

TERRY KEPNER'S

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portable 100

TANDY LAPTOP COMPUTING VOLUME 5, NUMBER 1 JANUARY 1988

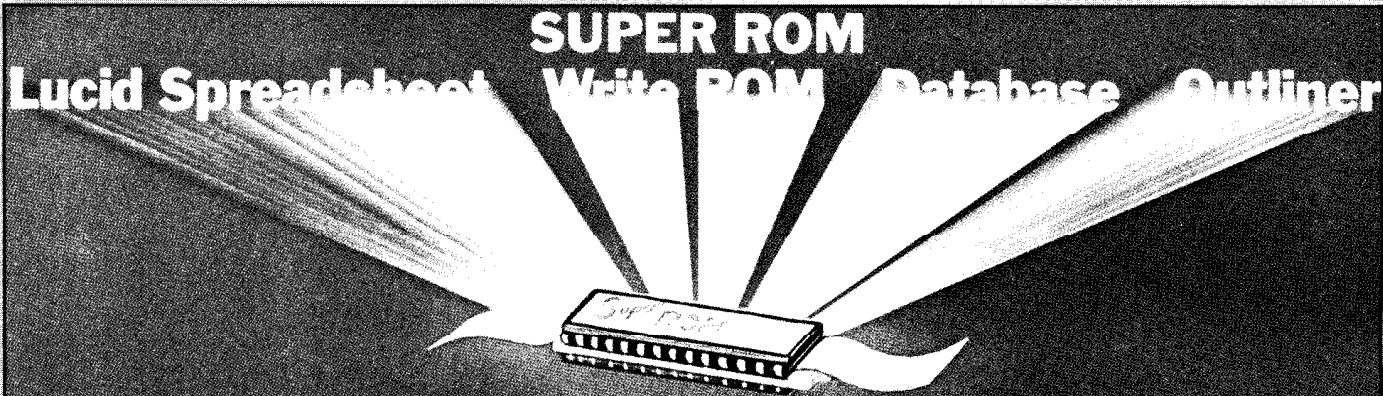
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passed our highest expectations for quality and clarity."

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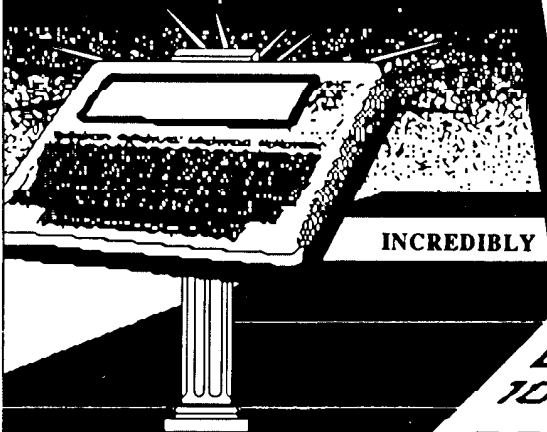
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TERRY KEPNER'S

portable 100

VOL. 5, NO. 1

JANUARY 1988

ON THE COVER: 1957 Studebaker,
 photograph by Diana Shonk

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ROM WITH A VIEW

Greetings!

In September 1986 we--Mark Robinson, Terry Kepner, and Marlene Butland--formed the Portable Computing International Corp. and purchased PICO Magazine from Wayne Green Enterprises. PICO is about portable computers, and focuses primarily on MS-DOS portables. For the most part, Terry handles the co-ordination of the production of the magazine, Marlene handles the circulation and marketing, and Mark handles the strategic planning and financial aspects of the company. Together we have made a mark on the industry, which prompted C.W. Communications/Peterborough to sell us Portable 100 Magazine. We will provide the magazine to you for the duration of your current subscription, and longer if you decide to renew it.

Other members of our team include: Randy Buyers, Advertising sales Director; Theresa Johnson, Circulation Director; JoAnn Niemela and Linda Tiernan, Editors; Diana Shonk, Design and Desktop Publishing Director; Mary O'Flynn, Office assistant; and a host of associates. We are all pleased to have the opportunity to provide you with a source of the information you want.

We realize that your magazine has been shuffled around a bit: from Camden Communications to C.W. Communications, and now to Portable Computing International Corporation. It's tough to run a portable computer magazine now a days, but, finally, Portable 100 has come home and found a place with people who truly love the magazine, the industry, and (of course), the Model 100. WELCOME!

Changes? Yes... a few. First, we're changing the name of the magazine (only slightly) to "Terry Kepner's Portable 100." Many of you may remember that Terry was one of the original people who helped start Portable 100. Before we bought PICO, he was its technical editor. Terry has written two books on the Model 100, one with Dave Huntress and one with Mark as a co-author. Terry has been published, at one time or another, in nearly every computer magazine in the industry. We hope that the new name will remind you that Portable 100 is now being published by one of the foremost experts in the industry.

The look, feel, and content of the magazine will not change (unless YOU want a change!) Our impression is that you like the magazine just the way it is... and we're committed to giving you exactly what you want. Be sure to let us know how we are doing, too. We are happy to change any aspect of the magazine, including or excluding any portions you request. Our job is to satisfy our subscribers... just let us know.

So WELCOME HOME! We're having a great time and you're getting a great magazine. Just stay in touch so that we can keep giving you exactly what you want.

Mark Robinson
Marlene Butland
Terry Kepner
JoAnn Niemela
Linda Tiernan
Theresa Johnson
Mary O'Flynn
Randy Buyers
Diana Shonk

.... and the rest of the team.

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Centronics, not Epson

Your article "Weighing the Printer Alternatives" (October 1987, p. 40), while very interesting, could have stood more research. First, not only did Epson America not invent dot matrix printing, but I doubt that the company existed when Centronics brought out the first dot-matrix printers and invented the now-standard parallel printer interface that bears that company's name.

While it's true that daisy wheels are dominant among formed-character printers today, mainframes have used print chains, print trains, and in the era of the Teletype 33, type bars, and IBM balls. To this day, high-speed impact printers, which produce around 2,000 lines per minute, use print trains.

Some printers have to overprint lines to produce near-letter quality (NLQ) output, but mine does not. My printer prints NLQ mode in a single pass at 180 dots per inch, and its newer cousins do so at 360 dots per inch. A good modern dot-matrix unit uses a 24-pin head, rather than the early 9-pin models that produced so much unreadable type.

Wilson
H. Heydt, Jr.
Albany, CA

You're right. Centronics predates Epson America. In fact, the early Radio Shack TRS-80 dot-matrix printers were manufactured by Centronics. Epson gained public awareness by manufacturing the IBM Graphics Printer, sold with the IBM PC. Today, one of the leading standards for dot-matrix printer commands and graphics codes is that used by Epson's FX-series.

Eds.

CORRECTION CORNER

The Word Counter listing (Octo-

ber 1987, p. 35) has several errors. These three lines should be replaced as follows:

```
190 IF INSTR(NA$,".") > 0 THEN
NA$=LEFT$(NA,INSTR(NA$,".")-
1)
410 GOTO 320
450 IF ERR=54 THEN PRINT @81,
PC$(1); "The document contains";
WC;
"words." ELSE PRINT @81, PC$(1);
"Bad file name or file not found."
```

DON'T FORGET THE 200

I own a Tandy 200 and have a question about Basic program compatibility with the Model 100 and Tandy 102. Is it correct that most programs will run on all three computers unless they include Peeks and Pokes?

When you print programs for the 100 and 102, could you also tell how to modify the Peeks and Pokes to run those programs on the Tandy 200?

Jimmie D. Baker
Lowell, IN

In most cases, Basic programs are compatible with the Model 100, Tandy 102, and Tandy 200. The compatibility problems occur with Peeks, Pokes, and occasionally with Calls.

Whenever possible, Portable 100 will make its Basic programs compatible with all three computers.

Eds.

CHEAP DATA TRANSFERS

I am a new user of a Model 100. I want to transfer information to and from MS-DOS computers. What's the simplest, cheapest, and most powerful way?

Parley D. Smart
Roosevelt, UT

Let's make three assumptions: The data to be transferred is a DO text-only document file, the computers are side-by-side, and your MS-DOS system has an RS 232 serial port. Connect the two with an inexpensive null-modem cable, use Telcom on the Model 100 and nearly any communications program on the MS-DOS computer. This communications program only needs simple text sending and capturing ability. Your only expense: a null modem cable.

If you want to transfer CO or BA files, or use an error-checking file-transfer method, you'll need an x-modem protocol communications program for the Model 100. These are available through the public domain; if you can't find one, Sigea Systems sells one called X-Tel. Your MS-DOS communications program will also need x-modem abilities.

Eds.

INTERACTIVE SOLUTIONS

Some users of Tandy's Interactive Solutions ROM may not have discovered an error in the instructions. It says that the first three letters of each file name must be unique. You must reset the printing parameters each time you print out a document if you do this.

Actually, you can use the same control parameters (if you've saved them) for each printing by making the first three letters similar. By keeping the first three letters the same and using the last three to distinguish each document, you can have groups of automatic print formats. This saves time especially if you want the same headers and footers. The database program also works this way.

Does anyone know of a software patch that allows the control-arrow key combinations to be used in the Interactive Solutions spreadsheet? Tapping shift-arrow to go from one

end to the other is bothersome.

Also, can the older Portable Disk Drives be modified to read and write 200K disks, like the newer PDD-2?

Russ Hall,
Salt Lake City, UT

We know of no way to change the key command sequence of Interactive Solutions, as the keyboard driving software is fixed in ROM (read-only memory). Unless Tandy releases an update of Interactive Solutions, such a fix seems unlikely.

We also don't know of any way of upgrading the original Tandy Portable Disk Drive to read and write 200K PDD-2 disks.

Eds.

PICK UP THE TAB

Is there any way to set the tabs on the Model 100 in Text mode? My tab key returns eight spaces, rather than the conventional five-space indentation.

Barry F. Moss,
Hilliard, OH

We don't know of a patch to change the default tab spacing in Text mode; perhaps a reader does. Many text-processing programs, though, do provide additional tab control.

Eds.

ESCAPE CODES

I have a Model 100 and a Tandy DMP 105 printer. I'd like to use some of the special print options, such as elongated print, different type fonts, and various line spacing, from Text. I can do this from Basic, but the brief instructions in the computer's manual doesn't help me with Text.

Fred W. Forrester,
Santa Barbara, CA

The trick is to embed the escape code, ASCII 27, into your text document. Unfortunately, there's no easy way to key it in while in Text. Here's a trick: Enter Basic and run the following program:

```
10 OPEN "ESC" FOR OUTPUT AS 1
20 PRINT CHR$(27)
30 CLOSE
```

When you return to the main menu, you'll find a new file, ESC.DO. Now enter your document. Where you want to use a printer escape sequence, press F2 (load), type ESC, and press enter. The escape sequence, shown as a ^[, will appear on the screen. Follow this with the letter or letter combination specified in your printer's owners manual.

If you're using many escape sequences, you can place the escape sequence into the paste buffer by selecting it with F7 and copying it with F5. Then use Paste to insert more escape codes into your document.

Eds.

NEC VERSION?

I read with interest your article "The Incredible Portable Sketchpad," in the September 1987 issue of Portable 100. I own a NEC 8201A laptop. Do you have a version of "Sketchpad" for the NEC? (Or will I have to translate all the "Print@" statements into "Locate X,Y:Print"?)

Also, if you have a NEC version, is it available on cassette? Price?

Melvin L. Zwillenberg
Maplewood, NJ

Sorry, we only have the program as listed in the article. If enough people show interest we might be able to get the author to translate the program to run on the NEC.

Eds.

DISK POWER ADDENDUM

Your reviewer, Thomas L. Quindry, seems to have missed a couple of the problems with "Disk Power," the DOS from Ultrasoft.

First, this program is in my experience not completely compatible with LUCID on PC'S SUPER-ROM. The Ultrasoft company claims that if you run a special re-setter program each time you use SUPER-ROM and if you access LUCID files only from the Model 100 main menu, not the DOS menu, there will be no problems. This had not worked for me and I have had to stop using "Disk Power," for that reason. My complaint to Ultrasoft only produced a letter repeating their special SUPER-ROM instructions, insisting that

there should be no difficulties with LUCID files, and blaming PC'SG. (Of course they may be technically right in what they say; but my difficulties stopped when I stopped using their product and returned to FLOPPY.CO.)

This brings me to the second problem with "Disk Power:" the Ultrasoft Company apparently does not guarantee satisfaction. If you find that you cannot use their product, it's your loss. It seems to me that such a policy implies an obligation to reveal their program's limitations and special requirements, fully and in advance.

I should add that I took the precaution of telephoning them before buying, and understood them to say that they had taken great pains to make "Disk Power" and SUPER-ROM fully compatible. (I assumed that meant they had succeeded!)

In fairness, though, I was otherwise well impressed with "Disk Power", which I found to be very smooth, natural, and powerful in use, cleverly designed, and amazingly compact. I'm sure that if LUCID files were not so important to me, I would have been quite happy with it.

J. R. Pulsifer
Fairmont, WV

Sorry to hear you have such a problem with Ultrasoft's "Disk Power." As for product returns, I can understand why they refuse to accept them. Too many times people buy a product, copy it onto their own cassettes or disks, then return the product to the manufacturer as "not what I wanted," keeping and continuing to use their pirated copies. Unfortunately it is just too easy for people to copy and use computer programs.

Eds.

CANADIAN COMPUTING

I just wanted to write and say how thrilled I am to finally see a magazine on the market that is devoted to the Model 100. I obtained my Model 100 just after Portable 100 previously "bit the dust." As such I have been very frustrated in my attempts to discover third party software and support through any other computer magazine. It's great to find the support out there once again.

As I am located near Toronto, Ontario, Canada, I would dearly like to see some Canadian advertising or at least notations on American ads if their products are available through Canadian outlets, and if so, which ones. A mention of the suggested Canadian retail prices would also be helpful.

I have a question for your reader's column:

With the popularity of portable, and especially laptop, computers, many people find it convenient, even necessary, to transport their computers with them on airline flights. As such, their baggage is usually subjected to X-ray searches. I understand that X-rays can permanently damage the data stored on floppy disks. What effect, if any, do X-rays have on hard disks, the stored data, and on the actual computer itself, i.e. the ROM and RAM stored programs?

Thank you for your response, interest and for renewing a terrific magazine.

Ms. Pat Adair
Mississauga, Ontario

We, on the other hand, are thrilled to be able to bring you the resurrected Portable 100.

X-rays, in and of themselves, don't harm computers or their magnetic media. It is the powerful magnetic fields used by the airport equipment to make those X-rays that causes the problems. I've checked my Tandy 100 through the airport dozens of times and have never experienced any data loss or damage of any kind. However, I always slip the 3.5-inch disks into my pocket and hand carry them through the metal detector just to be safe.

Terry

COUNTING WORDS

Like you, I use my Model 100 to do quite a bit of writing and I also discovered, early on, the need for an efficient word counter. So I was very interested in your recent article on the subject. I thought you might like to see my application of the same function since it differs somewhat from the method you used.

I had originally planned to write a short article about this program and submit it to your magazine, but since

you beat me to the punch, I thought I would send you this program just as a point of interest.

It isn't quite as versatile as yours; it won't handle dot commands or words separated by more than two spaces, but I haven't found this to be a problem. I use a custom formatter that I wrote myself and it doesn't use dot commands. I also do my word counts before I add any formatting so I've been pleased with this program.

The main thing it has going for it is speed. It will count a 5000-byte text file in about 12 seconds. The speed varies somewhat with the length of the file and the number of files in the computer, but it averages around 4000 words per minute. That means I can have a count of almost any file that will fit into my Model 100 in just over a minute. Not as fast as machine language certainly, but not bad for BASIC.

I'm very interested in pushing BASIC to its limits, both in terms of speed and compactness of code. I've been amazed at how much I can tighten my programs by using different commands, logical operators, and a little thought.

This program is a good example of that. It started out as a pretty standard routine and I kept pushing at it until I got the speed I was after. I've tried to make it run faster, but I haven't yet been able to. It's fast enough as is that it benefits from disabling the background task (Call 30300) since the overhead becomes significant, particularly on longer files. Some of the code may look a little odd, (like the end of line 2) but I've found that it executes.

As I said, the program is pretty limited, but it does handle most "standard," unformatted writing and is at least smart enough to skip lines that consists of only a RETURN. I sacrificed much of the user-friendliness that your program has to cut the size, (it's about 160 bytes) and increase the speed. For example, the only error indication is a word count of zero. But I've found that it works well for me. Speed is the most important factor (for me, at least) and this program is sufficient in that respect.

Thanks for all your great articles. Keep 'em coming.

```
1 MAXFILES=1:DEFINTF,C:DEFST
RS:ONERRORGOTO4:FILES:LINE
INPUT"FILE?";S:CLS:PRINTTIME
$:CALL30300:OPENSFORINPUTA
S1
2S="":LINEINPUT#1,S:C=C—
(LEN(S)MOD255):FORF=OTO254:
F=INSTR(F+1,S,""):IFFTHENC=C+1:N
EXT:GOTO2ELSE2
4PRINTTIME$:CLOSE:PRINT
"WORDS:"C:MAXFILES=O
```

Michael A. Wilson
California, Md.

Thanks for writing and showing us your solution to the problem.

Eds.

INTERFACING REQUEST

I would like to see you publish some articles in Portable 100 by Mr. Martin Koch of the California Polytechnic State University Robotics Laboratory or others, on how to interface the Model 100 to external devices for input/output and how to transfer that data from the Model 100 to other computers.

Joseph L. Baker
Walbridge, Oh

We'll see what we can do for you about that. Anyone out there care to share their solution to interfacing the Model 100 to the real world?

Eds.

SPIKING MA BELL

Thanks for resurrecting Portable 100. It's been sorely missed and will certainly fill a deep void in the computer information world.

I read Mike White's article (October, 1987) on telephone spike protectors with interest and, after building one, found that there was one problem and one side benefit that Portable 100 readers might be interested in learning about.

I found that the spike protector, when I connected the ground wire to an electrical ground, effectively suppressed radio frequency interference (RF) in a cordless telephone set and an AM radio. I had been plagued with interference in my home office from an unknown source and was quite surprised that it almost totally

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disappeared when the spike protector was installed.

White recommended attaching the ground wire to the small screw holding the cover plate on an electrical outlet. Normally, this is an excellent location but recently, some manufacturers have been supplying PLASTIC screws with the cover plates. A plastic screw will not provide the electrical ground connection needed to make the telephone spike protector effective.

Instead of using a cumbersome three-pronged plug as a portable ground connector, readers might consider using a banana plug jack. A fat one will fit securely into the ground hole and will not slide into one of the hot slots on a conventional outlet.

Robert Smith
Soquel, CA

They're using PLASTIC screws for wall plates? Boy, an awful lot of people are going to be upset when they try to ground via the screw. Thanks

Eds.

LAPTOPS, YES. MS-DOS, NO

I am writing to say that I have almost no interest in MS-DOS laptops. The Model 100 is an all-in-one, ready to go anywhere package. MS-DOS laptops have a very different kind of design and utility; they are cut down versions of desktop machines rather than laptops per se. They have too short a battery life for real mobility. If you are actually working on your lap, the screens are not readable. They are relatively fragile. And they are heavy.

General news coverage of laptops is available in a variety of computer magazines. I fear that the MS-DOS laptops will divert the energy of the Model 100 community, and diffuse the focus of your magazine. There are already magazines that try to cover the whole portable field; their content is too diluted to be of any interest or practical use. Please do not make Portable 100 one of them.

For readers who are Macintosh owners, (as well as those using the Model 100 as their principal machine), MS-DOS coverage is irrele-

vant. I am a Macintosh owner, Model 100 user, and author of a comprehensive article in the Berkeley Macintosh User's Group Newsletter (Fall '86) on using the Model 100 as an accessory for the Mac. The simplicity of operation, of interface, and of file transfer make the Model 100 accessible and usable for people trained on the Mac in a way no MS-DOS laptop could be. The facilities of the Mac Desktop, such as desk accessory file transfers and text editors, and the capacity to cut and paste up to 32K of text into any application, allow the Model 100 to be fully integrated into the Mac environment. For the Macintosh owner, the alien approach and incompatible files make MS-DOS capability an obstacle, and file transfer a Rube Goldberg adventure.

Gordon Haig
Berkeley, CA

Never fear, Portable 100 will never turn into an MS-DOS magazine, we'll leave that market to our sister publication, PICO.

Eds.

Make your Model 100, 102, or 200 practically perfect

PCSG has long been the champion of the Model 100 and 200 laptop portable computers. No longer toys, these machines can be made to rival the performance of many desktop models.

PCSG in the past three years has developed software programs and innovations that have rewritten all standards.

We can give you what we regard as the superior Model 100 or 200 system. This is a catalog of what you need to build that nearly perfect portable computer. Full brochures and the answers to any of your questions are just a quick phone call away. So, if you want to add dimensions of portable performance to your laptop unit, call in your order today.

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Write ROM

This is full word processing capability like on a desktop. Not only format documents with left and right hand

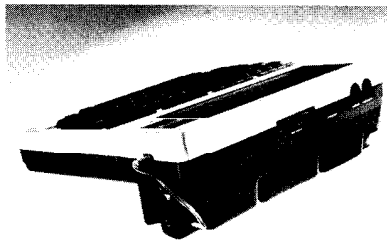
margins, page numbers, headers, footers but phenomenally more. Write ROM gives you memory writing performance: 44 features and functions that really bring text processing power to the Model 100, 102. \$99.95, plus shipping.

Lucid ROM

Features like LOTUS 123. But not just a spreadsheet, a program generator as well. Features like Cut and Paste, variable column widths and lightning fast calculation speed. Lucid changes your computer into capacity you never thought possible in the Model 100, 102, \$99.95, plus shipping.

Disk + ROM

Now your Model 100, 102, 200 plus any desk top computer is an instant disk system. With a function key transfer any files or BASIC or machine code programs to and from your portable and the other computer. The IBM version works over the phone. \$149.95, plus shipping. Cable \$40.00.



Business Analyst ROM

Perform those strategic "what if"

business problems. Allows detailed financial analyses like Breakeven, IRR, NPV, return on investment, interests costs, PV and others at the touch of a function key. Prints detailed reports. So easy! Also it performs simple everyday calculator functions. Check it out! \$99.95, plus shipping. Model 100, 102.

HARDWARE

6-ROM Bank

Access Super ROM, Disk +, Business Analyst and others. The 6-ROM Bank with its 30 hour rechargeable battery pack lets you personally create your ultimate Model 100, 102 system. \$199.00, plus shipping.

OTHERS

Custom ROMs

Have your own BASIC program put on to a ROM, or combine your program with a PCSG program. \$500.00 minimum order — quantity pricing as low as \$15.00 per ROM. Model 100, 102, or 200.

Cassette Programs

PCSG also has cassette programs available at closeout prices. Choose from Tutor+ (typing tutor — \$24.98), Type+ (makes your M-100 a memory typewriter — \$34.98), Tenky+ (financial calculator — \$29.98), Data+ (file manager — \$29.98), Sort2+ (sorting routine — \$14.98), Write+ (word processor — NEC only — \$34.98).

Shipping: \$7.50 (U.S.) two days, \$15.00 (U.S.) next day.

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Circle 73 on Reader Service Card

- 134 DATA 156,62,0,106,0,254,0,106,0,62,0,0
- 135 DATA 156,190,0,238,0,226,0,238,0,254,0,0
- 136 DATA 183,0,0,0,79,0,0,0,0,0,0
- 137 DATA 156,8,4,2,4,8,16,0,16,0,16,0
- 138 DATA 156,40,2,44,0,56,0,104,128,40,0,0
- 139 DATA 156,130,0,198,0,170,0,146,0,198,0,0
- 140 DATA 156,36,72,0,72,36,18,0,18,36,0,0
- 141 DATA 156,34,0,34,0,250,0,34,0,34,0,0
- 142 DATA 153,2,0,2,124,128,0,128,0,0,0,0
- 143 DATA 152,0,16,0,56,0,124,0,0,0,0,0
- 144 DATA 156,25,32,79,0,72,0,79,32,25,0,0
- 145 DATA 156,31,32,73,0,72,0,73,32,31,0,0
- 146 DATA 156,36,0,66,0,255,0,66,0,36,0,0
- 147 DATA 156,5,0,74,160,28,160,74,0,5,0,0
- 148 DATA 156,50,0,84,0,184,0,84,0,18,0,0
- 149 DATA 156,2,5,0,5,42,0,48,0,56,0,0
- 150 DATA 169,0,0,36,80,14,80,36,0,0,0,0
- 151 DATA 156,224,2,164,8,16,32,70,128,6,0,0
- 152 DATA 156,32,0,64,0,252,0,64,0,32,0,0
- 153 DATA 156,8,0,4,0,126,0,4,0,8,0,0
- 154 DATA 156,16,0,16,0,84,0,56,0,16,0,0
- 155 DATA 156,16,0,56,0,84,0,16,0,16,0,0
- 156 DATA 156,48,0,48,192,12,192,48,0,48,0,0
- 157 DATA 156,16,0,10,0,68,0,40,0,16,0,0

RUNNING THE PROGRAM

C-FONT.BA is reliable, fast, and extremely easy to use. Select C-FONT.BA from the menu as usual. As the program begins, the screen clears and an identification of the program appears. At the bottom of the screen you will see a notice: *Loading M100 Font — please Wait.*

If the printer is on line, the program immediately starts loading the new characters. The number of each character appears to the right of the notice as it is loaded. Upon finishing a new notice appears: *Test print characters? (Y/N)*

If you wish to make a test print of the characters, press Y or y. If not, press N or n. A "yes" answer tells the printer to print out each of the characters, from ASCII 33—255, one after the other. While the letters are printing, a notice appears: *Printing LCD Font — please Wait*

When the printer finishes printing the character set, the program returns to the Model 100 main menu. If you choose not to print the font, the program returns directly to the Model 100 menu.

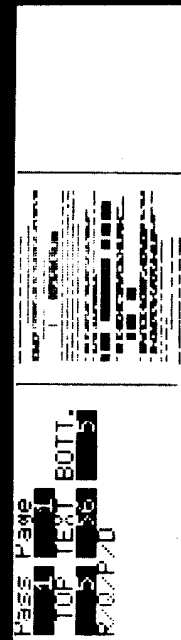
Continued

Works with all daisy wheel,
dot matrix & laser printers

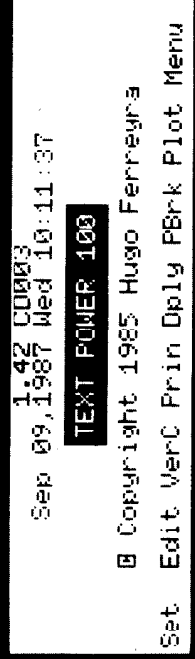
158 DATA 156,48,0,72,0,36,0,72,0,48,0,0
 159 DATA 156,56,0,72,0,142,0,72,0,56,0,0
 160 DATA 200,0,0,0,32,64,128,0,0,0,0,0
 161 DATA 156,4,10,32,138,96,10,32,28,2,0,0
 162 DATA 36,56,68,1,68,1,70,0,68,0,0,0
 163 DATA 156,18,0,126,128,18,128,2,128,66,0,0
 164 DATA 200,0,0,0,128,64,32,0,0,0,0,0
 165 DATA 171,0,63,0,2,0,2,60,2,0,0,0
 166 DATA 185,0,0,64,160,0,160,64,0,0,0,0
 167 DATA 156,32,0,48,0,56,0,48,0,32,0,0
 168 DATA 185,0,0,32,0,254,0,32,0,0,0,0
 169 DATA 184,0,0,16,234,0,174,16,0,0,0,0
 170 DATA 156,254,0,130,0,166,0,138,0,254,0,0
 171 DATA 156,254,0,130,0,186,0,146,0,254,0,0
 172 DATA 156,1,226,4,8,16,38,64,130,5,2,0
 173 DATA 156,136,33,210,4,8,16,34,68,139,0,2
 174 DATA 156,226,4,8,16,32,73,130,13,0,0,0
 175 DATA 156,32,80,136,0,254,0,128,126,128,0,0
 176 DATA 28,12,0,18,0,162,0,2,0,4,0,0
 177 DATA 156,6,136,20,32,68,32,20,136,6,0,0
 178 DATA 156,28,162,0,34,0,34,0,162,28,0,0
 179 DATA 156,188,130,0,2,0,2,0,130,188,0,0
 180 DATA 156,28,0,34,0,127,0,34,0,20,0,0
 181 DATA 155,16,32,0,32,16,0,16,32,0,0,0
 182 DATA 156,4,10,160,10,32,10,160,28,2,0,0
 183 DATA 171,0,28,162,0,34,0,162,28,0,0,0
 184 DATA 156,60,130,0,2,0,2,128,60,2,0,0
 185 DATA 156,127,128,0,128,18,128,18,108,0,0,0
 186 DATA 156,15,0,132,0,242,0,132,0,15,0,0
 187 DATA 156,28,34,8,34,72,162,8,34,24,0,0
 188 DATA 156,60,2,128,2,64,2,0,60,2,0,0
 189 DATA 156,28,34,8,162,8,98,8,34,24,0,0
 190 DATA 170,0,0,32,0,0,0,32,0,0,0,0
 191 DATA 156,18,0,126,128,18,128,2,128,66,0,0
 192 DATA 156,2,5,80,5,144,5,80,14,1,0,0
 193 DATA 156,14,17,68,17,132,17,68,17,12,0,0
 194 DATA 169,0,82,0,158,0,66,0,0,0,0,0
 195 DATA 171,0,12,82,0,146,0,82,12,0,0,0
 196 DATA 172,0,28,64,2,128,2,64,28,2,0,0
 197 DATA 156,16,0,32,0,64,0,32,0,16,0,0
 198 DATA 156,28,34,136,34,8,34,136,34,24,0,0
 199 DATA 169,0,162,0,62,0,130,0,0,0,0,0
 200 DATA 156,4,10,32,10,96,138,32,28,2,0,0
 201 DATA 152,0,18,0,94,128,2,0,0,0,0,0
 202 DATA 156,28,34,0,34,64,162,0,34,28,0,0
 203 DATA 156,60,2,0,2,64,130,0,60,2,0,0
 204 DATA 28,64,32,17,10,68,136,16,32,64,0,0
 205 DATA 155,94,128,16,128,80,0,80,142,0,0,0
 206 DATA 156,76,146,0,146,64,18,64,156,2,0,0

Continued

Circle 45 on Reader Service card.



TEXT POWER features **underlining, boldface, italics**, near letter quality, as well as other print sizes and font styles.
TEXT POWER supports automatic page numbering, tabs, text merging, label making and allows file printing to begin and end anywhere in the document.



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When we designed *Disk+* we did it out of necessity. We wanted a way that we could just connect a Model 100 to our desktop computer with a cable and save files onto the desktop's disk drive. We wanted it to be so simple to use it would be self-explanatory.

Picture this. *Disk+* comes to you on a Snap-in ROM and a diskette for your desktop. You take a quarter and open the little compartment on the back of your Model 100. Then you just press the ROM into the socket. *Disk+* appears on your main menu just like a built-in.

You connect your Model 100 to your other computer using an RS232 cable (available from PCSG for \$40).

You just place the *Disk+* diskette into the desktop's drive and turn on the computer. It powers up automatically and says "awaiting command" on your desktop's screen. Then you just put the widebar cursor on the Model 100 main menu on *Disk+* and press ENTER. You are shown your RAM files arranged just like the main menu.

To save a file to your other system's disk drive, you just move the widebar cursor to the file you want to save and press ENTER. It is saved instantly with no further action.

To look at the disk directory, you just press a function key on your Model 100. You see immediately the disk directory on your Model 100 screen, and it is arranged just like your Model 100's main menu.

To load a file from the diskette to your Model 100, you just move the widebar cursor to the file and press ENTER. The file is transferred to your Model 100's RAM instantly. You can press F8 and go back to the main menu, and the file you loaded from diskette is there, ready to use.

It is so nice to be able to keep your documents, programs (both BASIC and machine code) and *Lucid* spreadsheet files on the diskette, and bring them back when you need them. All files are ready to run or use with no changes or protocol by you.

If you have access to a desktop computer and don't have *Disk+*, then evidently we have done a poor job telling you about it.

All files and programs that you load or save, go over and come back exactly as they are supposed to be because of full error checking. This guaranteed integrity is really a comfort. *Disk+* is wonderful in so many other ways. For example, you can do a "save all" of all your RAM files with just a touch of a function key. That group of files is saved on the diskette under a single filename with a .SD (for subdirectory) extension. Any time you want, you can bring back all those files at once, or just one or two if you like, again with one-button ease.

Disk+ takes up no RAM. That's zero bytes either for storing the program or for operating overhead.

What really excites most *Disk+* users is text file cross compatibility. Your Model 100's text files are usable on your desktop computer, and your desktop's text files become Model 100 text files.

This means you can write something on your Model 100, and with *Disk+* transfer it

instantly to your desktop and start using it right away on your bigger computer. Or the way we like to work is to type in a document on the desktop computer and then transfer it to our Model 100 with *Disk+*. Then we print out the document, beautifully formatted, using WRITE ROM.

Disk+ works with just about every micro sold, from IBM PC and its clones, to all Radio Shack computers (yes, all), to Apple II, Kaypro, Epson and most CPM. Just ask us. More than likely, your computer is supported.

Incidentally, hundreds of Model 100 owners have gone to their Radio Shack stores and bought a color computer because it is so low priced, and with *Disk+* they have an inexpensive disk drive.

And if that weren't enough, how about this: *Disk+* also provides cross-compatibility between different computers like IBM, Apple or the Model 4 using the Model 100 as the intermediary device. Quite a feature!

The snap-in ROM is really great because you can use other ROMs like *Lucid* or WRITE ROM. They snap in and out as easily as an Atari game cartridge and you never lose your files in RAM.

Anyone who ever uses *Disk+* simply can't do without it. But so many times we have had new users call us and say, "Wow! I had no idea when I ordered it that *Disk+* would be so fantastic. I just couldn't believe that I could use my desktop computer's disk drive with my Model 100 just like it is another main menu."

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- 207 DATA 156,76,146,0,146,64,18,64,146,12,0,0
- 208 DATA 156,0,6,72,20,128,20,72,6,0,0,0
- 209 DATA 156,31,0,85,0,149,0,81,0,17,0,0
- 210 DATA 185,0,0,82,0,158,0,82,0,0,0,0
- 211 DATA 155,12,18,64,18,128,18,64,18,12,0,0
- 212 DATA 155,28,2,64,2,128,2,64,2,28,0,0
- 213 DATA 185,0,0,162,0,62,0,162,0,0,0,0
- 214 DATA 155,62,0,170,0,42,0,170,0,34,0,0
- 215 DATA 156,62,0,42,0,106,128,42,0,34,0,0
- 216 DATA 170,0,6,8,20,64,148,8,6,0,0,0
- 217 DATA 202,0,0,0,18,0,94,128,18,0,0,0
- 218 DATA 172,0,28,34,0,34,64,162,0,34,28,0
- 219 DATA 156,60,2,0,2,64,130,0,2,60,0,0
- 220 DATA 156,64,32,16,8,70,136,16,32,64,0,0
- 221 DATA 156,124,2,0,130,64,2,0,2,124,0,0
- 222 DATA 156,62,0,42,0,170,64,42,0,34,0,0
- 223 DATA 156,6,8,20,32,4,160,84,8,6,0,0
- 224 DATA 156,0,0,0,0,0,0,0,0,0,0,0
- 225 DATA 156,240,0,240,0,240,0,0,0,0,0,0
- 226 DATA 156,0,0,0,0,0,0,240,0,240,0,240
- 227 DATA 156,15,0,15,0,15,0,0,0,0,0,0
- 228 DATA 156,0,0,0,0,0,0,15,0,15,0,15
- 229 DATA 156,240,0,240,0,240,0,15,0,15,0,15
- 230 DATA 156,15,0,15,0,15,0,240,0,240,0,240
- 231 DATA 156,240,0,240,0,240,0,240,0,240,0,240
- 232 DATA 156,15,0,15,0,15,0,15,0,15,0,15
- 233 DATA 156,255,0,255,0,255,0,0,0,0,0,0
- 234 DATA 156,0,0,0,0,0,0,255,0,255,0,255
- 235 DATA 156,255,0,255,0,255,0,240,0,240,0,240
- 236 DATA 156,240,0,240,0,240,0,255,0,255,0,255
- 237 DATA 156,255,0,255,0,255,0,15,0,15,0,15
- 238 DATA 156,15,0,15,0,15,0,255,0,255,0,255
- 239 DATA 156,255,0,255,0,255,0,255,0,255,0,255
- 240 DATA 156,0,0,0,0,31,0,16,0,16,0,16
- 241 DATA 156,16,0,16,0,16,0,16,0,16,0,16
- 242 DATA 156,16,0,16,0,31,0,0,0,0,0,0
- 243 DATA 156,16,0,16,0,31,0,16,0,16,0,16
- 244 DATA 156,0,0,0,0,255,0,16,0,16,0,16
- 245 DATA 156,0,0,0,0,255,0,0,0,0,0,0
- 246 DATA 156,0,0,0,0,240,0,16,0,16,0,16
- 247 DATA 156,16,0,16,0,240,0,0,0,0,0,0
- 248 DATA 156,16,0,16,0,240,0,16,0,16,0,16
- 249 DATA 156,16,0,16,0,255,0,0,0,0,0,0
- 250 DATA 156,16,0,16,0,255,0,16,0,16,0,16
- 251 DATA 156,252,0,248,0,240,0,224,0,192,0,128
- 252 DATA 156,1,0,3,0,7,0,15,0,31,0,63
- 253 DATA 156,128,0,192,0,224,0,240,0,248,0,252
- 254 DATA 156,63,0,31,0,15,0,7,0,3,0,1
- 255 DATA 156,170,0,85,0,170,0,85,0,170,0,85

End of Listing

ADDITIONAL FEATURES OF ULTRASCREEN 100/102/200:
 - Operation and Relocation for programs of up to 2,600 characters
 - Relocatable in memory - no problem to use in conjunction with other machine language programs.
 - Full Model 100-102 character set is supported, including GRAPHICS and INTERNATIONAL CHARACTERS.
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 - ESPECIALLY SUITED FOR USE WITH TEXT POWER 100/102/200.

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UltraScreen allows FULL SCREEN EDITING from within TEXT. Features such as cut & paste, find, etc. are all fully supported. With no decrease in legibility, UltraScreen increases the total of number of characters from 320 to 600, and reduces the number of word wraps by one third, more than doubling the viewing capacity of your portable!
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Cruisin' with The Model 100

Build this simple, low-cost power adapter and take your 100 on a joyride.

by Ralph Tenny

When I pack for a long road trip, I take along my Model 100 to do some programming or to enter text. I also used to carry along some "AA" batteries to keep my 100 running. Then I realized I could save myself a lot of time and money if I powered my Model 100 through the cigarette lighter socket on the dashboard. I simply needed to build an adapter that matched voltages and protected the computer from voltage transients and alternator and ignition noise.

Photo 1 shows the result of my project: a small box with eight feet of wire (total) that lets you power the computer in either the front or back seats.

To construct this adapter, you need only five electronic parts besides the case, connectors, and wire. You don't even have to attach the connectors to the wire. Radio Shack stores sell a special cable with a cigarette-lighter adapter plug on one end and a Model 100-style power adapter on the other. All you have to do is cut the cable in the middle and insert the adapter. *Photo 2* shows both ends of this cable.

HOW IT WORKS

Figure 1 presents the electrical schematic for the adapter, which includes an optional diode. Resistor R1 and zener diode Z1 limit voltage excursions greater than 15V coming down the line. This cleaned-up voltage is regulated by REG1, which has been adjusted to approximately a 6V output by resistors R2 and R3.



Photo 1. Electrical schematic of the power supply.

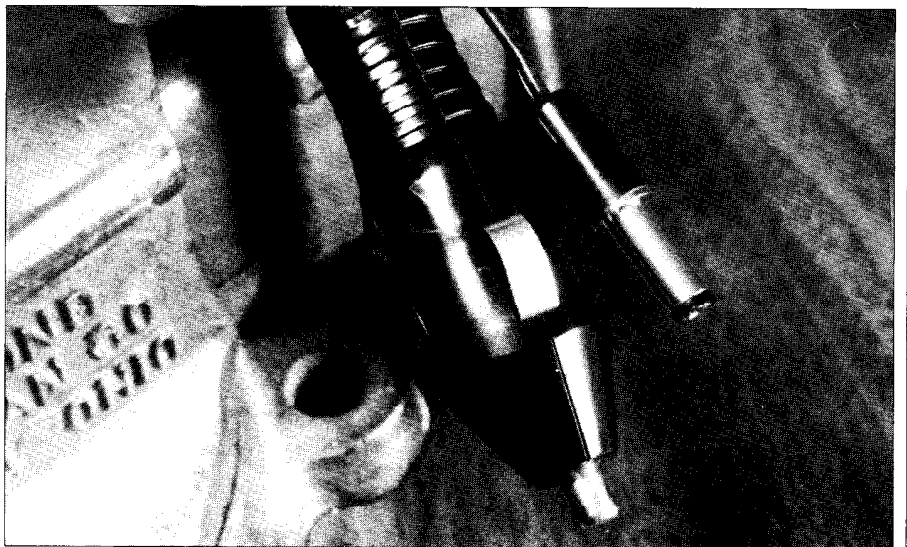


Photo 2. A Radio Shack cable with the connectors you need.

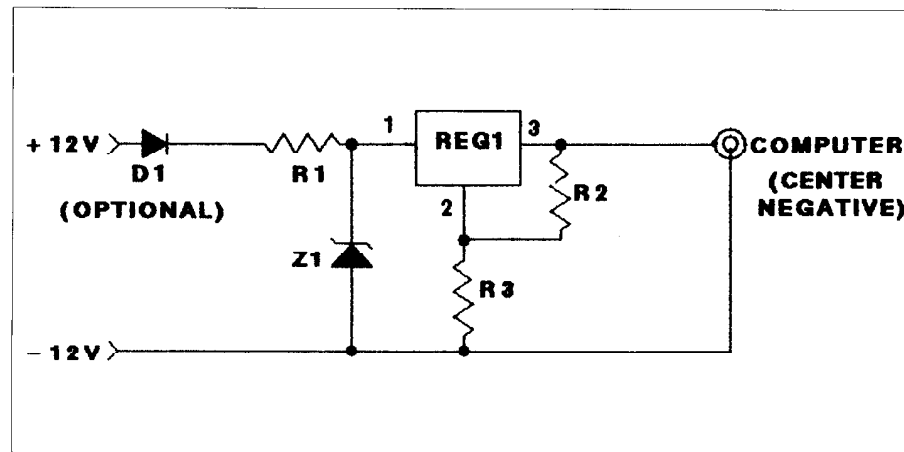


Figure 1

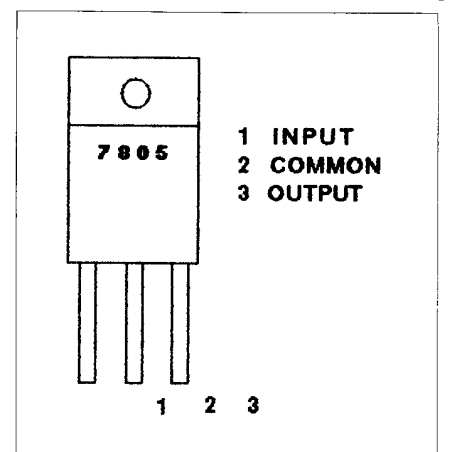


Figure 2

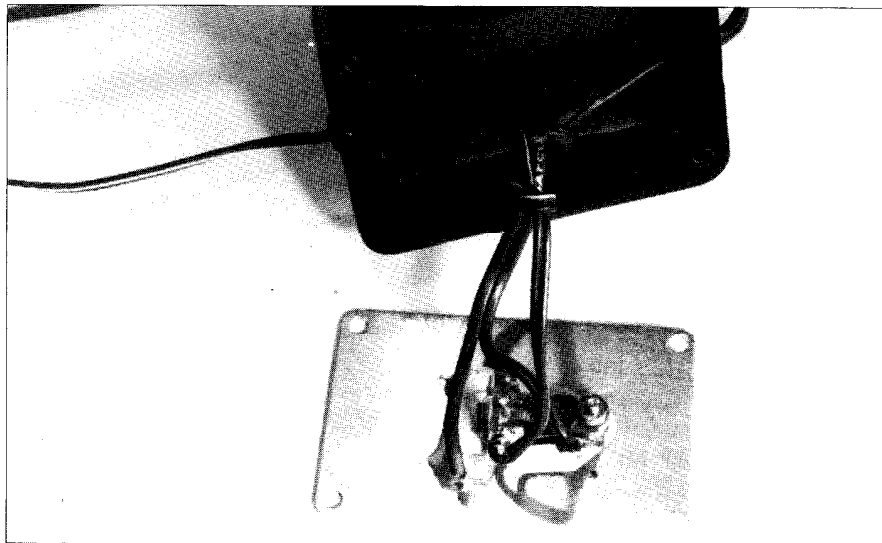


Photo 3. Inside view of the power supply.

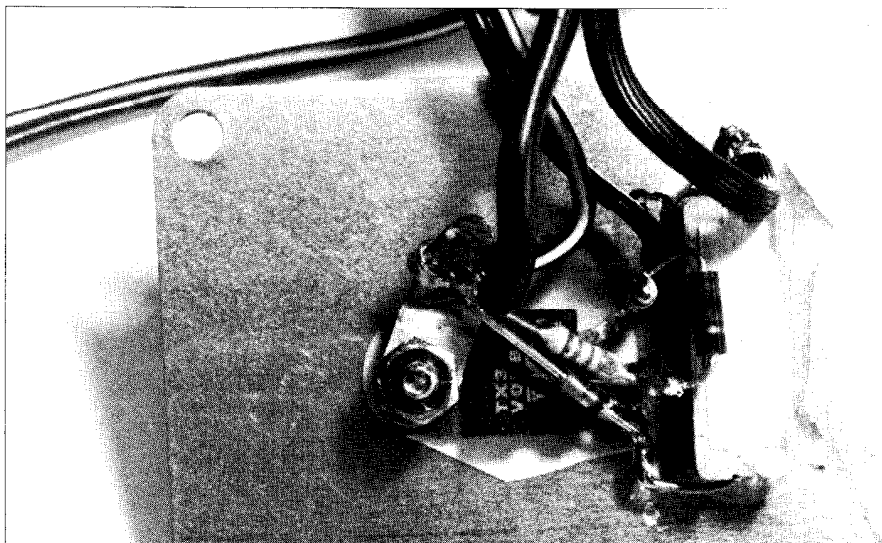


Photo 4. Front closeup view of the circuit construction.

Diode D1 is optional and protects the circuit from accidental polarity reversal. You can omit D1 if you are certain that the automobiles you will use have the same polarity of voltage in their cigarette lighter sockets (very likely unless you have a very old car).

THE CONSTRUCTION

Photo 3 shows my power-supply prototype from the inside. Note that the wires come through rubber grommets on the side of the case. Also, a knot tied in the wire serves as strain relief. All the parts are wired point-to-point, with some of them mounted on the metal box cover, which serves as a heat sink for REG1.

Photos 4 and 5 are closeup views showing the adapter's construction. I mounted REG1 to the metal cover using an isolation-mounting kit so that the same screw could mount a solder lug. This isolation is necessary, since the center tab of REG1 is common with the case (see Fig. 2).

The case is normally grounded when it is mounted to the heat sink. If you review Fig. 1, you can see that the center tab is elevated about 1V above circuit ground by current through R2 and R3, requiring the isolation. If you would rather use a terminal strip instead of the solder lug, the parts list (see the table) shows a suitable one. By using the terminal strip, you could mount REG1 without isolation.

Study Photos 4 and 5 and Fig. 2 as you read the following comments. R1 (the large gray block) is fastened to the cover with epoxy. The leads are

used as solder terminals, as are all three leads of REG1. The solder lug (or terminal strip) anchors the negative power lead, the negative output lead, one end of R3, and the anode lead of Z1. The cathode of Z1 and the input lead connect to REG1's input lead. The positive power lead is anchored by the other lead of R1. The other end of R3 and one end of R2 connect to the center lead of REG1. The other end of R2 and the positive output lead connect to the output lead of REG1.

SPECIAL PRECAUTIONS

Make all the connections except those to the input and output leads. Next, verify which input lead is negative and connect it to the solder lug. Plug the adapter into the lighter and check to see that the unconnected lead is positive with respect to the solder lug. Improper polarity will cause Z1 to explode and might destroy REG1.

Connect the positive input lead and again plug in the adapter. Check the output voltage (from the top of R2 to the solder lug) to see if it is between 5.7V and 6.5V. The parts-list table shows the resistor values I used plus some alternate values that are available from Radio Shack stores.

If you need to adjust the output to get the right voltage, parallel a resistor with R3 to lower the voltage or with R2 to increase it. When the voltage is right, connect the output wire and check the output polarity. Remember, the center of the barrel connector must be negative. Reverse the wires if necessary to get the correct polarity. Finally, test the adapter to be sure it will operate the computer.

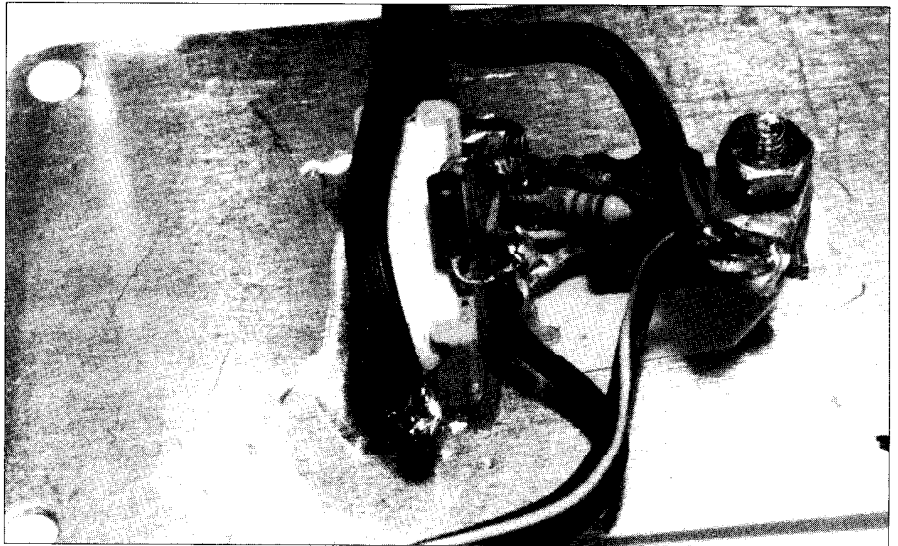


Photo 5. Rear closeup view of part locations.

PART	DESCRIPTION	RADIO SHACK P/N
D1	(OPTIONAL) 1N4001	276-1770
REG1	5 VOLT REGULATOR 7805	276-1770
R1	10 OHMS, 2 WATT	271-080
R2	120 OHMS, 1%, 1/4 WATT	
	ALTERNATE - 150 OHM, 1/4 W.	272-1312
R3	2000 OHMS, 1%, 1/4 WATT	
	ALTERNATE - 2.2K OHM, 1/4 W.	272-1325
Z1	15 VOLT, 1WATT ZENERT	276-564
CABLE	8', LIGHTER TO BARREL	270-1533B
CASE	3 1/4 X 2 1/8 X 1 1/8	270-230
GROMMETS	1/8" I.D.	64-3025
ISOLATOR KIT		276-1373



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 Company _____
 Address _____
 City/State/Zip _____

JANUARY 1988

This card
valid until
March 1, 1988

- Which portable(s) do you own?
 - A. Model 100
 - B. Tandy 102
 - C. Tandy 200
 - D. Tandy 600
 - E. NEC 8201
 - F. Olivetti M10
- What are your most important applications for your portable?
 - A. Word Processing
 - B. Database Management
 - C. Telecommunications
 - D. Programming
 - E. Scheduling/Time Management
 - F. Spreadsheets
 - G. Other _____
- Do you use your portable for...
 - A. Business Use
 - B. Personal Use
 - C. Both of the above
- What peripherals and accessories do you currently own for your portable?
 - A. Disk Drive
 - B. Memory Upgrade (RAM)
 - C. Accessory ROM Pac
 - D. Modem
 - E. Printer
 - F. Tape Drive

- What peripherals and accessories do you plan to purchase for your portable during the next 6 months?
 - A. Disk Drive
 - B. Memory Upgrade (RAM)
 - C. Add-On ROM
 - D. Modem
 - E. Printer
 - F. Tape Drive
 - G. Carrying Case
- How much do you plan to spend on portable computer hardware, software, and peripherals during the next 6 months?
 - A. less than \$100
 - B. \$100-\$250
 - C. \$250-\$400
 - D. \$400-\$600
 - E. \$600-\$750
 - F. more than \$750
- How often do you use on-line services?
 - A. Daily
 - B. Weekly
 - C. Monthly
 - D. Other _____
- In what type of business do you use your portable?
 - A. Journalism
 - B. Insurance
 - C. Retail
 - D. Education
 - E. Science or Engineering
 - F. Business
 - G. Other _____

1	26	51	76	101	126	151	176	201	226	251	276
2	27	52	77	102	127	152	177	202	227	252	277
3	28	53	78	103	128	153	178	203	228	253	278
4	29	54	79	104	129	154	179	204	229	254	279
5	30	55	80	105	130	155	180	205	230	255	280
6	31	56	81	106	131	156	181	206	231	256	281
7	32	57	82	107	132	157	182	207	232	257	282
8	33	58	83	108	133	158	183	208	233	258	283
9	34	59	84	109	134	159	184	209	234	259	284
10	35	60	85	110	135	160	185	210	235	260	285
11	36	61	86	111	136	161	186	211	236	261	286
12	37	62	87	112	137	162	187	212	237	262	287
13	38	63	88	113	138	163	188	213	238	263	288
14	39	64	89	114	139	164	189	214	239	264	289
15	40	65	90	115	140	165	190	215	240	265	290
16	41	66	91	116	141	166	191	216	241	266	291
17	42	67	92	117	142	167	192	217	242	267	292
18	43	68	93	118	143	168	193	218	243	268	293
19	44	69	94	119	144	169	194	219	244	269	294
20	45	70	95	120	145	170	195	220	245	270	295
21	46	71	96	121	146	171	196	221	246	271	296
22	47	72	97	122	147	172	197	222	247	272	297
23	48	73	98	123	148	173	198	223	248	273	298
24	49	74	99	124	149	174	199	224	249	274	299
25	50	75	100	125	150	175	200	225	250	275	300

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P100A-1

portable 100

Name _____
 Company _____
 Address _____
 City/State/Zip _____

JANUARY 1988

This card
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- Which portable(s) do you own?
 - A. Model 100
 - B. Tandy 102
 - C. Tandy 200
 - D. Tandy 600
 - E. NEC 8201
 - F. Olivetti M10
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 - C. Telecommunications
 - D. Programming
 - E. Scheduling/Time Management
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 - G. Other _____
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 - E. \$600-\$750
 - F. more than \$750
- How often do you use on-line services?
 - A. Daily
 - B. Weekly
 - C. Monthly
 - D. Other _____
- In what type of business do you use your portable?
 - A. Journalism
 - B. Insurance
 - C. Retail
 - D. Education
 - E. Science or Engineering
 - F. Business
 - G. Other _____

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3	28	53	78	103	128	153	178	203	228	253	278
4	29	54	79	104	129	154	179	204	229	254	279
5	30	55	80	105	130	155	180	205	230	255	280
6	31	56	81	106	131	156	181	206	231	256	281
7	32	57	82	107	132	157	182	207	232	257	282
8	33	58	83	108	133	158	183	208	233	258	283
9	34	59	84	109	134	159	184	209	234	259	284
10	35	60	85	110	135	160	185	210	235	260	285
11	36	61	86	111	136	161	186	211	236	261	286
12	37	62	87	112	137	162	187	212	237	262	287
13	38	63	88	113	138	163	188	213	238	263	288
14	39	64	89	114	139	164	189	214	239	264	289
15	40	65	90	115	140	165	190	215	240	265	290
16	41	66	91	116	141	166	191	216	241	266	291
17	42	67	92	117	142	167	192	217	242	267	292
18	43	68	93	118	143	168	193	218	243	268	293
19	44	69	94	119	144	169	194	219	244	269	294
20	45	70	95	120	145	170	195	220	245	270	295
21	46	71	96	121	146	171	196	221	246	271	296
22	47	72	97	122	147	172	197	222	247	272	297
23	48	73	98	123	148	173	198	223	248	273	298
24	49	74	99	124	149	174	199	224	249	274	299
25	50	75	100	125	150	175	200	225	250	275	300

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P100A-2

Tracking The Moon

This BASIC program lets you calculate the position of the Moon to within .2 degrees

by Louis C. Graue

Did you ever notice that the sun's location is as regular as a clock, while the moon seems to appear at random. Sometimes you can see the moon during the day. At times it is full and bright at night. Sometimes it is a small crescent, and every-so-often it does not appear at all.

The path of the moon is influenced by both the earth and the sun. An exact calculation of its position would involve solving the classical "three body problem," which is unsolved (the motion of the moon is viewed as being made up of five periodic motions, the main one being its motion round the Earth). The program presented here uses an approximation method that gives results correct to within 0.2 degrees.

The program is completely automatic. All you have to do is run the program and it will give you the location of the moon for each hour of the day on the date stored in the computer. You will get the local time, the azimuth angle and the altitude printed on the right half of the screen as they are computed. The results are also summarized graphically on the left half of the screen.

The time of sunrise and sunset are computed and used to set the night part of the day black. That part of the path of the moon which is above the horizon for the day is plotted. You are told for each hour where to look for the moon by providing the local time,

```

100 'MOON.BA : Calculate & plot positions of the moon.
110 TC=4 # hrs gmt ahead of local time
120 DEFDBL A-Z
130 PI=3.14159265: TP=PI*2: PT=PI/2
140 RD=180/PI: DR=PI/180
150 Cl=.91746406: S1=.397818675
160 N=DR*41.35:E=-DR*83.63 '(replace with local latitude and longitude)
170 GM=TC
180 '
190 DY=VAL(MID$(DATE$,4,2))
200 MN=VAL(LEFT$(DATE$,2))
210 YR=VAL(RIGHT$(DATE$,2))+1900
220 GOSUB 1740
230 GOSUB 1250
240 '
250 CLS
260 PRINT" MOON ALTITUDE"
270 PRINT"90";:PRINT@200," 0"
280 PRINT@240,"h";:PRINT@242,"0";:PRINT@246,"6";:PRINT@250,"12";
290 PRINT@254,"18";:PRINT@258,"24";:PRINT@280,"az";
300 LINE(14,8)-(110,44).L,B
310 FORI=12TO40STEP4:PSET(15,I):NEXT
320 FORI=12TO40STEP4:PSET(109,I):NEXT
330 FORI=18TO106STEP4:PSET(I,43):NEXT
340 FORI=38TO86STEP24:PSET(I,42):NEXT
350 PRINT@22,"DATE ",DATE$
360 PRINT@60,"";
370 PRINTUSING"LAT=##.## LONG=##.##";RD*N,-RD*E
380 PRINT@100,"";
390 PRINT"Time Azimuth Altitude";
400 PRINT@140,"";
410 PRINT"-----";
420 PRINT@180," +++ COMPUTING +++";
430 '
440 GOSUB 820
450 TR=TR-TC
460 TS=TS-TC: IF TS<0 THEN TS=TS+24
470 LINE(16,8)-(4*INT(TR)+INT((TR-INT(TR))/.25+.5)+14,41),L,BF
480 LINE(4*INT(TS)+INT((TS-INT(TS))/.25+.5)+14,8)-(108,41),L,BF
490 '
500 LT=0
510 TM=GM: GOSUB 1710
520 GOSUB 910: GOSUB 1320
530 GOSUB 1400
540 GOSUB 1470: GOSUB 1060
550 PRINT@180,"";
560 PRINTUSING"#### ##.## ##.##";LT,RD*AZ,RD*EL
570 IF EL>0 THEN GOSUB 670
580 IF LT=6 THEN PRINT@285,INT(RD*AZ+.5);
590 IF LT=12 THEN PRINT@289,INT(RD*AZ+.5);
600 IF LT=18 THEN PRINT@293,INT(RD*AZ+.5);
610 GM=GM+1: LT=LT+1

```

```

620 IF LT>23 THEN PRINT@264,"";PRINT" ** Finished **";GOTO 620
630 IF GM<24 GOTO 510
640 GM=GM-24: DN=DN+1
650 GOTO 510
660 '
670 C=4*LT+14
680 R=INT(44-.4*RD*EL+.5)
690 IF LT<TR OR LT>TS THEN PRESET(C,R) ELSE PSET(C,R)
700 RETURN
710 '
720 MS=TP*((D/365.242-.010452395)-INT(D/365.242-.010452395))
730 T1=MS: T2=.016718
740 T3=T1-T2*SIN(T1)-MS
750 IF ABS(T3)<.000001 GOTO 780
760 T1=T1-T3/(1-T2*COS(T1))
770 GOTO 740
780 T1=1.01686*TAN(T1/2)
790 EW=2*ATN(T1)+4.932237686
800 EN=0: RETURN
810 '
820 D=DN: GOSUB 720: GOSUB 1320: GOSUB 1560
830 T4=TR: T5=TS
840 EW=EW+.017203: GOSUB 1320: GOSUB 1560
850 GS=24.07*T4/(24.07+T4-TR)
860 GOSUB 1680: TR=TM
870 GS=24.07*T5/(24.07+T5-TS)
880 GOSUB 1680: TS=TM
890 RETURN
900 '
910 D=DN+GM/24
920 EW=TP*((1.13419+D*.229971506)/TP-INT((1.13419+D*.229971506)/TP))
930 MM=TP*((1.31924+D*.228027135)/TP-INT((1.31924+D*.228027135)/TP))
940 T1=TP*((6.21751+D*.01720196977)/TP-INT((6.21751+D*.01720196977)/TP))
950 T2=2*TP*((2.55068+D*.212768711)/TP-INT((2.55068+D*.212768711)/TP))
960 T3=TP*((4.7652214+D*.230895723)/TP-INT((4.7652214+D*.230895723)/TP))
970 EW=EW+.01148*SIN(T2)+.10976*SIN(MM)
980 EW=EW-.022235*SIN(MM-T2)-.003246*SIN(T1)
990 EW=EW+.003735*SIN(2*MM)-.0019897*SIN(2*T3)
1000 EW=EW-.0010297*SIN(2*MM-T2)-.0009948*SIN(MM+T1-T2)
1010 EN=EN+.011507*SIN(T2)+.10873924*SIN(MM)
1020 EN=EN-.0222006*SIN(MM-T2)
1030 EN=.0897797*SIN(EN)-.002548*SIN(T3-T2)
1040 RETURN
1050 '
1060 RO=.996986/(1+.0549*COS(MM+.10976*SIN(MM)))
1070 CE=EL-.0166*COS(EL)/RO
1080 RETURN
1090 '
1100 T2=.10976
1110 T1=MM+T2*SIN(MM)
1120 DV=.01255*RO*RO*SIN(T1)*(1+T2*COS(MM))
1130 DV=DV*4449
1140 T1=6378: T2=384401
1150 T3=T1*T2*(COS(DC)*COS(N))*SIN(LH)
1160 T3=T3/SQR(T2*T2-T2*T1*SIN(EL))
1170 DV=DV+T3*.0753125
1180 RETURN
1190 '
1200 SI=SIN(LH)*COS(DC)*COS(N)
1210 CO=SIN(N)-SIN(DC)*SIN(EL)
1220 GOSUB 1800: PO=TH
1230 RETURN
1240 '
1250 T1=YR: T2=MN
1260 IF T2 > 2.5 GOTO 1280
1270 T1=T1-1: T2=T2+12
1280 DN=INT(365.25*(T1-1980))-INT(T1/100)+INT(T1/400)-16
1290 DN=DN+DY+30*T2+INT(.6*T2-.3)
1300 RETURN
1310 '

```

continued

the azimuth and the altitude on the graph.

PROGRAM DESCRIPTION

The functions of each section of the program are:

Lines	Function
110 - 170	Set constants
190 - 210	Get date stored in the computer
220	Get sidereal time
230	Get number of days
250 - 420	Set up LCD screen
440 - 480	Black out night time part of the screen
500 - 650	Calculate and display moon coordinates
670 - 700	Plot position of the moon
720 - 800	Calculate position of the sun
820 - 890	Calculate times of sun rise and sunset
910 - 1230	Moon routines
910 - 1040	Moon position
1060 - 1080	Parallax correction for the moon
1100 - 1180	Radial velocity
1200 - 1230	Polarization correction
1250 - 1300	Date to number of days
1320 - 1850	Utility routines
1320 - 1380	Ecliptic to equatorial coordinates
1400 - 1450	Equatorial coordinates to elevation
1470 - 1500	Equatorial coordinates to azimuth
1510 - 1640	Rising and setting times and positions (gmt)
1650 - 1700	Rising and setting times and positions (gmt)
1710 - 1730	Hours and decimal hours to hours and minutes
1740 - 1790	Sidereal time calculations
1800 - 1850	Arc-tangent routine

The program spends most of the time in the loop from line 500 to line 650 where it calculates and displays the moon position for each hour of the day.

Do the following steps to check the program. Type it in exactly as given. Type `DATE$="07/04/86"` and run the program. The first values printed should be *Time = 0*, *Azimuth = 11.9*, and *Altitude = -22.7*. Enter `CTRL C` to stop the program and type `PRINT TR,TS`. You should get `TR = 6.177588772996` and `TS = 21.152662028718` (The time in hours of sunrise and sunset on July 4, 1986). If you don't get these values, then carefully check for a mistake in your copy.

CHANGES TO FIT YOUR LOCATION

The program, as listed, gives correct results for my home location. You will need to make changes in two lines to fit your location.

In line 110 set `TC` to the number of time zones Greenwich, England (universally accepted as the start point for all time zones) is away from your location. For those on eastern daylight time (daylight savings time adjusted), Greenwich Mean Time (gmt) is 4 hours ahead. When we change to eastern standard time we will need to change `TC` to 5 to have results agree with our watches (remember, spring forward, fall back) since gmt will then be 5 hours ahead. Those on central daylight time will use `TC=5` since gmt is 5 hours ahead for them. When they change to central standard time they will need to set `TC=6`. And so it goes for the other time zones across the world.

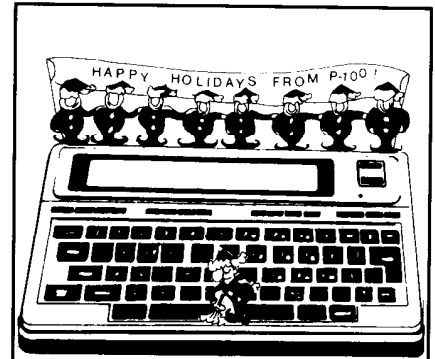
In line 160 change the numbers 41.35 and 83.63 to your latitude and longitude. These are degrees and can be scaled off a map of your location. The `DR` multiplier converts the degrees to radians. If you are in the southern hemisphere then you would need to put a minus sign on the latitude. If your longitude is East of England, you would eliminate the minus sign on the longitude figure.

For example if your latitude is 40.57 degrees north and your longitude is 81.32 degrees west, then you would type the following: `160 N=DR^40.57: E=-DR^81.32`

Before running the program be sure that `DATE$` is set to the correct date. Now run the program and you will find

out where the moon will be on that day. That is something that you can only get from your computer unless you happen to live at a place used by the almanac people.

I took the calculating routines from a book by John Morris called *Amateur Radio Software*. I consider it one of the best written books on computer programs I have ever read. It contains about 100 programs written in BASIC that can be easily converted to run on your portable computer. □



Do you have any questions, suggestions, news, or commentary? Don't be shy—send your article ideas to the editor at *Portable Computing International*, Portable 100, P.O. Box 481, Peterborough, NH 03458-0481.

```

1320 SI=C1*SIN(EN)+S1*COS(EN)*SIN(EW)
1330 CO=SQR(1-SI*SI): GOSUB 1800
1340 DC=TH
1350 SI=SIN(EW)*C1-TAN(EN)*S1
1360 CO=COS(EW): GOSUB 1800
1370 RA=TH: IF RA<0 THEN RA=RA+TP
1380 RETURN
1390
1400 T1=GS/24-RA/TP: GH=TP*(T1-INT(T1))
1410 LH=GH+E
1420 SI=COS(LH)*COS(DC)*COS(N)+SIN(DC)*SIN(N)
1430 CO=SQR(1-SI*SI): GOSUB 1800
1440 EL=TH
1450 RETURN
1460
1470 SI=-SIN(LH)*COS(DC)*COS(N)
1480 CO=SIN(DC)-SIN(N)*SIN(EL): GOSUB 1800
1490 AZ=TH: IF AZ<0 THEN AZ=AZ+TP
1500 RETURN
1510 GOSUB 1560 : IF TR<0 THEN RETURN
1520 T3=GS
1530 GS=TR: GOSUB 1680: TR=TM
1540 GS=TS: GOSUB 1680: TS=TM
1550 GS=T3: RETURN
1560 CO=SIN(DC)/COS(N)
1570 IF ABS(CO)>1 GOTO 1650
1580 SI=SQR(1-CO*CO): GOSUB 1800
1590 AR=TH: AS=TP-AR
1600 CO=-TAN(N)*TAN(DC)
1610 SI=SQR(1-CO*CO): GOSUB 1800
1620 TR=24*((RA-TH-E)/TP)-INT((RA-TH-E)/TP)
1630 TS=24*((RA+TH-E)/TP)-INT((RA+TH-E)/TP)
1640 RETURN
1650 TR=-1: TS=-1: RETURN
1660 MT=INT(TM*60+.5): HR=INT(MT/60)
1670 MT=MT-HR*60: RETURN
1680 T1=(GS-SE-.0657098*(DN-DE))/24
1690 TM=23.9345*(T1-INT(T1))
1700 RETURN
1710 T1=(SE+.0657098*(DN-DE)+GM*1.00274)/24
1720 GS=24*(T1-INT(T1))
1730 RETURN
1740 T1=YR-1
1750 DE=INT(.36525*(T1-1980))-INT(T1/100)+INT(T1/400)+381
1760 T1=(DE+29218.5)/36525!
1770 T1=6.6460656+T1*(2400.051262+T1*2.581E-05)
1780 SE=T1-24*(YR-1900)
1790 RETURN
1800 T1=ABS(SI): T2=ABS(CO)
1810 IF T1>T2 THEN TH=PT-ATN(T2/T1)
1820 IF T1<=T2 THEN TH=ATN(T1/T2)
1830 IF CO<0 THEN TH=PI-TH
1840 IF SI<0 THEN TH=-TH
1850 RETURN
    
```

Power Cell: The Answer to "AA" batteries

Tired of buying batteries for your Model 100?

by Teri Li

Are you tired of always buying batteries for your Tandy 100, 102, or 200? Would you like to keep working when your computer's built-in battery pack says it's time to recharge? Do your NiCd batteries fade so fast after the low-power light comes on that you can't do anything? Read on.

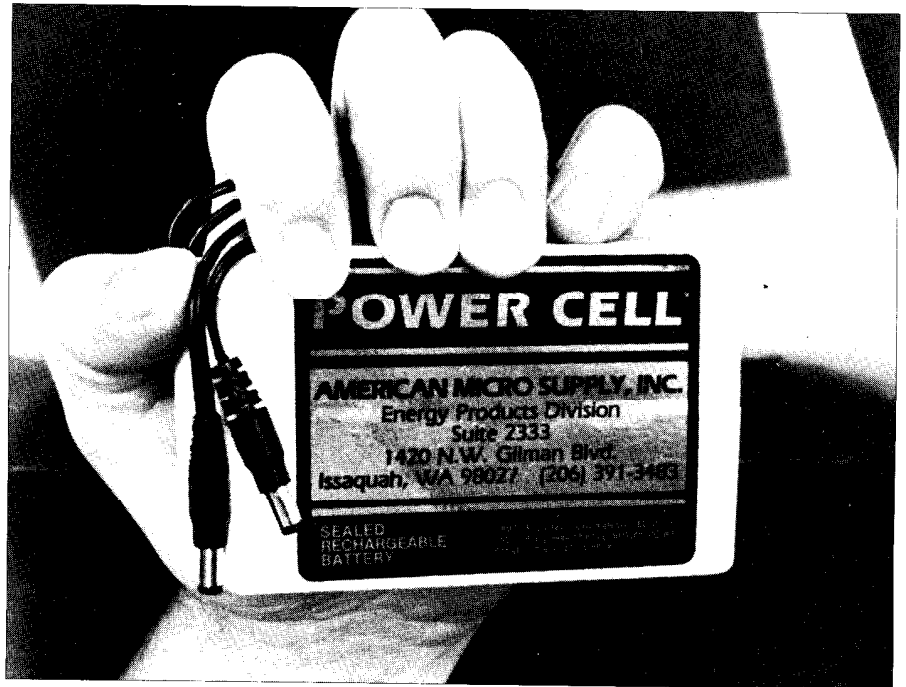
Shortly after buying my Model 100 back in 1984, I discovered a minor shortcoming that became a constant nuisance: I was continually trekking to the store for "AA" batteries.

I tried buying NiCd batteries, but finding a set that worked (most NiCd batteries don't fit properly in the battery compartment) was quite a task. After finding an appropriate set, I discovered that they didn't give me nearly the time between charges, lasting barely half the time of standard alkaline batteries. In addition, remembering to always recharge the NiCds overnight was a problem.

I ended up making my own power cable and using a 6-volt lantern battery for portable power. The cost was quite competitive and I could usually get a full month's worth of work before requiring a replacement. The batteries were a bit harder to find and they weren't light, but the trade-off was well worth it.

A Better Idea

With considerable relief I finally retired that system with a new one, the *Power Cell*, from American Micro



The power cell provides true portable power.

Supply. This battery is different from the batteries we normally use, which are either carbon-based or alkaline-based devices. The *Power Cell* is a lead-acid battery, like the type used in cars. Unlike car batteries, though, the *Power Cell* is sealed and will never spill or leak.

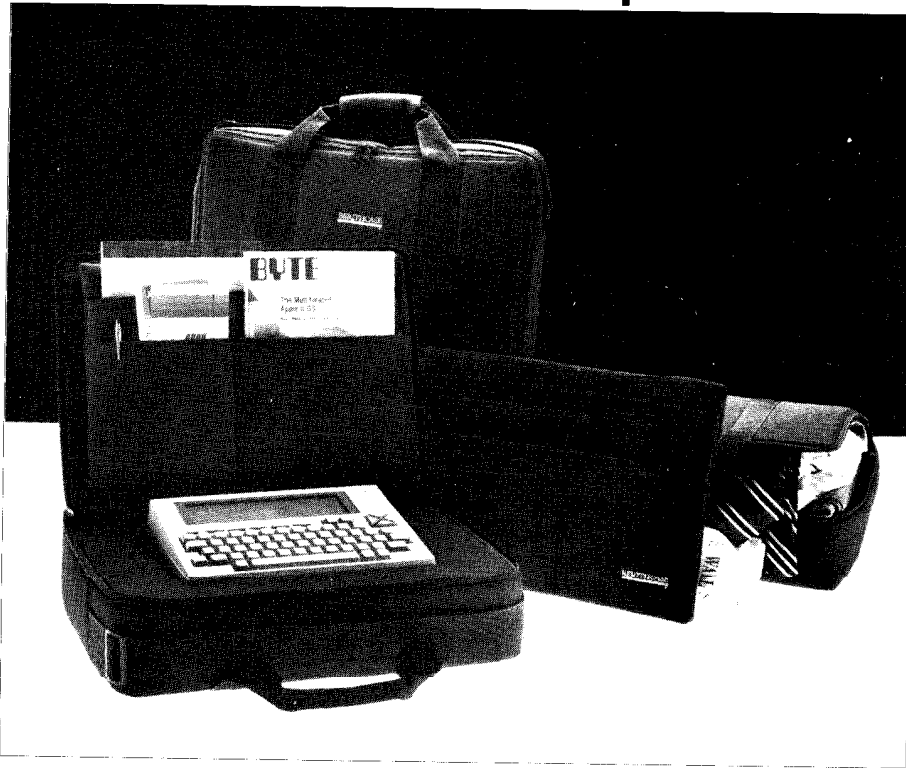
Because the battery is lead-acid based it has some impressive power characteristics: it has a power rating of 2.5 amp-hours (compared to .45 Amp-hours for carbon and NiCd batteries), enough for about 40 hours of use; it can be recharged using your computer's external power supply; is easily recharged overnight; doesn't have the "memory" problem NiCd batteries are accused of having; has a

projected life of 8 years; and has a special safety circuit to prevent a short circuit.

The *Power Cell* is not a tiny unit. While it is smaller than a standard index card (it measures 4.5-inches wide by 2.75-inches tall by 1.5-inches deep) and weighs only one and a quarter pounds (20 ounces), it is a handful to carry and you certainly do notice its extra mass in your traveling case. On the other hand, it is definitely smaller, lighter, and more convenient than carrying a NiCd battery charger and extra batteries with you everywhere you go.

Making the *Power Cell* much more convenient is the special power cable included with the unit that has two

Computer Case Or Bulletproof Vest?



Berith Activewear has announced the introduction of the **Berithcase** (rhymes with briefcase). This lightweight combination briefcase/laptop computer case is designed to protect your sensitive and expensive computer components as well as organize all of your traditional briefcase components. Highly puncture- and abrasion-resistant, the Berithcase is made out of black propex ballistics. This virtually indestructible material is frequently used in bulletproof vests. The interior armor is high-impact plastic, lined with nylon pack cloth.

Total weight of the case is only 3.5 pounds, and it fits comfortably under all commercial airline seats. It has modifiable foam inserts, so that you can adapt the case to your particular needs. Prices on versions of the case range from \$99 to \$129 retail. (\$129.00 version in photo.) For further information, contact Berith Activewear, 1015 South Gaylord, Suite 176, Denver, CO 80209 (303)744-8156.

power plugs and one power connector. The power connector allows you to attach your computer's battery eliminator when you are at home or the office. You can recharge the battery when the computer is off, or power the computer and an accessory from one power supply. On the road, the two plugs mean you can power a tape recorder or disk drive in addition to your computer, reducing the number of power supplies you need to carry, as well as substantially reducing the quantity of "AA" batteries you buy and use.

For convenience, and to prevent damaging the cord during storage, the power cord disconnects from the battery.

Summary

There's not really much more I can say about the *Power Cell*. It's much more convenient to recharge than Nickel-Cadium batteries, doesn't require a special charger unit, and lasts far longer regular batteries. It's size

takes some getting used to, but that's a small price to pay considering what you get.

Manufacturer's Specifications

American Micro Supply
1420 N.W. Gilman Rd, Suite 2333
Issaquah, WA 98027
(206) 391-3483

Power Cell, \$79.95

A six-volt, 2.5 amp-hour, sealed, lead-acid battery for all computers requiring six-volt power.

Size: 4.5"x2.75"x1.5"
Weight: 20 ounces.

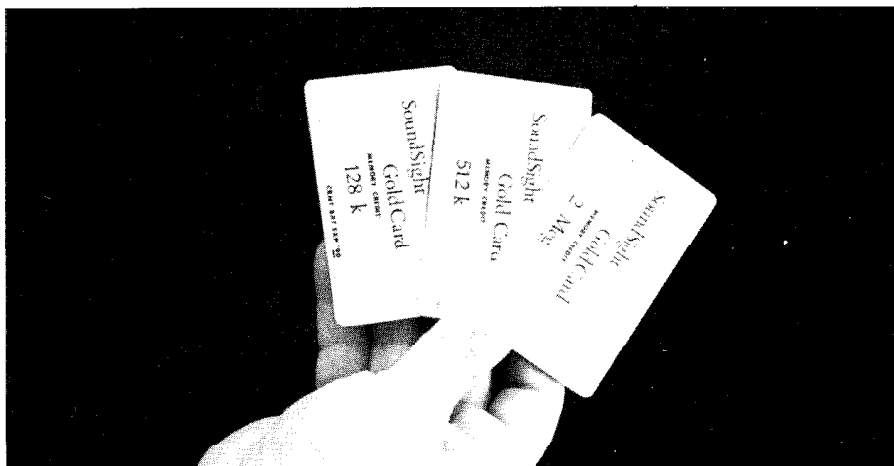
One year Warranty.

The SoundSight Gold Card

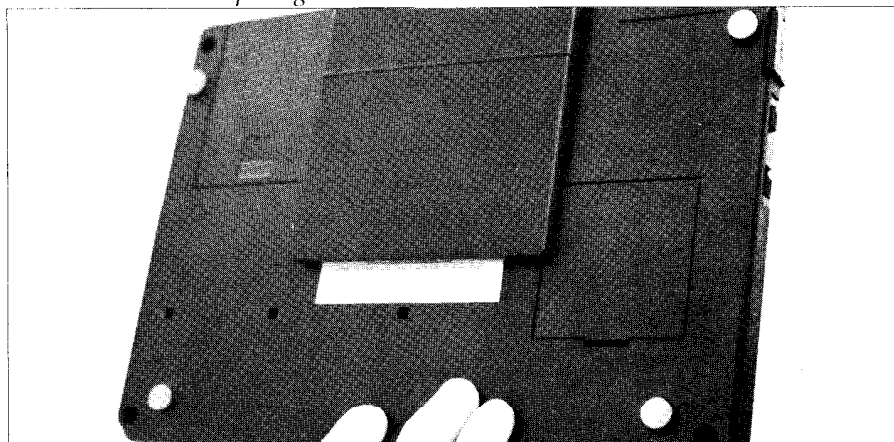
SoundSight has just released a ROM eliminator and System Resident BASIC Compiler: The SoundSight Gold Card. This system provides RAM in increments of 32k up to 2 Meg, on a credit card. Access up to 4 megabytes with full BASIC I/O is available using SoundSights' unique hardware design that permits easy insertion and removal of cards into dual slots. Additional slots allow access up to ten megabytes. The Gold Card memory is totally contiguous; no bank switching!

The SoundSight Gold Card is backed by a replaceable, long-lasting lithium cell which allows the user to remove, swap or add new cards without fear of disrupting the data. The slim, lightweight hardware design perfectly compliments the Tandy 100/102 and adds almost no size, weight or thickness to the computer unit, and is fully enclosed in durable plastic.

The new SoundSight ROM resident operating system does not occupy the 100/102's high memory and does not conflict with other ROMs, command files, or drivers.



SoundSight Gold Card gives you up to two megabytes of RAM in a credit card sized package.



The SoundSight ROM Eliminator: Now load as many ROMs as you want directly into memory, and run them at will from the ROM Eliminators' RAMROM. Use the Gold Card to store your ROMs and have them available in the quickest, easiest and most convenient form possible. Totally software driven, there are no bulky switches and laborious installation procedures.

A forthcoming Gold Card utility allows you to shrink your BASIC programs and increase their speed by a factor of 10 or more, running them directly from the RAMROM in Machine Language! Now design, test, and compile BASIC software exceeding 32k without leaving the system or incurring expensive compiling fees.

In addition, Gold Card's Text Editor, set for January release, will allow full access and manipulation of document files as large as the amount of RAM available. The Gold Card Text Editor opens and edits files in RAM of virtually any size.

SoundSight now offers a radically new data entry/retrieval system for the 102, based

on the Gold Card system.

Another new product, SA-MODES, provides a fast, efficient and highly organized ROM-based solution to the problems and inadequacies of computer data entry/retrieval/transmission for the field of law enforcement. Create reports onsite, and instantaneously transmit them to a host computer at the station that will also provide up-to-the-minute, online data, critical to efficient performance.

Other features include direct Gold Card RAMbank access for file uploads and downloads. A built in calculator, stopwatch and text analyzer while still providing the benefits of a ROM-based application.

Utilizing the proven Tandy 102 computer, and SoundSights' state-of-the-art technologies, SA-MODES is the most advanced, easily implemented and highly affordable data entry/retrieval/transmission system available.

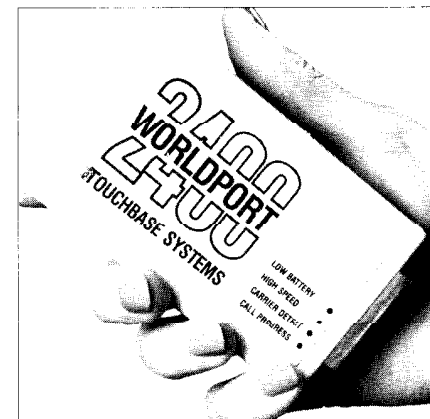
For more information contact SoundSight Computer Technologies, Inc. 225 W. Broadway, Suite 509 Glendale, CA 91204, 818-240-8400

Touchbase Systems Introduces 2400-Baud Modem

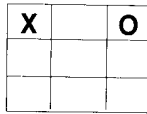
The *WorldPort 2400 Portable Modem* is a compact, battery-powered external modem designed for use with both portable and desktop computers. It features full AT Command Set compatibility, 2400/1200/300 bps operation, auto-dial/auto-answer, pulse and tone dialing, and non-volatile storage of up to 20 commands. It measures 4 x 2.4 x 1 inches in size, and has a unique acoustic coupler interface. An internal speaker allows audible monitoring of the call, while an LED array provides visual status of call progress, carrier detection, speed, and low battery indication.

The *WorldPort 2400* modem provides dual communications standards for international use (software selected), and may also be powered by an optional AC adapter or through the RS-232 port.

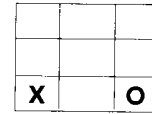
Carbon Copy Plus communications software is included with the *WorldPort 2400*. The package retails for \$359.00. For further information contact Touchbase Systems, 16 Green Acre Lane, Northport, NY 11768 (516)261-0423.



The Worldport 2400 is a 300/1200/2400 bps, on-line or acoustic-cup, AC- or DC-powered modem.



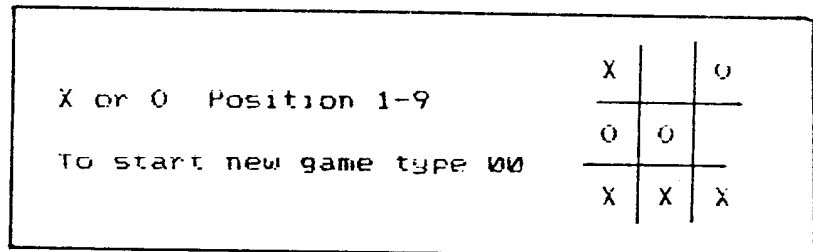
Tic-Tac-Toe



A simple game to while away the time.

by Ralph E. Wolf

Here's a simple little game for your Model 100 that is a lot of fun for two people. It is arranged so that you don't have to use the ENTER key during the game. If you type 11 22 33 44 55 66 77 88 99 the squares will be numbered for your information. If you type 00 you will clear the board and be ready for the next game. Wrong entries can be cleared using SPACE or changed by overwriting. The ESC key will return you to MENU. This program occupies about 650 bytes. Have fun! □



```

TICTAC.BA
10 CLS:DEFINT A
20 LINE (177,19)-(233,19)
30 LINE (177,35)-(233,35)
40 LINE (197,0)-(197,56)
50 LINE (215,0)-(215,56)
60 PRINT:PRINT
100 PRINT" X or O";
101 A$=INPUT$(1)
102 IF A$=CHR$(27) THEN MENU
110 PRINT" Position 1-9";
111 B$=INPUT$(1)
112 IF B$=CHR$(27) THEN MENU
113 IF B$<"0" OR B$>"9" THEN 111
114 B=VAL (B$)
115 PRINT@ 162, "To start new game type 00"
120 IF B=1 THEN PRINT@71,A$:GOSUB 500:GOTO 100
130 IF B=2 THEN PRINT@74,A$:GOSUB 500:GOTO 100
140 IF B=3 THEN PRINT@77,A$:GOSUB 500:GOTO 100
150 IF B=4 THEN PRINT@151,A$:GOSUB 500:GOTO 100
160 IF B=5 THEN PRINT@154,A$:GOSUB 500:GOTO 100
170 IF B=6 THEN PRINT@157,A$:GOSUB 500:GOTO 100
180 IF B=7 THEN PRINT@231,A$:GOSUB 500:GOTO 100
190 IF B=8 THEN PRINT@234,A$:GOSUB 500:GOTO 100
200 IF B=9 THEN PRINT@237,A$:GOSUB 500:GOTO 100
210 IF B=0 THEN GOTO 10
500 PRINT@10, SPACE$(24)
520 RETURN
    
```

The Printing Stopwatch

A BASIC program for accurately tracking time-billed projects.

by Ralph Tenny

As a contract writer and consultant, I may have two or more projects going at one time. These projects are often billed at an hourly rate. A printed time log makes a handy record and a good billing document. I use a program called TYMKPR (listing 1) to generate and print these time logs. TYMKPR uses the ON KEY GOSUB interrupt command to generate three functions. Function 2, called by key F1, opens a data file and writes the current DATE\$ and TIME\$, then closes the file. The second function records the current TIME\$ and DATE\$. In other words, F1 and F2 behave like the start and stop buttons on a stopwatch. The two time entries in the file are a record of a time interval in a file like this:

```
B11/02/86
T13:05:23
T15:58:12
E11/02/86
```

The third button, F3, causes a summary of the time log data to be printed. At the same time, the time interval covered by each record is computed and printed. Finally, the total time is printed, producing a record which looks like this:

```
B11/02/86
T13:05:23
T15:58:12
E11/02/86
173 MINUTES
B11/02/86
```

```
10 CLEAR500,50000:DIMJ$(90)
15 KEY ON:DA$="B":DE$="E":TI$="T"
20 INPUT"FILE NAME";NM$:RA$="RAM"+": "+NM$
25 GOTO1000
30 OPEN RA$ FOR APPEND AS 1
35 RETURN
40 CLOSE 1:RETURN
45 J$(Y)=I$:Y=Y+1
50 RETURN
55 K$=MID$(K$,2,5):K$(V)=K$
56 RETURN
60 L$=LEFT$(K$,2):L=VAL(L$)
65 M$=RIGHT$(K$,2):M=VAL(M$)
70 RETURN
75 LPRINT TAB(10);TM;" MINUTES"
80 RETURN
100 A$=DA$+DATE$:B$=TI$+TIME$
105 GOSUB 30
110 PRINT#1,A$:PRINTCHR$(10)CHR$(13)"A",
115 PRINT#1,B$
120 GOSUB40:RETURN
200 B$=TI$+TIME$:A$=DE$+DATE$
205 GOSUB30
210 PRINT#1,B$:PRINTCHR$(10)CHR$(13)"B",
215 PRINT#1,A$
220 GOSUB40:RETURN
300 INPUT"HEADER";E$
305 LPRINT E$,CHR$(13)
310 CLS:OPEN RA$ FOR INPUT AS 1
315 Y=0
320 I$=INPUT$(11,1)
325 IF EOF(1) = -1 THEN340
330 GOSUB45
335 GOTO320
340 CLOSE 1:GOSUB45:Z=0:V=1:Y=Y-1
345 K$=J$(Z):LPRINTK$;
```

```

350 IFLEFT$(K$,1)="T"THEN380
355 IFLEFT$(K$,1)="B"THEN375
360 IF Z=>Y THEN FL=1
365 GOSUB75
370 V=1:IF FL=1THEN430
375 Z=Z+1:GOTO345
380 IF Z=>Y THEN FL=1
385 IF V=2THEN405
390 GOSUB55:GOSUB60:Z=Z+1
395 L1=L*60+M:V=V+1
400 GOTO345
405 GOSUB55:GOSUB60:Z=Z+1
410 L2=L*60+M
415 TM=LZ-L1
420 TL=TL+TM
425 IF FL=0 THEN345
430 LPRINT TAB(9);TL;" MINUTES TOTAL"
435 MENU
1000 X=0:ON KEY GOSUB 100,200,300
1001 REM ON ERROR GOTO1030
1005 E$=TIME$:D$=C$
1010 C$=MID$(E$,4,2)
1015 IFC$=D$THEN1005
1020 X=X+1:PRINTX;
1025 GOTO1005
1030 STOP

```

can be done anytime as a check of total time expended. After each printout, the program returns to the Model 100 MENU.

During program startup, you are prompted for a file name which is used for the time keeping. This allows you to work on several projects, one at a time. The file name must be unique for each project, with a maximum of six characters in the name. The major limitation is that each time interval must begin and end on the same day. For example, start at 11/3/86, 8 P.M. (20:00:00) and stop at 1 A.M. (01:00:00, 11/05/86). TYMKPR will subtract 20:00 from 01:00 and get a negative time.

If you aren't familiar with the ON KEY GOSUB routine, see lines 15 and 1000 in Listing 1. KEY ON enables the function interrupt, and ON KEY GOSUB works just like ON..GOSUB. Other program features of note are:

Lines 320 and 325 read data string from RAM.

Although the data string is only nine characters long, the string terminator (CHR\$(13);CHR\$(10)) must be included for correct end-of-file determination. Each string is saved in the J\$ array (line 45), and the RAM file is then closed (line 340).

Time computation is performed line-by-line in lines 345 to 425 and the subroutines at lines 50 and 60. Line 50 truncates the time to HH:MM and lines 60 to 75 separates HH and MM and gets the Value of each, so lines 395 and 410 to 420 can compute the minutes per interval and total time.

Line 435 provides a no-hassle program termination. □

```

T19:02:44
T21:45:11
E11/02/86
163 MINUTES
336 MINUTES TOTAL

```

Note that both TIME\$ and DATE\$ have a prefix tag which aids in computing and printing the time. ("T" flags time entries, while "B" and "E" signify Begin and End.) When the program starts a "1" is printed in the upper left corner of the screen, fol-

lowed by a series of numbers which increase in value once a minute. To start timing, press key F1. This causes an "A" to be printed on the next line, followed by the ascending number series on one minute intervals. This screen printing is simply an indication that the program is running. To stop timing, press key F2. A "B" is printed, followed by the number series. Each pair of key presses adds another record to the file. The printout is activated by pressing F3, and

Managing Machine Language Programs On The Model 100

Save space and get more out of your computer

by Randy More

The Model 100 is an extremely convenient processing tool, being able to handle user written programs and textual files simultaneously. Its flexibility is augmented all the more by the host of software now available for the machine. But as the number of software packages for the Model 100 grows, especially those written in machine language, the precious available memory of your Model 100 may be shrinking at a furious pace.

Don't despair! With a greater understanding of the Model 100's internal file structure, and its methods of handling machine language programs, there are ways to cut the amount of memory used by your applications to a minimum.

UNDERSTANDING THE PROBLEM

The Model 100 uses an 80C85 processor as its central processing unit. This processor uses only absolute addressing for all of its operations, therefore mandating that all machine language programs execute at a specific address. The Model 100 operating system, however, is very dynamic. As files are added, deleted, or modified, the locations of other files in the system change position to take up the slack. This is why editing is slower on a 32K machine than on an 8K. There is more memory to shift around

This fluid situation is intolerable in the rigid world of the machine language program. So the Model 100

has implemented a unique solution. Using the CLEAR command from BASIC it is possible to create an area of memory that will not change when the built in processes are running. This "island" of memory is located between the value of HIMEM as set by CLEAR, and the value of MAXRAM. When you select a machine language (.CO) program from the main menu, the program is copied from the .CO file into the reserved memory and then executed.

As you might surmise, this is a very memory hungry way of handling the problem, since the program not only has a file where it resides when not in use, but also requires a reserved island of the same size. Thus a 4K machine language program requires 8K of your valuable system memory.

In the case where you have more than one .CO program, then the island need only be big enough to hold the largest one. When you execute the smaller ones,

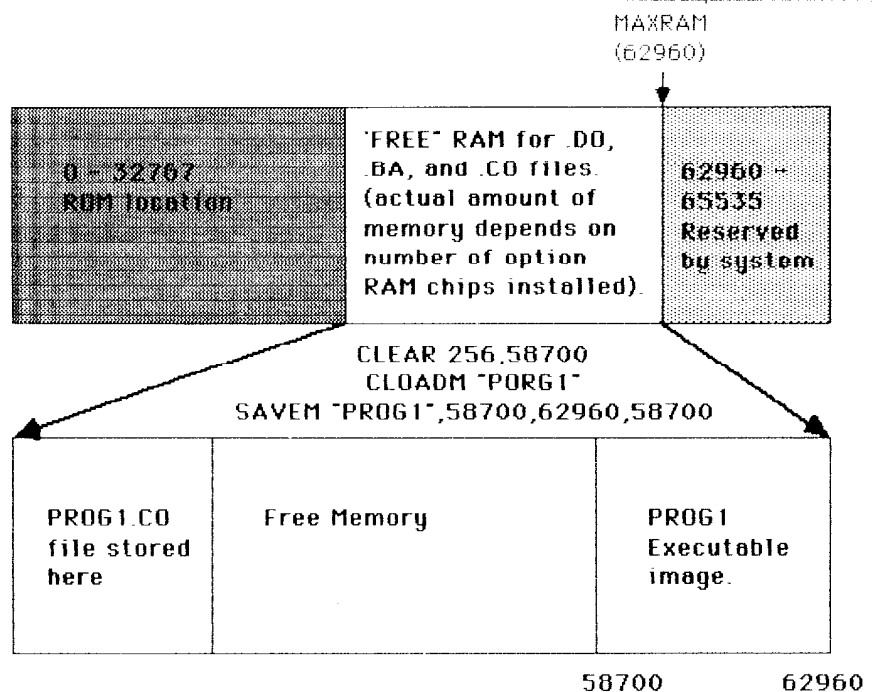


Figure 1. Model 100 Memory Map

each will only occupy that portion of the reserved area that they need.

MEMORY SAVING TECHNIQUES

If you only have one machine code program to contend with, there is an extremely simple, yet effective, way to reduce the amount of memory needed to handle it.

Let's say we have a program that is 4K bytes in length, and has been designed to execute at location 58700 in memory. First you would reserve the execution area in memory by typing (in BASIC) CLEAR 256,58700. Note that the number 256 is the amount of string space you wish to reserve, and should be set for your own tastes.

Then you might load in the program from tape by using CLOADM "name" where "name" is the name of the file on

There is an extremely simple way to reduce the memory needed.

tape. This operation will copy the machine code directly to its execution location in the reserved memory island.

Normally, you would now create your .CO file by entering SAVEM "prog1",58700,62960,58700. As we have discussed this would create a .CO file containing all of the memory between 58700 and 62960, and would indicate that this program begins execution with location 58700. (prog1 is the name you wish to give the .CO file). The file created in this operation will be just over 4K in size, and will reduce your overall available memory by more than 8K.

Since we know, however, that the memory in our island (58700 to 62960) will not be overwritten by other programs, we really don't need to duplicate it in a .CO file. Instead we simply save enough information to tell the system

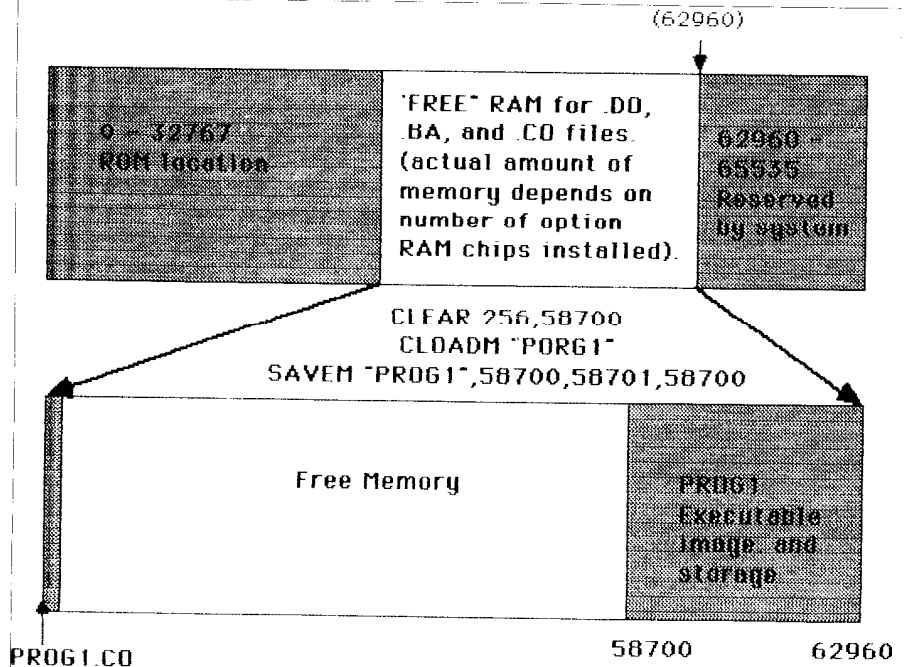
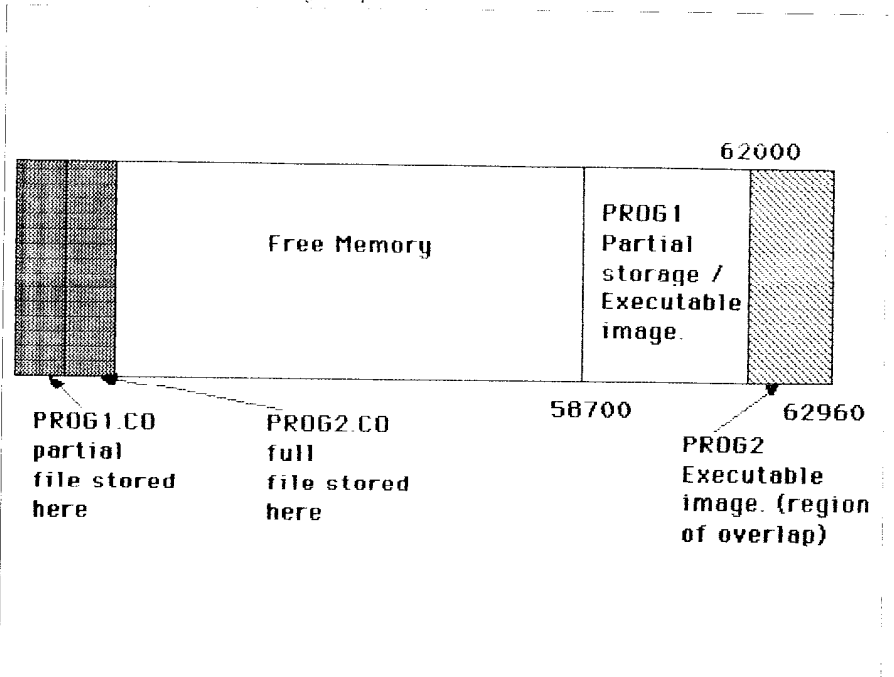


Figure 2. Model 100 Memory Map

where to go when we want to execute this program. Entering SAVEM "prog1", 58700,58701,58700 would create a one byte .CO file (you can't make one that is 0 bytes long). When this .CO file is executed only the one byte would be copied to the first location in the reserved

area, and then execution would begin. Since we know that the remainder of the program is still there (the area was reserved against over-writing) the program will still execute properly. But now it only requires 1 byte of additional storage (above and beyond the 4K is-

Figure 3. Model 100 Memory Map



FOUR MODEL 100 BOOKS

The Model 100 Program Book

by Terry Kepner and David Huntress

This book contains 51 useful and interesting BASIC programs designed for home, office, and educational uses. Program examples include: Bar Graph, Depreciation, Annuity, Pie Chart, Forms creation, Invaders game, Memory scan, Touch typing tutor and many others.

Only \$12.95 plus shipping.

60 Business Applications Programs for the TRS 80 Model 100 Computer

by Terry Kepner and Mark Robinson

Here are 60 powerful programs for interest calculations, annuities, depreciation, invoices, breakeven sales analysis, and more.

Only \$17.95 plus shipping.

Inside the Model 100

by Carl Oppedahl

"...an excellent Guide" —New York Times

Inside the TRS-80 Model 100 is a thorough guide to the internal workings of the Tandy Model 100, the best selling portable laptop computer. This book is a valuable source of information for those who wish to learn assembly language programming on the Model 100.

Other areas include: Disassembled ROM routines; Keyboard scanning; UART, RS-232C, and modem; Clock/calendar chip; Interrupt handling; 8085 instruction set.

Only \$19.95 plus shipping.

User Guide and Applications for the TRS-80 Model 100 Portable Computer

by Steven Schwartz

Gain expertise on the Tandy Model 100 with 14 ready-to-run programs for business. This package includes programs for statistics, graphics, sound, and more. With cassette tape.

Only \$42.95 plus shipping.

Or buy them separately—the book is only \$17.95; the cassette tape is only \$25.00, plus shipping.

Please add \$2.00 shipping and handling for each book ordered.

Short, Simple, And Basic

80 Pheasant Glenn, P.O.Box 11
West Peterborough, NH 03468-0011

Your source for Tandy Model 100/102 books.

land) to store 4K of program.

MORE THAN ONE PROGRAM

As has already been mentioned, multiple machine language programs will want to execute at the same location. For example, if we have a second program that is quite small, say 900 bytes, it might execute in the space from 62000 and 62960. In this case the previous trick would not work, since when the small program ran, it would destroy the lost 900 bytes of the larger one. The solution here is to have the .CO file of the larger program contain only the information that would be lost when the smaller one ran.

To set up this structure you would first clear out enough memory for the largest program (as before). Then you

would load the smaller program and save all of it as a .CO file, SAVEM "prog2", 62000, 62690, 58700. Note that the third argument is still 57800 since this is where the larger program begins execution.

CONCLUSION

Obviously, the ideal technique would be to have machine language programs that are all executed in different locations. Then they could all be stored in 1 byte pointer files. In many instances, manufacturers will have available different versions of their programs that execute in different locations. From these you choose the one that fits your other programs best. For example, CISS corp. has two versions of its LAPSTAR word processor: one for normal tape systems

that resides at 58748, and another for micro-disk equipped systems that resides at 55188 (above FLOPPY.CO).

No matter what programs you are attempting to use, and no matter where they reside, a little thought on your part can greatly increase the amount of free memory in your system. Thus making your Model 100, and your software products, live up to their lofty potential. □

Quick Fixes

Make fast, easy changes to your files with this Search-and-Replace program.

By E.A. Schwartz

I write newspaper stories for a living, not computer programs (as my wife frequently reminds me). One particularly large project, however, convinced me the time had come to write one. I had gathered a dozen files of library notes, each file containing a collection of 10 or 20 separate notes in no particular order. To organize them, I decided to print out each note separately and collate the whole bunch in a looseleaf binder. Then I realized I could organize these files and other projects much more quickly and efficiently if my Model 100 had a Search-and-Replace function to merge the files.

The standard-issue Model 100, as you know, has a Search function. You find it when you press F1 in a Text file. Text asks you what you want to find, then it takes you to it. If you want to search and replace automatically, however, you're out of luck—except with my program, which catches consistently misspelled names, titles, and words and lets you change print formats.

WHAT IT CAN DO

Back to my project. To merge the files, the program inserts a printer-control code at the end of each note where I had originally put an extra carriage return. The program looks for double returns and replaces each one with one return plus the code that tells the printer to advance to the next sheet.

A few quick readers might wonder at this point how you tell the program to find a return. Obviously, you can't use the Enter key to describe what you want to find. (If you

press ENTER in a BASIC program, the Model 100 will enter but will not print the return symbol.) The answer is to use *GRPH e*, which generates a return symbol on the screen, to represent the two characters that signify a return in a Text file: `CHR$(13)+CHR$(10)`.

Suppose, for example, you have completed a long report without using indents but with an extra space between paragraphs. And now you want to submit it for publication. However, the publishing house requires your submission include indents but no extra spaces between paragraphs. Thanks to my Search-and-Replace program, you can do the job in one pass.

Tell the program to search for two returns together and replace them with one return and a tab, which moves the cursor but doesn't appear as a symbol. The program works with spacebar spaces in the same manner. In addition, it deletes material from a file; just search for what you want deleted, and replace it with nothing.

You can use the program to format programs in ASCII files to print in what the Model 100 manual calls "fancy" format. That is, each statement is printed on a separate line. Search for colons and replace each one with a colon, a return, and the number of spaces necessary to indent the program statement so that it is lined up with the first statement in the line.

MEMORY REQUIREMENTS

Once it's loaded and running, the program asks the name of the RAM file you want to search. Enter the file

name. The program then counts the bytes in the file and tells you if you have too little memory to run that file. If your memory allotment is small, the program will tell you the approximate amount by which you've exceeded the available file space.

When you replace a short phrase with a long one, the file can become too long, and you can crash the program. For example, if you replaced "Gus" 20 times with "the Most Reverend Bishop Gustavus Adolphus Johnson," you might have a problem. The worst that could happen—should the program crash—is that you would have the original file, most of the replacement file, and an "OM" error message. Kill the latter file and resume as the next paragraph explains.

If the file is too big, but you still have a modicum of free memory, you might be able to overcome the problem by breaking the file down into two files, each one of which will fit.

S&R needs about as many free bytes in RAM as there are bytes in the file you are searching. This is because the program constructs a new file to replace the old one. You probably won't want to leave the program in residence in a BASIC file, taking up needed space. The program takes only a few seconds to load from a cassette, and you might use it only once a month.

A few other minor operational details: When the program asks for a file, you can opt out by pressing ENTER, which returns you to the menu. And should you get the "oversized file" message, the program

```

4000 CLEAR 600:CLS:MAXFILES=2:INPUT "File";F$:ON
  ERROR GOTO 4150:IF F$="" THEN MENU ELSE
  F$=F$+".do":OPEN F$ FOR INPUT AS 1
4010 CT$=INPUT$(200,1):CT=CT+200:GOTO 4010
4020 CT$="":IF CT+250>FRE(0) THEN PRINT "File"
  ((CT+250)-FRE(0))/1000 "K oversize"
4030 LINE INPUT"Search for? ";SF$:S$=SF$:
  GOSUB 4110
4040 X$=S$:LINE INPUT"Replace with? ";RS$:S$=RS$
  :GOSUB 4110
4050 SF$=X$:RS$=S$:S$="":OPEN F$ FOR APPEND AS 1
  :X$=CHR$(239)+SPACE$(100):PRINT#1,X$:X$=""
  :CLOSE 1:OPEN F$ FOR INPUT AS 1:OPEN "x.do"
  FOR OUTPUT AS 2
4060 NS$=INPUT$(100,1):S$=RR$+NS$:NS$="":X=
  INSTR(1,S$,CHR$(239)):IF X>0 THEN S$=
  LEFT$(S$,X-1):E=1
4070 GOSUB 4120
4080 IF E=1 THEN P$=S$:GOTO 4090 ELSE P$=LEFT$(
  S$,LEN(S$)-(LEN(SF$)-1)):R$=RIGHT$(S$,
  LEN(SF$)-1)
4090 PRINT #2,P$;:P$="":S$="":IF E=1 THEN CLOSE 2
  :KILL F$:NAME "x.do" AS F$:MENU
4100 GOTO 4060
4110 SF$=CHR$(143):RS$=CHR$(13)+CHR$(10)
4120 A=1
4130 S=INSTR(A,S$,SF$):IF S=0 THEN RETURN
4140 A=S+LEN(RS$):L$=LEFT$(S$,S-1):R$=RIGHT$(S$,
  LEN(S$)-((S-1)+LEN(SF$))):S$=L$+RS$+R$:L$=""
  :R$="":GOTO 4130
4150 IF ERR=54 THEN CLOSE 1:RESUME 4020 ELSE
  PRINT ERR "line" ERL:STOP
  
```

S&R allows easy fixes of consistently misspelled names, titles, and words and lets you change print formats.

stops to give you a chance to make a note of the amount you need to delete in the file. Press ENTER to return to the menu.

S & R VARIABLES

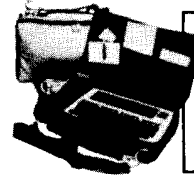
F\$ Filename
 CT\$ Counter input
 CT Counter
 Y\$ Dummy input
 SF\$ Search string
 X\$ Search string saver; Dummy end of file
 RS\$ Replacement string
 NS\$ Raw string to be searched
 RR\$ Final part of string to be searched, added to next string to catch search statements split between inputs

X Position of dummy ending
 E Marker for string including dummy ending
 A Search start position
 S Position of search string
 L\$ Portion of string that has been searched that is left of a located search string
 R\$ Portion of string that has been searched that is right of a located search string
 P\$ String to be printed in replacement file

S & R Line-by-Line

4000 Set up program, open file.
 4010-4020 Count bytes in file in 200s, exit if file is oversize.
 4030-4040 Input search string and re

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placement string.
 4050 Add dummy end-of-file to defeat the inability of Model 100 BASIC to save data in a multi-byte input string that contains an end-of-file.
 4060-4070 Input string to be searched, adding the last part of last string searched, equal in length to the search string less one, so that search statements split between input strings can be detected.
 4080-4100 Put processed string into the replacement file "X.DO," exit if dummy end-of-file detected.
 4110 Redesignates GRPH e's in search and replacement inputs as returns.
 4120-4140 Search for search string, replace with replacement string.
 4150 Error section. □

On the Road to Faster Code

Good computer languages are unambiguous. That is, you can interpret any legal language statement in only one way. The converse doesn't hold true, however. You can write several BASIC statements that perform the same function, in different ways, but with equivalent results. The trick is to determine which method is the most efficient, depending upon your program-design goals.

ESCAPE FROM ESCAPE

Suppose you're writing a program that uses many escape sequences. *Escape sequences* are special codes (starting with ASCII 27) that are usually sent to a screen or printer to give the output device a special instruction. *Esc-E* (`CHR$(27)+"E"`), for example, tells an Epson printer to use bold type. *Esc-p* enables Model 100-family inverse video, and *Esc-q* returns to normal character display.

The question is: Which programming is more efficient—repeatedly indicating the escape code as `CHR$(27)` or assigning ASCII 27 to a string variable?

A short test program shows how these alternatives affect printing speed (see *Program listing 1*). The program changes the system clock to make timing calculations easier. When you're through, you'll need to reset your clock to the right time.

Line 150 tests the first version, using `CHR$(27)` throughout the program. To compare RAM consumption, I saved this in two ways, as `CHR.BA` (159 bytes) and as `CHR.DO` (205 bytes). The program took nearly 15 minutes to run (actually 882 seconds).

To test the second alternative, assigning ASCII 27 to a string variable,

```
I added line 125 and replaced line 150:
125 E$=CHR$(27)
150 PRINT E$+"pHello"+E$+"qHello":B$=E$+N$+E$+"0"
```

In RAM, the tokenized BASIC file `E.BA` occupied 157 bytes, and the ASCII text version, `E.DO`, used 192 bytes. Execution time was 856 seconds. The `E$` version of this program seems more efficient, by a small time difference and by a larger RAM-consumption margin. The more ASCII 27 codes you use, the more RAM you save, too.

When I timed these two programs, I was surprised that the string-variable alternative didn't run faster. Perhaps the slow Print statement was to blame, so I tried the program again using simple assignment statements. Since assignment statements are so fast, I had to increase the number of iterations. First the `CHR$(27)` version:

```
140 FOR C=1 TO 30000
150 N$=CHR$(27)+CHR$(27)+CHR$(27)+CHR$(27)+CHR$(27)+CHR$(27)
```

This program required 530 seconds. The second version, though, took only 287 seconds and consumed far less memory in RAM:

```
150 N$=E$+E$+E$+E$+E$+E$
```

PLUS OR SEMICOLON

In the previous case, escape sequences were printed as `CHR$(27)+"pHello"`. Is that more efficient than `PRINT CHR$(27); "pHello"`? The next test program I tried uses semicolons (see *Program Listing 2*).

The tokenized `SEMI.BA` required 166 bytes of RAM, and the untokenized `SEMI.DO` required 233 bytes. The program required 1,268 seconds to execute.

The string-concatenation trial re-

quired replacing line 170:
170 PRINT A\$+B\$+C\$+A\$+D\$

The RAM files `PLUS.BA` and `PLUS.DO` consumed the same 166 and 233 bytes of RAM, and the test took 1,285 seconds to complete its run. Since the *plus* consumes temporary string space, and can run into problems if the combined string is longer than 255 characters, printing with semicolons is more efficient.

FULL-LINE COMMENTS

A final question: Which is more efficient for beginning full-line comments—the `REM` statement or the apostrophe? I've favored apostrophes since they're only a single keystroke and less noticeable in a program listing. But is there any other difference? See *Program listing 3*, which uses 100,000 iterations of nine comment lines.

This program used 324 bytes as the tokenized `REM.BA`, and 392 bytes as the untokenized `REM.DO`, and took 955 seconds to run.

To test the apostrophes, I replaced the word `REM` with apostrophes. This version, named `APOST.BA`, used 346 bytes of RAM—actually more than the `REM` equivalent—and `APOST.DO` needed 370 bytes. Running the program took 1,194 seconds.

The `REM` version appears to be more efficient. It's faster, and since a BASIC program in RAM is usually stored as tokenized `.BA` files, it's smaller, too.

Next month in MAXRAM, I'll look at another penny-pinching example, and some suggestions for typing in *Portable 100* program listings. □

—Alan L. Zeichick

```

100 DEFINT A-Z
110 N$="ABC"
120 TIME$="00:00:00"
130 '
140 FOR C=1 TO 5000
150 PRINT CHR$(27)+"pHello"+CHR$(27)+"qHello":B$=CHR$(27)+N$+CHR$(27)+"O"
160 NEXT C
170 '
180 PRINT TIME$

```

Program listing 1. The program uses CHR\$(27) to indicate escape code sequences

```

100 A$=STRING$(10,"A")
110 B$=STRING$(15,"B")
120 C$=STRING$(20,"C")
130 D$=STRING$(25,"D")
140 TIME$="00:00:00"
150 '
160 FOR C=1 TO 1000
170 PRINT A$;B$;C$;A$;D$
180 NEXT C
190 '
200 PRINT TIME$

```

Program listing 2. The program uses semicolons to increase speed.

```

100 DEFINT A-Z
110 TIME$="00:00:00"
120 REM
130 FOR C=1 TO 10000
140 FOR D=1 TO 10
150 REM
160 REM This is a
comment
170 REM This is another
comment
180 REM This is yet
another comment
190 REM This is still
another comment
100 REM Here's another
comment
210 REM There's one
more comment
220 REM This is
the last comment
230 REM
240 NEXT D
250 NEXT C
260 REM
270 PRINT TIME$

```

Program Listing 3.
The program uses apostrophes to begin full-line comments.



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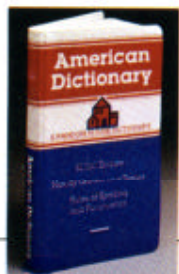
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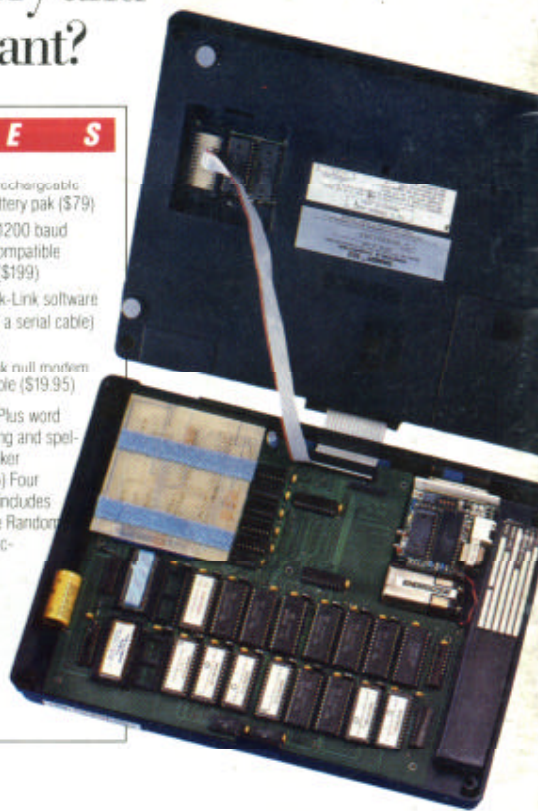
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