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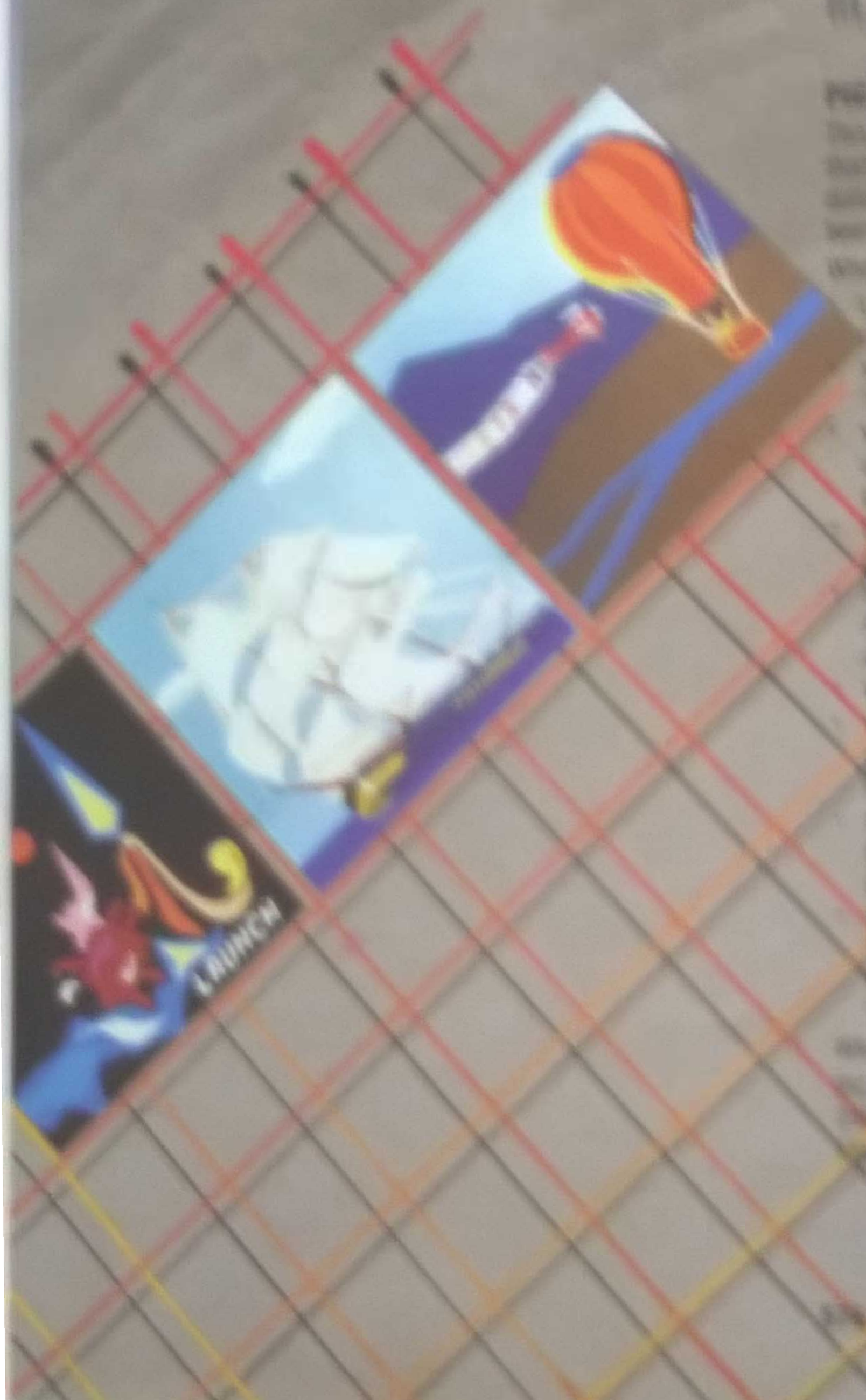

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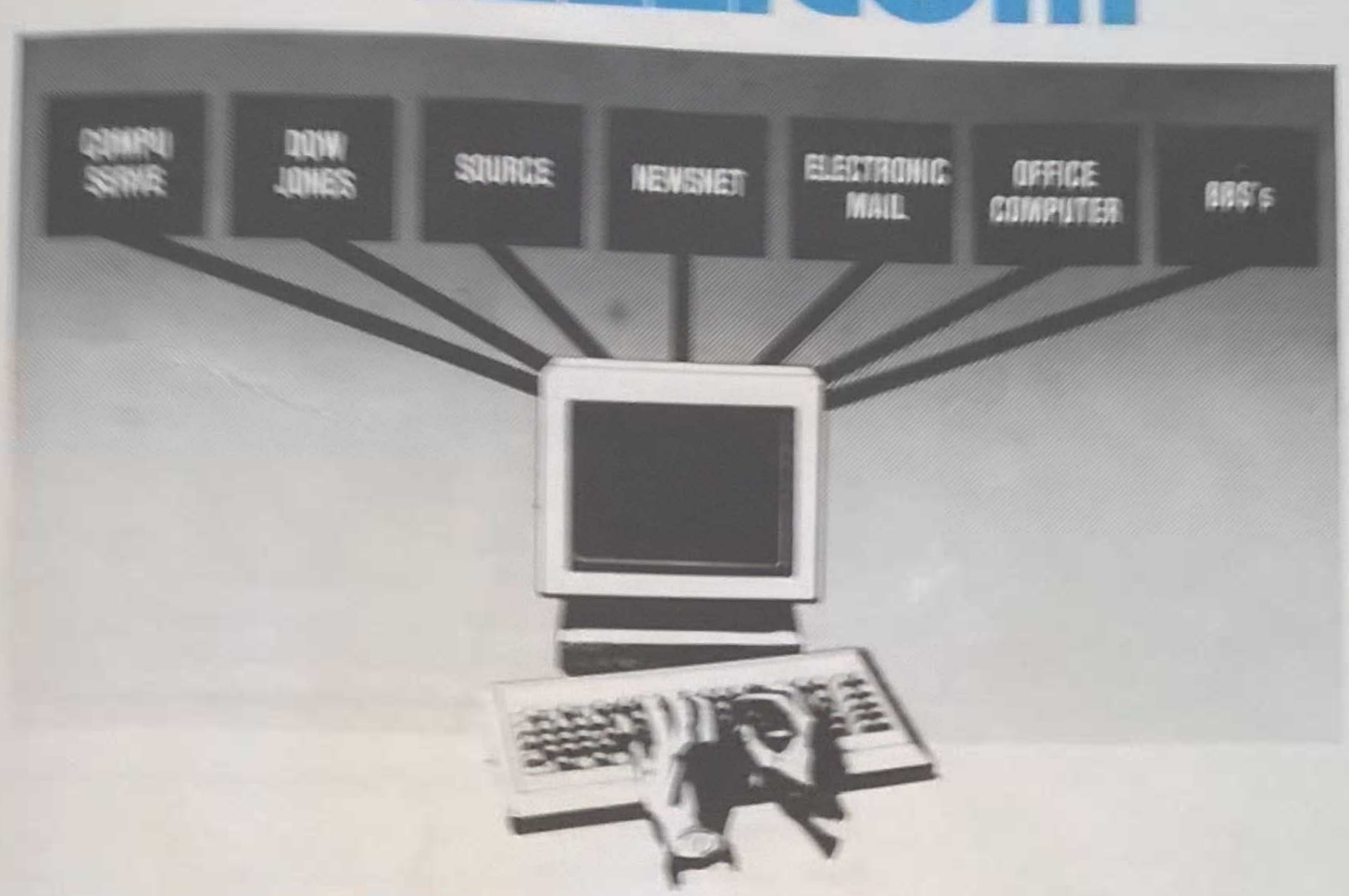

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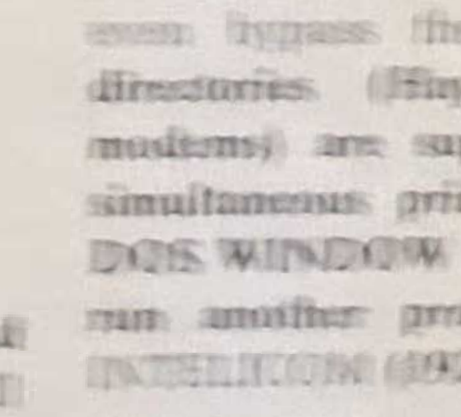

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Vol. II, Issue 6 — January 1986

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CONTENTS

FEATURES

Mega-DOS/*Bob Jack* 10
Altering DOS to allow memory upgrades

Mastering MS-DOS/*Danny Humphress* 14
Prompts with style

■ **Stock Market Trader**/*Fred Clabuesch* 16
A simulation that allows you to "play the market"

■ **Starting From Johnson's Rule**/*George M. Smart* 42
Project scheduling to achieve maximum efficiency

■ **An $11 Null Modem**/*Mick McGuire* 34
Save money — build your own!

BASIC Training/*Fred Blechman* 38
Handy BASIC hints

■ **XREF Patch**/*William J. Locke* 46
Cross-reference control transfers tool

■ **Free The Sanyo 550 — With Spool**/*Herb Martello* 51
Save yourself time with this handy program

DEPARTMENTS

Advertisers Index 66
Back Issue Order Form 59, 60
Business Sector/*Charlotte & Brian Stone* 62
Solutions to your applications problems
Delphi Bureau 61
Helpful Hints 45, 50
Input/Output/*Tim Purves* 48
Answers to your technical questions
Letters To The Editor 4
Racksellers 63
Soft Soapbox/*Belinda Kirby* 6
News and Comments
Soft Talk 58
New products and services
Submitting Material 57
Subscription Information 64
The First Great Soft Sector One-Liner Contest 47

REVIEWS

ASCII Printer/*J & M Software* 44
Bottomline Capitalist/*Venture Software* 44
CoForth/*Bluewater* 44
Open Access/*Software Products International* 44
Refer/*James Halstead & Associates* 44
SanyGraf/*A-OK Computers* 44

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■ The small disk symbols appearing beside features and regular columns indicate that the program listings with those articles are on this month's SOFT SECTOR ON DISK, ready to LOAD and RUN. For full details, see the SOFT SECTOR ON DISK ad on Page 62.

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LETTERS TO THE EDITOR

PRINTING SOLUTION

Editor:

In regard to the question about *FormGen* ^W listings not printing all of the calculations posed in the "Ask Sanyo" column (December '85, Page 50), I have experienced the same problem.

MicroPro offers this solution: "Do not use spaces when assigning the field names." For example:

A) 001/TOTALAMT
B) 001/TOTAL AMT

In example B, only part of the calculations will print out because of the space between the total and the amount. In example A, when the fields have been named correctly, up to 32 characters of the calculation will print in a ^W listing with version 1.40 and up to 254 characters for version 1.60.

Don Leventhal
Cleveland, OH

Editor:

I also have the same problem when using ^W to list a *DataStar* program with *FormGen*. The listed calculations do not print except for about the first 20 characters.

I'm using an MT-180L printer. I had the same program on the CP/M version which printed all the calculations so I think the problem is in the software.

Jesse Mitchell
Longview, TX

TAKING COMMAND

Editor:

Like so many people, I have wanted to write to you on many occasions to express my gratitude to you and your staff for producing the most helpful and useful publication I could possibly ask for when it comes to my Sanyo 555-2. I would especially like to thank those readers who have taken the time to share tips and programs with the rest of us through the pages of SOFT SECTOR.

In that same spirit, I would like to share what might seem to be a minor discovery to those in the know, but was a monumental find for me recently. I use *WordStar* for about 50 percent of my work, and was irritated every time I had to retype a redundant paragraph or address which was already available in another file.

Having worked with text editors in the past that permitted storing this type of information in a memory block for immediate recall, I was somewhat stymied that a program as sophisticated as *WordStar* did not permit a similar capability.

Then, the other day, I started experimenting with some of the *WordStar* commands that I was unfamiliar with just to see what they did and how they might come in handy. It was the ^KR command that opened my eyes and eliminated my *WordStar* "handicap." It seems this command will permit you to read an existing file into the current file you are editing, beginning at the point of your cursor. So now I have set up files which contain commonly used material and ^KR in whatever I need, whenever I need it. I hope this tip will help other novice *WordStar* hackers take advantage of the true power they have at their fingertips.

Robert C. Bliss
Lawrenceville, GA

SANYO USER AT LARGE

Editor:

In the recent issues of SOFT SECTOR, I have noticed that there are no users' groups in the Knoxville, Tenn. area. If one exists, I would like to get in contact with them. If not, I am willing to get one started. Should anyone be interested, please contact me at: 1539 Highland Ave., Apt. #16, Knoxville, TN 37916. Thanks for the support you have given Sanyo users.

Eugene Chumley
Knoxville, TN

Editor's Note: Although there are none listed, there may be some in your area. Check with your Sanyo dealer for any information he may have.

TWO CENTS WORTH

Editor:

I have two extra bits of information to add to replies published in the November '85 issue of SOFT SECTOR.

WordStar will only allow a default right margin of (screen width -4), i.e., 76 for an 80-character screen and 128 for a 132-

PAR AVION

character screen.

The Word Plus runs fine on a Sanyo, or any other MS-DOS computer. I use it instead of *SpellStar* and prefer it. By the way, it handles *WordStar* files just fine.

R.M. White
Houston, TX

INFORMATION EXCHANGE

Editor:

I have read with great interest your magazine SOFT SECTOR, and I really find it excellent.

I am also a Sanyo user and have an MBC-555-2, 256K, with a color and a monochrome monitor and an RS-232C card.

With other Sanyo Users in my country we are organizing a club which we will name "SUCH" (Sanyo Users Chile). I would be very happy if you could get me in contact with clubs in the U.S. or other countries so we could interchange our experiences and doubts in hardware and software.

Kenneth P. Pugh
Punta Arenas
Chile

Editor's Note: Please check our "Clubs" listing in the November 85 issue, Page 60.

NEW ADDITION

Editor:

In the October '85 issue of SOFT SECTOR, there is an advertisement for the Sanyo MBC-885 computer.

I have not noticed any articles or reviews on this machine in SOFT SECTOR, and would ask if you intend to do any.

George Ashton
Balmoral, Auckland 4
New Zealand

Editor's Note: Look for a review of the MBC-885 in the March '85 issue of SOFT SECTOR. We will begin coverage of this machine in coming issues.

TRUE VALUE

Editor:

Thank you for the magazine; it fits my needs perfectly.

I should like to comment on Robert McCoy's program "Determining Present Value" in the September '85 issue, Page 44.

The program listing provided does exactly what Mr. McCoy says it does, however the printout heading "Present Value Listing" does not describe the information that is tabulated by the program.

I suggest the following for lines 340, 350 and 510 to provide a present value listing for each year which I think would be more meaningful to the typical user.

```
340 FOR YY=0 TO Y
350 PV(YY)=PV0*(1+0)^YY
510 FOR YY=0 TO Y
```

With these changes, you can now get a printout of the present value listing for each year.

Jerry Hurlburt
Watsonville, CA

FOR ASCII ONLY

Editor:

I am writing in response to a program in the October '85 issue, ASCII-SD.BAS. I entered it into the computer and tried to run it. It then created ASCII-SD.COM as expected, so I then ran ASCII-SD.COM according to the instructions. I followed the rest of the instructions, loaded in a picture and tried to print it out and all I saw was a row of @s and the printer started shooting our paper with nothing on it. I would appreciate it if you would correct the program in the next issue. Thank you!

Jay Rossa
Liverpool, NY

Editor's Note: Please note that this is an ASCII screen dump and not a graphics screen dump. This program is used to print ASCII characters only.

CLEARING IT UP

Editor:

I like your magazine very much.

December's article under the monthly column, "Mastering MS-DOS" by Danny Humphress was a good article.

There are two more ways of getting the ESCAPE character to the screen. Take for instance clearing the screen. (Note: The ESCAPE character is ^[.) All you would have to do is type: a>Echo ^[[2J (ENTER). Presto!

Another way is to type the following lines:

A>Copy CON:CLEAR (ENTER)
^[[2J (ENTER)
CONTROL-Z (ENTER)
A>TYPE CLEAR (ENTER)

There are two ways of doing it *without* resorting to BASIC. With the ECHO command, you don't even use a file. Your drive can be empty when you do it.

Lawrence Glenn
Bigfork, MT

SYNC INVERSION

Editor:

The vertical interface circuit, described in the September '85 issue, Page 32, works fine on the standard Sanyo video output. For use with the video RAM Board, it must be modified because the video RAM's sync pulses are positive. These changes assume a compatible monitor such as the CRT-70 so the sync pulse inversion is eliminated.

First of all, change the 8-pin DIN input connector to a 9-pin D male connector with its associated pin assignment. Connect the horizontal sync line directly from input to output and use IC4 to pre-invert the vertical sync pulse by connecting the vertical sync input to Pin 12 and connecting Pin 11 to Pin 1 on IC1 and to C4. Also connect the intensity signal (Pin 6 on the 9-pin D connector) from input to output.

Mike Herrington
Naperville, IL

CHANGING OF THE GUARD

Editor:

As the new President of the Sanyo Users Group of Washington, I want to give you our own new mailing address for the "Clubs" section in SOFT SECTOR. Our new mailing address is: Sanyo Users Group of Washington, Doug Webbink, P.O. Box 2468, Fairfax, VA 22031, (703) 323-6683.

Our old mailing address was: Sanyo Users Group, Roger Moon, P.O. Box 1825, Rockville, MD 20850.

In addition, I wanted to notify you that the Washington Area Computer Users Group no longer exists. Its mailing address was: Washington Area Computer Users Group, Edward Cavert, 4032 Hadley Lane, Fairfax, VA 22032.

Our user group now has more than 180 members.

Douglas W. Webbink
President
Sanyo Users Group of Washington
Fairfax, VA

SOFT SOAPBOX

Change is the subject of "Soft Soapbox" this month since there has been a lot of it going on here at SOFT SECTOR. To begin with, you may notice a new look about the magazine within the coming issues.

Sandy Underwood, a native Louisvillian and 1985 University of Louisville graduate has assumed the position of art director of SOFT SECTOR. Kevin Quiggins, our former art director, has moved to our newest publication, *VCR, The Home Video Monthly*. Sandy has jumped in with both feet and will work with us to help bring you the quality publication you've come to expect each month. We would like to welcome Sandy to our team.

Not only have we acquired a new art director, but also new office space. SOFT SECTOR has moved into the Falsoft Building, which bears the name of our company. We are now occupying a spacious new building that is fondly refered to as the "high rise of Prospect." (It really is the tallest building in Prospect!) The address will remain the same for those who write to us and send in submissions.

You can also expect to find coverage of two new Sanyo MS-DOS machines: the MBC-675 and the MBC-885. The 675 is the new IBM-compatible compact portable. The 885 is an IBM-compatible desk top computer with a price tag that is somewhere between $1,200 and $1,500. Look for a review on the 675 in the February issue of SOFT SECTOR and a feature on the 885 in the March issue. We will begin regular coverage of these machines in coming issues.

Sandy Waters, who played a major role in developing Sanyo's new marketing policy, has resigned from his position as marketing manager for the computer division of Sanyo. We have not heard, as of yet, who is to replace him.

Because of the changes, the "Ask Sandy" column will not be found in this issue of SOFT SECTOR. However, we will resume the column after this month. Anyone with questions for Sandy can mail them directly to SOFT SECTOR.

Finally, we would like to say "thanks" to all of you who have helped make Delphi a success. We would particularly like to say thanks to Bob Jack (BJ85) for all the help he has given to other users by answering questions in the forum and for his support of SOFT SECTOR. Look for his excellent article "Mega-DOS" in this issue. You can expect to see more from him in the future. Not only thanks to Bob, but to all of you who have shared your knowledge and expertise with SOFT SECTOR readers and with us. Should you have any problems on Delphi, look for the following list of usernames to help answer questions: SOFT SECTOR, NICK OLS, DANNYTIOS and KIRBY.

Looking forward to providing you with another year of SOFT SECTOR.

— Belinda Kirby

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MS-DOS 2.11 SANYOBASIC (version Report 6w ... Reference Manual, CP/M-80 (Sanyo version) (Included in your Sanyo)

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It's the holiday gift season and time to tell Aunt Millie which **MichTron** program you'd like to receive. (Or time to decide which ones you'll buy yourself if anyone gives you cash!) Pick from the largest selection of Sanyo software any company offers. All programs run on the Sanyo 550 series; those listed in boldface also run on the Sanyo 700 and 800 series and other IBM-compatible computers.

For everyone:

BBS ($99.95) - bulletin-board system for your Sanyo.
Cornerman ($39.95) - sidekick for your Sanyo has calendar, notepad, calculator, dialer, even an ASCII table.
DI ($24.95) - advanced directory system sorts all files, even in subdirectories or on hard disks. Locates any file instantly.
M-Disk ($34.95) - classic RAM disk emulator makes your Sanyo super-fast at any disk-addressing operation.
Mi-Key ($34.95) - a key-change program. Type long strings with two or three keystrokes, or try out the Dvorak keyboard.
Mi-Term ($79.95) - terminal communication program helps your Sanyo talk to virtually any other computer system.
Mouselick ($34.95) - trick to make a joystick act like a mouse.
Printer Helper ($29.95) - controller helps Epson printers use their full range of features with your Sanyo.
Soft Spool ($34.95) - software print buffer and speeder keeps your computer working while the printer chugs along.
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SuperDirectory ($39.95) - cataloger keeps track of all files on all your disks. Sorts, prints disk labels, more.
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For businessmen:

Business Agreements ($49.95) - attorney-prepared legal forms and contracts simplify your business needs.
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MasterGraph III ($89.95) - business graphics package creates dramatic line, bar and pie graphs.
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Pledge ($199.95) - tracks pledges and special gifts to religious institutions, reports to givers and the treasurer.
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Grafiti ($39.95) - an easy-to-use, basic drawing program.
Picasso ($99.95) - menu-driven, advanced free-form drawing package gives you absolute control of graphics.
PrintFrame ($39.95) - versatile screen dump utility can be customized to take full advantage of your printer.

For programmers:

Drive Timer Plus ($24.95) - utility checks disk drives, encodes files and provides menu-driven DOS file commands.
DS DOS Plus 2.11 ($49.95) - MS DOS enhancement package supports 80-track drives, IBM graphics, nested directories.
EasyRecord ($139.95) - C-programmer's file utility manipulates files of all data types with easy-to-use functions.
EasyWindow ($139.95) - screen display manager makes custom windows easy from C language programs.
Graphpac ($49.95) - package of graphics routines for Pascal, C and machine language programs.
Super Zap ($49.95) - full-featured disk editor lets you change anything anywhere on a disk. Fix disk errors with ease.
Transfer ($59.95) - data transfer program converts TRS-80 files to MS-DOS files, or vice-versa.

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Text adventure games:
Adventure Disk #2 and *Adventure Disk #3* ($34.95 each) - five unique games on each disk.

Arcade games:
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Solitaire ($34.95) - and cribbage and blackjack and poker squares and klondike. Many hours of entertainment.
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MEG

Did you know you can expand your Sanyo's memory past the 256K the machine is set up for? Surprised? It's a fact, the Sanyo is a lot more powerful than most people think.

The 8088 CPU chip, which the Sanyo uses, can address up to a megabyte of memory. A stock, standard Sanyo MBC-550/555 can easily be altered to have .5 megabytes of memory (523,264 bytes). That's double the normal maximum.

How To Upgrade

To upgrade to .5 megabytes of memory, you will have to do three things. First, you will have to alter the power supply. There is an excellent article on how to upgrade your power supply in SOFT SECTOR, October '85, Page 10. This upgrade works. I personally know of several people, including myself, who are using this modification with no problems.

Next, you will have to add the additional memory. There are several ways to do this. The most popular way is to "piggyback" four more banks of 64K memory chips onto the two banks of memory chips which plug into the main computer board. This method is not hard, however, it does require a bit of skill with a soldering iron.

(Bob Jack is a self-employed small businessman who has been programming, using and writing about personal computers for the past 10 years. On Delphi, in the MS-DOS SIG, he is known as BJ85. He may be contacted at 8371 White Rd., Burbank, OH 44214; 216-948-2059.)

Finally, you will have to alter the Sanyo DOS to handle the additional memory. The standard 2.11 DOS and the Video Board DOS are not set up to work with greater than 256K of memory.

Why Alter DOS

In order to get the most out of the available memory, the standard DOS places the Video RAM (16K) at the end of the memory. This method works well up to 256K, however, the CRTC HD46505 chip (which displays the Video RAM) is not set up to address memory greater than 256K.

This presents a problem when you increase the memory beyond 256K. It's no longer possible to put the Video RAM at the end of memory. So what do you do? Simple, put the Video RAM at the beginning of the available memory where the CRTC can address it.

Sanyo, in an earlier version (1.23) of their DOS, used a subroutine called RELOCDOS (relocate MS-DOS). This routine moves the DOS from its current location to a new location. It was used to open a hole in front of the DOS for the Video RAM.

It looks like this earlier version of the DOS may have been written before the Sanyo finalized the computer hardware designed. They may not have been sure how much memory would be available, as the RELOCDOS subroutine does not appear in the later 2.11 DOS version, nor in the Video RAM Board version of DOS.

In summary, what all this means, is to alter the standard DOS to address over 256K of memory, the routine which sets up the CRTC HD46505 has to be changed, and the RELOCDOS subroutine has to be added.

How To Alter DOS

It is suggested that you prepare an altered DOS disk before making the hardware upgrade. In this way, you will have a bootable disk that you know works. This disk can then be used to test your hardware upgrade.

The patches in Listing 1 are for DOS 2.11 with I/O version 1.00. Look at the second line of your system disk. It should read MS-DOS 2.11 version 1.00. Another way to check for the correct version is to boot the system and look at the top line. It should tell you that you are using I/O version 1.00. Other lines will tell you MS-DOS version 2.11.

The actual altering of the DOS is really quite easy. First, make a copy of your system disk (use DISKCOPY A: B:). This copy must contain DEBUG.

Next, boot the copied disk and type in Listing 1. Be very careful, type them in accurately. If you are working with a single-sided disk, use the LOAD and WRITE commands. If you are working with a double-sided disk, use the double-sided commands. Do not type in the explanations.

What you are doing with DEBUG is reading in IO.SYS, altering the 2 CRTC set up registers (BX and BP), adding a modified version of RELOCDOS, filling the remainder of the routine with NOPs (no operations) and writing the altered IO.SYS back to disk. It sounds complicated, but it's really not. You will find DEBUG easy to work with.

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Listing 1: Standard 2.11 DOS V. 1.00 I/O

```
DEBUG                          Run DEBUG
                               Load command — u
L CS:100 0 0C 20               For double-sided dis
      or
L CS:100 0 09 20               For single-sided disk
A 0AA6                         Assembly mode
CALL 0AE1                      Call RELOCDOS
MOV BX,0C00                    Set Video address
MOV BP,0004                    Set Video page
JMP 0AE1                       Exit routine
PUSH DX                        Begin RELOCDOS, sa
MOV DX,1000                    New DOS page
CS:                            Use CS in next com
MOV DS,[0786]                  Get old DOS page
MOV ES,DX                      New DOS page int
CS:                            Use CS in next com
MOV [0786],DX                  Save new DOS pa
MOV CX,2222                    Length of move
MOV SI,0000                    Zero into SI
MOV DI,SI                      Zero into DI
CLD                            Direction flag forw
REPZ                           Repeat until zero
MOVSW                          Move word
POP DX                         Restore DX
RET                            Return from subr
ENTER                          To leave assemble
F 0ACE 0AE0 90                 Fill routine with
```

DOS

By Bob Jack

Once you have the system disk modified, label it "Mega-DOS." Make a backup copy of it and use one of the disks for a working disk.

Mega-DOS will boot on systems with less than 512K. However, since IO.SYS has to reside in memory beginning on a memory page, *Mega-DOS* wastes 30 to 40K of memory making the hole for the Video RAM.

When you are working with 512K of memory, a loss of 30 or 40K is nothing, but when you only have 256K or less, 30 or 40K can be quite a large piece of the available memory. More than likely, this is why Sanyo did not include the RELOCDOS subroutine in later versions of their DOS.

For these reasons, it is suggested that you test *Mega-DOS* on your machine. However, put it aside until you increase your memory. You will then have a DOS which will boot and run like normal on your Mega-Sanyo.

Video RAM Board DOS

The patches in Listing 2 are for the Video RAM Board DOS version 1.02 or version 1.03. Both patches are in exactly the same place. The procedure to change this DOS is exactly the same as with the standard DOS. Make a copy of the system disk. Boot the copied disk and type in Listing 2. When done, label this disk "Video-Mega-DOS."

Since the Video RAM Board does not use any of the available memory for Video RAM, the patches for the Video RAM Board DOS are even simpler. What you are doing is pointing the 2 CRTC registers (BX and BP) to zero, and putting a 32-byte buffer at the end of memory (in DX). You do not have to make a hole for Video RAM, so no RELOCDOS is needed.

Video-Mega-DOS can be run with any size of memory without any loss. It is suggested that after you make the changes, check the DOS and use it on a regular basis.

The Final Question

The final question has got to be, "What do you do with all that memory?" Well, there are a number of window programs which work with the Sanyo, especially if you have the Video RAM Board. For example, it's impossible to run a full *Sidekick* with some of the larger programs unless you increase the memory. Sometimes it's really helpful to be able to call up a calendar, or a calculator, etc., from the middle of a program.

A lot of memory comes in handy when running a RAM Disk program. This is where you use the memory just as if it were a disk. It's unbelievable how much it speeds up any program which must access the disk a lot. A good example is running a spelling checker.

In any event, whatever you use the increased memory for, you'll find *Mega-DOS* easy to operate and easy to use.

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```
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L CS:100 0 09 20         For single-sided disks
A 0AA6                   Assembly mode
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MOV BX,0C00              Set Video address
MOV BP,0004              Set Video page
JMP 0AE1                 Exit routine
PUSH DX                  Begin RELOCDOS, save DX
MOV DX,1000              New DOS page
CS:                      Use CS in next command
MOV DS,[0786]            Get old DOS page
MOV ES,DX                New DOS page into ES
CS:                      Use CS in next command
MOV [0786],DX            Save new DOS page
MOV CX,2222              Length of move
MOV SI,0000              Zero into SI
MOV DI,SI                Zero into DI
CLD                      Direction flag forward
REPZ                     Repeat until zero
MOVSW                    Move word
POP DX                   Restore DX
RET                      Return from subroutine
ENTER                    To leave assemble mode
F 0ACE 0AE0 90           Fill routine with NOPs
                         Write command — use either
W CS:100 0 0C 20         For double-sided disks
        or
W CS:100 0 09 20         For single-sided disks
Q                        Exit DEBUG
```

Listing 2: Video RAM Board DOS V. 1.02 or V. 1.03

```
DEBUG                    Run DEBUG
                         Load command — use either
L CS:100 0 0C 20         For double-sided disks
        or
L CS:100 0 09 20         For single-sided disks
A 2A26                   Assembly mode
SUB DX,20                32-byte buffer at end
MOV BX,0000              Zero Video address
MOV BP,BX                Zero Video page
JMP 2A5E                 Exit routine
ENTER                    To leave assemble mode
F 2A30 2A5D 90           Fill routine with NOPs
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Put some flair into your MS-DOS prompts

Prompts with Style

By Danny Humphress

For the past two months, we have been through an introductory course on using MS-DOS's ANSI.SYS device driver. Today, we'll put some of those ANSI codes to work for us through the use of the MS-DOS PROMPT command.

Remember that the PROMPT command is not supported by MS-DOS 1.25.

Cute Little Prompts

By now, the familiar A>, B> and C> prompts are probably good friends of yours. They tell you that MS-DOS is patiently waiting for your next command. And, being the nice guys that they are, they let you know what the current default drive is.

As utilitarian as the cute little MS-DOS prompts are, they are sometimes lacking in . . . well, charisma. Yes, I hate to say it, but our little prompt friends are quite boring. An occasional "Your Wish is My Command>" prompt or "What Now?" would certainly make those long nights at the computer a little less tedious.

What about when one has to set up a computer to be used by a novice? There's nothing like a cryptic A> prompt staring a new user in the face to perpetuate the stereotype of the big mean computer. Something along the order of "Hai!" is much more in tune with these computers' Japanese roots. The prompt could even say something like, "Type HELP if you need it" as a comfort to the new user.

Well, all this and more is possible thanks to MS-DOS's PROMPT command.

PROMPT allows you to change the MS-DOS prompt to just about anything you like. It can even contain the current drive letter, the directory path, the date and the time. Imagine a bank-marquee-like prompt: "At 10:50:00 the default drive is A."

With the use of ANSI codes, you can even have the prompt change screen colors and other attributes. If you want the screen to always be white on blue, you can have the MS-DOS prompt change the attributes to those colors each time it is displayed. This way, if you go into a program that changes the colors, they will return to your preferred colors when your prompt appears.

Darned Easy

One of the best things about PROMPT is that it is so darned easy to use. Suppose we want to change the prompt to "Now What?" The command would be:

```
PROMPT Now What?
```

The next prompt you see will be your own creation!

Special Characters

Some characters (especially ANSI codes) cannot be entered directly when using PROMPT. MS-DOS has provided a way around this though, by using special character sequences. Just as ANSI codes are preceded with an ESCAPE character, special PROMPT codes are preceded with a dollar sign ($). Here is a list of those codes:

Code	Prompt
$$	The $ character
$t	The current time
$d	The current date
$p	The current directory
$v	The MS-DOS version number
$n	The current drive
$g	The > character
$l	The < character
$b	The | character
$_	A carriage return and line feed
$s	A leading space
$h	A backspace
$e	The ESCAPE character

As you know, the "normal" MS-DOS prompt is the drive letter followed by a greater-than character (>). If we put this in PROMPT terms, the command would be:

```
PROMPT $n$g
```

The $n causes the prompt to display the current drive and $g displays a greater-than character (>). If you change the default drive, MS-DOS will be smart enough to change the prompt accordingly. If you had used A instead of $n, the prompt would always say A> — not very desirable unless you want to really confuse someone!

(Danny Humphress is the owner of a computer software and consulting firm in Louisville, Ky. Danny brings to SOFT SECTOR his extensive experience with small business computers and applications software.)

A prompt that I personally like to use is:

```
$p$g
```

This prompt shows the current directory path (including the drive letter) and a greater-than symbol. If, for example, you were in a directory called ACCOUNTS on Drive B, the prompt would be B:\ACCOUNTS>. I find this especially useful in that you are never in doubt about which directory you're in.

Some people who have just recently learned how to use PROMPT tend to go super loony. They'll set prompts that show the date, time, directory, MS-DOS version and their own little message. That's OK, though, you're the one who has to live with it! And besides, it's a good way to learn about PROMPT while having fun at the same time. Try this prompt on your computer to see what I mean:

```
PROMPT It's $t on $d$_You're in $p$_Push$g$_
```

Don't confuse the underline characters (_) with the hyphen (-). The command code $_ causes the prompt to advance to a new line.

You may have noticed that $$ prints a single dollar sign on the PROMPT command line. MS-DOS would think that it was part of one of the special codes. MS-DOS knows to print a single dollar sign ($) in the prompt wherever you send it.

Another special circumstance is when you want the prompt to start over a number of spaces from the left margin of the screen. If you just entered spaces between PROMPT and your text, MS-DOS would ignore them. The way around this is to use $s for each leading space you want. For instance, to indent the prompt 10 spaces, use 10 $s's. After you've entered a character other than spaces, MS-DOS will start paying attention to the spaces. So actually, you only need to enter one $s and nine spaces — the spaces after the $s will be printed normally.

ANSI Prompts

As mentioned earlier, it is possible to embed ANSI code sequences into MS-DOS prompts. One interesting use for this, if you have a color monitor, is to use the prompt to keep the screen colors changed to ones you like. I, for example, have a magenta prompt showing the directory path, and commands are entered and displayed in blue. This is done by changing the color to magenta before displaying the prompt and then changing the color to blue. Here's my favorite prompt:

```
PROMPT $e[35m$p$g$e[34m
```

Look complicated? Well, if you take it one code at a time, it's not so bad. The $e[35m sends an ESCAPE character ($e) and the ANSI code for magenta ([35m). The $p and $g display the current path and a greater-than character (>). Finally, $e[34m sends an ESCAPE character followed by the ANSI code for blue.

After entering this prompt, what you type in MS-DOS and what is displayed on the screen will be in blue. The prompt will be in magenta.

Now, my taste in colors runs slightly left of normal; so I would tone them down to your own tastes. But as I said, *I* am the one who has to live with it!

If you have a color Sanyo 550/555, you'll not be able to get colored prompts without first changing the screen mode to color. This is done by sending the ANSI code, ESCAPE [3h to the screen once. Use the BASIC program from last month or use a PROMPT $e[3h to get it in the proper mode and then enter your new prompt codes. You would not want to put $e[3h in your normal prompt, since it clears the screen *each time* it's sent to the screen.

With a little creativity, you can create some marvelous and exciting prompts. It kind of makes me feel sad for our two blue (make that green) A>, B> and C> friends. But, what the heck. Computers don't have feelings — do they?

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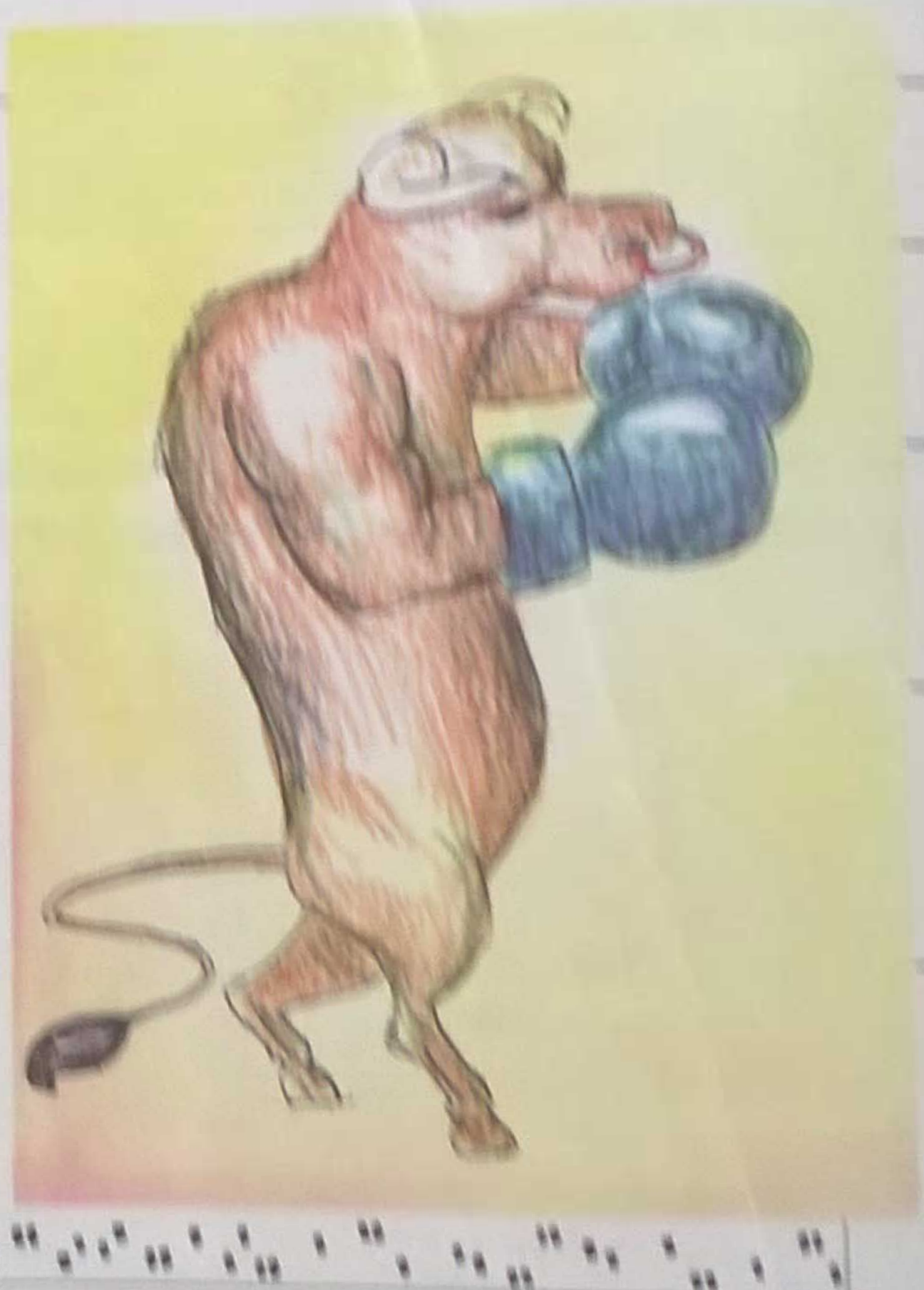
Random trends and
the financial animal in you

Stock Ma

By Fr



Stock Market Trader is a simulation of a stock exchange where five stocks are listed with starting prices. The player may buy or sell shares each day after which the traded shares are reposted. The player's current assets are shown and a new share price is computed for each of the stocks. The program will pay dividends and split stock on a random basis. Naturally, each time a player buys or sells a share of stock the computer takes its one percent as a "brokerage fee." The game code was written so that the market will operate on a trend with daily variation of each stock within this trend. The game will also switch trends at random intervals and what was a "Bear" market will become a "Bull" climate and vice versa.

How It Works

Lines one through 240 set up and initialize the variables, display the opening screen and make Function Key assignments. The names and initial values for the stocks are assigned in lines 230 and 240. Lines 250 through 380 hold the subroutines for the program and I enter all subroutines at the front of a program so time isn't wasted while the computer searches through the listing for the proper GOSUB number. Lines 390 through 490 hold the closing screen information and as this started out a subroutine, it was placed in this position. Now no longer a subroutine, it would be better placed at the very end of the program, just after the introduction screen information. Lines 500 through 1630 are the game code and divided into a number of separate modules. Lines 1640 through 1710 contain the information of the instruction screen and may be by-passed if the player is familiar with the game and doesn't need instructions each time.

Game Routine Details

Lines 500 through 610 set up the playing screen and determine the name of the player. Lines 620 through 640 write the opening share prices on the "Big Board" and after initial use, bypasses these lines for the remainder of the game. Lines 650 through 760 post the daily prices, the exchange average, whether the market is moving up or down and the player's current assets. Lines 770 through 830 clear the screen for the next day's trading and question the player as to his decisions regarding each stock. This routine may be by-passed by pressing the proper Function Key and the game will go on to the next trading day. Lines 840 through 8

(Fred Clubusch started programming on the Timex ZX-81 and has been reviewing and writing programs for the Sanyo MBC-555 series for the past year. He may be contacted at P.O. Box 2167, Simi Valley, CA 93062-2167; 805-520-1806.)

variations to challenge
round one to the closing bell

...ket Trader

abuesch

take the input values and process them for specific commands. This routine was designed so the computer would respond to all of the key strokes possible from the keyboard. This routine can read any character string input from zero to 255. This was necessary so that the computer would recognize CHR$(27) (ESCAPE) at any time and terminate the playing routine. Lines 880 through 1040 determine what the player did with each stock and post the result. The total price of stock purchases minus the brokerage fee is also compared to "Cash on Hand" and if the player is short, the program returns to the beginning of the input routine so that he can rethink his purchase choices. Lines 1050 through 1290 recompute each share's asking price for the next trading day. Lines 1300 through 1360 determine randomly if a stock should pay a dividend or split shares. The program also forces a split when any share price reaches or exceeds $999.99. This automatically causes an approximate 100/1 split and the resulting reduction in price per share. The remaining lines update the player's current assets and the values to be posted to the board.

Wrapping Up

This program is a close simulation of any stock market, but in this version a player may only buy stock up to the limit of his cash on hand minus the brokerage fee. You may want to write a routine that will allow the purchase of stock "On Margin" with all of the hazards that are implied. The day and date variables are presently in the program (lines 20 through 40), but the remainder of the routine has not been implemented. Another rainy day project. There is also a list of the major variables used. I would be interested to hear from you if you get a working "margin" routine implemented. I enjoyed writing the program and trust that you will have just as much fun playing *Stock Market Trader*. Have fun!

Variable List

C	—	Player's Cash Assets
P	—	Current Shares Held
S	—	Share Price
T	—	Shares Traded
I$	—	Stock Abbreviation
S$	—	Name of Stock
A	—	Shift from "Bear" to "Bull" Market
D	—	Player's Total Assets
TT	—	Total Dollar Amount of All Shares Traded each Day
DY	—	Trading Day
NP	—	Amount Lost or Earned in Market
TR	—	Market Trend
EA	—	Exchange Average
NC	—	Net Change
SA	—	Player's Stock Assets

The listing: TRADER.BAS

```
1 '    ********************************  ****************************************
       *  SANYO's MARKET TRADER       *  *******  *****  Written by TRANS-SAN INDUSTRIES
2 '    *  Version 1.1Ø                *                                [c] JUNE 1985
       ********************************  ----------  ----------------------------------
3 '    *  W. Fred Clabuesch           *  PO Box 2167  Simi Valley, Calif  93Ø62-2167
       ********************************  **********  ****************************************
4 '    For Personal Use Only --- Not For Resale
1Ø CLEAR:DIM C(5),P(5),S(5),T(5),I$(5),S$(5),O$(5):DEFDBL C,D,S
2Ø M1$="  JanFebMarAprMayJunJulAugSepOctNovDec"
3Ø YR$=RIGHT$(DATE$,4):YR=VAL(YR$):IF YR<1985 THEN DATE$="Ø1/Ø1/1985"
4Ø MTH%=VAL(LEFT$(DATE$,2)):DAY%=VAL(MID$(DATE$,4,2)):MTH$=MID$(M1$,3*MTH%,3)
5Ø A=(((RND(1)/1Ø)*1ØØ)/1ØØ):C#=1ØØØØ:D#=1ØØØØ:D1=Ø:D2=Ø:DY%=Ø:EA=Ø:F=Ø:NC=Ø:P=Ø
:P2=Ø:TT=Ø:ZP=Ø:ZR=Ø:ZT=Ø
6Ø T$="$ #########,.##":T1$="###.##":T2$="#######,":T3$="##.##":T4$="$ ###.##"
7Ø LOCATE 1,1,Ø:COLOR 3,Ø:CLS:FOR I=Ø TO 32 STEP 16
8Ø R$=CHR$(24Ø)+" ":R$=R$+R$+R$+R$+R$+R$+R$+R$+R$+R$+R$+R$+R$+CHR$(24Ø):GOSUB 35Ø:S
YMBOL(W,I),R$,3,1,2
9Ø R$=CHR$(24Ø)+" ":R$=R$+R$+R$+R$+R$+R$+R$+R$+R$+R$+R$+R$+R$+CHR$(24Ø):GOSUB 35Ø:SYMB
OL(W,I+8),R$,3,1,2:NEXT
1ØØ LINE(135,12)-(5Ø1,34),7,BF:LINE(138,14)-(498,32),1,BF
11Ø R$="Challenge":GOSUB 37Ø:FOR J=1 TO 2:FOR I=3 TO 7:SYMBOL(W+4,16),R$,5,2,I:N
EXT:NEXT
12Ø R$=CHR$(24Ø)+" ":R$=R$+R$+R$+R$+R$+R$+R$+R$+R$+R$+R$+R$+R$+CHR$(24Ø):GOSUB 35Ø:SYM
BOL(W,152),R$,3,1,2
13Ø R$=CHR$(155)+" $ ":R$="$ "+R$+R$+R$+R$+CHR$(155)+" $":GOSUB 35Ø:SYMBOL(W,16Ø
),R$,3,1,2
14Ø R$=CHR$(24Ø)+" ":R$=R$+R$+R$+R$+R$+R$+R$+R$+R$+R$+R$+R$+R$+CHR$(24Ø):GOSUB 35Ø:SYM
BOL(W,168),R$,3,1,2
15Ø LINE(Ø,181)-(639,189),5,BF
16Ø R$="PF1 - PLAY       PF2 - Instructions       <ESC> - Quit":GOSUB 33Ø:SYMBO
L(W,182),R$,1,1,Ø
17Ø KEY 1,"P":KEY 2,"I":KEY 3,"C":KEY 4,"Fred #1"+CHR$(13):KEY 5,"Freddie"+CHR$(
13)
18Ø SYMBOL(8Ø,192),"[c] 1984  Trans-San Industries",2,1,4
19Ø R$="SANYO's":GOSUB 38Ø:SYMBOL(W,55),R$,7,6,6
2ØØ R$="M a r k e t  T r a d e r":GOSUB 35Ø:SYMBOL(W,11Ø),R$,3,5,3
21Ø KEY OFF:Q$=INPUT$(1):GOSUB 26Ø:KEY ON:COLOR 3,Ø
22Ø IF Q$="P" THEN 23Ø ELSE IF Q$="I" THEN 164Ø ELSE IF Q$=CHR$(27) THEN CLS:GOT
O 47Ø ELSE 21Ø
23Ø RESTORE 24Ø:FOR I=1 TO 5:READ I$(I),S$(I),S(I):NEXT:GOTO 5ØØ
24Ø DATA USAA,Unt'd Svc Auto,13Ø, GM,Gen'l Motors,9Ø,AT&T,Am Tel & Tel,12Ø,IBM,I
nt'l Bus Mach,85,PG&E,Pac Gas & Elec,11
25Ø '-------------------------[ GEN SUB ROUTINES ]-------------------------
26Ø Q=ASC(Q$):IF Q>96 THEN Q=Q-32:Q$=CHR$(Q)
27Ø RETURN
28Ø KEY 1,"":KEY 2,"":KEY 3,"C":LINE(Ø,191)-(639,199),7,BF
29Ø R$="PF3 - Continue                <ESC> - Quit":Q$="":GOSUB 32Ø:LOCATE 25,CP,Ø:
COLOR 1,7:PRINT R$;
3ØØ KEY OFF:Q$=INPUT$(1):GOSUB 26Ø:KEY ON
31Ø IF Q$="C" THEN RETURN ELSE IF Q$=CHR$(27) THEN 4ØØ ELSE GOTO 3ØØ
32Ø CP=LEN(R$):CP=(4Ø-(CP/2)):RETURN
33Ø U=LEN(R$):U=U*8:W=32Ø-(U/2*1):RETURN
34Ø U=LEN(R$):U=U*8:W=32Ø-(U/2*2):RETURN
35Ø U=LEN(R$):U=U*8:W=32Ø-(U/2*3):RETURN
36Ø U=LEN(R$):U=U*8:W=32Ø-(U/2*4):RETURN
37Ø U=LEN(R$):U=U*8:W=32Ø-(U/2*5):RETURN
```

```
360 C=LEN(R$):D=C*6:M=320-(D/2*7):RETURN
390 '-------------------------[ SUB ROUTINE "D" ]-------------------------
400 LINE(7,29)-(632,81),1,BF:LINE(0,90)-(639,199),0,BF
410 DY$=STR$(DY%):R$="  **   **     At the End of "+DY$+" Days Trading  **   **
*":GOSUB 330:LINE(M,16)-(M+D,24),2,BF:SYMBOL(M,17),R$,1,1,0
420 NP=C#-10000:NP$=STR$(NP):FOR L=1 TO LEN(NP$):L$=MID$(NP$,L,1):IF L$<>" " T
HEN 430 ELSE NEXT
430 NP$=LEFT$(NP$,L+2):IF NP>0 THEN 450
440 R$="You've lost $"+MID$(NP$,2,L+2)+" in the"+DY$+" Days Trading":SYMBOL(M
,16),R$,1,2,6:GOTO 460
450 R$="You've made $"+NP$+" in the"+DY$+" Days Trading":SYMBOL(M,16),R$,1,2,6
460 R$="**  SANYO MARKET TRADER  **":GOSUB 330:SYMBOL(M,40),R$,1,2,6:COLOR 3
,0
470 R$="I've enjoyed our time together and trust that you also had a good time
":SYMBOL(M,120),""+R$+"",1,2,2
480 R$="and a good time. Have a Good Evening and come back soon.":SYMBOL(M,14
0),""+R$+"",1,2,2
490 R$="....  GOOD BYE for now  ....":GOSUB 340:SYMBOL(M,170),R$,1,2,7:COLO
R 3,0:LOCATE 12,1,0:PRINT:END
500 '-------------------------[ GAME ROUTINE ]-------------------------
510 CLS:SYMBOL(30,0),"The SANYO Stock Exchange",3,2,7:V=4:H=15:E=V:M=H
520 LOCATE 4,1:COLOR 6,1:PRINT CHR$(201);STRING$(78,205);CHR$(187);
530 FOR I=5 TO 10:LOCATE I,1:PRINT CHR$(186);:LOCATE I,80:PRINT CHR$(186);:NE
XT I:LOCATE 11,1:PRINT CHR$(200);STRING$(78,205);CHR$(188);
540 LOCATE 11,1:COLOR 6,1:PRINT CHR$(200);STRING$(78,205);CHR$(188);
550 LOCATE V,H:COLOR 3,0:PRINT"Enter your called name?":COLOR 7:LOCATE V,H:PRIN
T STRING$(10,177)
560 LOCATE V,HI,1:COLOR 6:KEY OFF:LINE INPUT(10)"",N$:KEY ON:IF LEN(N$)<=0 THEN
560
```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```
57Ø LOCATE V,HI,Ø:COLOR 2,Ø:PRINT SPC(12):LOCATE V,HI:PRINT N$:FOR I=1 TO 5Ø:NEX
T
58Ø LINE(6,29)-(633,81),2,BF:LINE(Ø,87)-(639,87),Ø
59Ø TR=RND(1)*4.99:IF RND>.5 THEN 61Ø
6ØØ A=-A
61Ø GOTO 1Ø9Ø
62Ø COLOR 1,2:LOCATE 5,1:PRINT TAB(15)" * * *  S T O C K  * * *";TAB(48)"Cost /
Share":COLOR,Ø
63Ø FOR I=1 TO 5
64Ø COLOR Ø,2:PRINT TAB(16)S$(I);TAB(33)"<";I$(I);">";TAB(5Ø);:PRINT USING T4$;S
(I):NEXT:COLOR 3,Ø
65Ø TR=EA:EA=Ø:FOR I=1 TO 5:EA=EA+S(I):NEXT:EA=(1ØØ*(EA/5))/1ØØ:IF ZP=2 THEN NC=
(1ØØ*(EA-TR))/1ØØ ELSE NC=Ø
66Ø IF NC<-99.99 THEN NC=-99.99
67Ø LOCATE 12,1Ø:COLOR 5,Ø:PRINT"The SANYO Stock Exchange Average | ";:PRINT USI
NG T1$;EA;:COLOR 4:PRINT"  Net Change |";:PRINT USING T1$;NC
68Ø COLOR 3:PRINT TAB(5) STRING$(7Ø,"="):COLOR 6:LOCATE 15,5,Ø:PRINT N$;"'s...";
:COLOR 3:LOCATE 14,23:PRINT"Stock Assets equal ";:PRINT USING T$;SA#
69Ø COLOR 7:PRINT TAB(24)"Cash Assets equal ";:PRINT USING T$;C#
7ØØ COLOR 4:PRINT TAB(23)"Total Assets equal ";:PRINT USING T$;D#:COLOR 3,Ø:PRIN
T TAB(5) STRING$(7Ø,"=");:GOSUB 28Ø
71Ø ZP=2:LINE(Ø,98)-(639,161),5,BF:LINE(Ø,162)-(639,199),Ø,BF
72Ø LOCATE 14,5:COLOR Ø,5:PRINT"  What would you like to do with your Stock in..
.  ":PRINT:V=15:H=7:H1=3Ø:H2=5Ø:DP=Ø:DS=Ø:TT=Ø:TS=Ø:TG=Ø
73Ø KEY OFF:KEY 1,"":KEY 2,"":KEY 3,"":KEY 4,"":KEY 5,"z":KEY 6,"RUN"+CHR$(13):M
AXL=6
74Ø LINE(Ø,191)-(639,199),6,BF:R$="PF5 - Pass to Next Trading Day          <E
SC> - Quit":GOSUB 32Ø:LOCATE 25,CP,Ø:COLOR Ø,6:PRINT R$;:COLOR 1,5
75Ø FOR I=1 TO 5
76Ø W$="":T(I)=Ø:COLOR 1:LOCATE V+I,H:PRINT S$(I);TAB(23)"? ...":LOCATE V+I,H1,1
:COLOR Ø:PRINT STRING$(MAXL,177)
77Ø LOCATE V+I,H1:COLOR 1
78Ø Z$=INPUT$(1):IF Z$=CHR$(25Ø) THEN 88Ø
79Ø       IF Z$=CHR$(27) THEN 4ØØ
8ØØ       IF Z$=CHR$(28) THEN 81Ø ELSE 85Ø
81Ø L=LEN(W$):H1=3Ø:LOCATE V+I,H1,Ø:COLOR 5:PRINT SPC(6):COLOR Ø
82Ø LOCATE V+I,H1:PRINT STRING$(6,177):COLOR 1:IF L=Ø THEN LOCATE V+I,H1,1:GOTO
78Ø
83Ø       IF L<=1 THEN W$="" ELSE WS$=LEFT$(W$,L-1):W$=WS$
84Ø LOCATE V+I,H1,1:PRINT W$;:GOTO 78Ø
85Ø PRINT Z$:W$=W$+Z$
86Ø       IF Z$=CHR$(13) THEN LOCATE V+I,23,Ø:COLOR 5:PRINT SPC(2Ø):GOTO 89Ø
87Ø       IF LEN(W$)=>6 THEN LOCATE V+I,23,Ø:COLOR 5:PRINT SPC(2Ø):GOTO 89Ø ELSE
H1=H1+1:GOTO 77Ø
88Ø LOCATE 1,1,Ø:LINE(Ø,98)-(639,199),Ø,BF:LINE(Ø,191)-(639,199),4,BF:R$="P a s
s":GOSUB 36Ø:SYMBOL(W,192),R$,4,1,1:GOTO 1ØØØ
89Ø T(I)=VAL(W$):LOCATE V+I,H1-7,Ø:COLOR 5:PRINT SPC(15)
9ØØ     IF T(I)<Ø THEN ST$="sold." ELSE ST$="purchased."
91Ø LOCATE V+I,H2:COLOR Ø:PRINT USING"######";T(I);:PRINT" Shares ";ST$
92Ø TA=P(I)+T(I):IF TA<Ø THEN 95Ø ELSE 93Ø
93Ø IF T(I)<Ø THEN DS=DS+(T(I)*S(I)):GOTO 98Ø
94Ø IF T(I)>Ø THEN DP=DP+(T(I)*S(I)):GOTO 98Ø ELSE 99Ø
95Ø LOCATE 23,8:COLOR 4,Ø:PRINT"  You over sold your shares! Rethink your sale a
nd Try Again.  "
96Ø COLOR 3,Ø:GOSUB 28Ø:LINE(Ø,176)-(639,199),Ø,BF:LOCATE V+I,H2,Ø:COLOR 5,5:PRI
NT SPC(3Ø)
97Ø LINE(Ø,191)-(639,199),6,BF:LOCATE 25,25,Ø:COLOR Ø,6:PRINT"PF4  Pass this Tra
ding Day    <ESC>  Quit";:COLOR 1,5:KEY OFF:GOTO 76Ø
98Ø P(I)=P(I)+T(I):H1=3Ø
```

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```
990 NEXT:LINE(0,98)-(639,199),0,BF
1000 ZT=2:TT=DP+DS:BF!=((.01*TT*100)/100):TG=DP+DS+BF!:IF TG<C# THEN TG=(INT((TG
-C#)*100+.5)/100):TG$=STR$(TG):GOTO 1010 ELSE 1040
1010 R$="You're spending $"+TG$+" more than you have!":GOSUB 330:SYMBOL(W,171),R
$,1,2,4
1020 COLOR 3,0:GOSUB 280:LINE(0,173)-(639,199),0,BF
1030 FOR I=1 TO 5:P(I)=P(I)-T(I):NEXT:KEY OFF:GOTO 710
1040 C#=C#-TS
1050 DY%=DY%+1:D$=STR$(DY%):TR2$=RIGHT$(TIME$,2):RANDOMIZE VAL(TR2$)
1060 IF ZR<>2 THEN R$="  *  *  *    At the End of Trading Day  |  |    *  *  *  *":GO
SUB 330:LINE(0,24)-(639,24),0:LINE(W,16)-(W+U,24),6,BF:SYMBOL(W,17),R$,1,1,0
1070 IF VAL(D$)>99 THEN W=386 ELSE IF VAL(D$)>9 THEN W=394 ELSE IF VAL(D$)<10 TH
EN W=402
1080 LINE(396,16)-(452,24),6,BF:SYMBOL(W,17),D$,2,1,4:COLOR 0,2:V=1
1090 IF D1>0 THEN 1110
1100 S=RND(1)*4.99:D1=RND(1)*4.99:P=1:IF D2>0 THEN 1120
1110 S2=RND(1)*4.99:D2=RND(1)*4.99:P2=1
1120 D1=D1-1:D2=D2-1
1130 FOR I=1 TO 5
1140 R=RND:IF R>.25 THEN 1160
1150 R=.25:GOTO 1210
1160 IF R>.5 THEN 1180
1170 R=.5:GOTO 1210
1180 IF R>.75 THEN 1200
1190 R=.75:GOTO 1210
1200 R=0
1210 BC=0:IF P<1 THEN 1240
1220 IF INT(S+.5)<>INT(I+.5) THEN 1240
1230 BC=4:P=0
1240 IF P2<1 THEN 1270
1250 IF INT(S2+.5)<>INT(I+.5) THEN 1270
1260 BC=-4:P2=0
1270 C(I)=(A*S(I)+R+INT(3-(6*RND)+.5)+BC):C(I)=INT(100*C(I)+.5)/100
1280 S(I)=S(I)+C(I):IF S(I)>0 THEN 1300
1290 C(I)=0:S(I)=.5:GOTO 1340
1300 S(I)=INT(100*S(I)+.5)/100:SP=(S(I)):IF SP>999.99 THEN 1310 ELSE 1340
1310 LINE(0,162)-(639,190),0,BF
1320 FS%=((100*(SP/10))/100):P(I)=P(I)*FS%:S(I)=SP/FS%
```


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```
1330 FS$=STR$(FS%):R$=""+I$(I)+" forced into"+FS$+"/1 stock split!":GOSUB 130:SY
MBOL(W,155),""+R$+"",1,2,7:FOR X=1 TO 50:NEXT
1340 NEXT
1350 TR=TR-1:IF TR<1 THEN 1370
1360 IF EP=0 THEN 620 ELSE 1400
1370 TR=RND(1)*4.99:A=(((RND/10)*100)/100):IF RND<.5 THEN 1390
1380 A=-A
1390 IF EP=0 THEN 620
1400 R=RND:I=INT(RND*7):IF I>5 THEN 1400
1410 IF I=0 THEN 1400
1420 IF R<.15 THEN 1430 ELSE 1490
1430 SD$=STR$(R):SD$=LEFT$(SD$,2):SD=VAL(SD$)
1440 SD$=STR$((10*(SD*4)+.5)/100):IF VAL(SD$)<.05 THEN SD$=".05"
1450 FOR L=1 TO LEN(SD$)
1460 L$=MID$(SD$,L,1):K=ASC(L$):IF K=46 THEN 1470 ELSE NEXT
1470 SD$=LEFT$(SD$,L+2)
1480 R$=""+I$(I)+" declares a Dividend of $"+SD$+" per Share.":GOSUB 130:SYMBOL(
W,173),""+R$+"",1,2,6:C#=C#+(P(I)*VAL(SD$)):GOTO 1530
1490 IF R>.88 THEN 1500 ELSE 1530
1500 R$=""+I$(I)+" splits Shares!":GOSUB 140:SYMBOL(W,181),""+R$+"",2,1,2
1510 IF R>.88 AND R<.95 THEN P(I)=P(I)*2
1520 IF R>.96 THEN P(I)=P(I)*3
1530 COLOR,2:IF ER=0 THEN LINE(5,29)-(634,81),2,BF ELSE LINE(100,40)-(634,81),2,
BF:GOTO 1550
1540 COLOR 1,2:LOCATE 5,2:PRINT"   STOCK       Cost/Share      Nr. of Shares
Value of Shares     % Change":COLOR 0,2
1550 SA#=0:FOR I=1 TO 5:COLOR 0:IF ER=2 THEN 1570
1560 LOCATE V+I,5:PRINT I$(I)
```


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```
157Ø LOCATE V+I,17,Ø:PRINT USING T4$;S(I)
158Ø LOCATE V+I,33:PRINT USING T2$;P(I)
159Ø LOCATE V+I,5Ø:SV#=P(I)*S(I):SA#=SA#+SV#:PRINT USING T$;SV#
16ØØ LOCATE V+I,7Ø:PRINT USING T1$;C(I)
161Ø NEXT:ZR=2
162Ø D#=Ø:SA#=((1ØØ*(SA#))/1ØØ):D#=C#+SA#:D#=((1ØØ*D#)/1ØØ):D!=D#
163Ø COLOR 3,Ø:GOTO 65Ø
164Ø '----------------------[ INTRO ]----------------------------------
165Ø CLS:SYMBOL(3Ø,Ø),"The SANYO Stock Exchange",3,2,6:LOCATE 5,12,Ø:COLOR 7
166Ø PRINT"Welcome to the SANYO's Trading Market.";:COLOR 3
167Ø PRINT"    You start with an account     worth $1Ø,ØØØ. You may buy and sell
 your stocks during each round.  A table     of  available  stocks,  their price
s,  and  the  number of shares  in  your     ";
168Ø PRINT"portfolio is printed and updated daily.":PRINT:COLOR 2
169Ø PRINT TAB(15)"To Enter a transaction ---":PRINT:PRINT TAB(15)"[1] - To buy
a Stock, Type xxx, where xxx is the number of                    shares you wish to tr
ade.":PRINT
17ØØ PRINT TAB(15)"[2] - To sell, Type -xxx, where -xxx is the number of shares
          you wish to sell.":PRINT:COLOR 4
171Ø PRINT TAB(15)"A 1% Brokerage Fee will automatically be charged your account
          for each buy or sell transaction.":PRINT:COLOR 6:PRINT TAB(2Ø)"GOOD L
UCK and Happy Trading!":GOSUB 28Ø:COLOR 3,Ø:GOTO 23Ø:END
3ØØØ R$="$ "+CHR$(155)+" $ "+CHR$(155)+" $ "+CHR$(155)+" $ "+CHR$(155)+" $ "+CHR
$(155)+" $":GOSUB 35Ø:SYMBOL(W,16Ø),R$,3,1,2
```


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Starting from Johnson's Rule

Prioritize tasks and schedule their components for optimum efficiency with this computerized model of a classic method

By George Smart

256K Required

If you are faced with several jobs, each with different deadlines and priorities, how can you best schedule them? Completing your work in the least amount of time and with minimum idle time is the goal of this job scheduling program. With a capacity of up to 40 jobs, the program seeks an optimal schedule via an algorithm developed by S.M. Johnson, a leader in operations research. In the mid-fifties, he introduced what is known as "Johnson's Rule," a method of scheduling N jobs on two machines. I converted a variant of this model from a "paper-and-pencil" method to BASIC, to allow up to 40 jobs on up to seven machines. (If you want to use more than seven machines, the program will comfortably handle up to 13, if you delete Line 210.)

The words "machine" or "device" are used interchangeably in this program and refer to the distinct operations through which a job must pass. A machine could be a process such as the framing on a house or the time it takes someone to get something approved. A job may be a specific job or a class of jobs, as long as there is a fixed amount of time for each job on each machine. The model assumes a job proceeds sequentially through the system in machine order, and although a job may start at any machine and skip over any machine along the way, it may not move to a previous machine. For example, in a system with six machines, a job could start at two and go to three, four and six but not start at four and go to five, six and one. If the flow of work in your situation does not conform to the above, you cannot use this program. If a job does not use a particular machine, a zero is entered in the data statements for that position.

Further, the program uses only whole numbers. Entering non-integers can really cause problems. If a job needs 3.5 hours of processing on a certain machine, you need to convert 3.5 to seven and double all other times to adjust for the difference. If you need 3.75 hours, you would convert to 4, giving a base of one unit of time equaling 15 minutes. Your solution will give answers proportionally as large, so just divide by the factor you multiplied by.

How It Works

After reading the data from data statements, the program gives you the option of setting down times for any machine or all the machines. If you accept the defaults and just press RETURN, this means 'N' for

George Smart has been programming for the past nine years and is currently the vice-president of TDS Computers in Carrboro, N.C. He may be contacted at P.O. Box 2831, Chapel Hill, NC 27515-2831.)

"Completing your work in the least amount of time and with minimum idle time is the goal of this job scheduling program."

each response and all machines are [illegible] operational. Next, you can see the [illegible] displayed in chart form. This chart will include all your input, plus a given job number (1 to 1-) and a calculated total processing time for each job (the sum of the machine times). The program then generates several alternate near optimum solutions without yet isolating the best. The number of alternatives is always the number of machines minus one. Sometimes two or more solutions may be the same. You can delete these to save time.

Finally, completion times, idle time and lateness are calculated for the remaining alternatives. Pick an alternative that has a desired characteristic (shortest completion time, minimal lateness, etc.) and get a report on the screen or on the printer.

Entering The Data

Data is entered using data statements in lines 2360 and up. The first two elements are the number of jobs and the number of machines. Next, data is entered for each job as follows: the time period the job is available for processing, the time period it is due, and the time it takes to process a job for each machine. Remember, all these numbers must be whole numbers, no negative numbers. Note: Although the program does not use the time period available, you could modify the program to include availability as a scheduling factor. I use a one for all availability numbers in my data and suggest you do as well.

A Peerless Example

The easiest way to illustrate how the program works is through the the case of Peerless Portajohn, Inc. Peerless makes the portable toilets you see on construction sites and at football games. Recently, faced with a flat market and increasing competition, the owner, "Little John" Portajohn, looked at his manufacturing schedule to try to cut costs. Peerless, unlike its competition, makes each Portajohn from scratch using only the finest materials. Further, to take advantage of certain skilled laborers, only one unit of each of the five models is processed each day.

Each model must pass through four areas: cutting, forming, baking, finishing and fitting. The time spent in each area differs from model to model, although in some areas (like baking), the time is approximately the same for all models. This year, the 1988 product line (which follows the "WC1," the company's first entry into the market; the "WC 2," an improved version that can be moved by one man; the "WC Jr.," for use in schools (see Author's Note for more on the WC Jr.), the "Personal Peerless," for camping and people "on the go," and "Pat," a personal project, the "Peerless Chimney," a luxury edition with stereo, climate con-

MS-FLUSH. Processing times (in ...ts of 15 minutes) for these models ...rough the various areas are as follows:

	Cutting	Forming	Baking	Finishing	Fitting
1 WC1	6	3	4	2	1
2 WC2	5	2	4	2	2
3 WC Jr.	3	1	3	2	1
4 Personal	3	3	2	1	1
5 Ultima	4	6	3	4	4

Porter must allocate nine hours of shop time each day, thus 36 periods are available if one period equals 15 minutes. At lunch (periods 17 through 20), work areas must be serviced while the crews are eating. Jobs must not be in progress during servicing so they must be removed before servicing starts. Since all work must be done by the last period of the day, 36 is used as a deadline for all jobs. And one, of course, is used as an availability time for all jobs. This makes Peerless' data statements look like:

```
2360 data 5,5
2370 data 1,36,6,3,4,2,1
2380 data 1,36,5,2,4,2,2
2390 data 1,36,3,1,3,2,1
2400 data 1,36,3,3,2,1,1
2410 data 1,36,4,6,3,4,4
```

Running the program gets Porter to the "Scheduling Control Section." Asked for system downtimes, he responds 'Y' for yes. He enters 17 when asked for the period. Porter repeats this for periods 18, 19 and 20. Finally, when asked for system downtimes, he responds 'N' for no. Since he does not wish to bring up any system downtimes, he responds 'N.' Similarly, since he does not want to either set or bring up downtimes for specific devices, he responds 'N' to those prompts. When asked if he wants to see the data, he responds 'Y' and sees the data. If the data is not correct, he presses the BREAK key, fixes the data statements and reruns the program.

The Report

Assuming the data is correct, Porter is shown several alternatives. The number of alternatives will be the number of machines minus one or four. Here are the alternatives:

Alternative Solutions

Order	1	2	3	4
1	5	5	5	5
2	2	2	2	2
3	4	3	1	1
4	3	1	3	4
5	1	4	3	3

Occasionally, two or more alternatives will be identical. To remove duplicates, Porter can now delete one or continue with scheduling. In his case, however, all the alternatives are different so none need to be deleted. Zero is pressed to continue. For each remaining alternative, the completion time, idle time and lateness are calculated and displayed as shown below.

```
Alt: 1   Completion Time: 36   Idle Time: 108   Lateness: 0
Alt: 2   Completion Time: 37   Idle Time: 113   Lateness: 1
Alt: 3   Completion Time: 35   Idle Time: 103   Lateness: 0
Alt: 4   Completion Time: 36   Idle Time: 108   Lateness: 0
```

Porter now selects the best alternative based on these criteria. Now he must choose between a printed report and one on the screen. Screen reports pause every 20 lines for you to press RETURN. Since 3 is clearly better on all counts he selects it and the final report looks like this:

Alternative 3 **Completion Time: 35** **Idle Time:103**

Time	1	2	3	4	5	
1	5	0	0	0	0	Job 1 0 units late
2	5	0	0	0	0	Job 2 0 units late
3	5	0	0	0	0	Job 3 0 units late
4	5	0	0	0	0	Job 4 0 units late
5	2	5	0	0	0	Job 5 0 units late
6	2	5	0	0	0	
7	2	5	0	0	0	
8	2	5	0	0	0	
9	2	5	0	0	0	
10	1	5	0	0	0	
11	1	2	5	0	0	
12	1	2	5	0	0	
13	1	0	5	0	0	
14	1	0	0	0	0	
15	1	0	0	0	0	
16	0	0	0	0	0	
17	down	down	down	down	down	
18	down	down	down	down	down	
19	down	down	down	down	down	
20	down	down	down	down	down	
21	3	1	2	5	0	
22	3	1	2	5	0	
23	3	1	2	5	0	
24	4	3	2	5	0	
25	4	0	1	2	5	
26	4	0	1	2	5	
27	0	4	1	0	5	
28	0	4	1	0	5	
29	0	4	3	1	2	
30	0	0	3	1	2	
31	0	0	3	0	1	
32	0	0	4	3	0	
33	0	0	4	3	0	
34	0	0	0	4	3	
35	0	0	0	0	4	
36	0	0	0	0	0	

How To Read The Report

The numbers across the top are ma... chines and the numbers down the side ... time periods. Within the cell, referenced by a given time period and a machine, ... the job scheduled for that machine at the time. A zero means a machine is operational but not in use. If a machine is down, the word "down" appears in the cell. Or to the side is the lateness of a specific job. Thus, Job 5 should be started first, followed by jobs 2, 1, 3 and 4. Porter's new production schedule yields a completion time of 35, which means he does not have to pay overtime. Since he selected the alternative with the least idle time, he cannot get any more efficiency from his present processing arrangement. The zero lateness of jobs means all work is done before the deadline. The report always goes one time period beyond completion time just to show you everything is really finished.

About Optimality

Although this program will produce the optimal schedule most of the time, it is a heuristic model, which more or less means no one can theoretically prove its accuracy in all cases. You are almost guaranteed improved results, however, over random scheduling or intuitive guessing. Once you set up a problem in terms of machines and processing times, you can play around with downtimes to further improve the solution. For example, Porter should switch lunch to periods 16 through 19 since all machines must be shut down in period 16 anyway to prepare for maintenance. Completion time would then be 34. Finally, you can go above 40 jobs, but be prepared to wait. The program gets exponentially slower.

If any of you become inspired to modify this program, I would appreciate a copy. I am interested in operations research problems. Please send your ideas and programs to: P.O. Box 2821, Chapel Hill, NC 27515-2821.

*Author's Note: Oh, the pitiful "WC Jr." Originally issued with a Chiclet-style seat, Jr.'s initial acclaim was quickly diminished by public criticism and discomfort. When Peerless offered to replace the seats for new, standard seats, it was too little too late. Demand had dropped off and no amount of marketing could erase the bad experience. Mr. Porter, at last contact, was considering dropping the line and scrapping it for parts, although he stressed it would not have any effect on overall Peerless profitability.

The listing: SCHEDULE.BAS

```
10 CLS:PRINT"[----------]"
20 PRINT"[                                                              ]"
30 PRINT"[     MACHINE SCHEDULING USING JOHNSON'S RULE                  ]"
40 PRINT"[     George M. Smart, Jr.                                     ]"
50 PRINT"[     Designed December, 1983                                  ]"
60 PRINT"[     Printed April 15, 1985                                   ]"
70 PRINT"[                                                              ]"
80 PRINT"[     For Scheduling L Jobs on ND Machines                     ]"
90 PRINT"[     With Respect to Due Dates                                ]"
100 PRINT"[                                                             ]"
110 PRINT"[     Capacity 40 Jobs, 7 Machines, 99 Time Periods            ]"
120 PRINT"[     Jobs Are Removed from Machines Prior to Downtime, if any ]"
130 PRINT"[                                                             ]"
140 PRINT"[----------]"
141 PRINT "Reading data"
142 READ L,ND
170 TS=99:                          REM -- # periods available
180 DIM B$(ND-1,TS,ND):             REM -- schedules
190 W=4:                            REM -- descr fields
200 DIM A(L,ND+6):                  REM -- main data array
210 DIM T(TS):GOSUB 2150:           REM -- time periods
220 DIM A$(W):GOSUB 2180:           REM -- desc fieldnames
230 DIM D$(ND):GOSUB 2240:          REM -- device names
240 DIM S(L,(ND-1)*2):              REM -- sum of device times
250 DIM SC(L,ND-1):                 REM -- alternative schedules
251 DIM START(ND):                  REM -- scheduling utility
252 DIM CT(ND):                     REM -- completion times
253 DIM ID(ND):                     REM -- idle times
254 DIM LATE(L):                    REM -- late times
260 REM -- read data stmts
290 FOR I=1 TO L:READ A(I,2),A(I,3):A(I,1)=I
300 FOR J=5 TO ND+4
310 READ A(I,J):SUM=SUM+A(I,J)
320 NEXT J
330 A(I,4)=SUM:SUM=0:NEXT I
340 REM ---------- scheduling control section
350 CLS:PRINT"[] Scheduling Control Section":PRINT
360 INPUT "System downtimes (Y/N): ";X$
370 IF X$="y" OR X$="Y" THEN 380:ELSE 410
380 INPUT "                         Period #: ";X
390 FOR J=1 TO ND-1:FOR I=1 TO ND:B$(J,X,I)=9999:NEXT I:NEXT J
400 GOTO 360
410 INPUT "Bring up system downtimes (Y/N): ";X$
420 IF X$="y" OR X$="Y" THEN 430:ELSE 460
430 INPUT "                                 Period #: ";X
```

```
1030 IF S(K,I+IL)>=LW2 THEN 1060
1040 LOC2=K
1050 LW2=S(K,I+IL)
1060 NEXT K
1070 IF LW1<=LW2 THEN 1130
1080 SC(L-M1,I)=LOC2
1090 M1=M1+1
1100 S(LOC2,I)=MAXSUM
1110 S(LOC2,I+IL)=MAXSUM
1120 GOTO 1160
1130 SC(J-M1,I)=LOC1
1140 S(LOC1,I)=MAXSUM
1150 S(LOC1,I+IL)=MAXSUM
1160 NEXT J
1170 M1=0
1180 NEXT I
1190 REM ---------- alternative solutions
1200 PRINT:PRINT"[] Alternative Solutions"
1210 PRINT TAB(8);"Alternative #"
1220 PRINT "Order";
1230 FOR X=1 TO IL
1240 PRINT TAB((X-1)*5+7);X;
1250 NEXT X:PRINT""
1260 GOSUB 2270
1270 FOR X=1 TO L
1280 PRINT A(X,1);
1290 FOR Y=1 TO IL
1300 PRINT TAB((Y-1)*5+7);SC(X,Y);
1310 NEXT Y:PRINT""
1320 NEXT X
1330 PRINT:INPUT "Enter alternative to delete (or 0 to continue) :";X
1340 IF X=0 THEN 1380
1350 FOR Y=1 TO L
1360 SC(Y,X)=0
1370 NEXT Y:GOTO 1330
1380 REM ---------- test schedule
1390 T$="[] Completion Times for Remaining Alternatives":GOSUB 2330
1400 PRINT "Please wait."
1410 FOR I=1 TO IL:IF SC(1,I)=0 THEN 1680
1420 FOR K=1 TO ND:START(K)=1:NEXT K
1430 FOR Q=1 TO L
1440 FOR J=1 TO L
1450 IF J=Q THEN 1460:ELSE 1610
1460 FOR K=1 TO ND
1470 FOR M=START(K) TO START(K)+A(SC(J,I),K+4)-1
1480 IF B%(I,M,K)=0 THEN B%(I,M,K)=A(SC(J,I),1):ELSE 1510
1490 NEXT M
1500 GOTO 1550
1510 FOR N=M-1 TO START(K) STEP -1
1520 B%(I,N,K)=0:NEXT N
1530 START(K)=START(K)+1
1540 GOTO 1470
1550 START(K)=START(K)+A(SC(J,I),K+4)
1560 IF K=ND THEN 1600
1570 FOR N=K+1 TO ND
1580 IF START(N)<START(K) THEN START(N)=START(K)
1590 NEXT N
1600 NEXT K:IF M-1>A(SC(J,I),3) THEN LATE(J)=M-1-A(SC(J,I),3):ELSE LATE(J)=0
1610 NEXT J
```

```
162Ø NEXT Q
163Ø REM ---------- completion time/select alt to print
164Ø M=M-1:CT(I)=M:LSUM=Ø
165Ø FOR J=1 TO L:ID(I)=ID(I)+A(J,4):LSUM=LSUM+LATE(J):NEXT J
166Ø ID(I)=(CT(I)*ND)-ID(I)
167Ø PRINT:PRINT "Alt: "I"     Completion Time: "CT(I)"  Idle Time: "ID(I)"   La
teness: "LSUM
168Ø NEXT I
169Ø PRINT:INPUT "(S)creen or (P)rinter : ";P$
17ØØ IF P$="s" OR P$="p" OR P$="P" OR P$="S" THEN 171Ø:ELSE 169Ø
171Ø IF P$="P" OR P$="p" THEN P=1
172Ø IF P$="S" OR P$="s" THEN P=Ø
173Ø PRINT:INPUT "Alternative to print: ";I
174Ø IF I>IL OR I<1 THEN 173Ø
175Ø IF SC(1,I)=Ø THEN 173Ø
176Ø REM ---------- print schedule
177Ø CLS:IF P=1 THEN 196Ø
178Ø PRINT "[] Alternative "I"      Completion time: "CT(I)"    Idle Time: "ID(I
)
179Ø GOSUB 227Ø
18ØØ PRINT "Time";
181Ø FOR J=1 TO ND
182Ø PRINT TAB(((J-1)*5)+8);D$(J);
183Ø NEXT J:PRINT ""
184Ø GOSUB 227Ø
185Ø FOR J=1 TO M:PRINT T(J);
186Ø FOR K=1 TO ND
187Ø TB=((K-1)*5)+8
188Ø IF B%(I,J,K)=9999 THEN PRINT TAB(TB);"down";
189Ø IF B%(I,J,K)<9999 THEN PRINT TAB(TB);B%(I,J,K);
19ØØ NEXT K
191Ø IF J>L THEN 192Ø:ELSE PRINT TAB(5Ø);"Job"J" "LATE(SC(J,I))"units late";
192Ø PRINT ""
193Ø IF J/2Ø=INT(J/2Ø) THEN INPUT "[]";X$
194Ø NEXT J
195Ø END
196Ø REM --- send to printer
197Ø LPRINT "[] Alternative "I"      Completion time: "CT(I)"    Idle Time: "ID(
I)
198Ø GOSUB 227Ø
199Ø LPRINT "Time";
2ØØØ FOR J=1 TO ND
2Ø1Ø LPRINT TAB(((J-1)*5)+8);D$(J);
2Ø2Ø NEXT J:LPRINT ""
2Ø3Ø GOSUB 227Ø
2Ø4Ø FOR J=1 TO M
2Ø5Ø LPRINT T(J);
2Ø6Ø FOR K=1 TO ND
2Ø7Ø TB=((K-1)*5)+8
2Ø8Ø IF B%(I,J,K)=9999 THEN LPRINT TAB(TB);"down";
2Ø9Ø IF B%(I,J,K)<9997 THEN LPRINT TAB(TB);B%(I,J,K);
21ØØ NEXT K
211Ø IF J>L THEN 212Ø:ELSE LPRINT TAB(5Ø);"Job"J" "LATE(SC(J,I))"units late";
212Ø LPRINT ""
213Ø NEXT J:LPRINT CHR$(12)
214Ø END
215Ø REM -- time periods
216Ø FOR I=1 TO TS:T(I)=I:NEXT I
217Ø RETURN
```

```
2180 REM == asset names
2190 A$(1)="Job #"
2200 A$(2)="Avail"
2210 A$(3)="Due  "
2220 A$(4)="Total"
2230 RETURN
2240 REM == device names
2250 FOR I=1 TO ND:D$(I)=STP$(I):NEXT I
2260 RETURN
2270 REM == line
2280 FOR WW=1 TO 79
2290 IF P=0 THEN PRINT "=";:ELSE LPRINT "=";
2300 NEXT WW
2310 IF P=0 THEN PRINT:ELSE LPRINT
2320 RETURN
2330 REM == section header
2340 CLS:PRINT T$:GOSUB 2270:PRINT:RETURN
2350 REM ========== data stmts for peerless example
2360 DATA 5,5
2370 DATA 1,36,6,3,4,2,1
2380 DATA 1,36,5,2,4,2,2
2390 DATA 1,36,3,1,3,2,1
2400 DATA 1,36,3,3,2,1,1
2410 DATA 1,36,4,6,3,4,4
```


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Are you disappointed with how slow WordStar is on your Sanyo? FastStar triples the speed of WordStar's screen output on Sanyo MBC-550/555 computers (monochrome mode). FastStar now works in color too, and still speeds up WordStar's screen output by a factor of 2½. No kidding! FastStar should not be confused with patches that only speed up scrolling (such as WizStar), since FastStar speeds up all of WordStar's screen output. FastStar does this by substituting highly optimized screen output routines for the slow operating system routines that WordStar normally uses.

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If you use WordStar on the Sanyo MBC-550/555, then FastStar can make a big difference for you.

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Often, people who have two or more computers in their home or office will find a need for a null modem. In our house, my Sanyo MBC-550 is the workhorse, utilized for word processing and other "practical" uses such as games and *Picasso*. For telecommunicating and most of our away-from-home chores, we rely on a Radio Shack Model 100. My problem was, the two computers could not communicate with each other. The 100 could talk to other computers hundreds of miles away, but it could not exchange information with the 550 which was only six feet away. The Sanyo has an RS-232 interface and a cable, but no modem. The least expensive null modem that I could find to fill the bill was one from Radio Shack for $29.95.

At the time, I thought the price was a bit steep for something that I was sure I would rarely use. As it turned out, I use my null modem almost daily, and I now know that it would have been worth $30. But, being handy with my hands, and being a cheapskate to boot, I started looking for an alternative. I discovered that I could build a null modem for under $11, using parts that can be purchased in any Radio Shack store.

The first problem was that I did not know how a null modem is wired. I had absolutely no idea! To find the answer, I searched the bookstores, the library and every computer book and repair reference manual I could lay my hands on. Still, I did not have a clue. I asked everyone I knew, and no one seemed to know!

Finally, I got smart and borrowed a null modem from a friend who just happened to be a Radio Shack dealer. After borrowing it, being the extravagant fellow that I am, I took my wife out to eat at a local fast food emporium. While we ate, I read out the connectors on the null modem with my handy-dandy pocket multimeter. I was quite sure, with all the strange looks the other customers were giving me, that someone was going to turn me in to the authorities for building a bomb or some other type of destructive device. In a public place, with a multimeter, a small electronic device, and several wires and probes, you, too, can become a menace to society!

Anyway, I survived the experience, returned the Radio Shack null modem, bought the parts from my friend, and went home to build my modem, which I cleverly named "McModem." Looking back on the whole process, I spent $11 for parts, $9 for gasoline, and another $7 for food equalling $27 (if I figure my time is free). If I include two days of research at minimum wage levels, I ended up paying $85.40 for my $30 modem. You, however, can profit from my misadventures and build a McModem for only $11!

First, go to your local Radio Shack store and buy the parts listed in the parts list. You may be able to purchase the parts from other sources for less, but I listed and used Radio Shack items to insure that everyone reading this article would be able to locate what they needed without spending days searching the local electronic parts dealers. There is a Radio Shack store in almost every town in America, and in most large cities outside the United States. As an example, I often bought my Radio Shack parts from a dealer in Reykjavik, Iceland (I lived there for three years). The higher prices outside the U.S. will mean that you will pay more than $11 for your parts, but the manufactured null modem would most likely cost more than $29.95 anyway.

Listing 4 is an option for those of you who want to see a large color-coded schematic of your modem. Figure 1 is what you will see. It is helpful only if you have a sharp color monitor with a twelve-inch or larger display. If you have a monochrome monitor, your best bet is to refer to Figure 1.

This article is not designed to be a tutorial on soldering techniques. If you don't know how to solder, there are many manuals and pamphlets available at electronic parts and hardware stores, or you might find it helpful to refer to an article I wrote which appears in SOFT SECTOR, February '85, Page 48. At any rate, practice with a few scraps of wire before working on the "real thing." Make sure you use rosin core solder, *not* acid core!

I did not include wire with the parts list, as you should be able to scrounge up enough wire without resorting to buying it. If this is not convenient, buy a roll of flat ribbon wire (Radio Shack #278-757, $2.39). However, 22 or 24 gauge wire is OK, and if it is color coded, it makes wiring the connectors easier. Be very careful while building the modem that you make the correct pin-to-pin connections. It is very easy, given the small space you will be working in, to make a mistake, especially if you use non-color coded wire.

If you are going to use your modem to connect your Sanyo to a Model 100 as

---

(Mick McGuire has been writing computer-related magazine articles since 1979 and is familiar with operation and programming on 13 different computer systems. The Sanyo MBC-550/555 is his computer of choice and his work has been featured in SOFT SECTOR on previous occasions. He may be contacted at 2234 George Wythe Rd., Orange Park, FL 32073; 904-272-5596.)

$11 MODEM

By Mick McGuire

All you need to modify one of the 25 Position D-Subminiature Connector hoods so that it will physically fit the recessed female connector on the 100. Refer to Figure 2. The male connector on your null modem will not work on the 100 until you cut the tabs off the front of the plastic hood shells. You can do this by simply bending the tabs back and forth until they break off. Then trim (sand or file) the rough edges. If you do this, you are faced with another problem. The tabs, to some extent, serve to hold the connector inside the hood. To compensate for the loss of the tabs, you must use two screws and two nuts (Radio Shack part #64-3011 and 64-3018) and the compression washers (the bent pieces of metal that came with the hoods). Assemble it so that, from the back side of the connector, you insert the screw through the compression washer, through the hole in the plastic hood, into the nut. When you tighten this down, the compression washer will hold the two halves of the connector hood together. In most cases, you won't need to modify the female connector. It works fine with most of the commercially available RS-232 cables. The one I have was manufactured for the Compaq.

After you build the modem, you might want to cover the wiring with something to make the whole assembly look more professional. I used plastic spiral wrap, and that works well, but you can either leave the wiring bare (it's more colorful that way) or cover it with anything handy that works for you. I advise against using standard electrician's tape or friction tape, as this gets messy and sticky as it gets old.

I won't tell you how long the wiring on your null modem should be, but I will tell you that a six foot length works just fine. A six-inch length works well if you will be using it with a regular RS-232 cable. If you have not yet bought a commercial RS-232 cable, you can just wire a long null modem cable (if you will not be using the RS-232 port for anything else) and eliminate the store bought cable.

Another option, and a good companion project to this one, is to wire your own RS-232 cable using the same techniques you will use to build the null modem, but all connections should be direct pin-to-pin (1 to 1, 2 to 2, 3 to 3, etc.). I did not do this as I already had a cable, but there should be no reason why it would not result in a savings comparable to that of the McModem. My commercial RS-232 cable cost me $24. I could have saved myself an additional $13 had I built it myself. Oh well, again, you can learn from

my experience.

Please note that on both the male and the female connectors, Pin 8 has two wires from pins 6 and 20 of the opposite connector. Pin 8 is the only one that will have double connections. When you do this pin, solder both wires at the same time. If you try to solder one, and then the other, the first is likely to end up with a cold solder joint.

Check your work carefully before you put away the solder and iron. Make sure your connections are bright and shiny, as a dull solder surface indicates the dreaded "cold solder joint." If one of your connections is dull, remove the old solder, clean your iron, and try it again. It's a lot easier to do it before you put it all together and try to use it. Next, make sure there are no solder bridges between pins and that there are no solder balls inside, or any other garbage, for that matter. Clean is the key word here. Attention to detail here can save you a lot of time and grief later. After checking your work, assemble your plugs using the hoods and you are in business! It is a good idea to check your work with an ohmmeter (multimeter) if you have one.

How To Use It

If you don't have any software, listings 1 and 2 will allow you to upload and download ASCII files to and from your Sanyo. Listing 3 is for those of you who need an upload program for a Model 100. Download to the 100 is best accomplished using the built-in Telcom program.

Both of the Sanyo programs are really bare-bones, but they are all you should need to get started. If you are downloading *from* a Model 100, you must first insert carriage returns or ASCII 13's after each line you will send, or you will get an "OS error" on your 100. The 100 has, what is sometimes referred to as, dot files. If they do not have a carriage return after each one.

When downloading to your Sanyo, and the other computer (100 or otherwise) is finished sending, press the BREAK key and wait. Be patient, as it takes the Sanyo a long time to get around to recognizing that you pushed that key. Then type CLOSE and press ENTER to empty what is left in the buffer to the disk and to close that particular file. You have now received and saved an ASCII file.

Uploading to the 100 is just as easy. First prepare the 100 to receive, using the Telcom program, and then run the Sanyo UPLOAD.BAS program. The procedure is just as easy using any other RS-232 equipped computer. The only difference is that you will have to develop or buy the proper software for it.

Program Listing 1

Line 20 clears the screen, and tells your Sanyo what format to use to output on Port 1 at a Baud rate of 300. See Page 5.

your *Basic Reference Manual* for information.

Lines 30 and 40 let you select a filename open a buffer for that file data. member, the file must have been saved ing the ,A option. Only ASCII files can e sent with this program.

Line 50 checks to see if the EOF (End Of File) has been reached, and then closes the buffer if it has. It then ends the program execution. If EOF has not been reached, program execution drops to the next line.

Line 60 gets another string of data from the disk, and calls it X$. Line 70 sends X$ to the RS-232 port. It then prints X$ on the screen. Lines 10 and 50 are self-explanatory.

Program Listing 2

Lines 10, 20 and 180 are self-explanatory. Line 30 lets you select a disk filename that the incoming data will be saved under. Line 40 opens a disk file for sequential output, and uses the name (F$) you gave it in Line 30. Line 50 lets you know that you can now instruct the other computer to start sending. Line 60 sets the Baud rate and clears out the A$ variable. Lines 70 through 140 set the parameters for the RS-232 port. Line 150 gets the incoming data (from the RS-232 port) and assigns it to the A$ variable. Line 160 prints A$ on your screen. Line 170 saves A$ to disk as part of the sequential file.

For Model 100 Owners

Listing 3 is for you. Although *Telcom* has an upload feature, we found that it was not very reliable. It kept losing data. This BASIC UPLOAD.BAS program works quite well for us. As with the Sanyo upload program, you must have saved the Model 100 file that you want to send in ASCII format using the ,A feature. Lines 10 and 20 are self-explanatory. Line 30 sets the communications parameters. See Page 165-166 of your manual. Line 30 opens a file for input as file number 1, at 300 Baud, 8-bit words, even parity, two stop bits and line disable. Line 40 opens a second file using the filename you defined in Line 20. Line 50 gets data from File 2 and assigns it to the variable X$. Line 60 sends X$ to the buffer (File 1) that was opened as the communications port and outputs X$.

Line 70 places a necessary timer in the program, prints X$ on the LCD screen, checks to see if it has reached EOF, and if it has, closes and ends program execution. If it is not the EOF, execution resumes at Line 50.

This article is long, but we covered a lot of territory. You now have enough information to: build a McModem; build an RS-232 cable; download files from another computer; upload files; and reliably send and receive Model 100 files. Not bad!

Parts List

*** Indicates optional item.**

Nomenclature	RS-Number	Unit Cost	Number Needed
D-Subminiature Male	276-1547	2.99 each	one
D-Subminiature Female	276-1548	3.99 each	one
25 Position D-Subminiature Connector Hood	276-1549	1.99 each	two
Nuts	64-3018	.99 @ bag	* two
Screws	64-3011	.99 @ bag	* two
Wire	278-757	2.39 @ pack	* one
Spiral Wrap	278-1638	2.19 @ pack	* one

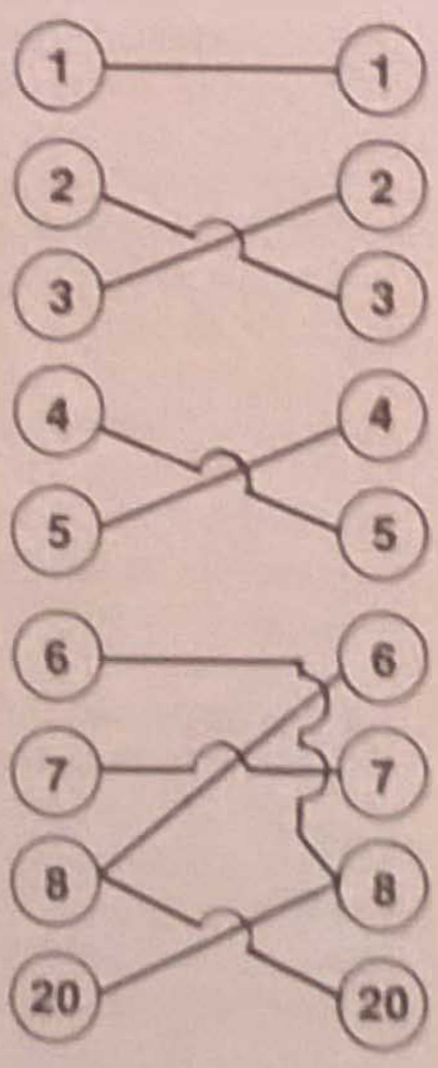

Figure 1: Connections

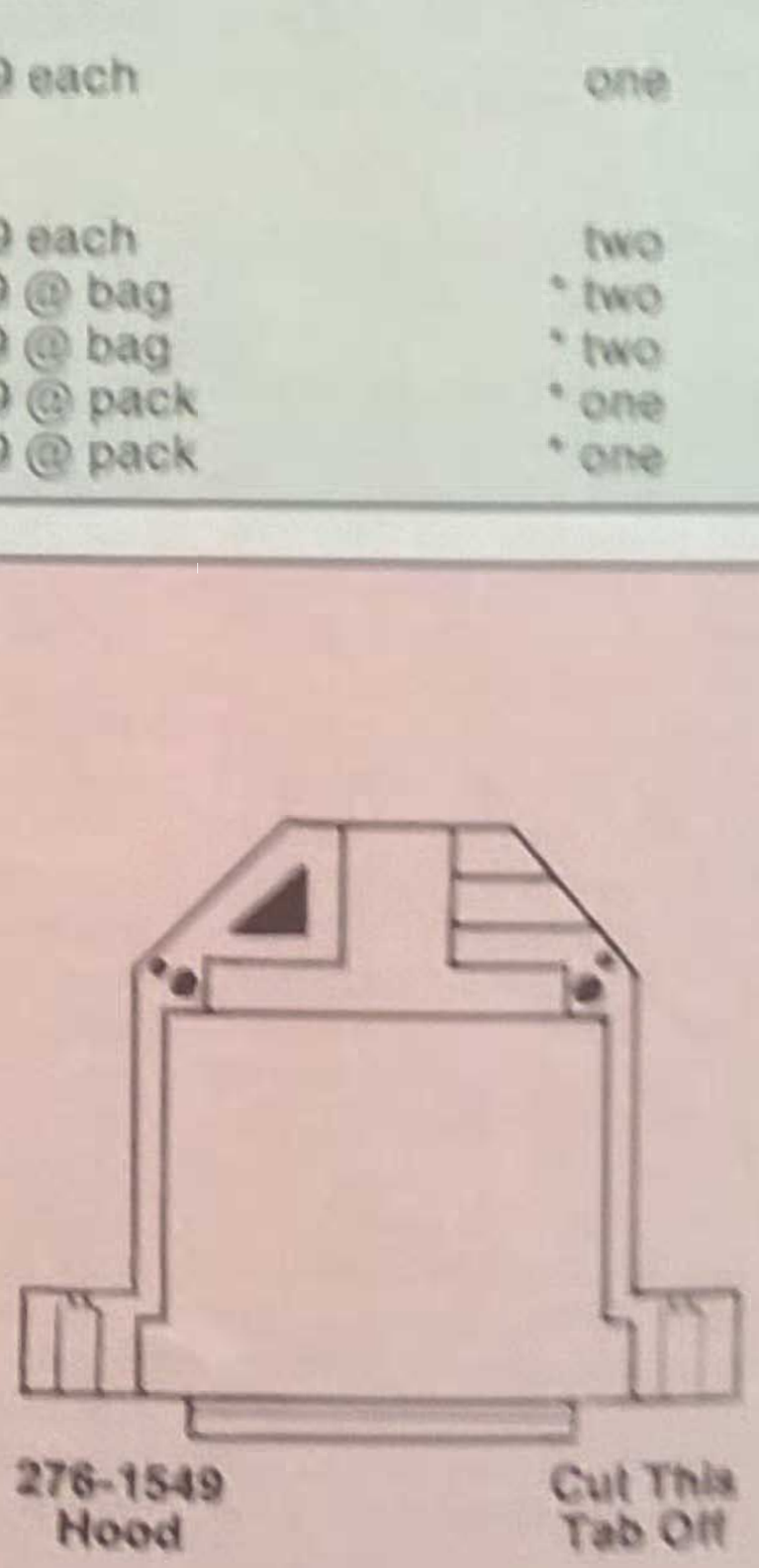

Figure 2

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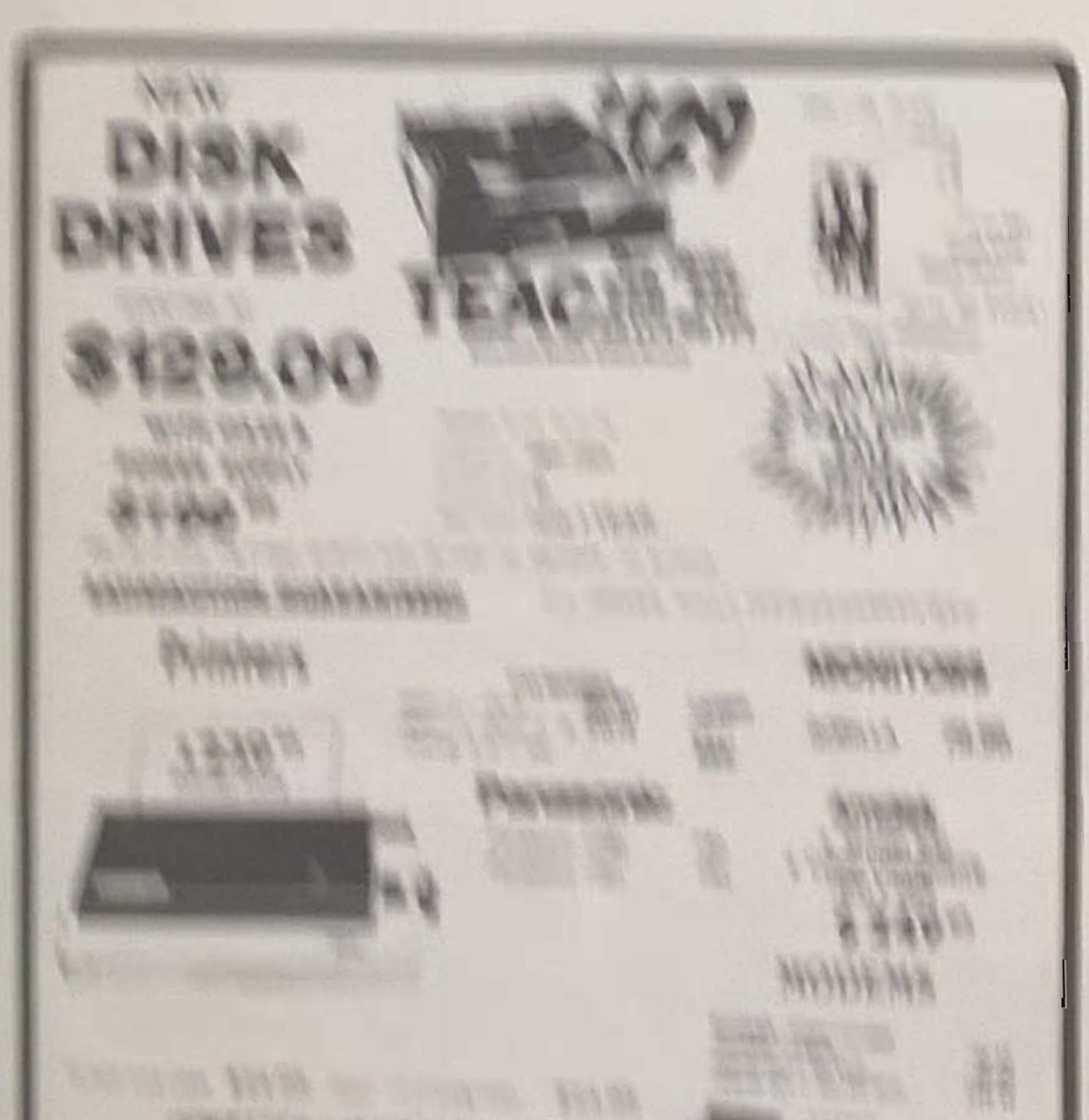
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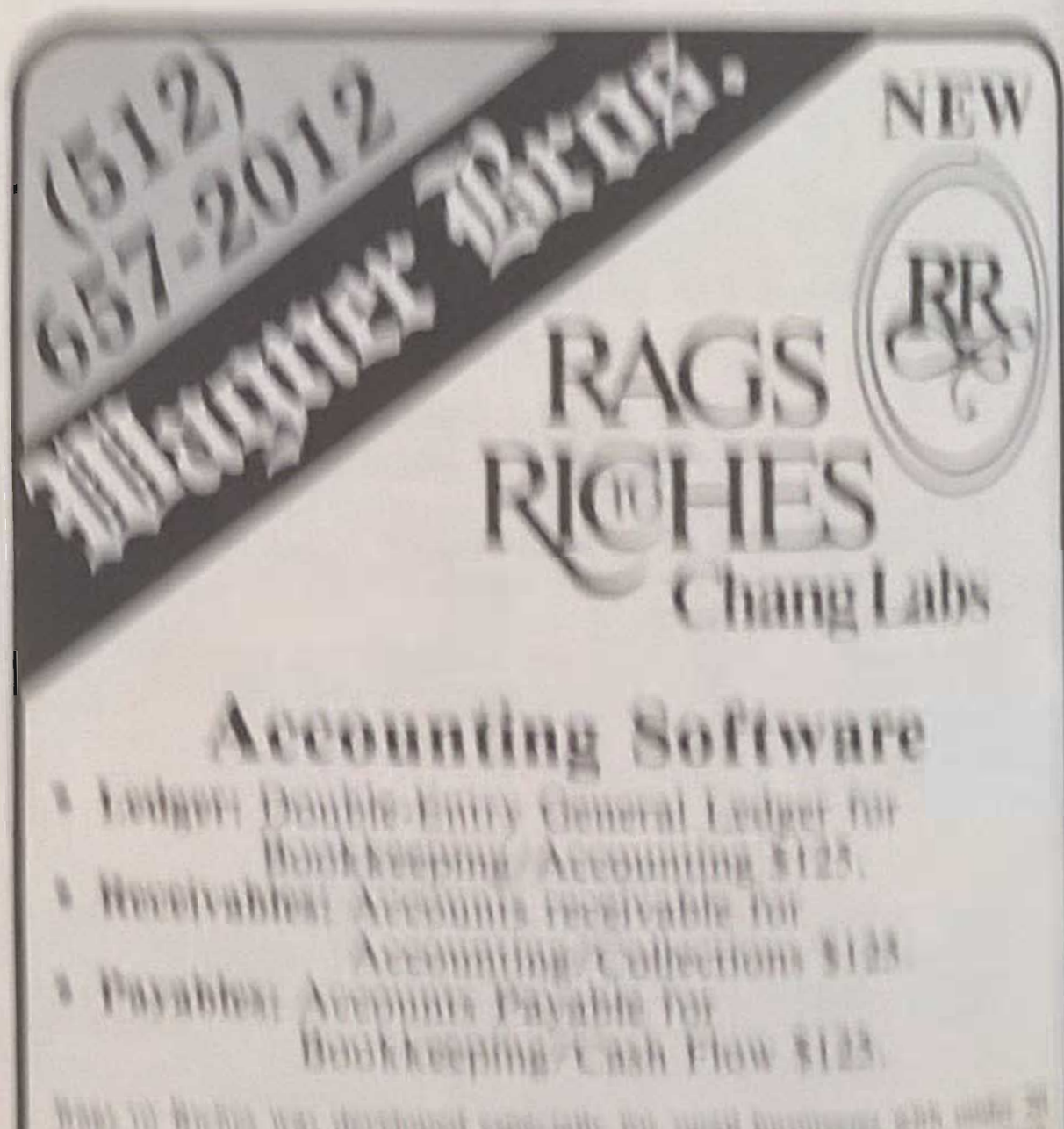
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```
12Ø AL=AH
13Ø OUT RSBR,AL
14Ø INIT%1,124,5
15Ø LINE INPUT%1,A$
16Ø PRINT A$
17Ø PRINT #1,A$
18Ø GOTO 15Ø
```

Listing 3: M-100.BAS

```
1Ø REM This program is for the Model 1ØØ, to Upload ASCII files.
2Ø INPUT "ENTER FILENAME TO UPLOAD: ";F$
3Ø OPEN "COM:38E2D" FOR OUTPUT AS 1
4Ø OPEN F$ FOR INPUT AS 2
5Ø LINE INPUT #2,X$
6Ø PRINT#1,X$
7Ø FOR T=1 TO 3ØØ:NEXT T:PRINT X$:IF EOF(2) THEN CLOSE:END ELSE 5Ø
```

Listing 4: CONNECT.BAS

```
1Ø CLS
12 PRINT
15 PRINT STRING$(8,32);
2Ø PRINT "FEMALE ",1,1;"   MALE"
25 PRINT
3Ø PRINT ,2,2
35 PRINT
4Ø PRINT ,3,3
45 PRINT
5Ø PRINT,4,4
55 PRINT
6Ø PRINT,5,5
65 PRINT
7Ø PRINT,6,6
75 PRINT
8Ø PRINT,7,7
85 PRINT
9Ø PRINT,8,8
95 PRINT
1ØØ PRINT,2Ø,2Ø
1Ø5 PRINT
11Ø PRINT," Fig 1. Connections"
12Ø FOR P=11 TO 139 STEP 16
13Ø CIRCLE (145,P),15,,,,1:CIRCLE (272,P),15,,,,1
132 CIRCLE (145,P),16,,,,1:CIRCLE (272,P),16,,,,1
134 CIRCLE (145,P),14,,,,1:CIRCLE (272,P),14,,,,1
14Ø NEXT P
15Ø FOR M=1 TO 1Ø
16Ø READ A,B,C
17Ø LINE(161,A)-(257,B),C
172 LINE(161,A+1)-(257,B+1),C
173 FOR R=2 TO 5
175 REM:CIRCLE (161,A),R:CIRCLE (257,B),R
176 NEXT R
18Ø NEXT M
19Ø DATA 11,11,3,27,43,4,43,27,5,59,75,6,75,59,7,91,123,5,123,91,4,123,139,5,139
,123,6,1Ø7,1Ø7,3
195 LOCATE 1,1,Ø
2ØØ GOTO 2ØØ
```

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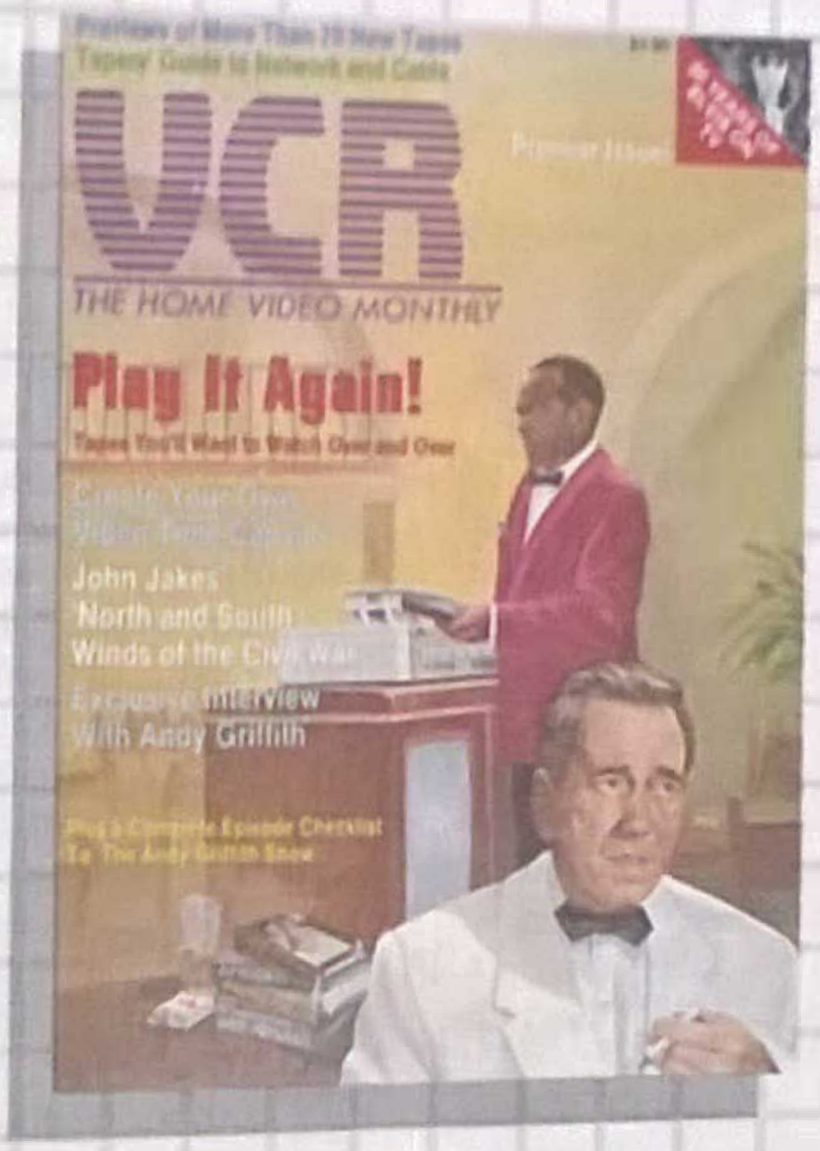

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BASIC TRAINING

Handy BASIC Hints

By Fred Blechman
Soft Sector Contributing Editor

Until now, in "BASIC Training," I've covered all of the commands that are generally used in Sanyo BASIC, and I briefly mentioned some that are seldom used. All of the material so far has been based on my book.

There's a lot of additional material on the subject that is not strictly related to BASIC such as communications, peripherals, software and information sources. Up to this point, none of this material has been covered in this series.

Now it's time for a breather, and some new information. In this, and in articles to come, I'll be covering some things I've discovered since completing the book, and will go into more depth on some subjects not covered in great detail in the book.

For now, however, here is a collection of miscellaneous BASIC handy hints. We'll see what happens when you route control codes to your screen and printer, how to prevent keyboard lockup if you don't have a printer, and how to erase to the end of a screen line or to erase the bottom of the screen.

Character Codes

All microcomputers are capable of producing 256 "characters" with the CHR$(X) statement in BASIC. The X can have a decimal value from zero to 255. The values from 32 (space) to 122 (lowercase Z) are standardized ASCII. Few U.S. micros deviate from this standard.

Table 1 shows these numbers and the letters, numbers and punctuation produced on the Sanyo 555. To prove this to yourself, just type (while in BASIC): PRINT CHR$(X) (using a number from 33 to 122 for X) and press ENTER. You'll see the appropriate character on the screen.

If you want to experiment with the numbers from 123 to 256, go ahead. You'll be surprised at some of the strange characters produced by the Sanyo's character generator chip.

Getting Hexed

Sometimes you will find the character number given in two-digit Hexadecimal code, which uses zero through F to represent the decimal numbers zero to 15. The numbers zero to nine are the same in Hexadecimal and decimal. A in "Hex" is 10 in decimal, B is 11, C is 12, D is 13, E is 14 and F is 15.

To convert a two-digit Hex number to decimal, multiply its first digit's decimal value by 16 and add the second digit's decimal value. For example, 37 Hexadecimal would be 3 times 16 plus 7, or 55 decimal. 134 Hexadecimal would be 13 times 16 plus 4, or 212 decimal. AC Hex would equal 10 times 16 plus 12, or 172 decimal. Simple enough?

Control Codes

Too bad that's not all there is to it, however. Not only is there a great difference in computer displays for the numbers above 122 decimal, but there's even more variation with printers. Printer character sets, except for the decimal values from 0 to 122, are anybody's guess, especially since the IBM PC came on the scene with fancy graphics characters most printer manufacturers never dreamed of! That's changing rapidly as the IBM (and Sanyo 555) characters become more common on the new printers.

But there's another group of character numbers we've ignored in our discussion so far. These are the decimal numbers zero to 31 (Hexadecimal zero through 1F). This is dangerous territory for both screen and printer! These codes are intended for communicating with the world outside of the computer itself, and are extensively used for printer control, hence its name "control codes."

Table 2 shows the results I've had using the Sanyo MBC 555 with an Epson work-alike printer, the CP-80 Type I. You can try this out with your printer using the following simple test program:

```
10 INPUT "Control Code Number";X
20 PRINT CHR$(X);"Testing . . . "
30 LPRINT CHR$(X);"Testing . . . ";
40 LPRINT CHR$(X);"Testing . . . "
50 GOTO 10
```

Notice that lines 30 and 40 are identical, except that line 30 ends in a semicolon to suppress an automatic line feed and carriage return. This is so you can more accurately see what the printer does. Make sure your printer is on and ready before running this program or your keyboard will lock up. (Later in this article we'll cover how to avoid that.)

Type RUN, press ENTER and you'll see the screen prompt. Type a number from zero to 31 and see what happens. Don't be surprised at anything!

(Fred Blechman, an acknowledged authority on home computers, has written several articles and books related to microcomputers. He is self-taught in electronics and computer BASIC programming and specializes in writing for beginners. Fred may be contacted at 7217 Bernadine Ave., Canoga Park, CA 91307; 818-346-7024.) Copyright® 1985 by Fred Blechman

Some CHR$ numbers will print funny characters on the screen. More than likely, CHR$(7) will cause your printer to beep, CHR$(8) will backspace and CHR$(9) will tab eight spaces. CHR$(10) and CHR$(11) command a "line feed," and CHR$(12) will cause a "form feed." CHR$(13) will give you a carriage return without a line feed.

CHR$(14) to CHR$(31) enter the domain of printer font commands (enlarged, condensed), and the ubiquitous CHR$(27), which is used as the "escape" character for most printers to precede another code. If you really want to be adventurous, add this to the above test program:

```
25 LPRINT CHR$(27);
```

Now, try numbers from 32 to 255 for the input number and watch your printer do "wild and crazy things," like underlines, extra line feeds galore, compressed vertical spacing, etc. Have lots of printer paper handy.

Printer Ready Test

It is a sad fact that the Sanyo MBC-550 series (and many other micros) will lock out the keyboard if a command is sent to the printer and the printer is either not there or is not ready to accept the PRINT command. Thus, if you should type LLIST or LPRINT instead of LIST or PRINT, and your printer is not ready, the keyboard will appear to go dead, and your only recovery is to reset your machine. The result is, you'll lose the program in work! Not a pleasant experience.

However, here's a simple test program you can run to find out the various codes returned to the computer parallel port for different printer conditions:

```
10 PRINT INP(30),
20 GOTO 10
```

With the printer connected to the parallel printer port (I have not tested the serial port, since that is seldom used for printers anymore), run this program. Turn the printer on and off, and use the printer switches that control online and ready. Try the printer with and without paper. Each change should print a different number on the screen, with the number repeating until you change some printer condition. The most important number is when the printer is ready. I found this number to be 208 with four different printers I tested.

Table 3 shows the results I got with various printer conditions. Notice that 208 was the "magic number" in all cases for printer ready. However, I've been around computers and printers long enough to know that nothing is certain, so check the printer you're using to verify the "ready" number. For the example that follows, I'll assume 208.

To use this information in a program, simply add a line before any printer commands, to verify that the printer is ready. Type in the line number: IF INP(30)<>208 THEN PRINT "TURN ON PRINTER OR PROGRAM WILL FREEZE!!!!"

You could, of course, get more elaborate by inspecting INP(30) for the other numbers returned when "off," "off line" or "out of paper," and print an appropriate action message. This borders on overkill, but does make for a program more friendly to novice users.

You might also prefer the easiest method of all to prevent printer-caused keyboard lockup. Just PRINT a message on the screen, reminding the user that the printer should be turned on, then follow this immediately with a confirming LPRINT statement. If the printer is not ready, the program will not move forward past the reminder. Here's an example of what I mean:

```
100 PRINT"***** BE SURE THE PRINTER IS
READY!*****"
110 LPRINT"..............PRINTER
READY..............."
```

Erase To End Of Line

You know that CLS will clear the entire screen and move the cursor to the top of the screen. There are lots of times, however, when you only want to erase a portion of the screen. For example, error messages might clutter up a screen, but erasing the entire screen would also erase prior useful display information. You might also be inputting information on a screen line that has already been used. If the new information has less characters and does not overtype all of the old, the display is confusing.

To erase to the end of a given line, use this statement in the program:

```
PRINT STRING$(81-POS,32);
```

This prints a string of spaces — ASCII Code 32 — from the current position of the cursor on the current line to the end of the line. The semicolon at the end of the statement prevents a line feed.

The simplicity of this approach has one flaw. When working on the last screen line, the screen will scroll up one line. To prevent this, change the 81 to 80 for that line only.

Erase To End Of Screen

Using the same general idea, you could erase all screen lines below a given line with this subroutine:

```
10000 ROW=CSRLIN
10010 FOR X=1 TO 25-CSRLIN
10020 PRINT STRING$(80,32);
10030 NEXT X
10040 PRINT STRING$(79,32);
10050 LOCATE ROW,1
10060 RETURN
```

Line 10000 determines the present cursor line number and assigns this to the variable ROW. Lines 10010 through 10040 clear the screen one full line at a time, except for the last space at the lower right corner, to prevent screen scroll. Line 10050 relocates the cursor back to the first erased screen line and 10060 returns the program from the subroutine call. By using this as a subroutine, it can be used at any time in the program.

This works, but it's slow since each line is erased in turn, and the cursor is constantly relocated as each line is erased. A more elegant, and much faster method, available in Sanyo BASIC for clearing to the end of the screen was suggested by Fred Clabuesch.

This method will *not* work, by the way, in IBM PC BASIC or the equivalent so-called BASICA or GW-BASIC available for the Sanyo. It *will* work in IBM PC BASICA which supports graphics commands.

The LINE statement is used to draw a box, which is then filled with the background color, thus apparently erasing the screen. The statement is:

```
LINE(0,CSRLIN*8-8)-(639,199),0,BF
```

The CSRLIN*8-8 calculates the vertical coordinate for the upper left corner of the box, based on the current cursor position. The 0 before the BF (Box Fill) command is the background color, here assumed to be black. If you have another background color, that COLOR number should be used.

The cursor never actually moves from its original location, so it is not necessary to relocate it.

Next month we'll depart from BASIC for a discussion of how to control your printer — including fancy fonts — while in MS-DOS. This will, among other things, allow you to print disk directories small enough to be pasted right on the disk's outer paper sleeve.

Table 1: CHRS codes 32 through 165.

CHRS#	Character	CHRS#	Character	CHRS#	Character	CHRS#	Character	CHRS#	Character
32		55	7	78	N	101	e	124	|
33	!	56	8	79	O	102	f	125	}
34	"	57	9	80	P	103	g	126	~
35	#	58	:	81	Q	104	h	127	⌂
36	$	59	;	82	R	105	i	128	Ç
37	%	60	<	83	S	106	j	129	ü
38	&	61	=	84	T	107	k	130	é
39	'	62	>	85	U	108	l	131	â
40	(	63	?	86	V	109	m	132	ä
41	)	64	@	87	W	110	n	133	à
42	*	65	A	88	X	111	o	134	å
43	+	66	B	89	Y	112	p	135	ç
44	,	67	C	90	Z	113	q	136	ê
45	-	68	D	91	[	114	r	137	ë
46	.	69	E	92	\	115	s	138	è
47	/	70	F	93	]	116	t	139	ï
48	0	71	G	94	^	117	u	140	î
49	1	72	H	95	_	118	v	141	ì
50	2	73	I	96	`	119	w	142	Ä
51	3	74	J	97	a	120	x	143	Å
52	4	75	K	98	b	121	y	144	É
53	5	76	L	99	c	122	z	145	æ
54	6	77	M	100	d	123	{	146	Æ

Table 2		
PRINTER CONTROL CODES		
CHRS	WITH PRINT	WITH LPRINT
7	BEEP CARRIAGE RETURN & LINE FEED	TONE
8	BACKSPACE	BACKSPACE
9	TAB (8)	TAB (8)
10	LINE FEED	LINE FEED
11	MALE GENDER SYMBOL	LINE FEED
12	BLANK SPACE	FORM FEED
13	NOTHING	CARRIAGE RETURN

Table 3

(NP-10) PRINTER VALUES

PRINTER	OFF	OFF LINE	OUT OF PAPER	READY
STAR SG-10	224	144	176	208
STAR STX-80	224	144	N/A	208
CP-80 TYPE 1	224	128	160	208
RADIO SHACK CGP-115	192	N/A	N/A	208

NOTE: ALL PRINTERS CONNECTED TO SANYO 555 PARALLEL PORT

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Software review

Refer — A Multi-Lingual Cross-Reference Utility

One of the problems with program reference utilities is that they only work with one language. If you're like me, you may write a BASIC one day then a C the next. Maybe you need to write a business program in *dBase II*. Well, I have a reference program for BASIC and there are many for C also, but I don't have one for *dBase II* and I can't recall ever seeing one available. *Refer* solves the problem in this case. *Refer* comes with the ability to reference BASIC, C, PASCAL, IBM FORTRAN, *dBase II* and *R:base 5000*. These are the most common languages that most people will use, but if your favorite language is not listed, you can easily add it to the list.

Refer has an option that lets you build a list of reserved words and use them with *Refer* to cross-reference any file. The word list is saved in the ASCII format so a BASIC program can be used to be saved with the option (save "MBASIC.LST",A). This saves the program in letters instead of compacting the reserved words into tokens which is called the token or binary format. Run *Refer* from the MS-DOS command line by typing REFER and pressing RETURN. *Refer* has a small menu that lets you return to the DOS level and add a new list of reserved words or cross-reference a file.

If you pick the option to cross-reference the file, *Refer* then asks for the name of the reserved word file. The ones that are on the disk have been named RESERVED.XXX where XXX is a short abbreviation of the language name such as RESERVED.BAS for BASIC or RESERVED.DB2 for *dBase II*.

If you were to make a new reserved word list, I would recommend that you also use this naming system to keep things straight as to remember. After telling *Refer* what the name of the reserved word list is, *Refer* reads in the words and prints them on the screen. Next, tell *Refer* what the name of the file you want to cross-reference is called. After this, *Refer* prints out the file/program to printer. You do need a printer it seems. The first time I tried to run the program with the printer off, it said "Device Fault" and locked up until I turned the printer on.

There is very little in the way of documentation for *Refer*, but it is easy to operate. After the file/program is printed out, *Refer* skips to the next page and starts printing the cross-reference section. You are given the option of suppressing the reserved words if you wish. This way, the only things that print are variable and non-reserved words.

The ability to cross-reference your programs is sometimes very important and can be a lifesaver. One other thing *Refer* comes with is a source code (written in GW-BASIC with a compiled version on the disk). By having the source code, you can change the program to fit your own needs.

For those of you who need a versatile cross-reference utility, *Refer* is the one for you.

(James Halstead & Associates, 1551 Plainfield, Joliet, IL 60435, 815-725-0346, $39)

— Gulf Purcell

Software review

CoForth — A New Language Specifically For Your Sanyo

I have discovered that reviewing a programming language is not the easiest thing to do. One can take several approaches when you are quite great detail about the particular implementation of the language or you can describe, in general terms, how you feel about it as compared to other implementations. I have chosen to do the latter. For one thing, I am not a computer expert, but another, there isn't enough space for a really detailed description, of course.

CoForth, produced by Laboratory Microsystems, was written specifically for use on a Sanyo MBC-555. However, if you have an MBC-775 (or one of the long awaited MS series) you are not left out in the cold. A version to run on IBM compatibles as well as the 555 is now available. One word of caution though, it runs much better on a 555. The 555 graphics is tremendously superior to the IBM and that makes a big difference if you use color. For example, a 555 will only do two color graphics in *CoForth* that is not due so much to a deficiency in *CoForth* as that in the high resolution mode — the 555 can only use two colors. One of them is the background color. The 775, and other IBM compatibles, will use multi color screens only in the medium-resolution mode. *CoForth* does not make use of this mode.

If you are a FORTH user, you probably already know that FORTH is sort of a compromise between a compiler and an

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interpreter. This quality allows the flexibility of an interpreter and the increased speed of a compiler. FORTH has been widely used in applications requiring a flexible interface to the outside world. CoForth, according to the producer, can run up to 30 times the speed of interpreted BASIC. Most users of the 555 want all the speed they can get. The 555 is no ball of fire in interpreted BASIC, and most compilers are less than totally compatible. CoForth can bridge that gap for you. One other note for all you FORTH users: CoForth follows the conventions of FORTH-83.

CoForth was originally developed for use with a Musical Instrument Digital Interface (MIDI). If your interests should happen to run along those lines, *CoForth* is what you need. Bluewater plans to offer a MIDI interface in the near future.

I know I haven't covered all the major points concerning *CoForth* as a software package, but I would like to move on to say something about Bluewater and the *CoForth* manual. First of all, the manual is excellent. It is printed in dot matrix, but is very legible. It is printed on both sides of the page. I know that sounds minor, but I hate those one-sided Xerox copies. The manual, just as others of this type, is not a tutorial. There are plenty of reasonably priced FORTH books on the market. This is not a criticism. Microsoft's C compiler retails for $500 and if you can learn C from their manual, you are ready for the presidency of Harvard University.

As for Bluewater, they are one of the most reasonable software suppliers I have ever come into contact with. One of their offers is to fully refund the purchaser if he doesn't like *CoForth* after a six week trial period. That sounds reasonable enough, but to add to that, they suggest that if you return it for a refund you first make a copy of the disk and the documentation. They ask that you pass it on to your friends. If these users like it, they are requested to register for $15. Registration will entitle them to possible upgrades at a reasonable cost.

Bluewater recognizes that copying software is a reality. They know there is not much to be done about it when it occurs on an individual basis as opposed to corporate level pirates. They ask only that you pay them a small sum for use of their software. If you have a copy and you think it is as good as I think it is, send them the $15. We need more people like Bluewater around.

In summary, I think *CoForth* is a great piece of software. The manual is good and the company is something out of all those books we read as children that painted the world as a beautiful place where everyone was trustworthy and trusting. Nothing like a breath of fresh air in any business.

And don't forget, all you 555 users, this software was *written* on your machine to *run* on your machine. IBM is an afterthought — in this case at least.

(Bluewater, 2537 Colfax Avenue So., Minneapolis, MN 55405, 612-377-7369, $40)

— Jim Pile

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Software review

SanyGraf — A Professional CAD Program

SanyGraf is a copy-protected Sanyo-only business and scientific graphics package for the MBC-550/555 series computers. It requires MS-DOS 2.11, 256K and one 360K floppy. Overall, the program and documentation are complete and well organized. After a short learning curve, the program proves to be very versatile. However, this program is weighted more toward business applications rather than scientific applications. A complete scientific package, for example, would include log plots, and topological and surface plotting capabilities.

With this aside, *SanyGraf* is a powerful program that provides a tremendous amount of flexibility and versatility to the user. One can select from line, scatter diagrams, bar charts and pie charts. All graph types are easily read from data files or input directly from the keyboard. The options presented to the user allow tailoring of the particular graph as required. These options include, but are not limited to, sizing (reducing or enlarging) the graph, scaling of the graph and labeling of the graph.

Once the graph and options are established, *SanyGraf* allows the user to save all graphing parameters to disk storage for later plotting, if desired.

A particularly interesting feature of *SanyGraf* is its capability of plotting multiple graphs per page. The program is formatted for up to four graphs per page, although the option exists to plot as many graphs as desired.

An option I have not seen in other graphing programs is its ability to position the graph on any portion of the screen (page). With a small amount of effort, one can manually produce text and graphics on the same page by proper compression of the graph and refeeding the paper through the printer.

Construction and presentation of the individual pie charts and bar charts are further enhanced by the availability of various colors and by user defined hatching. One merely has to define the appropriate segment, the spacing of the hatch and the angle of the hatch.

The documentation supplied with the program is most complete in the details of how to use and maximize the use of *SanyGraf*. It is recommended that the tutorial section of the manual be read and all examples followed if one wishes to develop, in a timely manner, proficient use of this program. The reference section of the manual is complete in the definition of the individual menus and the single-key commands. Most single-key commands relate directly to the function desired. For example, the 'V' key indicates that the user wishes to [V]iew the graph. The 'S' key indicates that the user wishes to [S]ave certain items. One cannot go wrong by proper study of the supplied manual.

This program is highly recommended for users of the Sanyo MBC-550/555 series computers without the Video RAM Board. The program rivals, and in some cases exceeds, higher priced packages for the IBM or compatibles. All functions worked exactly as described and, with use, the program becomes easier to use.

(A-OK Computers, 816 Easley St., Suite 615, Silver Spring, MD 20910, 301-585-5105. Distributed in Australia by: I. Zaleman, 14 Rushall Crescent, North Fitzroy, Melbourne, Victoria, Australia, 3068, $99)

— Edward Champion

Open Access — A Program Which Provides All The Options

Open Access is an integrated package consisting of six individual modules which could easily have been marketed as stand-alone products. In order to enter this realm you'll presently need a Video RAM Board or an MBC-775, 256K system and two 360K drives (one DS/DD), a graphics printer and communications capability. Software Products International (SPI) has informed me that the package has been printed specifically to the Sanyo 555 in Europe and should be available for U.S. distribution in the near future. The package is available in various languages which include English, German, French, Spanish and Italian.

Weighing the pros and cons of integrated software is best left to the individual who faces that choice. Having worked with specific individual packages on a daily basis for some time now, I did not look forward to starting from scratch to learn a package of this magnitude. However, the folks at Software Products International obviously foresaw this problem and provided the most complete and thorough documentation I've seen to date. The package comes with three separate manuals: "Getting Started" (with accompanying disk), "User Manual" (with a separate pocket reference guide, disk of sample files and plastic function key template), and finally the "Reference Manual." At first, this mass of instructional media is overwhelming. Once again SPI comes through by presenting it in a logical sequence which is easy to follow and understand.

Fundamental features included in all the modules include menu interface via menus, a help facility which is context sensitive, windows, and a calculator which is accessible at any time by pressing PF8.

The Information Manager is a unique aspect of *Open Access* because the package centers on its database. Here, you will find a true relational database which provides for 55 fields per record with up to 15 key fields, 32,000 records per file, the ability to open five files simultaneously, assignable field attributes and report generation. Not much more one could ask for except a programming language, like *dBASE*, and this is forthcoming as an installable option according to SPI. A noteworthy feature is the "Form-Query" command. This allows assignment of restrictions to key fields for record review, thus providing maximum flexibilty. The Information Manager module also includes a Standard Interface File (SIF) utility which converts DIF, text, and DBF data files to an *Open* access format or inversely convert SIF files to DIF format.

In the Spreadsheet, all the features anticipated in any popular spreadsheet can be found. The maximums are rows by 3,000, columns by 216, and cell entries at 648,000. An advanced feature provided by SPI is "Goal Seeking." This allows setting goals (or targets) for one or more dependent variables and determining the values of corresponding independent variables. This technique, inverse solution, can be very useful for those frequent "what if" situations.

If you're tired of seeing "flat" graphs, you're going to love the 3-D bar charts that *Open Access* can produce. As if this wasn't distinctive enough, you can also overlay and window graphs. Still not impressed? How about a slide show? The "Form/Slide" command provides for sequencing up to 32 previously saved slides into a "carousel" for presentations.

Word processing is part of an integrated package and is what highlights this module on an individual basis. Imagine being able to include that special graph into the report you're working on. The normal text and document modes are available along with the other standard features you expect in a quality word processor.

With *Open Access*, you can configure your system into a dumb terminal, or other terminal, once communication has been established. Creation of a configuration file(s) provides control of Baud rate, stop bits, data bits, parity, duplex, etc., and as always, from a menu-driven windowed environment.

A feature not found in other leading integrated packages is a Time Manager. Here a calendar is provided for scheduling and a card "Rolodex" file. Although the calendar cannot be printed per se, you can list appointments in general or sort by category for specific items.

There can be no doubt that *Open Access* is a high quality product which provides all the latest features in a well thought out and superbly presented package. The only negatives I found were:

1) Although presented well, the fine print of the documentation made it difficult for me to read.
2) Updating data in one module doesn't automatically change your other files containing the same data.
3) Running from a floppy-based system requires frequent disk swapping. The disks are numbered and labeled to minimize problems here.

This is definitely not a program for home use. However, anyone wanting to put a business on a computer should definitely look this package over closely. When compared to the sum of individual packages cost, which will provide the same services, *Open Access* is a bargain for the price.

(Software Products International, 10240 Sorrento Valley Road, San Diego, CA 92121, 619-450-1526, $695)

— Bob MacDonald

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Software review

ASCII Printer — A Better Screen Dump For Your Sanyo

ASCII Printer is a standard screen dump. It is installed from DOS and remains in memory while you go on about your business. At any point, hitting CONTROL-SHIFT-PF1 will send text on the screen to the printer. A brief glance at recent issues of SOFT SECTOR indicates that there are several similar programs available (at similar prices). There are also screen dumps in the public domain. So what is special about this one? The main feature is that it allows a part of the screen to be printed. Before the job begins, the user is asked to point out which lines are to be included. For example, from *WordStar*, one can restrict the printing to the actual text on the screen, deleting the menus, ruler line and Function Key prompts. I used the program to make handy, hard copies of the *WordStar* and *CalcStar* menus. A second feature is that it allows a form feed to be executed from the keyboard (by pressing CONTROL-SHIFT-PGUP. Also, only standard ASCII characters are printed — anything else on the screen is safely ignored. This should allow the program to work on any printer that is compatible with the computer. (It works fine on both my Sanyo PR-5000 letter quality and Okidata mu92 dot matrix.)

I spent some time trying to get the program to crash the system or screw something up. I couldn't do it. It works with every application program I have. If called in the middle of a screen scroll, it temporarily freezes the operation, prints the lines requested and continues. It even works when another screen dump is installed and working (e.g., a graphics dump).

Here are a few unrelated items that a potential purchaser might find of interest. It takes up 1,900 Bytes of RAM — much more than any other screen dump I have. I presume this is the price of the fancy features. Also, the characters made by Sanyo BASIC's SYMBOL command are not printed, probably because those are graphics characters. Once installed, the keystroke combinations that call the program can't be used for anything else. As far as I know, the only consequence of this is the loss of one of the Function Keys created by J. Weaver Jr.'s program, *WizStar*. Finally, the printer must be turned on and be online, not only when the program is called, but when it is installed. At installation, if the printer is not ready, the user will be prompted to turn it on. If the program is called when the printer is off, the system will *appear* to hang up (no prompt is given), but order is restored when the printer is turned on.

(J & M Software, 400 Sawyer Road, Lansing, MI 48910, $20)

— Stewart Shapiro

Software review

Bottomline Capitalist — For Business Management. It's Top Of The Line

Bottomline Capitalist is a business management challenge that can be run on the MBC-550/555 with MS-DOS 1.25/2.11, two 360K drives, a printer, and either a monochrome or color monitor. The basic 128K of RAM resident in the 550 series is sufficient for this program. The program is not copy protected.

In using the program, I found *Bottomline Capitalist* to be a most rewarding program in understanding and visualizing the impacts of decisions made in various areas of business. The program covers and emphasizes planning in the following areas: Sales and Marketing, Finance and Budgeting, Human Resources, Production Capacity, Product Selectivity and Setting of Corporate Goals.

Each participant in the business challenge can use his own management style to direct a particular start-up company. The immediate goal is to position your particular company in the market with the most profitability and a large share of the market. In addition, it is necessary to develop the resources (e.g., personnel) to support the company's short and long term goals.

After starting the business challenge, a printout of each company status is provided. Four standard financial statements for each company are given, not only for the starting quarters, but also for each subsequent quarter of the business development. These financial statements are as follows:

1) Income Statement: Depicts a company's income over a definite period of time such as a month, a quarter or a year.
2) Balance Sheet: A snapshot of a company's financial position at a definite point in time.
3) Statement of Changes in Financial Position: Depicts the sources and uses of working capital, where cumulative working capital equals current assets minus current liabilities in the balance sheet.
4) Ratio Analysis Statement: A categorization of over 20 corporate financial ratios by overall performance, profitability measures, investment utilization, financial condition, financial leverage, equity performance and Altman analysis.

A review of the reports for the fourth quarter 1985 and the first quarter 1986 provide a basis for the next quarter's decisions. Each individual, or team responsible for a particular company, inputs decisions for the next quarter. Data input

CoForth 83

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sheets are provided. I found that the time required for data input per quarter per company averaged about 20 minutes and was naturally dependent upon the number of decisions made. Of course, one can put as much or as little time as one wishes in developing the next quarter's strategy. Basically, what one puts into the program determines the quality of the output information.

As emphasized in the tutorial, the program attempts to stimulate your imagination and creativeness. The program does that well. It is easy to lose oneself in the challenge and spend countless hours analyzing "what if" situations.

For the more advanced business challenge player, the source code is provided. This allows one to change products and other pertinent data and thus simulate the influence of economic changes and management decisions on any particular product. This supports the statement from Venture Software indicating the program provides a management tool to assist the business manager in financial planning, modeling and analysis. Note that there are necessary disclaimers for any loss of profit or damages. Use the program as an aid; not the final word.

In summary, *Bottomline Capitalist* is an excellent program that has many applications ranging from recreation purposes to use in business management courses and seminars. Use of the program will give much insight into the business world. The cost of the program will yield more returns, both tangible and intangible, than one might expect.

(Venture Software, 16200 Ventura Blvd., Encino, CA 91436, 818-986-4110, $80 plus $5 S/H)

— Edward Champion

Helpful Hint . . .

A CHARACTER REFERENCE

As explained in the *WordStar Reference Guide* (Page I-2), filenames may not include some special characters such as colons, questions marks and asterisks. And if you do try to use these characters in a filename, *WordStar* will give you an error message and ask for a new filename.

However, as I discovered the hard way, *WordStar* will accept the character '>' in a filename. I used this character in naming a file that contained items from volumes 21 and beyond of a magazine, and *WordStar* accepted the name Index>20. When I went to save the file, I got a "fatal error" message, and lost my work. To be safe, then, do not assume that because *WordStar* accepts a special character as part of a filename, you will be able to save the file. It would be a good idea to type a line or two and check to see if you can save the file before proceeding.

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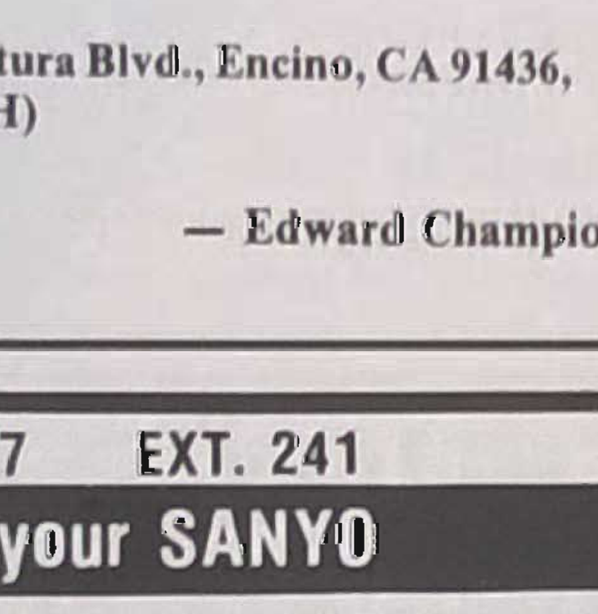

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XREF Patch

This is a modification to *XREF* which ran in SOFT SECTOR, October 1985, Page 19. It will cross-reference control transfers (line numbers) as well as the program variables. It is supplied here as a "patch" to the original program. Type these lines as they appear. Save the program: SAVE"XREFPAT.BAS".

```
190 DIM N(500),WORD$(300),MH(14),DETECT(125,3)
435 MH(14)="Line References"
560 GOSUB 1980:XPOS=XPOS+1:'                    Incriment Position
740 IF VAL(TEST$)>0 AND LRC=0 THEN GOTO 810:' Ignore Numbers
820 TEST$="":LRC=0:RETURN:'                     Exit routine - EVALUATE LINE
1005 GOSUB 1960
1255 GOSUB 2010
1360 XV=I:IF XV>X1 THEN X1=XV
1958 '
1959 '****************  LINE REFERANCE ROUTINES
1960 IF INSTR("GOTO GOSUB RESTORE RESUME THEN ELSE",TEST$)>0 AND TEST$<>"TO" THE
N LRC=1
1970 RETURN
1980 IF (A<58 OR A>62) AND (A<33 OR A>47) AND A<>44 THEN RETURN
1990 LRC=0
2000 RETURN
2010 IF VAL(TEST$)<14 THEN RETURN
2020 TEST$=MID$(TEST$,3,LEN(TEST$)-2)
2030 TEST$=STRING$(6-LEN(TEST$)," ")+TEST$
2040 TEST$="14"+TEST$
2050 RETURN
```

Load the *XREF* program: LOAD"XREF.BAS" (or use whatever program name you have given it). Merge the patch to the *XREF* program: MERGE"XREFPAT.BAS". Save the new program to disk under whatever name you wish. The operation of the program is unchanged; only a line number cross-reference will appear after the variable cross-reference.

— William J. [illegible]
Oxnard

ONE-LINERS

Here we are again with more winners of The First Great SOFT SECTOR One-Liner Contest. The authors of these winning entries will receive a copy of the January edition of SOFT SECTOR ON DISK.

To briefly restate the rules of the contest, begin the program with the number one and end it in a single line. Anything else goes. Entries will be accepted in either Sanyo BASIC or GW-BASIC. Include a printed listing, a title for the program and a short explanation of what it does. Send it to The First Great SOFT SECTOR One-Liner Contest, P.O. Box 385, Prospect, KY 40059.

SHELL DESIGNS

This program, which I call *Shell*, takes advantage of the Sanyo's spectacular graphics capabilities and its ability to generate random numbers.

The program creates an eyepleasing pattern on the screen using the LINE statement. The equations inside the FOR/NEXT loop calculate two locations on the screen and connect them with a line. A line connecting the "origin" and one of those locations exists as well. The resulting pattern is actually the graph of a polar equation with random numbers plugged into the variables. Each pattern will continue on the screen until the user presses a key, at which point a new pattern will begin.

```
1 RANDOMIZE(VAL(RIGHT$(TIME$,2))):Q=INT(
RND*8):W=INT(RND*8):IF Q=W THEN 1 ELSE C
OLOR Q,W:A=RND*2:B=RND*3Ø:C=RND*3Ø:D=RND
*2:CLS:FOR J=Ø TO 3ØØØ STEP .Ø8:IF INKEY
$<>"" THEN 1 ELSE R=A*SIN((B/C)*J)+D:X=C
OS(J)*R*4Ø:Y=SIN(J)*R*2Ø:PSET(32Ø+X,1ØØ-
Y),Q:NEXT J
```

Michael Doeff
El Cerrito, CA

★ ★ ★ ★ ★

SOLAR

Solar creates a colorful solar eclipse of changing colors. A color monitor will really make the random color generated stand out.

```
1 FOR X=Ø TO 599STEP 5:C=7*RND:FOR T=Ø T
O 1:LINE(X+T,25)-(599-X-T,199),C:NEXT T,
X:FOR Y=25 TO 199STEP 5:C=7*RND:FOR T=Ø
TO 1:LINE(599,Y+T)-(Ø,(199-Y-T)+25),C:NE
XT T,Y:FOR C=Ø TO 7:Z=Z+5+5Ø*(Z>45):CIRC
LE(298,112),55-Z,,,,C:PAINT(298,112),C:C
=C+7*(C>6):NEXT
```

John R. Torres
Queens Village, NY

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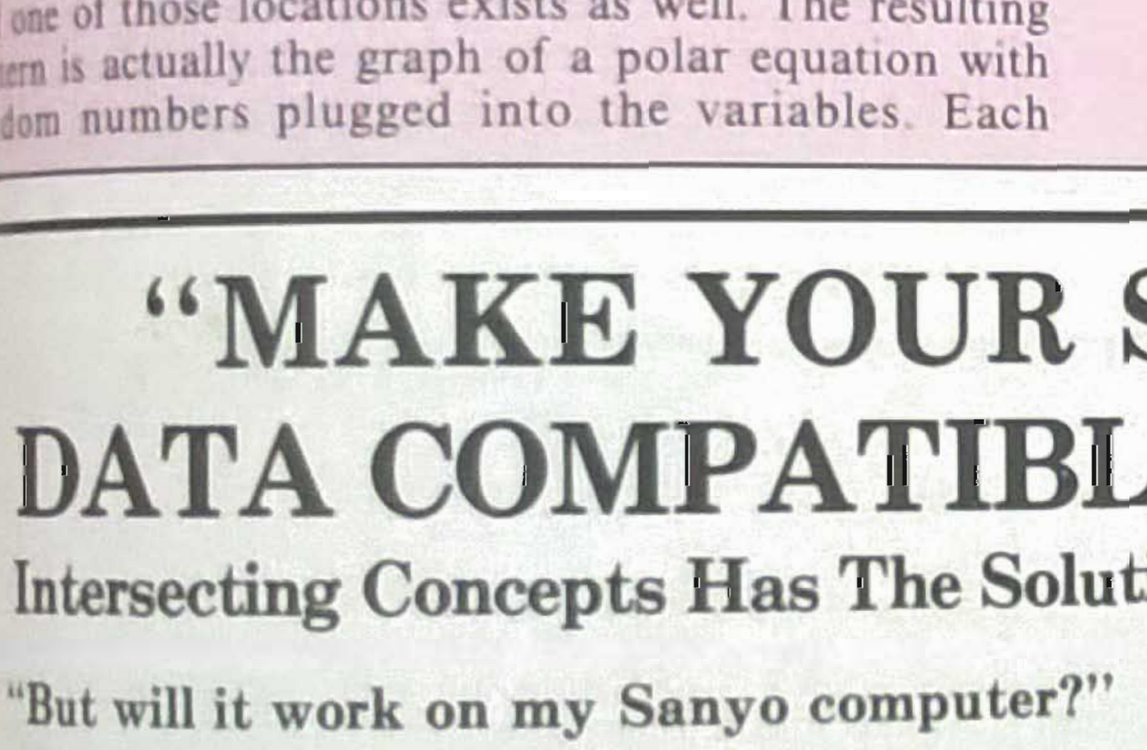

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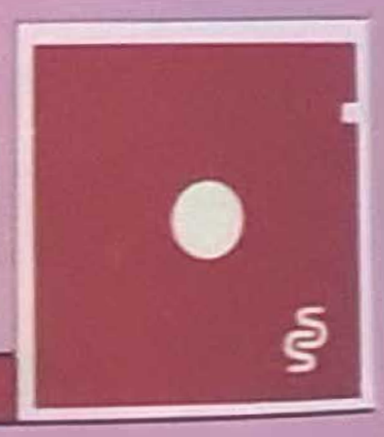

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INPUT OUTPUT

TIM PURVES
Soft Sector Contributing Editor

Q. *One of the ways I use to learn about programming and the Sanyo 550, is to try and understand programs written by others. Once I think I understand what the author was trying to do, it becomes a challenge to try and improve or change it to my satisfaction. In the* Font *program by J. Weaver (September '84, Page 50), there is a line that baffles me. I don't understand how the* PEEK*(0) ever becomes 64 when the* POKE*(0) is always inserting 192. I know the value changes from 192 to 64 because I printed it as the statement ran. I'd like to know why it changes.*

B. Lane
Alameda, CA

A. Line 60, in the *Font* program, is a cute little routine to align the Sanyo screen to an offset of zero. The PEEK and POKE instructions are looking directly at screen memory. The PRINT command causes the screen to scroll, which in turn causes the BIOS to update the video memory. What the program is trying to do is to align the screen so simple calculations can be used to place the characters on the screen, without worry about screen wrap or screen offset.

(Tim Purves is an expert on the Sanyo MBC-550/555 series computers and is an experienced programmer in assembly code, PASCAL, C and BASIC. He is available to answer any technical questions that the readers of SOFT SECTOR might have. All questions should be addressed to SOFT SECTOR, P.O. Box 385, Prospect, Ky. 40059.)

Q. *Help! I'm trying to teach myself some assembly language programming, at least enough to read and modify simple programs. I can't seem to find any information on the INT 21h and INT 20h commands. The only thing I can find is that they are DOS calls.*

Stewart Shapiro
Bexley, OH

A. The Interrupt 20h and 21h are the portable calls that will work on any MS-DOS/PC-DOS system. Interrupt 20h is used inside of a .COM file for an orderly return to DOS. Interrupt 21h has 50 plus functions ranging from character I/O to disk free space. A good reference to these calls is in the following book: *MS-DOS Programmers Reference for the Tandy 1000*, available through Radio Shack.

This book, although written for the Tandy 1000 (an IBM compatible), also has the BIOS interrupts defined. These, for the most part, work on the Sanyo. I literally use this book every day and find it invaluable in writing programs that run on the IBM and compatibles.

Q. *Will the 8087 and the Video RAM Board work together? I have seen it mentioned that there is not enough power in the machine to run them both at the same time.*

Michael Waters
Tracy, Canada

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A. They will run fine together. The only thing I would recommend is the Sanyo power supply upgrade. Also, make sure you buy a good quality 8087. I have seen some "bargain basement" 8087 chips that draw almost .75 amps instead of the normal under .5 amps.

Q. *Will* dBASE III *operate on the Sanyo 550, either with or without the Video RAM Board?*

Terry McCall
New Orleans, LA

A. *dBASE III* requires 384K on the IBM, which is equivalent to 512K on the Sanyo. Also, you would need a Video RAM Board. However, the real problem is the protection scheme prohibits the program from working on the Sanyo. This may change, however, since there is supposed to be a new version of *dBASE III* shortly.

Q. *I need the equivalent of the IBM CONTROL-ALT keys, to activate* Sidekick *on the Sanyo. Is there one, or do you have a patch that will overcome this problem?*

John Gardner
Magog, Quebec

A. Several months ago SOFT SECTOR published a patch written by Mark Zeiger of Sanyo Business Systems Corp., in the April '85 issue, Page 36. The patch allowed *Sidekick* to function on the Sanyo with a Video RAM Board.

Q. *I have a copy of* Flight Simulator 2, *given to me by the dealer where I purchased my new Sanyo. After I run your patch program, the screen comes up and then freezes waiting for me to press a key. What am I doing wrong?*

Donald Sass
Edmonton, Alberta

A. The *Flight Simulator* patch is one compatible with two versions of the apparently many versions. I have supplied the source code for those people so inclined to adapt it to the newer versions. The code to be replaced is basically the same. Since the program is copy protected, it makes it difficult to provide a generic version that will analyze the disk in question as the patch is needed.

Q. *I am having problems with my Sanyo keyboard. The keys keep sticking and the technician tells me that it is a low quality keyboard and he can't fix it. Are there any other Sanyo-compatible keyboards for sale that might be of better quality?*

Luis Rubio
Miami, FL

A. I think the Sanyo keyboard is of high quality. I have typed tens of thousands of lines of code on the Sanyo over the past two years, with many a complaint from the keyboard. You probably just got a "lemon." I would try to get the keyboard replaced under warranty.

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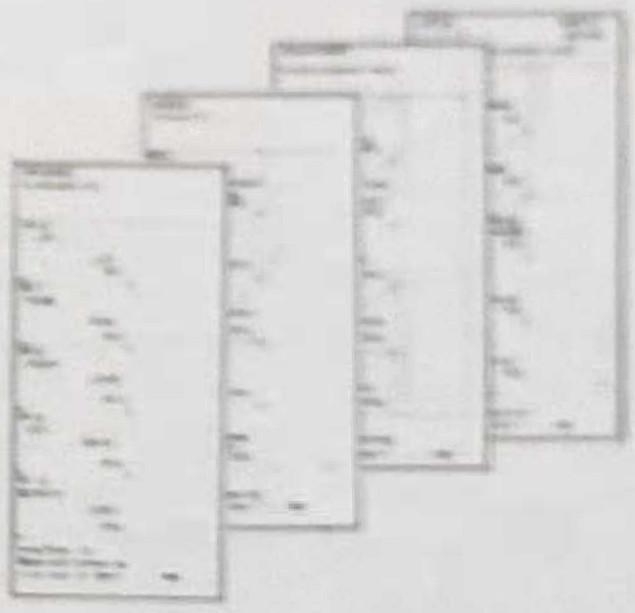

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1417.)

Free the Sanyo 550 — With Spool

Don't let your printer hog all your computer time;
this software buffer will allow you to print in background
while you and your Sanyo go on your merry way

Free the Sanyo 550 — With *Spool*

By Herb Martello

Most programs can send characters to the printer much faster than the printer can put them on paper. So it should be no surprise to learn that most of the time spent on printer I/O is actually wasted. However, by sacrificing some RAM, you can greatly increase the efficiency of all printer output with *Spool*. While it can't make your printer run faster, *Spool* frees up your Sanyo 550 series (running MS-DOS 2.11 or greater) well before your document is actually printed, and even reduces the time it takes to print it.

The primary reason for the wasted time is that the BIOS printer routine must wait for a ready printer before returning to the user program. Of course, any printer is unready when it is off line, but most printers are just as unready when the tractor or print head is moving and for a short time after receiving a character. Therefore, everytime the BIOS routine is called while the printer is executing a line feed, printing, or processing a character, the routine must wait until it is finished. While this might not seem like much time for some printers, consider that Sanyo's 8088 microprocessor could be executing about 240 instructions of your program for every millisecond it must wait. So you ask, how does *Spool* help?

To increase efficiency, most print spoolers — including *Spool* — direct printer output into a buffer and store it there until the printer is ready. *Spool* accomplishes this by setting aside some RAM for a buffer, completely replacing the usual BIOS printer routine with new code and utilizing Sanyo's interrupt controller. This handy controller is normally used to interrupt the microprocessor for keyboard and serial I/O and time keeping.

However, *Spool* also uses the controller to generate an interrupt when the printer goes from unready to ready. Each time this occurs, a character from the buffer can be sent to the printer. The result is that printing occurs in the background whenever there are characters in the buffer and the printer is online. By sidetracking the usual BIOS printer routine there is never any need to wait for an unready printer. (The only time the new routine would wait is if the buffer became full.)

In most cases, your program can quickly dump the printer output, complete its task and return control to you in considerably less time. For instance, it took 182 seconds to print the first listing for this article using *WordStar* and a Gemini 10X printer. With *Spool*, however, it was only 62 seconds before *WordStar* returned to its no-file menu. The listing continued to be printed in the background for another 66 seconds while I worked on something else.

Other than using some RAM, the only

(Herb Martello holds a B.A. in physics from Franklin & Marshall College where he worked extensively with PCs studying artificial intelligence. He currently works part-time writing custom application software for the home health industry. He may be contacted at 2623 Whiteford Road, Whiteford, MD 21160; 301-836-1417.)

other drawback to most spoolers is that printing cannot be controlled effectively once the characters are in the buffer. I learned this the hard way. After LLISTing a 15-page program, I realized that it was not the program I wanted. Turning the printer "off" suspended the transmission of characters to the printer, but when it was turned back "on," the spooler just continued where it left off. The only way to get rid of the listing was to reboot. So to provide some flexibility, there's also a small keyboard routine in *Spool*. This routine checks for two keystrokes, CONTROL-SHIFT-Q (quit) and CONTROL-SHIFT-P (pause). If you type the first of these keystrokes, *Spool* simply ignores any characters in the buffer. The other keystroke can be used to momentarily suspend printing until the combination is struck again.

By now you've surmised that *Spool* is a machine language program and you've probably looked to see how many DATA statements you'll have to type in. In case you haven't, they are in the first listing. This BASIC program creates *Spool* on the disk in the default drive. Lines 20 through 30 perform a check sum to insure the accuracy of the DATA statements before writing the code to the disk. Once it has passed this routine these lines can be eliminated. For those of you with an assembler, the second listing contains the assembly language source code. Regardless of which listing you use, *Spool* must reside on a system disk since it is installed at system start up.

However, before installing *Spool*, you must determine the buffer size you'll need. This should be chosen with some thought since the only way to change the buffer size is to reboot. Of course the idea is always to have space available in the buffer when your program has something for the printer. If memory is not a problem, choose the maximum size of 64K. Otherwise, you'll have to experiment. A good starting point is a size only as large as the longest document you expect to print, figuring each page of single-spaced text will fill about 3K.

With *Spool* on a system disk and a buffer size in mind, the final step is to use a text editor to create or add to the CONFIG.SYS file on the same disk. During start up, MS-DOS reads CONFIG.SYS (if it exists) for installation-specific settings. Therefore, in this file, enter the command DEVICE=SPOOL (size) where size is the buffer size in kilobytes from 1 to 64.

Now, whenever the computer is booted with this disk, MS-DOS will use the code in *Spool* to drive the printer. The only immediate differences are that start up will take slightly longer and *Spool* will display a message to verify the buffer size. In most cases, this is the same as the size requested. However, a 1K buffer is installed if an incorrect size is requested, and the largest possible buffer is installed if there is insufficient memory for the requested size. Once start up is complete, *Spool* is ready to handle printer I/O and all software should run as usual.

Listing 1: SPOOL.BAS

```
20 CS=0:N=0
25 READ A$:IF A$<>"-1" THEN CS=CS+VAL("&H"+A$):N=N+1:GOTO 25
30 IF CS<>507771 OR N<>588 THEN PRINT"Error in DATA statements":END
50 RESTORE 70:OPEN"r",1,"spool",1:FIELD#1,1AS Z$
60 FOR X=1 TO 588:READ A$:LSET Z$=CHR$(VAL("&H"+A$)):PUT 1,X:NEXT:CLOSE
70 DATA 12,00,00,00,00,80,3B,00,46,00,50,52,4E,20,20,20,20,20,FF,FF,FF
71 DATA FF,00,80,3B,00,46,00,4C,50,54,31,20,20,20,20,00,00,00,00,00,00
72 DATA 00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,2E,89,1E,37
73 DATA 00,2E,8C,06,39,00,CB,56,50,51,1E,06,53,2E,C5,1E,37,00,8A,47,02
74 DATA 3C,0A,77,42,74,1C,3C,07,77,23,3C,05,77,3E,74,32,3C,03,77,38,74
75 DATA 30,32,E4,2E,0B,06,24,00,75,2D,E9,FB,00,B4,02,CD,17,F6,C4,80,75
76 DATA 21,74,15,8B,4F,12,C4,77,0E,E3,17,26,8A,04,32,E4,CD,17,46,E2,F6
77 DATA EB,0B,90,B4,03,EB,08,B8,03,81,F9,EB,02,B4,01,89,47,03,5B,07,1F
78 DATA 59,58,5E,CB,FB,1E,52,0E,1F,8B,16,26,00,0A,E4,75,26,3B,16,28,00
79 DATA 74,FA,FA,06,53,8B,1E,2A,00,3B,D3,77,03,BB,FF,FF,43,89,1E,2A,00
80 DATA 8E,06,24,00,26,88,07,5B,07,FF,06,28,00,3B,16,28,00,B4,D0,77,02
81 DATA B4,50,5A,1F,CF,9C,2E,FF,1E,2F,00,FA,1E,0E,1F,83,3E,28,00,00,74
82 DATA 3D,80,3E,2E,00,00,75,36,50,E4,1C,A8,10,74,2E,53,8B,1E,2C,00,39
83 DATA 1E,26,00,77,03,BB,FF,FF,43,89,1E,2C,00,FF,0E,28,00,8E,1E,24,00
84 DATA 8A,07,5B,F6,D0,E6,1A,D4,0A,B0,07,E6,1E,D4,0A,B0,06,E6,1E,58,1F
85 DATA CF,9C,2E,FF,1E,33,00,FA,50,1E,0E,1F,B4,01,CD,16,3D,00,10,74,0C
86 DATA 3D,00,19,75,19,80,36,2E,00,FF,EB,0E,33,C0,A3,28,00,A3,2A,00,A3
87 DATA 2C,00,A2,2E,00,B4,00,CD,16,1F,58,CF,52,8C,CA,83,C2,18,2E,89,16
88 DATA 24,00,89,57,10,83,C2,3F,B1,06,D3,EA,B9,32,00,C4,77,12,26,8B,04
89 DATA 35,30,30,3C,09,76,09,46,49,75,F2,B8,01,00,EB,27,80,FC,09,77,04
90 DATA 86,E0,EB,02,32,E4,D5,0A,74,EC,3D,40,00,77,E7,8B,C8,CD,12,2B,C2
91 DATA 76,DF,2D,14,00,76,DA,3B,C1,76,02,8B,C1,50,B1,0A,D3,E0,89,47,0E
92 DATA 80,57,10,00,48,2E,A3,26,00,58,53,1E,0E,1F,D4,0A,86,E0,0D,30,30
93 DATA A3,33,02,BA,33,02,B4,09,CD,21,B8,FB,35,CD,21,89,1E,33,00,8C,06
94 DATA 35,00,BA,3C,01,B8,FB,25,CD,21,BA,AC,00,B8,17,25,CD,21,BA,F3,00
95 DATA B8,FC,25,CD,21,B8,08,35,CD,21,89,1E,2F,00,8C,06,31,00,BA,EC,00
96 DATA B8,08,25,CD,21,E4,02,24,EF,E6,02,1F,5B,5A,E9,6D,FE,20,20,6B,20
97 DATA 53,70,6F,6F,6C,65,72,20,49,6E,73,74,61,6C,6C,65,64,2E,0A,0D,24
98 DATA -1
```

Listing 2: Assembly language source code

```
;       SPOOL by Herb Martello, Whiteford, MD 21160
CODE    SEGMENT
        ASSUME CS:CODE,DS:CODE
        DW LFT1,0,8000H,STRTGY,ENTRY
        DB 'PRN     '
        DW 65535,65535,8000H,STRTGY,ENTRY
        DB 'LPT1    '

        DW 0
        DW 0                            ;Segment Address of RAM Buffer
        DW 0                            ;Size of Buffer in bytes
        DW 0                            ;Number of characters in buffer
        DB 0                            ;Pointer to last character in
        DD 0                            ;Pointer to last character out
        DD 0                            ;Flag to pause printing
        DD 0                            ;Address of old int 8
        DD 0                            ;Address of old int 251

ENTRY:  MOV WORD PTR CS:[HEADER],BX     ;SPOOL has be written as
        MOV WORD PTR CS:[HEADER+2],ES   ;an MS-DOS device driver.
        DB 0CBH                         ;For more information on
                                        ;device drivers consult
STRTGY: PUSH SI                         ;MS-DOS's Reference Manual
        PUSH AX                         ;for version 2.0 or greater.
        PUSH CX
        PUSH DS
        PUSH ES
        PUSH BX
        LDS BX,CS:[HEADER]
        MOV AL,[BX+2]
        CMP AL,10
        JA ERROR
        JE STATUS
        CMP AL,7
        JA OUTPUT
        CMP AL,5
        JA OUT
        JE BUSY
        CMP AL,3
        JA OUT
        JE ERROR
        XOR AH,AH
        OR AX,CS:[SRAM]
```


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```
        JNE OUT
        JMP INIT
STATUS: MOV AH,2
        INT 17H
        TEST AH,8ØH
        JNZ OUT
        JZ BUSY
OUTPUT: MOV CX,[BX+12H]
        LES SI,[BX+ØEH]
        JCXZ OUT
OTPT1:  MOV AL,ES:[SI]
        XOR AH,AH
        INT 17H
        INC SI
        LOOP OTPT1
        JMP OUT
BUSY:   MOV AH,3
        JMP SHORT OUT1
ERROR:  MOV AX,81Ø3H
        STC
        JMP SHORT OUT1
OUT:    MOV AH,1
OUT1:   MOV [BX+3],AX
        POP BX
        POP ES
        POP DS
        POP CX
        POP AX
        POP SI
        DB ØCBH
NEW17:  STI                     ;This replaces the BIOS printer
        PUSH DS                 ;routine (INT 17h).
        PUSH DX
        PUSH CS
        POP DS
        MOV DX,[MAX]
        OR AH,AH
        JNZ STAT
WAIT:   CMP DX,[NCHAR]          ;Wait for room in buffer.
        JE WAIT
        CLI
        PUSH ES
        PUSH BX
        MOV BX,[LCI]
        CMP DX,BX
        JA NOTEND
        MOV BX,65535
NOTEND: INC BX
        MOV [LCI],BX
        MOV ES,[SRAM]           ;Put the character into the RAM
        MOV ES:[BX],AL          ;buffer.
        POP BX
        POP ES
        INC [NCHAR]
STAT:   CMP DX,[NCHAR]          ;Return status is AH...
        MOV AH,ØDØH             ;AH=DØh if buffer is not full.
        JA ST1
        MOV AH,5ØH              ;AH=5Øh if buffer is full.
ST1:    POP DX
        POP DS
```

```
        IRET
        PUSHF
        CALL CS:[OLD40]
        CLI
        PUSH DS                 ;This routine is called each time the
        PUSH CS                 ;printer goes from unready to ready.
        POP DS
        CMP [WCHAR],0           ;Leave the routine if...
        JE LEAVE                ;...there are no characters in buffer,
        CMP [FLAG],0            ;...the pause flag is set,
        JNE LEAVE
        PUSH AX
        IN AL,1CH               ;...or the printer is not ready.
        TEST AL,10H
        JE LEAVE1
        PUSH BX
        MOV BX,[LCO]
        CMP [MAX],BX
        JA NOT1
        MOV BX,65535
        INC BX
NOT1:   MOV [LCO],BX
        DEC [WCHAR]
        MOV DX,[ADAM]
        MOV AL,[BX]
        POP BX
        NOT AL                  ;Send character in AL to printer.
        OUT 1A0,AL
        AAM
        MOV AL,7H
        OUT 1E0,AL
        AAM
        MOV AL,6H
        OUT 1E0,AL
LEAVE1: POP AX
LEAVE:  POP DS
        IRET
OLDS:   PUSHF                   ;Execute the old keyboard
        CALL CS:[OLD251]        ;interrupt.
        CLI
        PUSH AX
        PUSH DS
        PUSH CS
        POP DS
        MOV AH,1
        INT 16H
        CMP AX,1FFFH            ;Check for CTRL + SHIFT Q
        JE QUIT
        CMP AX,19FFH            ;Check for CTRL + SHIFT P
        JNE RTRN
        XOR [FLAG],255          ;Toggle the pause flag.
        JNZ SHORT REMOVE        ;Ignore the rest of the buffer.
        XOR AX,AX
        MOV [WCHAR],AX
        MOV [LC1],AX
        MOV [LCO],AX
        MOV [FLAG],AL
        MOV AH,0                ;Remove keystroke from keyboard
        INT 16H                 ;buffer.
```

```
RTRN:   POP DS
        POP AX
        IRET
INIT:   PUSH DX                 ;Begin the buffer at the first
        MOV DX,CS               ;paragraph after INIT.
        ADD DX,(OFFSET INIT-OFFSET BEGIN+15)SHR 4
        MOV CS:[SRAM],DX
        MOV [BX+1ØH],DX
        ADD DX,63
        MOV CL,6
        SHR DX,CL
        MOV CX,5Ø
        LES SI,[BX+12H]
IN2:    MOV AX,ES:[SI]          ;Read the buffer size from the
        XOR AX,3Ø3ØH            ;command line in CONFIG.SYS.
        CMP AL,9
        JBE IN1
        INC SI
        DEC CX
        JNZ IN2
NOT_OK: MOV AX,1                ;If size is not correct, install
        JMP SHORT OK            ;a buffer of 1k.
IN1:    CMP AH,9
        JA IN3
        XCHG AH,AL
        JMP SHORT IN4
IN3:    XOR AH,AH
IN4:    AAD
        JZ NOT_OK                   ;Check to insure the size is
        CMP AX,64                   ;within 1 to 64.
        JA NOT_OK
        MOV CX,AX
        INT 12H                     ;Determine the amount of RAM.
        SUB AX,DX                   ;Subtract the memory already
        JBE NOT_OK                  ;used.
        SUB AX,2Ø                   ;Make sure there's at least 2Øk
        JBE NOT_OK                  ;left after installing buffer.
        CMP AX,CX                   ;Choose the smaller of the
        JBE OK                      ;requested size and the largest
        MOV AX,CX                   ;possible size.
OK:     PUSH AX
        MOV CL,1Ø
        SHL AX,CL
        MOV [BX+ØEH],AX
        ADC [BX+1ØH],Ø
        DEC AX
        MOV CS:[MAX],AX
        POP AX
        PUSH BX
        PUSH DS
        PUSH CS
        POP DS
        AAM
        XCHG AH,AL
        OR AX,3Ø3ØH
        MOV WORD PTR [MESSAGE],AX
        MOV DX,OFFSET MESSAGE
        MOV AH,9                    ;Print the installation
        INT 21H                     ;message.
        MOV AX,35FBH                ;Fetch address of old keyboard
```

```
INT 21H
MOV WORD PTR [OLD251],BX        ;and save it in the new
MOV WORD PTR [OLD251+2],ES      ;keyboard routine.
MOV DX,OFFSET NEW251
MOV AX,25FBH                    ;Install new keyboard routine.
INT 21H
MOV DX,OFFSET NEW17
MOV AX,2517H                    ;Install new printer routine.
INT 21H
MOV DX,OFFSET NEW252
MOV AX,25FCH                    ;Install 'printer ready'
INT 21H                         ;routine.
MOV AX,35Ø8H
INT 21H                         ;Fetch address of old int 8h
MOV WORD PTR [OLD8],BX          ;and save it in the new int 8h
MOV WORD PTR [OLD8+2],ES        ;routine.
MOV DX,OFFSET NEW8
MOV AX,25Ø8H                    ;Install new int 8h routine.
INT 21H
IN AL,2
AND AL,ØEFH                     ;Enable the 'printer ready'
OUT 2,AL                        ;interrupt.
POP DS
POP BX
POP DX
JMP OUT
MESSAGE DB '  k Spooler Installed.',1Ø,13,'$'
CODE ENDS
END BEGIN
```


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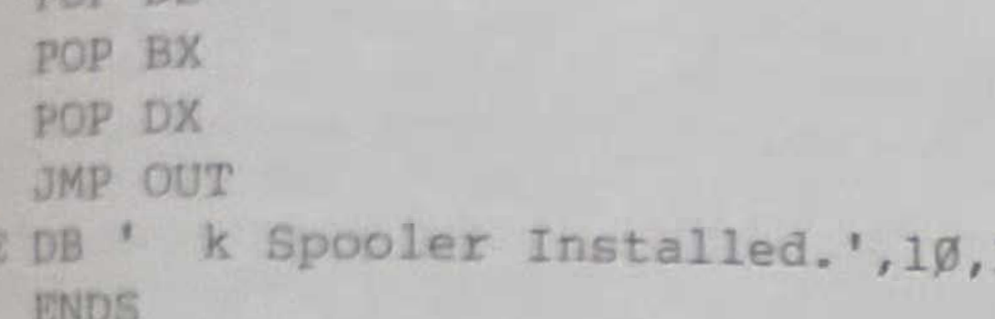

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```
message DB ' K Spooler Installed.',10,13,'$'
code    ENDS
        END BEGIN
```

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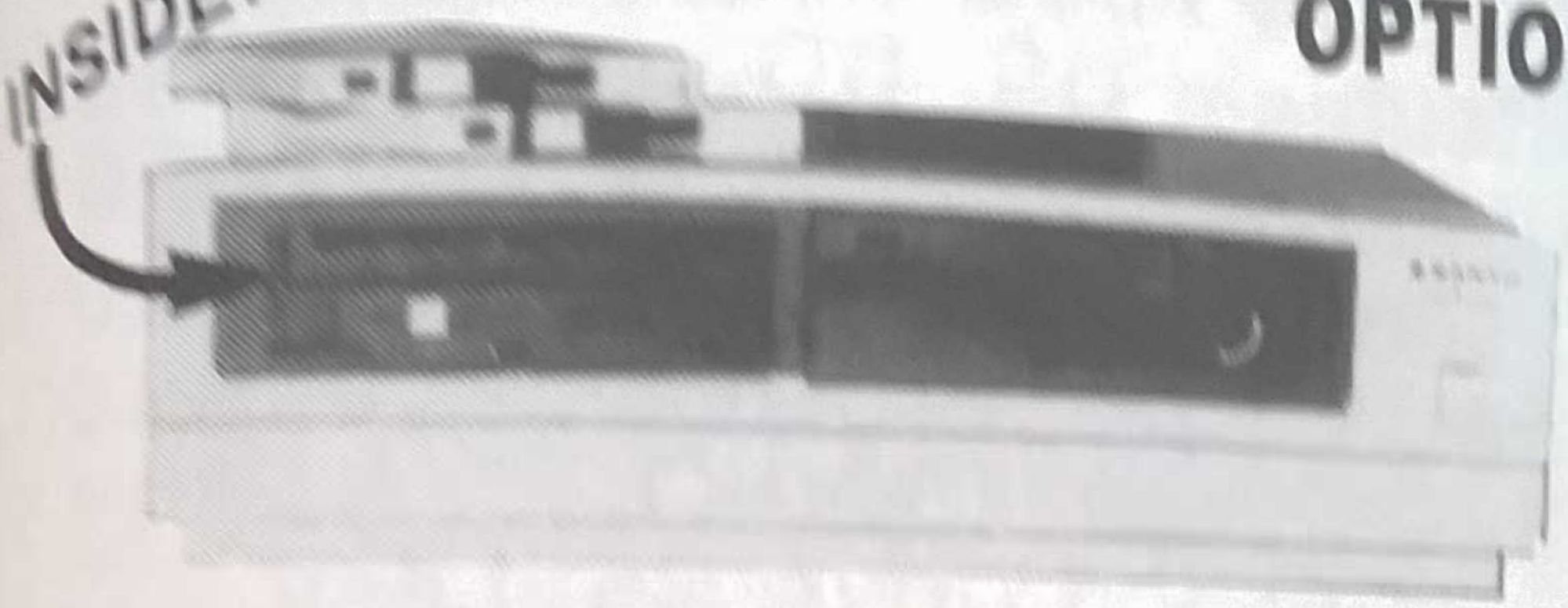

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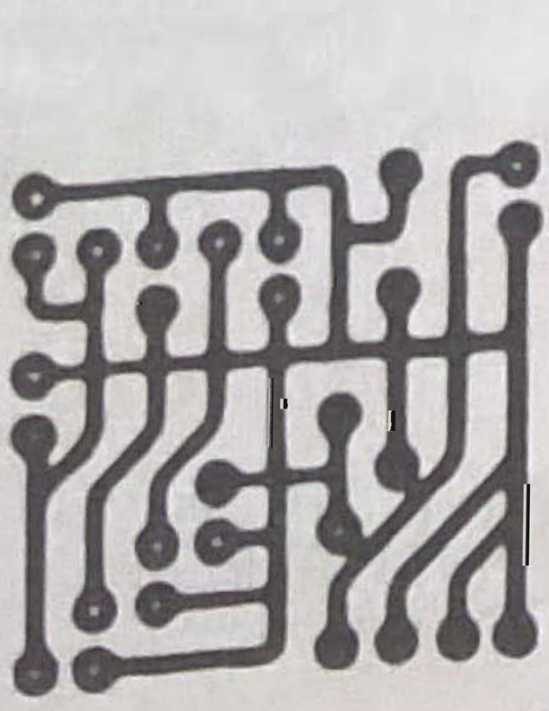

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Temp-Plate instructions are complete and include information on changing the function key values in many programs. Temp-Plates are currently available for $9.95 from Shoreland Computing, 711 Clinton Street, Grand Haven, MI 49417; (616) 842-8924.

* * *

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FastBack comes with a complete instruction guide and is currently available for $179 from Fifth Generation Systems, 7942 Picardy Ave., B-350, Baton Rouge, LA 70809; (213) 493-4483.

* * *

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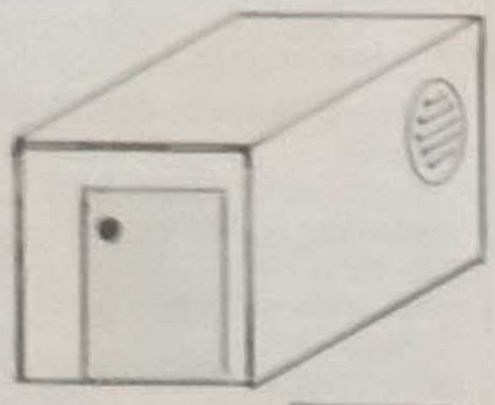

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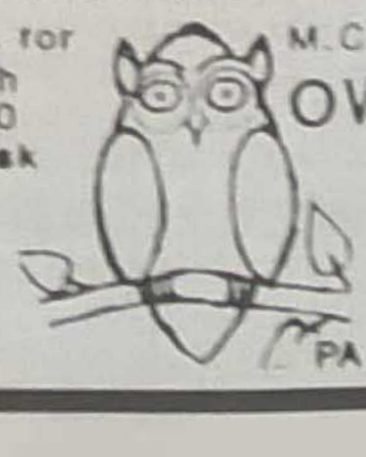

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needs of the novice and experienced PC user alike. The manual is divided into two parts: the User's Guide and the Reference Guide.

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Respond is currently available for $195, $5 S/H from Software Synergy, Inc., 466 Main Street, New Rochelle, NY 10801; (914) 633-0400.

* * *

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By awarding a *Seal*, the magazine certifies the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to SOFT SECTOR reviewers for evaluation.

§

Helpful Hint . . .

KEEPING TIME WITH DEBUG

In "Input/Output," in the November '85 issue of SOFT SECTOR, a reader asked about the problem of the time on the Sanyo MBC-550 series computers running fast, and whether there was a solution. Using DEBUG, I have delved into the MS-DOS code and have uncovered the source of the problem, along with a simple fix. The time on the computer does indeed run about 10 percent fast. Apparently, the writers of the Sanyo version of MS-DOS wanted to save a few bytes of code by assuming that an hour equals 3,276.8 seconds rather than 3,600. Fortunately, we can compensate for this by reprogramming Counter 0 on the computer's counter/timer chip. This counter is normally set to generate 100 counts per second. By reprogramming it to run at a slightly slower frequency, the time can be made to run accurately.

The easiest way to proceed is to create a short file, using DEBUG, that will reprogram Counter 0. Once in DEBUG, enter the following commands ('-' is the DEBUG prompt):

```
-e 100 B0,34,E6,26,B0,60,E6,20,B0,03,E6,20,CD,20 (ENTER)
-rcx (ENTER)
(DEBUG displays the current CX value)
0E (ENTER)
-n fixtime.com (ENTER)
-w (ENTER)
(DEBUG should respond with "Writing 000E bytes")
-q (ENTER)
```

You have now created the file FIXTIME.COM. By putting the command FIXTIME in your AUTOEXEC.BAT file, along with the commands date and time, the time counter will automatically be reprogrammed for accurate time keeping when you boot up. Remember that the time stops running during disk reads and writes, so it may appear to be running slow if you have been doing a lot of disk accesses. Of course, if you use a RAM disk rather than floppies, this will not be a problem.

Jim Ericksen
Chapel Hill, NC

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Delphi Bureau

By Kevin Nickols
MS-DOS SIG Manager

Welcome to "Delphi Bureau." As of December 4, 1985, the MS-DOS Computer Special Interest Group (MS-DOS SIG) on the Delphi Information Service had 950 members. SOFT SECTOR is very excited and enthusiastic about sponsoring this SIG.

Once online and in the MS-DOS SIG, the Sanyo world is at your disposal. Delphi is designed to be self-explanatory. The you first sign on, Delphi is menu intensive. This means at each prompt, everything you can do is precisely stated for you on the screen in a menu in plain English. This is known as "prompt level three." This makes learning commands very easy. Once you have become familiar with the commands, you can switch to one of two other prompt levels. Level two (/P 2) does not display a menu, but lists the options on the prompt line. Level one (/P 1) is for the experienced users. It gives only the prompt. This increases the speed at which you move around in Delphi.

Another feature that saves time is the ability to use abbreviations. To initiate any command, you just have to enter the first few letters that makes your choice clear. For example, if you reach the MS-DOS SIG from the main menu, you can just type G MS instead of GROUP MSDOS. Most of the time, only one letter is required. When more than one command begins with the same letter, you will need to use two or three letters.

At almost every prompt, typing HELP brings up a detailed help file with the available options. In some cases a ? will serve the same purpose. You may also type HELP (OPTION), where OPTION is the function you want help with, to receive data on that particular subject.

If you need more detailed help or are having erratic response, you should then consult the "Advice from Delphi" section. At the MAIN> menu, select "Using Delphi," then choose "Advice from Delphi." This section contains several helpful files on various topics.

If you have any problems or questions about your magazine subscription, SOFT SECTOR ON DISK, or any of the other SOFT SECTOR products, you can receive help from any of the following usernames: SOFTSECTOR, SYSOP, MSDOS, NICKOLS or KIRBY. Also, leave us any suggestions for the SIG you might have. We think Delphi offers us a way to solve your problems faster. Should you have any problems using or connecting with Delphi, you may contact Delphi at (800) 544-4005 or (617) 491-3393.

Here is for some information for our Canadian readers who use DATAPAC. We at SOFT SECTOR were originally under the impression that the use of DATAPAC carried no extra charge. However, there is a $3 hourly surcharge for its use. We wish we had been able to include this information in our November and December issues.

DATAPAC only supports seven-bit data transfer. Unfortunately, this means binary files (tokenized BASIC and machine language) cannot be transferred. This also makes several of the error-checking transfer protocols (XMODEM CRC, XMODEM check-sum, Kermit, etc.) inoperable. ASCII or source code listings can be transferred along with binary files.

When you upload source code, such as a BASIC program, please do it in ASCII format. This enables all of our members to run the programs.

Another thing I'd like to mention is that you have a choice between two editor utilities on Delphi. The default editor, automatically assigned to new users, is the powerful DEC EDT editor. But EDT is also a complex editor to learn. Therefore, a number of people will be more comfortable with the editor we call OLDIE. For those familiar with CompuServe's FILGE (file generator) editor, OLDIE is a FILGE-like editor and all it takes is a note from you in MAIL or MAIL for us to change your record so that OLDIE is invoked any time you use the edit feature. While not nearly as sophisticated as EDT, OLDIE is a lot easier to learn.

Finally, I would like to mention that although there is no surcharge for 1200 Baud users, there is a $5 surcharge for those using 2400 Baud.

Next, "Delphi Bureau" for January. Next month, look for a list of conferences scheduled with Sanyo notables such as Jim Rumphress, Fred Blechman and Mark Zeiger.

BUSINESS SECTOR

CHARLOTTE & BRIAN STONE
Soft Sector Contributing Editors

Q. *I have a C. Itoh 8510A and a Riteman 15 — both dot matrix printers. I would like to use them with* WordStar *but they are not on the installation menu. What choices do I use? Also, what do you know about* StarPolish?

What is the difference between the TEAC 54B and 55B disk drives?

I have an opportunity to get a 10M hard disk drive from a friend with an IBM PC who is changing to a 30M drive. Can I just install it in my Sanyo in place of Drive B? Will MS-DOS 2.11 handle the formatting and addressing of the hard disk? Will my present cable (floppy) be long enough for the hard disk? My other alternative is to use two 800K floppies in serial so I can leave B, C and D open for data drives.

Also, I would like to use a Keytronics KB5151 keyboard on my MBC-555-2. I like the extra keys and the layout much better. I called Keytronics and they said their keyboard cannot duplicate the protocol and scan codes. When I tried the KB5151 on my Sanyo all it did was lock up. Can you tell me how to get this keyboard to work?

Albert Price
Austin, TX

A. Your Riteman 15 printer would best function with *WordStar* if you use the Epson choice from the *Install* menu. The C. Itoh 8510A will function as the standard printer. I do not have any information about *StarPolish*.

The difference between TEAC 54B and 55B disk drives is the 55B has a head load solenoid and the 54B loads the head onto the disk as soon as you turn the handle after inserting the disk. The 55B drive only loads the head when it has been selected. They function the same otherwise.

Regarding the hard drive from an IBM PC: You would need a hard drive controller and interface to use the 10M drive. If you really wanted to use it, you would be looking at an additional expense of $500 to $1,000. Additional because the Sanyo does not have the ability to take IBM-style interface cards which you would need. You could not just install the hard drive in place of one of your floppy disks.

Regarding the use of 800K disk drives, each drive installed on the Sanyo will take one of the positions A,B,C or D. You cannot connect two drives and have the computer think that they are only one.

The Keytronics KB5151 keyboard will not function with the Sanyo MBC-550 series because the data from the two keyboards is not the same. They effectively speak two different languages and as a result, are not interchangeable.

Q. *A whole bunch of things I use* ReportStar *for need a blank, underlined space on each line so people working with the report can put in checks or their own calculations. The only way I can manage to do this is to have a field in the definition file which is always blank, tell* ReportStar *to print that field and pad it with an underline. It would be nice to have the option of such an underline to separate the headings, too.*

Molly M. McGinnis
Manteca, CA

A. If you want to set off a portion of your report with a line across the page, and you have a printer with an underline character that is more attractive than its hyphen, there is a method you can use that allows you to use the underline. The problem, as you know, is that the underline in the report layout signifies a field. That is why the hyphen key would normally be used to draw a decorative line. Some printers print the same character for a hyphen as for an underline — the only difference being the hyphen prints above the base line. Other printers use a shorter line for a hyphen, leaving more white space showing. In this second case, you might prefer to use the underline character.

Here is how to define such a decorative field. As with any report field, draw the desired length of line across the screen. Place the cursor under any part of the line and type CONTROL-R to define the field. You may name the field or not as you wish. If you do, you could name it "Decorative 1," "Decorative 2," etc. Press RETURN to answer all the prompts down to "Field Source: (File/Calc/Input)." Type C for Calculated. To the next prompt "Numeric/String? (N/S)," answer S for String. The next prompt is "Enter string expression: $DECORATIVE 1=." Type '-' and press RETURN. The underline character must be enclosed in quotes for the gram to accept your answer. You will get the prompt "Unless." Press RETURN without typing anything. Answer the prompt "Enter pad character:" with an underline. You do not need to go any further with your field definition. Just go ahead and finish the report definition.

Q. *I am using my own form made from* FormGen *for about 200 to 300 insureds under the "New York Auto Assigned Risk Plan." As these policyholders drop off for non-pay, non-renewal, etc., I would like to reroute them to a "dead" file on another disk, keeping only the active files current. There is a place on my form determining in force, 'X' or not 'X' but how do I get a readout for just one or the other. Using* ReportStar, *I can get hard copies of all of these accounts, but apparently I need a batch file of some sort to discriminate one selection from another. I would still like to have those dead files to draw from at some later time, so I don't want them "deleted" as such.*

Paul J. Powers
Rome, NY

A. Here are some options to choose from to accomplish what you want.

You could leave all the data in one file and use the INCLUDE IF statement in all your reports to have them cover only the active or only the inactive policies. INCLUDE IF is the last option in the file description portion of *Redit*. The statement should read INCLUDE IF $IN FORCE="X. Naturally, you would substitute the actual field name from your data file. Use the name of the field, not the number. *ReportStar* would interpret a number as a field from the report instead of a field from the data file.

Next, set up a version of your form in *FormGen* with the IN FORCE field as the key field, then use *FormSort* to sort the data file. All of the blank IN FORCE records will be sorted together at the beginning of the file. All the 'X' records will be together at the end of the file. Then use *WordStar* to "block write" one portion of the file to a new file. Resort the two new data files with *FormSort* and a definition file with your regular key field set up to put them back in the order you want them.

Look up the "Business Sector" column in the June 1985 issue of SOFT SECTOR and send for the *I.S. Manager* program. *I.S. Manager* can move the inactive records to another file easily, and then back again if necessary.

Finally, look up "Business Sector" in the March 1985 issue of SOFT SECTOR and read the answer to the letter from Steve Garman on pages 32 and 34 for instructions in the long method of using *ReportStar* to write the inactive records to another file.

Q. *Will the IBM PC version of* Easy-Speller II *work on the Sanyo MBC-550? I have been told it would by IUS and that it would not by Sanyo. Who is correct?*

Stephen B. Braden
Chicago, IL

A. I do not know for sure if *Easy Speller II* (for the IBM PC) will work on the Sanyo MBC-550. My advice to you would be to believe the person at Sanyo who told you that it will not. Possibly we have some readers who have firsthand experience and would be willing to share their findings with us. The big problem with the *Easy Writer* programs is that they do not save the files in ASCII format, which is what *WordStar* and most other word processing programs do. This is part of the reason we have a compatibility problem. If the files were saved in ASCII, then almost all spelling checkers would work with your files. I personally would not use a word processing program that did not support the ASCII format because it limits all of the other things that can be done with a word processor.

Q. *When using* DEBUG *to patch programs which are likely to crash, I would like to be able to put all of the patches which I know are necessary into a file and input DEBUG via:*

```
DEBUG BADPROG.EXE<PATCHES
```

This way I wouldn't need to reenter old patches, or to worry about DEBUG*'s inability to write an* EXE *file. A similar scheme might be used for a program which needed to have the same setup information typed in each time it was executed. My problem is that when the "end of file" is encountered, the system hangs instead of redirecting the input back to the console.*

Robert Babcock
Bedford, MA

A. First, the way to get around DEBUG's inability to write to a file with an EXE extension is to rename it first. For example, to modify BADPROG.EXE:

```
RENAME BADFILE.EXE BADFILE
DEBUG BADFILE
e xxxx xx      (make changes here)
w
q
RENAME BADFILE BADFILE.EXE
```

Secondly, DOS's redirected input has its shortcomings. The redirected input file must have enough data in it to satisfy the program's requests. If this condition is not met, DOS will wait forever on the EOF. It is rumored that DOS 3.0 has corrected this problem. Also, the program must call DOS to receive its input, not the BIOS. BASIC fails this requirement.

(Charlotte Stone, office manager for the Detroit office of the Shaw Walker Co., has been using a Sanyo computer in her daily work routine since October of 1983. Brian Stone has been using a variety of Sanyo computers since May of 1983. Both have been involved with computers since their first purchase in July of 1978.)

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Helpful Hint . . .

MORE ACCLAIM FOR *RECLAIM*

Congratulations and many thanks to Chuck Kincade for his brilliant program RECLAIM.BAS for recovering deleted ASCII files (August '85, Page 31). Here are a few ways to make it even more useful. First, those of us who use RAM disks know that the material on electronic disks is available only as long as the computer is running, but sometimes we forget. If the computer is actually turned off, everything on a RAM disk is lost (and nothing's gonna bring it back). If the computer crashes and has to be reset (or if it is reset by accident), it appears that everything is lost — not necessarily so. To attempt recovery of a file on a RAM disk, first set up the RAM disk *exactly* as you did previously, but do not copy any files to it. Then run RECLAIM.BAS on the RAM disk (tell the program it is a single-sided disk). Your file *may* still be there. Second, users of GW-BASIC can have the program supply a directory of the relevant disk to determine how many bytes are free. Add the following code:

```
390 PRINT "Would you like to see the directory? (y or n) "
400 A$=INKEY$:IF A$="" THEN 400 ELSE IF A$<>"Y" AND A$<>"y" THEN 430
410 XX$=LEFT$(RECLMFIL$,2):IF RIGHT$(XX$,1)<>":" THEN XX$=""
420 SHELL "DIR "+XX$+"/W":PRINT:PRINT:PRINT
```

Third, *WordStar* document files are hard to read in this program since they set the high bit for many characters. That can be corrected with the following code. (Note: The high bit is cleared only for the display — the file that is written is still a *WordStar* file.)

```
193 PRINT:PRINT "Clearing the high bit will make WordStar files more readable."
195 PRINT "Would you like this done? (y or n)"
197 A$=INPUT$(1) :IF A$="Y" OR A$"="y" THEN PARITY=1 ELSE PARITY =0
2290     IF ICHR<=NBYTREC GOTO 2250
2300     IF PARITY=1 THEN GOSUB 2350
2305     IF IPRT=0 THEN PRINT RECORD$; ELSE LPRINT RECORD$;
2310 NEXT JREC
2320 RETURN
2330 REM This subroutine strips the high bit from each character in RECORD$
2340 REM
2350 FOR II=1 TO LEN(RECORD$)
2360 IF ASC(MID$(RECORD$,II,1))<128 THEN 2390
2370 JJ=ASC(MID$(RECORD$,II,1))-128:IF BELCHR$=CHR$(JJ) THEN JJ=0
2380 MID$(RECORD$,II,1)=CHR$(JJ)
2390 NEXT II
2400 RETURN
```

Stewart Shapiro
Newark, OH

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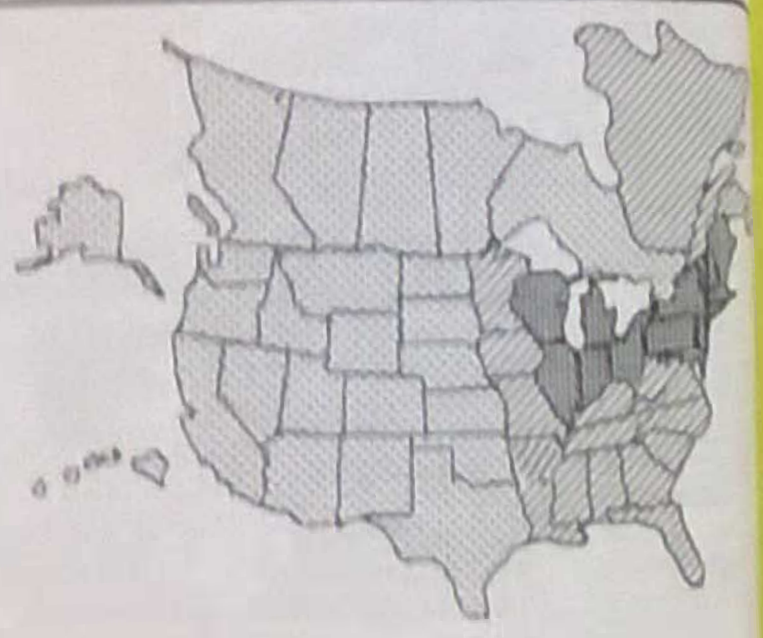

A-OK Computers 33, 35
AA Computer Exchange 17
Advent Products 5
Bayou Technologies 42
BGW Systems 17
Block Mkt. 41
Bluewater Software 44
C-Tek 44
Chaucer Software 13
Chryson Computer 8
Comptel 43
Comp-U-Type 21
Computer Associates, Inc. 45
Computer Grove 20
Computer Solutions 45
Computer Toolbox, Inc., The 3
EPIC Sales Inc. 19
FutureSystems 49
FYI Computer Service 64
Intersecting Concepts 47
James River Group, Inc., The ..... BC
Lotech Software Designs 49
MichTron ..... IFC, 9
Michigan Software Distributors 20
MicroComputer Tools Co. 64
MVP Software 50
Owl-Services 58
PT Software 29
Peripheral Products Distributing 40
Prickly-Pear Software 63
Rocky Mountain Micro 29
Shoreland 50
Soft Sector Binders 48
Soft Sector On Disk 48
Systems Peripherals Consultants 57
Tampa Bay Digital 57
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Tri Lakes Software 53
True Data 34
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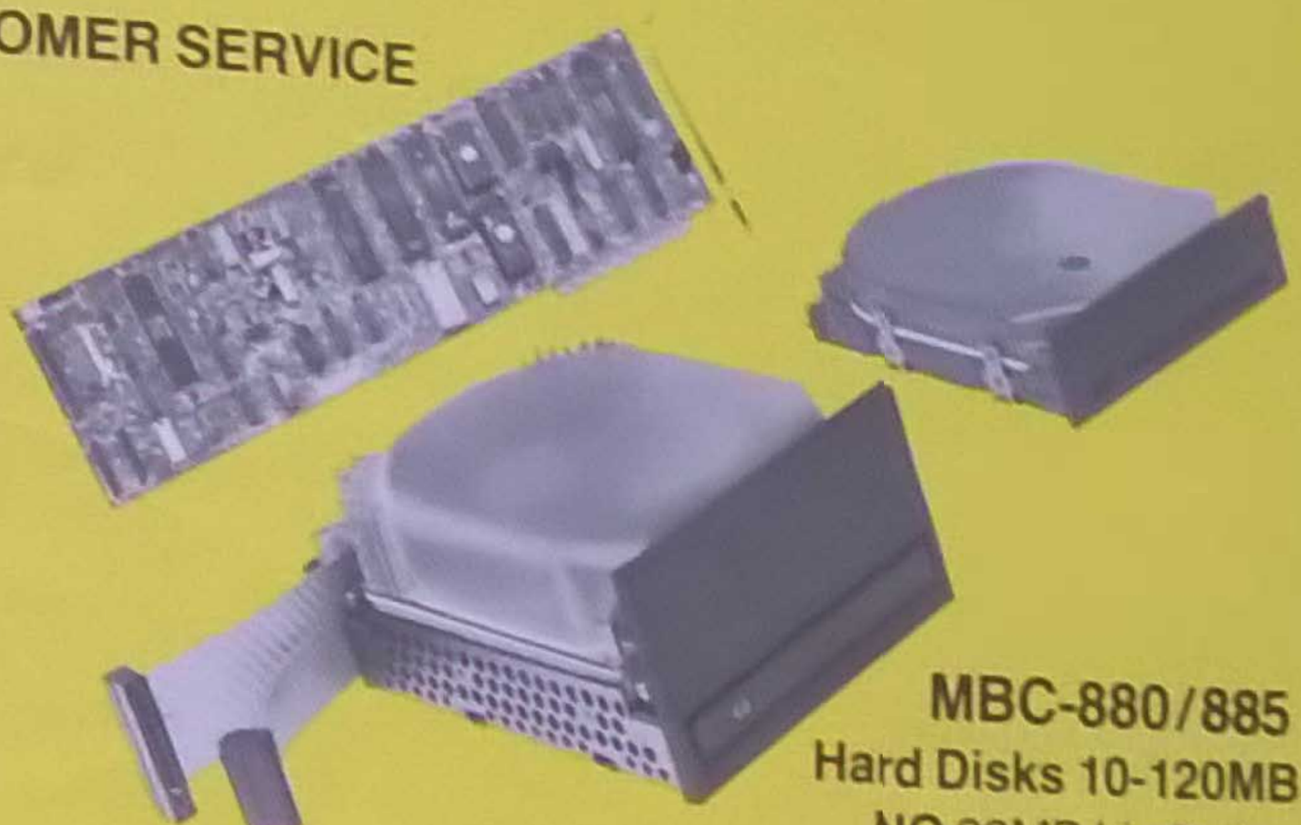

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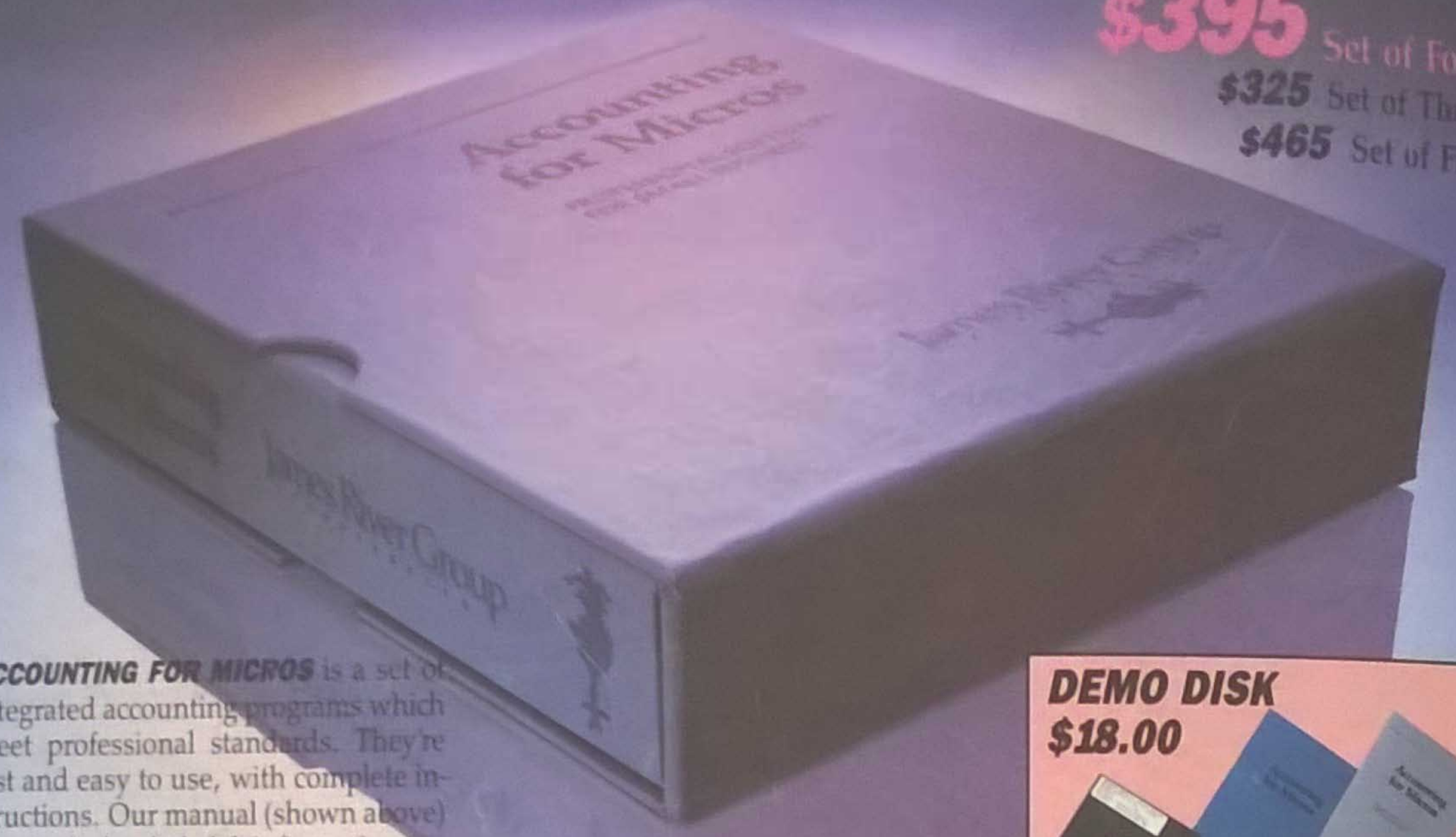

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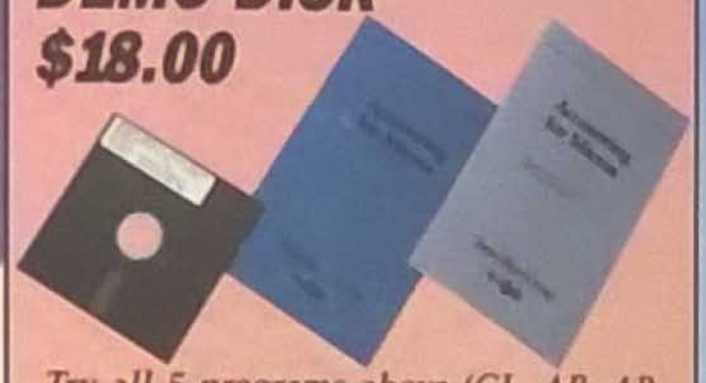

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