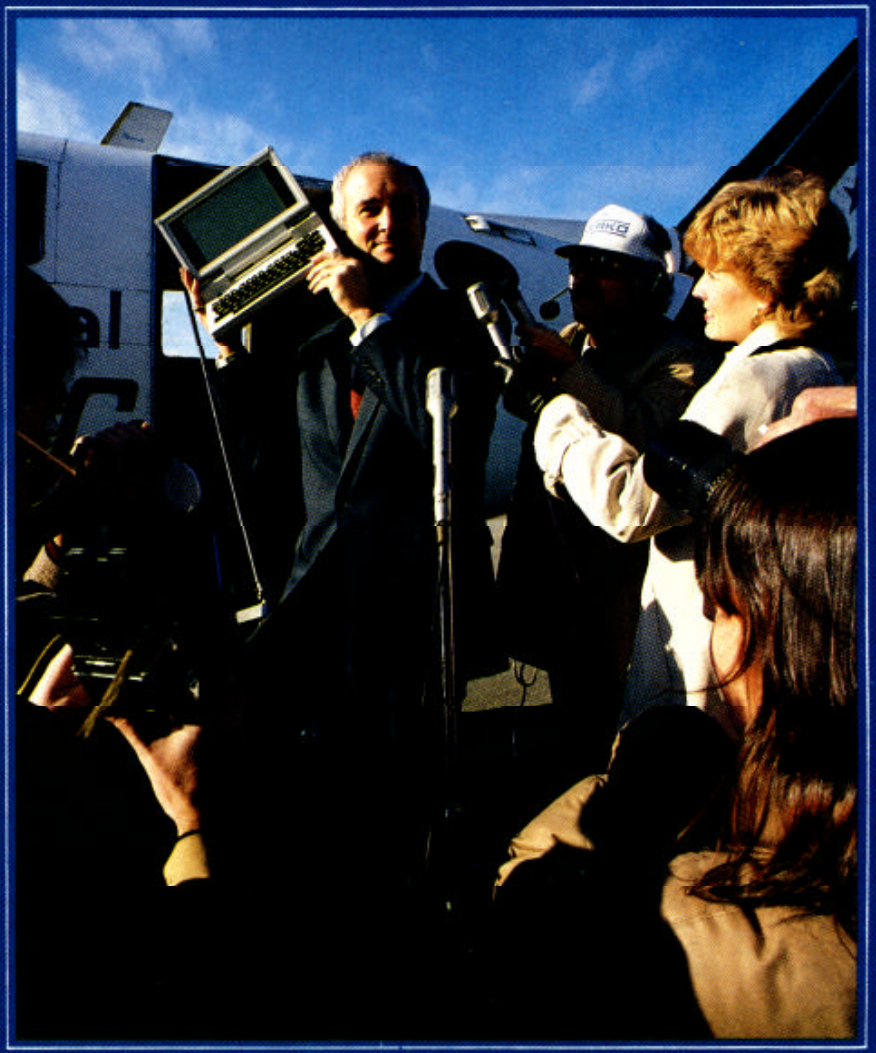
FEBRUARY 1985 $3.95

PORTABLE 100

The magazine for Model 100 users

THE 200 IS HERE!



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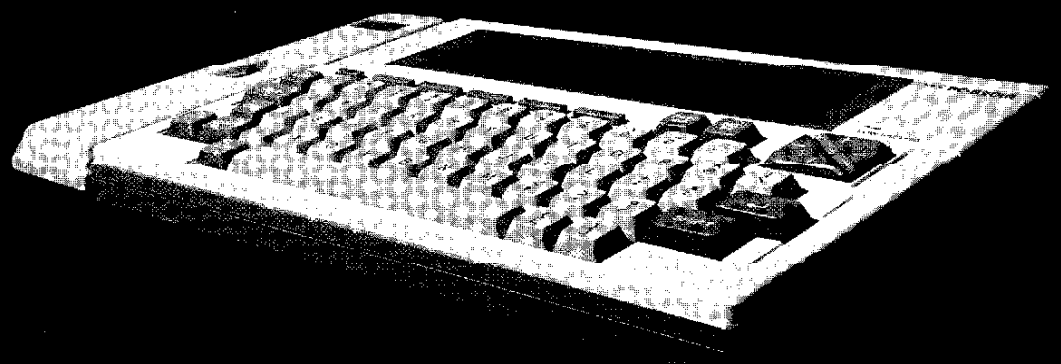
*TANDY CORPORATION

NEW MODEL 200
Tandy's Ed Juge Barnstorms U.S. Showing It Off

LAP MARKET'S Latest Entry: Bill Walters Reviews



NEC 32K vs. SIDECAR 128K

Up To 192K Of Memory On-line For Your NEC PC-8201 Means Goodbye To Unreliable Cassettes, And Bulky Disk Drives.

The problem with most portables is utility gets sacrificed for portability. Only being able to take 32K of files with you is a real pain. Things like form letters, data bases, spreadsheet layouts, and other files have to either be left behind or you have to mess with external storage devices. The inconvenience of having to bring along cassette players, and disk drives (not to mention the hassle getting them to work) can make you wonder why you brought this "productivity tool" in the first place.

THE NEC SOLUTIONS

The NEC PC-8201 has two solutions for this problem. First it has the ability to house up to 64K of RAM inside the machine. Through a technique called "bank switching" you can access up to three different 32K "banks" of memory: two inside the computer and one in a plug-in cartridge. This is a big improvement. But the problem here is each additional 32K cartridge from NEC costs $395.

PURPLE'S SOLUTION

Many of you will remember us as the first company to manufacture an aftermarket 8K memory module for installation inside the computer. This product was so successful that other companies copied it. Our customers kept asking for more storage, and the result is our SideCar™. It uses a bank switching system similar to NEC's to let you access up to ***four additional banks of 32K, giving the NEC PC-8201 up to 192K of on-line memory!*** Now there really is a portable computer of amazing proportions.

THE PORTABLE SOLUTION

Now you can have gobs of data instantly available at the flick of a switch. The SideCar™ plugs into the NEC PC 8201 in the same slot the NEC 32K cartridge uses. The memory is powered by two standard size AA batteries when the computer is not in use. You can even change the batteries without losing the data. SideCar™ comes standard with 32K of memory, with up to three additional 32K modules available giving it a total capacity of 128K. They are simple plug-in options so you can buy a 32K version now and add memory as needed. The batteries will support the memory for up to one year.

NO RISK OFFER

We give you a 30 day satisfaction guarantee and a 1 year warranty on your SideCar™. If you are not completley satisfied for any reason, we will refund the entire amount of your purchase. If at any time during the one year warranty period your SideCar™ requires service, we will fix or replace it within 48 hours.

THE BOTTOM LINE

The basic 32K SideCar™ with 32K in bank 1, expandable to 128K, is $349 (Part #SC32). User installable 32K banks are $145 for bank 2 (Part #SCB2), and $175 each for bank 3 and 4 (Part #SCB34). If ordered together the banks are installed and tested at the factory.

Price includes shipping, and insurance in the continental USA. Your SideCar™ will be shipped the next business day via UPS surface freight. If you want 2nd day air service, just add $4. No extra charge for VISA/Mastercard, or American Express. For fastest delivery send certified checks or credit card. Calif. residents add 6% sales tax. Personal check take 3 weeks to clear. Call for purchase order information.

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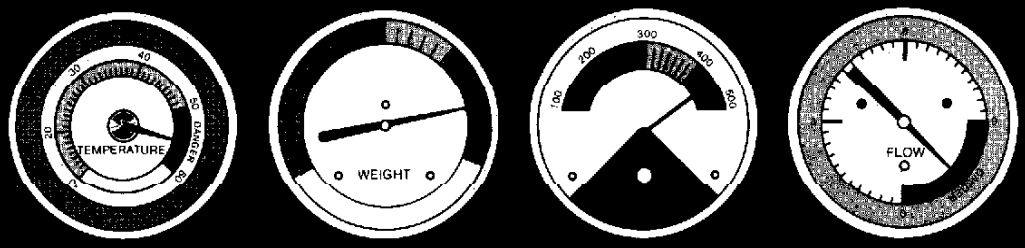
What could happen in an hour?



A lot of things could go wrong in an hour . . . Or right, with a Quasitronics Q-3000 Series Intelligent Peripheral.

So why not let things go right . . . with a Quasitronics Q 3000 Series Intelligent Peripheral? That's all you need to turn your computer into a sophisticated data acquistion and control system. In record time. And we make it easy because we put the intelligence in the box. You'll never have to worry about setting up complex interfaces that take days to configure. But you will have to think about the level of intelligence you want.

Our high performance Q-3010 and Q-3020 support the ever-popular BASIC. All you need is a terminal to write your specific application program. Our optional non-volatile memory even protects your program when the power is off. And because we've built in a TINY BASIC interpreter, these two systems can stand alone . . . without constant direction from the host computer.

Our very economical Q-3014 and Q-3024 talk in simplified ASCII command code. This means you'll have sharp, efficient communication . . . with control commands sent by the host. And whether you're comfortable with FORTRAN, PASCAL, BLISS*, or C, you'll develop programs in the language that's right for you.

Every Q-3000 has remote capability through a built-in-short haul modem and standard RS232 serial port. Your system will talk with hosts up to 1000 feet away over an asynchronous serial communication link in ASCII. So you'll always have up-to-the-minute data reporting and function control during critical operations. And for data collection from hostile environments, the dual slope A/D converter reduces interference from electrical noise.

To give you additional flexibility, a variety of I/O channel combinations are available. Both the Q 3010 and Q-3014 have 8 analog inputs, while the Q-3020 and Q-3024 have 2 analog inputs. All Q-3000's come with 4 digital outputs for driving a wide range of loads. When set in conjunction with their built in real time clocks, the I/O channels do everything from logging data to activating alarms and controls. At selected intervals and values.

So why wait another hour to see what can go wrong in your operation, when so much can go right with a Q-3000 Series Intelligent Peripheral. We're so sure about that, we even give you a unique 1 year warranty against manufacturing defects.

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General Specifications		
Analog Input	**Serial I/O**	**Digital Output**
Standard Full Scale Input Voltage is ±5 volts. Resolution is 1 part in 5,000 or 1 part in 20,000.	RS-232 or current loop, ASCII message format.	Open collector drivers to control LED's, relays, alarms.

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page 33

PORTABLE 100

VOLUME 2 NO. 13
FEBRUARY 1985

COVER STORY

33
TANDY 200:
THE LEGEND CONTINUES...
By Bill Walters
While not the revolutionary item its sibling was, the 200 still improves a good thing.

ARTICLES

26
SUPPLY AND DEMAND IT'S ONLY A MATTER OF POWER
By Carl Oppedahl
You need to know more than it only takes four AA batteries to run your 100.

40
SPREAD — PART 2: EXPANSION AND SOME HELPFUL PATCHES
By Woods Martin
In the further adventures of the Penurious Peanut Company, Spread keeps the goober firm out of the red.

48
THE SECRET BEHIND THE ENIGMATIC @.BA
By Jessie Bob Overholt
When Jesse Bob finished RFU, he promised to reveal all about his cassette backup file @.BA. Here's what the odd-looking file does.

COLUMNS

18 BUSCH I FAGLE
Auto Program — Part 9: GS & R Lets Your 100 Sweat the Details, Not You
By David Busch
22 FULL DUPLEX
By Terry Kepner

REVIEWS

54 BRIDGE
Alpine Data Systems
55 PORTABLE ACCOUNTANT
FACS Inc.
62 SIDECAR
Purple Computing
64 PORTAPAC
Cryptronics Inc.

DEPARTMENTS

4 PREVIEW
9 MAIL.100
12 THE WIRE
17 BOOKS
66 NEW PRODUCTS
68 USER GROUPS

Cover and feature photographs by Benjamin Magro.

page 40

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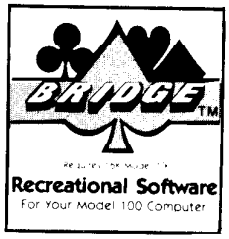

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PREVIEW

JOHN P. MELLO JR.

FAREWELL FROM AN EDITOR MOVING ON

This is my last issue as editor of *Portable 100*. I am leaving for personal reasons. They have nothing to do with publishing or computers or business. They have to do with matters of the heart.

However, I couldn't have chosen a more apt moment to depart, a more pregnant moment to usher in a new regime, because I am leaving when Tandy will introduce its successor to the Model 100.

In order to get the new Tandy portable on the cover this month, we had to alter our publishing schedule. We have scrapped the January issue and will make up the shortfall to subscribers by sending them an additional issue when their subscriptions expire.

That means current readers will get one more issue of the new *Portable 100* with its expanded coverage of Tandy's new lap computer.

Readers will be guided through the new era by *Portable 100*'s new editor, Bruce Taylor.

Bruce brings a wealth of publishing and journalistic experience to *Portable 100*. He just finished a stint at New England Publications, where he helped launch two travel annuals and revamp another. He has been a television and newspaper reporter, editor of an overseas weekly, and marketing director of the state Maine.

Bruce, who can be found on numerous summer days sailing Penobscot Bay, will be skippering a mature *Portable 100*.

Maturation came after months of struggle, and it wouldn't have been possible without the support of some people I'd like to publicly thank.

You have seen some of them here before:

Kerry Leichtman, who lobbied for my appointment as managing editor of the magazine; Jim Povec and Carl Cramer, who maintained their commitment to the 100 through the most harrying of times.

Others are almost invisible here:

Peter Montross, *Portable 100*'s advertising magician, who created the advertising base the magazine needed to survive, a remarkable feat when you consider most products for the 100 were only a twinkle in eyes of their creators when we set the publication date for this magazine.

Dave Thomas, assistant sysop of the Model 100 Special Interest Group on CompuServe, has worked tiredlessly and selflessly to maintain what is today the best source of public software for the 100 anywhere.

Connie and Doug Leavitt, and the crew at Camden Type 'n Graphics, have kept the galleys coming despite the trying pressures a periodical can exert on a typesetter.

Nancy Laite, my assistant editor, who manages a smile even in the face of my ravings in the editorial department as the monthly deadline approaches.

Paige Parker and Margie Strauss, who have tolerated my imitations of Perry White in the production department.

And there are still others:

Mike Greenly, whose reporting has appeared in these pages from time to time, who revived my wonder in computing when I felt it all getting stale.

And Peter Stanwyck, who taught me to better understand what Jonathan Edwards meant when he advised his flock "intend to live in continual mortification, and never expect or desire any worldly ease or pleasure."

David Busch, who has been an editor's dream: always two columns ahead and right on deadline.

There are many more: Terry Kepner, Jake Commander, Bill Louden, Bill Walters, Tim McByron....

I've enjoyed working with these people.

I have enjoyed watching *Portable 100* grow.

When this magazine began, I wanted it to have its own voice. That didn't mean doing different for difference's sake. It did mean not doing only because that's the way it's done.

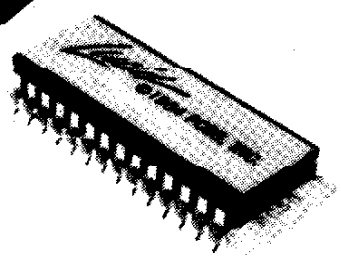
I admit we've stumbled along the way. One of our biggest fiascos was typesetting program listings. But we regained our balance and kept going forward.

I regret I won't be here when *Portable 100* takes its next step, a giant one for the magazine and Tandy.

I'll miss *Portable 100*. I'll miss it with all my heart. ◀

Not only a spreadsheet, but a program generator as well.
So good we sell it on a satisfaction guaranteed 30 day trial.

Lucid©



Appears on MAIN MENU like a built-in! on Snap-in™ ROM. Takes no memory to store or for operating overhead. All RAM is available for data storage.

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LUCID© is truly the spreadsheet plus. The result of a splendid, exhaustive research and development program to produce the fastest, most feature-rich spreadsheet for the Model 100 that gives you capabilities you cannot equal with Multiplan* or even Lotus 1-2-3**.

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Anyone who experiences LUCID© won't settle for anything else.

is an advanced spreadsheet that is a program generator as well.

on Snap-In™ ROM

Changes your Model 100 into a totally different computer with capability you never thought possible.

PCSG says "Satisfaction Guaranteed or your money back within 30 days!"

PCSG was the first to develop software for the Model 100. That was back in April of '83. We could have rushed out onto the market with an inferior spreadsheet, but we chose to undergo a significant development and produce a spreadsheet for the Model 100 that would truly be world class. A spreadsheet that would rival Lotus 1-2-3*.

LUCID® is here now. It is on a ROM cartridge that snaps into the compartment on the back of your Model 100. It takes no memory to load and no memory for operating overhead. That means you have the full 29.6k bytes free to store your data.

LUCID® is amazing in so many ways. First of all, it is memory conserving. It will let you build a large spreadsheet--255 row by 126 column capacity. Where other spreadsheets actually consume 4 to 5 bytes for an unused cell, LUCID® uses no memory for empty cells. This lets you build huge spreadsheets in your Model 100's RAM that could consume 80 to 100K on a desktop computer.

Secondly, LUCID® is fast. Whenever you ask other spreadsheets to calculate a file of any size, you can get up and go get a cup of coffee before they are through. LUCID® is so rapid, a 36 column corporate financial statement took less than 4 seconds to calculate.

Thirdly, LUCID® has features you won't find in most other spreadsheets. For example, when you type a label (text) it will cross column boundaries, in other words when you type a label or title it will appear as you type it irrespective of column of width. LUCID® also allows you to set column widths individually, and of course LUCID® has insert row and insert columns, as well as other standard features. LUCID® even lets your formulas refer to cells in other spreadsheet files.

Further, LUCID® has what no other spreadsheet has: Cut, Copy, and Paste. It uses the same keys as Cut and Paste in TEXT, but here's the difference:- it takes all the formulas with it when you paste and they all automatically recalculate with the entire sheet.

And here is what is really amazing. You can copy or cut from one spreadsheet and paste into another spreadsheet or even a TEXT file.

LUCID® supports all BASIC math functions as well as Log, sine, cosine, tangent, exponentiation and other sophisticated math funcions.

LUCID® has so many features that you will say "this is what I need in a spreadsheet", such as automatic prompting of an incorrectly typed-in formula showing just where the mistake was made.

LUCID® has expanded "go to" functions that remember and produce a windowing capability. It has a special block definition capacity that makes many other

*Trademark Lotus Corp. © PCSG 1984

features possible that refer to whatever section of the spreadsheet you designate. LUCID® has many enhancements that make it easy to use. Once anyone begins to use it they say "this is the way a spreadsheet ought to work".

In the same fashion as TEXT creates ".DO" or document files, LUCID creates ".CA" or calcsheet files. In the same way you can get into any document file just by putting the wide bar cursor on the filename from the main menu, when you put the cursor on any ".CA" file, you are immediately working on that sheet.

But perhaps most remarkable is that LUCID® is not only a spreadsheet but a program generator as well. First, LUCID® lets you protect all cells against entry or change, and then unprotect just the cells you want for someone else to use as input fields.

Combined with the spill-over length feature, you can design input questions such as "What is your name?, What is your age?, Choose which applies to you: a) TALL b) MEDIUM c), SHORT, Type in the state where you were born". You can provide complete on screen instructions for use. This lets you create a series of prompts so that you can have a person totally unfamiliar with computers, entering information that you want to process, to create a personalized report based on calculations made using the facts and numbers they put in.

You see, LUCID® will not only process values, but text input as well so that the facts other than numbers can be responded to. LUCID® has the ability for you to refer in a formula to cells containing words. This feature combines with the capacity of doing "if then" statements that work by doing table look-ups against even massive X/Y charts of text or numerical information. A simple example based on the inputs illustrated above would be to report the recommended calcium intake for tall people based on their age. You can make even more specific inquires and reports, such as recommended amount of Aerobic exercise based on age and weight. Answers can be values or words depending on the situation, eq. 150 lbs., 25 years might be "30 minutes" but 280 lbs., 50 yrs might be "Warning: Aerobic exercise could be dangerous". You can produce a program that responds to inputs with no programming knowledge whatsoever.

You can prepare a report section in your spreadsheet with instructions to your user for printout, and they can produce a personalized printout that responds to their input. All your formulas and tables that did the calculations and provided the facts are invisible to that user. LUCID® is useful for doctors for patient questionaires, trouble-shooting technicians, purchase clerks, people doing job quotes, stores for customer workups, insurance agents and anybody who needs to process specific facts and numbers to produce a report based on those responses.

LUCID® comes with a manual that explains not only the characteristics of LUCID®, but will train you how to use a spreadsheet even if you have never seen one before. You are shown how to do budgets, forecasts, breakeven analysis amortizations and many other types of personal and business reports and calculations.

User friendly is such an overused term in this industry, but we can tell you that everyone who uses LUCID®, who has experienced any other spreadsheet, says that LUCID® is amazingly easy to use. A typical comment has been "I have never seen a spreadsheet that does so much, and yet LUCID® is so much easier and faster to use."

LUCID® is a result of a most exhaustive developmental effort in which PCSG's objective was to develop a spreadsheet that was better than the state-of-the-art. We are so pleased because LUCID® provides for the Model 100 spreadsheet capability you cannot equal on a desktop computer. Plans are underway to offer LUCID® someday for larger computers, but for now TRS 80 Model 100 owners have the good fortune of having this powerful exciting ROM program exclusively.

LUCID® is the easiest to use, fastest and yet most feature-rich spreadsheet, with capability that takes it far beyond the definition of a mere spreadsheet. We are so excited about LUCID®, because it changes the Model 100 into a totally different computer with power and function most never dreamed possible.

LUCID® is, in our opinion and that of those who have examined it, a breakthrough. We sell it on a 30 day trial. If you are not completely satisfied, return it within 30 days for a full refund. Priced at $149.95, on snap-in ROM. Mastercard, Visa or COD.

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Lucid© SPEC COMPARISON

	Lucid	1,2,3	Multiplan	Visicalc
Cut and paste into other spreadsheets or TEXT	Y	N	N	N
Individually variable column widths	Y	Y	Y	N
References to labels in formulas	Y	N	N	N
# Rows	254	2048	255	254
# Cols	126	255	63	63
References to cells in other spreadsheets	Y	Y	Y	N
Two dimensional table lookups	Y	N	N	N
Cell protection	Y	Y	Y	N
Redirectable output	Y	Y	—	N
Long labels spill over column boundaries	Y	Y	N	N
Insert row / col	Y	Y	Y	Y
Delete row / col	Y	Y	Y	Y
Replicate	Y	Y	Y	Y
Copy	Y	Y	Y	Y
Absolute and relative cell references	Y	Y	Y	N
Function to count cells occupied by a value	Y	N	Y	Y
SQR				
SIN				
COS				
TAN				
ATN				
LOG				
EXP				
INT				
TBL (Lookup, Choose, etc.)	Y	Y	Y	Y
RND				
SUM				
CNT				
MAX				
MIN				
★★				
Edit keys work on initial input	Y	N	N	N
Natural order of recalculation - with detection of circular references	Y	Y	Y	N
Automatic syntax checking of input - cursor stops at your mistake	Y	N	N	N
'Wander' mode on input of formulas to 'point' to cell references	Y	Y	Y	Y
'Wander' mode on edit of formulas	Y	N	N	N
'Go to' remembers where you 'came from'	Y	N	N	N
Sort by column and row	★	Y	Y	N
Graphing of selected ranges	★	Y	N	N
Automatic insertion of date into edit line with control-D	Y	N	N	N
Super compact - empty cells take no memory	Y	N	N	N
Table lookups can use labels as keys	Y	N	N	N
Available now on Model 100	Y	N	N	N
Automatically fits wide spreadsheets to narrow paper	Y	Y	Y	N
Ability to suppress zeros on printout	Y	N	N	N
Allows multiple printer fonts in same spreadsheet	Y	N	N	N

These Lucid functions operate on rectangular ranges as well as individual rows and columns.

★ Extensibility by optional personality modules, with function key access.
★★ Lucid is designed to perform by simple one time entry formulas all other functions not provided as built-in.

Speed and Precision Comparison
All benchmarks performed on a spreadsheet occupied by 600 formulas.
all times in seconds.

	Lucid on Model 100	123 on IBM PC	Multiplan on IBM PC	Visicalc on IBM PC
Sum of 600 cells	2.0	1.4	11.5	7.0
Insert column	0.5	2.4	11.0	6.0
Square root 600 cells	133	12.0	112	298
Replicate 100 rows	20.0	1.5	20.0	12.0
Decimal precision	14 digits	11 digits	14 digits	12 digits

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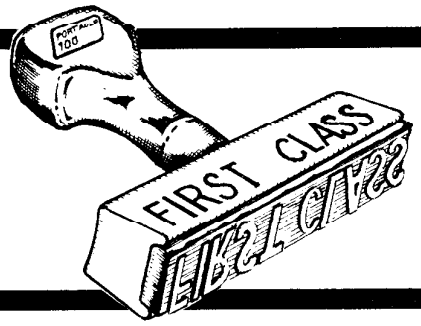


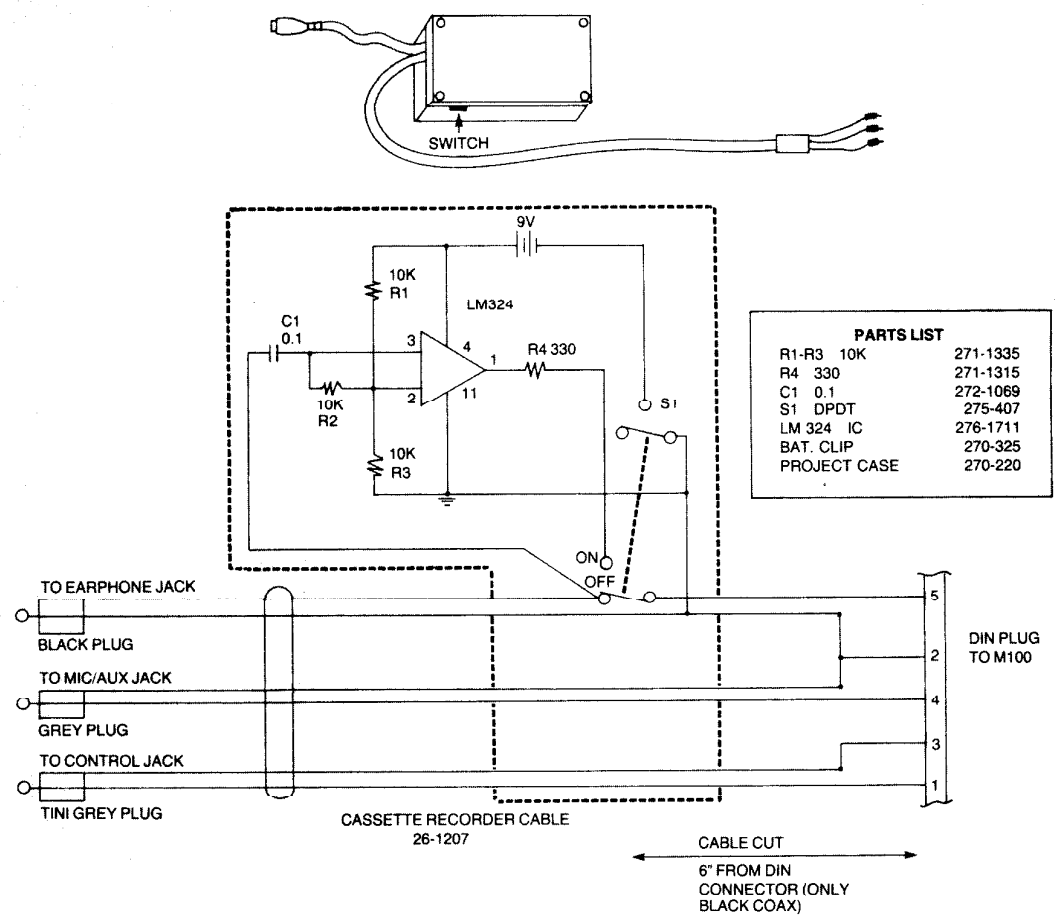
Editor's Note: In addition to letters from our readers, we also include in Mail.100 letters from CompuServe and The Source. Those message writers are identified by their CompuServe (CIS ID) and Source (STC ID) identification numbers.

CASSETTE TIPS

In the July issue several readers described problems with their Model 100 and cassette recorders. I have encountered several problems, since I use non-Radio Shack cassette recorders to store data. I have solved most of the problems and would like to share their solutions.

It is important that the playback signal from the recorder be at a high enough level.

The Model 100 manual states that the level should be between 0.8 and 5 volts (AC,RMS). To provide a clamped



PARTS LIST

R1-R3 10K	271-1335
R4 330	271-1315
C1 0.1	272-1069
S1 DPDT	275-407
LM 324 IC	276-1711
BAT. CLIP	270-325
PROJECT CASE	270-220

M-100 MICRO CASSETTE INTERFACE
DAVID H. KAUN 8-12-84 MENONOME, WI

signal to the input amplifier M30 (the Model internal input amplifier for signals from the cassette recorder), the input level should be over .25 volts.

Although M30 will switch states at lower voltages (low to high for an M30 input greater than +77 millivolts and high to low for an M30 input below +107 millivolts), the higher peak voltages are needed to obtain clean, wide pulses for the CPU serial input.

I have found I need at least a 1.2 volt rms recorder output signal to get reliable data transfer.

Under full limiting, the input load seen by the recorder is about 100 ohms. The small "walkman" type cassette recorders intended for earphones may not provide a high enough output, even at full volume, to adequately drive the 100-ohm Model 100 cassette input.

If the cassette unit uses four batteries (6 volts), output will probably be high enough at full volume. If the cassette unit uses two batteries (3 volts), output will not be sufficient to give reliable data transfer. The end result is an incorrect checksum and the CLOAD operation aborts.

Too high an input voltage will result in false transitions from background noises. A cassette recorder nominal signal above .8 volts also insures against the normal variation in small recorder output signals of several decibels from causing the CLOAD abort.

Another problem is portable cassette recorders use a permanent magnet or a DC electromagnet in the erase head to erase during the record (CSAVE) operation. This erase is inadequate to cleanly erase previous data on digital tape formulations. I have found I have to bulk erase digital data cassette tapes before I use them with my portable recorders to obtain reliable results.

This problem does not occur with 110 V AC powered cassette recorders, since these use the high frequency bias signal to drive the erase head, and usually it is at a high enough level to do a clean erase of digital tapes.

If the recorder has metal tape record capability, the erase will be strong enough for digital tapes.

A major problem has been getting the Model 100 output signal attenuated so it will not overdrive the single input of my portable recorders. The Model 100 output signal is at too high a level to go directly into the microphone input.

The recorders expect a millivolt or less and the Model 100 is sending about 650 millivolts. The result is a gross distortion of the recorded signal and total inability of the Model 100 to recognize it on playback.

By using an 18K resistor in series and a 100 ohm shunt resistor on the recorder side with both R and L inputs connected together, I am able to reduce the signal at the microphone input to where my Sony Soundabout works well.

The recorded tape signal is about 1 decibel over the standard reference level, and this is about as much as one should have. Above this there is too much distortion of the audio, and the Model 100 CLOAD process becomes unreliable.

The last point is about tapes. The only reliable cassette that I have found is a cassette tape such as Radio Shack's Delux Certified Computer Cassette

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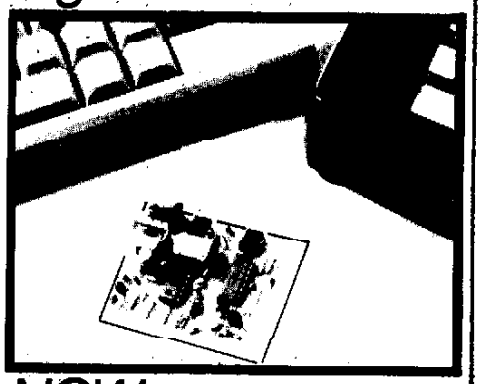

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(Radio Shack Catalog No. PN 26-308).

It is too bad that Microsoft did not provide a soft failure characteristic on CLOADing when the checksums do not match. It would be nice to have the CLOAD process continue on to the end of the program. It is easier to make a simple manual correction to the data, text, or program where the error occurred then to lose the entire file because of single single-bit errors.

David A. Heiser
Carmichael, CA

U.S. SNAIL DELIVERY

My congratulations on achieving your first birthday. *Portable 100* presents information that's badly needed in a field where standardization hasn't yet been achieved.

The sweepstakes was certainly a fine way to celebrate your anniversary and I think it was really great of your advertisers to offer give-away prizes.

The end of the month is always a treat for me. That is when I receive my issue of *Portable 100*. To my surprise, free gifts were offered if I sent in my card by October 1. That would be highly unlikely as I didn't receive my magazine until September 28.

Some thought should be given to this. I'm sure that we in the midwest are shunned by the postal workers. I know for a fact that my issue isn't the only one detained due to conversations with other 100 owners who have the same complaint.

I'd like to see more articles on running programs with the Disk-Video Interface. It seems that a lot of programs won't run when using the DVI due to location of the interface in RAM. I'd like to see articles that'd tell us how to get around this or let the programmers write the programs to fit. Tandy seems to be the worst offender.

Dan Lichtman
Northbrook, IL

▶ The Model 100-cassette interface is a very popular topic of discussion among Model 100 owners. For MEWS buffs comfortable with the working end of a soldering iron, David Kaun offers the plan below for creating a microcassette interface.

—*Eds.*

EXPAND THE SEARCH

I thoroughly enjoyed Jesse Bob Overholt's series and program, *Funkey* (see July and August issues of *Portable 100*). It's a well-written and useful program. However, I've noted one problem with the program. It doesn't locate all the directory entries. I believe that Jesse stops the directory search too soon. Modifying line 50010 to

50010 NF=0 :FOR X-1694 TO –1364 STEP 11

appears to correct the problem.

Roy H. Nickum Jr.
Overland Park, KS

◀

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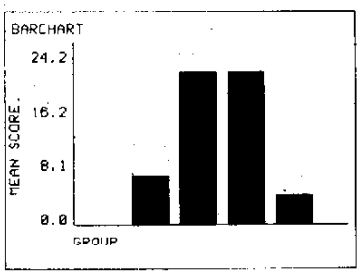

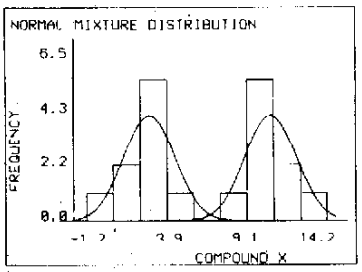

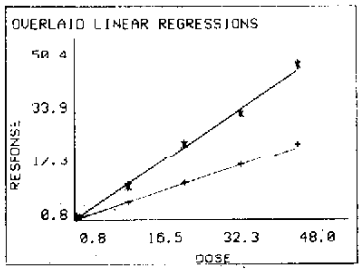

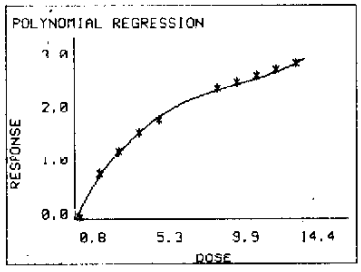

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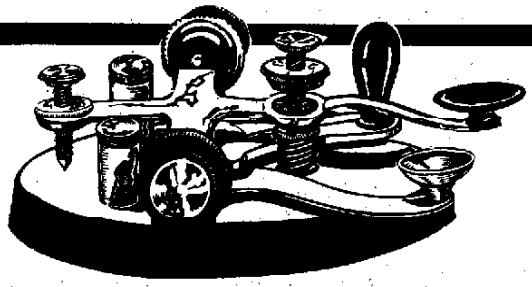
THE WIRE



MEWS STAR AT PR CONFERENCE

One would have thought it was a convention of reporters. There they were, all lined up against the wall with heads and hands poised over Model 100 screens and keys. It was reminiscent of widely circulated pictures of the press, a group that has eagerly taken to the little computers. But first impressions can be deceiving.

They were reporters, yes. But press they were not. They were members of the Public Relations Society of America attending the national conference in Denver, CO, and acting very much the part of their media kin. They were in fact writing news and feature stories, summarizing the major conference activities, and doing it on half-a-dozen Model 100s set aside for the job.

The reporting crew was made up of about a dozen public relations practitioners who had organized themselves ahead of time on CompuServe's Public Relations and Marketing Forum (PRSIG) to cover the conference. After the stories were prepared on the Model 100 by the PR reporters, they were uploaded onto PRSIG so that public relations colleagues could share in the conference experience. Fourteen conference stories eventually were prepared by the reporters —many of them within hours of the original presentation.

Already the group is planning for next year's conference in Detroit, said Ron Solberg, systems operator for PRSIG. "We found that the 100 was so easy to use by both computer pro and novice that we're hoping to lease or rent it out to any and all attendees who wish to use it. With more than a thousand in attendance, we have virtually an unlimited resource to tap to get that story."

Solberg and his colleagues realized that the 100 combined with videotex opens a national conference much beyond its usual audience. In addition to making it possible for individual readers to tune in, local newsletter editors around the country now have access to the same kind of resources usually accorded the most sophisticated news organizations.

"I don't think we expected that so many of our associates would be quite this ready and willing to spend personal time to report a conference to distant colleagues," said Solberg. "That 100 is really a remarkable instrument — it just makes you want to sit down and write a story."

TANDY DEBT RATING LOWERED

Standard & Poor's Corp. has lowered the rating on Tandy's approximately $130 million of subordinated debentures to "A" from "A+" and assigns an "A+" rating to the company's proposed offering of $300 million senior notes.

The ratings on subordinated debt are removed from Credit Watch where they were listed Nov. 12.

S&P said the change reflects the impact of highly competitive conditions in the microcomputer industry along with financial implications of an extremely aggressive share repurchase program.

Profits for the first quarter ended Sept. 30 declined 37 percent, extending a trend that is not expected to be quickly reversed.

At the same time, Tandy's balance sheet has been significantly altered by some $500 million of stock repurchases and the issuance of over $200 million of long-term debt. In early October, Tandy's directors authorized the repurchase of an additional 5 million common shares with a current market value of $120 million.

MAGAZINE SHAKEOUT

Tandy Corporation was cited as an example of an American corporation taking advantage of rapidly-developing information technology to remain competitive in a global economy at the 16th annual Information Industry Association conference held at the Sheraton Palace Hotel in San Francisco.

"Information is starting to become a competitive factor to an enormous number of cutting-edge companies," noted William McGowan, chairman and chief executive officer of MCI Communications Corp.

For example, McGowan said, the Texas-based Tandy Corporation has each of its 8000 computer stores linked electronically with its headquarters, enabling executives to track every single sale in each store every day.

McGowan told more than 700 participants at the conference that digital communications systems transmitting both voice and data will make for cheaper and more reliable telecommunications.

Electronic mail systems will tie businesses together with their clients and their employees, he said.

McGowan, one of the keynote speakers who kicked off the three-day conference, added that real estate agents in San Francisco can use telecommunications to show houses to clients in New York City.

And insurance salespeople can take a computer to a prospective client's house, connect it by phone line to a large computer, and calculate insurance packages on the spot, he said.

McGowan said telecommunications represents "the highways" and the "bargelines" of this new information era.

He predicted more companies will begin to take advantage of the rapidly developing information technology: "I think history will show a watershed when all this happens, and when it happens it will happen in a rush."

The Information Industry Association is a trade group representing companies that create, store, manage, and distribute information. ◀

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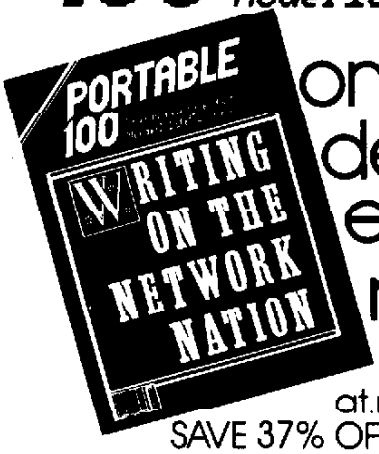

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DON'T BE PUT OFF BY HYPE IN TITLE

Computer of the Century
William B. Sanders
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269 pages
$19.95, softbound

By SCOTT L. NORMAN

Despite the rather ambitious title, this book isn't an encyclopedia of Model 100 lore. Instead, it's essentially an introduction to programming in Basic, with a modest buyer's guide thrown in for good measure.

Since the Radio Shack manual specifically disclaims any responsibility for teaching you how to write programs, there seems to be a market for such an introductory text; I think that despite a few rough spots, William Sanders has succeeded in producing one.

Geniality and patience set the overall tone of the book. Prospective readers should be able to handle the occasional foulups that accompany the learning process.

At the same time, it's hard to maintain that this is the ideal text for the terminally hard-nosed. Because of the introductory level, it emphasizes short, simple programs. They can eventually be made to do useful things, but make no mistake: You won't be writing super data-base managers or accounting systems by the time you reach the last chapter.

And then there are the numerous cartoons that adorn the book. I'm ambivalent about them. To be sure, they're wittier and better drawn than the ones in TRS-80 Color Computer manuals. I prefer the two-fingered extraterrestrials who admire the binary system and Winston Churchill. However, I wonder if all of the pictures are really necessary. I'm far from convinced they enhance the book's ability to teach, and they may make it less attractive to the business user who wants to dip into Basic programming.

BEATS MANUAL. I can discuss the major portion of the book in a few words. In general, my impression is that it could be used successfully as a self-study course in 100 Basic. The author's style is light and easy to follow, topics are treated in a logical order, and the program listings are short, plentiful, and easy to read (although the parentheses tend to look too much like square brackets). A few of the errors in the Radio Shack manual are brought to the reader's attention and corrected.

Most topics are covered in greater detail than in the computer's manual. There's a particularly nice, compact treatment of sequential tape and RAM files, culminating in a little information management program for creating, appending, and reading text files. Commands involving relational operators, such as PRINT(X<Y), also receive a more complete explanation than is common in an introductory text.

NOT FLAWLESS. At the same time, the book does have some flaws. They're not fatal, but I think they should be pointed out since they can trip up a novice user.

In the first place, there's considerable evidence of a hasty proofreading job, presumably the result of the publisher's interest in getting the book to market in time to be competitive. Aside from the relatively harmless identification of a megabyte as a measly 102,400 bytes ("to be precise", the text informs us) and similar matters, there are errors in some of the program listings. Some of these are fairly obvious, but what is the raw beginner to make of this example from page 114?

```
10 DEFSTR
G20 G="GOOD GRIEF!"
30 PRINT G
```

Only a single symbol has been incorrectly located but the newcomer to Basic could have a rough time.

There also are several instances of faulty logic within program listings: N=N-1 when N=N+1 was intended, and that sort of thing. The plus sign is replaced by "<<" on page 110 and again on page 112, and probably elsewhere as well. A $20 book really should do better.

There also are a few organizational problems.

The symbols for integers and single- and double precision variables are described long before such quantities are actually defined, which might prove confusing.

The reader learns how to redefine a function key on page 25, but the instructions for clearing the definition don't appear until page 208.

READ and DATA statements are introduced in the body of the book, but RESTORE only is mentioned in the glossary.

Finally, there are some stylistic lapses. For example, I'd quarrel with the practice of having GOTO and GOSUB statements use REM lines (e.g. subroutine title lines) as their destinations. This can get the programmer into real trouble if the REMs are deleted to save space. You might as well develop good programming habits while you're learning.

MANUAL COMPANION. However, I should really repeat that I don't consider any of these problems to be insurmountable. The message is that you have to keep your eyes open and your wits about you. There's enough worthwhile material here to make *Computer of the Century* a useful adjunct to the 100 manual for experienced users, and a primary reference book for the novice — even if the title really belongs to Whirlwind, ENIAC, or System/360. ◀

BUSCH LEAGUE

DAVID BUSCH

AUTO PROGRAM — PART 9
GS & R LETS YOUR 100 SWEAT THE DETAILS, NOT YOU

Editor's Note: This is the ninth in a series of columns by Dave showing Portable 100 *readers how to program the Model 100 to program itself. The columns are adapted from Dave's book* Teach Your TRS-80 to Program Itself!, *published by Tab Books Inc.*

If you thought we were through with programs that generate or modify other programs, you were wrong. We have a ways to go before we've exhausted the Automatic Model 100.

In months to come, we'll provide you with programs to proofread other programs, write programs to play songs, and write programs in Spanish and "compile" them in Basic.

This month, we'll present a utility that allows you to go through document or text files and perform a global search and replace in them.

TRIVIAL SIGNIFICANCE. We've seen that the key to teaching our Model 100 to program itself has been to provide it with a simple set of instructions that it can follow to do what we want. Many times, these are trivial, repetitious tasks that the computer can do much faster than we can.

For example, a human could easily go through a program looking for remark statements and delete them manually. However, we might overlook one or two.

And, even with the Model 100's screen editor, moving the cursor around and pressing delete or backspace repeatedly is time consuming and boring. With programs like REMover (*Portable 100*, June 1984, page 18), we have been able to command the Model 100 to do this task for us.

Global search and replace is another feature that can automate a time-consuming, error-prone task. With this capability you can find every instance of a string and if you wish, change it to something else.

GS&R. Global search and replace is a strong feature of microcomputer word-processing programs. It allows the user to search through a text file and change all occurences of one string to another.

That's what this program does. It looks for *any* string of your choice and replaces it with a string you choose.

Unlike some word-processing programs, you are shown each occurence of the search string and offered the opportunity to replace it. You can pick and chose which to replace and which to leave alone.

HOW IT WORKS. The search string is input into S$ in line 160. Since LINE INPUT is used, the string may contain commas and other string delimiters.

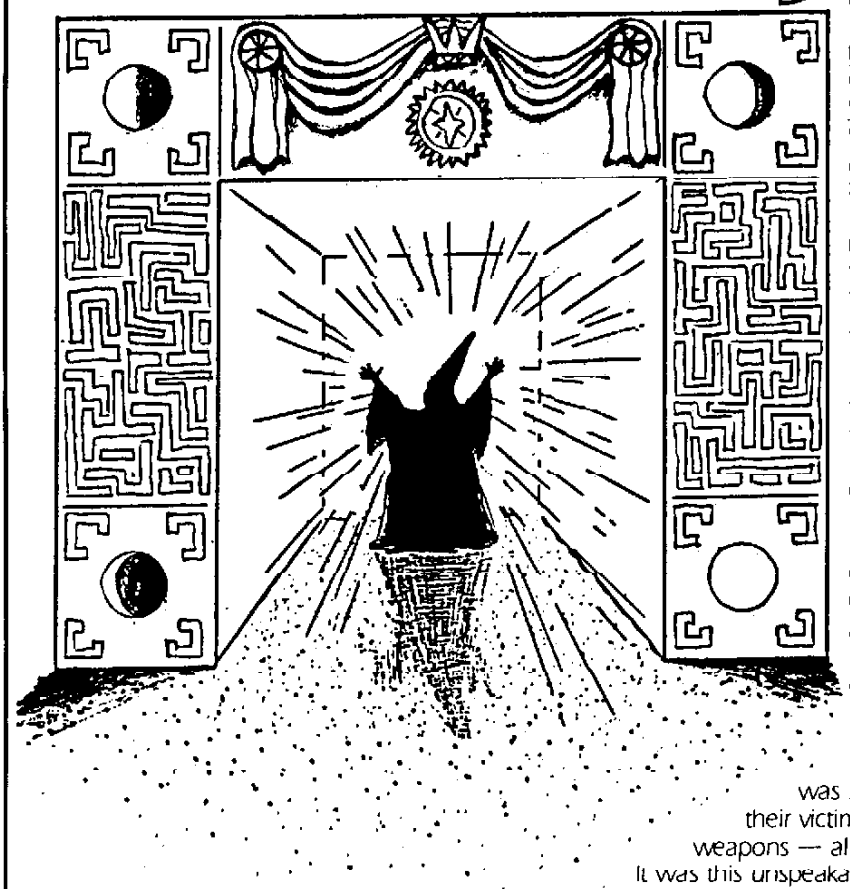
The replacement string is entered into RE$ in line 190.

Then the input and output files are opened and the first program (or text) line loaded into A$ in line 320.

You have have been offered the option of whether the program queries you before making the replacement.

A search routine, identical to REMover's, hunts for the string. The difference is where REMover had "R=INSTR(P,A$,"REM")," Global substi-

PORTAL OF LIGHT



Long, long ago in a land far away, you were born (in a previous life) as the only child of King Gabrial, beloved ruler of Fortonnia. Your birth was viewed as a great threat to the forces of evil which lurked in the land.

The evil wizard Fondu personified these forces of evil, and he battled to undo the good works of King Gabrial, your father. During your childhood, you were watched by Fondu and his henchmen, who waited for their opportunity.

As you approached your thirteenth birthday, plans were laid by the evil ones to prevent you from ever assuming the throne. They could not kill you — your life force had already grown too strong ...

But they had at their disposal something far worse than death! The infamous and legendary mountain city of Labyrinthia was their domain. Hidden deep in the mountains of Fortonnia, no mortal had ever escaped from its walls.

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MODEL 100 WITH 24K RAM
DEALER INQUIRIES WELCOME

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Circle No. 2 on Reader Service Card

tutes S$ for REM. If R does not equal zero, then the string searched for has been successfully located.

BIFUCATED. At that point, the program line is cut into two sections. L$ stores everything in the line up to the beginning of the search string. R$ includes the rest of the line *after* the search string.

Another string, Y$, is constructed that is a series of blanks of the same length as the replacement string.

If the user has specified querying, control goes to an INKEY$ loop for keyboard input. Each time through the loop, L$, Y$, and R$, are printed on the same line, followed by a short delay, and then L$, RE$, and R$.

The result is a flashing display with the left and right portions of the program line remaining on the screen, while the potential replacement flashes on and off in its place.

A "Replace it?" prompt asks for a decision. The program will only replace the string if a "Y" is entered. Any other key will leave the program line as it was.

Once the string has been replaced, the program branches back to look further. If the search string is not found, the program line is printed to RAM and a new program line fetched.

Global is a short, but powerful program that will let you make changes rapidly in a given program. Should you decide to change the name of a variable, substitute one keyword for another, or do some changes of prompts and other material within quotes, it will handle them all. Its chief advantage over using a text editor for the same chore is the ability to examine each line before making the change. ◀

```
10 ' ********************
20 ' *                  *
30 ' *  GLOBAL SEARCH   *
40 ' *    UTILITY       *
50 ' *                  *
60 ' ********************

70 CLEAR 5000
    : MAX FILES =2
90 ' *** DEFINE FILES ***

100 CLS
     : PRINT
     : PRINT
110 PRINT "Enter name of program to
     be processed :"
120 PRINT
130 LINE INPUT F$
140 CLS
     : PRINT
     : PRINT
```


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```
150 PRINT "Enter string to search for
    :"
    : PRINT
160 LINE INPUT S$
170 CLS
    : PRINT
    : PRINT
180 PRINT "Enter string to replace
    with :"
    : PRINT
190 LINE INPUT RE$
200 CLS
    : PRINT
    : PRINT
210 PRINT "Do you want to choose
    whether to replace each?"
220 PRINT "(Y/N)"
230 CH$=INKEY$
    : IF CH$=""GOTO 230
240 IF CH$="Y" OR CH$="y" THEN CH=1
250 CLS
260 F1$=LEFT$(F$,4)+"GB.DO"
270 ' *** Open RAM Files ***
280 OPEN F$ FOR INPUT  AS 1
    : OPEN F1$ FOR OUTPUT AS 2
300 IF EOF(1)GOTO 600
310 ' *** LOAD LINE ***
320 LINE INPUT #1,A$
330 IF CH=1 THEN CLS
340 P=1
350 R=INSTR(P,A$,S$)
360 IF R=0GOTO 570
370 L$=LEFT$(A$,R-1)
380 E=LEN(S$)
390 R$=MID$(A$,R+E)
400 Y$=STRING$(LEN(RE$),32)
410 IF CH=0 THEN GOTO 530
420 ' *** REPLACE? ***
430 B$=INKEY$
440 PRINT @0,L$;Y$;R$
450 FOR N1=1 TO 50
    : NEXT
460 PRINT @,L$;RE$;R$;
470 FOR N1=1 TO 50
    : NEXT
480 PRINT @100,"Replace it? (Y/N)"
490 IF B$=""GOTO 430
500 IF B$="Y" OR B$="y"GOTO 530
510 P=INSTR(P,A$,S$)+LEN(S$)-1
520 GOTO 350
530 A$=L$+RE$+R$
540 P=INSTR(P,A$,RE$)+LEN(RE$)-1
550 GOTO 350
560 ' *** PRINT FILE ***
570 PRINT #2,A$
580 IF CH=0 THEN PRINT A$
590 GOTO 300
600 PRINT #2,A$
610 CLOSE
```


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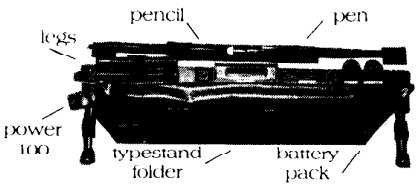

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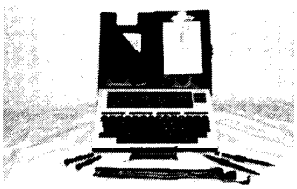

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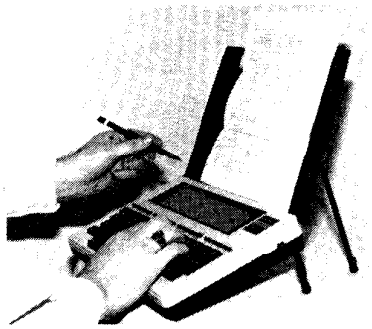

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FULL-DUPLEX

TERRY KEPNER

Editor's Note: Full-Duplex is dedicated to solving reader's Model 100 problems. Readers needing assistance should address their letters to Terry Kepner, P.O. Box 481, Peterborough, NH 03548. Readers are reminded to include a return address with all Full-Duplex correspondence.

TWO QUERY C-64 CONNECTION

How do you interconnect a Model 100 to a Commodore 64?

Al Baron
General Business Services
Brownsville, TX

▶ Easily. But you can't directly connect the two computers because the Commodore uses a non-standard voltage level for its RS232 port (5 volt instead of 12 volt). You have to buy a conversion cable/adapter for the Commodore RS232 port.

Commodore makes one called the 1011A RS-232 Adapter (retail $49.95). Another one is made by Data 20 Corporation (23011 Moulton Parkway, Suite B10, Laguna Hills, CA, 92653, 714-770-2366, retail $59.99) and called simply Printer Interface. The only other piece of equipment you would need is a null modem to swap the transmit and to receive pins between the two computers. Radio Shack sells one, or you can make your own following the instructions in the article in the premier issue of *Portable 100*, September 1983. Once you have the computers set up, you can use the OPEN and CMD commands in Commodore Basic to send data back and forth.

You're only other choice is to resort to modems and to use the phone lines. This is less convenient, but might be easier to implement and transfer data since the modem packages usually let you send and receive data from buffers whereas few of the Commodore terminal packages support communications through the Commodore 1011A adapter, or similar pieces of hardware.

I'm a businessman who travels a great deal. I recently purchased a Model 100 to help me keep up with my workload while on the road but have one problem that has plagued me, making the usefulness of the 100 limited for my needs. I've asked people at Radio Shack and Commodore in the Houston area without receiving a good answer.

I own a Commodore 64 and use Terminal 64 (put out by Midwest Micro Associates and handled by all Commodore dealers) when using the 64 with the Commodore 1600 modem or RS232 terminal adapter. This program has the 24K buffer feature that allows me to go directly from capture of material to my 1515 printer with the touch of a key. It's a nice, useful piece of software.

The Commodore people also make an RS232 terminal-type adapter (the 1011A Adapter) which lets me hardwire the port directly to the Model 100. Several pin reversals in the cable were necessary but the configuration works beautifully. Using a handshake of 3711D on the 100 and accepting the presets of the Terminal 64 program (300 baud, full duplex, mark parity, wordsize 7, stopbits 1, linefeed off) I get perfect communications with the two units, am able to capture text from the 100 to the Commodore buffer, and print away.

My problem is when I want to unload from the 100 via phone. Changing the setting of the 3 to M as instructed gives me only garbage and or nothing at all. I use ear muffs in a hotel room, have tried many local and long-distance lines in my home, and changed handshakes of both the 100 and Terminal 64 program and had the earmuffs checked ... and still garbage. I know the modem works in both units since I have CompuServe and The Source. Can you give me any clue as to the solution?

Vince Purcell
Houston, TX

▶ Odd as it may sound, try changing the modem parameters to M7E1E in the Model 100 and change Terminal 64 to match it. From your letter, it sounds like Terminal 64 has parity enabled (mark parity), whereas the Model 100 has it turned off (I for ignore).

Other than that, I'm stumped. Via the phone lines you should have good communications between the two computers since both communicate over the phone to Compuserve and The Source without trouble. Does anyone else have any suggestions?

MOVE IT WITH SCRIPSIT

Thank you for the effort you put into my request for information. I just found out there's such a method of putting data from *Portable 100* text to Model III Tape Scripsit. May I share the information with you? Contact Structured Software Services, 9233 NE 269th St., Battle Ground, WA, 98604. They can go from Model 100 text to Model III Tape Scripsit data, from Model III to Model 100, and Basic back and forth.

Dale Stupfel,
Dublin, CA

▶ Thank you very much for the information. I'm glad someone has finally written the routines for Model 100-to-Model III tape transfer.

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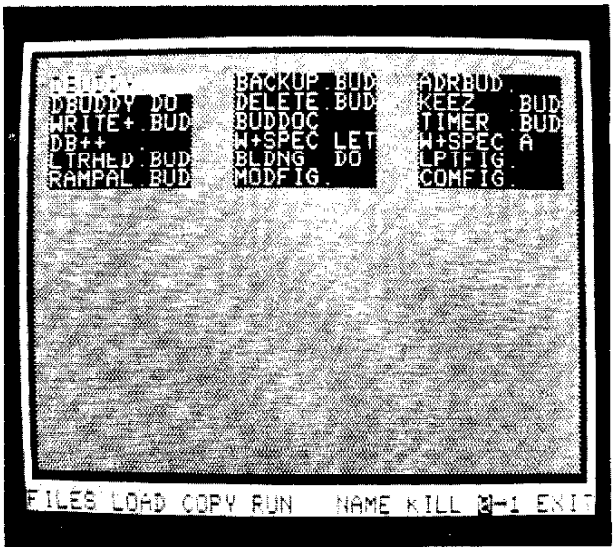

A typical Disk-Buddy Menu.
Note the function key labels on the command line.

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A STEP BEYOND BEYOND

In the August issue of *Portable 100* you offered, "A step beyond," from a letter written by Jim Gaffney of El Paso, TX. I'd like to take that routine one more step with this short one-liner:

```
10 ON INSTR("AaBbCc",INKEY$)
/2+1 GOTO 10,100,200,30
```

This reduces the number of bytes needed in Mr. Gaffney's routine by approximately 45 percent.

Don Moore
Coconut Grove, FL

▶ Now that's really an improvement!

NAGGING QUESTIONS

I have three simple questions that nag me every time I read *Portable 100*. If you could answer them for me, I'd appreciate it. What does MEWS stand for? And can you tell me how to use PRINT@?

Also, for Christmas 1983 I received a Gemini-10X parallel printer to be used with my Model 100. Since I'm not experienced with word processing I don't know how to send control codes to the printer from TEXT. I usually do it from BASIC. Please help me send control codes to the printer from TEXT.

Sarah Nash
San Francisco, CA

▶ MEWS stands for Micro Executive Work Station, which is how Radio Shack advertises the Model 100.

PRINT@ is very simple. All the display locations are numbered sequentially from the upper left corner down to the lower right corner, from zero to 319. PRINT@, plus a number from zero to 319, will direct printing of any information to start at the specified column. The first column of the top line is number zero, the first column of the second line is position 40, the third line starts with position 80, and so forth in increments of 40 until you reach the bottom line, which begins with position 280 and ends with position 319.

To position printing on the LCD, take the line number (numbering the top line as zero and the bottom line as seven), multiply by forty and add the horizontal column number (starting the leftmost column as zero) to get the PRINT @ location. For example, CLS:PRINT@136,"Working"; would erase the display and print the word *Working* almost at the center of the display (almost because the word is seven letters in length and the display is 40 columns wide). PRINT@ is usually used in positioning prompts and printing columns of data on the display.

To send a control code in text, each code to be sent must be preceded by control-P (up-caret P). For example, to send the control code 15 (decimal) to your printer, you would press the CTRL key, the P key, the CTRL key, and the O key. If you need to send the escape character (character 27 decimal), press the CTRL key, the P key, the CTRL key, and the ESC key on the Model 100 keyboard. If you have to send a series of control codes to the printer, just keep pressing the CTRL P combination before each printer control code. And that should get you started.

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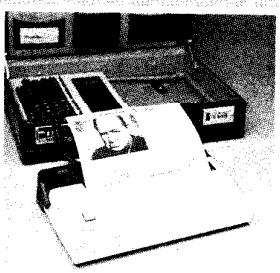

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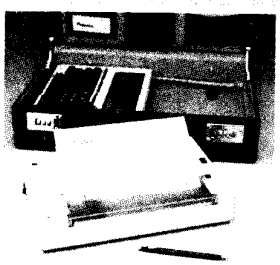

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COMPANION ERRS

I enjoyed your review of *The Model 100 Companion* in the July issue of *Portable 100*. However, there's something in the book that I don't understand. I wrote to Osborne/McGraw-Hill before Christmas to see if there was an errata sheet. I was told that my letter had been turned over to their technical people and there'd be a short delay in answering. Since they evidently aren't going to answer, I thought maybe you'd be able to help me.

My problem is on page 113. The paragraph reads:

"When you've identified a program you wish to download, be sure the KEY DIGIT prompt is displayed, and then use the Read command by typing R followed by the program name as listed in the database. Then press ENTER. For instance, if you wanted to download the program in Figure A-4 you would type R TEST and press ENTER. (This name does not have to be the same as the program name appearing on the SIG catalog.) When you're ready to start downloading, press ENTER again (to complete the READ command). The program will be displayed on your Model 100 screen as it downloads into the computer."

Something seems to be missing there. As I understand it, all you'd accomplish would be a READ of the program. Nothing tells the Model 100 to download. And there's where I get mixed up.

I would want to press F2 for DOWN, and, when prompted with File to Download, would type in a name I want to call the program, and press enter. Am I right so far? What I don't have straight is how do I make sure I'll download (in the example TEST) the program I want?

Also, and not covered in the book, how can I get a copy of the program on the printer? If I can, will it also be in the Model 100 when it's all over?

You might wonder why I don't just experiment around. To tell you the truth, I'm scared silly by the unfriendliness of CompuServe. It makes a nervous wreck out of this old gentleman!

Vic Wright
Indianapolis, IN

▶ You found an error in the book. To get the CompuServe program properly downloaded into your Model 100, you should press the F2 key and give the Model 100 a storage filename before asking CompuServe to type or read the program. When you issue the command R (for READ) you must specify the name of the program you want. What the example meant was that you shouldn't just type the name used in the example, but that you should use the filename of the program you want downloaded.

To get hardcopy of any information (including programs being downloaded) received while you're in TELCOM, just press the F5 key (see the Model 100 manual, page 81) and all data will be echoed to the printer as it is received. This doesn't store anything in memory, it just echoes what arrives as it arrives.

To store data you must use the DOWNload key F2. But even if you don't manage to get it properly stored in your computer, you can still have a hardcopy of it on paper for typing in later. Good luck.

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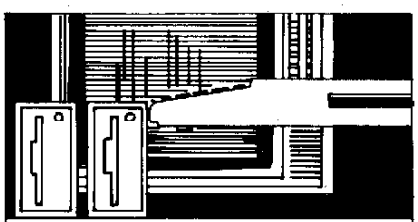
SUPPLY & DEMAND: IT'S ONLY A MATTER OF POWER

You need to know more than it only takes four AA batteries to run your 100.

BY CARL OPPEDAHL

This article is adapted from Oppedahl's book to be published by Weber Systems entitled, Advanced Programming of the Model 100.



HARDWARE

How long can you leave your Model 100 turned off without losing your files?

If you use nickel-cadmium AA cells rather than regular AA cells, will they be recharged by the AC adapter?

How can you protect yourself against damage due to battery leakage?

Why does the printer make the low battery lamp illuminate?

These and many other questions are often asked about the power supply of the Model 100. Here are some answers to them.

The Model 100 is designed to draw its power from four AA cells or from an AC adapter (Radio Shack catalog no. 26-3804). Conventional carbon-zinc cells (the kind Radio Shack gives away free) may be used, but Radio Shack recommends alkaline cells for the Model 100.

DIM BULB. With no peripherals attached and no sound coming from the beeper, the Model 100 draws about 350 milliwatts. A milliwatt is a thousandth of a watt, a unit of power consumption most often seen in the description of light bulbs. A hundred Model 100s together draw as much power as a typical 35-watt bulb.

Under full-load conditions the 100 may draw as much as 1100 milliwatts, according to a decal on the base of the unit, but I have never seen it draw more than about 975 milliwatts. The actual current drain at a given instant is a function not only of the internal load but also of the voltage supplied from the AA cells or external power source.

Unlike most consumer electronic devices, the Model 100 contains a DC-to-DC convertor which creates all needed internal voltages from whatever external DC level is supplied. What the convertor requires is a certain amount of source power (source voltage times source current). If the voltage supplied to the convertor diminishes, the convertor compensates by drawing more current. If a high voltage is supplied, the convertor will draw less current.

The DC-to-DC convertor is able to accomplish its task, namely production of rock-steady plus or minus five volts, with input voltages ranging from seven volts from the AC adapter to as little as 3.7 volts from batteries that have run down beyond the point of turning on the low battery light (see figure 1).

DC-TO-DC CONVERTOR. The convertor, shown as a block in the upper right corner of figure 1, is the most complicated part of the Model 100 power supply. It is comprised of a number of semiconductors and a custom-wound transformer.

Current passing through the transformer alternates at about 100 kilohertz. The voltages produced are:

- Minus five volts, designated VEE, for the RS-232C driver, operational amplifiers in the cassette and modem circuits, and liquid crystal display;
- Plus five volts, designated VB, backed up by a nicad cell, for the RAM memory and clock/calendar chip; and
- Plus five volts, designated VDD, for everything else in the computer.

Memory protection is provided by a nicad cell rated 3.6 volts at 50 milliampere-hours. The cell appears on page 36 in the service manual and as "3-51FT" in the schematic. Since the rated protection time for a 32K machine is eight days, this means that the 32K of RAM (together with the clock/calendar chip) must draw something less than .25 microamperes.

Nicads have what is called discharge memory. If a nicad is repeatedly discharged only half-way, then recharged, it will lose the second half of its capacity. Thus most nicads come with the advice they should always be discharged fully before recharging.

But in the Model 100, recharge is taking place when:

- Fresh AA cells are in place with nothing plugged into the Model 100's DC six-volt connector; or
- The AC adapter is connected and working.

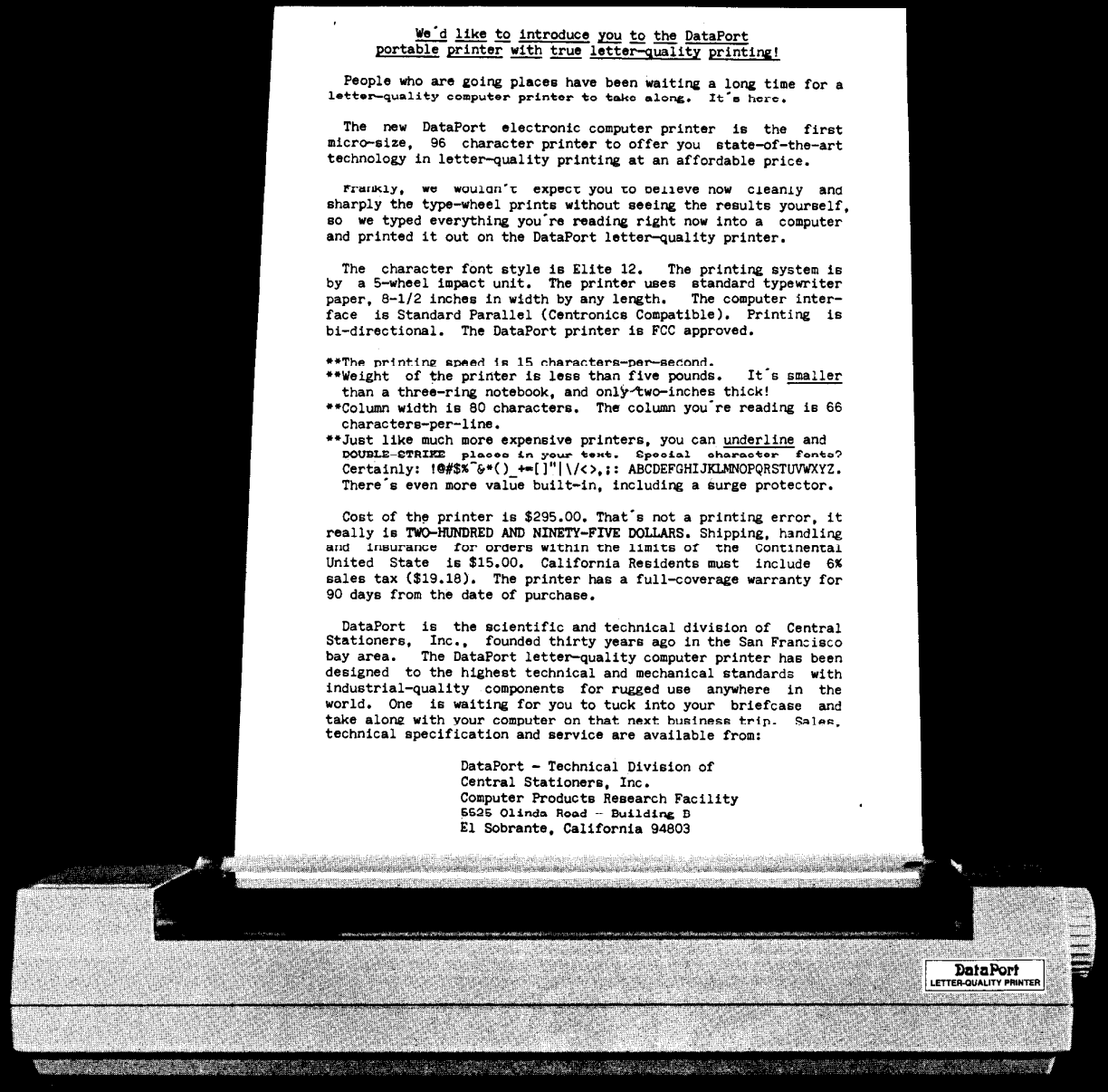
Conversely, the only time the nicad can run down is when:

- either the AC adapter (or equivalent) is plugged into the Model 100 but not producing power; or
- nothing is plugged into the DC six-volt connector and the AA cells have been exhausted. A special case arises during the brief moment when you are away from AC outlets and are replacing a set of AA cells.

The conditions resulting in nicad discharge don't arise very often in the Model 100. When they do, they are usually remedied promptly by the user. As a result, the tendency is for the nicad to provide memory-protection current for only a short time.

One safeguard is always keep a spare set of AA batteries on hand and install them without delay when the "low battery" light comes on.

Prior to any servicing of the Model 100 and during installation of RAM expansion modules, it is necessary to re-



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move all sources of power (including the nicad) from the circuit board. Because the nicad is soldered in place, a switch SW-3 is provided to disconnect the nicad. This double-pole, single-throw slide switch labelled memory power is located on the bottom of the computer. Turning it off for more than a few seconds will result in loss of all data in RAM and loss of proper clock-calendar timekeeping.

LONG-TERM STORAGE. If the Model 100 is to be stored for any period up to a year, the AA cells (if alkalines and reasonably fresh) are likely to keep the RAM contents for the whole period. It is, nonetheless, wise to backup important files on tape. Many things can go wrong besides loss of battery power.

The reason the AA cells last so long is that when the Model 100 is turned off, the current required to keep the RAM chips up is less than a microampere. The nicad is constantly being recharged by the AA cells, and they also provide RAM protection.

But the current drain in the Model 100 with the on-off switch off is in an order of magnitude less than AAs would see in a normal consumer electronic device. (The closest parallel might be a battery-powered wall clock.) It is almost as though the AA cells were hanging unused on a store display; the memory protection life of the AA cells is essentially the same as their shelf life, about a year at room temperature.

CONVENTIONAL CELLS. In contrast, carbon-zinc conventional cells run down by themselves on the shelf in a matter of months. While the shelf life of a conventional cell is longer in a refrigerator, this is not a sensible place for a Model 100.

What's worse, when a conventional cell runs down it leaks corrosive acid. Most alkalines, on the other hand, bear written guarantees against leakage. With some brands the guarantee may be limited to flashlights, but a prudent Model 100 owner will seek out alkalines with a guarantee such as this: "We will repair or replace, at our option, any device damaged by our battery...."

The guarantee is usually worded to be void "if either user or device recharges battery" but, as may be seen from figure 1, the Model 100 never recharges the AA cells. Plugging something (such as the AC adapter) into the DC 6V connector simply disconnects the AA cells from everything else.

VERY LONG-TERM STORAGE. If the computer is going to be stored for substantially more than a year, or in a very hot climate, it is prudent to remove the AA cells, even if alkaline, as a precaution against leakage. (Presumably all important files will already have been backed up on tape.) Such a storage period provides the ideal opportunity to discharge the nicad fully to restore its full capacity — simply leave the memory power switch on after removing the AA cells.

Why not use the AC adapter for memory protection?

Plugging the AC adapter into the Model 100 disconnects the AA cells from everything else. As long as the AC adapter is working, it will recharge the nicad and provide memory protection. But suppose the AC adapter is bumped out of its outlet, or the AC power goes out for a few days. Then only the nicad is able to protect the RAM; but if it has developed a discharge memory it may not last even the rated eight days. User files would then be lost.

I suggest not relying on the AC adapter for memory protection.

LOW-POWER SIGNALS. The power supply includes circuitry to annunciate impending battery loss, both to the user and to the CPU. A voltage divider and comparator, shown as a block in figure 1, yields voltages calculated to trigger the low battery LED (light-emitting diode), and LPS (low power signal).

The divider is set up so as the supply voltage falls, the LED illuminates first (at about 4.1 volts). Later LPS is asserted when the supply has fallen to about 3.7 volts. As it happens, there is no connection from the low battery light to the CPU.

The first clue the CPU gets that something is amiss is the LPS signal. The LPS signal is generated only by a rather substantial power loss. Possible causes might include greatly depleted AA cells, loss of AC power when the adapter is being used, or simply turning off the main power switch.

The LPS signal goes to two places. It appears at bit 7 of input port 0D8H as a logic "0" (a change from the usual logic "1") and activates the so-called TRAP interrupt line of the 8085 CPU.

The TRAP interrupt, which cannot be masked or disabled, disables all other interrupts and causes a subroutine call to 24H. Study of the ROM reveals this results in an orderly termination of calculations in progress, and the computer then turns itself off.

CPU TURN-OFF. The CPU turns off the Model 100 by turning on bit four of output port 0BAH. The signal which results, called PCS (power control signal), appears at the upper right corner of figure 1. As a result, all activity dependent on VDD and VEE stops. (The

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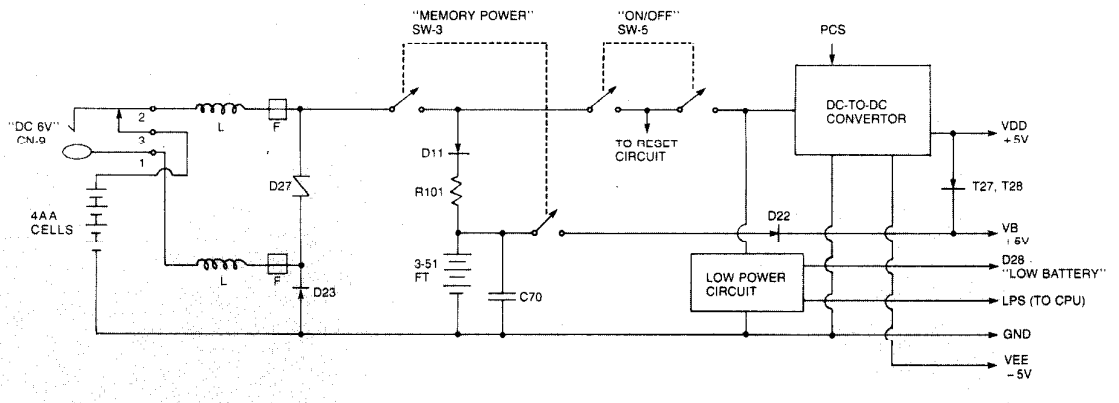

Figure 1. Model 100 Power Supply

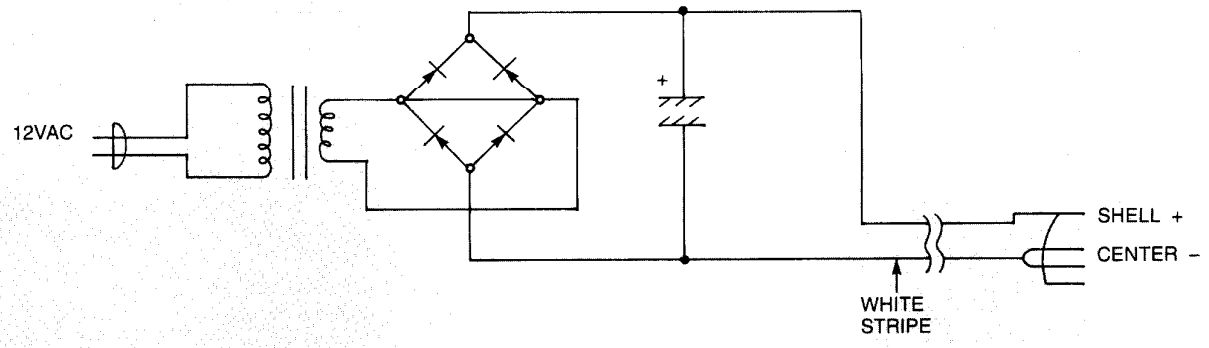

Figure 2. Inside AC Adapter.

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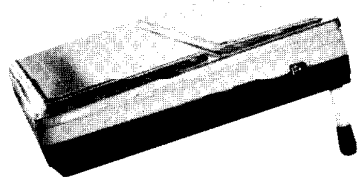

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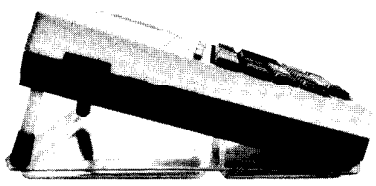

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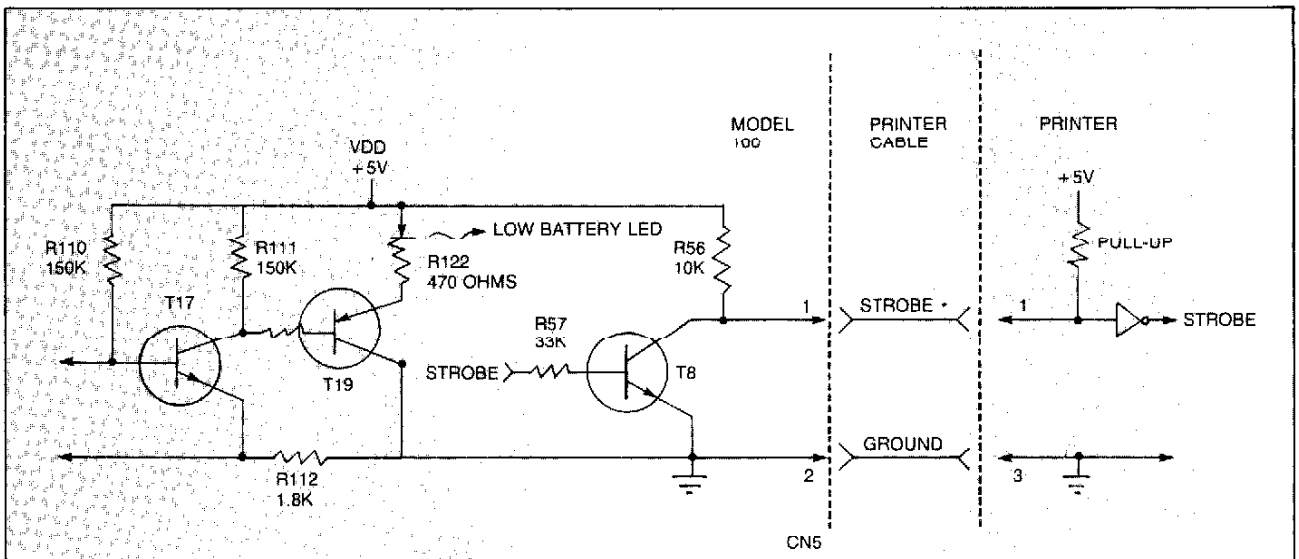

Figure 3. Printer and Low Batter Light.

ROM code for the power-down routine is located at 1431-1458H.)

The AC adapter, oddly, is not UL approved, but it is similar in design and construction to many UL-approved adapters. Inside the adapter are a transformer, rectifier, and capacitor as shown in figure 2.

The transformer has 120-volt primary winding, and a nominal 5.6-volt secondary winding rated at 400 milliamperes. The alternating current output is connected to a one-piece full-wave rectifier, which produces direct current, but with a substantial AC ripple. The DC current is smoothed by a 2200 microfarad, 10-volt electrolytic capacitor, and provided to the Model 100 by a cable two meters long.

The white-striped lead of the cable is the negative wire, which connects to the inner conductor of the round plug. The plug is a 5.5 millimeter barrel plug, equivalent to Radio Shack catalog no. 274-1551.

INSIDE THE 100. Within the Model 100, ferrite beads and inductors are installed to aid in suppression of radio frequency (RF) energy. This energy might otherwise be transmitted into the house wiring through the AC adapter, or into the air by the adapter cord acting as an antenna.

In addition a surge protector, D27, is provided to soak up power line spikes that might otherwise damage the 100.

Though the adapter is rated six volts at 400 milliamperes, the actual no-load output is about eight volts. This drops to about seven volts under a typical Model 100 load of 50 milliamperes, or to about 6.5 volts under a heavy load of 150 milliamperes.

OTHER ADAPTERS. Most AC adapters are composed simply of a transformer and rectifier, but do not contain a capacitor so do not do any filtering. This explains why the Model 100 user's manual warns against using anything but the Radio Shack adapter.

In a pinch, you could use any AC adapter providing at least six volts at as little as 180 milliamperes, so long as you provide capacitors totalling 2200 microfarads, perhaps spliced into the cord running from the adapter to the computer.

THE ALTERNATIVES. In powering the Model 100, you are not limited simply to AA cells and the AC adapter. Any ripple-free source of DC between 3.8 and 7 volts, and capable of providing at least 1.1 watts, may be plugged into the DC six-volt jack using a barrel plug

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(Radio Shack catalog no. 274-1551).

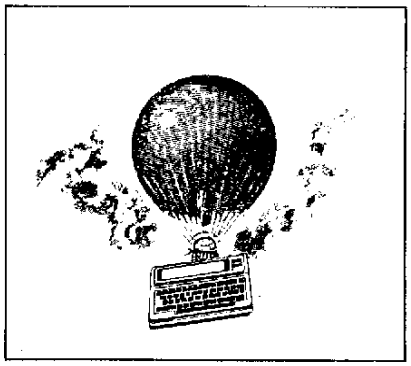
One sensible choice would be a six-volt lantern battery with screw terminals. (Just remember that the negative lead must be wired to the center terminal of the barrel plug.) The low battery light will work as expected to warn you of power loss. If you ignore the light, the computer will turn itself off just as it would for dead AA cells.

Alkaline AA cells are expensive. I've been known to have had a two-pack-a-day habit. It is tempting to use AA nicads since they may be recharged many times at a fraction of the cost of alkalines.

Unfortunately, AA nicads produce about 1.25 volts (see accompanying story), which is less than conventional or alkaline cells. As a result, the low-power circuit will be triggered sooner for a set of fresh nicads than for a set of fresh alkalines.

Unlike a flashlight or children's toy, the Model 100 does not allow its AA cells to run down completely. Thus the AA nicads will likely develop a discharge memory and then trigger the low battery light even more quickly after recharging.

If the Model 100 is to be left with



power off for an extended period of time, alkalines will protect the RAM memory longer than AA nicads. Nicad AA cells will, however, save money. As long as one takes the usual file backup precautions, there is no particular harm in using them.

As shown in figure 1, the Model 100 AC adapter won't recharge the AA nicads. A separate charger must be used.

With the Model 100 turned off and the printer turned on and connected, some printers will cause the low battery light to turn on. A sneak circuit in the printer interface allows this.

Referring to figure 3, note that transistor T18 is turned on whenever a printer strobe is desired by the CPU. That provides a ground path to the strobe line in the printer, which triggers gates in the printer to accept an incoming character.

Within the printer (no matter what the make), the strobe line must have a pullup resistor to plus five volts, so if the cable is unplugged, the printer will not commence strobing in nonexistent data. Strangely, the Model 100 also has a pullup resistor, R56, which is connected to the same five-volt source as the low battery LED.

When the Model 100 is turned on, and has sufficient battery, transistor T17 is off and does not turn on T19, so the low battery LED is kept off.

When the Model 100 power is off any weak voltage leaking back to T17, as from the printer through R56, turns T17 on. The extent of the leakage, hence the brightness of the light, is a function of the size of the pullup resistor. Transistor T17 causes T19 to turn on and the weak-voltage illuminates up the LED.

This doesn't really harm anything, but if it is desired to stop such leakage, a diode may be installed in series with R56 so current can flow only toward the printer. ◀

WHEN IS A BATTERY NOT A BATTERY?

Perhaps you recall making an electrical cell in junior high science class by putting strips of dissimilar metals into a lemon or glass of salt water. The choice of metals determined the voltage produced.

(The materials most commonly used today, carbon and zinc, yield 1.5 volts. Nickel-Cadmium cells yield about 1.25 volts.)

When you did this, you were creating a Voltaic cell, after Allesandro Volta, one of the first researchers in the field.

Often, more than 1.5 volts was needed, so a stack or series of such cells was set up and referred to as a Voltaic pile or *battery* of cells. To this day, most uses of the word battery have to do with the connotation of a grouping of items for some common purpose.

The so-called nine-volt battery used in transistor radios contains six carbon-zinc cells, producing 1.5 volts each, totalling nine volts. But any device producing 1.5 volts, such as one of the AA batteries used in the Model 100, contains but a single cell and so cannot be called a battery according to the historical use of the term. ◀

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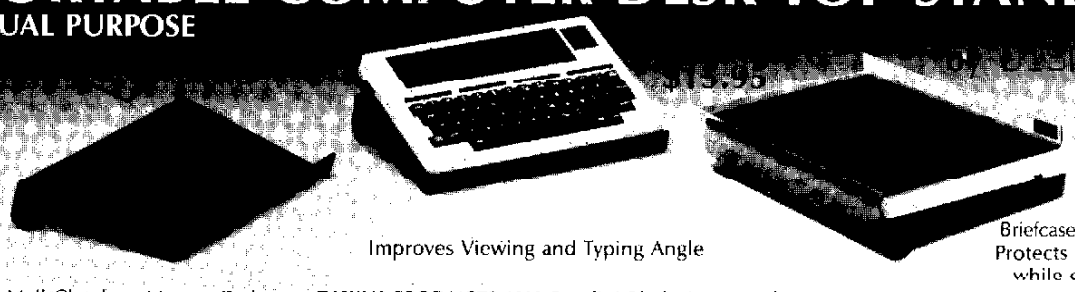

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While the new Tandy 200 portable may not inspire a revolution, it will most definitely heat up the Lilliputian battleground for King of the Lap (or Briefcase, if you prefer) Computers.

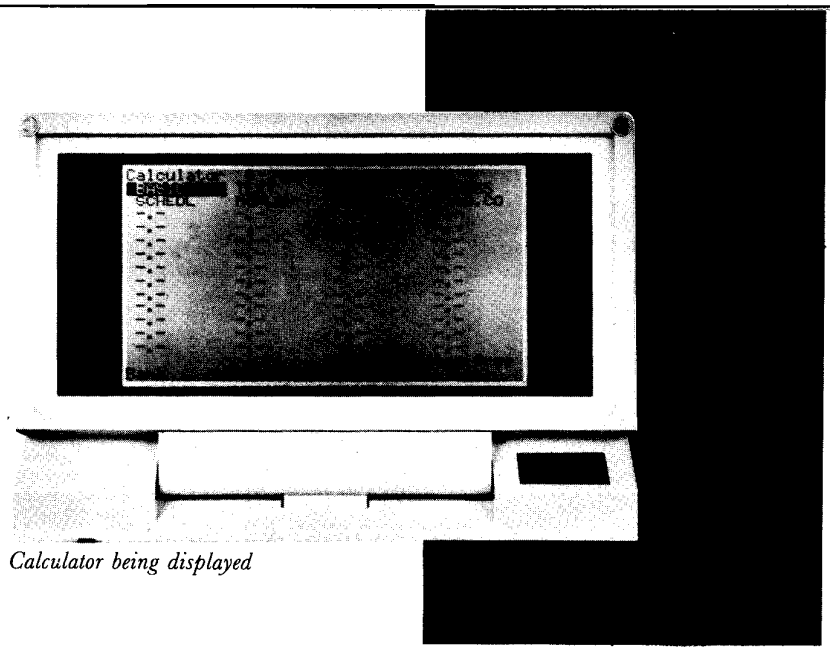
TANDY 200:
The Legend Continues

By William T. Walters

Just as the Model 100 revolutionized the way we thought about portable computing — indeed, proving that those two words were not necessarily mutually preclusive — the new Tandy 200 promises to be a true second generation of the family.

Few who saw and used — the Model 100 weren't impressed by it.

Those who weren't either were die-hard MS-DOS aficionados or people who believed they needed bigger displays and more memory than the 100 provided. Okay, folks, Tandy couldn't do much for those enamored with MS-DOS portable computers, but everybody else had better hang onto their pocketbooks!



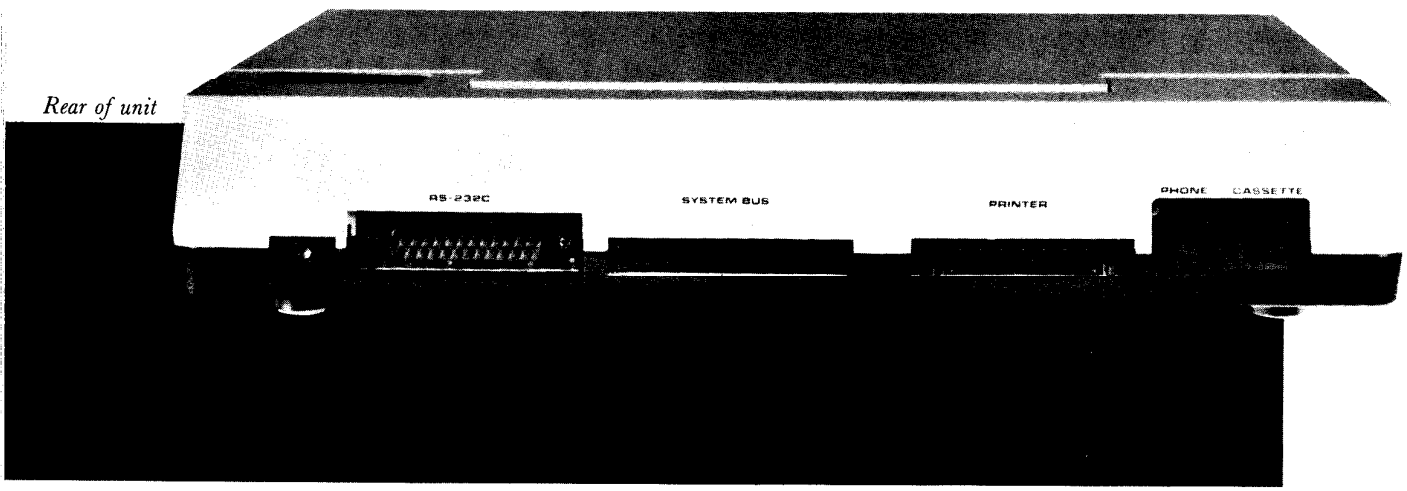
Calculator being displayed

TANDY 200:
The Legend Continues

The Tandy 200 is built on the history of the 100. Everything that most of us liked about the 100 is even better on the 200. Some of those things that many of us felt were missing on the 100 are built into the 200. Plus a few neat tricks to boot. Light weight and true portability — the very things that made the 100 revolutionary — are neither sacrificed nor compromised in the process.

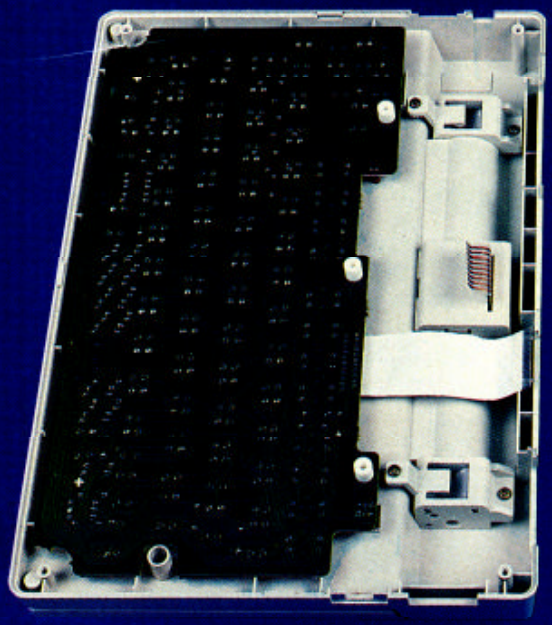
LOOK AT THE 200'S FEATURES.

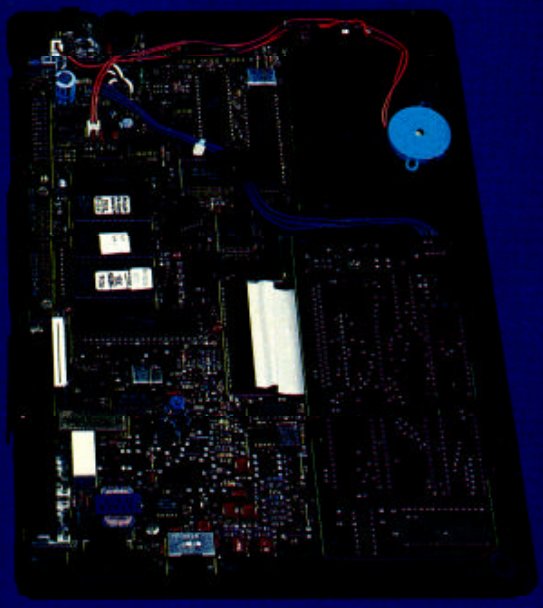
- Flip-up Liquid Crystal Display (LCD) with 16 lines of 40 characters each;
- Built-in 300 baud telephone modem with software selective tone or pulse dialing;
- 24K Random Access Memory (RAM) standard, expandable to 72K;
- 72K Read Only Memory (ROM) standard, expandable to 104K;
- RS232 Interface, programmable from 72 to 19,200 baud;
- Parallel Printer Interface;
- Bar-Code Reader Interface;
- Powered by four AA alkaline or rechargeable nickel-cadmium (nicads) batteries;
- Six built-in software packages for word processing, communications, appointments, address liss, spreadsheets, and programming in Basic;
- Uses all Radio Shack Model 100 accessories.



Rear of unit

photographs by Benjamin Magro.





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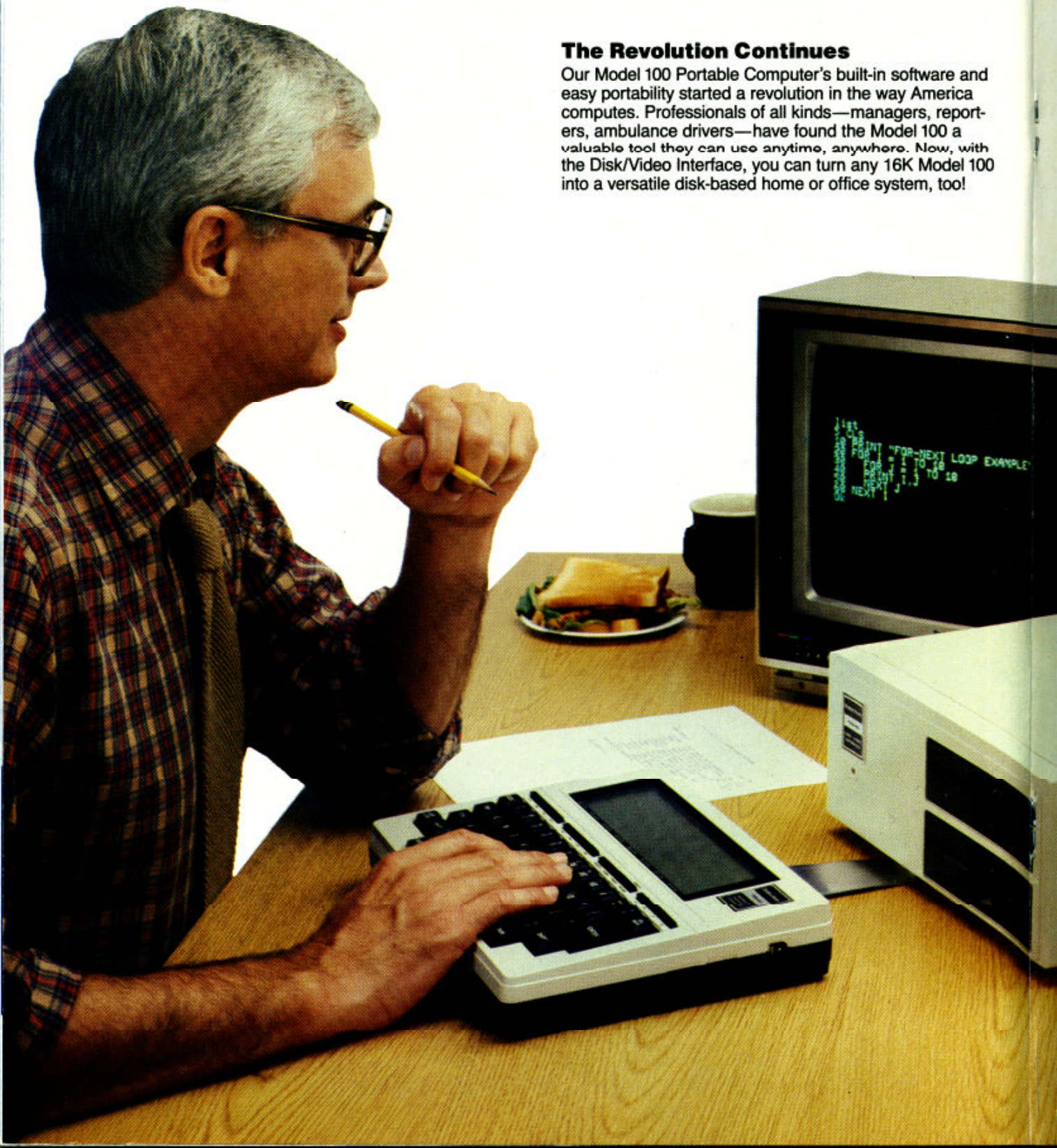

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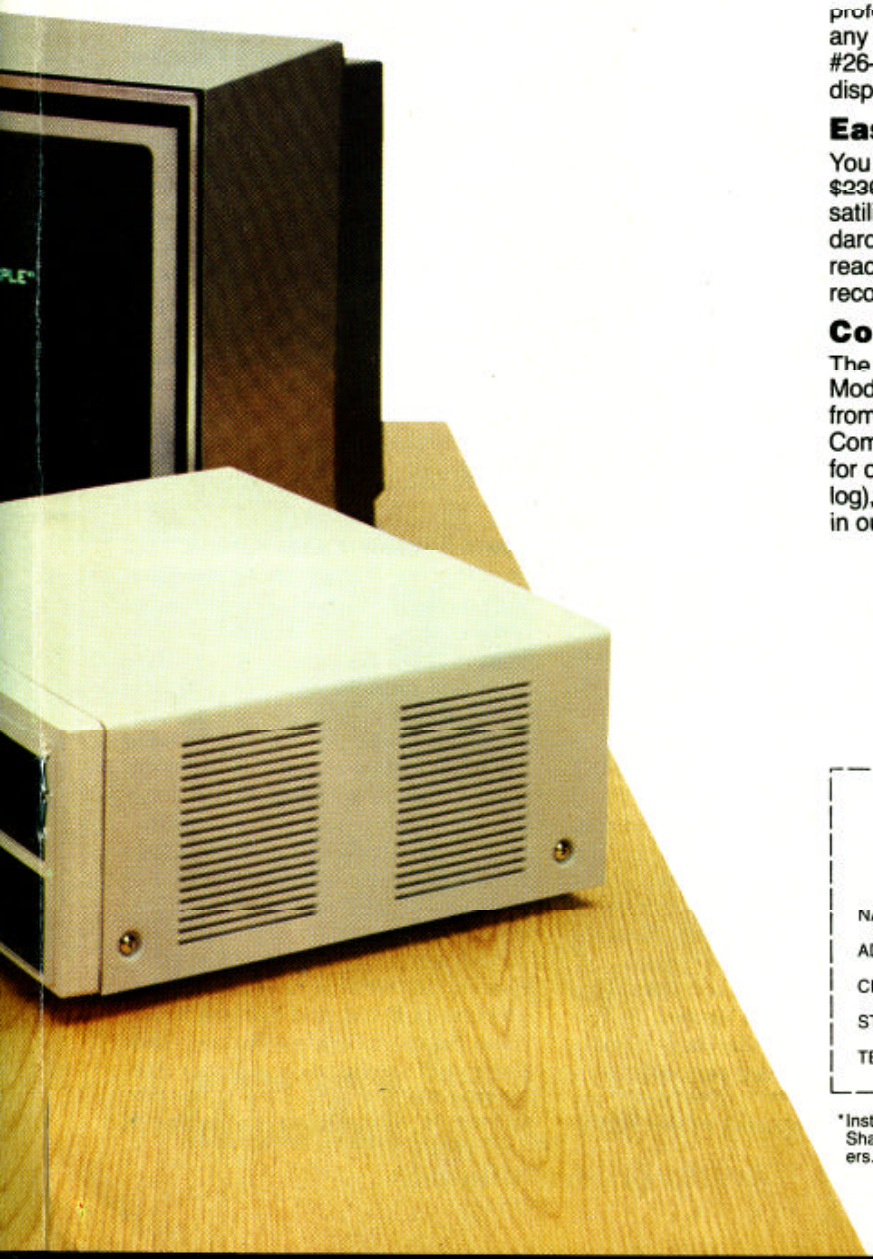

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The Disk/Video Interface also lets you enjoy a big 40-character by 25-line screen display on any TV. The larger screen is perfect for writing notes and reports or developing your own programs in BASIC. When accessing data by phone, you can read a full 25 lines of information without scrolling. And you can utilize all of Model 100's graphics characters.

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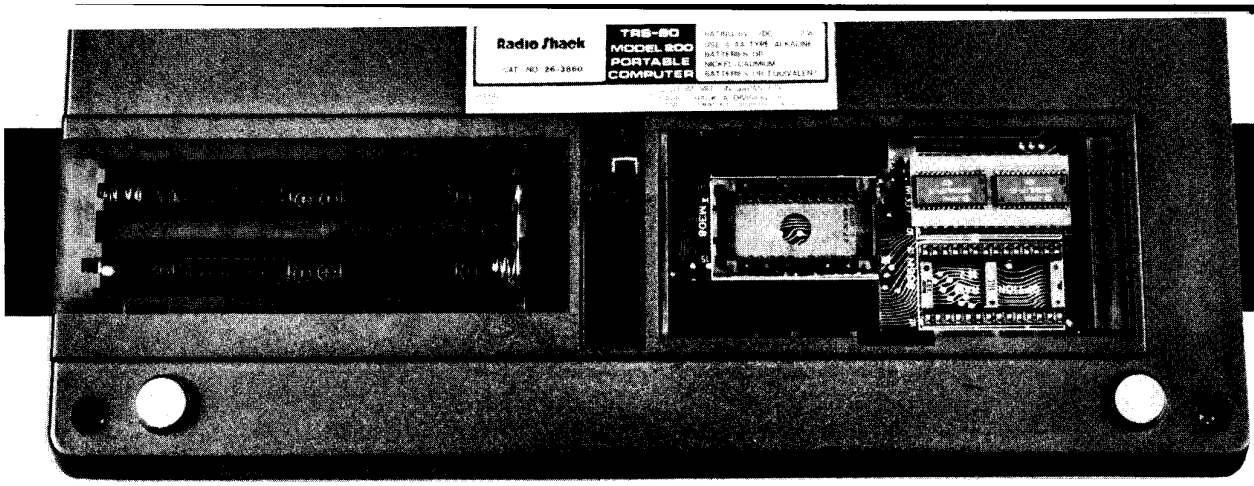

Bottom of unit

Although at 2.25 inches in height the 200 is .25 inches taller than the Model 100, the rest of the dimensions remain the same. 11.75 by 8.5 inches. The added height at the rear of the unit is to steady the flip-up LCD.

The 200 weighs in at 4.5 pounds, and is decked out in a no-nonsense color scheme of black and white, or fawn grey as Tandy calls it.

The processor used in the new Tandy is an 8-bit 80C85 and only can address a total of 65,536 (64K) locations of memory at any one time. The built-in programs are stored in a total of 72K-bytes of ROM.

The operating system plus applications programs (except Multiplan) occupy a total of 40,960 (40K) locations, leaving 24,576 (24K) locations addressable for RAM. These two values add up to the limit of the addressing capability of an 8-bit processor, 64K.

MULTIPLAN. By a novel arrangement, the Multiplan program is contained in a separate 32K ROM, and not the main 40K ROM. When executed it switches out the main 40K ROM to prevent conflicts. Also, there's room for another 32K ROM, like in the Model 100. In this case, however, a CMOS Electrically Programmable Read Only Memory (EPROM) will work.

If this expansion ROM is installed, its name also will appear on the main menu (a complete reset of the unit is required), and if invoked, it'll swap out the main 40K ROM.

The 100 expansion ROM socket required the use of a custom manufactured circuit that generally wasn't available. The 200 expansion ROM will accept a new CMOS EPROM which can be programmed in quantities as small as one.

Note that the 200 can't program EPROMS. That requires special equipment. Also, the programs in this expansion ROM must be in pure machine language, not Basic. However, since Multiplan is installed inside the unit, in the same size and type ROM, I predict ROM-based software from Radio Shack and other vendors in short order.

RAM BANK SWITCHING. Text files and program files created by the user occupy RAM. The basic 200 comes with a total of 24K-bytes RAM. RAM expands in increments of 24K. Each expansion module costs $249.95 from Radio Shack. In the memory expansion compartment, located on the bottom of the unit, there are three memory-expansion sockets. Two sockets are for additional 24K banks of RAM and one socket is for the 32K expansion ROM mentioned earlier. The 200 provides the capability of electronically selecting one of the three segments (banks) of RAM at any time.

This capability provides greater overall RAM size, but any program or file can't be larger than 24K total. Also, the 200 doesn't have the ability of allowing a file or program to overflow from one bank of memory into another. But then, neither does any other battery-powered portable computer. The good news is all expansion memory, both RAM and ROM, is installable by the customer.

BIG, FAST DISPLAY. You're first struck by the large size of the 200's display. It shows 16 lines by 40 big characters, plus dot-addressable graphics. The LCD has only two positions, either opened or closed. It's easy to read at normal viewing angles and there's a small knob for contrast adjusting.

The scroll display is greatly improved from the 100 version. It features its own controller and receives information from the processor serially. This dedicated controller improves the performance of the display and results in faster, smoother scrolling. When, for example, a Basic program consisting of 50 lines of 38 characters each is listed on the 100 (beginning with a clear screen), the complete listing takes 17 seconds, or about .33 second per line. This same operation on a 200 takes six seconds.

COMFY KEYBOARD. The keyboard is a comfortable typewriter style layout with an added row of small pushbutton keys above the regular keyboard. These extra keys provide special functions and commands used in the 200's programs. Plus, a group of four keys controlling the cursor are full-sized keys formed in a diamond keyout.

Since the display folds up from the keyboard, both keyboard and display are protected from dust when not in use. This also allows the keyboard to be located physically closer to the bottom of the unit. One doesn't have to stretch his hands to type as is necessary with the 100.

THINGS PRESENT AND FUTURE. Like the 100, the 200 has been designed with the most common peripheral interfaces already built in. Also, connections to these peripheral devices have been well thought out. The 200 uses the same cables and peripherals currently being sold by Radio Shack for the 100. (The one exception is that instead of using a fragile 40-pin integrated circuit-type socket inside the unit, Radio Shack used a small 40-pin female connector located at the rear of the cabinet along side the rest of the connectors.

Accessories sold by companies other than Radio Shack, such as Holmes Engineering's Bullet and Portable Computer Support Group's Portable Disk Drive, will require new software specifically for the 200. This is because

continued on page 59

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AMPI's AmericanCalc Spreadsheet—designated TPlan for the Radio Shack TRS-80 Model 100, and NPlan for the NEC PC-8201A—is a full-feature spreadsheet program. It has the following features: handles up to a maximum of 90 rows or 26 columns; cursor movement is left, right, up, down, and go to any location; accepts data entries for numbers, labels, and formulas; formulas include addition, subtraction, multiplication, division, power, trigonometric, integer, absolute, natural logarithm, and exponentiation; replicate numbers or formulas; insert or delete rows or columns; copy, save, load, and screen dump; and built-in calculator. The program is shipped with bound instruction manual, pre-recorded audio tape, and vinyl album case.

This popular spreadsheet now has three new templates especially designed for busy people who do not have the time to set up their own spreadsheet applications. Once the TPlan or NPlan is loaded, simply select and load the application template that fits your particular need. The three new templates are:

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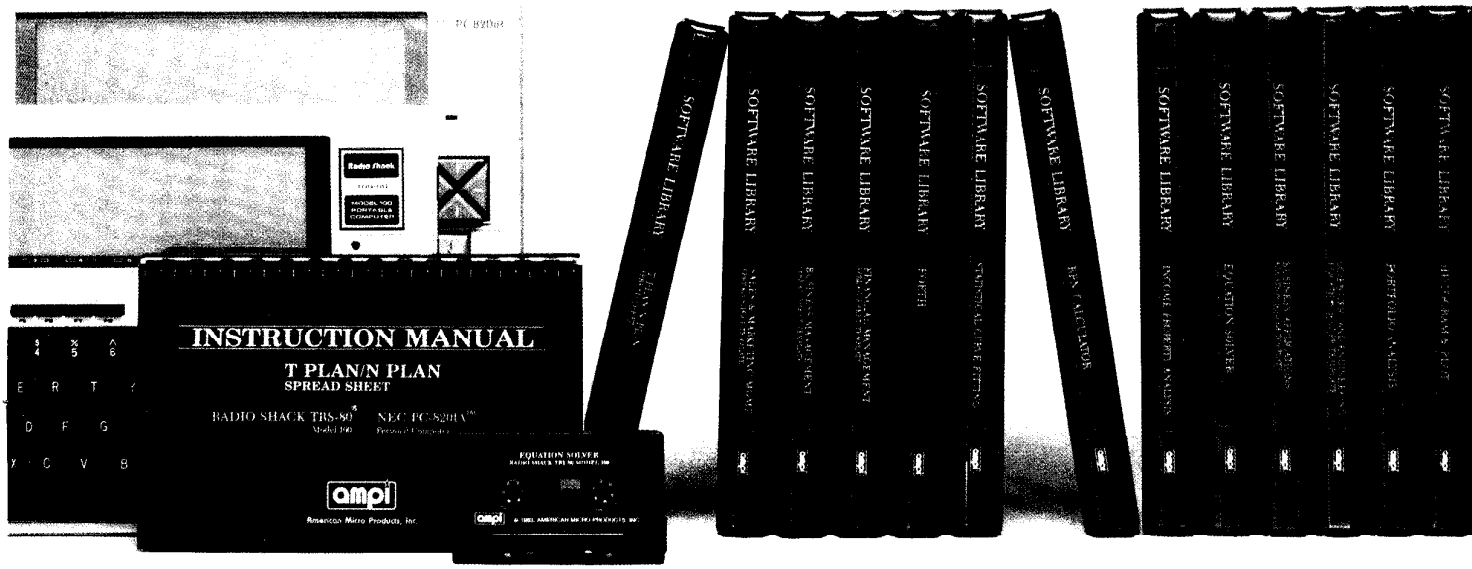

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SPREAD — PART 2: EXPANSION AND SOME PATCHES

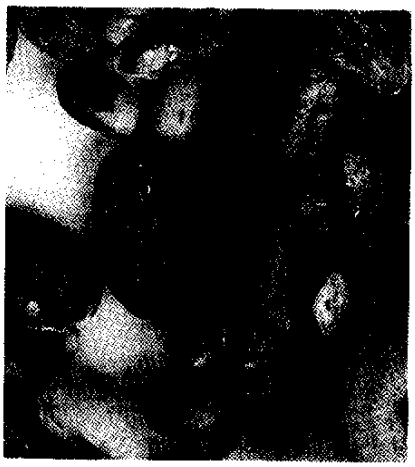
In the further adventures of the Penurious Peanut Company, Spread keeps the goober firm out of the red.

By WOODS MARTIN

Editor's Note: This is the second installment of Wood's series on Spread, a spreadsheet written in Basic and refined over several months by members of the Model 100 Special Interest Group on CompuServe. The original program was written by Terry Dettman and appeared in Basic Computing. *This version of the program incorporates ideas from SIG members Don Hergert, Gary Bender, Chris Young, and Joel Hassel.*

How did you make out last month? You might not be comfortable with a spreadsheet, but I know you got lots of practice typing or downloading a very long program. With 11,565 characters, it's easy to make typing mistakes or have errors creep in if you downloaded Spread from a network or bulletin board. If you're up and running, congratulations!

If you still have problems, carefully reread the December article and try again — with patience; it can be done.



If you are downloading from the Model 100 Special Interest Group on CompuServe, I recommend using the CISTRN.100 in data base XA1. Read CISTRN.DOC for instructions on how to make error-free file transfers.

A warning: CISTRN only works without the Tandy Disk-Video Interface (DVI), since it uses the same memory space as disk basic. Spread, of course, supports the DVI.

Table 1 lists the availability of the program and supporting files if you are just getting started.

PPC'S PROBLEMS. Now let's return to the production problems of the Penurious Peanut Company.

If you completed last month's exercise, you have a model saved under the name NUT1.DO.

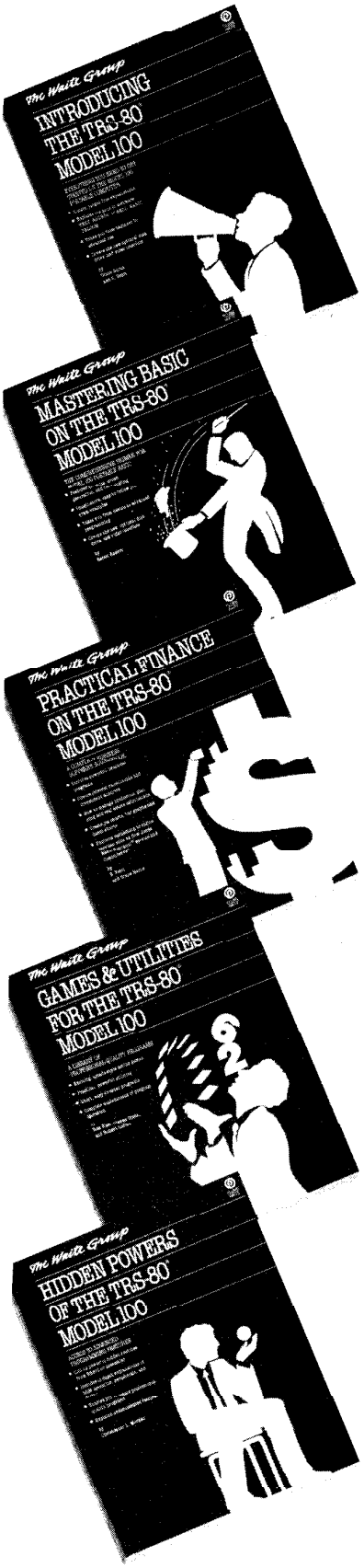
Run Spread. Press enter in response to the "new cm?" query and wait until a blank model displays.

Press /SL and the command line will appear followed by "Store:" and the RAM menu (plus "DVI 0:" if enabled).

At "Load file:", type NUT1 (or CAS:NUT1 for cassette or 0:NUT1.DO for disk) and press enter. The NUT1 model will load, calculate (!C) by columns and display as in exhibit 1.

The current element is A0 as indicated by the reverse video display cursor and the element register at the left of the second line on the screen.

The command line contains "L> Item" showing the "definition" of A0 is a Label. Remember, definition is what



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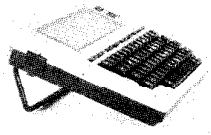

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Table 1. Downloading Sources.

```
>A9 /H Packaging cost per can
>A10 /H Cans per case
>A11 /H Wholesale price per case
>A12 /H Total cases sold per month
>A14 Sales (/H not needed)
>A15 /H Cost of Goods Sold
>A16 /H Fixed G & A Expenses
>A17 /H Net Profit Make the following value and formula entries:
>D9 .093
>D10 24 (press /F0 to correct format)
>D11 22.98 (press /F2 to correct format)
The remaining entries are integers so press /GF0 global format
>D12 10000
>D14 +D11*D12>(D5,0)
>C14 bbbbbbbbb$ (bbb are spaces)
>D15 (D5+D9)*D10*D12>(D5,0)
>D16 15000
>D17 +D14-D15-D16
>C17 bbbbbbbbb$ (bbb are spaces)
```

has been entered into the element and always appears on the command line when the element is under the display cursor.

The display at the column row position of the element is the same as the definition in the case of a label but will be formatted (with selected decimal places) if a value. It will represent the formatted result of a calculation if the definition is a formula.

MODEL PROBLEMS. I mentioned last month this model has some problems. Type >B3 and press enter. The display cursor moves to B3 which displays 5 with V>5 as the definition on the command line.

Type 40 and press enter. Notice In> appears on the command line as soon as the first key is pressed. When enter is pressed, this changes to V>40, and 40 is displayed at B3. Now press "!". !C appears on the command line. The element register cycles through the elements as recalculation takes place by columns and the screen is refreshed.

Look at B4. What happened to almonds? Even the Penurious Peanut Company can't put in a *minus* 10 percent of anything, so we need to prevent that from happening.

Type >B4 and press enter. The definition of B4 contains a formula: F>100-B1-B2-B3. The percentage of almonds is 100 less the sum of the other ingredients but, in this case, the others already add up to 110 percent.

RELATIONAL FUNCTIONS. We will use the "/E" editing command to correct the problem. Press /E and Ed> 100-B1-B2-B3 appears on the command line with the cursor blinking over the last character.

Hold down control and press the left arrow, causing the cursor to move to the first character. Type a left parenthesis [(] followed by control–right arrow and right parenthesis [)]. The formula is now in parenthesis, first step in creating a relational function to keep almonds from being negative.

Type @ <=((B1+B2+B3),100). Note the left and right arrow keys can be used with delete and backspace to insert, delete, and correct mistakes just as in TEXT.

Press enter. F> replaces Ed> in the definition and B4 now displays zero! The raw percentage is multiplied by the relational function @<=. The result is one if the sum of the percentages of the other nuts is less than or equal to 100 percent. If they total more than 100 percent, the result is zero.

TWO MORE PROBLEMS. Two problems remain. Element B5 displays a total of 100 percent which is not cor-

L> Item

A 0	A	B	C	D
0	Item	Pct by wt	Cost/lb	Cost/can
1	Peanuts	60	0.338	0.203
2	Pecans	10	1.850	0.185
3	Cashews	5	2.437	0.122
4	Almonds	25	1.024	0.256
5	TOTAL	100		0.766

Exhibit 1. NUT1 Display.

L> Item

A 0	A	B	C	D
0	Item	Pct by wt	Cost/lb	Cost/can
1	Peanuts	60	0.338	0.203
2	Pecans	10	1.850	0.185
3	Cashews	5	2.437	0.122
4	Almonds	25	1.024	0.256
5	TOTAL	100		0.766
6				
7	Penurious Mixed Nuts — 1 pound cans			
8				
9	Packaging cost per can		0.093	
10	Cans per case	24		
11	Wholesale price per case			22.98
12	Total cases sold per month			10000
13				
14	Sales		$229800	
15	Cost of Goods Sold		206076	
16	Fixed G & A Expenses		15000	
17	Net Profit		$ 8724	
18				
19				
20				

Exhibit 2. PNUT Display.

rect. Move the display cursor to B5. Type @ SUM(B1,B4) and press enter. 110 displays at B5. Okay so far.

Press the right arrow twice to move the cursor to D5. The definition of D5 is a formula: F>@SUM(D1,D4).

A definition that short could easily be retyped but let's use the edit command again for practice.

Press /E and Ed> replaces the F> before the definition.

Type @=(B5,100) and press enter. That multiplies the sum by another relational function. The function returns to one if the total percentage is 100 and zero if it is anything else.

Element D5 now displays zero as a reminder some of the data in the model is invalid. Although individual elements have been recalculated as they were changed or edited, others are still wrong so press ! to recalculate and refresh the display.

Type B3 and press enter to return the cursor to cashew percentage.

Type 5 and press enter to restore it to its original value.

Recalculate with !. Observe the model now displays exactly the values it did originally. The difference is that invalid data will not produce a result which would corrupt later calculations.

EXPANDING THE MODEL. These simple examples of the decision making power of relational functions illustrate their many uses.

Now let's expand our model.

For non-DVI users it will fill three screens but that is no problem because Spread movement is easy.

Type >A7 and press enter.

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Now press /H for the header entry command.

Type Penurious Mixed Nuts - 1 pound cans and press enter. Note the header line was entered all at once but individual element definitions have only nine characters. Check that by using the right arrow to move to B7, C7, and D7.

Experiment. Go to A8 (>A8enter) and type the exact same definition terminated with an enter but without using /H. Only Penurious is displayed at A8. Yet the A8 definition contains the entire line.

A plain label entry will be truncated at nine characters; only the /H command will permit longer entries. Press / B and "Blank" appears on the command line. Press enter and element A8 is blanked out and has no definition.

HEADER BUG. Beware though, there is a bug in the header command. Move the cursor to C8. Type 10 and press enter. Go to D8 and type +C8 and press enter. C8 and D8 will display 10.000, since global format is three decimal places as selected last month.

Move the cursor to A8, press /H and once again type Penurious Mixed Nuts - 1 pound cans. Press enter.

The first part is okay, but the 10.000 in C8 and D8 remains. Using the right arrow we see the definitions of C8 and D8 are correct, but the C8 and D8 displays do not agree.

The bug is /H does not clear the value or formula flags and so C8 and D8 do not know they have been changed.

Listing 1 is the patch to correct this problem. If you don't want to edit the Basic code, simply blank any value or formula elements before using /H.

At C8 and D8, execute a /B and press enter. Return to A8 and reenter the line using the /H command. This time it works because /B resets the flags.

We are finished using row 8 for testing, so let's get rid of it. Making sure the display cursor is on row 8 (the column doesn't matter), press /D. "Delete Col

Program Listing 1. Header Command Patch.

```
122 GOSUB 58
     : IF ST="" THEN RETURN
     ELSE GOSUB 64
     : IF Z=0 THEN S(R,C)=ST
     : RETURN
     ELSE  FOR X=1 TO LEN(ST) STEP 9
     : GOSUB 64
     : S(R,C)=MID$(ST,X,9)
     : C=C+1
     : IF C>CM THEN X=LEN(ST)
     : BEEP 'SPAT03.WM3
```

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Listing 2. Optional CRT Patch.

```
810 CLS
      : ON ERROR GOTO 900
      : SCREEN 1
      : SCREEN 0
      : PRINT "CRT Y/N ";
      : GOSUB 61
      : CLS
      : IF A=89 THEN SCREEN 1
      : WIDTH 80
      : C2=7+(7-CM)*(CM<7)
      : R2=(-21*(RM>=21))-(RM
     *(RM<21))'SPAT01.WM3
```

Row" appears on the command line. Press R to delete row 8.

MORE HEADERS. Enter the header lines in Table 2 using the /H command. Terminate each entry with enter.

Press ! to recalculate and refresh the display which should appear as in Figure 2. It will all display on the monitor using the DVI, or the shift and control keys can be used with the up and down arrows to examine it on the 100's screen.

If your model is correct, save it under the name >PNUT.DO. I suggest the prefix > for all Spread model files and the prefix < for Spread data transfer files.

Press /SS and type the filename: >PNUT for RAM memory, CAS:>PNUT" for cassette, or 0:>PNUT.DO for disk drive zero.

Finally, the bottom line. Penurious is making a profit on mixed nuts. But take care, the price of almonds just shot up to $1.50 per pound. Type >C4enter to go to almond cost. Type 1.5 and press enter. Press ! to recalculate and look at net profit at D17.

IN THE RED. What profit? Go back to C4 and change the price back to the original 1.024 and then go to B3. Change the percentage of cashews from 5 to 10 and recalculate.

Notice the percentage of almonds dropped to 20 and there is still a loss at D17.

Any other items in the model can be changed to see the effect on the bottom line — a classic if simplistic use of a Spreadsheet.

Finally, check the error trap. Change the cashew percentage at B3 to 50 and recalculate. The almond percentage is forced to zero by the relational function, while the total is an illegal 120. This forces total cost/can and, in turn, sales and cost of goods to zero.

While more elaborate commercial Spreadsheets can be made to print ERROR in such cases, zero sales is sure

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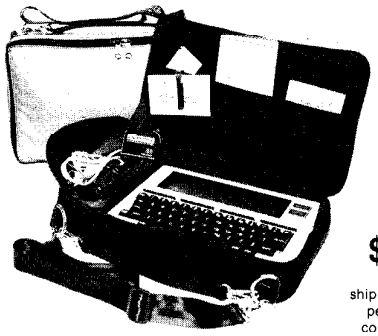

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to get the attention of any sales manager I know.

HARD COPY. If you have a printer a hard copy might be nice — if the model shows a profit.

Go to B3 and change the cashew percentage to 5 and recalculate. Then, and this is important, go to the upper left corner by typing >A0 and press enter or by pressing control left-arrow and then control up-arrow.

Printing will begin at the current element (display cursor) and will end at the lower right position selected.

Press /P and "Print: Printer, Device" appears on the command line. Press P to use the parallel printer port, or D to print to the serial port (COM:3711E), cassette, disk, LCD, or CRT (although the CRT two may cause a messy screen).

The only thing you can't print to is RAM because a bug in BASIC sometimes corrupts the memory when trying to write directly to it with PRINT USING statements. A way around this is to print to cassette or disk and then use TEXT to transfer the file back to RAM.

Listing 3. Optional Initialization Patch.

```
2 SCREEN 0
  : MAX FILES =1
  : CLS
  : C=3037
  : INPUT "Clear<3037>";C
  : CLEAR C
  : DEFINTA-Z
  : DEFSTRS
  : CM=19
  : RM=20
  : INPUT "cm<19>";CM
  : INPUT "rm<20>";RM
  : SU="S"
  : GOSUB 800
  : GOSUB 770
  : GOSUB 90
  : GOTO 70'SPAT02.WM3
```

Assuming a parallel printer and entry of /PP, "Lower right" will display on the command line. Type D17 and press enter. The entire model will be printed.

There is no check for the printer being ready. If it isn't and can't be made so (like if you don't have a printer), you must press shift-break to recover. Then type GOTO 70 and press enter followed by /M to refresh the screen. This is the *only* way to recover

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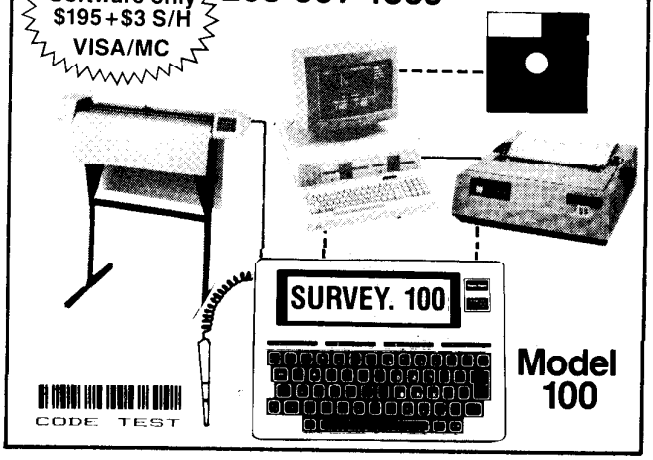

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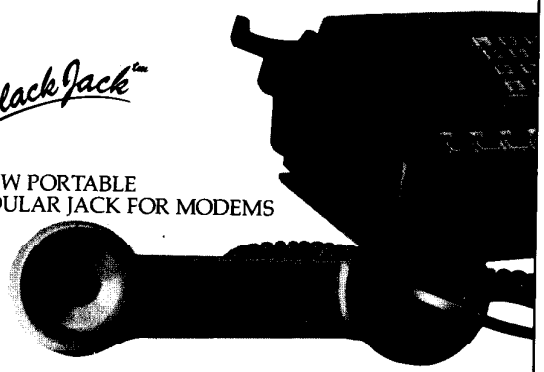

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FILES AVAILABLE ON:
SOURCE
Participate subconference 84.27415
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SPREAD.IMG
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Model 100 Special Interest Group
XA2 data base
READ.WM3 (program)
SPAT01.WM3 (crt option)
SPAT02.WM3 (clear option)
SPRDOC.WM3 (documentation)
SPRGLO.WM3 (glossary)
SRVAR.WM3 (variable cref)
SPRLIN.WM3 (line no. cref)
SMNUT1.DO (sample model 1)
SMPNUT.DO (sample model 2)

from a break or a control-C during printing or any other time.

CONT will not work since Spread uses INKEY$ for all input and that statement does not honor CONT. Another M100 Basic bug?

VALUABLE PATCHES. This month I'll finish up with two optional patches for special use. The first is for DVI users.

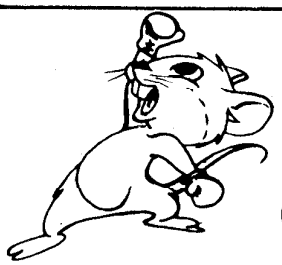
Spread normally checks for the DVI and if it is enabled, also assumes the CRT is in use. Patch 1 in Listing 2 allows manual selection of the CRT and brings it up in 80 column mode.

The second patch is for users with lots of memory who want to experiment with different values of CLEAR, RM and CM. Patch 2 in Listing 3 allows these values to be changed on start up without editing any of the program code. Pressing enter after each query will accept the usual Spread defaults.

By keeping the cashews out of the can, the Penurious Peanut Company is making money and rapidly outgrowing its packing plant. The question is, will the cash flow support a new building?

When we meet again we'll look at a mortgage and loan payment model that calculates monthly payments and prints yearly schedules, allowing for variable interest rates.

It is an application that pushes Spread almost to its practical limits. As you have noticed, the more complicated we get, the slower Spread runs, a victim of Basic and its famous garbage collector. Maybe if I get enough of you hooked and wanting something faster, the Portable Computer Support Group will give me a copy of Lucid. ◀



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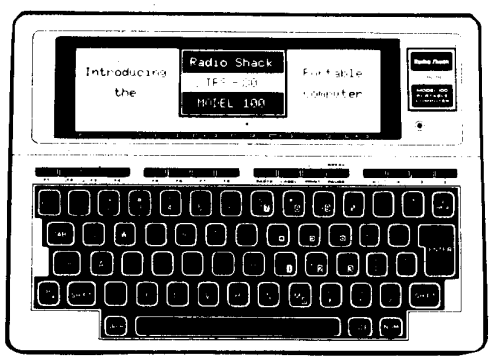

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Circle No. 23 on Reader Service Card

THE SECRET BEHIND THE ENIGMATIC @.BA

When Jesse Bob finished RFU, he promised to reveal all about his cassette back-up file @.BA. Here's what the odd-looking file does.

By JESSIE BOB OVERHOLT

The chapter and Section of Murphy's Law governing programmers mandates that we create back-ups for all we do. In a series of articles (see *Portable 100*, July, August, September, 1984) on using the function keys, I developed a program called RFU, short for RAM File Utility.

One of its strong features is a back-up of all or some RAM files to cassette. At the end of the series, I promised a program to restore RAM files from a cassette back-up. As any good politician should, I am hereby keeping my promise to my reading constituency.

UNCOMMON NAMING. The program is called "@.BA". It's not a typo. The name of the program employs the somewhat unconventional but valid "@" (at) symbol to a usefull end. You may recall from the RFU series that a file called "@.BA", if found in RAM, is always the first one written to cassette during a RAM file back-up operation. Because the sole purpose of "@.BA" is to restore files from the cassette, it is logical to put it on the tape first.

Now let's get down to the operation of this program shown in *Listing 1*.

The program begins, in lines 100 to 170, with an initialization procedure. An array called "FL$" is defined for the purpose of holding the names of the files in the RAM file directory. It is also necessary to define the quote (QT$) and the carriage return (CR$) as variables, because they can't be specified as quote string literals.

Subroutine 50000 is called to load the RAM file directory into "FL$".

This is a modified version of the subroutine used in RFU for the same purpose. Because the addresses of each file are not needed, only the names are stored.

After picking up the file names, a check is made to see if any files exist in the computer. If one or more are found then a check is made in lines 150 and 160 to see if the program has been sorted as "@.BA". In the event that @.BA" is not yet in the RAM directory, it is saved to RAM in line 170. This step is essential, since loading in Basic files from cassette would destroy the program if it were not saved in RAM.

Note the use of subroutine 11000 to set up a SAVE command in the keyboard buffer. This subroutine was discussed in the RFU series, although it was numbered 53000 in that program. (Well, I never claimed to be consistent.)

CASSETTE DIRECTORY. Once the restoration program has been securely tucked away in RAM, it's necessary to check for the directory of the cassette. This is stored on tape by RFU under the name "(DIR)", which is also an odd, but valid, file name. Lines 200 to 220 check the RAM directory to see if the "(DIR)" Document has been read off the tape.

In lines 300 through 340 the cassette directory is read into RAM. This directory contains the name and length of each file that has been stored on the back-up cassette.

Actual restoration of files begins at line 400. The cassette directory file, (DIR), is opened in 410, and the back up date is read and displayed. Then files are read one at a time and matched against the file names collected in the "FL$" array. When the file is found that is on cassette, but not in RAM, the load process begins.

A check is made in 460 through 480 to see if enough free RAM is available to load the file. Finally, at 490, the file type is checked in order to select an appropriate copy routine.

"Document" files are restored by 500 to 550. This is the same copy routine used in RFU, where it was numbered 57000. It copies in blocks of 255, the largest possible string length, for speed. Once the copy has completed, it's sent back to line 400 to check for another file copy.

BASIC MORE DIFFICULT. Basic programs are more difficult to restore, since the CLOAD used to read them also does an implied "NEW" that de-activates the restoration program.

In the Basic file recovery routine at line 600 the subroutine at 11000 is pressed into service to create a series of commands for Basic. This series consists of a CLOAD, a SAVE, and, finally, a RUN to get "@.BA going again.

When RAM is finally recovered from cassette the recovery program goes to line 900. Here a count of recovered files is displayed and the "(DIR)" Document file is deleted since it is no longer neeeded. The recovery utility "@.BA" is left in RAM, so that it can be copied onto another back-up cassette by RFU.

Recovering files from a cassette back-up, using this program, is simplicity itself. First go to Basic. Then load "@.BA". If you used RFU to make the back-up cassette, then a simple CLOAD will do. Then type RUN and sit back and wait for your files to return to RAM. This whole process can ususally be done in less than 10 minutes... just enough time for a quick cup of coffee.

Make sure all of your cassette back-ups have this program on them.

There, I've kept my promise, and you've (hopefully) foiled Murphy one more time. ◀

```
100 'Initialization
110 CLEAR 1024
    : MAX FILES =2
    : DEFINTA-Z
```

Introducing *SUPERA* and *TEX PRO*...
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SUPERA - Beyond PRO AID

SUPERA is a revolutionary concept in Model 100 software. Like PRO AID, SUPERA adds many new features to the Model 100 operating system, making your computer far more powerful. Unlike PRO AID, or any other machine language program, SUPERA loads and behaves like a BASIC program! Because of its unique format, you will not have to worry about memory conflicts between SUPERA and other machine language programs.

Essentially, SUPERA gives you all the features of TEX PRO and almost all those of PRO AID, and more, in a remarkably easy to use format. While in use, SUPERA must remain in the computer as a Basic file, and it must be the first Basic program loaded from cassette. But otherwise you can forget about it. SUPERA will constantly work in the background providing your Model 100 with numerous features otherwise not available. In addition to the TEXT and BASIC enhancements provided by PRO AID and TEX PRO, SUPERA also allows you to kill and rename files by control keys while at the main menu. Only a few of the lesser used features of PRO AID are missing from SUPERA. Registered PRO AID owners can purchase SUPERA at a reduced rate.

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TEX PRO enhances the text editing capabilities of the Model 100 in much the same way that TEL PRO enhances TELCOM. When you enter TEXT after running TEX PRO, you will discover that TEXT suddenly has several new features.

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Only 3.6K bytes long, ASM is both compact and fast. In fact ASM can assemble a 14K source file version of itself in about 20 seconds. Input and output data can be either decimal or hex. Constants can be in either decimal, hex or binary. Output is automatically routed to the printer if the printer is connected and on.

ASM supports +, -, *, /, exponents, MOD, AND, OR, NOT, and the use of parenthesis in the data field.

While not a macro assembler, ASM contains a built-in library of useful macros which you can immediately add to your programs. Among these are a collection of relative branch instructions that make it possible to write relocateable routines for use with a BASIC program.

ASM checks for most common errors, and if one is detected, it displays the offending line with the error in inverse video.

As an end of assembly option, ASM will provide a table of addresses for all symbolic labels. This table includes the number of references to each label. ASM comes with full documentation, and a listing of useful ROM routines.

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TEL PRO adds a whole new dimension to the TELCOM program. If you enter TELCOM via TEL PRO, you will discover a variety of new capabilities open to you. Without losing your connection, you can kill files, access the menu, check the time, perform BASIC calculations, upload BASIC programs, set alarms, access help screens, append data from the display to text files, read text files, and more.

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DASM is for the serious ROM investigator. DASM does much more than simply disassemble the machine code inside your Model 100. It provides function key controls to easily follow the logical flow of the code, to access the contents of specific locations, to check the keywords corresponding to BASIC tokens, and more. DASM allows for input/output to be in either hex or decimal. You can interrogate any range of memory, and then return to the disassembly.

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This was PORTABLE 100's first try at something like this and we were a little cautious when we first approached our advertisers for help with the effort. Their enthusiasm was overwhelming. So let's give credit where it belongs . . . to the **PORTABLE 100** advertisers who donated prizes. Without them we would have been giving away a lot of nothing. Thanks guys!

When we said you had to enter to win the **PORTABLE 100** 1984 SWEEPSTAKES we meant it . . . and WOW did you respond!

By November 1st we had received over 5200 entries and from those we came up with the names of 53 winners. **CONGRATULATIONS** to all of the winners and **THANK YOU** to everyone that entered.

Remember, too, that all the products donated can be purchased from these companies. We asked only advertisers with products specific to the Model 100 to donate, although many of them carry items for other computers like the NEC 8201 portable.

Again, thanks to everyone. We just might do this again next year!

SWEEPSTAKES

GRAND PRIZE WINNER:

Dr. Tom Hutto / St. Albans, WV

Tom wins **RADIO SHACK'S** $800 *DISK/VIDEO INTERFACE* plus a $600 *DYNAX DX-1* printer from **THE COVINGTON GROUP** and a copy of their *TEXT POWER 100.*

SECOND PRIZE:

G.L. Sprague / Avon, CT

G.L. wins **PORTABLE COMPUTER SUPPORT GROUP'S** $550 *PORTABLE DISK DRIVE* and $600 worth of **PCSG** software.

THIRD PRIZE:

Jack Albertson / Irvine, CA

Jack wins the $500 *CHIPMUNK* from **HOLMES ENGINEERING** plus $500 worth of software from **TRAVELING SOFTWARE.**

FOURTH PRIZE:

E.R. Creamer / Belmar, NJ

E.R. wins the $400 *PORTAPAC* from **CRYPTRONICS** and $400 worth of software from **AMERICAN MICRO PRODUCTS.**

FIFTH PRIZE:

Stephen P. Sheehy / Vista, CA

Stephen wins $325 worth of 32K RAM expansion from **PG DESIGN** and $260 worth of software from **SKYLINE MARKETING.**

PORTABLE 100 STAFF MEMBERS DRAWING WINNING ENTRIES.

WINNERS!

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Rev. F.E. Wall / Arlington, TX

The Reverend wins $180 worth of *REMOTE CONTROL* software from **KENSINGTON MICROWARE** and a $600 carrying case from **KANGAROO VIDEO PRODUCTS.**

SEVENTH PRIZE:

Paul W. Brunner / Cherry Point, NC

Paul wins $150 worth of software from **KEY SOLUTIONS.**

EIGHTH PRIZE:

H.P. Gordon / Rochester, NY

H.P. wins $118 worth of Software from **SUSIE SOFTWARE.**

THREE 9TH PRIZES:

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Our winners each receive a $70 8K RAM chip from **PURPLE COMPUTING.**

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Hartvig wins a $50 *BLACK JACK* from **MICRO PERIPHERAL CORPORATION.**

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William S. Wakefield

William wins a $40 program called *SECURE* from **SECURE SYSTEMS.**

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Each winner receives a pair of $15 *M-STRAPS* by **THE DON STEPHENS COMPANY.**

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```
120 DIM FL$(25)
      : OT$=CHR$(34)
      : CR$=CHR$(13)
130 CLS
      : PRINT "Restore RAM files from
      cassette"
140 GOSUB 50000
      : IX=0
      : IF NF=0 THEN 170
150 FOR I=1 TO NF
      : IF FL$(I)="@.BA" THEN IX=I
      : I=NF
160 NEXT I
      : IF IX THEN 200
170 X$="SAVE"+QT$+"@"+QT$+CR
      $+"RUN"+CR$
      : GOSUB 11000
      : END
200 'Check for [DIR] file
210 X=0
      : FOR IX=1 TO NF
      : IF FL$(IX)="[DIR].DO" THEN X=IX
      : IX=NF
220 NEXT IX
      : IF X THEN 400
300 'Load the directory
310 BEEP
      : X$="when cassette ready."
      : GOSUB 10000
320 OPEN "CAS:[DIR]" FOR INPUT  AS 1
      : OPEN "[DIR]" FOR OUTPUT AS 2
330 IF NOT EOF(1) THEN LINE INPUT #1,
      X$
      : PRINT #2,X$
      : GOTO 330
340 CLOSE
400 'Load the next file
410 OPEN "[DIR]" FOR INPUT  AS 1
      : LINE INPUT #1,X$
      : PRINT @170,X$;
420 IF EOF(1) THEN 900
430 INPUT #1,F$,L
440 X=0
      : FOR IX=1 TO NF
      : IF F$=FL$(IX) THEN X=IX
      : IX=NF
450 NEXT IX
      : IF X THEN 420
460 CLOSE
      : IF L<(FRE(0)-16) THEN 490
470 BEEP
      : PRINT @174,"Memory Full!"
480 X$="for menu."
      : GOSUB 10000
      : MENU
490 X$=RIGHT$(F$,2)
      : F$=LEFT$(F$,LEN(F$)-3)
      : IF X$="BA" THEN 600
500 'Load a .DO file
510 OPEN "CAS:"+F$ FOR INPUT  AS 1
520 OPEN F$ FOR OUTPUT AS 2
530 L=L-1
```


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Circle No. 39 on Reader Service Card

```
      : X=FIX(L/255)
      : L=L-X*255
      : IF X=0 THEN 550
 540 FOR I=1 TO X
      : PRINT #2,INPUT $(255,1);
      : NEXT I
 550 IF L>0 THEN PRINT #2,INPUT $(L,1
 560 CLOSE
      : NF=NF+1
      : FL$(NF)=F$+".DO"
      : GOTO 400
 600 'Load a .BA file
 610 X$="CLOAD"+QT$+F$+CR$
 620 X$=X$+"SAVE"+QT$+F$+CR$
 630 X$=X$+"RUN"+QT$+"@"+CR$
 640 GOSUB 11000
      : END
 900 'Restoration complete
 910 PRINT @40,CHR$(27);"J"
      : PRINT @170,"RAM files
      restored!";
 920 BEEP
      : X$="for menu."
      : GOSUB 10000
 930 KILL "[DIR].DO"
      : MENU
10000 'Wait for ENTER key
10010 PRINT @280,CHR$(27);"J";"Push
      <ENTER> ";X$;
10020 IF INPUT $(1)<>CHR$(13) THEN 1002
10030 PRINT @280,CHR$(27);"J";
      : RETURN
11000 'Load commands into key buffer
11010 FOR I=1 TO LEN(X$)
11020 X!=(I-1)*2+65451
      : X=ASC(MID$(X$,I,1))
11030 POKE X!,X
      : IF X>7 THEN POKE X!+1,0
      ELSE POKE X!+1,255
11040 NEXT I
      : POKE 65450,LEN(X$)
      : RETURN
50000 'Subroutine to read RAM directory
50010 NF=0
      : FOR X!=63842 TO 64095 STEP 11
50020 IF PEEK(X!)<128 THEN 50080
50030 IF (PEEK(X!) AND 24) THEN 50080
50040 NF=NF+1
50050 X$="."   "
      : FOR I=9 TO 10
      : MID$(X$,I-7,1)=CHR$(PEEK(X!+I))
      : NEXT I
      : L=8
50060 IF PEEK(X!+L)=32 THEN L=L-1
      : GOTO 50060
50070 X$=STRING$(L-2,32)+X$
      : FOR I=3 TO L
      : MID$(X$,I-2,1)=CHR$(PEEK(X!+I))
      : NEXT I
      : FL$(NF)=X$
50080 NEXT X!
      : RETURN
```


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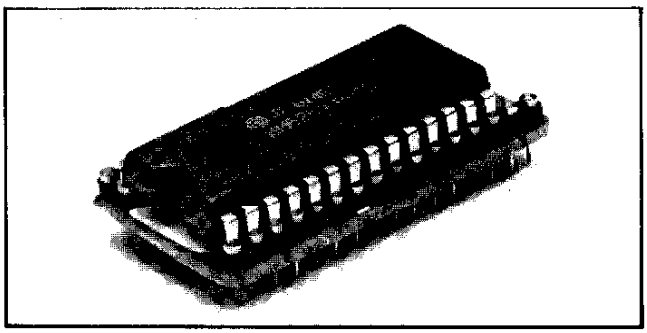

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Circle No. 15 on Reader Service Card

REVIEWS

IT'S A GAME OF WITS WHEN THE 100 PLAYS CARDS

Bridge
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Requires 16K Model 100
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By BONNIE HELLEVIG

I was excited about the prospect of playing Bridge on the Model 100 since my regular partner recently moved away.

It took a while to get used to the dummy laid out opposite me even when I was defending, but I adjusted and the rest of the playing was effortless.

The program's very realistic and it's easy to see what is happening.

It comes on cassette and includes a booklet which explains how to physically bid and play on the computer (there's nothing on the rules of Bridge), has scoring tables, and a glossary of terms.

SILENT PARTNER. The value in having a regular partner is you become familiar with his or her bidding habits. Of course, proper bidding follows particular rules, but with a regular partner you further narrow down the meanings of certain bids.

At first I thought this was my problem in failing to ever get to what I considered a decent contract. However, after many hours of play I came to the conclusion that the human element is vital for bidding hands in Bridge.

I had a hard time finding any consistency in my partner's bidding; he would name his best suit and I would name mine. He would almost always pass, leaving us in contracts of two Spades, for example. If we managed to approach game, we'd almost always be in an unsuitable contract.

For example, in one hand I had six hearts and two diamonds; he had eight diamonds and two hearts. Clearly we at least should have been in game in diamonds. The bidding got to:

He (North): 3D
Me (South): 3H
:Pass

My regular partner would certainly have pursued game in diamonds holding eight of them, and we even had enough hearts between us for a game in hearts.

BIDDING AND SCORING. In our three heart contract we took all the tricks. This was typical of the bidding. Frustrating? You bet.

Eventually, I came to take over the bidding, guessing what my partner had and jumping to game from the two level. This seemed to work but was equal to taking shots in the dark.

Conventions? Not that I could tell. In one memorable hand we managed to bid up to the four level:

Me (South): 2S
He (North): 3C
:4C
:4NT

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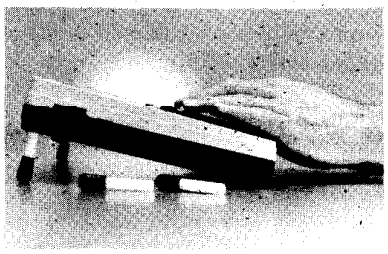
PROP LEGS



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This 4NT surprised me. It was very unusual for my partner to be so bold. I wondered if he was asking for aces, trying for slam in clubs. I deliberated then gave my answer — five diamonds, telling him I had one ace. And guess what my partner did?

He passed. We were in five diamonds and I had *no* diamonds. Needless to say, we did not make this contract.

So that's the bidding. Frustrating? I guess so. The play was excellent, however. My partner was clever and consistent. I found it very good practice for real Bridge.

The scoring was strange though. Once we miraculously got to a four heart contract, made one or two over bid, but were told that we were set 39. This happened occasionally and messed up our totals so I was forced to ignore how we were doing score-wise.

BRIDGE AU SOLITAIRE. All in all, Alpine Data has a decent Bridge program. Bridge fanatics will enjoy the play, the challenge of having a bad partner, and the chance to play Bridge anytime. No more looking for a fourth, (or even a second or third). Although the bidding is a serious flaw, if you love to play, like to practice, and have patience, this is a good program.

But let me emphasize: Do not try to learn bidding on this program. No one will ever play with you! Practice your play and accept the fact that the bidding depends on your guts, and not on logic. ◀

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By RICHARD J. NAST

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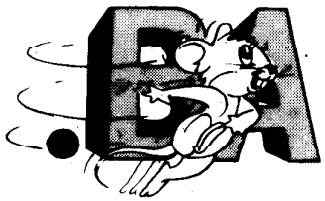

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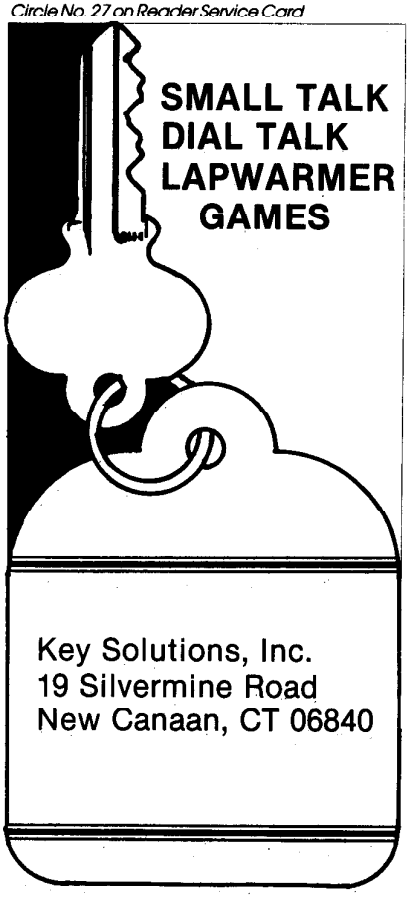

counting practitioner doing client write-up work or the small business owner. This is a double-entry general ledger system which isn't to be confused with a single-entry system. It can be used by both the professional accountant and by anyone who knows the difference between a debit and a credit.

ASSETS. This program provides the user with the following reports:

- cash disbursements journal
- cash receipts journal:
- general journal;
- trial balance, and;
- detailed general ledger.

Additional features include automated backup of data files and automated balance forward.

The output can be directed to either the LCD display screen or the printer. This is a nifty feature because you can review your data entries before printing them out on paper.

DYNAMITE FEATURE. The program is an integrated on-line system and here is where its real power reveals itself.

As a test of Portable Accountant, I took my Model 100 to the office, set up the chart of accounts, input the cash receipts and disbursements journals, and made the necessary standard journal entries. After all the data was input, I chose the option of displaying it on the screen, corrected my errors using the text editor feature on the Model 100, and displayed the output on the screen.

Particularly exciting was my ability to view the trial balance on the screen and in addition view the net income calculation (which the program automatically computes) on the screen. From this information, I then was able to calculate the federal and state tax accruals and make the necessary journal entries.

After all the entries were made, I was able to review on the screen the entire detail posted to each general ledger account. When the information was reviewed for accuracy, I made a hard-copy of the general ledger. This integrated on-line feature isn't found on some of your more expensive general

ledger applications and I found it to be a real time saver.

LIABILITIES. There were no unbearable drawbacks. However, I did find the lack of information on the explanation of error messages troublesome.

For example, when I was inputting data, I inadvertently hit a comma key and embedded a comma on the text field. The program came at me with an error #6 message. Nowhere in the manual could I find an explanation of this. I eventually was able to figure it out, but having an explanation in the manual would have saved me a lot of time.

DOCUMENTATION. The instruction manual was well-written and easy to use. The text was double spaced and legible. The documentation also included a sample company with step-by-step instructions.

Sample files were prerecorded on the program tape so you didn't have to input data if you didn't want to. The illustrations were well-documented and led you through the tutorial with ease.

SOPHISTICATED. Portable Accountant was one of the few programs I've encountered where the author adhered to the "kiss principle" (keep it simple, stupid). Although the program doesn't generate a balance sheet or income statement, I found this wasn't a significant problem. My solution was to input the figures obtained from the trial balance to a spreadsheet program and then generate all the needed financial statements I wanted.

In view of the fact the program was designed to meet the needs of the accountant doing client write-up work, I feel the program passed this test with flying colors.

The assets of Portable Accountant far exceed its liabilities. I was extremely pleased with the program and the results it produced. This software package is an excellent value and would certainly be an asset for the accountant doing client write-ups or for that matter, a small business owner who wanted to keep his own records. ◀

continued on page 62

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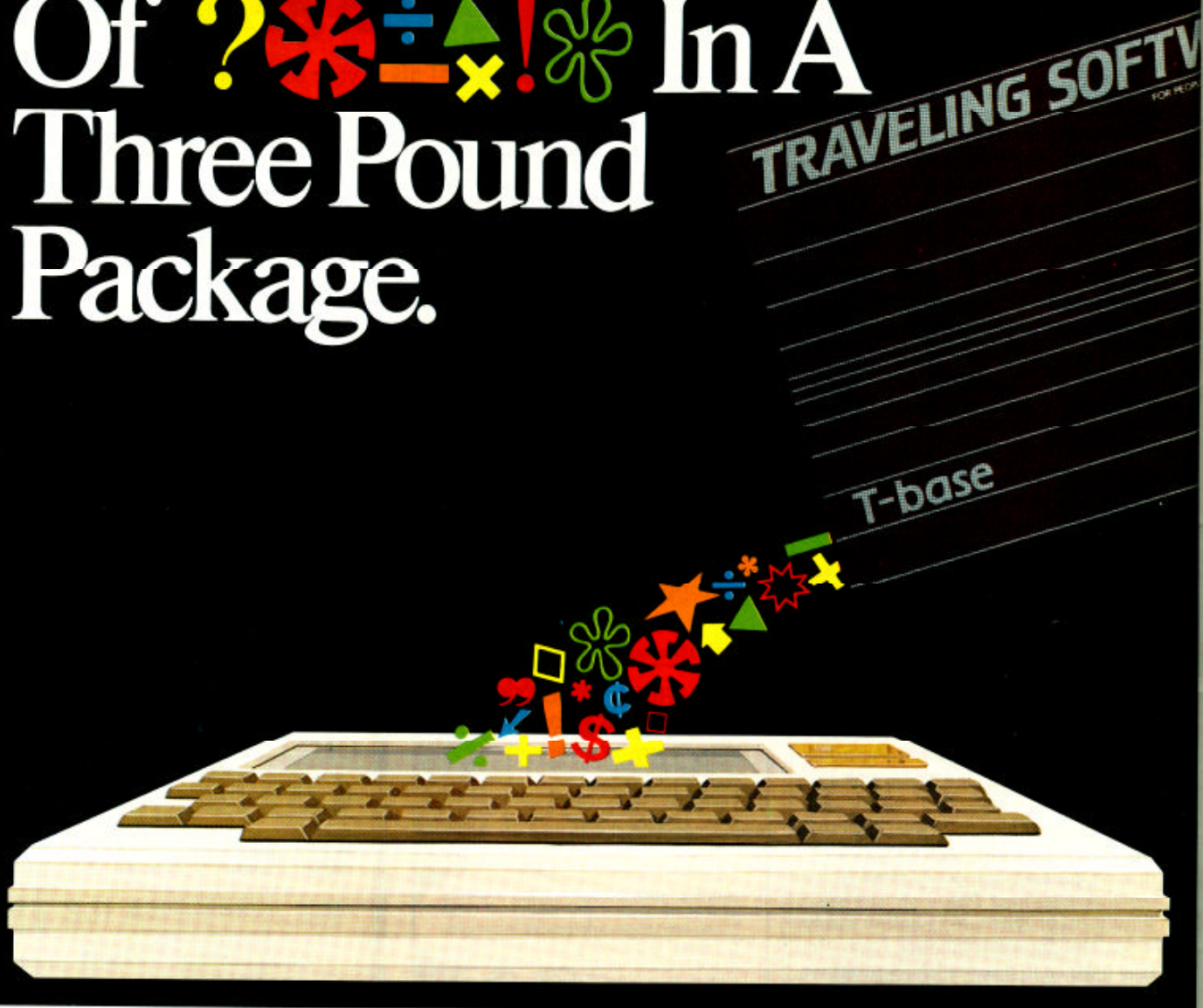

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continued from page 38

the internal operating system has changed and one of the locations for machine-language routines was left in the same place as on the 100.

This requirement has had an impact on Radio Shack, too. Both the Bar-Code Wand and the Disk/Video Interface (DVI) require new software to work with the 200. Also, changing the bus connector causes the DVI to require a new cable just to connect to the 200.

Current estimates by Radio Shack executives slate software availability for both items in 60 days. The cable for the DVI should also be available at the same time. I've seen the DVI connected to a 200 and have had an opportunity to put it through its paces. Let me tell you, it's nice — especially with its full-sized 80 by 25 Multiplan.

NEW DVI. The new DVI software can reside in any or all banks of RAM and takes about 5.5K of space. It also lets the user know when it's loaded by adding DISK/VIDEO code installed under the bytes-free prompt when entering Basic.

If the size of this code takes you aback, remember it only needs to be loaded into one bank of RAM at a time, and then only will work with information in that bank. The 5.5K area of RAM used can be reclaimed without destroying any files and that's a real plus compared to the 100 version.

Later, if you want to reboot the DVI code, you can after a quick poke command, followed by pressing the reset button. All of this is not as straightforward or as easy as it could be, but at least the capability has been provided to regain that precious RAM without destroying files. If you own a Model 100 and use these items, you should ask at your store for ordering and pricing information on the new software and cable.

SWITCHES AND CONNECTORS. The left side of the unit has a switch to select the use of acoustic cups or direct-connect cable for the modem and the bar-code reader connect. Across the rear of the cabinet are the 1500 baud-cassette interface (the cassette interface has been improved through software and is more reliable), the modem connector, the new system bus connector, a standard DB-25 connector for RS232 and a well-recessed reset button.

The right side only has the connector for the AC adapter (same adapter as for the 100) and a dial which adjusts the contrast level of the LCD. The on-off power switch is now a push button and is located above the keyboard in the left corner.

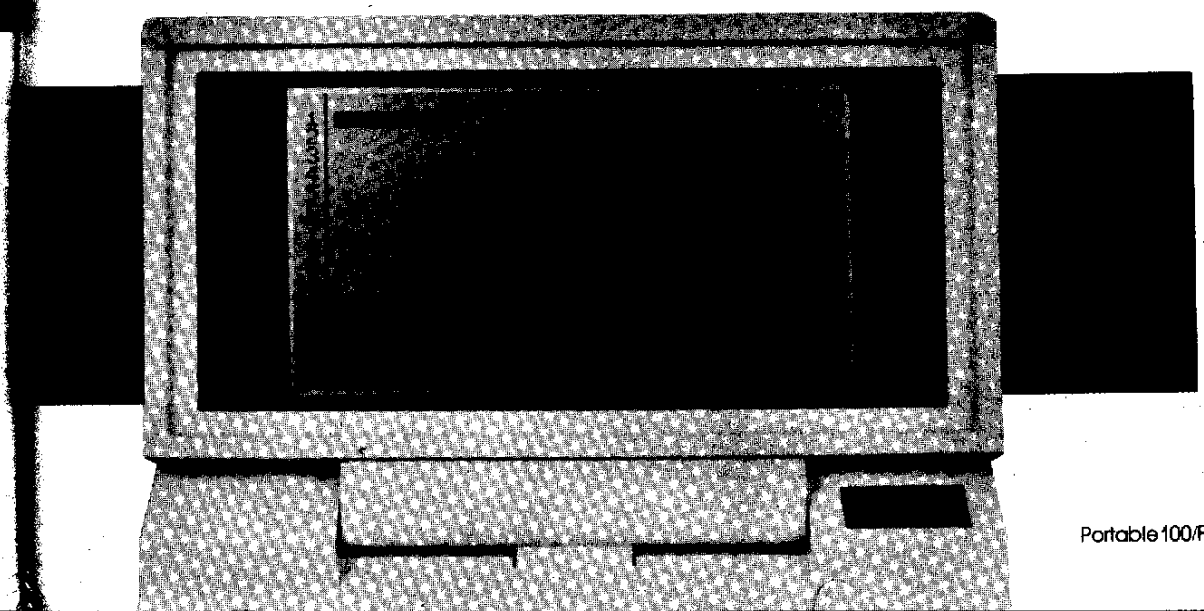
Housed on the bottom of the unit are two compartments and one switch. One of the compartments is for memory expansion and the other is for batteries. The switch is labeled memory power and turning it off removes power from the built-in nicad batteries. These batteries power the 200's memory when main power is off and will retain any stored information for approximately 15 days in the case of a 24K RAM unit after the operating batteries are exhausted.

In normal operation these small batteries are kept constantly recharged by either the AC adapter or from a trickle charge from the operating batteries. If the memory power switch is in the off position, the unit won't operate. It's left in the on position except when storing the 200 for extended periods of time.

POWER UP. The battery compartment is adequately labeled and the owner's manual states that nicad AA batteries are usable "after slight modification by Radio Shack." Originally, there was to be a switch for selection of battery types. Now, to prevent any possible misunderstanding on the part of the customer, a specific setting inside the unit is required.

This modification consists of connecting two jumpers inside the unit, installation of a screw which closes the battery compartment, and a seal placed over the screw. This seal warns you to replace batteries only with rechargeable nicad batteries. Why? When nicad batteries are installed, use of the AC power adapter will cause them to recharge. That's good. However, if voltage from the AC adapter was applied to standard nonrechargeable alkaline batteries, they could explode. That's bad.

How long does each type of battery last? Standard alkaline batteries will power the 200 for about 25 hours without any external devices connected. Nicad cells will give about 5 hours under the same circumstances and require 15 hours to recharge. Since the 200 can be operated while



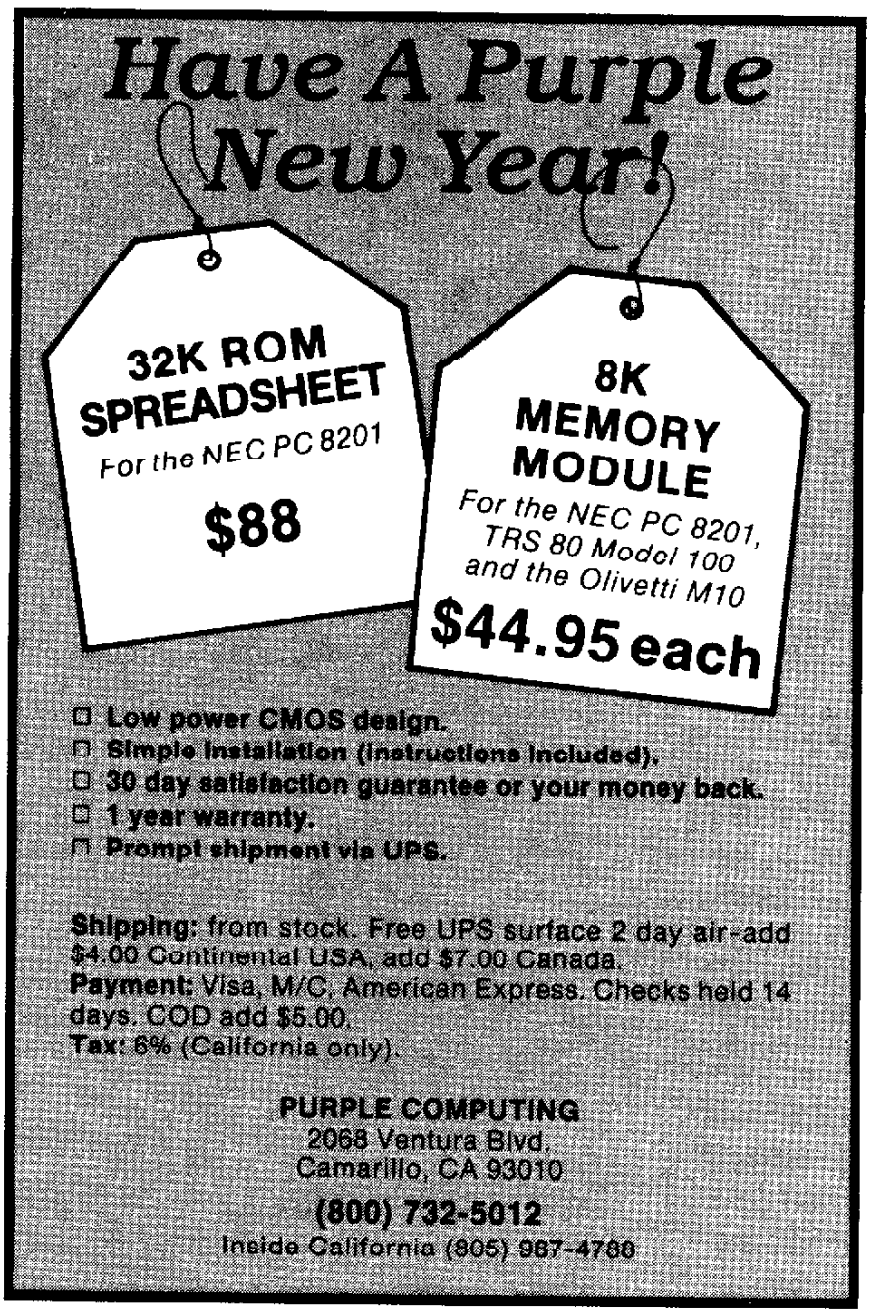
Calculator display

recharging from the AC adapter, this short operating time won't be inconvenient. The modification costs $15 and will require you to leave your unit at least overnight. Radio Shack prices calculate to $8.78 for a set of nicads and $2.99 for a set of alkalines. It doesn't take long before that adds up to a set of nicads. I intend to have that done first thing on my machine.

SIX-SHOOTER. The applications software built in are still the key to success and the 200 has a few slick tricks locked up inside. The software has been produced by Microsoft and at first glance, is identical to the 100. Not so.

The six built-in programs are shown on a single menu that has space for 46 files or programs. As on the 100, a shadow cursor indicates which file or program is to be selected. When this shadow cursor is moved over a user file, the next to last line will display the length in bytes (characters) of that file. The last line of the display shows the commands Bank, Copy, and Kill.

Pressing Bank will shift you to the next available bank of memory if one is installed. Each bank maintains its own menu of files and each bank is completely separate from other banks. Copy is used if you have one or more optional banks of memory to make a duplicate copy of a file in another bank. This is very useful for managing your limited memory space. The Kill function will erase a file only after asking you if you're sure you want to erase. This is a nice touch when you consider the action of killing a file is irrevocable.



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ALARM PROMPT. There are two new software features completely unique to the 200: the Alarm and the Calculator functions. I'm particularly enthusiastic about the alarm capability. Alarm can function in one of two different ways. First, it can store a single day/time to turn on and run any specific program. This has application for remote data-retrieval installations or for unattended calling and connecting to other computer systems. The second is the capability of keeping track of up to 255 different alarms, along with one-line message prompts.

If I wish to be reminded of my wife's birthday, I can make the following entry into the NOTE.DO file:

04/21/85 09:00:00,A,Don't forget the Birthday Tomorrow!

The entry consists of four distinct parts. A date, which consists of two digits, for month, day and year each separated by a slash mark (/). The time must be in a 24-hour format of hours, minutes, and seconds separated by a colon and is followed by a comma and a capital A to indicate Alarm. The next comma indicates the start of the message which can't be longer than one line or 40 characters.

If the 200 is turned off, it beeps loudly for 10 to 15 seconds and turns on, displaying the message on the bottom line of the LCD in flashing normal then reverse lettering. If any key is pressed, the flashing message disappears. Should I not be close-by, the 200 will turn back off when the automatic power-off time elapses (default is 10 minutes) and the next time I turn it on, the alarm prompt will display.

FOUR-FUNCTION CALC. Many people have said they feel very silly having to sit with a pocket calculator beside their computer. The problem is that if

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March 31, 1985

8501

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46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90

March 31, 1985

8501

you're using the computer for almost anything else, it isn't easy to get it to add, substract, multiply, or divide.

Not so anymore! A simple four-function calculator can be called to the top line of the display at any time by pressing the NUM key followed by the GRPH key. It's dismissed by pressing the GRPH key again. With the NUM key locked down you get a pretty fair simulation of a 10-key pad — even to redefining the 0 as +, the P as - and the ; as *. These reassignments mean you don't have to use the shift key to generate those math operators. It's neat and more useful than I had originally dreamed it could be.

WORD PROCESSING. The Text program is a small text processor which, due to its size, doesn't have all the bells and whistles of a dedicated word processor. The 200 version of Text is almost identical to the 100 version. Both allow continous typing and will automatically wrap words as they read the end of the display without splitting. All eight function keys are assigned duties that make Text easy to use. The only function key that is different from the 200 version is the F4, or List, key which invokes the List Manager program for operation on the text file.

The PRINT key is also changed. It still serves a dual purpose; by itself it causes the text currently on the LCD to be printed just as it appears on the LCD. If, however, you depress and hold the SHIFT key and then press PRINT, a large pop-up menu appears. This new menu allows you to set the line length, left margin, number of lines per page, number of lines to print per page, and top margin. It even asks you if you want to pause after each page. Page numbering along with headers and footers are still missing. But any way you look at it, it's one heck of an improvement from the 100 version that only gives you line length as an option.

All printed output from the 200, just like the 100, has as a line terminator a carriage return only. No line feed character is ever sent since all Radio Shack printers expect to receive only carriage return without a line feed. This feature eliminates a number of good printers that are available from non Radio Shack sources. It didn't take very long, however, for someone to figure out a small patch-type program that would fix this problem on the 100.

The program to do it was put on CompuServe's Special Interest Group (SIG) bulletin board in a matter of weeks after the Model 100 was introduced. It probably won't take long for someone to figure out how to do the same thing on the 200, too.

TELECOMMUNICATING. The communications program which is included with the 200 is called Telcom. It, too, is very similar to the earlier 100 version. The Telcom instruction manual is a separate book and goes into great detail about information services and ways to access them. This information should help first time users understand what services such as Dow Jones, The Source, and CompuServe are. It also explains that communications networks such as Tymenet and Telenet are separate services used to connect to the information providers.

The manual is quite thorough and contains very explicit instructions for connecting to Dow Jones and Compu-

continued on page 71

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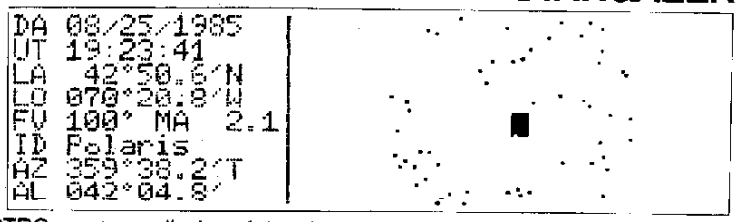

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continued from page 57

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By DON SIDER

The old correspondent's bag of tricks continues to get smaller and lighter. For years I climbed aboard airplanes chasing *Time* magazine stories around the world, with a Hermes Rocket hanging from one arm. It was the smallest, lightest typewriter available. Looking back, it was huge and it weighed a ton.

A year ago, the NEC 8201 came into my life. The most liberating, most exciting professional tool I'd ever used. About a third smaller and a third lighter than the Rocket, it fit easily into my briefcase. It became my constant companion, too small, too light to leave behind.

Then came the InTouch internal modem, replacing my Volksmodem. One less item to tote, one less connection to make. And now comes Sidecar, the memory module from Purple Computing. Suddenly the NEC has 192K of RAM. 192K! No more need to save to tape on the road; the bulky data recorder stays at home.

POWERFULLY SMALL. Aside from all the power it packs in a small space, the most unusual thing about Sidecar is its ordinariness. It requires no special effort to use, no special skill. You just plug it into the NEC's expansion slot, and it becomes bank 3, as accessible and workable as the other two banks.

Sidecar looks and feels like part of the NEC. It is the same color and shape; there is nothing foreign about it as it clings to the left side of the computer. It's small (2.25 inches wide by 2.5 inches high by 8.5 inches long) and light (11 ounces plus its two AA batteries). It tucks into a corner of the briefcase and could get lost in the socks pocket of your suitcase. You don't know it's there until you need it.

It comes with one to four banks of 32K each. You can start small and add to RAM as you go — though it seems to me that anyone wanting to expand the NEC's built-in 64K would go all the way with 128K of added memory muscle.

BANK ON IT. Prices quoted by manufacturer Purple Computing are $349 for the 32K model, $145 for the user-installable second bank and $175 each for user-installable third and fourth banks. The whole 128K package, installed and tested at the factory, is $799.

You switch Sidecar banks (they are labeled "A" through "D") with a small toggle on the top of the unit. The instructions say you are permitted to jump from one Sidecar bank to another any time your NEC is not in bank 3, such as when the Sidecar is not engaged.

Though they don't say what damage could be done if you jumped from "A" to "B" while in bank 3, and anyone should have enough sense not to break that rule, I wonder if a lockout on the toggle would be practical to make sure no one tries it. (This may be the only place the instructions fail to tell you more than you need to know. They are written clearly and engagingly for the novice, and with sufficient detail to please the hacker.

The four banks-within-a-bank are well-marked on the menu, so there should be no confusion as to where you are — though it might pay to keep an index on paper or in bank 1 to remind you where you stashed a file, to save rummaging through six separate menus to find it.

AS ONE WITH THE NEC. I banged on the Sidecar as hard as I could for a week. Wrote files into each of its banks; copied files and programs to and from them, to and from the NEC's internal banks 1 and 2; uploaded to and downloaded from Telemail; plugged into Dow Jones News/Retrieval and The Source through Telcom. I wrote and transmitted this review via Sidecar Bank "D." Everything has been, as the astronauts put it, nominal.

The Sidecar works, just as the NEC's built-in memory works. You never notice a difference. Which is just as you want it to be. ◀

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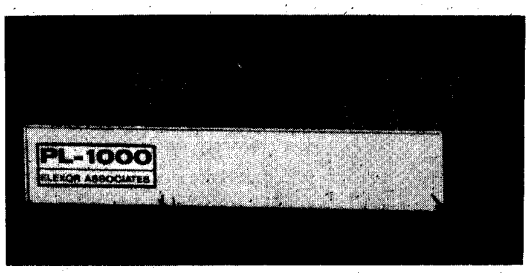

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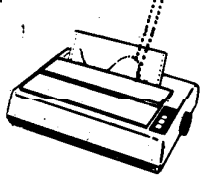

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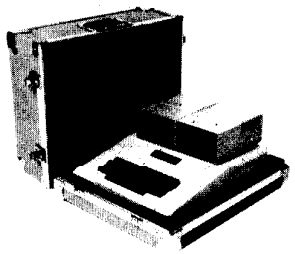

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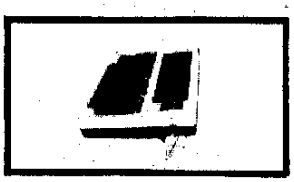

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By WOODY LISWOOD

PortaPac is one of those items that defies categorization. You might call it a portable battery-powered RAM disk. It might be called external memory storage. It also could be called another method of getting your data from the 100 to some other computer. By any name, PortaPac does all these things.

It arrives as a narrow flat box: 1.75 inches tall by 5.88 inches wide by 9.9 inches long. It weighs 3.75 pounds. The front has a few lights and a push button. The back has a DB-25 RS232C connector, a set of dip switches, and a pin for an AC power adapter and battery charger. The instructions say to charge it for 24 hours before using.

CASSETTELESS. PortaPac loads a Basic program into your 100's memory. You set all the dip switches down and go to TELCOM and use Stat to set 97O1E. You connect straight through the RS232 cable with male DB-25s on each end.

Press function key 4 to go to TELCOM's terminal mode. Press the reset button on the front of the PortaPac 100. A ROM in the PortaPac loads a header into the Model 100.

Type B and press enter. Press F2 (receive a file in TELCOM) and say PDOS.DO. Enter again. Now press control-B. A program will download from the PortaPac. When done, press key F8 to return to the main menu.

Enter BASIC. Load PDOS.DO then save PDOS.BA. Kill PDOS.DO. Now you have loaded a small file allowing you to reach the PortaPac 100 as needed.

That little sequence is quite elegant. It means you don't have to worry about cassettes and memory space. Even if you bomb everything and want to reload from the PortaPac, you can start fresh no matter where you are. It's the next best thing to the Disk+ and Lucid ROMS which go into the ROM slot on the bottom of the 100.

IN USE. The system is simplicity itself to use. Hook up the cables. Put your cursor on PDOS.BA. Press return. Press the reset button on the PortaPac and it automatically sets itself up for the 100 and displays a working menu.

The PortaPac formats itself into 64K logical drives. The first time you use it you must initialize the PortaPac. You would need to format each memory segment separately depending on which version of the PortaPac you purchase. It ranges from 64K to 192K.

GETTING STARTED. F1 initializes the drive you are using. Since I had a 64K Model I only had one logical drive. The documentation implies you will need to press F1 whenever you instruct the PortaPac to address a different drive.

F2 shows you the directory of the PortaPac. It also lists file size.

F3 allows you to rename files.

F4 allows you to erase files from the PortaPac's memory.

LOAD AND SAVE. F5 loads a file from the PortaPac 100 to your 100. It asks for the file name in the PortaPac 100. Then it asks for the file name you wish to have on the 100. It also shows you a directory of the files from your 100. While saving your file, it displays a line count at the bottom right hand of your screen. Then away it goes.

Like other 100 external storage devices, PortaPac will only allow you to save text files. If you wish to save a program file, you must first load it into Basic, then save it as a text or as a document file. Then PortaPac will save it.

F6 saves a file from the 100 to the PortaPac 100. First you tell it the file name you wish to get from the 100. Then you give it a name for the PortaPac 100.

F7 shows you a direct command menu for the PortaPac 100. (We will cover that later in the review.)

THE MENU TREE. F8 goes to another menu tree. In this menu tree:

F1 will format the logical disk for your PortaPac 100.

F2 will initialize the PortaPac 100 to IBM protocol. You also can use the PortaPac to upload files to the IBM PC (or compatibles). You save from the 100 to the PortaPac. Then hook the PortaPac to your other computer. Then download from the PortaPac. The only problem is that you will need an intelligent terminal program on the Micro computer end to capture the data which the PortaPac is going to send. The RAM-based program you downloaded to the 100 will only work for the 100, the NEC 8201A, and the Olivetti M-10.

F3 initializes to Tandy protocol. You don't ever need to use this since the auto boot program sets the PortaPac to 100 protocol automatically.

F6 returns you to the first menu.

F7 shows you the complete direct command menu.

F8 takes you back to the 100 main menu.

USE IN THE FIELD. It works like a dream. I've had no problems with the machine during four weeks of use including two cross-country flights. It has replaced my cassette recorder and tapes in my Kangeroo pouch.

Since I use the 100 primarily as a text machine, the 64K is normally adequate for what I do on planes. If it gets really large, I usually upload to my personal file space on CompuServe or The Source and download to the Compaq at home.

DIRECT COMMANDS. The PortaPac operating system also includes a set of single letter direct commands. These are for something other than the 100 and the function-key menu system:

B - Boot the Model 100 Basic program

D - Display directory of the PortaPac

E - Erase files

F - Format the current RAM disk

H - Show the initial command menu

I - Initialize disk parameters to IBM

L - Load a file to your computer

P - Change the internal parameters

R - Rename files in the PortaPac

S - Save a file from the computer to the PortaPac

T - Initialize the Model 100 protocol

/ - Change to a different drive in the PortaPac.

DOCUMENTATION. In working with the PortaPac for this review I received three letters and one chip from Cryptronics as they made changes and modifications. In each letter was a new documentation booklet. The last one received was 37 pages long.

Much space is spent covering the technical discussions about the parameter changes you might want to make if you use the PortaPac with something other than the 100.

I found that for the 100, you really needed no documentation other than the first set of instructions to load the Basic boot program from the PortaPac to the 100. After that you just run the program, press the button, and follow the menu instructions. It couldn't be simpler to use.

TECHNOLOGY. Although the PortaPac contains a built-in lead-acid battery, its useful life away from a charger is limited to about 20 hours. You need to keep it plugged in with the accompanied AC adapter.

I use it on batteries only when I need to save something on a plane. When I arrive, I plug it in until I need to leave.

At home I keep it charged. Otherwise, in what the PortaPac calls hybernation mode, you stand the chance of losing your battery charge and eventually your data.

On the other hand, the PortaPac is a terrific solution to the problems of traveling and ease of use of the 100. If you despise cassette recorders, as I do, then this becomes a welcome addition to your system. (Remember that I always upload to a Compaq and don't use the 100 as a primary working machine.)

RECOMMENDATION. If you need to transfer files between different computers and the 100, this is a very elegant solution. If you need to have extra RAM through the RS232 port, this also is an excellent solution.

If the 100 is your only computer, then PortaPac is an extra RAM memory for you to use between bouts with your cassette recorder. It won't replace the need for long term permanent storage, however, nor will it solve the problem of taking a multitude of programs with you if you use more than the built-in functions of the 100.

The PortaPac works, is easy to use, and most important, solves those problems it says it will. ◀

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NEW PRODUCTS

EDITED BY NANCY LAITE

Guess we'll have to wait a little longer for the release of the ***TRS-80 MODEL 200***. There were some who thought Radio Shack would do the 200's splashdown at this year's Comdex ... no dice.

A new portable did come out of Comdex '84 though. ***NEC*** debuted its ***STARLET PC8400***, a 4.7 pound CP/M portable with lots built-in: Telecommunications and Personal Filer (two programs written by NEC). 300-baud modem, 64K RAM, 32K RAM disk WordStar and a spreadsheet to go, all for under $1000.

A NEC spokesperson said, "Starlet's in addition to other NEC products and not to replace the 8201. Being manufactured in Japan, it'll be sold solely in America."

"The 80-by-16-line LCD, CP/M operating system, and built-in software will put NEC in a different marketplace, one different from such portables as the 100 and Olivetti. The PC8400 will be closer to Epson's PX-8."

SOUNDSIGHT of Hollywood, CA, continues to experience delays in producing its ***128K BUBBLE MEMORY MODULE***. The firm told *Portable 100* it would have its "virtual" software ready for the bubble by November 11. That date came and went without a sign of the software allowing the 100 to treat the bubble memory as RAM.

The new software, ***SERAM*** (for Sequential RAM) will sell for between $200 and $300.

Fred Howe, executive director of Soundsight, told us the software won't be out until after the first of the year.

When *Portable 100* talked to Howe, he reported the bubble is presently expandable only to 512K. "When INTEL releases their four megabit chip by year end, this will enable the bubble to expand to two megabytes."

HOLMES ENGINEERING'S CHIPMUNK was snared by the FCC, delaying shipment of the disk drive by two weeks. According to Bob Willard of Holmes Engineering, in October the federal agency issued a new ruling: All manufacturers of Class B computer products using radio frequencies have to be certified by the FCC before shipping. Prior to this, production units could be shipped pending final notification of compliance. Now the government label must be affixed first.

Willard said Holmes Engineering has no doubt the Chipmunk will comply, but to get the units out faster, the company's shipping them to consumers without FCC approval but with a statement to that effect.

"The FCC needs to update its standards to take into account the specialties of lap portables. Standards now are for desktops; lap portables present a unique set of problems with their potential for inteference with radio and television," commented Willard.

It's come to our attention that ***TARGET SYSTEMS*** of Pacific Grove, CA, is no longer in business. We had been awaiting a review copy of ***NEWSPRINT***, one of the company's formatting softwares and called to find out its status.

Gary Bailey informed *Portable 100* it was no longer available. Publication of any of Target's software "wasn't worth it anymore" due to the high cost of shipping and production.

This month marks the release of a portable robotic three-color plotter from ***AMERICAN MICRO PRODUCTS INC.***. Richardson, TX. Only 3.5 pounds, ***PENMAN*** hails originally from England. Priced at $395, the hardware comes with free custom software for the 100.

Robert Judy of ***SWINDELL JUDY INC.*** has promised to send us one of his ***MAGIC MOUSE*** packages. We'd hoped to receive a unit by this issue but some last minute changes made by Judy's system people to improve the five mouse utility program has caused a delay.

But, Judy said, "the hardware is complete, as is the software kernel." *Portable 100* should know more by next month.

And for those of you into gadgets, a ***COMPUTER VACUUM*** is available from ***THE PINE CONE***, Gilroy, CA.

Mini-Vac is lightweight and portable and sells for just under $30. Its two interchangeable wands suck up dust from those nice dirt collectors between your computer keys. Joseph Blake of The Pine Cone said Mini-Vac is also great for camera and stereo equipment, typewriters, and car cleaning.

Another fun accessory is ***PORTA-STAND*** from ***PORTAPRO*** of Denver, CO. Portable and compact, it makes screen viewing and typing easier. In a world of expensive paraphernalia, this computer aid has an attractive price of $12.95.

This time of year always brings out the New Year's Resolutions. On my list, beneath the vow to get up early and be more patient with the kids, is to find more time to read. There's a couple of newly published computer books I hope to get to.

SIXTY BUSINESS APPLICATIONS PROGRAMS FOR THE TRS-80 MODEL 100 COMPUTER by *Portable 100* columnist Terry Kepner and Mark Robinson turns the 100 into a mighty fine business tool. Although the $17.95 book doesn't tell you how to avoid typing in all 60 programs, it makes the 100 a workhorse.

Carl Oppedahl's, ***ADVANCED PROGRAMMING FOR THE MODEL 100*** has found a publisher. When the original publishing company was sold, Carl's book got waylaid. Now under ***WEBER SYSTEMS*** of Cleveland, OH, it's due out this spring.

A very detailed book, the author says it's the "only book dealing with something beyond turning the machine on. A thorough guide to the internal workings of the Model 100, the book's invaluable to those who want to learn assembly programming." Two of the subjects covered are disassembled ROM routines and input-output ports. ◀

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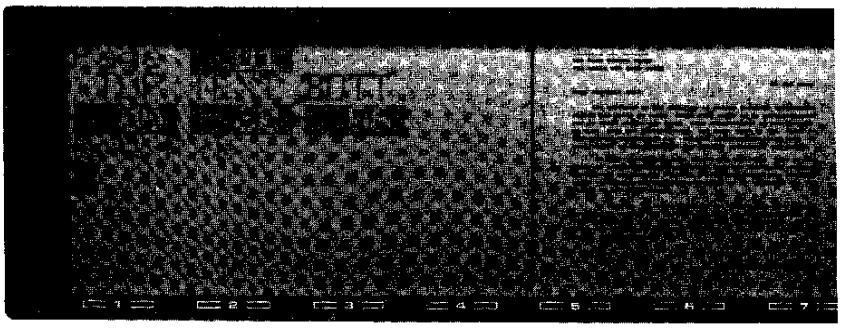

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USER GROUPS

EDITED BY NANCY LAITE

Editor's Note: Portable 100 *wants to keep its readers informed about Model 100 user groups. If you know of a group in your area, let us know about it. Send user-group correspondence to Nancy Laite, User Group Editor, Portable 100 Magazine, Highland Mill, Camden, ME 04843.*

This month we're pleased to welcome two more user groups to the Model 100 fold. Hailing from Irvington, NY, is Portable Computer Message System (PCMS). Almost one year old, PCMS is an on-line bulletin board information service for all battery-powered portable computer users.

Sysop and President Jason Riches told *Portable 100* PCMS "allows users to send and obtain information regarding how and where to get portable computer software, hardware, peripherals, and new products. Free technical assistance and free programs from an ever-changing library also are available.

Riches said originally, members thought PCMS would only interest users in New York, New Jersey, and Connecticut, but maintained the group has received calls from California, Canada, England, and Denmark. "Apparently," Riches surmised, "there are a lot of enthusiasts who don't mind paying for long distance phone calls!"

MIXED BAG. Riches' BBS encourages new members. To access with the 100, set TELCOM stat to M712E,10 and dial 914-693-0293. Use 300 baud only. Interested people can also contact Jason Riches by calling his office, 914-591-6470.

Be aware, however, that PCMS is a mixed bag. The 200-plus paid membership includes other portable users such as NEC, Epson HX-20, and Grid computerists. The $15 membership fee gets you a kit containing a one-year subscription to the group's monthly newsletter, a 6-page users guide, and free access time.

NAVY GROUP. Still in an embryonic stage is a user group at the Naval Postgraduate School in Monterey, CA. The brass at NPS has just issued 90 24K Model 100s to operations research curriculum students.

"A group is bound to come out of this," says civilian professor Jim Eagle. Although the machines belong to NPS, students will be able to use them as long as they're in school.

This "teaching experiment," as Eagle calls it, gives officers a new learning tool and a new way to communicate with the university's mainframe, an IBM 3033. "Already," says Eagle, "software is being developed by the faculty to use in the classroom."

Each student takes an experience tour, generally halfway through his two year stint at NPS. Eagle says each will be strongly urged to take his 100 with him. The purpose is twofold, he explains, "not only will students be able to write with the 100 while on the move, but also be able to download their work to the mainframe from wherever, like a portable terminal."

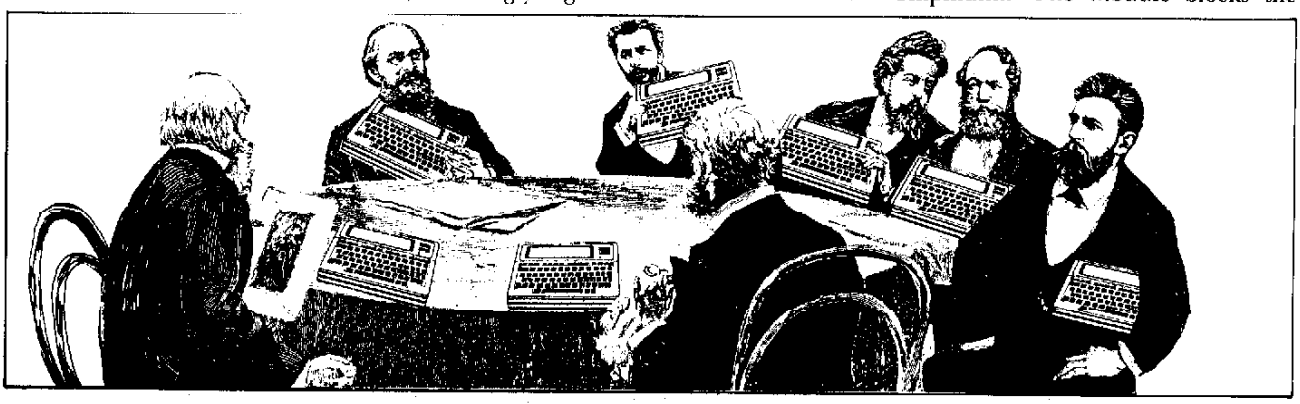
L.A. NO 100 LADY. Phone calls to the West Coast still couldn't uncover a user group in Los Angeles. Although we've talked to plenty of 100 users there, it appears no one has taken the initiative to form a group.

Further North, Danville Tigers leader Bill Templeton says he's tried to encourage his 100 friends in the LA area to start a group, but to no avail. "They're just too spread out down there," he told us.

Too bad the enthusiasm of the Danville Tigers hasn't rubbed off. This active group still holds its monthly meetings, averaging 30 members a meeting, with some driving from Sacramento and San Francisco.

CHIPMUNK. At a recent meeting *Jason*, one of Holmes Engineering's Chipmunk prototypes, was demonstrated. "Everyone liked it, and I'll personally trade in my Bullet for the Chipmunk," Templeton remarked, referring to the Holmes Bullet wafer drive.

Members discovered a dilemma though: How do they use PG Designs' 32K modules simultaneously with the Chipmunk? The module blocks the



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100's expansion bus, the place where the Chipmunk connects to MEWS.

What's down the road? Templeton says, "I'm trying to encourage more meetings on CompuServe, to share with others. If you get on CompuServe people get involved. They get answers to their problems faster. We've found people at Radio Shack aren't very helpful and it's frustrating."

Woody Liswood will be the guest speaker at the Tigers' next meeting to discuss Portable Computer Support Group's Lucid ROM chip. Members should note that meetings will be returning to weekends as opposed to weeknights.

NOVA 100. Nova 100 in the Washington, DC area also is still very much alive and well. Says President Michael Connick of Reston, VA, "The telecommunicating qualities of the 100 are so easy to use, it's very easy to meet only electronically."

But lately, he said, some members are hoping to meet in person, for workshops and speakers. There's talk of having another "super supper," where members have a chance to chat face-to-face.

The number of callers on the Nova 100 BBS has risen to 60 daily. "People are still downloading software," explains Connick about the group's expanding software library.

One program he said he'd share is the sysop operations software he wrote for the Model 100. Although now he runs the BBS on his Victor 9000 in C, originally the 100 was used. Interested sysops can call 703-476-9459 to have this program downloaded.

SPACE USERS. Meanwhile our friend at NASA, Pete Smith, reports a continually growing Telemail software library. In fact when we called, he was doing a trial run on a new fancy print formatter to replace the one the group's been using for over a year.

Apparently, Smith says, a bug has been found in the print formatter, Newsprint. Written by Ed Juge in April 1983, something's wrong with the program's title function.

NASA boasts over two hundred Model 100s in its agency. The reason, Smith explains, is "because this office has people who travel a lot. The 100 allows them to download via Telemail while on the road."

PHILLY DEAD. Unfortunately, we have to report the demise of Philly 100. Founder and President Richard Ross attributed the group's death to "a lack of interest in keeping it going" and so are "no longer meeting."

RICHMOND, VA. But in Richmond, VA, the local user group is well into its second year. At the last meeting, members gathered at President Bob Ripley's home to tackle print using. "The 100 user's manual very poorly covers this," Ripley told us, "so we used David Liens' *TRS-80 Model 100 Portable Computer* as a reference and jumped in."

Although the majority of user groups seem to meet electronically, Ripley reports his group likes the way they meet. "Everyone can ask more detailed questions and swap programs more easily in person."

January's meeting will feature fellow member C.B. Williams, a representative for AT&T. The topic will be assembly-language programming. ◀

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44	1	A & J	63	22	Elexor	7	41	P.C.S.G.
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3	3	Alpine Data Systems	62	24	Hedelund	CII	42	Purple Computing
39	4	American Micro Products	44	25	IRD	60	43	Purple Computing
62	5	American Micro Products	45	26	Kangaroo	1	44	Quasatronics
21	7	ARMS	69	27	Key Solutions	15	45	Radio Shack
24	8	Axonix	55	28	KJM Development	37	46	Radio Shack
23	9	Buddy Systems	62	29	Loquor	32	47	SIGEA
63	10	Cabbage Cases	55	30	Menlo Systems	29	48	Southworth
62	6	Canada	49	31	Micro Demon	11	49	Statware
55	11	Chattanooga Choo Choo	57	32	Micro Help	46	50	Survey Software
65	12	Chattanooga Systems	46	33	Micro Peripheral Corp.	20	51	Swindell Judy
67	13	Covington	43	34	Node	47	52	Swindell Judy
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53	15	Cryptronics	CIII	36	PG Design	63	54	Swindell Judy
16	16	CompuServe	56	37	PG Design	64	55	Tobias
61	17	Custom Software	25	38	Polar	10	56	Touchbase
27	18	DataPort	52	39	Polar	58	57	Traveling Software
42	19	Delker Electronics	42	40	PORTAPRO	CIV	58	Traveling Software
45	20	DFW Computer Center	5	41	P.C.S.G.	41	59	Waite Group
31	21	Diskus Products	6	41	P.C.S.G.	64	60	Wagoner

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continued from page 61

Serve as well as to other systems. The draft I reviewed didn't go into much detail on connecting to other personal computers, but Radio Shack executives said additional information would be included in the final manual.

Running Telcom brings up a screen which shows the settings for the serial communications channel, a prompt indicating you're in Telcom, and labels the function keys. The communications settings now include four extra parameters. The only functions assigned which are different from the Model 100 version are:

Stat — allows altering of the communications settings. You have the capability to set various word length, parity, number of stop bits, enable or disable X-ON/X-OFF flow control, even mask unwanted control characters, and add or strip line feeds at the end of each received line. These last two features were missing from the version in the 100 and are a welcome addition. Originate or answer and tone or pulse dialing also are selectable through software control, another change from the 100 version.

Brk — causes a break sequence of 250 ms to be sent. Just as a control-C character is sent to services such as CompuServe to signal for attention, a break sequence is sent to quite a number of mainframes to signal attention or to disconnect. The 100 didn't allow this signal and was unusable with quite a few mainframe systems.

LIST MANAGER. The 200 has one mini data-base manager and it's called the List Manager. The List Manager is the core program executed by the Schedl, Addrss, and Text programs. Both Schedl and Addrss preset the text file that is to be used to the name of a specific file. A number of 100 owners said they wanted to be able to use the Schedl program with any text file. Their goal was to be able to create a number of smaller, specialized lists that could be used to contain specific information. That capability is included with the 200.

Text has the F4 key assigned to LIST and selecting it will cause the mini data-base program to be executed. The data file it will use will be the current file being accessed by the Text program. Another nice touch. The owner's manual gives a pretty good explanation of this as well as the Schedl and Addrss programs and several samples are included. Schedl and Addrss program functioning is identical to the same programs in the 100 with one exception: F4 is marked EDIT and causes the Text program to be entered with the appropriate file, all ready to add or change information. When you enter Text this way, pressing F4 again will return you to the program it was entered from. This way, you don't have to be jumping back and forth to the main menu to add or update the information file that's being used.

PORTABLE MULTIPLAN. The last program included with the 200 is Msplan. Yes, a portable-sized Multiplan, and it's impressive.

As a test, I took several medium-sized spreadsheets in a Model 4 and created a special type of file called SYLK (SYmbolic LinK). This means that Multiplan examines the spreadsheet and creates a text file with all the necessary information for it to be sent to another computer. Then, using Vidtex on the Model 4 and Telcom on the 200, I loaded in the SYLK files of the spreadsheets. Once in Msplan I simply loaded the SYLK and presto. They all worked.

I'm truly impressed that such a small portable could have an almost complete implementation of Multiplan already installed. Now you can carry your spreadsheets around just about anywhere you like. That feature alone ought to excite more than a few who yawned at the Model 100.

FUNCTION KEYS. Since this is a portable implementation, the limitations are 63 columns by 99 rows. Believe me, that's pretty hefty and bigger than anything I loaded in. If you're familiar with Multiplan, about the only change you'll have to get used to is using an equal sign when entering formulas. Everything else is the same, from named data references to a full-featured set of intrinsic commands.

The function keys provide the capability to:

- Edit — lets you edit the contents of a cell.
- Blnk — replaces the contents of specified cells with blanks.
- Copy — duplicates the contents of a cell or group of cells. Secondary options are right, down, and from.
- Form — changes the display format or width of one or more cells. Secondary options are cell and width.
- Name — assigns a name which can be used to identify one or more cells in a command or formula.
- Opt — selects various options including automatic or manual recalculation and mute or beep on errors.
- Tran — loads a worksheet into memory, saves active worksheet to cassette or disk, clears the current worksheet or moves the cell pointer. Secondary options are load, save, clear, and goto.
- Exit — exits Multiplan and saves the active worksheet to RAM.

COMMAND KEYS. Three command keys are also in Multiplan:

- PASTE — inserts rows or columns in the worksheet before the specified cell.
- PRINT — prints the current window as displayed on the LCD screen.
- <SHIFT>+PRINT — prints all or a portion of the active worksheet.

Don't think this is just a minature version of the real Multiplan. Except for multiple windows and iterative calculations, this is the real McCoy and, boy, is it nice!

MICROSOFT VARIATION. The version of Microsoft Basic which is included remains unchanged from that of the earlier Model 100 except for one command extension. To test this I logged onto CompuServe and went to the Model 100 SIG data base of programs. These programs have been written by users of CIS and the SIG and most have been contributed to public domain. This large wealth of programs is available free or nearly so since you have only to pay for the CIS connect time.

I used the Telcom download function to retrieve 15 different programs. The only criteria I used was that a program couldn't contain any Poke or Call commands since the 200 ROMs are different from the 100 ROM. Every program, functioned perfectly.

Going one step further, I opened my drawer full of Model 100 cassette programs. Again, a random sampling of programs was made with the same criteria — except I gave up after 10 programs. The results? Same. Perfect operation.

POWER AUTO-EXECUTE. The power command has been extended and when used will set an internal alarm that will cause the 200 to power on and execute a Basic program at the specified time. As mentioned earlier, this has some nice potential for control or monitoring applications as well as for sending information to a remote computer system late at night unattended. The syntax used for this new extension is POWER "time"."date"."program.BA".

As an example, to get a program called Test to execute on February 28th, 1985 at 9 a.m., the entry in Basic would be POWER "09:00:00"."02/28/85"."TEST.BA".

This new option can run only one program which must be located in RAM Bank 1 and only one Power Auto Execute can be set at any time. The Power Auto Execute can be set or reset while in any RAM bank. If the target program is not found, RAM Bank 1 main menu will be displayed, and, if no target program is specified, Basic will be entered with RAM Bank 1 active.

To illustrate the thought that Microsoft and Radio Shack gave to this feature, you have to consider the possibility that the 200 is busy running an other program when the Power Auto Execute occurs. It's very rude of your computer to suddenly terminate a program you're using.

Relax. That's not the way it happens. Should it become time for a Power Auto Execute sequence, the 200 will begin beeping, three beeps per second for five seconds. If you want to see what all the fuss is about, press the CTRL and LABEL keys and you'll see the prompt "It's time to run TEST.BA" displayed in reverse lettering on the last line of the LCD. You can cancel this message by pressing any key. If you want to let the system run TEST.BA, you must exit back to the main menu and from there the 200 will take over.

BOTTOM LINE. The 200 is an excellent portable computer and provides a lot of power for each dollar spent. As reviewed, it does have some shortcomings. All documentation I received was at the semi-final draft stage.

Conversations with Stu Weinstock, buyer for the Tandy 200, brought prompt reassurances that the errors I found had been identified and are in the process of correction for the final versions of the manual.

I'd hoped that a renumber capability would have been added, but no commands could be added without destroying compatibility with Model 100 Basic programs saved on cassette. Hopefully someone will create a short machine-language utility that'll perform true program renumbering.

The limitation of 24K RAM will seem formidable, but I can't think of the last time I had a single program which required more than that amount. It's going to be nice for text files, because I can type up a blue streak, and 24K disappears almost like magic. Now, I have the capability of switching to one of two more banks with a total storage capability of 72K. Well, almost. Approximately 4906 bytes are consumed in each bank for system overhead. Still, 19,670 is a lot of programming room and three times that is 59,010 — more room anyway you look at it.

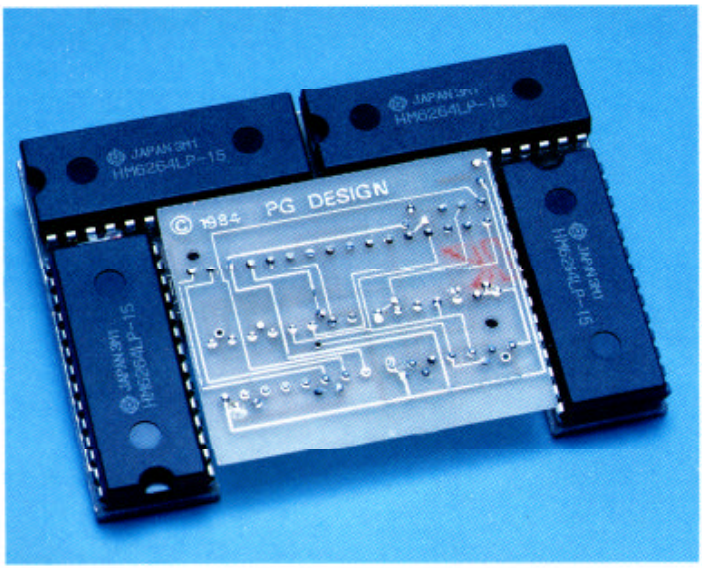
The Text program still doesn't have page numbers, header/footers, or, most importantly, search and replace. Basic doesn't have nice functions like HEX$ or renumber capability, but I can certainly live without those.

The size is right. The weight is right. It has just the right mix of features and capabilities for me. I'm willing to wager that for quite a number of people who are in the market for a good portable computer, the Tandy 200 is going to fit them like a glove. ◀

MODEL 200 SPECIFICATIONS

CPU	80C85
Clock speed	2.4576 Mhz
Memory Configuration	24K RAM (standard), expandable to 72K 72K ROM (standard), expandable to 104K
Display	Liquid Crystal, 16 lines of 40 characters each in 6x8 matrix. Total 240 x 128 dots.
Keyboard	Standard IBM type layout 72 keys 12 Function/command keys
	Interfaces 1500 baud cassette
	RS-232 (EIA standard) Baud: 75, 110, 300, 600, 1200, 2400, 4800, 9600, 19200 Parity: None, Odd, Even, Ignore Stop bits: 1 or 2 Data Word: 6, 7, 8 bits
	Radio Shack Parallel Printer (Centronics compatible)
	Bar Code Reader (HP HEDS 3000/3050 compatible)
	300 baud auto-dial direct connect modem Baud: 300 Tone Pairs: Originate or Answer, Bell 103 std. Data Word: 6, 7, 8 bits Parity: None, Odd, Even, Ignore Stop bits: 1 or 2 Dial Type: DTMF tone or pulse (10 or 20 pps)
	40 pin system expansion bus
Power	4 "AA" alkaline or Nickle-Cadmium batteries 6 VDC through optional AC adapter
Operating time	15 hours with "AA" batteries, 5 hours with Ni-Cad
Memory backup	24K RAM approx. 15 days 72K RAM approx. 5 days
Dimensions	11.75 x 8.5 x 2.25 (w, d, h)
Weight	4.5 lbs

32K RAM CHIPS FOR YOUR MODEL 100



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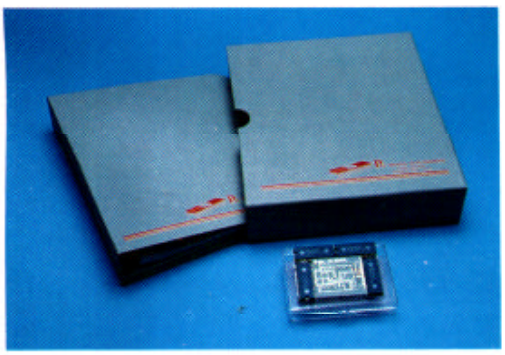

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