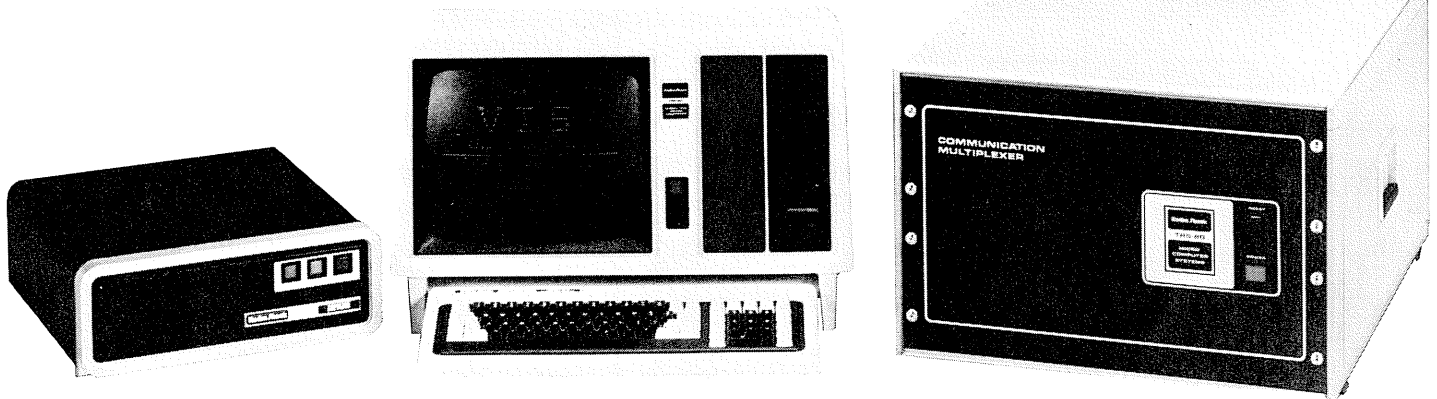
Model 16B incorporates two (and soon five) RS-232C serial communications interfaces and a parallel printer interface and can expand from 256K (stan-

dard) to 768K of Random Access Memory. VIS can also be used with the TRS-80 Model 16 (with a maximum of 512K and 2 ports) and with TRS-80 Model 12 computers that have been upgraded to Model 16 capabilities.

CUSTOMER/USER COMPATIBILITY

VIS is compatible with a wide variety of TRS-80 products. Information providers can use any TRS-80 disk-based computer, such as a Model II, 12, 16 or 16B, to maintain their data base. Other compatible computers and communications terminals may also be used.

Information consumers can use any TRS-80 computer, such as the TRS-80 Color Computer or TRS-80 Model I, II, III, 4, 12, 16, 16B desktop computers with a 300-baud modem. The TRS-80 Model 100 portable computer with built-in modem may also be used, as may many other compatible computers. If a full-function computer is not needed, users can employ Radio Shack's TRS-80 Videotex terminal, PT-210 Portable Printing Terminal, DT-1 Data Terminal with modem—or virtually any other available terminal. The DT-1 requires an external modem.



PC-2 Tests (From page 20)

```

10 CLEAR
20 C=0
30 A=30912
40 POKE A,90
50 B=PEEK A
60 IF B=90 THEN 80
70 C=C+1
80 IF A=30975 THEN 110
90 A=A+1
100 GOTO 40
110 IF C=0 THEN LPRINT "SYSTEM RAM GOOD"
120 IF C>0 THEN LPRINT "SYSTEM RAM BAD"
130 CLEAR
140 C=0
150 A=30288
160 POKE A,90
170 B=PEEK A
180 IF B=90 THEN 200
190 C=C+1
200 IF A=30463 THEN 230
210 A=A+1
220 GOTO 160
230 IF C=0 THEN LPRINT "DISPLAY CHIP 1 & 3 GOOD"
240 IF C>0 THEN LPRINT "DISPLAY CHIP 1 & 3 BAD"
250 CLEAR
260 C=0
270 A=30544
280 POKE A,90
290 B=PEEK A
300 IF B=90 THEN 320
310 C=C+1
320 IF A=30719 THEN 350
330 A=A+1
340 GOTO 280
350 IF C=0 THEN LPRINT "DISPLAY CHIP 2 & 4 GOOD"
360 IF C>0 THEN LPRINT "DISPLAY CHIP 2 & 4 BAD"
370 LPRINT "END OF TEST"
380 END

```

```

10 CLEAR
20 C=0
30 A=31000
40 POKE A, 90
50 B=PEEK A
60 IF B=90 THEN 80
70 C=C+1
80 IF A=31183 THEN 110
90 A=A+1
100 GOTO 40
110 IF C=0 THEN LPRINT "SYSTEM RAM GOOD"
120 IF C>0 THEN LPRINT "SYSTEM RAM BAD"
130 END

```

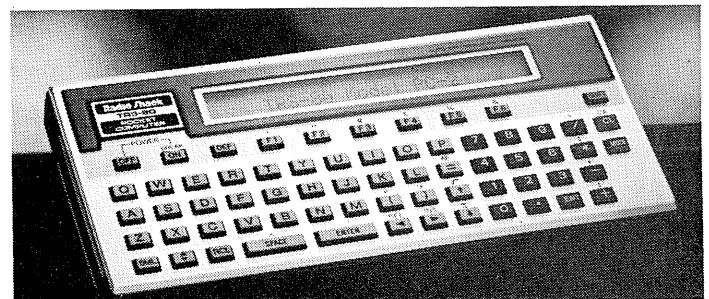
DISPLAY CHIP TEST

This test will take approximately ten seconds to run. The LCD display should fill-up with dots. If you are not using a printer, delete line 110 and change line 120 to 110.

```

10 A=&7600
20 POKE A,255
30 A=A+1
40 IF A=&764E THEN 60
50 GOTO 20
60 A=&7700
70 POKE A,255
80 A=A+1
90 IF A=&774E THEN 110
100 GOTO 70
110 LPRINT "END"
120 END

```



TEST FOR NUMERIC FIXED MEMORIES

This test will take approximately thirty seconds to run. If you are not using a printer, change the LPRINT statements to PRINT.

Computers In Hotel/Motel Rooms: A Traveler's Best Friend

Editor's Note: The CompuServe Information Service is one of the largest information and entertainment services available to owners of personal computers and computer terminals. With each issue of TRS-80 Microcomputer News, various features of CompuServe will be discussed. The CompuServe Information Service is sold at Radio Shack stores nationwide and in Canada.

The first thing a person does when he checks into a hotel or motel room is take inventory of the room. Ah, one double bed, color television set with HBO, nice view, closet, bathroom, phone—and a computer?

That's right! A computer. More than ever, traveling businesspersons can either carry a computer, such as a TRS-80 Model 100, or find one making itself at home in their room when they arrive.

But what's there to do with a computer when one is traveling around on business? Especially if that trip only takes you out of town for maybe one or two nights. It's difficult to start any really big projects, and who can you get in touch with after hours even with the luxury of the computer?

Well, the technology of videotex, aided by CompuServe, can help those traveling business personnel in ways they probably never thought of. At the end of the big meeting, after the last letter is recorded and after you have shut your briefcase and filed the statistics report, CompuServe can welcome you to the world of videotex.

But first of all, what is videotex? Videotex is—generic. Yes, that's right. The truth of it is, it's another generic. Just like "Kleenex", "Graham Crackers" and "Dog Food."

The true identity of videotex is a two-way, interactive system that transmits electronic information (text and graphics) directly to you, the mass medium consumers. Videotex users and their computers or computer terminals interact with a main computer by using a key pad, push button console, or full typewriter-like keyboard to transmit signals to the main computer via cable or telephone lines. Information is sent to your computer equipment at your home or office and is displayed on your hotel TV screen or other video display unit.

As in any videotex operation, CompuServe's information is prepared by individual information providers who work with programmers and research specialists in formatting the material into videotex reading form.

They then put it up into the main computer systems which you are able to access. Or, in some cases, CompuServe will switch the customer to a computer in another location. The efforts of CompuServe's staff allow consumers to search a database, send and receive inquiries, shop, or bank at home.

The costs involved in being a videotex user usually include cost of communications, the telephone charges (mainly paying for the local call from your room or if the call is long distance), the computer connect time and any extra charges for premium videotex services.

Some people wonder what the difference is between videotex and videotex(t). Videotex and videotex(t) are one in the same. If you were in Britain, you'd be using the Prestel videotex system operated by the government postal and telephone service. In France, Telematique, also operated by the government postal and telephone service, might be the service where you'd plug in your computer. And if you were in the Far East you'd be using the Captain system.

So far we've generalized the generic. We have a user, a computer, and a communications system. Specifically, how does all this mix? With technology.

The technology is helping to provide flexible, reliable, and cost effective data communications. And CompuServe is just one videotex service which accomplishes this.

CompuServe has been serving some of the nation's largest industries in major metropolitan areas through coast-to-coast sales and service facilities since 1969. By the late 1970s, CompuServe had an established reputation for reliability in providing software solutions, operations assistance, and research and development capabilities to its business customers. Having successfully introduced electronic information services to the business world, CompuServe then turned their efforts toward personal computer services and opened up a world of information to the hobbyist, the professional, and the novice.

So, what are the topics that an out-of-town businessperson would be interested in once settled into a hotel room?

Well for the business maven, CompuServe has several services to whet the appetite.

For the business traveler who likes to keep up with the news, CompuServe offers *The Washington Post*, The AP Wire, The Business Wire, The Business Information Wire and Tickerscreen which will keep you busy catching up on business you missed while you were engaged in . . . business.

The Washington Post provides summaries of the business and governmental fields and calendars of congressional activities. There are also administrative features, congressional news, articles on business and economy, science and technology, the courts and the law, the world and the nation, editorials and commentaries, and politics.

Many sections include news digests which give brief descriptions of recent happenings, decisions and conflicts.

From *The Washington Post* you can connect directly into the Associated Press Viewdata Wire. The Viewdata Wire is formatted especially for videotex screens. The Viewdata Wire offers world, national, political, historical, Wall Street, and other types of information in an up-to-the-minute format. The entertainment section looks at news from the theater, the soap operas, television, movies, and other selected features. You can find out if it's raining where your next meeting is being held, or if anything major has happened in business while you were out of the office.

And when you're done catching up on the day's business news, you can read up on what's happening with the rest of the world. The Associated Press Viewdata Wire will provide you with some of the most informative and interesting human interest stories. And you can be sure they're the latest news as the AP Wire is updated constantly.

The Business Wire also makes available business news of the day in the form of press releases, news articles and feature articles. When you've read all the other reports, the Business Wire can provide you with information on hundreds of different companies daily. Also, the Canadian Business Wire can provide you with the up-to-the-minute news and information it has been providing to government leaders and Canadian businessmen since 1975. Access the Canadian Business Wire and read about the news from around the Great White North, or from around the world.

After you've settled in, freshened up and read the daily news, it's time for dinner. But what about the weather, and your dinner companion, who might be a particular person. Solution. Once again, access CompuServe and type GO WEA first of all. WEA stands for weather, which will tell you if you should bring an umbrella, change into lighter dress or bundle up for a particularly cool evening. You can even find out what the extended forecast will be for the area you're in, your next destination or homestead.

Back to the dinner company. If you know that your companion(s) have a taste for good wine, try CompuServe's Bacchus Wine Data.

Bacchus Wine Data can provide you with useful information whether you're a connoisseur or a neophyte. Bacchus can help you pinpoint what type of wine to have with your companion. The Wine Information section can help you figure out what wine to order with your dinner, tell you characteristics of wines (in case he/she orders the wine; you'll know what you're drinking) and also gives you a section on the special vocabulary of wine.

Wine Recommendations will tip you off about good wines at great prices and great wines at any price. It also includes a section of wines that have just been released. You can really make a nice impression if you pick a great wine at a great price, can tell a little about it, and know the correct name and its characteristics.

As you're getting ready to go to dinner and have a little extra time on your hands, take care of a couple of things. Send EMAIL (electronic mail) to your office to let them know how you're doing. EMAIL allows you to communicate with other users by using their User ID as a mailbox address. Tell them how you're doing, what you've left to do, and then send it to them—within a half-hour. They'll be glad you did.

And, if you may be picking up the tab for dinner, keep a check on your expenses using our Electronic Banking ser-

vice. If you're a member of one of the banks listed on our service, you can check the balance on your checking account, savings account or other personal or business accounts with the touch of a keyboard. You can even pay an overdue bill through your computer before you leave for dinner.

When dinner is over and you've some time before turning in, you can do a little hopping around on the system. Prepare for your pet project by doing some research with Information On Demand. Whatever you need, they'll provide. Information On Demand has access to various other information data banks as well as its own. This is a premium service, however, and there will be an extra cost for the labor connected with all searches.

You can also enlist the services of Grolier's *Academic American Encyclopedia*. Grolier's provides a 21-volume, nine-million word searchable database of subjects for you to pick from. Whether it be France or Siam, Grolier's can give you a brief, yet concise description to suit your needs.

For some relaxation after dinner, don't turn on the TV, switch to the games section of CompuServe. They have over 45 games and entertainment features for you to choose from. Play MegaWars or MegaWars II, The Fourth Dimension. Be a Kryon or a colonist and champion the cause for the freedom of the Empire.

Play Blackjack against the computer or against another person, perhaps from across the country. Maybe even someone from your home town. Maybe even your spouse.

Play word games, board games, puzzles or simulations.

When you've tired yourself out from fighting dragons, space warriors, hangmen and dwarves, you can do one last thing before you watch the Carson monologue and then retire.

You can use the Official Airline Guide (OAG) to check your flight schedule. OAG provides listings of flight schedules and fares. Just follow the input prompts under the OAG service to know when you're coming and going.

Now that that's accomplished you can get a good night's rest. And in the morning before your flight leaves or your next meeting, you can check the Peak Delay Guide, CompuServe's Aviation service which lets you know if the major hub from which you're leaving, or to which you're arriving, will be clear, fogged in or keeping planes in a holding pattern over the city for any unlimited amount of time. The Peak Delay Guide works wonders for those busy people not wishing to get caught up in the jet stream of things.

Make your next business trip a success by taking CompuServe along. CompuServe's just a phone call away.

Questions and comments about the CompuServe Information Service can be sent to Richard A. Baker, Editorial Director, or Jacqueline A. Farthing, Assistant Editor, CompuServe Information Service, 5000 Arlington Centre Boulevard, P. O. Box 20212, Columbus, Ohio 43220 or through Feedback, main menu item 5, CompuServe User Information.

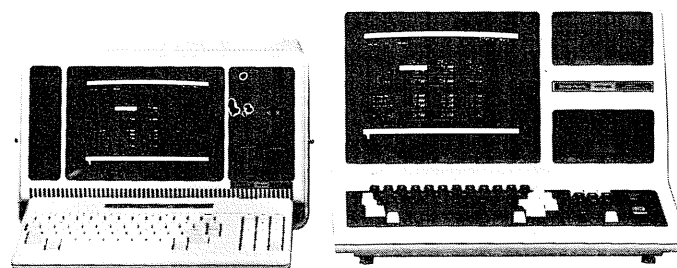
The Model 4P Portable Computer

By Linda Miller

Wouldn't it be nice to have a portable computer complete with disk drives, a nice readable screen, a full range of existing software, and yet not have to lug around something that dislocates your shoulder every time you pick it up? The TRS-80 Model 4P (Cat. no. 26-1080, suggested retail price \$1,799) is such a computer. As its name implies, the 4P is a portable Model 4.

WHAT ABOUT SOFTWARE?

The Model 4P will run Model III disk software as well as software designed for the Model 4. A Model III emulation disk comes with the 4P. When the 4P is booted with the emulation disk, an image of the Model III ROMs is loaded into the lower 14K of memory and that area of memory is write protected. The 4P then operates as a Model III, except that it does not have cassette input/output.



The Model 4P has:

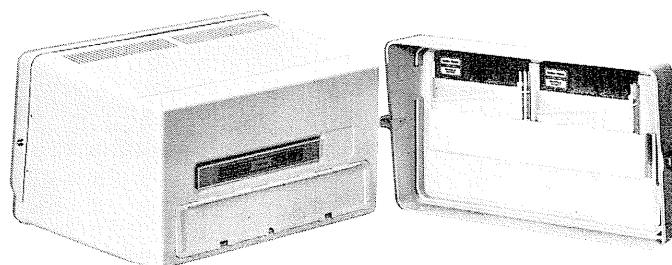
Two 5 $\frac{1}{4}$ " thinline double density floppy disk drives. Two is the maximum number of floppy disk drives available for this unit.

A 9" screen compared to the 12" screen of the Model 4

No cassette port or Model III ROMs

An optional Model 4P Modem on a user installable card (Cat. no. 26-1084)

On the back of the 4P is a recessed handle which lifts out for ease of carrying and snaps back into place when the computer is not being toted about. When it's time to transport the 4P, the keyboard is slipped into the keyboard storage space under the console display, diskettes can be conveniently stored in the cover, and the cover is snapped securely to the console via the side latches.



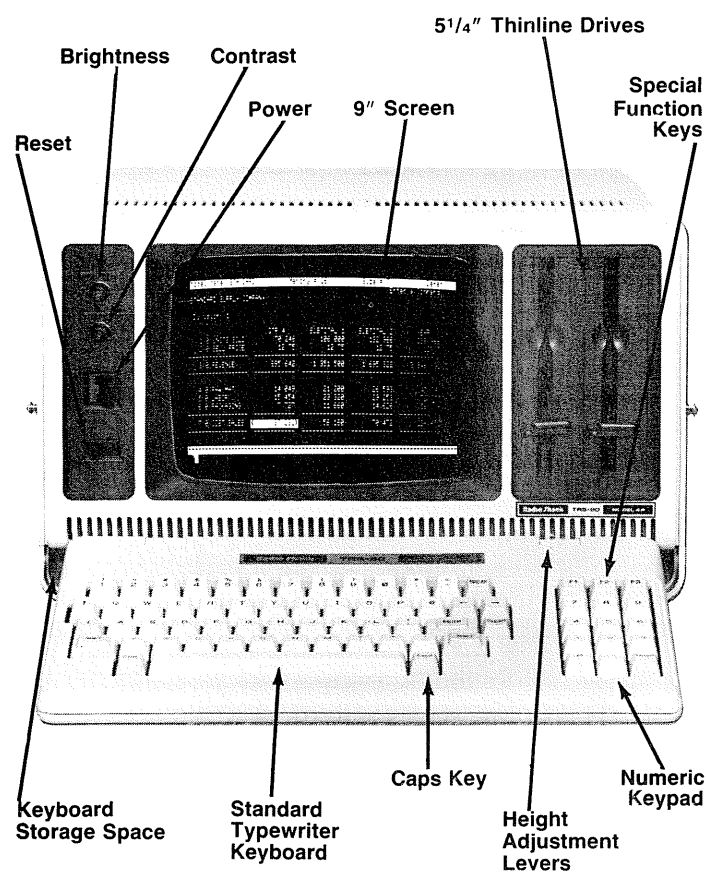
The 9" black and white, high resolution monitor has a highly readable eighty column by twenty-four line display. When in the Model III mode, you have 64 columns by 16 lines.

The Model 4P keyboard height is adjustable. With the levers at the rear of the keyboard pressed in, the keyboard lies flat for ease of storage. With the levers pulled out, the back of the keyboard is slightly elevated so that it tilts toward the operator at a slight angle.

Notice also the two thinline 5 $\frac{1}{4}$ " disk drives to the right of the display.

PORTABLE AND COMPACT

The Model 4P tips the scale at about twenty-six pounds and goes together to form a compact, easily transportable unit. The 4P is a "real" Model 4 computer which just happens to have the added feature of being highly portable.



THE MODEL 4P DIFFERENCES

The Model 4P is packaged in an attractive off-white case. The primary differences between the Model 4 and the Model 4P are cosmetic.

Writing Postcards/Labels Via the Model II/12


Ron Kuris
8822 Sheldon West Drive
Tampa, FL 33624

If you own a Model II or 12 with a printer, this may be one of the handiest tricks around.

I recently had a problem with typing a single postcard or label on my hard disk system. In order to do so, I had to exit my current program, load SCRIPSIT-HD, create a document, type the card, print the card, and then go back to programming. Now, I have an easier way.

I return to TRSDOS Ready, type **(E C H O)**, and press **(ENTER)**. Then, I hold down **(CTRL)** and press **(N)**. Lo and behold, all further keystrokes are sent to the printer. So, I type my postcard (being careful not to make mistakes), then hold **(CTRL)** again and press **(O)**. I then press **(BREAK)** which returns me to TRSDOS Ready, and re-start my application program. This saves me about two or three minutes of moving through SCRIPSIT trying to type a simple postcard. Now, I truly can throw away my typewriter.

Also note, if you have a Model 12 or a new Model 16, you can press **(F7)** instead of holding **(CTRL)** and pressing **(N)** since they have the same ASCII value.


I also use this procedure to change modes on my printer. You can send any control code to your printer in this mode (as well as the video). 

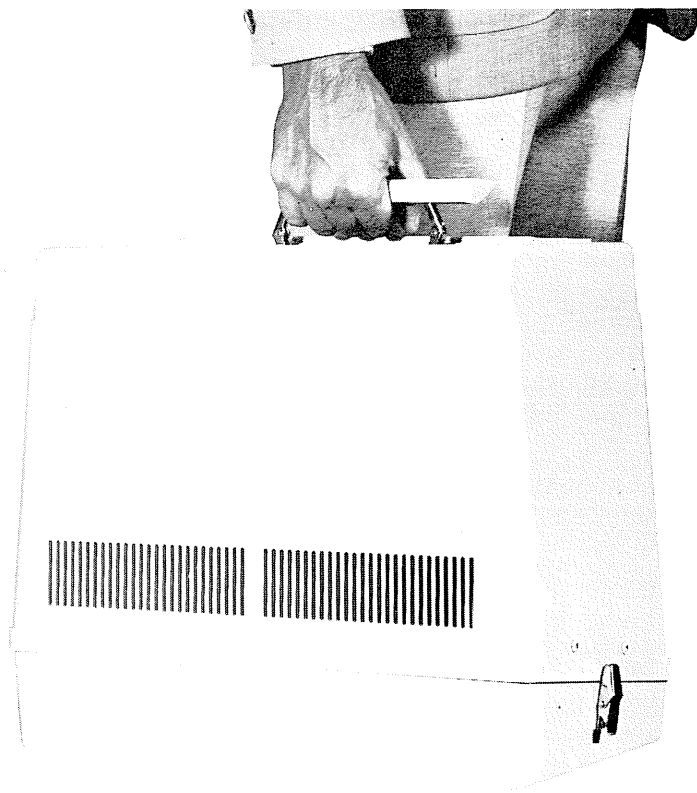
Minimum Scripsit 2.0 Diskettes

George R. Berman
84 Franklin Avenue
Yonkers, NY 10705

When you select the format utility in SCRIPSIT 2.0, you find that the last question on the menu is "Will this diskette be used in drive 0 (Y or N)?" The default response is "N." Nevertheless, I suspect that most users change that to "Y" and thus carry the entire TRSDOS and SCRIPSIT systems on every diskette. Consider the alternative.

If you select the default response, SCRIPSIT will format a diskette which has nothing on it except your documents in a large file called DOCUMENT/CTL. The directory on such a diskette has nearly twice the capacity of a full-system diskette. Not only does this save on diskette purchases, but it means fewer diskettes to search for a document.

A problem arises when you try to back up such a "minimum" diskette because SCRIPSIT requires a system diskette in Drive 0 to complete the backup process. Thus, unless you have three drives you cannot backup a "minimum" diskette within SCRIPSIT. The solution lies in TRSDOS. With the "minimum" diskette in Drive 1 and a SCRIPSIT system diskette in Drive 0, exit to TRSDOS. Type "BACKUP 1 TO 0". When TRSDOS asks if the destination diskette is ready, put your backup diskette in Drive 0 and answer "Y". The backup will run to completion and then ask you to return a system diskette to Drive 0. All done with one diskette swap. 



A PORTABLE MODEL 4

The Model 4P has many of the same powerful features as the Model 4 including:

- 64K RAM—expandable to 128K
- Z-80A microprocessor
- Three special function keys
- Caps key
- Key Click

A version of TRSDOS which is datafile compatible with LDOS 5.1.3

Optional use of the CP/M operating system with no additional hardware card installation needed (not yet available)

TRSDOS 6.0 which is the same powerful operating system the Model 4 uses. TRSDOS 6.0 features include a print spooler, a communications program, and job control language (JCL).

Parallel printer interface


RS232C interface

An 80 column by 24 line display with upper and lower case in the Model 4 mode and a 64 column by 16 line display under TRSDOS 1.3 or LDOS 5.1.3 in the Model III mode


Reverse video

Sound—One voice, seven tones

Microsoft BASIC

MEMDISK, a feature which simulates a disk drive in available memory either within the standard 64K or using the additional 64K bank of memory. 

AND SO . . .

The TRS-80 Model 4P is an attractive, powerful machine which already can run thousands of available programs. It is a full fledged Model 4 computer that just happens to be portable. 

Business Graphics Analysis Pak— Added Support, New Features

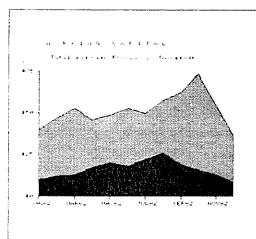
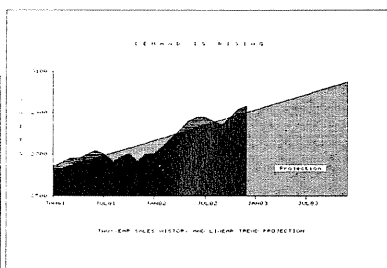
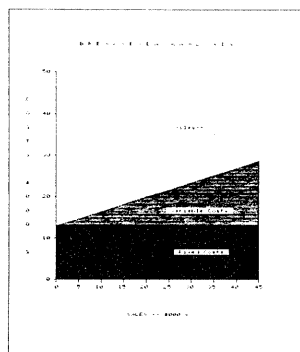
Business Graphics Analysis Pak, which makes it easy to obtain a variety of business charts, has been significantly enhanced by its developers at TimeWare Corporation.

Originally designed for the Model III TRS-80 microcomputer and announced in the December 1982 issue of *TRS-80 Microcomputer News*, Business Graphics has been upgraded for use with Model II and high-resolution devices.

The new Model II version of Business Graphics requires at least one disk drive and 64K RAM and includes such added capabilities as pie charts with detached slices and scatter charts based on up to three sets of data. The Model II version can also be used with the Model 12 or the Model 16 in II mode.

The upgraded Model III version of Business Graphics requires two disk drives and 48K RAM and can also be used with Model 4 in Model III mode.

Both versions offer high-resolution for both screen displays and printed output.



Line Charts

ADVANTAGES OF HIGH RESOLUTION

How do high-resolution graphics differ?

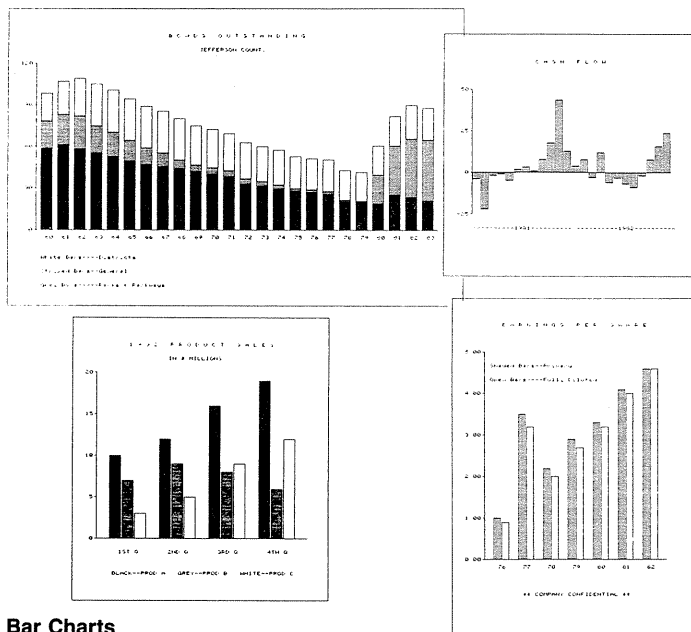
- Charts are more precise, as the data points can be placed more accurately.
- Curved lines are smoother.
- More shading types are available, and all shading is finer grained.
- Because fine outlines are used, very small bar segments and pie slices—often hidden in low-resolution charts—can be clearly defined.

In short, high-resolution means more accurate and more attractive charts!

HIGH-RESOLUTION GRAPHICS BOARD

If your TRS-80 microcomputer has the high-resolution graphics board, you can obtain screen displays that match the high-resolution printed output.

Large charts that overflow the low-resolution screen can be viewed in their entirety in high-resolution, as the display is reduced to fit the viewing area.



Bar Charts

OUTPUT DEVICES SUPPORTED

You can obtain printed copies of your Business Graphics charts with any of the following Radio Shack printers:

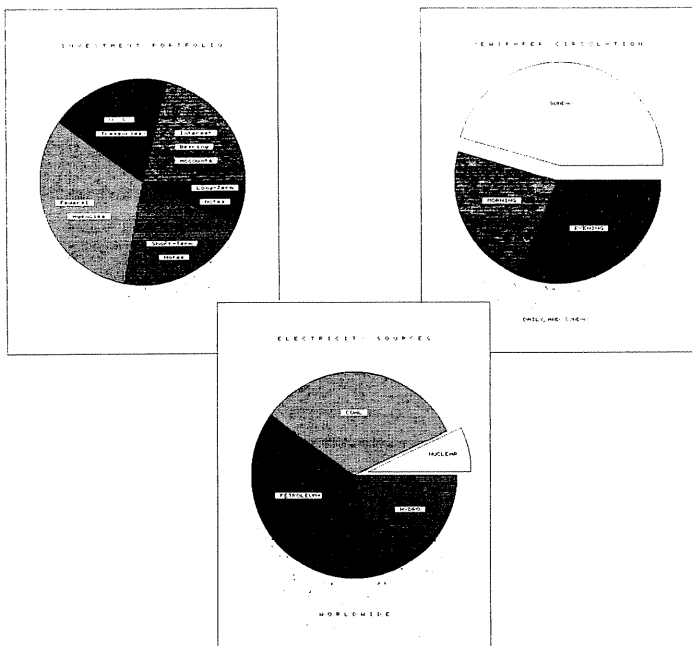
- Dot Matrix printers DMP 100, 200, 400, 500, and 2100
- Line Printers V, VI, VII, and VIII
- Daisy Wheel II and DWP 410 printers

All the charts illustrated in this article were produced on a DMP 500 printer.

If you have the Multi-Pen Plotter, you can produce charts in up to six colors, drawing the charts either on paper or directly on transparency film for use with an overhead projector.

HOW BUSINESS GRAPHICS CHARTS ARE CREATED

To create a chart with Business Graphics, all you need to do is select the chart type and supply your data. Your chart is set up automatically—scaled, labeled, and laid out to suit the printer or plotter you are using.

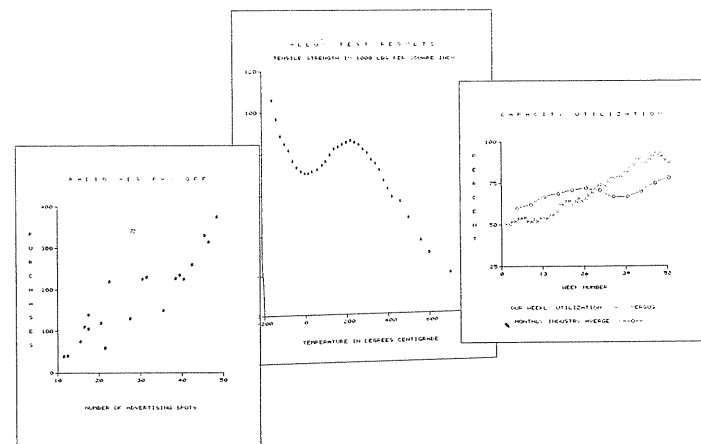


Pie Charts

If you prefer to control the format, menu selections make it easy to insert titles, request automatic time labels, change the size or scale of the chart, and add a frame.

While your chart is displayed on the screen, you can edit the text—inserting, changing, or deleting characters. You can use the arrow keys to move text around on the screen, placing the text wherever you want it, in or about the chart. When satisfied with the results, you can produce a hard copy of the chart on your printer or plotter.

Charts and chart settings can be saved for future use. You can use the same settings with different data to produce a series of related charts, or for quick output of charts used for periodic reporting.



Scatter Charts

CHART DATA

Data for your Business Graphics charts can be entered at the terminal, brought in from a disk file, or generated by the program. Virtually any type of file—VisiCalc, SCRIPSIT, BASIC, FORTRAN—can be used. (Some file types require conversion with a utility supplied with the package.)

You can edit data—adding, deleting, or changing values. You can transform data with various built-in functions—consolidating data, smoothing out fluctuations with a moving average, computing a trend and projecting it into the future, and then use that transformed data to produce more meaningful charts.

CHARTS TYPES

Four types of charts are available:

- **Line charts** emphasize trends over a period of time. Charts may obtain up to three curves, each based on up to 100 points.
- **Bar charts** pinpoint individual values and are effective for comparisons. Charts may contain up to 100 bars, and the bars can be stacked with up to three segments or clustered in groups of up to three bars.
- **Pie charts** compare parts to a whole and may contain up to 12 slices. With Model II, individual slices can be detached from the center of the pie.
- **Scatter charts** can be used to show relationships between data, to plot data with different time intervals, to lead or lag curves, even to create designs or logos. With Model II, charts can be based on up to three sets of data, each comprising up to 100 pairs of values.

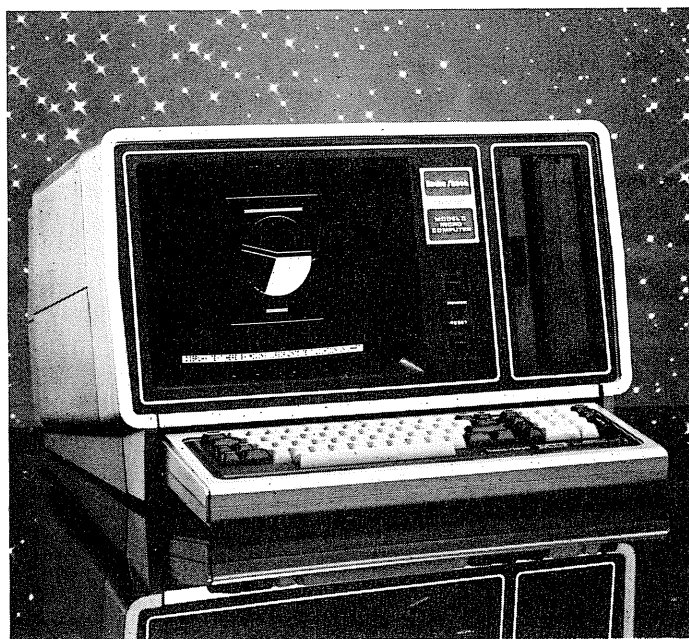
Chart width can range from 2 to 11 inches, and chart height from 3¹/₃ to 11 inches. Any chart can be framed.

Solid, dashed, or dotted lines can be used for curves, and any character can be specified for the data points. Curves, bars, bar segments, and pie slices can be shaded.

If you have the Multi-Pen Plotter, you can specify the color to be used for the curves, data points, bar or slice outlines, shading, and text.

WHY USE GRAPHICS?

Communications professionals use charts to convey numeric information quickly and clearly. Charts show what the numbers mean and make the information easier to remember.



The Assembly Is Getting Out of Hand, Call the Supervisor

Jean-Pierre Radley
320 Central Park West
New York, NY 10025

“Si non è vero, è ben’ trovato” . . . Italian proverb

My first computer was the Radio Shack hand-held PC-1. I learned BASIC on it by brute force. Three months later(!) I decided I was ready for the Model II. Opening its Manual was a bit short of devastating, but I forged ahead on my own in the wee hours. I was soon into Supervisor Calls and assembly language. I had two guides, Barden’s *TRS-80 Assembly Language Programming* (RS #62-2006) and Rosenfelder’s *BASIC Faster and Better* (RS #62-1002).

Think of an SVC as a subroutine which finds its marching orders in the low part of RAM where TRSDOS lives. Even the BASIC interpreter does not contain every last byte needed for one of its commands; a lot of its work is done by SVC’s.

To start playing with SVC’s, you need to read the DEBUG section of your Manual; you need an even dozen of Z-80 instructions; you need to be patient, careful, and accurate. Even without any Z-80 reference works, you could crib the necessary codes from the sample programs given in the Owner’s Manual. The essential dozen is in Fig. 1.

| MNEMONIC | CODE | RESULTS |
|----------|-------|-------------------------------|
| LD A,n | 3E n | load register A with n |
| LD B,n | 06 n | load register B with n |
| LD C,n | 0E n | load register C with n |
| LD D,n | 16 n | load register D with n |
| LD E,n | 1E n | load register E with n |
| LD H,n | 26 n | load register H with n |
| LD L,n | 2E n | load register L with n |
| RST 8 | CF | jump to execute the SVC |
| RET | C9 | return to where you came from |
| LD BC,ij | 01 ij | load registers B & C with ij |
| LD DE,ij | 11 ij | load registers D & E with ij |
| LD HL,ij | 21 ij | load registers H & L with ij |

Figure 1.

In the case of the last three, you must write code in the LSB/MSB format used by the Z-80, and you must always write values in hexadecimal (when hand-assembling code, that is; assembler programs accept values in any base, and addresses in “normal” MSB/LSB). If you need to load B with 66 and C with 60, first “hex” those values: 66D = 42H, 60D = 3CH. Then your four bytes of code are: 06 42 0E 3C, using the second and third instructions in Fig. 1. You can do the same thing in three bytes with the antepenultimate instruction: 01 3C 42.

From TRSDOS READY, type **DEBUGON** (ENTER), then **DEBUG** (ENTER). Type **M**, then some two-byte hex values, and use the up- and- down arrows. You can’t get below 2800H, nor beyond F3FFH. The lower part is for TRSDOS itself, and the upper is for routines

like DEBUG, DO, or SPOOL. The area between F000H and F3FFH is locked out to BASIC or VisiCalc or any other program. However, we can use it for short assembly language programs which will not be disturbed by loading other programs. If you wanted to put these exercises at E000H, and you were also using BASIC, then you would enter BASIC with -M:57344. To exit DEBUG, type **ESC** and either **S** or **O**. **S** returns to TRSDOS with DEBUG still on while **O** turns DEBUG off before returning to TRSDOS.

(Editor’s note: the 4.x series of Model II/12/16 TRSDOS operating systems reserve the right to use all memory above F000H. If user machine language routines are written so that no portion of them exceeds F000H, then there is no chance of them being overwritten by TRSDOS. Remember, however, to protect the routine from being overwritten by a BASIC or COBOL program.)

VDLINE

Let’s start with SVC#9 which is called VDLINE. The Manual says, “This routine writes a buffer of data to the Display, starting at the current cursor position . . .” If DEBUG is on, type **DEBUGENTERMF0000**. If DEBUG is not on, type **DEBUGON** (ENTER). Hit the **F1** key; if the cursor’s not in the upper left corner, try **ESC M F1**. We’re going to “hand-assemble” a little buffer of data. Use **TAB** or the four arrow keys to high-light position F040H. Consult Fig. 2. Type **09 1A 20 41 4C 4C 20 41 42 4F 41 52 44 20 19**. Now get the cursor to F000H (just hit **F2MF000** (OF1)).

The Manual says that A must have the SVC’s number, B the number of characters to be sent to Display, C an optional end-of-line character, and (HL)—the parentheses means HL has the address, or “points to”—must be the location of the buffer of data. So we need to issue these orders:

Load A with 09D = 09H SVC VDLINE
Load B with 15D = 0FH length of the message
Load C with 13D = 0DH code for carriage-return
Load HL with F040H where the buffer starts.
From Fig.1 we find our four instructions to be:

3E 09 06 0F 0E 0D 21
40 F0 (40 F0 is in LSB/MSB order!)

Type them starting at F000H (without the extra spacing that I’ve put in between the four groups). Two more instructions: **CF** invokes the SVC instructions that were just entered, and **C9** which will return to the address saved in the stack (look at SP on the video,) or else the CPU will hunt past the end of this program and find some code to execute which may or may not be to our liking.

TRS-80 Model II DEBUG Program

```

F000 3E 09 06 0F 0E 0D 21 40      F0 CF C9 00 FF 00 FF 00 >.....!@.....
F010 FF 00 FF 00 FF 00 FF 00      FF 00 FF 00 FF 00 FF 00 .....
F020 FF 00 FF 00 FF 00 FF 00      FF 00 FF 00 FF 00 FF 00 .....
F030 FF 00 FF 00 FF 00 FF 00      FF 00 FF 00 FF 00 FF 00 .....
F040 09 1A 20 41 4C 4C 20 41      42 4F 41 52 44 20 19 00 . . ALL ABOARD . .
F050 FF 00 FF 00 FF 00 FF 00      FF 00 FF 00 FF 00 FF 00 .....
F060 FF 00 FF 00 FF 00 FF 00      FF 00 FF 00 FF 00 FF 00 .....
F070 FF 00 FF 00 FF 00 FF 00      FF 00 FF 00 FF 00 FF 00 .....
PC      SP      SZHPNC      AF      BC      DE      HL      IX      IY      AF'      BC'      DE'      HL'
F0000  21FE  000000  0000  0000  0000  0000  0000  0000  0000  0000  0000  0000
?O

```

DEBUG is now OFF
TRSDOS READY

Figure 2.

NOW, (using Fig.2) CHECK ALL THE ENTRIES VERY CAREFULLY! Weird things in the middle of the night will grab you, if you made a mistake. Press (F2) to leave DEBUG's edit mode. Type (J); type (F00000). Now PC, the program counter should read "F000," the next address the CPU is to go to for an order. Is the diskette backed up? Light up, drink up, or stand up. Let's continue: type (C). Hey!

Terrific the first time you do it yourself, but hardly of major usefulness. The point is, though, that every SVC can be performed using the simple Z-80 commands given here in Figure 1: LOAD A, B, C, D, E, F, H, or L with the values required under the description of the SVC, RST 8, and RET.

PRINIT, PRCHAR, AND PRLINE

Now we'll do something more practical which I cooked up because my VisiCalc printouts were requiring too much cutting and pasting of large sheets. Originally I had VisiCalc issue a set-up string to my LP-V: (ESC) (CTRL) (N) translates to 1B 0E, the CONDensed STaRt code. Fine, the printer would now be in condensed mode, but TRSDOS would still issue carriage returns after 132 characters on a line; now I'd type /SE (Execute System command) FORMS [W = 198] to fill up the entire width of my paper. Here's where elementary hand-assembly in the DEBUG did the job faster. We're going to use three SVC's:

- #17 PRINIT the SVC underlying FORMS [P = L = W =]
- #18 PRCHAR send one character to the printer
- #19 PRLINE send a line of characters to the printer

For a new VisiCalc printout, we want PRCHAR first to issue a top-of-page command from wherever the printer now is on the page. The other two SVC's need to be used together. PRLINE gives instructions to the printer about type size; PRINIT gives matching instructions to TRSDOS'

bookkeeping. Open your Manual to these SVC's, and we'll put the printer in condensed mode with this data: (also check your printer manual to see if it uses the same control codes as Line Printer V).

```

CON STR      "1B 0E" starts condensed mode on LP-V
1/6"L       "1B 36" 6 lines/inch (normal) on LP-V
Page length  = 66D = 42H
Lines printed = 60D = 3CH
Max chars/line = 198D = C6H
Top of page  = 12D = 0CH
SVC PRINIT   = 17D = 11H
SVC PRCHAR   = 18D = 12H
SVC PRLINE   = 19D = 13H

```

At F000H, type the message for the printer:

1B 0E 1B 36

At F004H, load A with 18D

3E 12 'PRCHAR

At F006H, load B with top-code:

06 0C

At F008H, do PRCHAR, send 0CH to the printer:

CF

At F009H, load A with 19D:

3E 13 'PRLINE

At F00BH, load B with the length of the message:

06 04

We do not load C with anything as we don't need any other character after the four byte buffer.

At F00DH, load HL with the message address:

21 00 F0

(remember LSB/MSB).

At F010H, do PRTLINE, send message to the printer:

CF

TRS-80 Model II DEBUG Program

```

F000 1B 0E 1B 36 3E 12 06 0C      CF 3E 13 06 04 21 00 F0 . . . 6> . . . > . . . ! . .
F010 CF 3E 11 01 3C 42 16 C6      CF C9 FF 00 FF 00 FF 00 . > . . B . . . . .
F020 FF 00 FF 00 FF 00 FF 00      FF 00 FF 00 FF 00 FF 00 .....
F030 FF 00 FF 00 FF 00 FF 00      FF 00 FF 00 FF 00 FF 00 .....
F040 FF 00 FF 00 FF 00 FF 00      FF 00 FF 00 FF 00 FF 00 .....
F050 FF 00 FF 00 FF 00 FF 00      FF 00 FF 00 FF 00 FF 00 .....
F060 FF 00 FF 00 FF 00 FF 00      FF 00 FF 00 FF 00 FF 00 .....
F070 FF 00 FF 00 FF 00 FF 00      FF 00 FF 00 FF 00 FF 00 .....
PC      SP      SZHPNC      AF      BC      DE      HL      IX      IY      AF'      BC'      DE'      HL'
2800  21FE  000000  0000  0000  0000  0000  0000  0000  0000  0000  0000  0000
?O

```

DEBUG is now OFF
TRSDOS READY
DUMP CONSR6 START = F000 END = F019 TRA = F004

Figure 3.

TRS-80 Model II DEBUG Program

| | | | | | | | | | | | | | | | | | | | | |
|------|--------|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------------|------|------|------|
| F000 | 1B | 0E | 1B | 36 | 3E | 12 | 06 | 0C | CF | 3E | 13 | 06 | 04 | 21 | 00 | F0 | ... 6> ...> ...! | | | |
| F010 | CF | 3E | 11 | 01 | 3C | 42 | 16 | C6 | CF | C9 | FF | 00 | FF | 00 | FF | 00 | .> . B | | | |
| F020 | 1B | 0E | 1B | 38 | 3E | 12 | 06 | 0C | CF | 3E | 13 | 06 | 04 | 21 | 20 | F0 | ... 8> ...> ...! | | | |
| F030 | CF | 3E | 11 | 01 | 50 | 58 | 16 | C6 | CF | C9 | FF | 00 | FF | 00 | FF | 00 | .> . PX | | | |
| F040 | 1B | 0F | 1B | 36 | 3E | 12 | 06 | 0C | CF | 3E | 13 | 06 | 04 | 21 | 40 | F0 | ... 6> ...> ...!@ . | | | |
| F050 | CF | 3E | 11 | 01 | 3C | 42 | 16 | C6 | CF | C9 | FF | 00 | FF | 00 | FF | 00 | .> . B | | | |
| F060 | FF | 00 | FF | 00 | FF | 00 | FF | 00 | FF | 00 | FF | 00 | FF | 00 | FF | 00 | | | | |
| F070 | FF | 00 | FF | 00 | FF | 00 | FF | 00 | FF | 00 | FF | 00 | FF | 00 | FF | 00 | | | | |
| PC | SZHPNC | | AF | | BC | | DE | | HL | | IX | | IY | | AF' | | BV'DE' | | HL' | |
| 2800 | 21FE | 000000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 |

? O

DEBUG is now OFF

TRSDOS READY

DUMP CONSTR8 START = F020 END = F039 TRA = F024

TRSDOS READY

DUMP CONEND START = F040 END = F059 TRA = F044

Figure 4.

Now we need to initialize TRSDOS printer driver. You should be at F011H. Proceed:

At F011H, load A with 17D: 3E 11 'PRINIT
 At F013H, B and C get the 66D and 60D values (in the usual LSB/MSB pattern): 01 3C 42
 At F016H, get the 198D into D: 16 C6
 At F018H, RST 8: CF
 At F019H, finally, a RETURN statement: C9

You should have written bytes from F000H to F019H inclusively. CHECK YOUR CODE against Figure 3 before fixing it in RAM with the F2 key.

While the first four bytes are codes that we want to send to the printer, we have no idea what kind of instructions they represent for the Z-80 or what mischief they might cause if we tried to execute them as Z-80 code. Program execution starts at the fifth byte. Type (F2) (J), answer the prompt (F0004). Type (C) to continue the CPU's work at location F004H. If the printer was off, nothing much will happen since we haven't provided any error-reporting commands to act on those Z and NZ exit conditions described under each SVC. If the printer was on, it should have moved to a fresh page and be in condensed mode.

Let's do it again in slow motion. Go back to DEBUG at location F000H. ESC cancels the M prompt. Type (B), then (1), then (F0008B2F010B3F018B4F019). DEBUG will break execution at each D7 it has substituted for a CF or C9, until you type C again. Again J(ump) to F004H. Type (C) four times, slowly, and watch the register contents change on the screen. Without the breakpoints—type (E)(mpty)—the Z-80 proceeds at its 4 MHz clock rate.

You don't imagine that we're going to do a J and a C in DEBUG each time we want to get small printing? Get the code on the screen again, type (ESC) and (O) which will turn off DEBUG and return you to TRSDOS. Now, turn to the DUMP instructions. We need a filespec to store our routine, say CONSTR6. The syntax is: DUMP CONSTR6 [START = F000 END = F019 TRA = F004]. It costs an entire granule of disk space, but it's awfully fast. In VisiCalc, to get small printing you now type (7) (S) (E) (C) (O) (N) (S) (T) (R) (6) (ENTER). The command in BASIC is: (S) (Y) (S) (T) (E) (M) (" (C) (O) (N) (S) (T) (R) (6) ").

Our next objective is to compress printing not just horizontally, but also vertically. If the code isn't still at F000H, there's a quick way to get it there. If DEBUG is ON, any program name typed from TRSDOS READY will take you into DEBUG and wait at its TRAnsfer address. So type (D) (E) (B) (U) (G) (O) (N), then (C) (O) (N) (S) (T) (R) (6). Type (M) (F) (O) (O) (O) (ESC). Most of the new code will be identical, so we'll copy it by typing (L). Answer the start, end, and transfer prompts with F000, F019, and F020. Type (M), (F1). Change the following bytes:

At F023H 36 → 38 (for 8 lines per inch)

At F02EH 00 → 20 (LSB of the message address)

At F034H 3C 42 → 50 58 (print 80 lines out of 88)

This program gets DUMPed as CONSTR8 (D) (U) (M) (P) (C) (O) (N) (S) (T) (R) (8) (S) (T) (A) (R) (T) (=) (F) (0) (2) (0) (E) (N) (D) (=) (F) (0) (3) (7) (T) (R) (A) (F) (F) (0) (2) (4).

You can see in Figure 4, from F040H to F059H, another routine which cancels either of the first two: CONEND.

If you want to use these routines from BASIC, there's no need to do a disk access each time. These little programs have non-overlapping RAM addresses, so you can load each of them only once with three commands of the form SYSTEM"filespec." Now that these cuties are sitting there from F000H upwards what's the equivalent in BASIC to the J(ump) and C(ontinue) commands used in DEBUG?

USR0 to USR9 are fixed two-byte locations in BASIC's area of RAM (from 2B2AH to 2B3DH). The DEFUSRn command loads USRn with an address. It says, "Here's an address." The statement J%=USRn() is really a GOSUB to an operation external to your BASIC program. It says, "continue at the address stored in USRn." (e.g. to execute CONEND with USR # 8: J%=0: DEFUSR8 = &HF044: J%=USR8(0)). It's a pretty fast way of getting a fresh page with different print sizes.

You could DUMP all three routines into ONE file, say CHGPRINT, START = F000H, END = F059H, specifying no TRAnsfer address, but putting RORT=R into your DUMP parameters so that the file would load, not execute, and then return. Then DEFine the USer addresses as the respective points where each little program is meant to start and where it will run until the C9 instruction returns to your BASIC program. So, to get condensed print, 8 lines to the inch, pick any USR number, say 5. DEFUSR5 = &HF024: J = USR5(0). (The zero is a dummy parameter in this case. You can reDEFine USR # 5 over and over, or use a different number for each routine.) For still more flexibility, if you don't want a Top-of-page, start after the PRCHAR segment. For CONEND (normal printing) without starting a fresh page: DEFUSRn = &HF049. Enjoy!

Musical Notes

by Bryan Eggers
Software Affair, Ltd.

"I can't believe that your computer is really making that music! You must have a tape recorder hidden under the table."

No, we don't have a phonograph up our sleeve, either. It's Radio Shack's new STEREO music synthesizer, Orchestra-90™ (26-1922), in its Special Composer's Edition.

Anyone with a TRS-80 Model III or 4, Level II 16K tape or disk system can create amazing music and percussion in up to FIVE simultaneous notes ("voices") in STEREO! Each voice may be assigned any of five different instrument sounds: organ, oboe, clarinet, trumpet or violin. In addition, each of these instrument registers may be modified to produce new user-defined sounds.

Orchestra-90 allows transcription and synthesis of any written sheet music, even if the user has NO MUSICAL KNOWLEDGE whatsoever! The powerful music language allows professional musicians to utilize the system, too. In fact, Orchestra-90 has been used in education, live stage performances, and radio commercials. It was recently used to synthesize all the music for an album by a contemporary composer, Robb Murray. He used Orchestra-90 to compose and play every song!

The system consists of a small interface box containing two precision digital-to-analog converters that convert the digital output of the computer into stereo audio signals. The interface plugs into the 50-pin connector on the bottom of the computer.

No internal modifications are required to the computer, no additional power supply is required, and the interface has no effect on normal operations of the computer. Two phono jacks on the box supply the stereo music output. These are connected to the TAPE, TUNER, or AUXILIARY inputs of any stereo amplifier or receiver using standard phono cables (available at Radio Shack).

The heart of the Orchestra-90 system is a single software program. This software functions as a full-screen text editor, compiler, and digital synthesizer. This allows complete input, modification, compilation, and play of music without leaving the master program, which uses less than 8K of memory. The balance of memory is available for creating your music file. Orchestra-90 files are extremely compact, using about 1K of memory per minute of playing time. Files may be saved to tape or disk for future play or modification. Four sample music files are included with the system.

Music files can also be transmitted via modem to your friends. An additional source of music files and information is the free Orchestra-90 Special Interest Group on the CompuServe Information Service. Support for the Orchestra-90 is provided by Software Affair, Ltd., the designers of Orchestra-90. After logging into CompuServe, type "GO

HOM-5". A menu gives you two choices: the Orchestra-90 ARCHIVES area or the Orchestra-90 SIG area.

The ARCHIVES is a permanent storage area for Orchestra-90 information. The Orchestra-90 SIG contains the message center for users, as well as databases containing over 300 music files plus many utility programs, including a FREE smart terminal program, ORCTERM! You can use this program or VIDTEX to download music files from the XA2 database. The uploading and downloading procedures are explained in the Orchestra-90 manual.

TRANSCRIBING MUSIC

You don't "play" the keyboard to produce music with Orchestra-90. You teach your computer how to play any piece of sheet music!

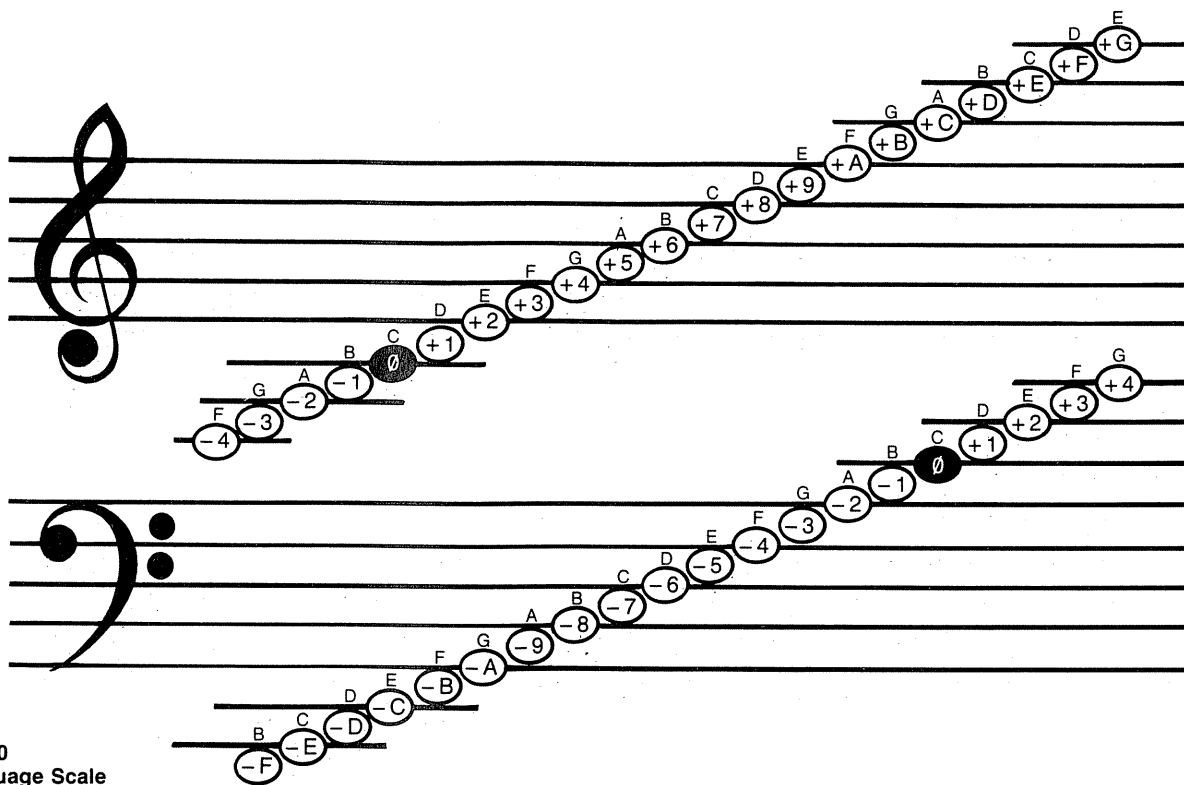
You do this by creating a text file that represents your sheet music in Orchestra-90's symbolic code. This file will then be interpreted by the system's internal music language compiler. Once compiled (in only a couple of seconds), the piece can be played. An additional compile command allows you to play from any cursor location in the music file. You can listen to each measure as you enter it, or the last couple of measures, etc. This transcription system is faster than any other music system available for any computer. Proof of this is an estimated 10,000 Orchestra-90 music files already in circulation! One user we know, Jim Sheldon, has already arranged over 800 songs!

Transcribing music is very easy. Each note requires only two pieces of information to be properly transcribed in Orchestra-90 notation. You need to input the duration (length) of the note and its position (pitch) on the musical staff. If you aren't familiar with standard music notation you simply compare each note on your sheet music to a reference chart in the manual, then insert the equivalent Orchestra-90 music language symbols into your music file. The compiler indicates the location and type of any syntax errors found in the file. Adults and children can learn to use this system very quickly.

Orchestra-90 can be used to transcribe music written in any key or time signature. The synthesizer can play whole notes through sixty-fourth notes, with a range of over six octaves. Notes may be single, double or triple-dotted and/or played as triplets. Accidentals are also supported, as are repeats, multiple endings, and modulations.

The tempo of the music can be defined and changed anywhere in the music file. You can even experimentally determine a new tempo setting while the music is playing by pressing special key combinations. Then, you can edit the new value permanently into your music file.

Sections of the music file can be repeated at different tempos and/or with different voice/instrument assignments without retyping any of the repeated section.



**Orchestra-90
Music Language Scale**

The manual explains how to transcribe any piece of sheet music. Examples are given and described in detail. This kind of direct transcription of sheet music requires no musical knowledge, but once you become familiar with music notation and the Orchestra-90's capabilities, you'll discover many interesting ways of enhancing your transcription. Remember, sheet music is normally written for humans to play, but ORCH can play faster and more complicated arrangements than any human, and it never gets tired or makes mistakes! You can make some truly dazzling musical arrangements with this system.

The stereo mapping command allows you to determine which voices play through each of the two stereo channels. Voices may be switched from speaker-to-speaker at any point in the music file.

Each of the voices may play using any of the five default instrument registers. For example, you might have all the voices playing with the organ sound, or maybe two trumpets, one oboe and one clarinet, or any combination you like. You can change these instrument assignments at any point in the music file. Orchestra-90 is a true digital music synthesizer that creates all necessary waveform tables in memory. No "sound chips" are used. Different instrument sounds are produced by adding multiple harmonics ("partials") to the fundamental tone. Orchestra-90 allows you to define the relative loudness of up to eight partials that make up each of the five different instrument registers. You can also define the relative loudness of each instrument. Each music file can be saved with its own special instrument definitions.

If you are a singer or musician, you can set the melody voice to a loudness of 0 (silent). This allows you to practice singing or playing the melody while Orchestra-90 accompanies you by playing the rest of the arrangement.

Normally, Orchestra-90 plays consecutive notes as if they were "tied," in other words, without even a whisper of

silence between them (the musical term is "legato"). But, each individual note can be assigned one of four optional levels of articulation. Articulation shortens the note and separates it from the following note, making it more distinct. This simulates the musical effects of "portato" and "staccato."

Not in your key? Orchestra-90 will play the song in any key you like. It takes only seconds to transpose the arrangement up to two octaves up or down, adjustable in half-step increments. In addition to this overall song transposition, Orchestra-90 allows the transposition of each individual voice up or down in full step increments. For example, you might feel that the arrangement might sound better if the bass were played an octave lower. Again, it's just a matter of changing a couple of symbols in your music file.

Orchestra-90 can also produce percussion effects. There are two general types of percussion available, sine-wave and random. Sinewave percussion creates the "hollow" percussive effects like drums and wooden blocks, while random percussion can be used to create "noisy" effects like cymbals. You can define your own percussion instruments.

Several music files can be played automatically with one command, just like a jukebox. This is possible with both the tape and disk versions of Orchestra-90.

A separate utility, ORCHUTIL, is also included. This program allows the user to do tape/disk file transfers, remove unnecessary spaces and measure numbers from music files to reduce their size, do certain global character changes, convert files to ASCII for uploading/downloading on BBS systems, and do 500/1500 baud tape conversions.

In future articles we'll explain specific transcription techniques, arranging tricks, special effects, new instrument definitions, use of the utility programs, the ORCH-90 SIG on CompuServe and maybe even a little music theory!

Orchestra-90 is a trademark of Software Affair, Ltd.

Model 100 ROM Routines

This is a description of Model 100 ROM routines and addresses. Although not thoroughly tested, the information is correct to the best of our knowledge. It is provided for your convenience.

LCD FUNCTIONS AND ESCAPE CODES

Routines for generating common LCD functions and Escape Codes. These functions have no entry or exit parameters.

| Function Name | Entry Address | Equiv. ESC | Description |
|---------------|---------------|------------|---|
| CRLF | 4222H | — | Generate a Carriage Return and Line Feed. |
| HOME | 422DH | — | Move cursor to Home position (1,1). |
| CLS | 4231H | — | Clear Display. |
| SETSYS | 4235H | T | Set system line (lock LCD line 8). |
| RSTSYS | 423AH | U | Reset system line (unlock LCD line 8). |
| LOCK | 423FH | Y | Lock LCD display (no scrolling). |
| UNLOCK | 4244H | W | Unlock LCD display (scrolling). |
| CURSON | 4249H | P | Turn on cursor. |
| CUROFF | 424EH | Q | Turn off cursor. |
| DELLIN | 4253H | M | Delete a line on LCD at current line. |
| INSLIN | 4258H | L | Insert a blank line on LCD at cursor. |
| ERAEOL | 425DH | K | Erase from cursor to End Of Line. |
| ENTREV | 4269H | p | Set reverse character mode. |
| EXTREV | 426EH | q | Turn off reverse character mode. |

LCD VARIABLE AND STATUS LOCATIONS

| Name | Address | Contents |
|--------|---------|---------------------------|
| CSRY | F639H | Cursor Position (ROW). |
| CSRX | F63AH | Cursor Position (COLUMN). |
| BEGLCD | FE00H | Start of LCD memory. |
| ENDLCD | FF40H | End of LCD memory. |

DIRECTORY TABLE

| | | |
|--------|-------|---|
| DIRTBL | F962H | Directory table, contains all file location, status and type information. |
|--------|-------|---|

Each file in the system is managed by an 11 byte directory entry in the following format:

- Byte 1 : Directory Flag (indicates file type and status).
- Bytes 2-3 : Address of file
- Bytes 4-11 : Eight (8) byte filename.

The directory flag contains the following information:

| | |
|-------------|--------------------------------|
| Bit 7 (MSB) | 1 if a valid entry |
| Bit 6 | 1 for ASCII text file (.DO) |
| Bit 5 | 1 for machine lang. file (.CO) |
| Bit 4 | 1 for ROM file |
| Bit 3 | 1 for invisible file |
| Bit 2 | Reserved for future use |
| Bit 1 | Reserved for future use |
| Bit 0 | Internal use only |

ROM ROUTINES

LCD FUNCTIONS

LCD—Displays a character on the LCD at the current cursor position.

Entry Address : 4B44H (or RST 4)
 Conditions: A = Character to be displayed
 Exit Conditions : none

PLOT—Turn on one LCD pixel at the specified location.

Entry Address : 744CH
 Entry Conditions: D = X coordinate (0-239)
 E = Y coordinate (0-63)
 Exit Conditions : none

UNPLOT—Turn off one LCD pixel at the specified location.

Entry Address : 744DH
 Entry Conditions: D = X coordinate (0-239)
 E = Y coordinate (0-63)
 Exit Conditions : none

POSIT—Get the current LCD cursor position.

Entry Address : 427CH
 Entry Conditions: none
 Exit Conditions : H = Column Number (1-40)
 L = Row Number (1-8)

ESCA—Send a specified Escape Code sequence.

Entry Address : 4270H
 Entry Conditions: A = Escape Code
 Exit Conditions : none

KEYBOARD FUNCTIONS

BRKCHK—Check for BREAK characters only (Control C or Control S).

Entry Address : 7283H
 Entry Conditions: none
 Exit Conditions : Carry: Set if BREAK (CNTRL-C) or PAUSE (CNTRL-S) entered.
 Reset if no BREAK or PAUSE characters.

INLIN—Get a line from the keyboard-terminated by **ENTER**.

Entry Address : 4644H
 Entry Conditions: none
 Exit Conditions : Data is stored at location F685H.

STFNK—Set Function Key definitions (F1-F8).

Entry Address : 5A7CH
 Entry Conditions: HL = Address of function table.
 Exit Conditions : none

The function table consists of character strings to be used by the keyboard driver when processing F1-F8 keys. Each string has a maximum length of 16 characters and is terminated by an 80H code. If the last character of the string is Ored with 80H, that last character can also serve as the terminator. The entire string (up to the 80H) will be placed in the keyboard character buffer when the appropriate function key is pressed. You must specify character strings for all eight function keys. To leave a key undefined, use the 80H terminator as the definition of the key. The user determines where in memory the table will reside.

Example of a function key table:

```
FCTAB      DEFM      'FILES'      ; F1
           DEFW      0D80H
           DEFM      'LOAD'      ; F2
           DEFB      80H
           DEFM      'SAVE'      ; F3
           DEFB      80H
           DEFM      'RUN'       ; F4
           DEFW      0D80H
           DEFM      'LIST'      ; F5
           DEFW      0D80H
           DEFB      80H          ; IGNORE F6
           DEFB      80H          ; IGNORE F7
           DEFM      'MENU'      ; F8
           DEFW      0D80H
```

KYREAD—Scan keyboard for a key. Return with or without one.

Entry Address : 7242H
 Entry Conditions: none
 Exit Conditions : A = Character, if any
 Z Flag:
 SET if no key
 RESET if key found
 Carry:
 SET—Character in code Table below.
 RESET—Normal character set code.

Note: Code Table is indicated if Carry is SET (1), Register A will contain one of the following:

| | |
|-----|-------------|
| A | Key Pressed |
| 0 | F1 |
| 1 | F2 |
| 2 | F3 |
| 3 | F4 |
| 4 | F5 |
| 5 | F6 |
| 6 | F7 |
| 7 | F8 |
| 8 | LABEL |
| 9 | PRINT |
| 0AH | SHIFT-PRINT |
| 0BH | PASTE |

CHGET—Get a character from keyboard. Wait for character.

Entry Address : 12CBH
 Entry Conditions: none
 Exit Conditions : A = Character code.
 Carry:
 SET if special character.
 RESET if normal character

Note: F1-F8 return preprogrammed text strings.

CHSNS—Check keyboard queue for characters.

Entry Address : 13DBH
 Entry Conditions: none
 Exit Conditions : Z Flag:
 SET if queue is empty
 RESET if keys are pending

KEYX—Check keyboard queue for characters or BREAK.

Entry Address : 7270H
 Entry Conditions: none
 Exit Conditions : Z Flag:
 SET is queue is empty
 RESET if keys are pending
 Carry:
 SET if BREAK has been entered
 RESET if any other key

CLRFLK—Clear function key definition table (fills table with 80Hs).

Entry Address : 5A79H
 Entry Conditions: none
 Exit Conditions : none

DSPFNK—Display function keys

Entry Address : 42A8H
 Entry Conditions: none
 Exit Conditions : none

STDSPF—Set and display function keys.

Entry Address : 42A5H
 Entry Conditions: HL = Start address of function table.
 Exit Conditions : none

ERAFNK—Erase function key display.

Entry Address : 428AH
 Entry Conditions: none
 Exit Conditions : none

FNKSB—Display function table (if enabled).

Entry Address : 5A9EH
 Entry Conditions: none
 Exit Conditions : none

PRINTER FUNCTIONS

PRINTR—Send a character to the line printer.

Entry Address : 6D3FH
 Entry Conditions: A = Character to be printed.
 Exit Conditions : Carry:
 SET if cancelled by BREAK
 RESET if normal return

PNOTAB—Print character without expanding tab characters.

Entry Address : 1470H
 Entry Conditions: A = Character to be printed.
 Exit Conditions : unknown

PRTTAB—Print a character, expanding tabs to spaces.

Entry Address : 4B55H
 Entry Conditions: A = Character to be printed.
 Exit Conditions : unknown

PRTLCD—Print contents of LCD.

Entry Address : 1E5EH
 Entry Conditions: none
 Exit Conditions : none

RS-232C AND MODEM FUNCTIONS

DISC—Disconnect phone line.

Entry Address : 52BBH
 Entry Conditions: none
 Exit Conditions : none

CONN—Connect phone line.

Entry Address : 52D0H
 Entry Conditions: none
 Exit Conditions : none

DIAL—Dial a specified phone number.

Entry Address : 532DH
 Entry Conditions: HL = Address of phone number information.
 Exit Conditions : none

RCVX—Check RS-232 queue for characters.

Entry Address : 6D6DH
 Entry Conditions: none
 Exit Conditions : A = Number of characters in queue.
 Z Flag:
 SET if no data.
 RESET if characters pending.

RV232C—Get a character from RS232 receive queue.

Entry Address : 6D7EH
 Entry Conditions: none
 Exit Conditions : A = Character received.
 Z Flag:
 SET if OK.
 RESET if Error (PE, FF, or OF).
 Carry:
 SET if BREAK pressed.
 RESET if no BREAK.

SENDCQ—Send an XON (Control Q) resume character.

Entry Address : 6E0BH
Entry Conditions: none
Exit Conditions : none

SENDCS—Send an XOFF (Control S) pause character.

Entry Address : 6E1EH
Entry Conditions: none
Exit Conditions : none

SD232C—Send a character to the RS-232 or Modem (with XON/XOF).

Entry Address : 6E32H
Entry Conditions: A = Character to be sent.
Exit Conditions : Unknown

CARDET—Detect Carrier-Modem only

Entry Address : 6EEFH
Entry Conditions: none
Exit Conditions : Z Flag:

SET if carrier detected.
RESET if carrier not detected.
A = 00H if carrier
= FFH if no carrier detected

BAUDST—Set BAUD rate for RS-232C.

Entry Address : 6E75H
Entry Conditions: H = BAUD rate code (1-9, M)
Exit Conditions : None

INZCOM—Initialize RS-232C and Modem.

Entry Address : 6EA6H
Entry Conditions: H = BAUD rate code (1-9, M)
L = UART Configuration code.
Carry:
SET if RS-232C
RESET if Modem

Exit Conditions : none

Note: UART Configuration code is formed in one byte as follows:

BIT 0—Specifies number of Stop Bits (0 = 1, 1 = 2)
BITS 1-2—Parity Setting: 00 = None, 01 = Even, 10 = Odd
BITS 3-4—Word Length: 00 = 6, 01 = 7, 10 = 8
The byte is ANDed with 1FH to ignore bits 5-7.

Text string containing the current STAT setting is located at F65BH (5 bytes): BAUD, Length, Parity, Stop Bits, XON/XOFF switch.

SETSER—Set serial interface parameters and activate RS-232/Modem.

Entry Address : 17E6H
Entry Conditions: HL = Start address of ASCII string containing serial parameters, terminated by a binary zero (e.g. '78E1E',0) The syntax of the string is the same as the syntax for STAT in TELCOM.
Carry:
SET for RS-232C
RESET for Modem.

Exit Conditions : none

CLSCOM—Deactivate RS-232C/Modem.

Entry Address : 6ECBH
Entry Conditions: none
Exit Conditions : none

CASSETTE FUNCTIONS

CTON—Turn cassette motor on.

Entry Address : 14A8H
Entry Conditions: none
Exit Conditions : none

CTOFF—Turn cassette motor off.

Entry Address : 14AAH
Entry Conditions: none
Exit Conditions : none

CASIN—Read a character from cassette and update checksum.

Entry Address : 14B0H
Entry Conditions: C = Current checksum.
Exit Conditions : A = Character
C = Updated checksum.

CSOUT—send a character to cassette and update checksum.

Entry Address : 14C1H
Entry Conditions: A = Character to be sent.
C = Current checksum.
Exit Conditions : C = Updated checksum.

SYNCW—Write cassette header and sync byte only.

Entry Address : 6F46H
Entry Conditions: none
Exit Conditions : none

SYNCR—Read cassette header and sync byte only.

Entry Address : 6F85H
Entry Conditions: none
Exit Conditions : none

DATAW—Write a character to cassette-no checksum.

Entry Address : 6F5BH
Entry Conditions: A = Character to be sent.
Exit Conditions : none

DATAR—Read a character from cassette-no checksum.

Entry Address : 702AH
Entry Conditions: none
Exit Conditions : D = Character from cassette

OTHER ROUTINES

MUSIC—Make tone.

Entry Address : 72C5H
Entry Conditions: DE = Frequency
B = Duration
Exit Conditions : none

Note: See the Model 100 owners manual for Frequency and Duration information.

TIME—Read system time.

Entry Address : 190FH
Entry Conditions: HL = Address of 8 byte area for TIME.
Exit Conditions : HL (←) TIME (hh:mm:ss)

DATE—Read system date.

Entry Address : 192FH
Entry Conditions: HL = Address of 8 byte area for DATE.
Exit Conditions : HL (←) DATE (mm/dd/yy)

DAY—Read system day of the week.

Entry Address : 1962H
Entry Conditions: HL = Address of 3 byte area for DAY.
Exit Conditions : HL (←) DAY (ddd)

INITIO—Cold start reset.

Entry Address : 6CD6H
Entry Conditions: none
Exit Conditions : none

IOINIT—Warm start reset.

Entry Address : 6CE0H
Entry Conditions: none
Exit Conditions : none

MENU—Go to main menu.

Entry Address : 5797H
Entry Conditions: none
Exit Conditions : none

RAM FILE FUNCTIONS

MAKTXT—Create a text file.

Entry Address : 220FH
Entry Conditions: File name (max 8 bytes) must be stored in FILNAM (FC93H). The 'DO' extension is not required.
Exit Conditions : HL = TOP address of the new file
DE = Address of directory file (Flag)
Carry: SET if file already exists.
RESET if new file

CHKDC—Search for file in directory.

Entry Address : 5AA9H
Entry Conditions: DE = Address of filename to find
(ASCII filename plus 0 byte terminator)

Exit Conditions : HL = Start address (TOP) of file.
Z Flag:

SET if file not found
RESET if file found

GTXTTB—Get TOP address of file.

Entry Address : 5AE3H
Entry Conditions: HL = Address of directory entry for file.
Exit Conditions : HL = TOP start address of file

KILASC—Kill a text (.DO) file.

Entry Address : 1FB5H
Entry Conditions: DE = TOP start address of file
HL = Address of directory entry
Exit Conditions : none

INSCHR—Insert a character in a file.

Entry Address : 6B61H
Entry Conditions: A = Character to insert
HL = Address at which to insert character.
Exit Conditions : HL = HL + 1
Carry:
SET if out of memory

MAKHOL—Insert a specified number of spaces in a file.

Entry Address : 6B6DH
Entry Conditions: BC = Number of spaces to insert
HL = address at which to insert spaces.
Exit Conditions : HL and BC are preserved
Carry:
SET if out of memory

MASDEL—Delete specified number of characters.

Entry Address : 6B9FH
Entry Conditions: BC = Number of characters to delete.
HL = Address at which to begin deleting
Exit Conditions : HL and BC are preserved.

| | |
|-------|--------------------|
| 12CBH | CHGET |
| 13DBH | CHSNS |
| 1470H | PNOTAB |
| 14A8H | CTON |
| 14AAH | CTOFF |
| 14BOH | CASIN |
| 14C1H | CSOUT |
| 17E6H | SETSER |
| 190FH | TIME |
| 192FH | DATE |
| 1962H | DAY |
| 1E5EH | PRTLCD |
| 1FB5H | KILASC |
| 220FH | MAKTXT |
| 4222H | CRLF |
| 422DH | HOME |
| 4231H | CLS |
| 4235H | SETSYS |
| 423AH | RSTSYS |
| 423FH | LOCK |
| 4244H | UNLOCK |
| 4249H | CURSON |
| 424EH | CUOFF |
| 4253H | DELLIN |
| 4258H | INSLIN |
| 425DH | ERAEOL |
| 4269H | ENTREV |
| 426EH | EXTREV |
| 4270H | ESCA |
| 427CH | POSIT |
| 428AH | ERAFNK |
| 42A5H | STDSPF |
| 42A8H | DSPFNK |
| 4644H | INLIN |
| 4B44H | LCD |
| 4B55H | PRTTAB |
| 52BBH | DISC |
| 52DOH | CONN |
| 532DH | DIAL |
| 5797H | MENU |
| 5A79H | CLRFLK |
| 5A7CH | STFNK |
| 5A9EH | FNKSB |
| 5AA9H | CHKDC |
| 5AE3H | GTXTTB |
| 5B46H | FUNCTION KEY TABLE |
| 6B61H | INSCHR |

| | |
|-------|----------------------------|
| 6B6DH | MAKHOL |
| 6B9FH | MASDEL |
| 6C93H | USED TO INIT FUNCTION KEYS |
| 6CD6H | INITIO |
| 6CE0H | IOINIT |
| 6D3FH | PRINTR |
| 6D6DH | RCVX |
| 6D7EH | RV232C |
| 6E0BH | SENSCQ |
| 6E1EH | SENDSC |
| 6E32H | SD232C |
| 6E75H | BAUDST |
| 6EA6H | INZCOM |
| 6ECBH | CLSCOM |
| 6EEFH | CARDET |
| 6F46H | SYNCW |
| 6F5BH | DATAW |
| 6F85H | SYNCR |
| 702AH | DATAR |
| 7242H | KYREAD |
| 7270H | KEYX |
| 7283H | BRKCHK |
| 72C5H | MUSIC |
| 744CH | PLOT |
| 744DH | UNPLOT |
| F639H | CSRY |
| F63AH | CSRX |
| F65BH | Current STAT setting |
| F962H | DIRTBL |
| FC93H | FILNAM |
| FE00H | BEGLCD |
| FF40H | ENDLCD |

Keysort—A Modified Quicksort for the Models II/12

Joey Rodrigue

Keysort performs a quick sort on a user defined array. First the program asks for the number of elements in the array (not more than 100 unless you change the values in the three arrays set up by the DIM statement in line 10). Then it prompts you to enter each element until all the data is entered.

Once the data is entered, the program will query you for the following information the first time the program is run and after each sort.

```
START COLUMN?  
NUMBER CHARACTERS?  
START ELEMENT NUMBER?  
NUMBER OF ELEMENTS?
```

```
1 CLEAR 20000  
10 DIM SD$(100),SK%(100),ST%(100)  
30 '  
40 INPUT "NUMBER OF ELEMENTS ";NE%  
   : NS% = NE%  
50 FOR I% = 1 TO NE%  
   : INPUT SD$(I%)  
   : SK%(I%) = I%  
   : NEXT I%  
60 '  
70 INPUT "      START COLUMN ";SC%  
80 INPUT "  NUMBER CHARACTERS ";NC%  
90 INPUT "START ELEMENT NUMBER ";SE%  
100 INPUT "  NUMBER OF ELEMENTS ";NE%  
110 '  
120 GOSUB 10000  
130 '
```

```

140 FOR I% = 1 TO NS%
    : PRINT SK%(I%),SD$(I%)
    : NEXT I%
150 '
160 GOTO 70
170 '
10000 ' KEYSORT (this is a modified QUICKSORT) x =
    max NE%
10010 ' SD$(x) = sort data array      SK%(x) = sort
    key      ST%(x) = sort temp
10020 ' NE% = number of elements to sort      SE% =
    starting element for sort
10030 ' SC% = starting character position      NC% =
    number of characters to sort
10040 ' TM$ = temporary string              TM% =
    temporary integer
10050 ' Returns string array SD$ sorted & integer
    array SK% updated as needed
10060 '
10070 ' Set start and end points for sort
10080 L1% = 1
    : ST%(L1%) = NE% + 1
10090 M1% = SE%
10100 '
10110 ' Set end of array segment & enter here for
    partial sort
10120 J1% = ST%(L1%)
10130 I1% = M1% - 1
    : ' Set start of array segment
10140 IF J1% - M1% < 3 THEN GOTO 10480
10150 M2% = INT( ( I1% + J1% ) / 2 )
10160 '
10170 ' find a large element among the small ones
10180 I1% = I1% + 1
10190 IF I1% = J1% THEN GOTO 10340
10200 IF MID$(SD$(I1%),SC%,NC%) <=
    MID$(SD$(M2%),SC%,NC%) THEN GOTO 10180
10210 '
10220 ' find a small element among the large ones
10230 J1% = J1% - 1
10240 IF I1% = J1% THEN GOTO 10340
10250 IF MID$(SD$(J1%),SC%,NC%) >=
    MID$(SD$(M2%),SC%,NC%) THEN GOTO 10230
10260 '
10270 ' exchange out-of-order elements
10280 TM$ = SD$(I1%)
    : TM% = SK%(I1%)
10290 SD$(I1%) = SD$(J1%)
    : SK%(I1%) = SK%(J1%)
10300 SD$(J1%) = TM$
    : SK%(J1%) = TM%
10310 GOTO 10180
10320 '
10330 ' array segment now divided, move compare
    elements between
10340 IF I1% < M2% THEN GOTO 10370
10350 I1% = I1% - 1
10360 '
10370 IF J1% = M2% THEN GOTO 10430
10380 TM$ = SD$(I1%)
    : TM% = SK%(I1%)
10390 SD$(I1%) = SD$(M2%)
    : SK%(I1%) = SK%(M2%)
10400 SD$(M2%) = TM$
    : SK%(M2%) = TM%
10410 '
10420 ' save starting point for array segment of
    large array
10430 L1% = L1% + 1
10440 ST%(L1%) = I1%
10450 GOTO 10120
    : ' Repeat QUICKSORT of array segment of small
    array
10460 '
10470 ' the following handles the 1 and 2 cases
10480 IF J1% - M1% < 2 THEN GOTO 10560
10490 '
10500 IF MID$(SD$(M1%),SC%,NC%) < MID$(SD$(M1% +
    1),SC%,NC%) THEN GOTO 10560
10510 TM$ = SD$(M1%)
    : TM% = SK%(M1%)
10520 SD$(M1%) = SD$(M1% + 1) : SK%(M1%) = SK%(M1% +
    1)
10530 SD$(M1% + 1) = TM$
    : SK%(M1% + 1) = TM%
10540 '
10550 ' set begin and end point for array segment of
    large array
10560 M1% = ST%(L1%)+1
10570 L1% = L1% - 1
10580 IF L1% > 0 THEN GOTO 10120
10590 '
10600 RETURN
    : ' End of sort

```

Hardy Weinberg Equilibrium

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Syracuse, NY 13210

This Color Computer program is written in unextended BASIC.

The Hardy-Weinberg Equilibrium equation is a simple binomial expansion which is used in introductory biology and anthropology courses to teach the rudiments of population genetics. It is used to calculate gene frequencies. The most common routine for which the equation is used in introductory courses is one which compares observed genotype frequencies (e.g. data from the field) with the expected frequencies obtained from H-W ($P^2 + 2PQ + Q^2 = 1$). The results are then compared using Pearson's Chi Square test for significance.

The program I have written does the following:
Lines 5-95 introduce the program and compute genotype frequencies from whole numbers, if the submitted data is not already in frequency form;

Lines 100-120 compute gene frequencies from genotype frequencies;

Lines 125-175 compute the H-W genotype frequencies.

A subroutine, Line 400, converts the genotype frequencies back to whole numbers in preparation for the Chi Square subroutine, Line 500. After the Chi Square is obtained, the result is compared to a value from the table which is significant at 5%, and the results are declared to be or not to be significant.

```

5 PRINT "HARDY-WEINBERG"
10 PRINT "P SQUARE + 2PQ + Q SQUARE=1"
15 PRINT "IS THE DATA IN FREQUENCY FORM?(PRINT YES OR
    NO)"
20 INPUT A$
25 IF A$="YES" THEN 80
30 INPUT "IF YOUR DATA IS IN WHOLE NUMBERS, INPUT THE
    NUMBER OF P SQUARE";F
35 INPUT "2PQ IS";G
40 INPUT "Q SQUARE IS";H

```

```

45 PRINT F+G+H
50 FOR L=1 TO 2000
51 NEXT L
55 I=F+G+H
60 PRINT "FREQ.P SQUARE="F/I
   : PRINT "FREQ.2PQ="G/I
   : PRINT "FREQ.Q SQUARE="H/I
65 FOR L=1 TO 2000
66 NEXT L
70 X=F/I
   : Y=G/I
   : Z=H/I
75 GOTO 100
80 INPUT "TOTAL NUMBER OF PEOPLE";I
   : I=I
81 I=I
85 INPUT "P SQUARE=";X
86 PRINT "F="X*I
   : F=X*I
90 INPUT "2PQ=";Y
91 PRINT "G="Y*I
   : G=Y*I
95 INPUT "Q SQUARE=";Z
96 PRINT "H="Z*I
   : H=Z*I
100 PRINT "P=X+Y/2="X+Y/2
105 PRINT "Q=Y/2+Z="Y/2+Z
110 FOR L=1 TO 5000
111 NEXT L
115 P=X+Y/2
120 Q=Y/2+Z
125 PRINT "N="2
   : N=2
130 GOSUB 2001
135 PRINT P"TO THE"N"IS"E
136 E=E
140 FOR L=1 TO 1000
141 NEXT L
145 GOSUB 2070
150 PRINT Q"TO THE"N"IS"E1
151 E1=E1
155 FOR L=1 TO 1000
156 NEXT L
160 PRINT "2PQ IS"2*P*Q
165 FOR L=1 TO 1000
166 NEXT L
170 G1=2*P*Q
175 PRINT E"+"G1"+"E1"=1"
180 FOR L=1 TO 2000
181 NEXT L
185 GOSUB 400
190 FOR L=1 TO 1000
191 NEXT L
195 GOSUB 500
200 IF C1<3.84 THEN 210
205 IF C1>3.84 THEN 215
210 PRINT "NOT SIGNIFICANT AT .05 OR LESS"
   : GOTO 220
215 PRINT "SIGNIFICANT AT .05. YOU ARE NOT IN
   EQUILIBRIUM."
220 END
400 PRINT "X1="E*I
   : X1=E*I
405 PRINT "Y1="G1*I
   : Y1=G1*I
410 PRINT "Z1="E1*I
   : Z1=E1*I
415 RETURN
500 REM THIS IS A ROUTINE FOR PEARSON'S CHI SQUARE
505 PRINT "SUM OF OBSERVED - EXPECTED SQUARED/EXP."
510 PRINT "POWER OF N="N
515 GOSUB 3030
520 PRINT "(F-X1)SQRD./X1="E2/X1
525 A=E2/X1
530 PRINT "POWER OF N="N
535 GOSUB 3060

```

```

540 PRINT "(Y-2PQ)SQRD./2PQ="E3/Y1
545 C=E3/Y1
550 PRINT "POWER OF N="N
555 GOSUB 3090
560 PRINT "(Z-Z1)SQRD./Z1="E4/Z1
565 J=E4/Z1
570 PRINT "CHI SQUARE="A+C+J
   : C1=A+C+J
575 RETURN
2000 REM THIS IS A ROUTINE FOR RAISING A NUMBER TO A
   POWER
2001 E=1
2005 FOR A=1 TO N
2010 E=E*P
2015 NEXT A
2020 IF N=0 THEN E=1
2025 RETURN
2070 E1=1
2075 FOR A=1 TO N
2080 E1=E1*Q
2085 NEXT A
2090 IF N=0 THEN E1=1
2095 RETURN
3030 E2=1
3035 FOR B=1 TO N
3040 E2=E2*(F-X1)
3045 NEXT B
3050 IF N=0 THEN E2=1
3055 RETURN
3060 E3=1
3065 FOR B=1 TO N
3070 E3=E3*(G-Y1)
3075 NEXT B
3080 IF N=0 THEN E3=1
3085 RETURN
3090 E4=1
3095 FOR B=1 TO N
3100 E4=E4*(H-Z1)
3105 NEXT B
3110 IF N=0 THEN E4=1
3115 RETURN

```

Calculating Ohms, Volts, and Watts

Larry Gurley
Route 1
Martin, TN 38237

I would like to share this Color Computer program with your readers. The program is very helpful to me when I need to calculate anything in Ohm's or Watt's law.

```

1 REM:THIS PROGRAM WILL CALCULATE OHMS,VOLTS,AMPS AND
   CALCULATE ALL THE WATTS LAW.
2 REM:WRITTEN BY LARRY GURLEY,1983
3 REM:INPUT VOLTS,AMPS,RESISTANCE,WATTS
4 PRINT "ENTER 'END' WHEN FINISHED"
5 PRINT
6 DIM A$(15),B(25)
10 INPUT "WHAT DO YOU WISH? IF OHMS LAW ENTER
   VOLTS,AMPS,RESISTANCE. IF YOU WISH WATTS LAW
   ENTER ENTER WATTS.";A$(1)
15 CLS
20 IF A$(1)="VOLTS" GOSUB 60
30 IF A$(1)="AMPS" GOSUB 110
40 IF A$(1)="RESISTANCE" GOSUB 160
50 IF A$(1)="WATTS" GOSUB 210
52 IF A$(1)="END" GOSUB 430
53 GOTO 10
55 END

```

```

60 INPUT "AMPS=";B(1)
70 INPUT "RESISTANCE=";B(2)
80 B(3)=B(1)*B(2)
90 PRINT "VOLTAGE=";B(3)
100 RETURN
105 END
110 INPUT "VOLTS=";B(4)
120 INPUT "RESISTANCE=";B(5)
130 B(6)=B(4)/B(5)
140 PRINT "AMPS=";B(6)
150 RETURN
155 END
160 INPUT "VOLTS=";B(7)
170 INPUT "AMPS=";B(8)
180 B(9)=B(7)/B(8)
190 PRINT "RESISTANCE=";B(9)
200 RETURN
205 END
210 PRINT "YOU MUST INPUT VOLT, AMPS, WATTS"
211 CLS
215 PRINT
220 INPUT "YOU ARE NOW IN WATTS LAW***WHAT DO YOU
      WISH TO FIND**VOLTS-AMPS-WATTS?";A$(2)
221 CLS
230 IF A$(2)="VOLTS" GOSUB 280
240 IF A$(2)="AMPS" GOSUB 330
250 IF A$(2)="WATTS" GOSUB 380
260 RETURN
270 END
280 INPUT "WATTS=";B(11)
290 INPUT "AMPS=";B(12)
300 B(13)=B(11)/B(12)
310 PRINT "VOLTS=";B(13)
320 RETURN
325 END
330 INPUT "WATTS=";B(14)
340 INPUT "VOLTS=";B(15)
350 B(16)=B(14)/B(15)
360 PRINT "AMPS=";B(16)
370 RETURN
375 END
380 INPUT "VOLTS=";B(17)
390 INPUT "AMPS=";B(18)
400 B(19)=B(17)*B(18)
410 PRINT "WATTS=";B(19)
420 RETURN
430 END

```

Plotting Ratios

Wayne Johnson
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I have followed the Color Computer Programs in your magazine since I purchased a 4K Color Computer in April 1982.

Here is a short program, 1.7K, for all CoCo users. The program is intended to accept twelve pieces of numerical data, sort for the greatest value, and plot ratios of less than one on a color bar graph.

```

10 REM*****
20 REM COLOR HISTOGRAM FOR
30 REM COLOR COMPUTER
40 REM WRITTEN BY:
50 REM WAYNE JOHNSON
60 REM DATE: 3-25-83
70 REM*****
80 CLS(4)
      : PRINT @231, " COLOR BAR GRAPH ";

```

```

90 FOR Z=1 TO 2000
      : NEXT Z
      : K=1
      : B=0
100 CLS(3)
      : POKE 65495, 0
      : DIMQ(12), R(12)
110 PRINT @128, "THIS PROGRAM WILL AUTOMATICALLY PLOT
      A MONTHLY COLOR BAR GRAPH WITH THE GREATEST
      VALUE PLOTTED AS 1.0 AND THE BALANCE OF THE
      VALUES AS RATIOS LESS THAN 1.0 ";
120 FOR Z=1 TO 7000
      : NEXT Z
      : CLS
130 CLS
      : PRINT
      : PRINT "ENTER VALUES FOR EACH ITEM"
140 FOR C=1 TO 12
      : PRINT "#" C " = ";
      : INPUT Q(C)
      : NEXT C
150 PRINT
      : PRINT "VALUES ARE PLOTTED WITH THE
      GREATEST VALUE AS 1.0, AND THE OTHERS AS A
      RATIO LESS THAN 1.0.";
160 FOR Z=1 TO 2500
      : NEXT Z
170 FOR C=1 TO 12
      : A=Q(C)
180 IF B<=A THEN B=A
190 NEXT C
200 FOR C=1 TO 12
      : R(C)=Q(C)/B
      : NEXT C
210 CLS(0)
220 CLS(0)
      : FOR V=1 TO 28
      : SET (6, V, 5)
      : NEXT V
230 FOR H=6 TO 63
      : SET (H, 28, 5)
      : NEXT H
240 FOR H=5 TO 63 STEP 2
      : SET (H, 16, 5)
      : SET (H, 4, 5)
      : SET (H, 22, 5)
      : SET (H, 10, 5)
      : NEXT H
250 PRINT @ 33, "r";
      : PRINT @ 129, "a";
      : PRINT @ 225, "t";
      : PRINT @ 321, "i";
      : PRINT @ 417, "o";
260 PRINT @ 64, "1.0";
      : PRINT @ 160, ".75";
      : PRINT @ 256, ".50";
      : PRINT @ 352, ".25";
      : PRINT @ 448, "0.0";
270 FOR C=5 TO 27 STEP 2
      : READ Q$
      : PRINT @ 480+C, Q$;
      : PRINT @ 480+C+1, CHR$(128);
      : NEXT C
280 DATA j, f, m, a, m, j, j, a, s, o, n, d
290 FOR C=1 TO 12
      : FOR H=4*C+5 TO 4*C+7
300 FOR V=28 TO 28-R(C)*(28-4) STEP -1
310 SET (H, V, K)
      : SET (H, 28, 5)
      : SET (H+1, 28, 5)
320 NEXT V
      : NEXT H
      : K=K+1
      : IF K=9 THEN K=1
330 NEXT C
340 PRINT @ 8, "GREATEST VALUE=";B;

```



```

: RESTORE
350 Z$=INKEY$
: IF Z$="" THEN 350
360 CLS
: PRINT
: PRINT
: PRINT "DO YOU WISH TO CONTINUE WITH ANOTHER
SET OF TWELVE BAR GRAPHS";
370 INPUT Q$
: IF Q$="YES" THEN 130
380 IF Q$="NO" THEN 390 ELSE 360
390 CLS
: POKE 65494, 0
: END

```

```

160 IN$=INKEY$
: IF IN$="N" THEN 120 ELSE IF IN$ = "Y" THEN 170
ELSE 160
170 CLS
: PRINT @ 32, "WHAT WOULD YOU LIKE TO DO "
: PRINT
: PRINT NA$;"?"
: PRINT
180 PRINT "*****"
190 PRINT "COLOR MATH (ENTER ONE)"
200 PRINT
: PRINT
: PRINT " 1. ADDITION + 2.
SUBTRACTION -"
210 PRINT
: PRINT "*****"
220 IN$=INKEY$
: IF IN$="" THEN 220
230 IF IN$ ="1" THEN CZ=1 ELSE IF IN$ ="2" THEN CZ=2
ELSE GOTO 220
240 P = -1
250 IF SW > 0 THEN GOTO 1050
260 CLS 0
: PRINT @ 64, " trs color-math...compiling ";
270 ': ---> zero
280 DATA 142, 140, 140, 141
290 DATA 138, 128, 128, 133
300 DATA 138, 128, 128, 133
310 DATA 139, 131, 131, 135
320 GOSUB 1800
330 ': ---> one
340 DATA 128, 141, 128, 128
350 DATA 128, 133, 128, 128
360 DATA 128, 133, 128, 128
370 DATA 128, 133, 128, 128
380 GOSUB 1910
390 ': ---> two
400 DATA 140, 140, 140, 141
410 DATA 131, 131, 131, 135
420 DATA 138, 128, 128, 128
430 DATA 139, 131, 131, 131
440 GOSUB 1910
450 ': ---> three
460 DATA 140, 140, 140, 141
470 DATA 131, 131, 131, 135
480 DATA 128, 128, 128, 133
490 DATA 131, 131, 131, 135
500 GOSUB 1910
510 ': ---> four
520 DATA 138, 128, 128, 138
530 DATA 139, 131, 131, 139
540 DATA 128, 128, 128, 138
550 DATA 128, 128, 128, 138
560 GOSUB 1910
570 ': ---> five
580 DATA 142, 140, 140, 140
590 DATA 139, 131, 131, 131
600 DATA 128, 128, 128, 133
610 DATA 131, 131, 131, 135
620 GOSUB 1910
630 ': ---> six
640 DATA 142, 140, 140, 140
650 DATA 139, 131, 131, 131
660 DATA 138, 128, 128, 133
670 DATA 139, 131, 131, 135
680 GOSUB 1910
690 ': ---> seven
700 DATA 140, 140, 140, 141
710 DATA 128, 128, 128, 133
720 DATA 128, 128, 128, 133
730 DATA 128, 128, 128, 133
740 GOSUB 1910
750 ': ---> eight
760 DATA 142, 140, 140, 141
770 DATA 139, 131, 131, 135
780 DATA 138, 128, 128, 133

```

Color Math

Peter W. Smyth
412 Clark Court
Fort Ord, CA 93941

Here is a program I first wrote for my TRS-80 Model III and later modified for my son's TRS-80 Color Computer. The program is called TRS-80 Color Math. My five-year-old enjoys learning on the computer and by adding size and color, his attention is held much longer than by using smaller characters without color, as on my Model III.

This program may be viewed somewhat like a sample, as it can easily be modified.

```

10 REMARKS:
12 ' COLOR-MATH
14 ' TRS-80 COLOR 16K
16 ' BY SFC PETER W. SMYTH
18 ' FOR PATRICK S. SMYTH
20 ' 412 CLARK COURT
22 ' FT ORD, CA 93941
24 ' (408) 384-3759
26 ' 1 DECEMBER 1982
28 ' CONVERTED FROM TRS-80
30 ' MODEL III 16K
31 ' (SAME AUTHOR)
32 '
34 '*****
36 ' THIS PROGRAM WAS DESIGNED
38 ' TO ASSIST A CHILD WITH HIS/
40 ' HER MATH BY ADDING SIZE AND
42 ' COLOR TO THE LESSON, THERE-
44 ' FORE MAKING THE LEARNING
46 ' PROCESS MUCH MORE
48 ' INTERESTING...
52 '*****
54 ' FOR MENU, ENTER <T> ON ANY SINGLE CHARACTER
ANSWER...
56 ' TO TERMINATE, ENTER <A> AS ABOVE...
58 ' ALL OTHER QUESTIONS, ANSWER AS
INDICATED.
60 '*****
100 CLEAR 400
110 DIM CN$(15, 4)
120 CLS
: PRINT @ 0, "HELLO, I AM YOUR COLOR COMPUTER.
130 PRINT @ 64, "MY NAME IS ALEX, WHAT IS YOUR
NAME?"
: PRINT
: INPUT NA$
140 PRINT @ 160, NA$;"", "THAT'S A NICE NAME."
150 PRINT @ 224, "IS ";NA$;"",
: PRINT "YOUR REAL NAME?"
: PRINT
: PRINT
: PRINT " ( PLEASE ENTER Y OR N )"

```

```

790 DATA 139, 131, 131, 135
800 GOSUB 1910
810 ': ---> nine
820 DATA 142, 140, 140, 141
830 DATA 139, 131, 131, 135
840 DATA 128, 128, 128, 133
850 DATA 131, 131, 131, 135
860 GOSUB 1910
870 ': ---> plus
880 DATA 128, 133, 138, 128
890 DATA 131, 135, 139, 131
900 DATA 128, 133, 138, 128
910 DATA 128, 133, 138, 128
920 GOSUB 1910
930 ': ---> equals
940 DATA 128, 128, 128, 128
950 DATA 140, 140, 140, 140
960 DATA 131, 131, 131, 131
970 DATA 128, 128, 128, 128
980 GOSUB 1910
990 ': ---> minus
1000 DATA 128, 128, 128, 128
1010 DATA 131, 131, 131, 131
1020 DATA 128, 128, 128, 128
1030 DATA 128, 128, 128, 128
1040 GOSUB 1910
1050 CLS 0
      SW = 1
1060 FOR KN = 0 TO 1000 STEP 1
1070 L = 96
1080 P = RND(9)
1090 IF P = 9 THEN P = 0
1100 P1 = P
1110 GOSUB 1710
1120 L = 104
1130 IF CZ=1 THEN P=10 ELSE IF CZ=2 THEN P=12
1140 GOSUB 1710
1150 L = 112
1160 P = RND(5)
1170 IF P = 5 THEN P = 0
1180 IF P>P1 AND CZ=2 THEN P=P1-1
1190 IF P1=0 OR P<0 THEN P=0
1200 P2 = P
1210 GOSUB 1710
1220 L = 120
1230 P = 11
1240 GOSUB 1710
1250 L = 190
1260 P = 13
1270 GOSUB 1710
1280 IF CZ=1 THEN ANS=P1+P2 ELSE IF CZ=2 THEN
      ANS=P1-P2
1290 TAN$ = STR$(ANS)
1300 LA = LEN(TAN$)
1310 IF LA = 2 THEN GOSUB 1370 ELSE GOSUB 1470
1320 PRINT@ 482, "PRESS spacebar TO CONTINUE.";
1330 H$=INKEY$
      : IF H$="" THEN 1330
1340 CLS(0)
1350 NEXT KN
1360 END
1370 ': ---> SUBROUTINE one-char
1380 IN$=INKEY$
      : IF IN$="" THEN 1380
1390 IF IN$ = "T" THEN GOTO 170
1400 IF IN$ = "A" THEN GOTO 1950
1410 IN = VAL(IN$)
1420 L = 298
1430 P = IN
1440 IF IN = ANS THEN GOSUB 1710
      : RETURN
1450 GOSUB 1610
1460 RETURN
1470 ': ---> SUBROUTINE two-char
1480 IN$=INKEY$
      : IF IN$="" THEN 1480

```

```

1490 IF IN$ = "T" THEN 170
1500 IF IN$ = "A" THEN 1950
1510 PRINT @ 298, IN$;
1520 IS$=INKEY$
      : IF IS$="" THEN 1520
1530 PRINT @ 298, IN$ + IS$;
1540 L = 298
1550 P = VAL(IN$)
1560 IF (VAL(IN$+IS$)) = ANS THEN GOSUB 1710 ELSE
      GOSUB 1610
      : RETURN
1570 L = 306
1580 P = VAL(IS$)
1590 GOSUB 1710
1600 RETURN
1610 ': ---> SUBROUTINE error
1620 FOR I = 1 TO 50 STEP 1
1630 SOUND I+150, 1
1640 CLS (RND(8))
1650 NEXT I
1660 SOUND 1, 7
1670 CLS(0)
1680 PRINT @ 64, NA$,"";
      : PRINT @ 135, "THE CORRECT ANSWER IS:";
1690 PRINT @ 271, ANS;
1700 RETURN
1710 ': ---> SUBROUTINE draw
1720 FOR I = 0 TO 3 STEP 1
1730 PRINT @ L, CN$(P, I);
1740 L = L + 32
1750 NEXT I
1760 RETURN
1770 ': ---> SUBROUTINE color
1780 RC = ((RND(7)) * 16)
1790 RETURN
1800 ': ---> SUBROUTINE input
1810 P = P + 1
1820 FOR J = 0 TO 3 STEP 1
1830 NUM$ = ""
1840 FOR M = 0 TO 3 STEP 1
1850 READ NUMBER
1860 NUM$=NUM$+CHR$(NUMBER+RC)
1870 NEXT M
1880 CN$(P, J) = NUM$
1890 NEXT J
1900 RETURN
1910 ': ---> SUBROUTINE create
1920 GOSUB 1770
1930 GOSUB 1800
1940 RETURN
1950 ': ---> END OF RUN...
1960 CLS
1970 PRINT @ 64, NA$,"", IT WAS FUN."
      : PRINT @ 128, "BYE-BYE...."
1980 END

```

Definition Quiz

Jeff Coburn
16 Wynchwood Road
Livingston, NJ 07039

Here is a Color Computer program that quizzes the user on words and their definitions. The user inputs his own words and definitions.

```

10 REM U STANDS FOR UNIMPORTANT
20 REM VARIABLE AND WILL BE USED
30 REM WHENEVER POSSIBLE.
40 CLS 5
50 PRINT @ 32, "QUIZ - DESIGNED BY JEFF COBURN"
60 PRINT @ 96, "FOR INSTRUCTIONS, PRESS ENTER."
70 PRINT @ 160, "ANY OTHER KEY BEGINS THE PROGRAM";

```

```

80 U$=INKEY$
90 IF U$="" THEN 80
100 IF U$=CHR$(13) THEN 670
110 CLS
120 REM W$ IS THE WORD
130 REM D$ IS THE DEFINITION
140 W$=""
    : D$=""
150 DIM W$(600)
160 DIM D$(600)
170 FOR I=1 TO 50
180 CLS
190 PRINT "#"; I;
200 INPUT "WORD? "; W$(I)
210 IF W$(I)="BEGIN QUIZ" OR W$(I)="BQ" THEN 270
220 PRINT "#"; I;
230 INPUT "DEFINITION? "; D$(I)
240 IF D$(I)="BEGIN QUIZ" OR D$(I)="BQ" THEN 270
250 CLS
260 NEXT I
270 REM CHOOSE SECTION W TO D OR D TO W
280 PRINT
    : PRINT
290 PRINT "PLEASE CHOOSE 1, 2, OR 3:"
300 PRINT "1 GUESS WORD FROM DEFINITION"
310 PRINT "2 GUESS DEFINITION FROM WORD"
320 PRINT "3 END PROGRAM"
330 INPUT N
340 N=INT(N)
350 IF N<1 OR N>3 THEN 330
360 IF N=1 THEN 390
370 IF N=2 THEN 500
380 IF N=3 THEN 610
390 CLS
    : PRINT "YOU WILL BE GUESSING THE WORD FROM THE
DEFINITION."
400 PRINT "WHEN ALL DEFINITIONS HAVE BEEN GIVEN AND
ALL WORDS GUESSED, THE PROGRAM WILL LET YOU
CHOOSE THE OTHER TYPE (GUESS DEFINITION FROM
WORD."
410 PRINT
420 FOR I=1 TO 50
430 IF D$(I)="BQ" OR W$(I)="BQ" THEN 270
440 PRINT "#"; I;
450 PRINT D$(I)
460 INPUT "? "; C$
470 PRINT "ANSWER IS..."; W$(I)
480 NEXT I
490 GOTO 270
500 CLS
510 PRINT "YOU WILL GUESS THE DEFINITION FROM THE
WORD. WHEN ALL WORDS HAVE BEEN GIVEN AND ALL
DEFINITIONS GUESSED, THE PROGRAM WILL LET YOU
CHOOSE THE OTHER TYPE (GUESS WORD FROM
DEFINITION."
520 PRINT
530 FOR I=1 TO 50
540 IF D$(I)="BQ" OR W$(I)="BQ" THEN 270
550 PRINT "#"; I;
560 PRINT W$(I)
570 INPUT "? "; C$
580 PRINT "ANSWER IS... "; D$(I)
590 NEXT I
600 GOTO 270
610 PRINT "ARE YOU SURE YOU WISH TO STOP?";
620 INPUT " YES/NO"; U$
630 IF U$<>"YES" THEN 280
640 PRINT "HOPE YOU LEARNED SOMETHING!"
650 PRINT "GOODBYE"
660 END
670 CLS
680 PRINT "THIS PROGRAM ALLOWS YOU TO QUIZ YOURSELF
ON WORDS AND THEIR DEFINITIONS."
690 PRINT "JUST ENTER THE WORD OR DEFINITION AT THE
PROMPT. WHEN YOU ARE DONE TYPE IN BQ OR BEGIN
QUIZ TO START."

```

```

700 INPUT "PRESS ENTER TO START"; U$
710 GOTO 110

```

Density

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Box 507
Atwood, IL 61913

A science teacher's delight, this program lets a student practice a density lab.

An irregular solid's volume is found by displacement of water. Figure 1 shows the difference in water levels caused by lowering an insoluble object into the graduated cylinder. This difference is the object's volume. Figure 2 displays a triple beam balance used to determine the object's mass. The density is found by dividing the object's mass by its volume. The program will generate different masses and volumes for each run. There are also three multiple choice questions about the lab exercise that was performed.

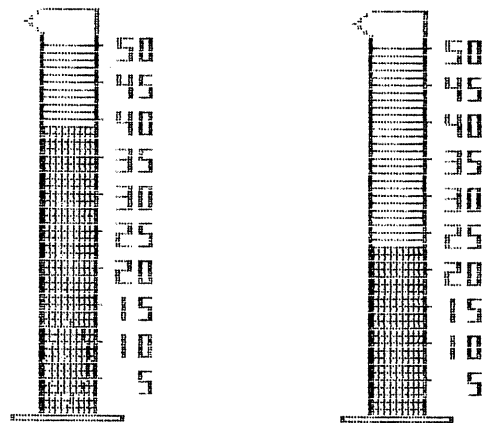


Figure 1.

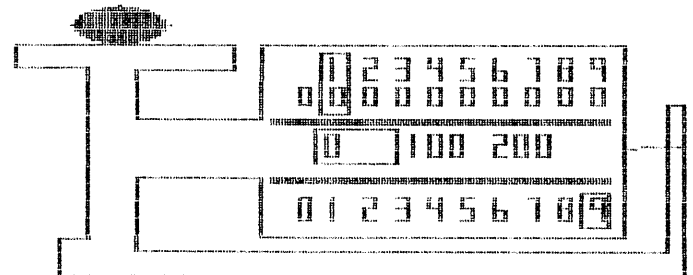


Figure 2.

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10 'JAMES W. WOOD, 424 N. MISSOURI, ATWOOD, IL, 61913
20 W$(0)="D9R4U9L4"
    : W$(1)="D9"
    : W$(2)="R4D4L4D5R4"
    : W$(3)="R4D4L4R4D5L4"
    : W$(4)="D4R4U4D9"
    : W$(5)="R4L4D4R4D5L4"
    : W$(6)="D9R4U4L4"
    : W$(7)="R4D9"
    : W$(8)="R4D4L4U4D9R4U5"
    : W$(9)="D4R4U4L4R4D9"
30 L=RND(16)
    : W=RND(16)
    : H=RND(16)

```

```

40 CLS
   : PRINT @42, "DENSITY LAB"
50 PRINT
   : INPUT "YOUR NAME"; NA$
60 GOTO 840
70 FOR A=1 TO 800
   : NEXT A
   : PRINT " NOW "; NA$; ", IT IS TIME TO"
   : PRINT "LEARN HOW TO USE A BALANCE."
80 PRINT
   : PRINT " TO MOVE          PRESS"
90 PRINT " 10 GRAM          Q, W"
100 PRINT "100 GRAM        A, S"
110 PRINT " 1 GRAM         Z, X"
120 PRINT "                LEFT, RIGHT"
130 PRINT
   : PRINT "YOU MUST HAVE THE INDICATOR"
   : PRINT "POINTING STRAIGHT RIGHT TO BE"
   : PRINT "BALANCED."
140 PRINT "PRESS <ENTER> TO CONTINUE";
150 A$=INKEY$
   : IF A$="" THEN 150
160 PMODE 2, 1
   : PCLS
   : SCREEN 1, 1
170 DRAW "BM6, 90R80D10L35D20R45U30R134D42R5L5D
36L134U24L45D30R195U60R7D70L230U15R10U70L27U8"
180 IF W$="R" THEN LINE (20, 60)-(60, 90), PSET, BF
   ELSE CIRCLE(45, 82), 19, 5, .45
   : PAINT (45, 76), 5, 5
190 LINE (246, 131)-(250, 131), PSET
200 LINE (100, 120)-(225, 122), PSET, BF
210 LINE (100, 144)-(225, 146), PSET, BF
220 DRAW "BM110, 152XW$(0);"
230 DRAW "BM122, 152XW$(1);"
240 DRAW "BM134, 152XW$(2);"
250 DRAW "BM146, 152XW$(3);"
260 DRAW "BM158, 152XW$(4);"
270 DRAW "BM170, 152XW$(5);"
280 DRAW "BM182, 152XW$(6);"
290 DRAW "BM194, 152XW$(7);"
300 DRAW "BM206, 152XW$(8);"
310 DRAW "BM218, 152XW$(9);"
320 DRAW "BM120, 126XW$(0);"
330 DRAW "BM152, 126XW$(1);"
340 DRAW "BM158, 126XW$(0);"
350 DRAW "BM166, 126XW$(0);"
360 DRAW "BM182, 126XW$(2);"
370 DRAW "BM190, 126XW$(0);"
380 DRAW "BM198, 126XW$(0);"
390 FOR X=110 TO 218 STEP 12
400 LINE (X, 107)-(X+4, 114), PSET, B
   : NEXT X
410 DRAW "BM122, 95XW$(1);"
420 DRAW "BM134, 95XW$(2);"
430 DRAW "BM146, 95XW$(3);"
440 DRAW "BM158, 95XW$(4);"
450 DRAW "BM170, 95XW$(5);"
460 DRAW "BM182, 95XW$(6);"
470 DRAW "BM194, 95XW$(7);"
480 DRAW "BM206, 95XW$(8);"
490 DRAW "BM218, 95XW$(9);"
500 B1=107
   : B2=117
   : B3=93
   : B4=124
   : B5=150
   : C1=107
510 LINE (B1, B3)-(B1+9, B3+25), PSET, B
520 LINE (B2, B4)-(B2+30, B4+14), PSET, B
530 LINE (B1, B5)-(B1+9, B5+14), PSET, B
540 LINE (235, 131)-(245, 122), PSET
550 A$=INKEY$
   : IF A$="" THEN 550
560 IF ASC(A$)=13 THEN 670
570 IF A$="Q" THEN Q1=Q1-1
   : IF Q1<0 THEN Q1=0 ELSE LINE (B1, B3)-(B1+9,
B3+25), PRESET, B
   : B1=B1-12
   : LINE (B1, B3)-(B1+9, B3+25), PSET, B
   : GOTO 640
580 IF A$="W" THEN Q1=Q1+1
   : IF Q1>9 THEN Q1=9 ELSE LINE (B1, B3)-(B1+9,
B3+25), PRESET, B
   : B1=B1+12
   : LINE (B1, B3)-(B1+9, B3+25), PSET, B
   : GOTO 640
590 IF A$="A" THEN A1=A1-1
   : IF A1<0 THEN A1=0 ELSE LINE (B2, B4)-(B2+30,
B4+14), PRESET, B
   : B2=B2-30
   : LINE (B2, B4)-(B2+30, B4+14), PSET, B
   : GOTO 640
600 IF A$="S" THEN A1=A1+1
   : IF A1>2 THEN A1=2 ELSE LINE (B2, B4)-(B2+30,
B4+14), PRESET, B
   : B2=B2+30
   : LINE (B2, B4)-(B2+30, B4+14), PSET, B
   : GOTO 640
610 IF A$="Z" THEN Z1=Z1-1
   : IF Z1<0 THEN Z1=0 ELSE LINE (C1, B5)-(C1+9,
B5+14), PRESET, B
   : C1=C1-12
   : LINE (C1, B5)-(C1+9, B5+14), PSET, B
   : GOTO 640
620 IF A$="X" THEN Z1=Z1+1
   : IF Z1>9 THEN Z1=9 ELSE LINE (C1, B5)-(C1+9,
B5+14), PRESET, B
   : C1=C1+12
   : LINE (C1, B5)-(C1+9, B5+14), PSET, B
   : GOTO 640
630 GOTO 550
640 IF M>Q1*10+A1*100+Z1 THEN LINE (235, 131)-(245,
122), PSET
   : LINE (235, 131)-(245, 131), PRESET
   : LINE (235, 131)-(245, 140), PRESET
   : GOTO 550
650 IF Q1*10+A1*100+Z1=M THEN LINE (235, 131)-(245,
122), PRESET
   : LINE (235, 131)-(245, 131), PSET
   : LINE (235, 131)-(245, 140), PRESET
   : GOTO 550
660 IF Q1*10+A1*100+Z1>M THEN LINE (235, 131)-(245,
122), PRESET
   : LINE (235, 131)-(245, 131), PRESET
   : LINE (235, 131)-(245, 140), PSET
   : GOTO 550
670 CLS
   : PRINT NA$; ", HOW MANY UNITS MASS";
   : INPUT GR
680 IF GR=M THEN 700
690 PRINT "FUNNY, I MEASURED"; M; " UNITS"
   : GOTO 710
700 PRINT "AT LEAST YOU CAN USE A BALANCE."
710 IF W$="R" THEN DE=M/(L*W*H) ELSE DE=M/(D2-D1)
720 DE=(INT(DE*1000))/1000
730 PRINT "THE MASS IS "; M
   : PRINT "THE VOLUME IS ";
   : IF W$="R" THEN PRINT L*W*H ELSE PRINT D2-D1
740 PRINT "OK "; NA$; ", ";
750 INPUT "WHAT IS THE DENSITY"; DD
760 PRINT "TRUE VALUE="; DE
   : PRINT "% ERROR=";
   INT((ABS(DE-DD)/DE)*10000)/100; "%"
770 IF INT((ABS(DE-DD)/DE)*10000)/100 >5 THEN PRINT
NA$
   : PRINT "DID YOU DIVIDE MASS BY VOLUME?"
780 GOSUB 1090
790 PRINT "ANOTHER LAB, "; NA$; " (Y/N)"
800 A$=INKEY$
   : IF A$="" THEN 800
810 IF A$="Y" THEN RUN

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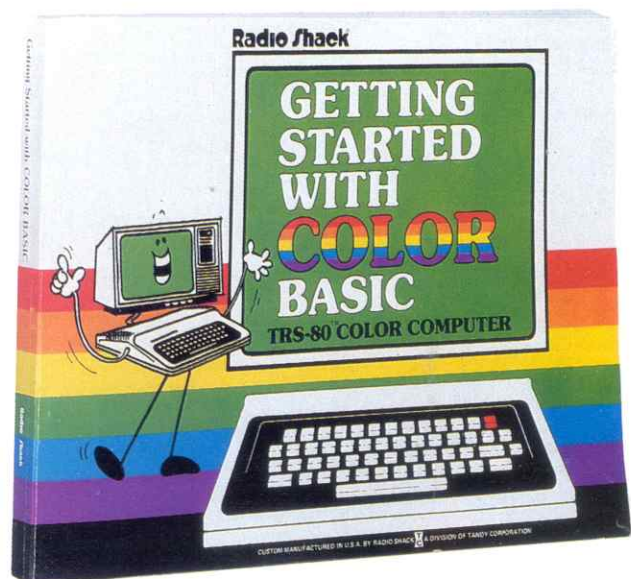
820 IF A$="N" THEN END
830 GOTO 800
840 M=10+RND(30)
850 CLS
: PRINT "THE DENSITY OF AN OBJECT IS"
: PRINT "EQUAL TO ITS MASS DIVIDED BY"
: PRINT "VOLUME. D=M/V"
: PRINT "TO FIND THE VOLUME OF IRREGULAR"
: PRINT "SOLIDS WE USE A GRADUATED"
: PRINT "CYLINDER. THE OBJECT'S VOLUME"
: PRINT "IS EQUAL TO THE DIFFERENCE IN"
860 PRINT "WATER LEVELS BEFORE AND AFTER"
: PRINT "THE OBJECT IS PLACED IN THE"
: PRINT "CYLINDER. BE SURE THE OBJECT IS"
: PRINT "COMPLETELY SUBMERGED."
870 PRINT "EACH LINE ON THE CYLINDER"
: PRINT "REPRESENTS 1 CUBIC CENTIMETER."
: PRINT "READ CYLINDER FROM BOTTOM UP"
880 PRINT "PRESS <ENTER> TO CONTINUE"
890 A$=INKEY$
: IF A$<>CHR$(13) THEN 890
900 D1=15+RND(10)
: D2=35+RND(12)
910 PMODE 3, 1
: PCLS
: SCREEN 1, 0
920 DRAW "BM100, 100G5F5D155L10D2R40U2L10U165L20"
930 FOR A=25 TO 175 STEP 3
: LINE (100, A)-(120, A), PSET
: NEXT A
940 FOR A=25 TO 175 STEP 15
: LINE (120, A)-(123, A), PSET
: NEXT A
950 DRAW "BM128, 22XW$(5);"
: DRAW "BM137, 22XW$(0);"
: DRAW "BM128, 37XW$(4);"
: DRAW "BM137, 37XW$(5);"
: DRAW "BM128, 52XW$(4);"
: DRAW "BM137, 52XW$(0);"
: DRAW "BM128, 67XW$(3);"
: DRAW "BM137, 67XW$(5);"
: DRAW "BM128, 82XW$(3);"
: DRAW "BM137, 82XW$(0);"
960 DRAW "BM128, 97XW$(2);"
: DRAW "BM137, 97XW$(5);"
: DRAW "BM128, 112XW$(2);"
: DRAW "BM137, 112XW$(0);"
: DRAW "BM130, 127XW$(1);"
: DRAW "BM137, 127XW$(5);"
: DRAW "BM130, 142XW$(1);"
: DRAW "BM137, 142XW$(0);"
: DRAW "BM137, 157XW$(5);"
970 E1=176-3*D1
: E2=176-3*D2
980 FOR A=173 TO E1 STEP -3
: PAINT (110, A), 3, 4
: NEXT A
990 A$=INKEY$
: IF A$<>CHR$(13) THEN 990
1000 CIRCLE (110, 153), 9, 2, 2.2
1010 PAINT (110, 143), 2, 2
1020 FOR A=124 TO 175 STEP 3
: LINE (100, A)-(120, A), PSET
: NEXT A
1030 FOR A=E1 TO E2 STEP -3
: PAINT (110, A), 3, 4
: NEXT A
1040 A$=INKEY$
: IF A$<>CHR$(13) THEN 1040
1050 CLS
: INPUT "INITIAL VOLUME (CC)"; M1
: INPUT "FINAL VOLUME (CC)"; M2
1060 IF M1<>D1 OR M2<>D2 THEN PRINT "TRY AGAIN"
: FOR A=1 TO 500
: NEXT A
: GOTO 910

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1070 PRINT "VERY GOOD "; NA$
: INPUT "WHAT IS THE VOLUME OF THE OBJECT IN"
: CUBIC CENTIMETERS"; VZ
: IF VZ=M2-M1 THEN PRINT "CORRECT "; NA$ ELSE
PRINT "SORRY "; NA$; ", "; M2; "-"; M1; "=";
M2-M1
1080 GOTO 70
1090 NC=0
: PRINT
: PRINT "HOW IS DENSITY CALCULATED?"
: PRINT
: PRINT " A) MASS DIVIDED BY VOLUME"
: PRINT " B) VOLUME DIVIDED BY MASS"
: PRINT " C) LENGTH/WIDTH/HEIGHT*MASS"
1100 AN$=INKEY$
: IF AN$="B" OR AN$="C" THEN PRINT "SORRY, THE"
ANSWER IS A"
: GOTO 1110 ELSE IF AN$="A" THEN NC=NC+1
: PRINT "CORRECT "; NA$
: GOTO 1110 ELSE 1100
1110 PRINT
: PRINT "HOW IS THE VOLUME OF AN IRREGULAR"
OBJECT FOUND?"
: PRINT
: PRINT " A) LENGTH*WIDTH*HEIGHT"
: PRINT " B) WATER DISPLACEMENT"
: PRINT " C) BY GUESSING"
1120 AN$=INKEY$
: IF AN$="A" OR AN$="C" THEN PRINT "SORRY, THE"
ANSWER IS B"
: GOTO 1130 ELSE IF AN$="B" THEN NC=NC+1
: PRINT "CORRECT "; NA$
: GOTO 1130 ELSE 1120
1130 PRINT
: PRINT " YOU ARE USING A TRIPLE BEAM"
BALANCE. THE OBJECT IS HEAVIER THAN THE WEIGHT"
FOR WHICH THE BALANCE IS SET."
: PRINT " THE POINTER WILL POINT"
: PRINT
: PRINT " A) UP"
: PRINT " B) DOWN"
: PRINT " C) RIGHT"
1140 AN$=INKEY$
: IF AN$="B" OR AN$="C" THEN PRINT "SORRY, THE"
ANSWER IS A"
: GOTO 1150 ELSE IF AN$="A" THEN NC=NC+1
: PRINT "CORRECT "; NA$
: GOTO 1150 ELSE 1140
1150 PRINT "YOU ANSWERED"; NC; "OUT OF 3"
: PRINT "QUESTIONS CORRECTLY."
: RETURN

```



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ROCHESTER 3000 Winton Rd.
SCARSDALE 365 Central Park Ave.
SCHENECTADY Woodlawn Plaza
SPRING VALLEY White House Center, 88 W. Rt. 59
STATEN ISLAND 2409 Richmond Ave.
SYRACUSE 2544 Erie Blvd.; Hotel Syracuse, 510 S. Warren
UTICA Riverside Mall
VALLEY STREAM Green Acres Shop. Ctr.
YONKERS Cross Country Shop. Ctr.

NORTH CAROLINA
ASHEVILLE K-Mart Shopping Center, Tunnel Rd.
CHARLOTTE 3732 Independence Blvd.; Tyvola Mall, 5401
South Blvd.
DURHAM South Square Mall
FAYETTEVILLE Eutaw Shopping Center, 815 Elm St.
GREENSBORO 3718 High Point Rd.
RALEIGH Townridge Sq., Hwy. 70 W.
WILMINGTON Independence Mall
WINSTON-SALEM 629 Peters Creek Pkwy.

OHIO
AKRON Fairlawn Plaza, 2727 W. Market St.
BEDFORD HEIGHTS 5217 Northfield Rd.
CANTON 5248 Dressler Rd. NW.; Mellet Plaza, 3826 W.
Luscarawas
CENTERVILLE 2026 Miamisburg-Centerville Rd.
CINCINNATI 9725 Montgomery, 16-18 Convention Way (on
Skyway)
CLEVELAND 419 Euclid (Downtown); 27561 Euclid Ave.
COLUMBUS 862 S. Hamilton, Great Eastern S/C, The Patio
Shop. Ctr., 4661 Karl Rd.; 400 N. High St.
DAYTON Northwest Plaza, 3279 West Siebenthaler
ELYRIA 286 Midway Blvd.
FAIRFIELD 7255 Dixie Hwy. (1/4 Mi. North of I-275)
NORTH OLMDSTED Great Northern S/C
PARMA 7551 W. Ridgewood Dr.
TOLEDO 5844 W. Central Ave.; Brownstone Plaza, 1724 S.
Reynolds Rd.
YOUNGSTOWN Union Square Plaza, 2543 Belmont Ave.

OKLAHOMA
OKLAHOMA CITY 4732 SE 29th St., Springdale S/C, 4469
NW 50th; 1101 SW 59th St.
TULSA 7218 & 7220 E. 41st St.

OREGON
EUGENE 390 Coburg Rd.
PORTLAND 7463 SW Barbur Blvd.; 9131 SE Powell; 3rd and
Washington Sts. (Downtown)
SALEM Salem Plaza, 403 Center

PENNSYLVANIA
ALLENTOWN Crest Plaza S/C, Cedar Crest Blvd. US 22
BALA CYNWYD 87 E. City Line Ave.
EASTON 25th St. Shopping Center
ELKINS PARK Elkins Park Square, 808 Old York Rd.
ERIE 5695 Peach St.
HARRISBURG Union Deposit Mall, Union Deposit Rd. #17
LANCASTER Park City Plaza, US 30
MONROESVILLE 3828 Wm. Penn. Hwy.
MONTGOMERYVILLE Airport Sq., Rt. 309
PHILADELPHIA 7542 Castor Ave.; 1002 Chestnut St.; 1801
Market St., 10 Penn Center

PENNSYLVANIA
YORK York County Shopping Center
PITTSBURGH 5775 Baptist Rd., Hills Plaza; 303 Smithfield
St.; 4643 Baum Blvd.; 4768 McKnight Rd.
SCRANTON 206 Meadow Way
WYOMISSING Berkshire Mall West, 1101 Woodland Rd.

PUERTO RICO
HATO REY 243 Franklin D. Roosevelt Ave.

RHODE ISLAND
E. PROVIDENCE 850 Waterman Ave.
PROVIDENCE 177 Union St.

SOUTH CAROLINA
COLUMBIA Old Sears Bldg., 1001 Harden St.
GREENVILLE N. Hills S/C
N. CHARLESTON 5900 Rivers Ave.

SOUTH DAKOTA
SIOUX FALLS 1700 S. Minnesota at 25th

TENNESSEE
CHATTANOOGA 636 Northgate Mall
JOHNSON CITY Peerless Center
KNOXVILLE Cedar Bluff S/C, 9123 Executive Park Dr.
MEMPHIS 4665 American Way; 1997 Union Ave.
NASHVILLE 2115 Franklin Pike; Rivergate Plaza

TEXAS
AMARILLO Wellington Sq. S/C, 1619 S. Kentucky
ARLINGTON 2500 E. Randol Mill, Suite 113
AUSTIN 8764 E. Research Blvd.; Southwood Mall, 1501 Ben
White Blvd.
BROWNSVILLE 1639 Price Rd. (Hwy. 77)
BEAUMONT 5330 Eastex Frwy.
COLLEGE STATION 2414 Texas Ave., South
CORPUS CHRISTI 1711 S. Staple St.
DALLAS 15340 Dallas Pkwy., Suite 1100; 2930 W.
Northwest Hwy.; 1517 Main St.; 2588 Royal Ln.
EL PASO 9515 Gateway West; Kern Plaza Shopping Center,
3100 N. Mesa
FT. WORTH 231 One Tandy Center; 2801 Alta Mere
GALVESTON 5924 Broadway
HARLINGEN 1514 S. Hwy. 77, Sunshine Strip
HUMBLE 19300 "B" Hwy. 59 (at FM 1960)
HOUSTON 211C-FM 1960; 10543 Gulf Fwy.; 5900 North
Fwy.; 6813 SW Fwy.; 809 Dallas St.; Holland Square
Center, 10920 East Freeway, (713) 453-0600; Champion
Forest Plaza, Champion Forest Dr. and F.M. 1960 West;
1018 Gessner; 3278 South Loop West (So. Main at 610)
HURST Northeast Mall
LAREDO 102 East Calton Rd.
LUBBOCK 3625 34th St.
ODESSA 16131/1/1 "A" East 8th Street
RICHARDSON Fleetwood Sq. S/C, 202 W. Campbell Rd.;
320 S. Central Expr.
SAN ANTONIO 6018 West Ave.; 4249 Centergate; Riverbend
Parking Garage, 211 W. Market St. (Downtown)
WICHITA FALLS 1720-A 9th St.

UTAH
OGDEN K-Mart Shopping Center, 3672 Wall Ave.
OREM Grand Central Plaza, 384 East & 1300 South
MURRAY 6051 S. State Ave
SALT LAKE CITY 301 South State St.

VIRGINIA
ALEXANDRIA 3425 King St. at Quaker Ln.
ARLINGTON Crystal City, 2301 So. Jefferson Davis Hwy.
FAIRFAX Westfair Center, 11027 Lee Hwy.
LYNCHBURG Hill's Plaza, Ward's Rd.
NEWPORT NEWS Newmarket South Shop. Ctr.
NORFOLK 5731 Poplar Hall Dr.; Wards Center, 122 E. Little
Creek Rd.
RICHMOND Willow Lawn S/C, 1617 Willow Lawn Dr.; 7728
Midlothian Turnpike
ROANOKE Franklin Bldg., 3561 Franklin Rd. S.W.
ROSSLYN 1911 N. Ft. Myer Dr. at Rt. 29

WASHINGTON
BELLEVUE Crossroads Mall, North East 8th & 156 St.
BELLINGHAM 1111 Cornwall Ave., Suite B & C
FEDERAL WAY 33505 Pacific Hwy. South
OLYMPIA 106 N. Wilson
SEATTLE 18405 Aurora Ave. N.; 1521 3rd Ave.; 5030
Roosevelt Way NE
SPOKANE 7702 N. Division; E. 12412 Sprague
TACOMA 7030 S. Sprague
TUKWILA 15425 53rd Ave. S.
YAKIMA 1111 N. First St.

WEST VIRGINIA
HUNTINGTON 2701 1/2 5th Ave.

WISCONSIN
APPLETON 2310 West College Ave.
MADISON 57 West Towne Mall
MILWAUKEE 6450 N. 76th St.; 729 N. Milwaukee
(Downtown)
WEST ALLIS 2717 South 108th St.

ADDRESS CHANGE

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